PFAFF

Docu-Seam-System

User's guide

For Software version
79-001 400-11/...

296-12-18 460/002
Benutzerhandbuch engl. 10.01

PFAFF Industrie Maschinen GmbH

Postfach 3020
D-67653 Kaiserslautern

Königstr. 154
D-67655 Kaiserslautern

Editing / Illustrations
PFAFF
Dept. TES

Contents ..... Chapter - Page

Contents ..... Chapter - Page

1 Proper use

The PFAFF Docu-seam system is a supplementary quality assurance device, with which safety-oriented seams can be observed and documented during the sewing process.
Process parameters are aquired online by a measurement device during stitch formation, data are analyzed and documented.
The result ist a good/bad information about the sewn seam strength. On a seam file all important process parameters are stored automatically.
Simultaneous to this operation a label is printed including these data in clear text and barcode.
This label is sewn into the seam and makes retraceability possible for each seam.

Any use which is unauthorized by the manufacturer is regarded as contrary to the instructions! The manufacturer does not accept responsibility for any damage caused by improper use! Using the device according to the instructions also involves compliance with all operating measures provided by the manufacturer!

2 Installation

The following described installations may only be executed by adequately specialist personnell! The danger and safety instructions on the machine itself are to be followed!

2.01 System requirements

Hardware

- PC with Pentium processor, 800 MHz or higher, Disk drive
- 2 ISA slots, Standard hard disk, min. 64 MB RAM
- min. 14" color monitor, Microsoft-compatible mouse, CD-ROM drive

Software

- Microsoft WINDOWS 98®
- Control panel settings:
  High Color 16 bit, Screen: 640 x 480

WINDOWS 98® is a registered trademark of MICROSOFT CORPORATION, USA

2.02 Installation of driver software NI-DAQ for WINDOWS

Attention: The NI-board... must be removed from the PC !!

In the delivered condition, the following installations have already been carried out and must only be done for a new configuration.
After the PC is switched on, the Docu-seam program is started automatically.

Depending on the driver version the CD starts automatically or must be called manually. The CD drive could be D:

Manual calling or CD starts automatically

- Start, Run, Browse, click on symbol **My Computer**
- Click on the CD drive
- Open **NI-daq... (D:)** with double click
- Directory of the CD is listed
- Open **Setup.exe** with double click ===> D:\setup.exe, OK
- Open **Install NI-DAQ** with double click
- **NI-DAQ driver files, Next**
- Select Destination Directory **C:\NI-DAQ, Next**
- **Select Group** is indicated, **Next**
- **Ready to install, Next**, file is installed
- **Install, OK**, Shut down PC, Restart
- **Shut down PC**

2.03 NI-DAQ Hardware Configuration

- Remove plug from the mains, plug in NI-board..., connect the flat wire
- Connect plug to the mains, Start the PC, **My Computer, Control Panel, Add New Hardware**
- **Add New Hardware Wizard, Next, Next**, Search for your **New Hardware**, Yes, Next
- Next, Detection progress is running, **Next**, Hardwaretypes are listed
- **Select Data Acquisition Devices, Next**
- Models are listed: **Select , Next**
- Resourcetype and Settings are listed, **Next**
- **Finish**, Shut down PC
- Start WINDOWS
- **My Computer**, Control Panel, System, System Properties
  Select Device Manager
- Open **Data Acquisition Devices**, Open NI-board...
- NI-board... Properties: Select **Resources**, if necessary change settings
  and select new value
- I/0 range 0260-027 F, interrupt 05, DMA 03, OK, **close**
- Shut Down WINDOWS, Start PC
- Go to **Start, Programs**, National Instruments DAQ, **NI-DAQ Configuration Utility**
- Correct configuration is indicated, **Next**
- **Configuration, OK**
- File, **Save**, Exit

Handling conflict warnings

- If there is an interrupt conflict a new interrupt number must be set by a jumper on the NI-board..., see User Manual.
- Similar to this set the DMA channel, see Lab-PC + User Manual page 2-6, and the I/O range, see User Manual.

An indicated interrupt conflict leads to a failure during data aquisition and indication, for example using the Monitor function.

Example

- Conflict: ECP-printer (LPT1), **OK**
- Conflict warning, Yes ===> Ressource setting
- Device conflict: DMA03 used by: ECP-printer (LPT1), OK
- Shut down WINDOWS, start WINDOWS, My Computer, **Control Panel, System**
- **Device Manager, Conflicting device!** Select ECP-printer
- **Resources**, manual configuration
- ECP-printer (LPT1) set on DMA1, no conflicting device
- **OK**, close
- **Start, programs, National Instrument DAQ, NI-DAQ Configuration Utility**
- Correct configuration is indicated, Next
- **Configure, OK**
- File, **Save**, Exit

2.04 Install Docu-Seam-Program from CD

- **Start**, Run, Browse, **My Computer**, select CD drive
- PFAFF directory is listed
- Open **PFAFF**, select **Pfaffsetup**.bat, Open, **OK**
- Program is installed on drive C:
- **Start, Programs, WINDOWS Explorer**
- Open directory **PFAFF**, select small screen
- Click on Icon DS11-... and drag and drop to desktop screen
- Close Explorer, Arrange Icons
- Install PFAFF Icon: click on with right mouse key, Pop up menu is opened
- **Properties, Change Icon**, Browse
- In directory PFAFF double click on **PFAFF.ico, OK**
- **Apply, Close**
- Start Docu-Seam-Program
- If taskbar appears on the screen do the following operation:
- Close the program using keys **F1** and **F12**
- **Start, Settings**, select **Taskbar & Start Menu**,
- deactivate **Always on top**, activate **Auto hide**
- **Apply, OK**
- Restart the Docu-Seam-Program from WINDOWS

2.05 Linking the Docu-Seam-Program to Startup

- Click on **Start** with the right mouse key
- Click on Open, **Programs, Startup**
- Press Ctrl key and drag and drop the **PFAFF Icon** to **Startup** using the left mouse key, Close, shut down PC, OK
- After Restart the Docu-Seam-Program is loaded and started automatically

The screen has to indicate the following 4 PFAFF icons:
DS-Config.exe, DS-Setup.exe, DS-Label-Copy.exe and DS11-...exe

2.06 Locking the WINDOWS function key

2.06.01 In WIN 98

- **My Computer**, Control Panel, System, **Device Manager**
- Open directory **keyboard**, Standard (101/102-key) or Microsoft Natural Keyboard is indicated, **OK**
- **Add New Hardware**, **Next, Next**, No, the device is not listed, **Next**
- **No**, Select Hardware types, **Next**
- Hardware types: click on keyboard
- Models: Select **Olivetti-keyboard (102-key), Next**
- If conflict warning, **Next**, **Finish**
- **Properties of, General**, deactivate device user
- Click on **Activate device, Restart** PC, Yes
- The WINDOWS key is now locked in Docu-Seam-Program

2.06.02 In WIN 95

- **My Computer**, Control Panel, Keyboard, **General**
- Keyboard type is listed, **Change**, activate **Show all devices**
- Models: Select **Olivetti-keyboard (102-key), OK, Close**
- **Restart** your computer now, **Yes**

2.07 Shut Down Windows, automatically

This feature can be locked or unlocked in programm **DS-Setup** by opening the **Functions**.
The meaning of the function slider **Auto-Win-Exit** is as follows:

Green: After program stop by pressing **F1** and **F12** Windows will be Shut down automatically.
Nevertheless if you want to jump to the Windows main screen (e.g. configure DS-Setup) press **F1** to stop the Docu program.
After pressing **Alt Esc** the start bar is visible. Clicking on Start, Programs, Windows Explorer, folder PFAFF and DS-Setup, password 1 or 2 must be entered to open the **Functions** and remove the slider **Auto-WIN-Exit** to **Red**.
After clicking on the key **return** you jump back to Setup level 2.
Clicking on the key **Windows** the program DS-Setup is closed and the Windows Explorer is indicated. After closing the Explorer the Docu main screen is displayed again. Now shut down Windows by pressing **F1** and **F12** to read the new setting from **Auto-WIN-Exit** when the system is restarted.

Red: This function is deactivated, means a program stop by pressing **F1** and **F12** switches to the Windows main screen.

2.08 Label Printers

After installation the printers must be selected as default printers!
Do not select WINDOWS-Printmanager!
The PC must be re-booted!

2.08.01 Gemini T Label printer

- Connect the printer as default printer to the parallel interface LPT 1 of the computer.
- Install the driver software under WINDOWS 98 as described in the printer manual

Setting the printer parameters

- Call up the **Gemini** symbol with a double mouse click.
  The **Gemini Control Panel** opens.
- Printer: select **Setup**. **Tharo Gemini** opens.
- Set **Unit** to **mm** and type in **155.0** as **Label Height** (take care of your label size).
- Do not select **Continuous Material**!
- Select **Landscape, X Fast Print**.
- **Label Printing Mode**: Select **Options..., Printer Mode** opens.
- Select **Batch Mode** and set **Presentation Position** on 3.
- Select **Thermal Transfer** and set **Heat Setting** on 5, adapt if necessary.
- Set **Printer Speed 50 mm/sec.** and **Label Offset** on **0.0**.
- Select **OK**, **Tharo Gemini** opens.
- Select **field** and deactivate **Always on Top**.
- Select **field** and close.
- Close **Gemini**.

Loading the barcode

- Call up the symbol **Fonts** in **WINDOWS Control panel.**
- Call up **Add fonts**
- Insert barcode disk and select disk drive ("**A:**").
- Double click **Code 39**.
  A list of fonts is displayed.
- Double click **Codedreineun Plain (True Type)**.
  Font is displayed.
- Close function.

2.09 Network Installation (Instruction for self-installation)

2.09.01 Requirements

- Ethernet standard, IEE 802.3
- NE2000 compatible, WINDOWS 98, PCI-Bus
- Additional: BNC connector for coax cable, T-connector
- End resistor
- Definition:
- PC1 = Client = Docu-PC, access to resource (drive) of PC2
- PC2 = Server = External device, shares resource (drive) for PC 1
- Access to Docu-PC is **not** permitted!

2.09.02 Principle Configuration

Start of Network configuration

- Register card **Configuration, Add, Client, Add**
- Manufacturer: Microsoft, Network Clients: Client for Microsoft Networks, OK

Configuration of Network card

- **Network, Add, Network card, Add**
- Select network driver, for example select **disk**
- Diskdrive (default **A:**) confirm with **OK**, select **Model of network card,** for example select **SN 2000 Ethernet Adapter, OK**

Definition Network protocol

- **Network, Add, Protocol, Add**
- Manufacturer: Microsoft, Network protocol: IPX/SPX compatible protocol

Release resources (disk drive C) of PC2 (server)

- **Network, Add, Service, Add**
- Click **File and Print Sharing** for Microsoft Networks, **OK**
- Click **Network, File** and **Print Sharing**
- Mark both fields, **OK**
- Select **Network, Access control** with Share-level, **OK**

Select work groups and PC identification

- For PC1: **Network, Identification**, input of PC-name **PC1**
- Work group: **Docu-System**, Comment: ***, **OK**
- Same input for **PC2, Restart** the PC

Release drives and folders on PC2

- **My Computer**, select **drive C:**, open with right mouse click the **context menu**, click **Sharing**
- **Sharing As: Share Name** C
- Access Type: **Read-/Write Access, Apply, OK**

Example:

- Open Network Neighbourhood after Network Installation, click **PC2, drive C**, open with right mouse click the context menu.
- New, Folder, New Folder, **Rename, PC1** input
- After clicking on folder **PC1** the complete address is displayed in the task bar: **\\PC2\C\PC1.**
- Configure in PC 1 setup: open **DS-Setup**, password 1 or 2 input.
- In Setup level 2 input of path for seam files: **\\PC2\C\PC1**, then return to WINDOWS.
- If both PCs are connected to a network, seam files are only saved in PC2.
- If PC2 cannot receive data, a short warning is displayed on the screen, data are saved automatically on PC1 (Docu-PC) in path **C:\PFAFF\Seamfile**.
- If no path for seam files was created in setup level 2, seam files are saved automatically in path **C:\PFAFF\Seamfile**.

Depending on the configuration of functions in setup level 2 a network error information can only be reset using password 1 or 2.

2.10 Configuration in Docu software and machine controller

2.10.01 Detection of the docu seam area

The docu seam area can be activated and deactivated by knee switch, fotocell or seam program (see chapter 3.10).

2.10.02 Language selection

Factory settings in program **DS-Config.exe** already select the language. Changing the language here, you have to save the stitch-regulator position for PFAFF 3715-2/.. (see fig. 2-01):

- Doubleclick the icon **DS-Config.exe** to open this program.
- Move the slider with the mouse to the corresponding position.
- Click on the button **Return**. The selected language is saved.

If only the preselected language has to be changed, use the following procedure:

- Open file manager function.
- In "**C:\PFAFF**" open the file "**poti-ref.txt**" with a double click.
  The contents of the file are displayed; the right-hand number group indicates the language:
  0.00 = German
  1.00 = English
  2.00 = French
  3.00 = Spanish
- Enter the appropriate number, close the Editor function and start the docu-seam program.

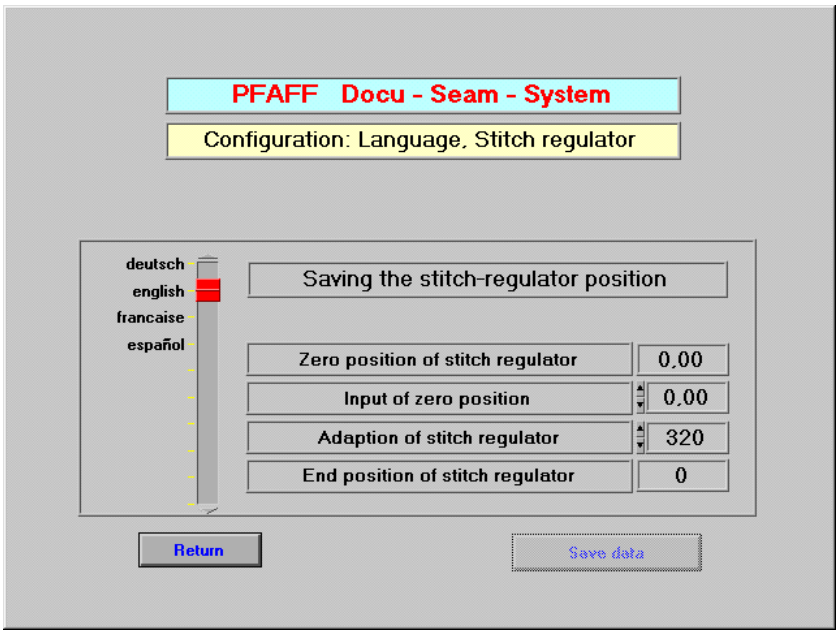


Fig. 2 - 01

2.10.03 Teach in the stitch-regulator position (PFAFF 3715-2/...), see fig. 2 - 01

- Set both adjusting dials for the stitch length to "0".
- Turn the main shaft to take over the mechanical gear position.
- Enter the displayed stitch-regulator position in the field "**zero position of stitch regulator**" into field "**Input of zero position**".
- Press Return key.
- Set both adjusting dials for the stitch length at the maximum position.
- Turn the main shaft to take over the mechanical gear position.
- Change the preset value of 320 in the field "**Adaption of stitch-regulator**" with the mouse using the arrow symbols, so that the "**End position of stitch-regulator**" has the exact value "**100**".
- Press the Return key.
- Clicking on the button **Save data**, the entered values are saved.

For teaching in only a new stitch length open the function **Stitch Edit** on the docu screen, see chapter 3.09.05.
To deactivate this function set the **Adaption of stitch regulator to "0"**.

2.10.04 Service information

- The stitch-regulator potentiometer is installed with a resistance value of 1000 +/- 300 ohm (only **PFAFF 3715-2/..**) using a medium stitch length.
  This is an electric voltage of 1.68V to 3.12V.
- The actual value is the measured value displayed in the right lower corner of the screen **Monitoring stitch-regulator position.** This indication too can be used to find the correct assembly position.
- If the synchroniser is dismantled, exchanged or adjusted, the starting position of the synchroniser must be taught in again (only PFAFF 3715-2/..).
  - In the operating field OC-TOP activate key 10, TE.
  - Select parameter 700 **Needle position 0** on the programming level B (mechanical level).
  - Push pedal forward once.
  - Turn hand-wheel forward and position the tip of the needle **exactly** on the upper edge of the needle plate.
  - Push pedal forward once again.
  - Deactivate key 10, TE.
  - Start sewing procedure.

