

PFAFF

Docu-Seam-System

User's guide

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

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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 acquired online by a measurement device during stitch formation, data are analyzed and documented.

The result is 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 personell! The danger and safety instructions on the machine itself are to be followed!

2.01 System requirements

Hardware

- PC with Pentium processor, 350 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

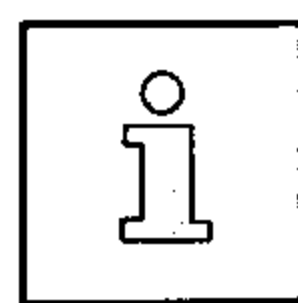
- Microsoft WINDOWS 98®
- Control panel settings:
High Color 16 bit, Screen: 640 x 480

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

2.02 Installation of driver software NI-DAQ for WINDOWS



Attention: The Lab-PC+ 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

- 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
- Go on installation described under point 2.03

CD starts automatically

- 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 Lab-PC+ 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 Lab-PC+, 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 Lab-PC+**
- Lab-PC+ Properties: Select **Resources**, if necessary change settings
and select new value
- I/O 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 Lab-PC + board, see User Manual page 2-7.
- Similar to this set the DMA channel, see Lab-PC + User Manual page 2-6, and the I/O range, see User Manual pages 2-3 and 2.5



An indicated interrupt conflict leads to a failure during data acquisition 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 DS08-00x 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

2.06 Locking the WINDOWS function key (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

2.07 Locking the WINDOWS function key (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

2.08 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 95/98 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.

2.08.02 Seiko Label Printer

The printer is connected as a default printer to either the serial interface **COM2** or the parallel interface **LPT 1**.

The software can be installed with the enclosed disks for WINDOWS 95/98.

- Insert disk in drive and execute "**winsetup.exe**".
- Follow the installation instructions.
- Send print orders to printer.
- If necessary, carry out printer test.

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

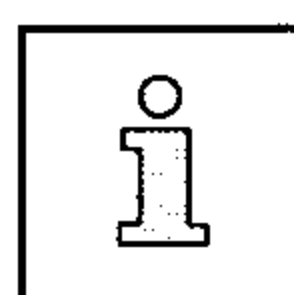
- For PC1: Network, Identification, input of PC-name PC1
- Work group: Docu-System, Comment: ***, OK
- Same input for PC2, Restart the PC

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

Scanner Installation

- Looping the scanner via cable into keyboard
- Open **WINDOWS Editor**
- Read installation codes from scanner manual:
 - **Restore Default**
 - **Wedge: IBM AT**
 - **Nationality: English**
 - **Operating Test: 123456** (displayed in Editor)
- 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.

In this way, measuring errors, caused for example by sudden changes in temperature, are eliminated by a special measurement principle.

The signals from the sensor are then evaluated in the PC via a signal input card and a data acquisition card 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 or knee switch (photocell PFAFF 3715-1/..).

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 to the following error types:

- skip stitch
- needle thread breakage, end of needle thread
- bobbin thread breakage, end of bobbin thread
- needle breakage

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 functions.

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

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.

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

Password 1

Clicking on the slider with the left mouse key it is moved up and the window **Password Level 1** opens. 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.

Password 2

Opening the window for password 2 in setup level 2, a password list for level 2 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.

Password 3

Opening the window for password 3 in setup level 2, a password list for level 3 is displayed. The user may enter 10x6 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.

3.03 Release functions

Move the slider **Functions** from red to green in setup level 2, and the screen **Functions:unlock/lock** opens.

Unlocking function means the slider on green, locking functions means slider on red.

- High limit value, low limit value, Option:
 - 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, Table, Min/Max, 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

Clicking on **return** this configuration is saved and left.

3.04 Path for seam files

The path for saving seam files is entered in setup level 2. If there is no path entered, the seam files are saved automatically under C:\PFAFF\Seamfile.

(See chapter 2.09.02 Principle configuration)