2.10.05 Parameter/Configuration-Settings

Enter settings on the control panel with display:

PFAFF 3715-1/..	
Configuration	Meaning
9 	Docu-Seam-monitoring: no (Selection slider F2 may be positioned on Test seam, Save, Monitor or Threadforce). In this cofiguration the machine can be used without Docu-Seam-System.
10 	Docu-Seam-monitoring: yes (Selection slider F2 has to be positioned on Docu-Seam). If this condition is not fullfilled, a Watchdog function will block the machine, **a sewing operation is not possible.**

PFAFF 3715-2/..				
Group	Parameter	Meaning	Adjustm. range	Standard setting
2	205	Max. speed in Docu-Seam-Area	100 - 2000	**1500**
	221	Max. speed for sewing program	300 - 6400	**3200**
6	607	Max. speed	100 - 10 000	**3200**
	683 	Docu-seam-monitoring yes / no I = **yes** (selection slider F2 must be positioned on Docu seam) If these conditions are not fullfilled, a watchdog function is blocking the machine, **a sewing operation is not possible.**		**I**
		II = **no** (selection slider F2 must be positioned on Test seam, Save, Monitor or Thread force. The machine can be used completely independent on the Docu-Seam-System		
9	991	WINDOWS-M, default	0 - 239	**217**
	992	WINDOWS-K, default	0 - 239	**85**

Because of process security watch the parameter 683 and Configuration 9 or 10!
For information please see instruction manual of motor manufacturer.

2.10.06 Adjustment of thread force (thread tension)

The configuration must be executed in file Pfaff\DS-INI.txt.
The first character in this file defines the wanted version:

0 without electrical adjustment, mechanical version
1 electrical actuator for adjustment
2 electrical actuator for automatic controller (closed loop) adjustment

The exact function of setting/controlling the thread force is described in chapter 3.06 point 6.

2.11 Scanner Installation

- Looping the scanner via cable into keyboard
- Open **WINDOWS Notepad**
- Read installation codes from scanner manual:

- **Restore Default**
- **Wedge: IBM AT**
- **Nationality: English**
- **Operating Test: 123456** (displayed in Notepad)

- Code selection for code 39 is read from scanner manual:
  1. Read **Enter configuration**
  2. Read **Standard Code 39**
  3. Read **Exit and Save configuration**

3 Operation

3.01 How the Docu-Seam-System works

A sensor inserted in the needle thread course of the sewing machine determines the actually occurring tensile forces on the needle thread (needle thread tension) at every stitch during the sewing process.
The signals from the sensor are then evaluated in the PC via a signal input board and a data acquisition board and are displayed on a monitor on a user interface running under WINDOWS 98. The analysis of these signals provides information about the machine setting and the quality of every individual completed stitch.
The seam area in which the system is to be activated (docu-seam area), is determined by seam program, knee switch or photocell.
The docu-seam system compares the established thread tensile forces with the previously-entered limit values and gives an evaluation of the seam on the monitor.
In the case of a good seam, a label can be issued, if necessary using
a printer, with the relevant signal to the PC interface.
Moreover, the docu-seam system activates a skip stitch detection function and reacts on running out of bobbin thread.
Thread tension is no longer adjusted manually but it is preset by an electrical actuator (setpoint). The closed loop controller always corrects the thread tension (feed back).

In addition, the docu-seam system offers the possibility of continuing to process the data provided with standard spreadsheet programs.

A function for monitoring the number of stitches in the docu-seam area (calculation of the average stitch length) can also be activated.

In conjunction with a PFAFF 3715-2/.. it is possible to monitor the stitch length setting dial (determination of the stitch regulator position).

To increase process security 3 password levels are integrated which permit access on the system and user funcitons.
Using a scanner, data comparison of the sewing process components is possible.
Sewing process data are saved under a significant identification number (printout also on label) or can be used for a network connection.

Recommendation: in Docu-Seam-Area machine speed should not exceed 2000 min^{-1}.

3.02 Password Input, Setup levels

The Docu-Seam-System is protected by 3 setup levels.
To configure these levels you have to run the program **DS-Setup**, started from the WINDOWS platform. Setup level 1 gives the information to make a password input (Fig. 3 - 01).

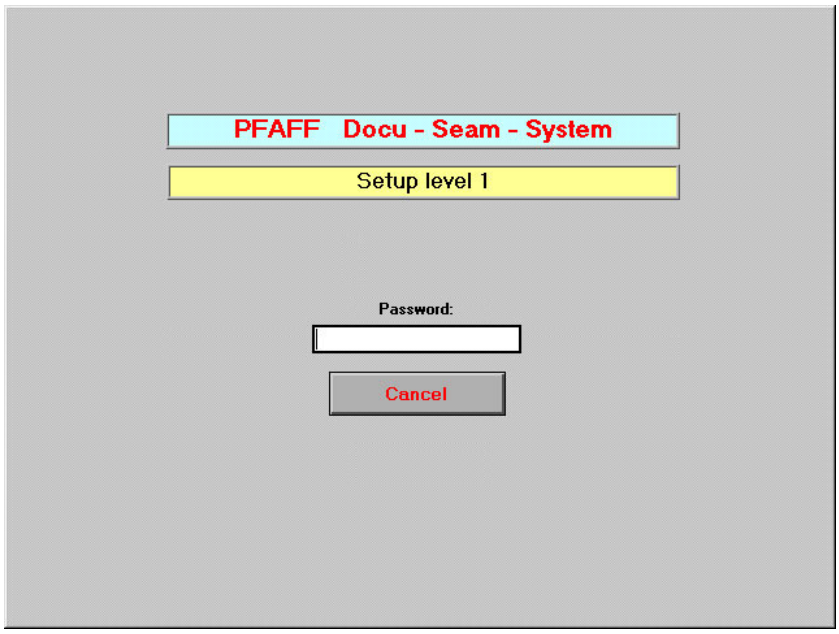


Fig. 3 - 01

Starting up the system for the first time, enter the factory preset password **PFAFF**.
Setup level 2 opens where additional inputs are possible (Fig. 3 - 02).

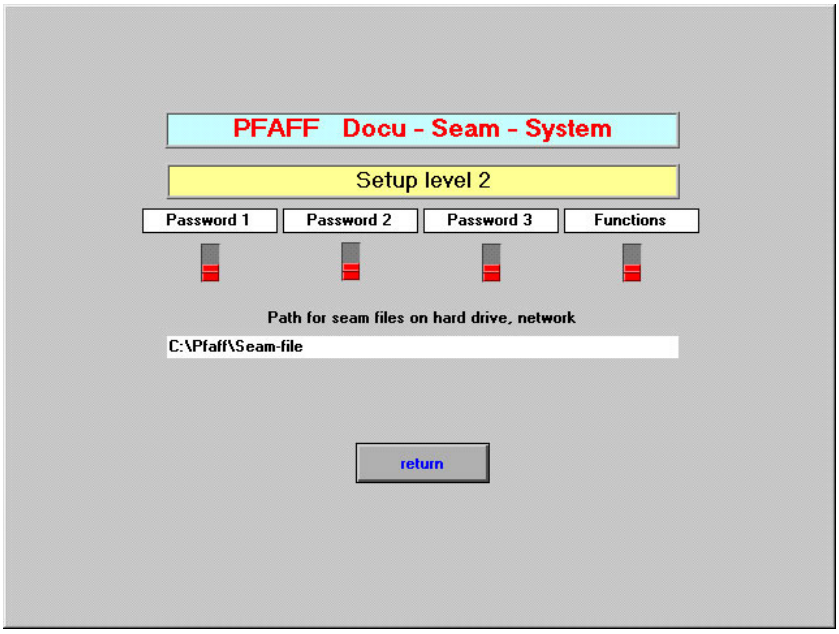


Fig. 3 - 02

Password 1

Clicking on the slider with the left mouse key it is moved up and the window **Password Level 1** opens (Fig. 3 - 03). Password **PFAFF** can be changed into a user password. Using password 1 (highest priority) you get access to all safety areas and only a person, responsible for the whole system, should get this password.

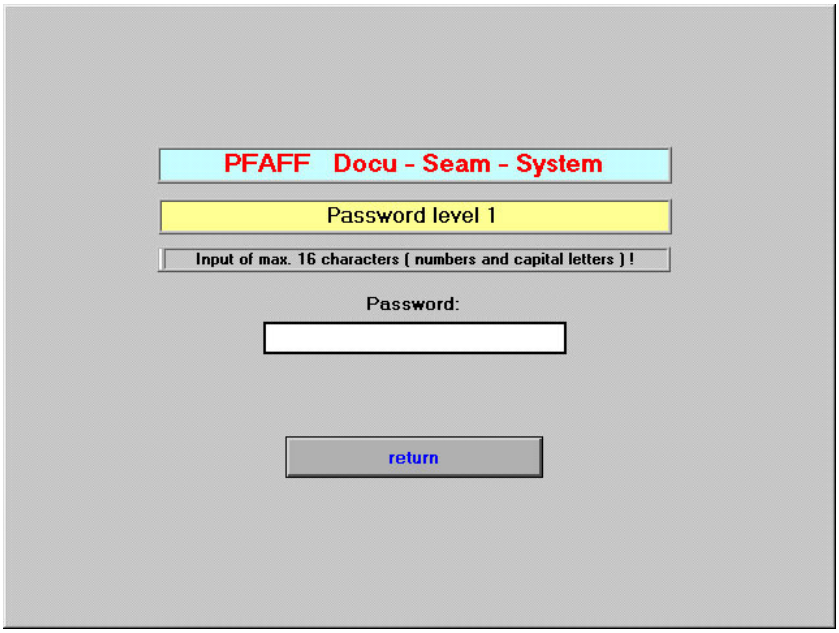


Fig. 3 - 03

Password 2

Opening the window for password 2 in setup level 2, a password list for level 2 (Fig. 3 - 04) is displayed. Up to 5 substitutes of password 1 may be entered. Entering password 2 in setup level 1 there is no access in level 2 for the inputs of password 1 and password 2. The other selections of setup level are released.

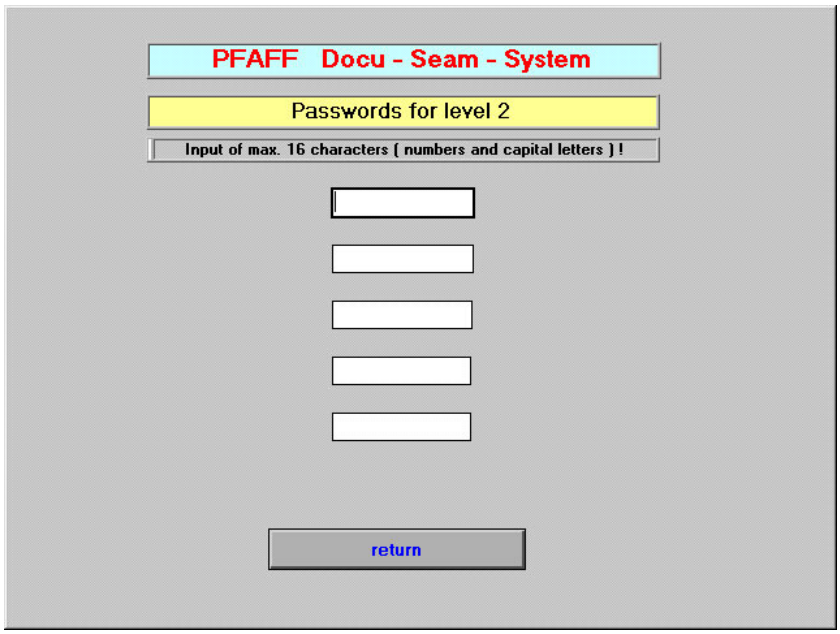


Fig. 3 - 04

Password 3

Opening the window for password 3 in setup level 2, a password list for level 3 (Fig. 3 - 05) is displayed. The user may enter 20x6 characters to get access on the sewing process, for example 2 characters for the operator, 2 characters for the plant-no., 2 characters for the machine-no.

The Status LED field indicates 1 out of 20 passwords according to the actual entered password 3. Now the screen indicates which password number (the hidden password 3) has started the system.

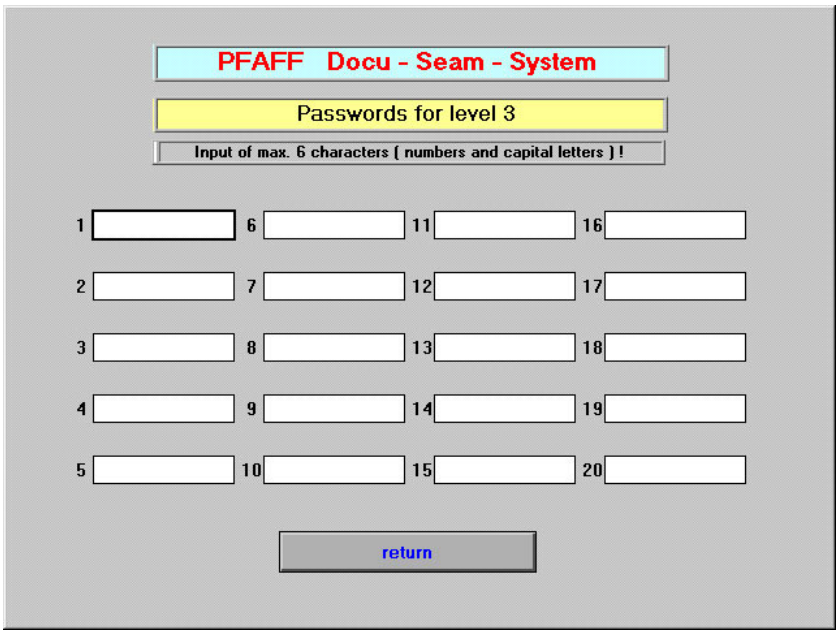


Fig. 3 - 05

3.03 Path for seam files

Enter the path for saving seam files in **Setup level 2** (Fig. 3-02). If no path is entered seam files are saved automatically under **C:\PFAFF\Seamfile** (see also chapter 2.09.02 Configuration, principle).

3.04 Saving docu seam files on floppy disk too

If docu seam files have to be saved not only on hard disk or network but also on a floppy disk, this function can be released or deactivated, see chapter 3.05.

Move the function slider to green, an input field in setup level 2 is indicated (Fig. 3-02) to enter the path/folder for seam files also on floppy disk.

The path A:\Seamfile is preset automatically, may be changed if necessary.

The existing saving procedure on hard disk or network remains independent on this action.

If no floppy disk was inserted an indication appears on the screen: **Please insert floppy disk!** Data were already saved on hard disk or network.

If a read only floppy disk was inserted an indication appears on the screen: **Remove read only on floppy disk!** (e.g. set startup in BIOS on C).

In case of inserting a floppy disk without path/folder, the preselected path in setup program is activated.

If memory capacity on the floppy disk is filled up to 1.38 MB, an indication appears on the screen: **Floppy disk full, insert new floppy disk!** After inserting a new floppy disk the saving process is executed.

3.05 Release functions

Move the slider **Functions** from red to green in setup level 2, (Fig. 3-02) and the screen **Functions:unlock/lock** opens (Fig. 3-06).
Unlocking function means the slider on green, locking functions means slider on red.

- High limit value, low limit value, Option (Fig. 3-06):
  Green: Input is unlocked
  Red: Input is locked
- F2 Selection, Scale, Label Form, Label/Scan, Stitch Edit
  Green: WINDOWS can be opened
  Red: WINDOWS are locked
- Label-Copy:
  Green: Using the key combination Ctrl Shift F1, the label which is still in memory can be printed. The label gets an imprint "Copy!"
  Red: Using the key combination, no Label-Copy is possible (see **chapter Making Label copies 3.09.10**)
- Stitch counter (incl. thread force diagram), Table, Min/Max,µ, s, Bargraph, Docu-seam-no.:
  Green: Indications are visible
  Red: Indications are not visible
- Unlock machine:
  Green: After bad docu seam the sewing machine is not locked
  Red: After bad docu seam the sewing machine is only unlocked by entering password 1 or 2
- SC reset daily:
  Green: The seam counters (file SC.txt in path C:\PFAFF\Counter) are reset a 0:00 o'clock
  Red: The seam counters are reset to zero after reaching a total number of docu seams of 9999.
- Cross check no.:
  Green: A cross check number (modulo 43) is appended to the barcode
  Red: No cross check number is calculated
- NOK file:
  Green: NOK files are saved, NOK is appended to the identification number
  Red: No NOK files are saved
- Network/File:
  Green: Deleting the error information and unlocking the machine is executed automatically after about 5 seconds
  Red: Deleting the error information and unlocking the machine only by entering password 1 or 2

- Option:
  Green: Input is unlocked
  Red: Input is locked
- BT Change:
  Green: No confirmation of bobbin change
  Red: Bobbin thread change must be confirmed by password 1 or 2, the machine is unlocked
- Setpoint, actual value:
  Green: Input and indications are unlocked
  Red: Input and indications are locked
- Scan-Exit:
  Green: Execute Exit without password 1, 2
  Red: Execute Exit with password 1, 2
- Auto-WIN-Exit:
  Green: Shut down Windows automatically
  Red: No automatic Windows shut down
- Label name, ext.:
  Green: Reading the label name from external
  Red: Reading the label name not from external
- Saving on floppy disk:
  Green: Saving data on floppy disk too
  Red: No saving on floppy disk

Click on **return**, this configuration is save and left.