3.05 Input Functions

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

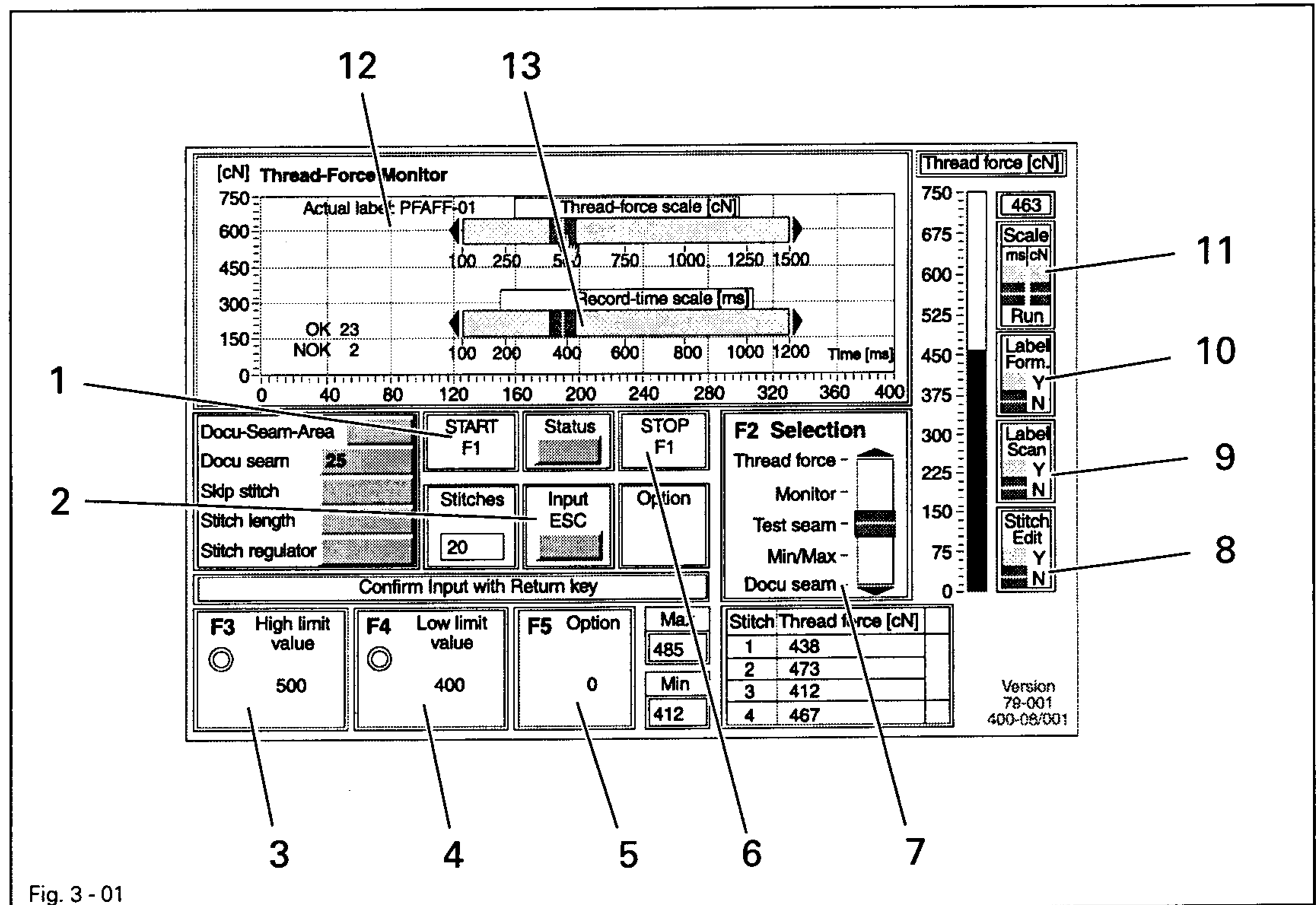


Fig. 3 - 01

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)

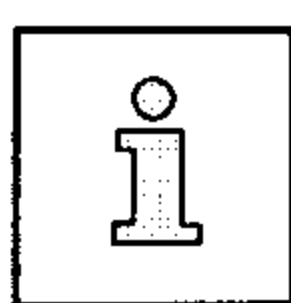
After calling this function when Input is activated, (see above), the high limit value for thread force can be changed. After pressing <Return>, the newly-entered limit value is adopted and saved. At the same time, Input is deactivated again (input display red).

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)

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. After pressing <Return>, the entered limit value is adopted and saved. At the same time, Input is deactivated again (input display red).



"Permissible exceedings" are individual stitches outside the tolerance range which do not cause a serious reduction in seam quality. Skip stitches, thread breakages, thread ends or needle breakages are still recognized and lead **immediately** to an error message in case of a measured thread force below 50 cN.

6 - 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 3.14. 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 3.14. Parameter/Configuration settings**

To sew a docu seam, parameter 683 must be set to I.

7 - 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 3.05 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.

Test seam (<arrow keys>)

After calling this function, a test seam can be sewn with the slowest and fastest speeds planned for the docu-seam area.

Min / Max (<arrow keys>)

With this function, the user can request the maximum- and minimum-occurring thread forces after a test seam has been completed. The values are displayed in the respective display fields (below right); the table takes over the thread forces attributed to the stitches.

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.

8 - 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**.

9 - Label/Scan

By using this function, information concerning the selected label can be entered. See **Chapter 3.09.07 Label name, label selection**.

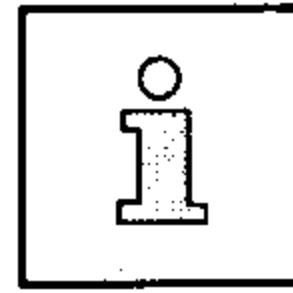
In addition you can call up or execute the input for the scan function, see **Chapter 3.09.11. Scanner function**.

10 - Label Form.

With this function the label size and label printer can be selected.

11 - 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. 12 on Fig. 3-01). 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. 13 on Fig. 3-01).