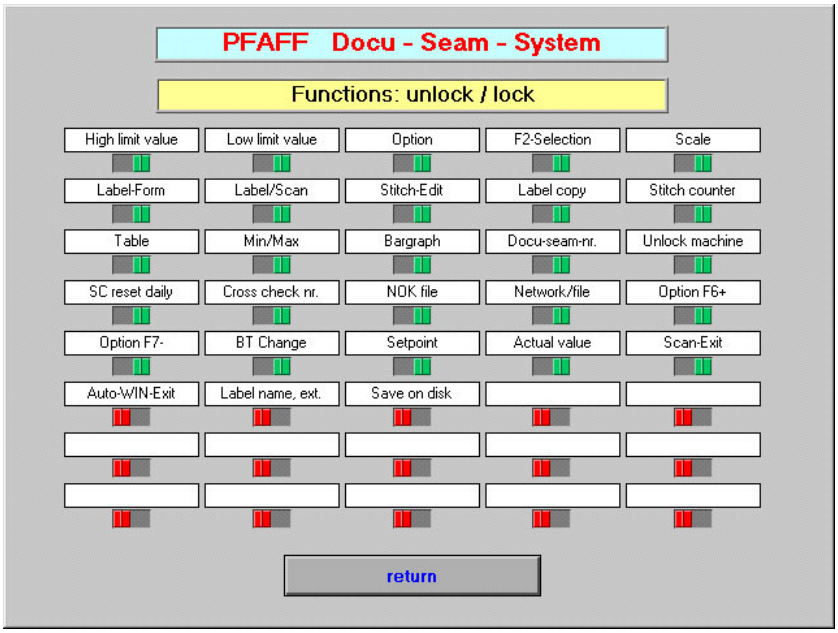


Fig. 3 - 06

3.06 Input Functions

The functions can be called up by clicking with the mouse or with the respective key.

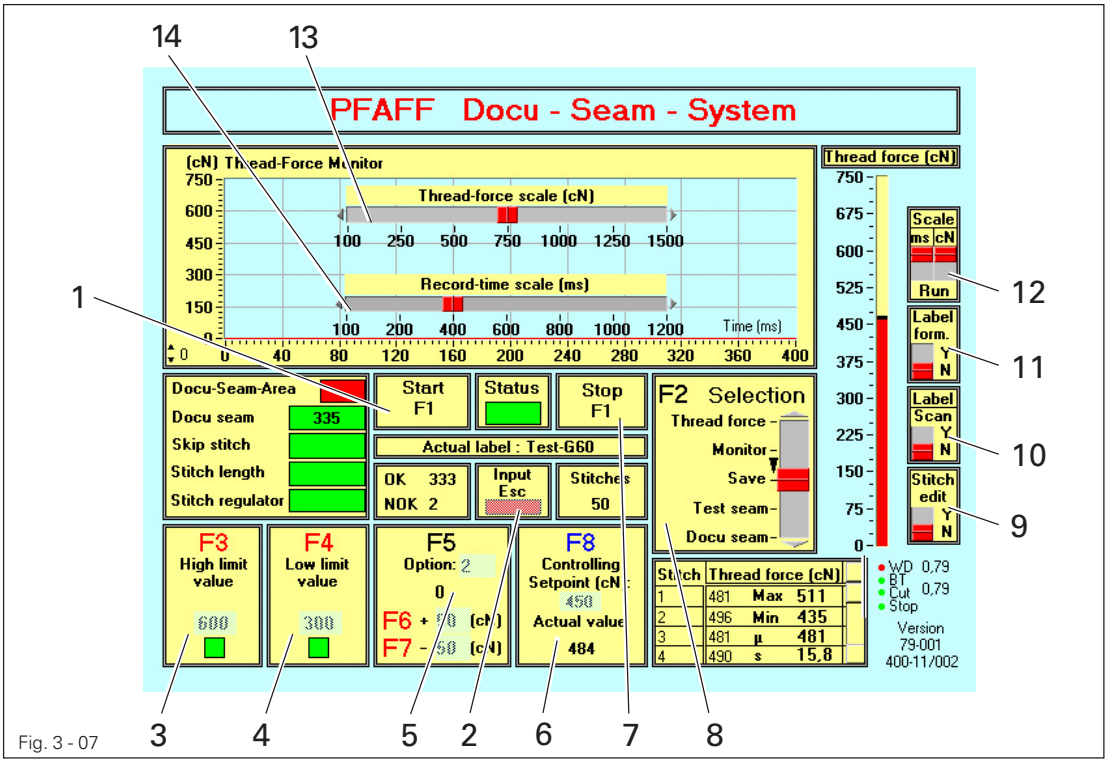


Fig. 3 - 07

1 - Start (F1)
By calling this function, the program is started.

2 - Input (Esc)
This function enables and/or blocks the input of limit values and the use of Option (Input display red = input not active / Input display green = input active)

3 - High limit value (F3)
After calling this function when Input is activated, (see above), the high limit value for thread force can be changed. After pressing <Return>, the newly-entered limit value is adopted and saved. At the same time, Input is deactivated again (input display red).

4 - Low limit value (F4)
After calling this function when Input is active (see above, the low limit value for thread force can be changed. After pressing <Return>, the newly-entered limit value is adopted and saved. At the same time, Input is deactivated again (input display red).

5 - Option (F5, F6, F7)
After calling this function when Input is active (see Point 2 - Input), the number of "permissible exceedings" can be entered, that is, the number of individual stitches, whose thread force may lie outside the prescribed limit values.

This extension now allows the user to define the area of limit value exceedings very exactly.

Example: High Limit Value HLV=600 cN
Low Limit Value LLV=300 cN
Option F5= 2, F6= +50 cN, F7= -50 cN

If the High Limit Value is set to 600 cN (interrupted red line), and the Lower Limit Value is set to 300 cN (interrupted red line), and 2 deviations are allowed, the new sewing results may be **within** the new High Limit Value of 600 cN +50 cN = 650 cN (bold red line) and the new Low Limit Value of 300 cN -50 cN = 250 cN (bold red line).
Each measured thread force, which leaves the exceeded tolerance range of 250 cN to 650 cN , **immediately** leads to a NOK seam.
This function leads to a more flexible system and can be adapted to more different operations, with the focus on an exact definition of the sewing process itself to increase the number of OK seams.
Blinking of the different signs leads to a better failure analysis in case of leaving the preset tolerance range.
As long as the input at **Option** is still **0**, no inputs at **F6** or **F7** are possible.
The entered values can be saved by pressing **<Return>**, the input is deactivated again (indicator red).

6 - Controller (F8)
After calling this function two different inputs are available if the input is active.:

1. Electrical adjustment of thread force

To enter a value move selection slider **F2** to **Test seam.** Enter a numeric value for the thread force of 0 – 100% within the input field **F8**. Sewing tests have to prove whether the correct thread force has been adjusted. Switching from **Test seam** to **Docu seam** the corresponding percentage value is accepted, saved and is related to the actual sewing process (defined by label name). This ensures a correct reproducibility of the sewing process.
Pressing the **Return** key the new value is accepted and saved, the input is deactivated again/ indicator red.

2. Automatic electrical adjustment of thread force (closed loop control)

Principle of controller loop:
This version shows a feedback control loop (Setpoint/Actual value comparator, sensor, control valve, control device). Contrary to electrical adjustment the automatic controller loop compensates the influence of external disturbance, means changes in thread force by process effects are detected and compensated by automatic regulation. This ensures a balanced distribution of the stitch related thread force values in the middle of the tolerance range; drifting of thread force values is minimized and production of defective docu seams is reduced.
In position **Test seam** various sewing tests must be made to achieve a correct seam quality. The ascertained thread force value will be loaded to **Docu seam** by switching the slider to this position and is related and saved to this actual sewing process (defined by label name). This ensures a correct reproducibility of the sewing process.

Operation:
To enter a setpoint of thread force the selection slider **F2** must be positioned on **Test seam**. Enter the thread force setpoint in cN into field **F8**. At the end of the sewn test seam the actual, representative value of thread force for this seam section is indicated in field **Actual**

value. In case of deviation between actual value and setpoint the thread force is regulated and corrected automatically.

If setpoint and actual value are close together switch to Docu seam; the ascertained stimulus control (electrical value for adjusting thread force) is downloaded. This value is attached simultaneously to the actual sewing process (defined by label name).
Needing this sewing process again after a certain time (loading the corresponding label name) the necessary thread force is readjusted automatically too, means the saved process parameters are reloaded and reproducibility is ensured.

Remark:
"Heavy corrections" to the thread force are detected by the Docu-Seam-System, means a stimulus control deviation of 40% related to the required and previous loaded value leads to a warning information on the screen. The operator gets an information that there is any reason for a heavy correction of the thread force. It is commendable to check thread guides, eyelets, thread quality etc.

7 - Stop (F1)
By calling this function, the program is stopped (status = red).
After this, the WINDOWS platform can be reached by pressing the key F12.

For PFAFF 3715-1/.., using the machine panel, the configuration must be set to 9, if the selection slider is not positioned on Docu seam, see chapter 2.10.05 Parameter/ Configuration settings
To sew a docu seam, configuration must be set to 10.

For PFAFF 3715-2/.., using the machine panel, parameter 683 must be set to II, if the selection slider is not positioned on Docu seam, see chapter 2.10.05 Parameter/Configuration settings
To sew a docu seam, parameter 683 must be set to I.

8 - Selection (F2)
If the options display has been activated with F2, the functions can be selected by using the mouse or the arrow keys on the keyboard.

Thread force (<arrow keys>)
By using this function, the static thread force of both the needle and bobbin threads can be measured, See Chapter 3.08 Measurement of static thread force.

Monitor (<arrow keys>)
With this function, the flow of the dynamic thread force during the sewing process is displayed on the thread force monitor. This function may be employed for the analysis of signals and gives indications of the quality of stitch formation. With a corresponding setting of the measuring ranges for the x- and y-axes, detailed and characteristic features of the flow of the thread force can be recognized.

Save (<arrow keys>)
Switching from Monitor to Save, the dynamic thread force signal is saved on the screen.

Test seam (<arrow keys>)
After calling this function, a test seam = simulated docu seam can be sewn with the slowest and fastest speeds planned for the docu-seam-area to check all settings.
There is no label printout and no identification number with seamfile.
The LED indicator Docu-Seam-Area shows Test.
Only in Test seam it is possible to enter values into panels F3-F8.

Docu seam (<arrow keys>)
This function can be activated when all necessary values have been entered. The seam supervision is active in the docu-seam function, as soon as the docu-seam area is reached during the sewing process. There are no inputs F3 - F8 possible.

9 - Stitch edit
With this function it is possible to activate both, monitoring the number of stitches (calculation of the average stitch length) and the stitch regulator position. See Chapter 3.09.04 Monitoring the number of stitches and 3.09.05 Monitoring the stitch-regulator position.

10 - Label/Scan
By using this function, information concerning the selected label can be entered. See Chapter 3.09.07 Label name, label selection.
In addition you can call up or execute the input for the scan function, see Chapter 3.09.13 Scanner function.

11 - Label Form.
With this function the label size and label printer can be selected.

12 - 14 Selection of measuring ranges (Scale)
The measuring ranges for thread force and time axes can be selected using this function. For the thread force, full-scale values ranging between 100, 250, 500, 750, 1,000, 1,250 and 1,500 cN may be selected (see Pos. 13 on Fig. 3-06).
For the time axis, you have the full-scale values of 100, 200, 400, 600, 800, 1,000 or 1,200 ms at your disposal (see Pos. 14 on Fig. 3-07).

The full-scale values will be adopted both for display on the monitor and for the bar graph display.

3.07 Display functions

The system offers a whole series of data which are displayed on the screen by the display functions.

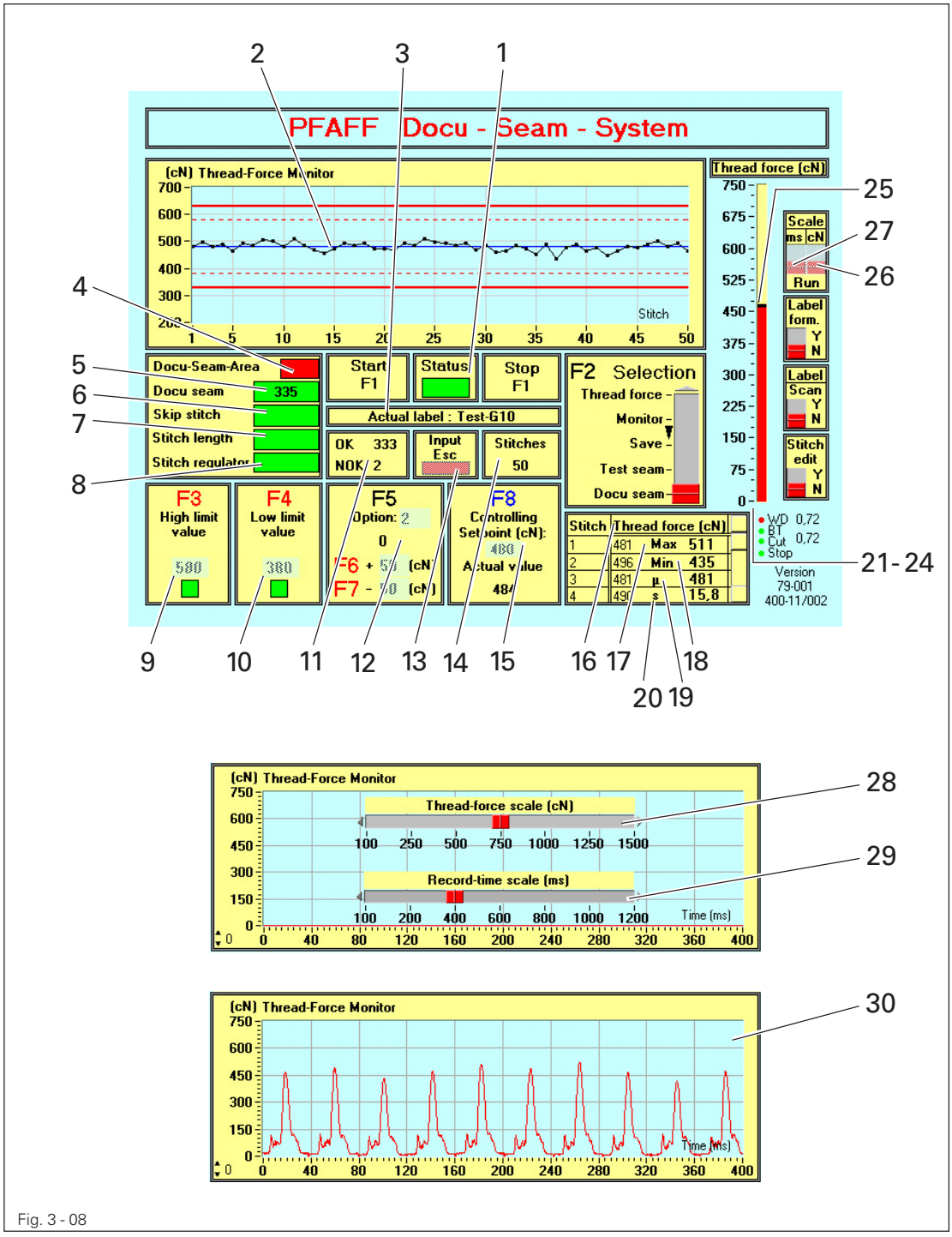


Fig. 3 - 08

1 - Status display

This function displays the current status of the program
(red display = program not yet started / green display = program running).

2 - Thread force diagram
As well in position Test seam as in Docu seam (selectable with slider F2), the thread force values of the executed stitches are indicated. These values represent the max. thread force during stitch formation, means when the take up lever is in the upper death point. Each single stitch can be identified as a real numeric value in the thread force table 17. These values are saved in the corresponding seam file on the PC (see chapter 3.12.04).

3 - Actual label
With this function the current label name = process name loaded is displayed.
All process parameters are downloaded when reading the label name (settings, label text....).

4 - Docu-seam area
This shows whether the machine is currently in the docu-seam area or not
(Green display = docu-seam ara / Red display = not in docu-seam area).
If F2 is on Test seam, Test is written into this field.

5 - Docu-seam
The result of the Docu-seam is displayed.
(Green display = docu-seam is in order/Red display = docu-seam is not in order).
Contemporary a numeric indication of the total number of executed docu seams is indicated (indicator 11, Fig.3-8 indicates the OK and NOK docu seams).

6 - Skip stitches
From this display, you can recognize whether skip stitches have appeared in the docu-seam area. (Green display = no skip stitch / Red display = skip stitch).

7 - Stitch length
From this display, you can recognize whether the calculated stitch length in the docu-seam area is correct (preset seam length : counted stitches).
(Green display = stitch length in order / (Red display = stitch length not in order).

8 - Stitch regulator
This display shows whether the preset position of the stitch regulator has maintained .
(Green display = position in order / (Red display = position not in order).

9 - High limit value
In this panel, the adjusted value for the high limit value is displayed.
This display serves as an adjustment aid, to recognize during a test seam whether the previously-set high limit value is being complied with.
(Green display = limit value not exceeded / Red display = limit value exceeded).
The high limit value is indicated as an interrupted red line in the thread force diagram point 2, Fig. 3 - 08.

10 - Low limit value

In this panel, the adjusted value for the low limit value is displayed.
This display serves as an adjustment aid, to recognize during a test seam whether the previously-set low limit value is being respected.
(Green display = not below limit value / Red display = below limit value).
The low limit value is indicated as an interrupted red line in the thread force diagram point 2, Fig. 3 - 08.

11 - OK, NOK

OK: The number of good docu seams is indicated
NOK: The number of bad docu seams is indicated

12- Option (exceedings)

The number of preset and executed stitches within the docu seam area, falling outside the limit values for thread force is indicated in this panel (extended tolerance range with F6 and F7). The bold red lines in thread force diagram point 2, Fig. 3-08, show this extended tolerance range. If only 1 stitch exceeds this extended tolerance range, an error warning is indicated immediately.

13 - Input Esc

The mode in which the program is currently operating is displayed here by pressing key Esc. (Red display = input not active / Green display = input active) Input keys F2 - F8 are unlocked.

14 - Stitches

The number of stitches in the docu- and test-seam area is displayed here.

15 – Closed loop controller

The preset Setpoint of thread force is indicated in this panel in cN.
This is the real gained, representative Actual value for the corresponding docu seam area.
If the system was configured as thread force controller without feedback, the indicator only shows the preset percentage value of thread force.
If there is a mechanic thread force adjustment this panel remains empty. The necessary configuration is described in chapter 2.10.06.

16 - Thread force table

All individual stitches sewn during a test seam or a docu-seam are displayed in this table with the accompanying thread force. In this way, a seam analysis related to specific stitches is made possible.

17 - Maximum thread force

The maximum thread force occurring during a test seam or a docu-seam is displayed here.

18 - Minimum thread force

The minimum thread force occurring during a test seam or a docu-seam is displayed here.

19 - µ

Out of the thread force values of table 16 the arithmetic average is calculated and indicated.

20 - s

Out of the thread force values of table 16 the standard deviation is calculated and indicated.

21 ... 24 Diagnosis-LEDs

To indicate controller signals and processes by using a simple method several diagnosis-LEDs were placed in the lower right corner of the Docu screen.

- WD... Watch Dog	blinks:	Program runs in Docu seam
- BT.....Bobbin Thread	red:	Alarm signal of bobbin thread monitor
- Cut....Cut	red:	Thread cutting
- Stop..Stop	red:	Machine stops, Error 9

25 - Bar display (bar graph)

When the static thread force is measured, as well as during the test seam and the docu-seam, the value of the thread force that has just been measured is displayed on the bar display.

The division of the scale adjusts itself according to the newly-set full-scale value.

26...29 – Scale

If position **Monitor** is selected in panel **Selection F2** scaling is possible.

- Click on slider **26** or **27** for **cN** or **ms** and move upwards. A slider for setting the full scale values of thread force **28** or time axis **29** appears on the thread force monitor.
- Click on the needed scale value. The slider moves to the selected full scale value and these values are accepted in the monitor and the bargraph.
- Move the slider **26** and **27** down again.

30 - Monitor

Selecting the position **Monitor** in panel **Selection F2**, the dynamic thread force signal is indicated. For a detailed signal analysis change the measurement ranges **26 - 29**.

3.08 Measurement of static thread force

Besides the supervision of the docu-seam area, this system also offers the possibility of measuring both the needle thread tension (force of the needle thread) and the bobbin thread tension (force of the bobbin thread) without any additional device when the machine is stationary.
In this way, you can have optimum, reproducible values for setting the machine which can always be set precisely for every individual sewing process.

3.08.01 Measurement of static force on the needle thread

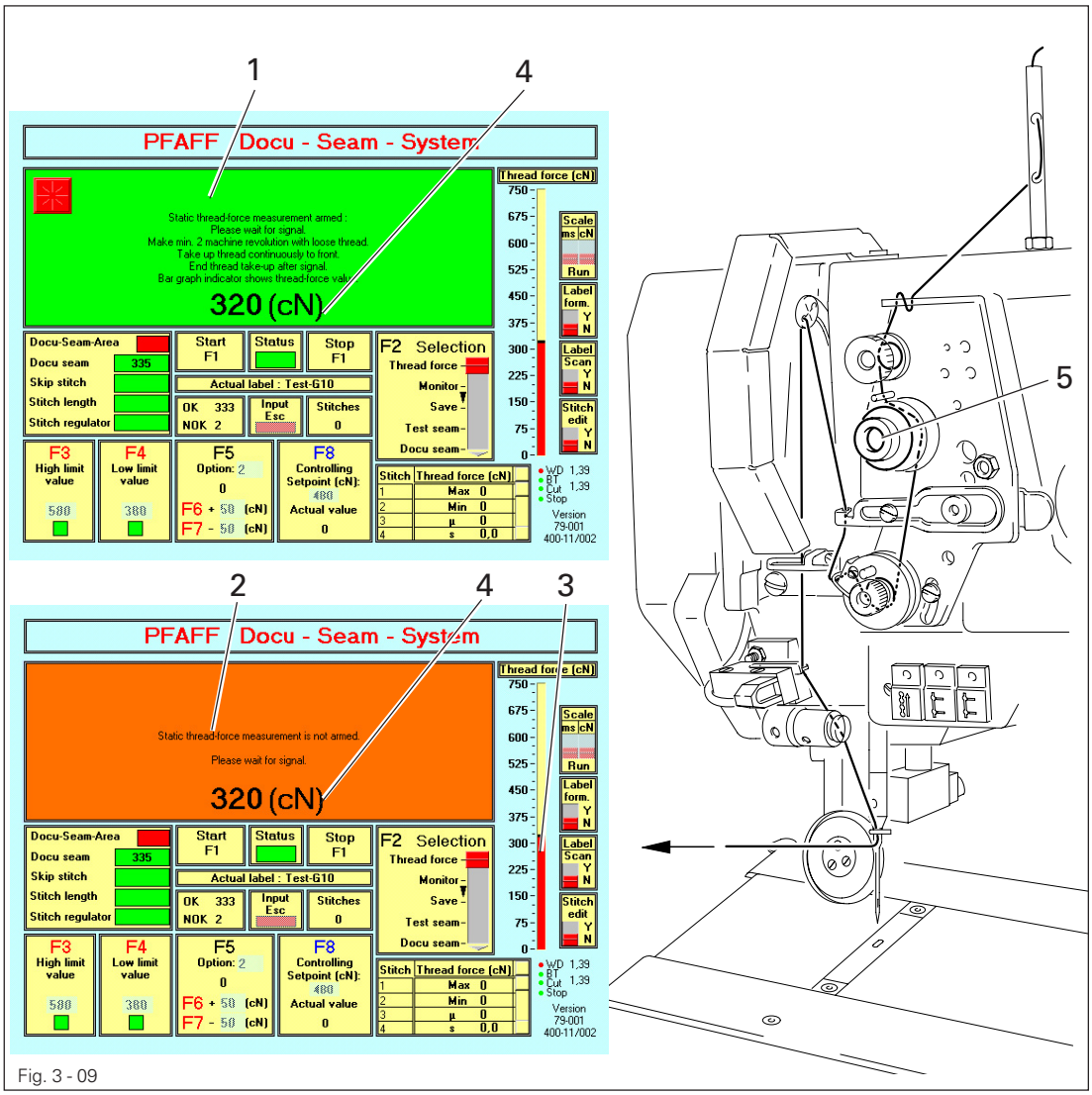


Fig. 3 - 09

- Thread the needle thread according to the machine class, taking into account that the thread is passed through the thread force sensor, but not yet through the needle.
- Call up the **Selection** field with **<F2>**.
- If necessary, adjust the measuring range for the thread force (see **Chapter 3.07 Display functions, point 26, and 27, Fig. 3 - 08**
- Select the function **Thread Force** using the **<arrow keys>** or the mouse.
  A green text field **1** with instructions appears on the thread force monitor.

- After the signal, carry out at least 2 machine revolutions.
  Machine stop at take-up lever T.D.C.
- Pull the needle thread evenly and slowly in the direction of the arrow until a red text field **2** appears on the thread force monitor.
  The measured value can be read off the bar graph **3** and the display panel **4**.
- If necessary, adjust the thread tension (knurled nut **5**) and repeat the measuring procedure after the signal, until the value for the thread force is correct.

The alternating procedure "Measure - read - adjust" takes place in a 6-second rhythm, once the measuring function has been initialised by the revolution of the machine.

3.08.02 Measurement of static force of the bobbin thread

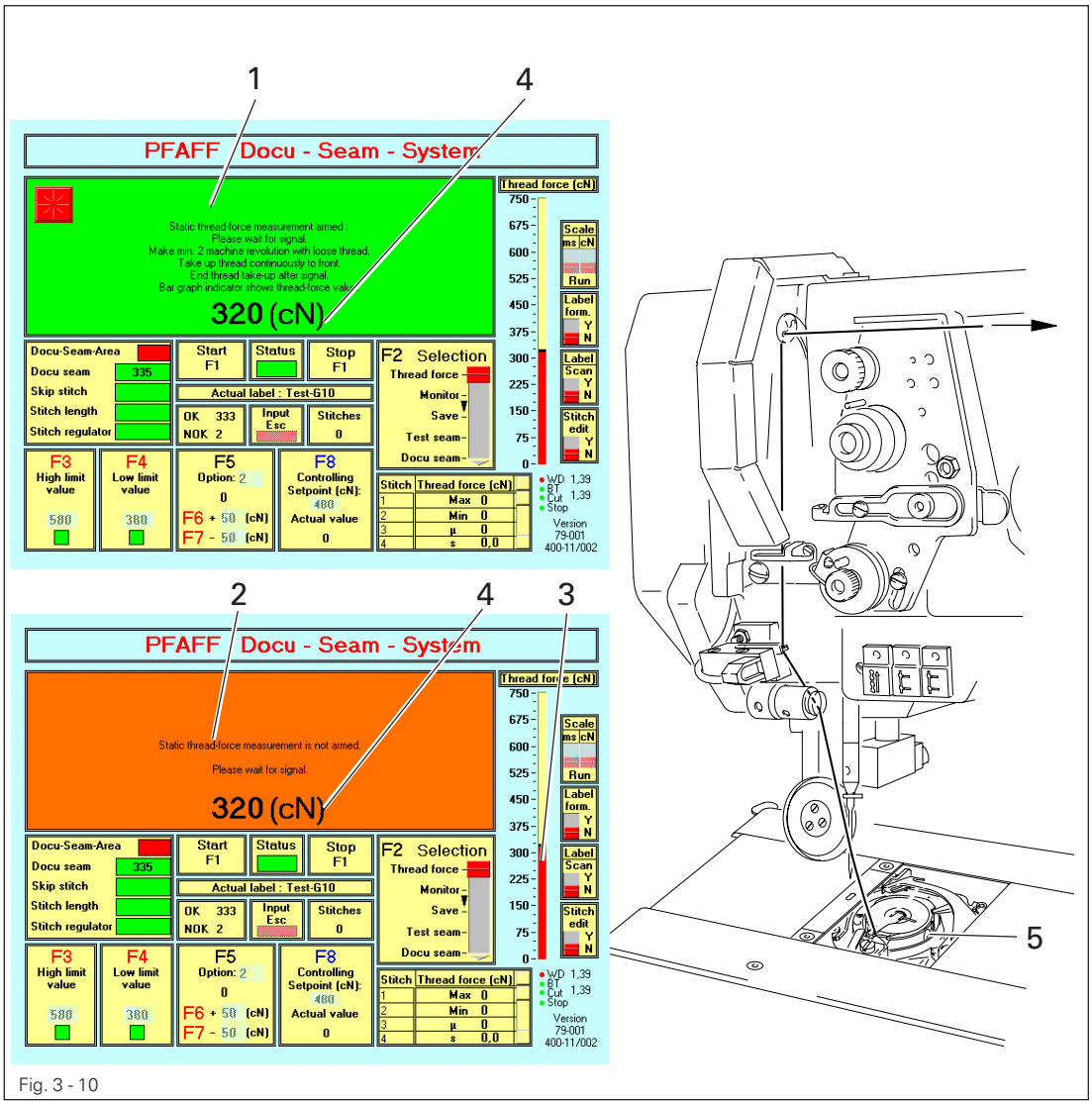


Fig. 3 - 10

- Thread the bobbin thread through the thread force sensor and the take-up lever (depending on the machine type).
- Call up the **Selection** field with **<F2>**.
- Set the measuring range for the thread force at 100 cN (see **Chapter 3.07 Display functions** point 26 and 27, Fig. 3 - 08).
- Select the function **Thread Force** using the **<arrow keys>** or the mouse.
  A green text field **1** with instructions appears on the thread force monitor.
- After the signal, carry out at least one machine revolution.
  Machine stop at take-up lever T.D.C.
- Pull the bobbin thread evenly and slowly in the direction of the arrow until a red text field **2** appears on the thread force monitor.
  The measured value can be read off the bar graph **3** and the display panel **4**.
- If necessary, adjust the thread tension (screw **5**) and repeat the measuring procedure after the signal, until the value for the thread force is correct.

The alternating procedure "Measure - read - adjust" takes place in a 6-second rhythm, once the measuring function has been initialised by the revolution of the machine.

3.09 Test seam

The necessary requirements for the docu-seam area can be established by stitching off a test seam. In the process, the system saves the thread force of the individual stitches and displays the values on the thread force table 1 at the end of the test seam.
The maximum- or minimum-occurring thread forces are displayed in the **Min/Max** panel. These thread forces serve as the basis for setting the limit values.
The original docu seam can be simulated here (parameter 683=I or configuration=10 remains), neither a label is printed nor the identification number with data file is created.
Test is written into the indicator LED **Docu-Seam-Area**. Only in **Test seam** inputs for panels **F3-F8** are possible.

In case of thread break in Test seam, a new stimulus control (setting) is calculated which does not correspond to the correct preset values; therefore enter manually a new setpoint.

3.09.01 Determining limit values

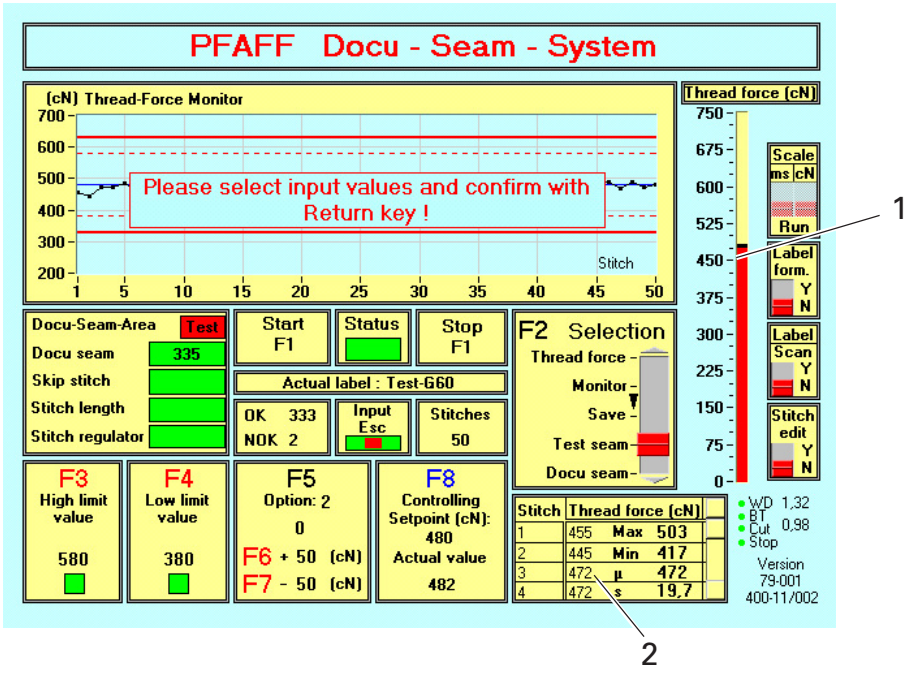


Fig. 3 - 11

First of all, the measuring ranges for the thread force and the time axes should be selected appropriately and the static thread forces for the needle and bobbin threads should be established or adjusted.

- Call up the **Selection** field with **<F2>**.
- Select the function **Test-Seam** using the **<arrow keys>** or the mouse.
- Stitch off the seam area, using the min. and max. speeds for the docu-seam area. During the sewing procedure, the thread force occurring in every individual stitch is displayed on the bar graph **1**. Then the values are indicated in thread force table 2.

3.09.02 Setting limit values

After the maximum or minimum thread force by stitching off the test seam are established (see **Chapter 3.09.01 Determining limit values**), the limit values for the thread force can be entered.

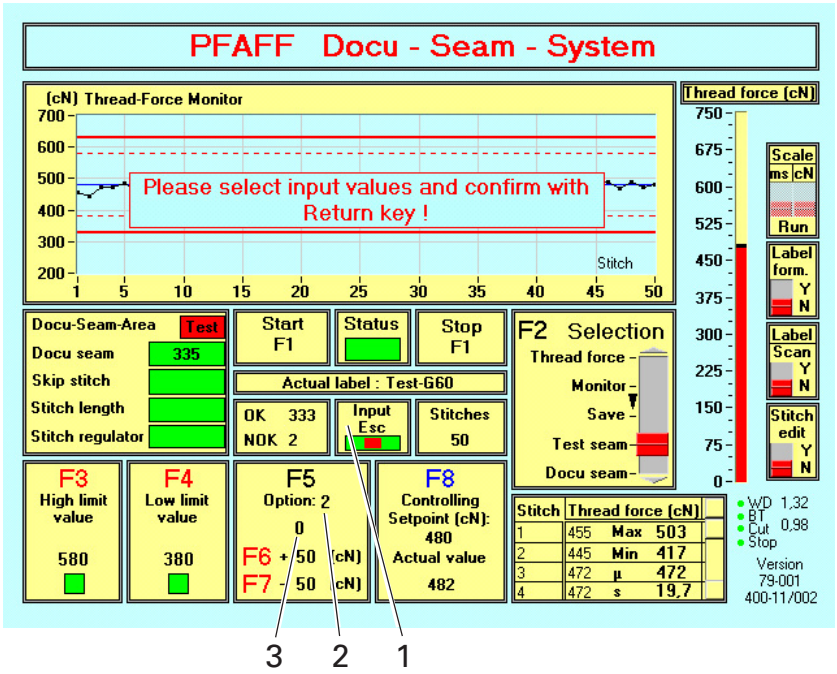


Fig. 3 - 12

The limit values should be set at an appropriate and safe distance, according to normal sewing practice, from the thread force values measured in the test seam.

- Activate the input mode by pressing **<Esc>**. The input display 1 changes from red to green. If key **Caps Lock** is activated, key **<Esc>** deactivated.
- Activate the input field for the high limit value with **<F3>**.
- Enter the high limit value.
- Activate the input field for the low limit value with **<F4>**.
- Enter the low limit value.
- Enter the options with **<F5 - F7>**.
- Confirm the input limit values by pressing **<Return>**.
  The altered limit values are adopted and stored on the hard disk.
  The input display **1** changes again from green to red.

In a similar fashion to the input of limit values, the input of "permissible exceedings" can - if required - be carried out in the selection field **2** (**"Option"**).
The occurrence of exceedings becomes more probable with a low tolerance level in the limit values. An evaluation of the seam quality must determine whether exceedings are permissible at all.
The actual number of exceedings occurring is displayed in field **3** (only active within the docu-seam area).

3.09.03 Checking limit values

The sewing procedure (production) with the adjusted limit values can be simulated by stitching off a further test seam.

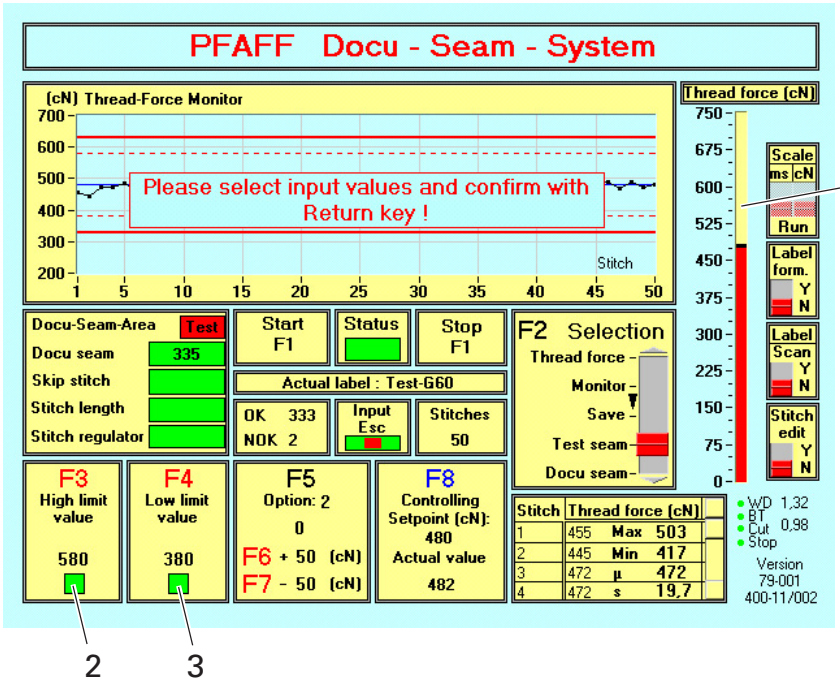


Fig. 3 - 13

- Call up the **Selection** field with <F2>.
- Select the function **Test seam** using the **<arrow keys>** or the mouse.
- Stitch off the seam area.
  During the sewing procedure, the thread force occurring in every individual stitch is displayed on the bar graph **1**.

When stitching off a test seam, the display elements **2** and **3** should not change from green to red, unless a real error has occurred!
A check of the thread force values in the table is possible.

- Correct the limit values, if necessary.

3.09.04 Monitoring the number of stitches (calculated stitch length)

- Click on the slider in the panel **Stitch Edit** and move it to "**Y**" (for yes).
  The input window **Selection** opens.

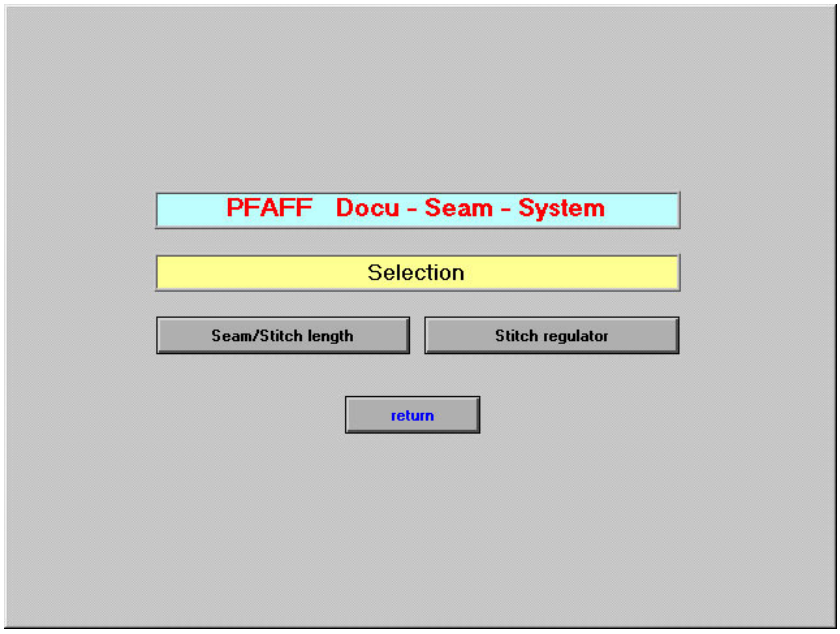


Fig. 3 - 14

- Click on the key **Seam length/Stitch length,** the panel **Monitoring the number of stitches** opens.

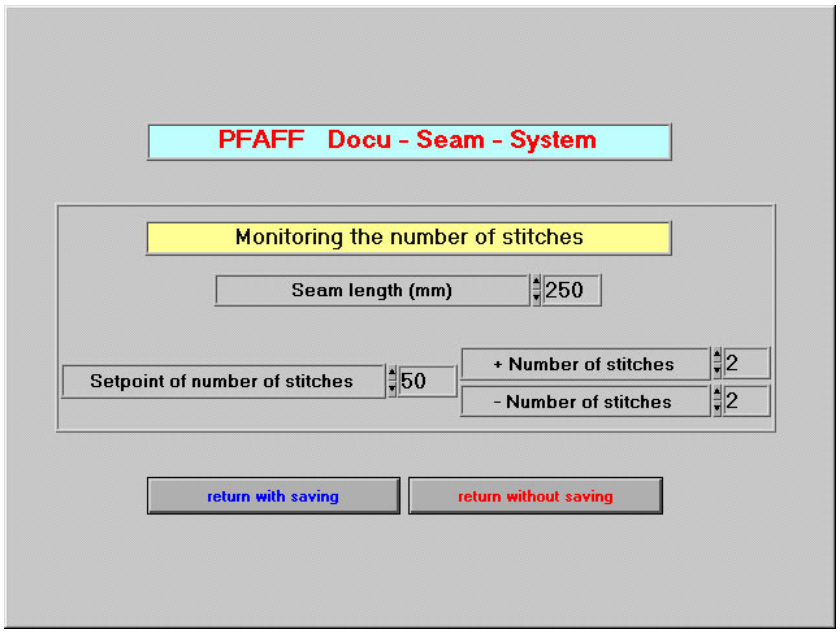


Fig. 3 - 15

- The 4 input fields are activated by clicking on with the **left mouse key** or by pressing the **TAB-key**.
  These numerical values can also be increased or reduced by clicking on the corresponding arrow fields.
- Enter the length of the docu-seam area (in millimeters) in the field "**seam length**".

- Enter the required number of stitches in the field "**setpoint of number of stitches**" (Seam length : number of stitches = ideal stitch length). The stitch length resulting from this calculation is stored in the seam file.
- Enter the allowable tolerance for the number of stitches in the docu-seam area in the fields "**+/- number of stitches**". Example:

  Seam length: 250 mm
  Setpoint no. of stitches: 50
  +/- number of stitches: 2

  Result: 51 counted stitches in the docu-seam area, i.e. the docu-seam is in order, because the tolerated number of stitches was not exceeded. The average stitch length was therefore 4.9 mm (250 mm : 51). This is stored automatically as the result in the seam file. The indication panel for the stitch length remains green.

- To save these input values, click on the key "**return with saving**".
  If the previous values are to be saved, click on the key "**return without saving**".

If the value "**0**" is entered for the seam length, the function "**monitoring the number of stitches**" is deactivated.

3.09.05 Monitoring the stitch-regulator position

In the case of sewing machines with manual adjustment of the stitch length with an adjusting dial, an integrated sensor monitors the stitch-regulator position for each stitch length.

- The correct stitch length is determined by adjusting the adjusting dial or by making test seams.
- Click on **Stitch Edit** and move to **y** (yes). Input panel selection opens. (Fig- 3 -14).

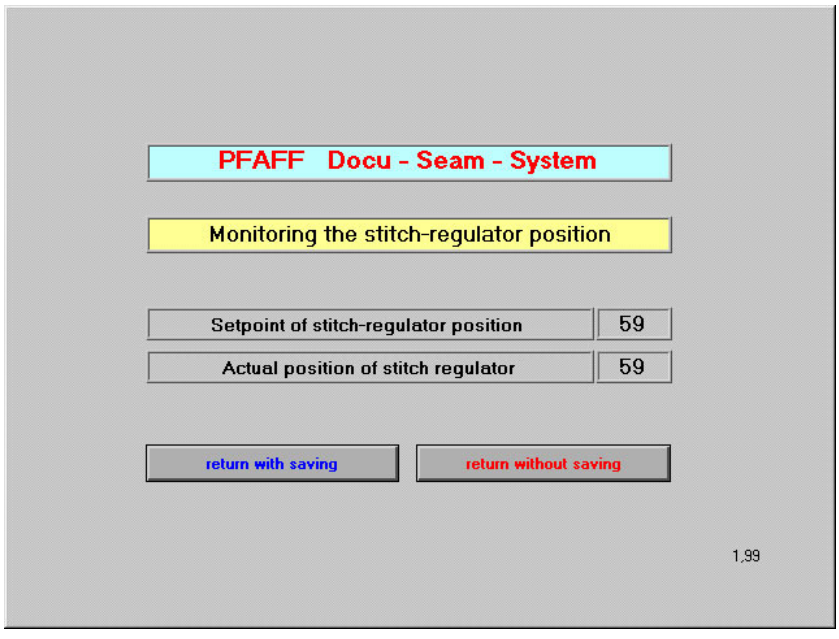


Fig. 3 - 16

- Click on the key **Stitch regulator,** the panel **Monitoring the Stitch-regulator position** opens (Fig. 3- 16).
- The resulting correct position for the stitch-regulator is taken over as the setpoint by clicking on the function "**return with saving**".
  As long as the value of the actual position does not deviate from the setpoint by more than +/-**4** after sewing the docu-seam, the stitch-regulator position is considered to be in order, i.e. the stitch-regulator indicator is green, and the setpoint and actual position are stored automatically in the seam file.

To deactivate the function "**Monitoring the stitch-regulator position**", the stitch-regulator adaption must be set to "0" in the Configuration program.

3.09.06 Label sizes, printer selection

- Click on the slider in the field "**Label Form.**" and move it to "**Y**" (for yes).
  The input window for the label sizes opens.

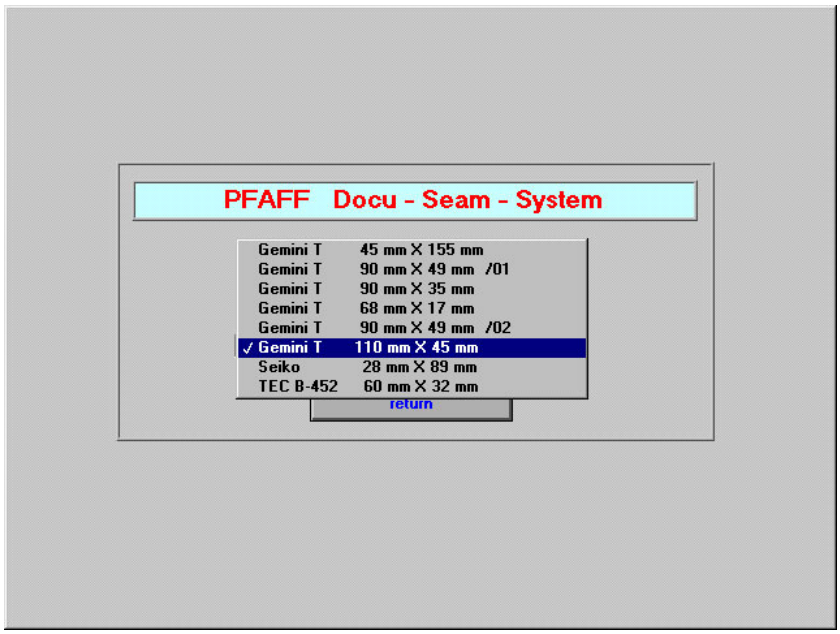


Fig. 3 - 17

- Open the menu by clicking on the arrow symbol.
- Press the left mouse key and position the mouse pointer in the desired field.
- Click on the key "**return**".
  The window "**Save As**" opens.

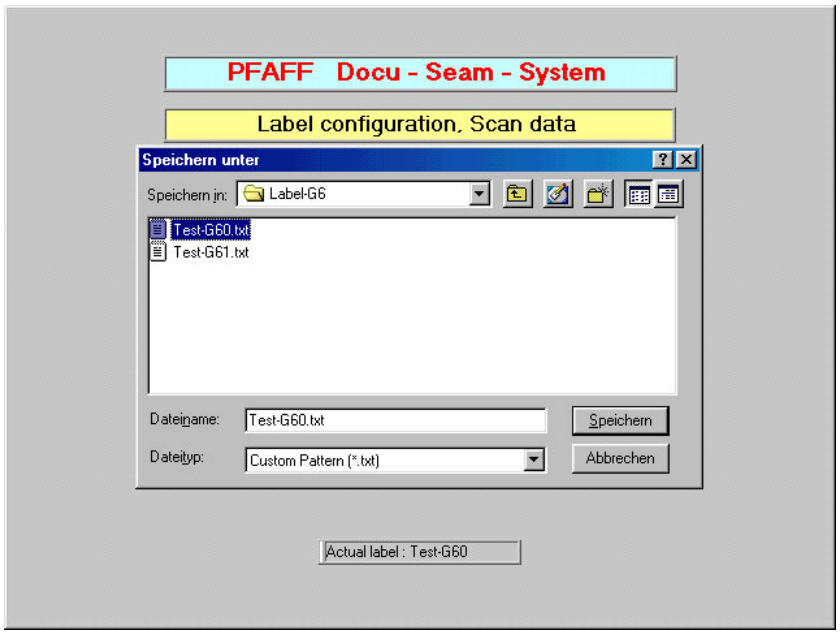


Fig. 3 - 18

- Select your label as described in **Chapter 3.09.07 Label name, label selection**.

3.09.07 Label name, label selection

- Open the window "**Save As**". See **Chapter 3.09.06 Label sizes, printer selection**.
- Click on the desired label names, if these exist.
- Click on "**Save**".
  Text and information about the selected label are displayed.

To create a new label:

- Enter the name of the label in the text field "**file name**".
- The cursor must blink in the input field.

The label name **must** have 8 characters, to which **.txt** is appended automatically.

- Click on "**Save**".
  The window for text input opens.

Do not install new directories because program access is done automatically to existing label directories.

3.09.08 Text input for label printer

All functions are explained with the example of the Gemini printer and with a label size of 110 x 45 mm.

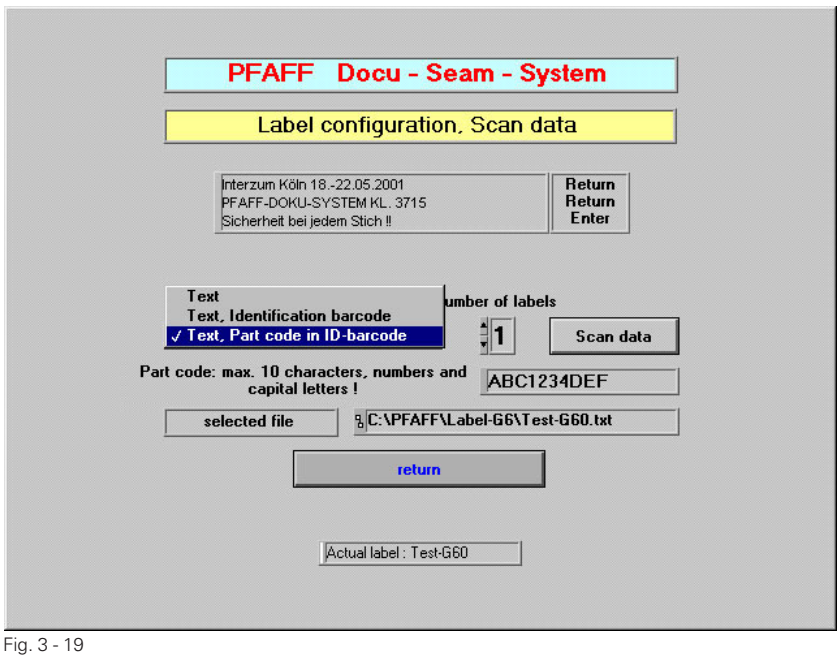


Fig. 3 - 19

- Activate the input fields by clicking on with the mouse (the cursor appears in the appropriate field) or by using the **TAB-key**.

After loading already existing label names all corresponding data appear which can be handled here.

Input of clear text

Three rows with approximately 40 characters each can be entered.

- Activate the input field of the first row (the cursor blinks).
- Enter the text and press <Return>.
- Enter the text for the second row and press <Return>.
- Enter the text for the third row and press <Enter>.

Label output

Different output options can be selected.

- Click on the arrow symbol.
  The menu opens.
- Click on desired field.

- Text:
  Only clear text is printed.

- Text, Identification barcode:
  Cleartext and Identification barcode is printed.

- Text, Part code in ID-barcode:
  Cleartext, 10 digits for user specific input and Identification barcode is printed.

To use the barcode function, the appropriate software (Option) must be installed on the WINDOWS platform. See Chapter 2.08.01 Gemini T Label Printer.

Number of labels

- The desired number of labels, from 0 - 9, can be selected by clicking on the arrow symbol.
- If the setting "0" is selected, the information "no printer existing" appears.
- To end data input click on key return to save all adjustments.

Label selection

If there was a wrong label name selected by mistake, enter EXIT to execute a new label selection.

3.09.09 Summary of the label sizes and printer selection

Gemini T, 45 mm x 155 mm

Label output:
- Clear text, 3 rows for customer data
- Label name, seam number, date, time
- Identification number
- in addition with barcode

Definition:
- 6 digits for customer input
- 4 digits for the year
- 3 digits for the day of the year
- 4 digits for Docu seam number
- 1 digit for cross check number

Number of labels: 0 - 9

Gemini T, 90 mm x 49 mm /01

Label output:
- Clear text, 3 rows for customer data
- Label name, seam number, date, time
- Identification number
- in addition with barcode

Definition:
- 2 digits for the year
- 3 digits for the day of the year
- 4 digits for Docu seam number
- 1 digit for cross check number

Number of labels: 0 - 9

Gemini T, 90 mm x 49 mm /02

The new version 90 mm x 49 mm/02 with a sewing space of 20 mm offers a manual input field of 2 characters (numbers and capital letters) and contents the following items:

- 3 rows for clear text
- 1 row for label name and seam number
- 1 row for date and time
- 1 row for identification-nr. in barcode (option cross check nr.)
- 1 row for identification-nr. in clear text

The Identification-nr. is defined as follows:
- 2 digits for manual input
- 2 digits for the year
- 3 digits for the day of the year
- 4 digits for the Docu seam number
- 1 digit for the cross check nr.(Option, only in Barcode visible)

Number of labels: 0 - 9

Gemini T, 90 mm x 35 mm

Label output:
- Clear text, 3 rows for customer data
- Label name, seam number, date, time
- Identification number

Definition:
- 2 digits for the year
- 3 digits for the day of the year
- 4 digits for Docu seam number

Number of labels: 0 - 9

Gemini T, 68 mm x 17 mm

Label output:
- Identification number
- in addition with barcode

Definition:
- 4 digits for customer input
- 2 digits for the year
- 3 digits for the day of the year
- 4 digits for Docu seam number
- 1 digit for cross check number

Number of labels: 0 - 9

For this label it is possible to enter 3 rows of clear text, which are not printed but are saved in the seam file.

Gemini T, 110 mm x 45 mm

The transverse label printout offers a better print quality.
(Remark: Change printer driver settings: Label Height=45.0,
select Portrait)

The field **Label output** offers 3 selections:

Text:
3 rows for clear text, 1 row for label name and seam number
1 row for date and time
1 row for identification-number:
2 digits for the year
3 digits for the day of the year
4 digits for the Docu seam number

Text, Identification-Barcode:
3 rows for clear text, 1 row for label name and seam number
1 row for date and time
1 row for identification-nr. in barcode (option cross check nr.)
1 row for identification-nr. in clear text

The Identification-nr. is defined as follows:
6 digits for customer specific input, e.g. password 3
digits for the year
3 digits for the day of the year
4 digits for the Docu seam number
1 digit for the cross check nr. (option, only in barcode visible)

Text, Part code in ID-barcode:
3 rows for clear text, 1 row for label name and seam number
1 row for date and time
1 row for identification-nr. in barcode (option cross check nr.)
1 row for identification-nr. in clear text

The identification-nr. is defined as follows:
10 digits for customer specific input, e.g. part code
2 digits for the year
3 digits for the day of the year
4 digits for the Docu seam number
1 digit for the cross check nr. (option, only in barcode visible)

Number of labels: 0 - 9

Seiko, 28 mm x 89 mm

Label output:
- Clear text, 3 rows for customer data.
- Label name, seam number, date, time
- Identification number

Definition:
- 2 digits for the year
- 3 digits for the day of the year
- 4 digits for Docu seam number

Number of labels: 0 - 9

The cross check number (Modulo 43) is not appended to the text identification number but is printed with the barcode, if the function was released in setup level 2.

3.09.10 Making Label copies

To increase process security a separate program can be used if there is access on Password 1 or 2.
The program **DS-Label-Copy** is started from the WINDOWS platform, a list is displayed containing the saved seam files.
Clicking on the wanted seam file, the label is printed.
The screen displays the question: Another label copy?
No: Program exit, return to WINDOWS platform
Yes: List of seam files is displayed
If seam files are saved in other folders, they must be opened, too.

Labels of NOK seam files are not printed!
Label copies automatically get the additional printout "Copy!"

If the key combination Ctrl Shift F1 was unlocked in the function configuration (setup level 2), the last, still saved label can be printed.

3.09.11 Loading a label name from external device

This function can be released or blocked in the setup program, see chapter 3.05. If this function is used a superior master PC (network installation, Ethernet) can download a new label name (includes all necessary sewing parameters) into the file **Label-ID** (C:\Pfaff\Label-ID.txt). The new preselected label name has to exist already on the Docu PC. A selection of a new label name can be executed only within the same label format. A new label name is downloaded always after finishing a complete sewing process, means after thread cutting.

3.09.12 Information for ordering the required materials

Gemini T Printer

Supplier: Dalektron GmbH
Hainer Chaussee 55
63303 Dreieich
Telephone: 06103/86051, Telefax: 06103/88976

- Label 45 mm x 155 mm
  In rolls, Tyvek permanent with heat transfer foil, Order-No. AA-300-050-SW
- Label 90 mm x 48,8 mm
  In rolls, Tyvek permanent with heat transfer foil, Order-No. AA-300-090-SW
- Label 90 mm x 35,5 mm
  In rolls, Tyvek permanent with heat transfer foil, Order-No. AA-300-090-SW
- Label 110 mm x 45 mm
  In rolls, Tyvek Type D-281/0 with heat transfer foil, Order-No. AA-300-110-SW

Seiko Smart Label Printer 220

Supplier: Inmac Micro Warehouse
Postfach 1280
65433 Flörsheim
Telephone: 0180/5237266, Telefax: 0180/5228229

- Label 28 mm x 89 mm, Inmac-No.: B-AC 7460

3.09.13 Scanner function

To recognize and check the sewing process components (threads, fabrics, etc.) you can use this scanner function.
A comparison of the preset and acutal data is executed, the sewing process is only unlocked if the data comparison was successful and scan data are saved then in the corresponding seam file (OK or NOK).
For every sewing process the corresponding label must be selected and configured.
To open the scanner function for data input, click on the button **Scan data** of this configuration screen. There are 10 rows available to enter up to 10 data.

Text

Enter clear text, description for example: Needle thread 1

Code

Only capital letters and numbers (no spaces) must be entered, for example: NT1.

Cycle

This is a setting which means, after how many docu seams a new scan operation must be executed, for example: 15.
If the input is 1, the scan operation must be executed after each docu seam.
Clicking on the button **return** you leave the scanner function and the settings are saved automatically together with the selected label name.

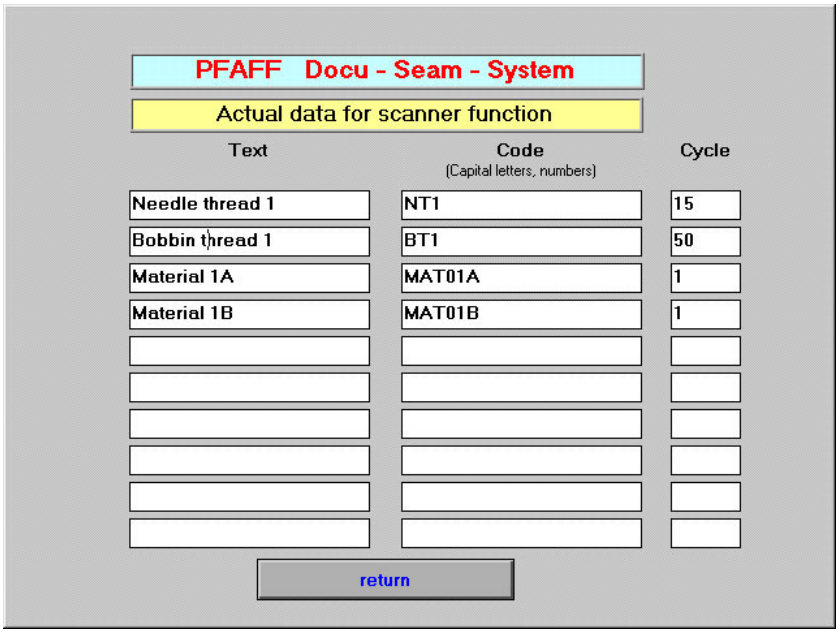


Fig. 3 - 20

- Calling existing label names (sewing process parameters are saved under this name) the corresponding scan data settings are loaded automatically.
- If there is no cycle input, you are asked only once for the scan data after system start.
- Starting the program you are asked for scanning your components.
  In case of scanning new parts with new codes at the beginning of a new production processs these scan data do not match with the loaded label of the old sewing process. Now entering EXIT you can call the corresponding label selection.
- Before the sewing process you are asked to scan, this can be by-passed by entering EXIT, if there are no pieces available at the work station; now a new label selection can be executed.
- Thread cutting indicates the end of a sewing process. If a new order must be started (new materials, new threads, etc.), the Docu-System needs these new data in connection with the corresponding label (see chapter 3.09.06-3.09.08, 3.09.11).
  If an already existing label is selected for another sewing process, the corresponding sewing parameters are loaded automatically.
  After preparation for a new sewing process the next scan operation is asked corresponding to the selected label with its corresponding scan data.

The handscanner can also be used to enter manual input like passwords and codes using barcode 39.

3.10 Detecting the Docu-Seam-Area

The area of monitoring the seam can be activated by 3 different modes (see the following table):

Knee switch
The operator has to press the knee switch to define the beginning and end of the docu-seam-area.

Fotocell
Because of start and stop material flags the fotocell detects the docu-seam-area. It is recommended to choose a specific size and shape for the material flags, an equal sided triangle outside the seam with a hight of 15 mm.
The reflection area on the stitch plate must be lightly polished to secure a correct function. If adaptions of the fotocell switching level are necessary, use the yellow adjustment screw at the front side of the fotocell housing. Flashing of the yellow fotocell LED means the material detection is instable.

Seam program, stitch counter
By entering seam programs, complete sewing processes or only seam sections can be executed with the corresponding machine functions.

Detection of Docu-Seam-Area by means of:			
	Knee switch	Fotocell	Seam program Stitch counter
PFAFF 3715-1/..	Select in operation mode **Input** the symbol **Knee switch**	Select in operation mode **Input** the symbol Sensor (**fotocell**)	Select in operation mode **Input** the **Stitch counter**
PFAFF 3715-2/..	Parameter 994 = I Parameter 995 = II	Parameter 994 = I Parameter 995 = II	Activate operation mode **programmed sewing** by key **T9 (P/M)**. Parameter 994 = I Parameter 995 = I Do not connect the Knee switch/fotocell to the motor controller.

Refer to example of seam programming chapter. 3.13

3.11 Sewing with the Docu-Seam-System

After the limit values for the thread force have been established, entered and tested, production can be carried out monitored and controlled by system.

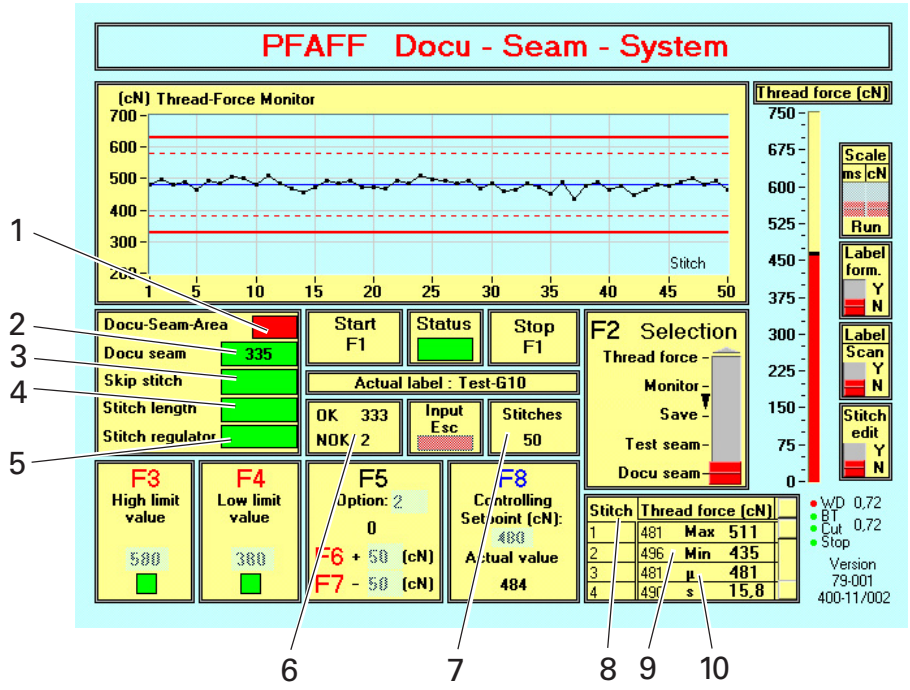


Fig. 3 - 21

- Call up the "**Selection**" field using <F2>.
- Select the function "**docu-seam**" using the **<arrow keys>** or the mouse.

If the system is restarted (beginning of operations), a program autostart takes place after the devices are switched on. In this case, the default values from the previous use are installed and the **docu-seam** function is activated.
See **chapter 2.10 Configuration in Docusoftware and machine controller**.

- Stitch off the seam.
  As soon as the docu-seam area is reached, the seam monitor function is activated (display **1** turns green). On leaving the docu-seam area (display **1** turns red again), the seam results are displayed:

Docu seam is in order:

- The thread force diagram shows the sewing result, stitch by stitch
- Display panels **2, 3, 4** and **5** are green
- PC interface receives a signal (seam is in order)
- Docu-seam number is increased by 1 and displayed in panel **2**
- The Docu-seam OK-indicator is increased by 1
- Total number of stitches in the docu-seam-area is displayed in panel **7**
- Thread force table **8** contains all the individual stitches with the corresponding thread force values
- Maximum/minimum of occuring thread force is displayed in panel **9**

- The arithmetic average μ and the standard deviation **s** are displayed in panel **10**
- Seam file is stored on the hard disk and/or on floppy disk or linked to a network
- The appropriate label is printed

Docu-seam is not in order:
- Display panel **2** and in case diplay panels **3, 4** or **5** are red
- PC interface receives no signal
- Docu-seam number is given
- The Docu-seam NOK-indicator in panel **6** is increased by 1
- Total number of stitches in the docu-seam-area is displayed in panel **7**
- Thread force table **8** contains all the individual stitches with the corresponding thread force values
- Maximum/minimum of occuring thread force is displayed in panel **9**
- The arithmetic average μ and the standard deviation **s** are displayed in panel **10**
- Seam file is stored with the extension NOK on hard disk and/or floppy disk or linked to a network
- No label is printed
- The LED indicators are reset automatically after thread cut

Password after NOK-seam:
To increase process security after a NOK-seam you can finish the running sewing process only after entering password 1 or 2. Therefore start program **DS-Setup** and open the **Functions** to set the corresponding slider **Unlock Machine** to **Red**.
After a detected fault within the docu seam the machine is stopped now, (Error 9 or Stop symbol on the machine display) the sewing material cannot be taken away because the needle is in the material; an input field appears on the Docu screen for password 1 or 2. After entering the correct password the error indication appears in the machine display, the machine remains locked. Quitting the error information on the machine display (PFAFF 3715-1/... key **Enter**, Pfaff 3715-2/... key **S+**), the machine is finally unlocked and the seam can be finished.

3.12 Output functions of the Docu-Seam-System

The docu-seam system offers various possibilities for the evaluation and further processing of stored information.

3.12.01 Thread force diagram

The complete Docu seam can be displayed in a diagram with this function including the thread forces stitch by stitch. You get an immediate summary about the homogeneity of your produced seam and you are able to check the distance to the limit values.
A sewing stop immediately indicates a thread force decrease while sewing over additional plies of material the thread force increases. The more the sewing process is optimised to constant thread forces, the less NOK seams are to be expected. This function is a tool to make the sewing process itself and the sewing result visible.
If the selection slider F2 is positioned on Docu-Seam, this function is activated and scaling of Y-axis (thread force in cN) is executed depending on preset limit values and scaling of the X-axis is executed automatically depending on the number of sewn stitches.
This function can be released or locked in program DS-Setup, opening Functions and placing the slider Table on the corresponding position (Green = visible, Red = not visible).

3.12.02 Monitor

After calling up the Monitor function, the dynamic thread force signal is displayed on the thread force monitor.
In this way one has the possibility of a signal analysis of the dynamic thread force, which gives indications of the quality of the stitch formation.

If the thread force analysis is used intensively in the "**Monitor**" function, the signal form (the curve) can be stored on the screen by switching from **Monitor** to **Save** during recording the signal (using arrow keys or mouse click).

3.12.03 Thread force table

Every single stitch is listed in the thread force table too, together with the corresponding thread force values (in Test and Docu-seam). Seams with a maximum of 4999 stitches per docu seam can be processed. It is possible to scroll through the table by clicking the mouse on the arrow keys at the side or by moving the slider.

3.12.04 Contents of the seam files

Seam files for good and bad docu seams are saved with the following parameters on hard disk and/or floppy disk or network:

- Identification number
- cross check number
- part code
- date, time
- label name = process name
- number of labels
- stitch length (calculated)
- setpoint of no. of stitches
- +/- no. of stitches
- actual stitch regulator position
- option: input, +/-
- setpoint of thread force
- scan data
- arithmetic average
- thread force values for all stitches
- contents of barcode
- password 3
- seam number
- label format
- clear text
- high/low limit values
- seam length
- actual no. of stitches
- setpoint of stitch regulator position
- +/- tolerance
- actual option
- actual thread force value
- statistical calculation: Min, Max
- standard deviation

The thread force values out of the seam files can be processed further with standard WINDOWS spreadsheet software, for example to prepare digrams or statistics.

3.12.05 Saving seam files

- The default setting is to save seam files on hard disk under C:\PFAFF\seamfile (configuration in setup level 2, chapter 3.02).
- Data can be saved on floppy disk too (configuration in setup level 2, chapter 3.04).
- Network saving (configuration chapter 2.09 and 3.02).
- The stored seam files can be deleted or further processed in WINDOWS (path C:\PFAFF\seamfile).
- It is recommended that the user should archive the stored seam files at time intervals determined by himself and then delete the archived seam files on the hard disk.

3.12.06 Seam file counter

Under C:\PFAFF\Counter\sc.txt 4 rows of information is saved:

1. Day of the year
2. Counter for all docu seams
3. Counter for good docu seams
4. Counter for bad docu seams

The counter values can be changed or reset in this file.

If new files get the name of already existing files, a WINDOWS error warning is displayed on the screen.

3.13 Examples of seam programming

3.13.01 PFAFF 3715-1/..

The seam to be programmed should have
- 3 seam areas and
- be stored with the comment "docu"
- under program number 7.

- Call up the operation mode ENTER

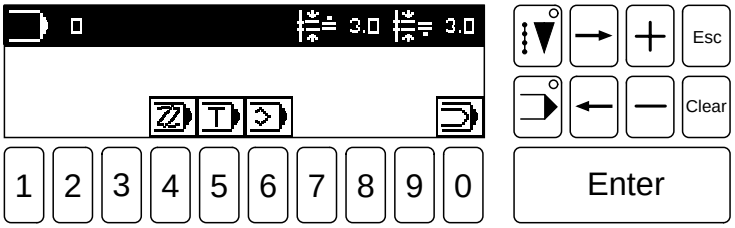


Fig. 3 - 22

- Call up the function **Programming (Number key 4)**

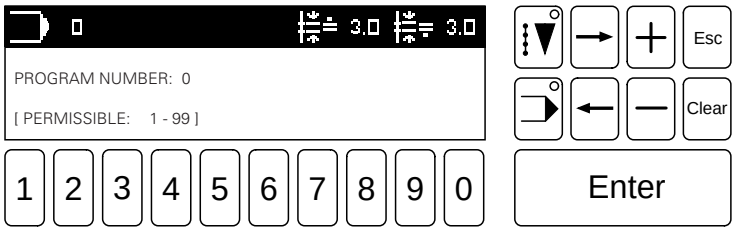
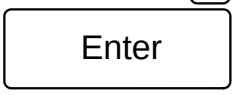


Fig. 3 - 23

- Enter programm number **7**.



- Confirm input with Enter key.
  (Display appears for entering comment).

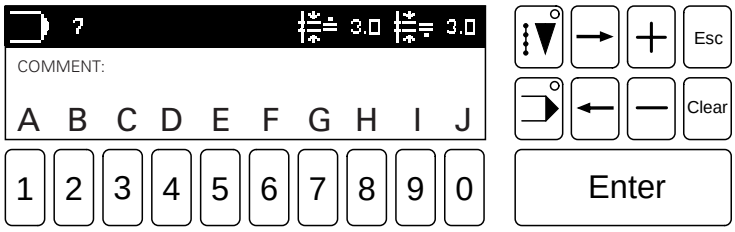
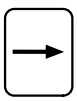


Fig. 3 - 24

- Select letter **D**.



- Press **right arrow key**.

- Select letter **O**.

- Complete comment using the above method.

Enter

● Confirm input with Enter key.

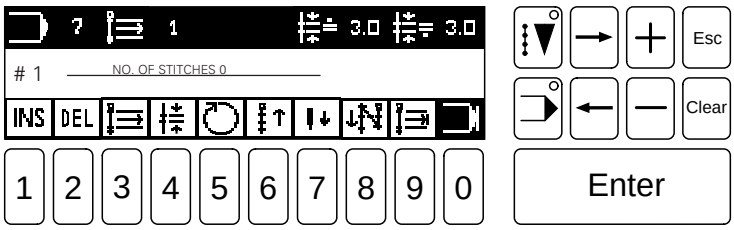


Fig. 3 - 24

● Program the first seam area (before the docu-seam)

The seam area should have
- stitch count (20 stitches)
- and a stitch length of 3.5 mm (for roller presser and wheel feed).

● Call up the function **stitch length (Number key 4)**.

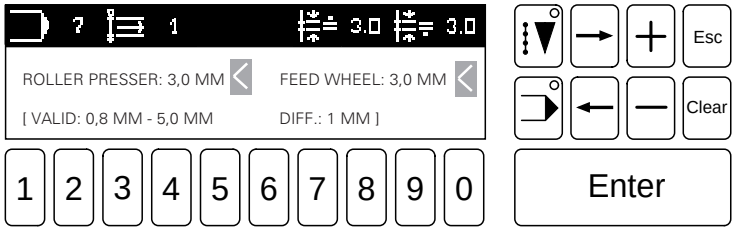


Fig. 3 - 25

The input is used for both stitch lengths. If different values have to be entered, the roller presser and the wheel feed have to be selected with the use of the **arrow keys**. Pay attention to the cursor.

3 5

● Insert the desired stitch length.

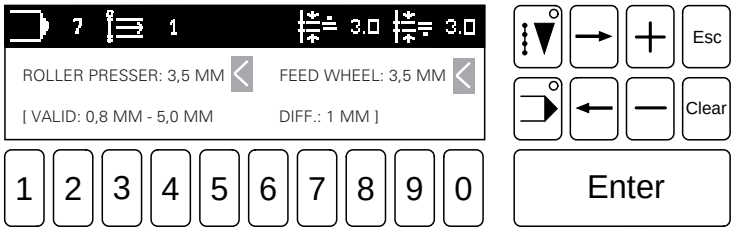


Fig. 3 - 26

Enter

● Confirm stitch length input with Enter key.

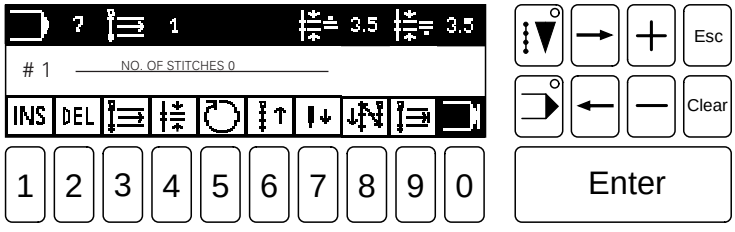


Fig. 3 - 27

- Call up the function **End of seam area (Number key 9)**.

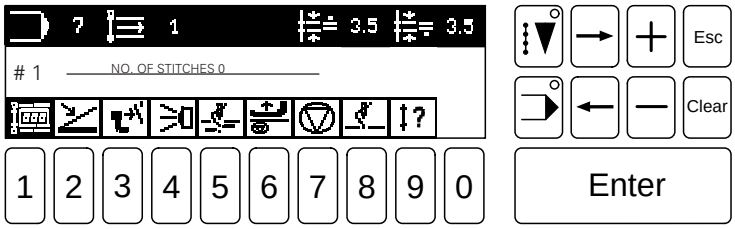


Fig. 3 - 28

- The function **stitch counter** is already switched on (inverse). By operating the function **(Number key 1)** the menu for the input of the number of stitches is opened.

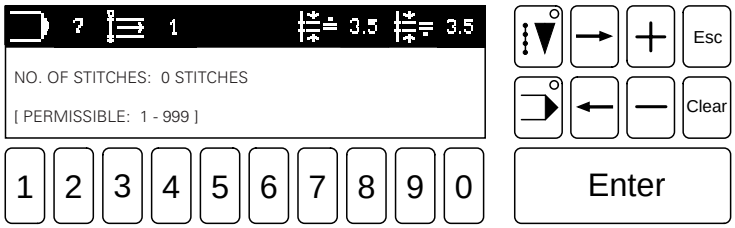


Fig. 3 - 29

2 0

- Enter the desired number of stitches.

Enter

- Confirm input with Enter key.

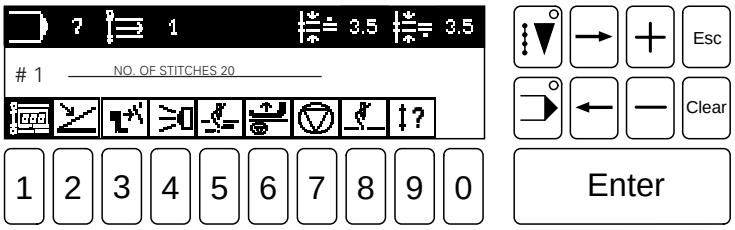


Fig. 3 - 30

Enter

- Close the menu, end of seam area, with Enter key.

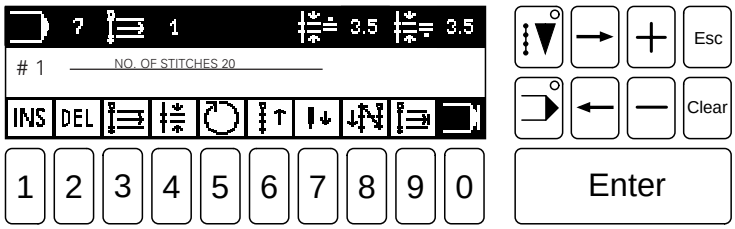


Fig. 3 - 31

- To program the second seam area, switch off the function **End of program (Number key 0)**.

Enter

- Press **Enter key** to teach in the first seam area.

- Program the second seam area (docu-seam area):

In the seam area
- the stitch length should be 5.0 mm
- the automatic stop function should carry out a stitch count (20 stitches)
- the speed should be reduced to 1500 min^{-1}
- and the seam area should be recorded.

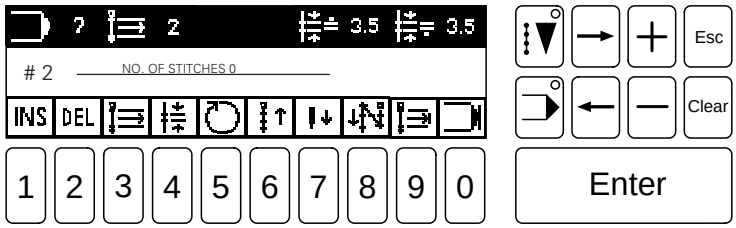


Fig. 3 - 32

- Call up the function **stitch length**.

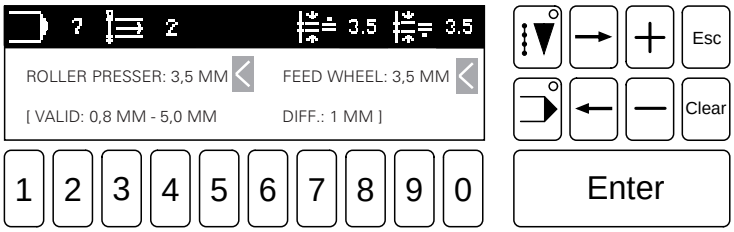


Fig. 3 - 33

5 0

- Enter value for the stitch lengths.

Enter

- Confirm input with Enter key.

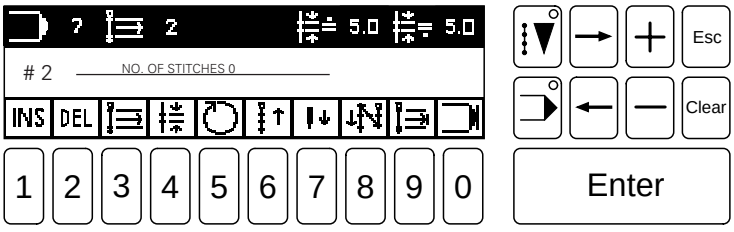


Fig. 3 - 34

- Call up the function for **end of seam area (Number key 9).**

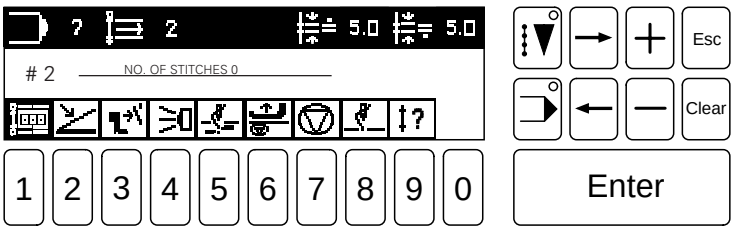


Fig. 3 - 35

- Call up the menu for entering the number of stitches **(Number key 1)**.

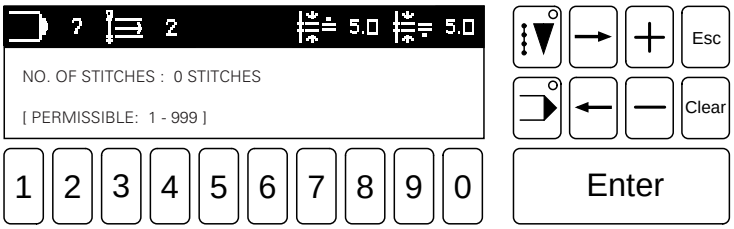


Fig. 3 - 36

2 0

- Enter desired number of stitches.

Enter

- Confirm number of stitches with Enter key.

- Switch on the function **Docu-seam area**.

- Switch on the function **Stop**.

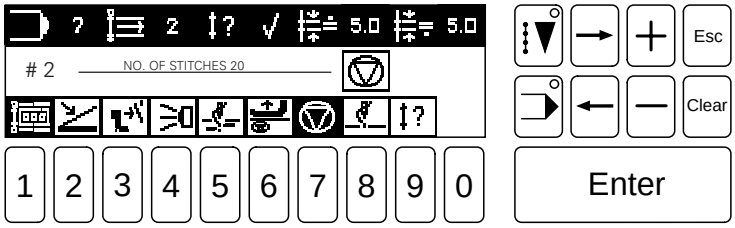


Fig. 3 - 37

Enter

- Press **Enter key** to teach in the end of the seam area.

- Call up the function Speed.

1 5 0 0

- Enter desired speed.

Enter

- Confirm speed with Enter key.

Enter

- Press **Enter key** to teach in the second seam area.
  The computer jumps to the input for the third seam area.

- Program the third seam area (docu-seam area):

The seam area should have
- a stitch count function (20 stitches),
- a stitch length of 2.5 mm (for roller presser and feed wheel)
- and a thread trimmer at the end of the seam area.

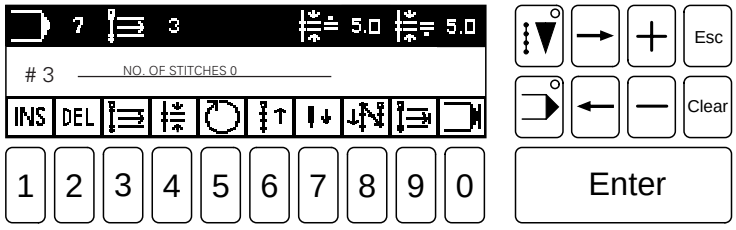


Fig. 3 - 38

- Call up the function **stitch length (Number key 4)**.

2 5

- Enter value for the stitch lengths.

Enter

- Confirm input with Enter key.

- Call up the function for **end of seam area (Number key 9)**.

- If the **stitch counter** function is not switched on, switch on the function **(Number key 1)**.

- Select the **stitch counter** function once again to open up the menue for input.

2 0

- Enter number of stitches.

Enter

- Confirm number of stitches with Enter key.

- Switch on the **Trim thread** function **(Number key 5)**.

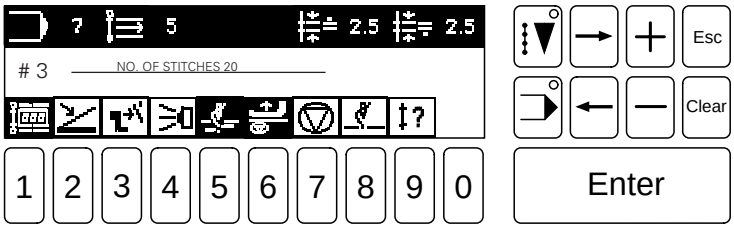


Fig. 3 - 39

Enter

- Press **Enter key** to teach in the end of the seam area.

- Call up the **End of program** function.

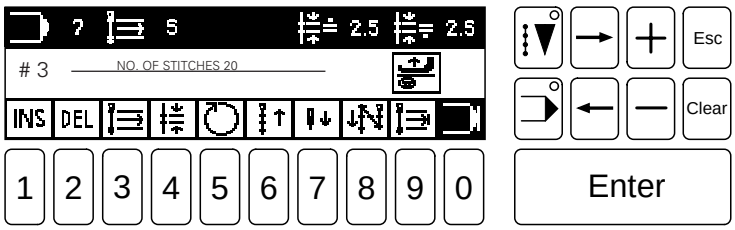


Fig. 3 - 40

Enter

- Press **Enter key** to save the seam programm.

3.13.02 General information on seam programming on the PFAFF 3715-1/..

To achieve the best possible seam quality, please observe the following information.

- As the thread force values are dependent on the speed, it is useful to avoid changes in speed within the docu-seam area. This enables a better tolerance for the limit values and the number of seams classified as good increases.
- The speed should be reduced 5 stitches before the docu-seam area.
- If a docu-seam is classified as poor, the sewing procedure can be ended or interrupted by switching over to manual sewing. To quit the error indication and to be able to sew manually, the **Number key 1** must be operated.
- If the sewing procedure is to be started at certain seam sections, the sewing positions and program positions must coincide. If necessary the program must be set at the required starting point manually.
- The needle must be positioned within the fabric at end of Docu.seam and stop within Docu-seam, to prevent slippage or withdrawal of fabric.
- Additional symbols on the control panel:

Docu-seam-area activated

Bad (NOK) Docu-seam

Good (OK) Docu-seam

No Watchdog function, machine-PC communication is interrupted, machine stops

3.13.03 PFAFF 3715-2/..

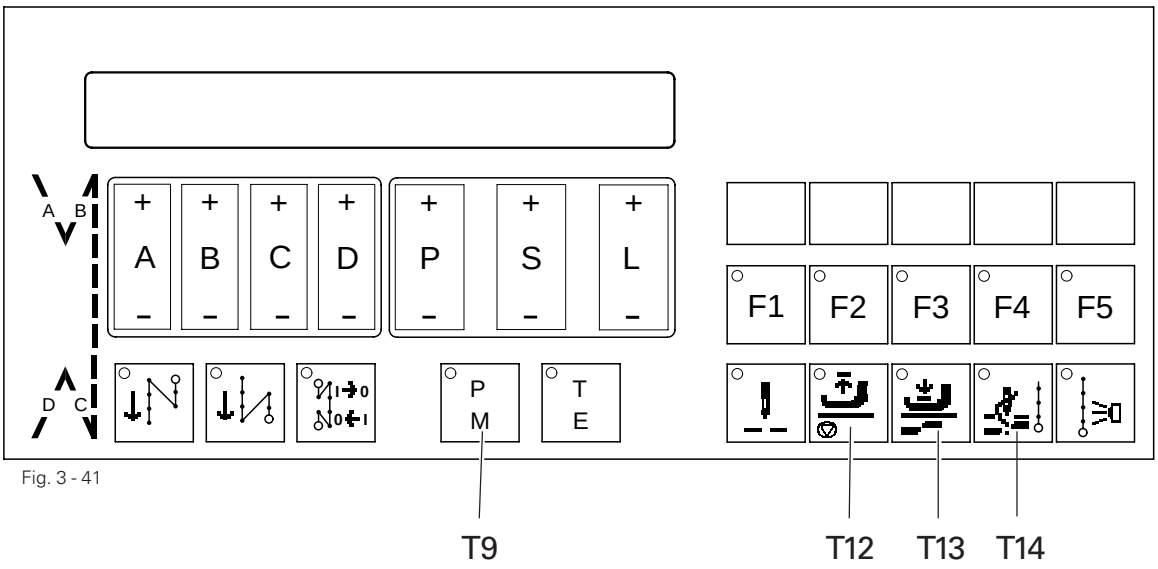


Fig. 3 - 41

Programming "before the docu-seam area"

- Switch on mains switch;
- Key T9 on; PM-LED is on
- P +/- on 1; Program start on program number 1
- D +/- on 2; Switching program 1 to program 2
- A +/- on 2000; Speed = 2000 min^{-1}
- S +/- on 1; Select seam section 1
- L +/- on 20; Enter 20 as number of stitches
- Press F1; LED on, i.e. forward to next program without a stop
- S +/- on 2; Select seam section 2
- L +/- on 0; Program 1 finished, move to program 2
- S +/- on 0; Program combination, L +/- on 1

Programming "in the docu-seam area"

- P +/- on 2; Program 2 selected
- D +/- on 3; Switching program 2 to program 3
- A +/- on 1500; Speed = 1500 min^{-1}
- S +/- on 1; Select seam section 1
- L +/- on 20; Enter 20 as number of stitches
- Press F5; LED on, call up second level of the F-keys
- Press F1; LED on, docu-seam area activated
- Press F5; F5 blinks, F1 LED off, i.e. machine stops
- Press T12; LED on, lift foot
- S +/- on 2; Select seam section 2
- L +/- on 0; Program 2 finished, move to program 3
- S +/- on 0; Program combination, L +/- on 1

Programming "after the docu-seam area"

- P +/- on 3; Program 3 selected
- D +/- on 1; Return to program 1
- A +/- on 2000; Speed = 2000 min^{-1}
- S +/- on 1; Select seam section 1
- L +/- on 20; Enter 20 as number of stitches
- Press T14; LED on, trim thread
- Press T13; LED on, lift foot, end of seam
- S +/- on 2; Select seam section 2
- L +/- on 0; Program 3 finished, move to program 1
- S +/- on 0; Program combination, L +/- on 1
- Return to program start at No. 1 by pressing P-key

If seams with more than 255 stitches are to be programmed, the appropriate number of seam sections have to be selected. For docu-seams with more than 255 stitches, each additional seam section must be entered with the key sequence F5, F1, F5 (docu-seam activated).

3.13.04 General information on seam programming on the PFAFF 3715-2/..

To achieve the best possible seam quality, please observe the following information.

- As the thread force values are dependent on the speed, it is useful to avoid changes in speed within the docu-seam area. This enables a better tolerance for the limit values and the number of seams classified as good increases.
- The speed should be reduced 5 stitches before the docu-seam area.
- The machine stop after the docu-seam must be programmed. The machine then stops 3 stitches after the end of the docu-seam.
- Label printing takes place, if necessary the label can be sewn in.
- The next seam program can only take place after this procedure.
- In the case of manual sewing the docu-seam can be switched on and off by using the knee switch.
- If a docu-seam is classified as poor, the sewing procedure can be ended or interrupted by switching over to manual sewing. The key S+ on the operating panel has to be pressed (to quit the error signal).
- If the sewing process is to be started at certain seam sections, the sewing positions and program positions must coincide. If necessary the program must be set at the required starting point manually.
- The needle must be positioned within the fabric at end of Docu-seam and stop within Docu-seam, to prevent slippage or withdrawal of fabric.
- Additional symbols on the Quick operating panel:
  On the LCD matrix following signs appear at the postion "/":
  - X Docu-seam area activated
  - ! Error in docu-seam
  - o No watchdog function, machine-PC communication is interrupted.
  - m Manual sewing within a programmed seam, activated by T4 (F4). Switching to the next programme takes place by pressing the foot pedal fully backwards (Position 2-).

4 Extension

4.01 Coupling of Bobbin Thread Monitor with Docu-PC

Coupling the Bobbin Thread Monitor –926/06 with the Docu-PC leads to another monitoring method of the sewing process included with the Docu-Seam-System. When the bobbin thread monitor detects that the preselected amount of residual thread is reached (LED at machine is blinking), in case of a correct preset of residual thread you can finish your running sewing process without stopping the machine (Parameter 727 = II).
After thread cutting this bobbin thread alarm is evaluated and the sewing machine is blocked (Error 9 on display, Parameter 679 = II). The Docu screen displays the question: **Bobbin Thread changed ?**
After the bobbin thread was changed this operation must be confirmed by:
Pressing **Key F10** or clicking on the **Field F10** on the Docu screen with the mouse pointer.
After this confirmation Error 9 is deleted and the sewing machine is unlocked.

Parameters for PFAFF 3715-1/...
The option **Bobbin Thread Monitor "6"** can be activated/deactivated in chapter 11.08 in the input menu at **Switch Functions "1"** of the sewing machine instruction manual.
To preset the still needed number of stitches after the 1. bobbin thread alarm, select **Counter "3"** the option **Delay, thread monitor "4"** of the sewing machine instruction manual.

Parameters for PFAFF 3715-2/...

679 I Error 92, restart of machine only by switching the main switch on/off
II Error 9, machine stops, Docu-PC resets Error 9, then the machine can start again.

727 I Machine stops when residual amount of thread is reached.
II No machine stop when residual amount of thread is reached.

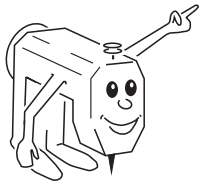
4.01.01 Unlocking with password 1 or 2

If the process **Change Bobbin Thread** must be secured even stronger, the machine release can be made by entering password 1 or 2. Therefore start program **DS-Setup** and open the **Functions** to set the slider **BT Change** to **Red**. After leaving the program **DS-Setup** and starting the Docu-Seam-Program, an additional input field for password 1 or 2 appears on the Docu screen. After entering the correct password the sewing machine is unlocked.

4.02 Exit function for label 110 x 45 mm

Using this integrated function you can react quick and flexible on changes in the production process. If the label name = process name exists in a printed barcode, you can read this name immediately by scanner without opening the label file.
Advantage:
Using this method, label data = process data are downloaded automatically after scanning and also jumping back to the main program is executed at once.
This function too can be secured by password and switch **Scan-Exit** in program **DS-Setup** and **Functions**.

Green: Execute **Exit** without password 1 or 2
Red: Execute **Exit** with password 1 or 2



Notes

PFAFF

PFAFF Industrie Maschinen GmbH

Postfach 3020
D-67653 Kaiserslautern

Königstr. 154
D-67655 Kaiserslautern

Telefon: (0631) 200-0
Telefax: (0631) 17202
E-Mail: info@pfaff-industrial.com

Gedruckt in der BRD
Printed in Germany
Imprimé en R.F.A.
Impreso en la R.F.A.