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

3.06 Display functions

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

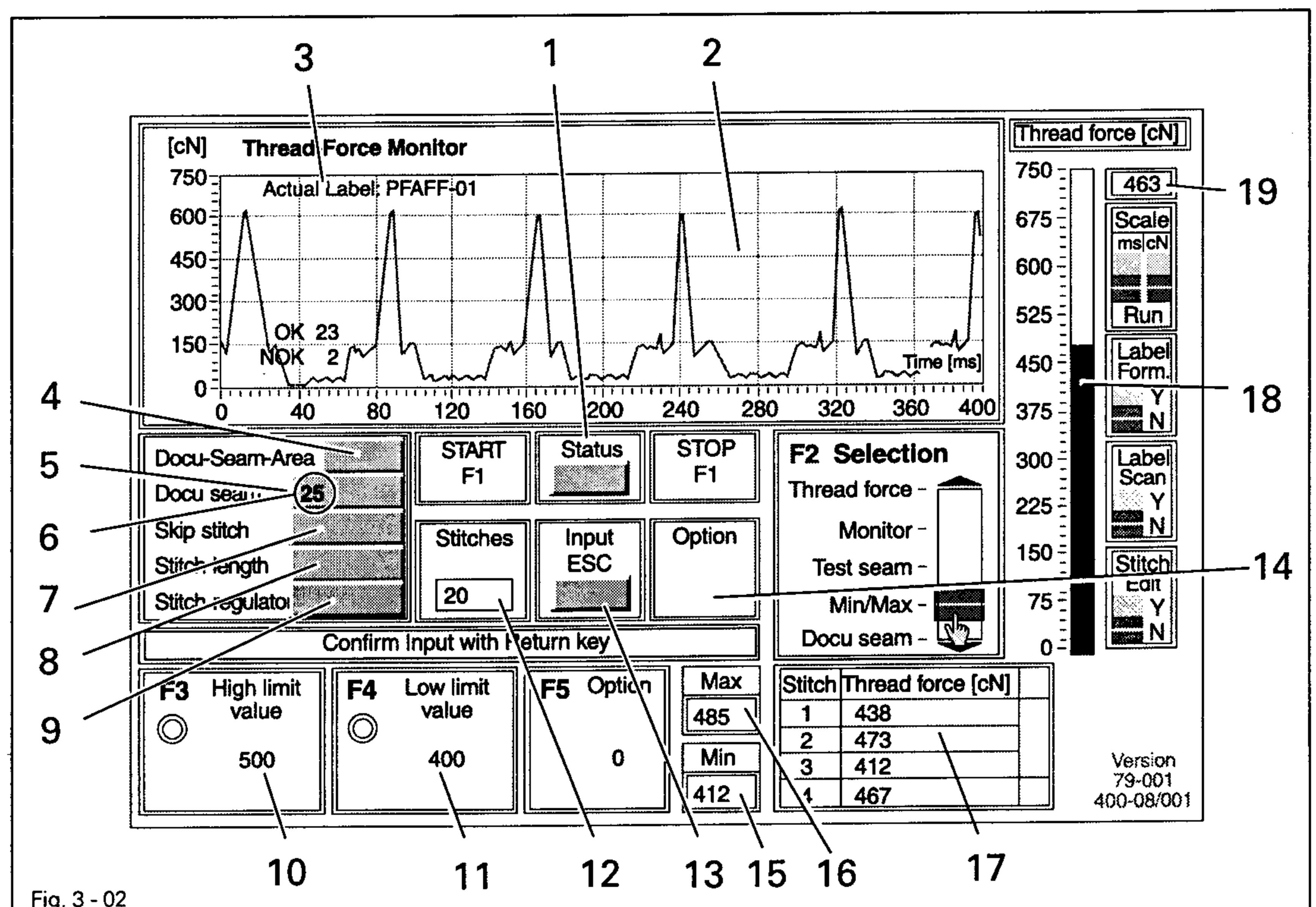


Fig. 3 - 02

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 monitor

The flow of the dynamic thread force can only be displayed during the sewing procedure by using this function. The measuring ranges of the x-axis (time in ms) and of the y-axis (thread force in cN) can be changed (see 3.04 Selection of measuring ranges).

3 - Actual label

With this function the current label name loaded is displayed.

4 - Docu-seam area

This shows whether the machine is currently in the docu-seam area or not (Green display = docu-seam area / Red display = not in docu-seam area).

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).

6 - Docu-seam number

The total numbers of docu-seams (good or bad) is displayed.

OK: The number of good docu-seams is displayed.

NOK: The number of bad docu-seams is displayed.

7 - 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).

8 - Stitch length

From this display, you can recognize whether the calculated stitch length in the docu-seam area is correct.

(Green display = stitch length in order / (Red display = stitch length not in order).

9 - 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).

10 - 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).

11 - 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).

12 - Stitches

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

13 - Input display

The mode in which the program is currently operating is displayed here.

(Red display = input not active / Green display = input active).

14 - Option (exceedings)

The number of stitches within the docu-seam area falling outside the limit values for thread force is displayed here. (Activate with the keys **Esc** and **F5**).

15 - Minimum thread force

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

16 - Maximum thread force

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

17 - 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.

18 - 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.

19 - Display panel for thread force

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 as a numerical value.

3.07 Selection of measuring ranges

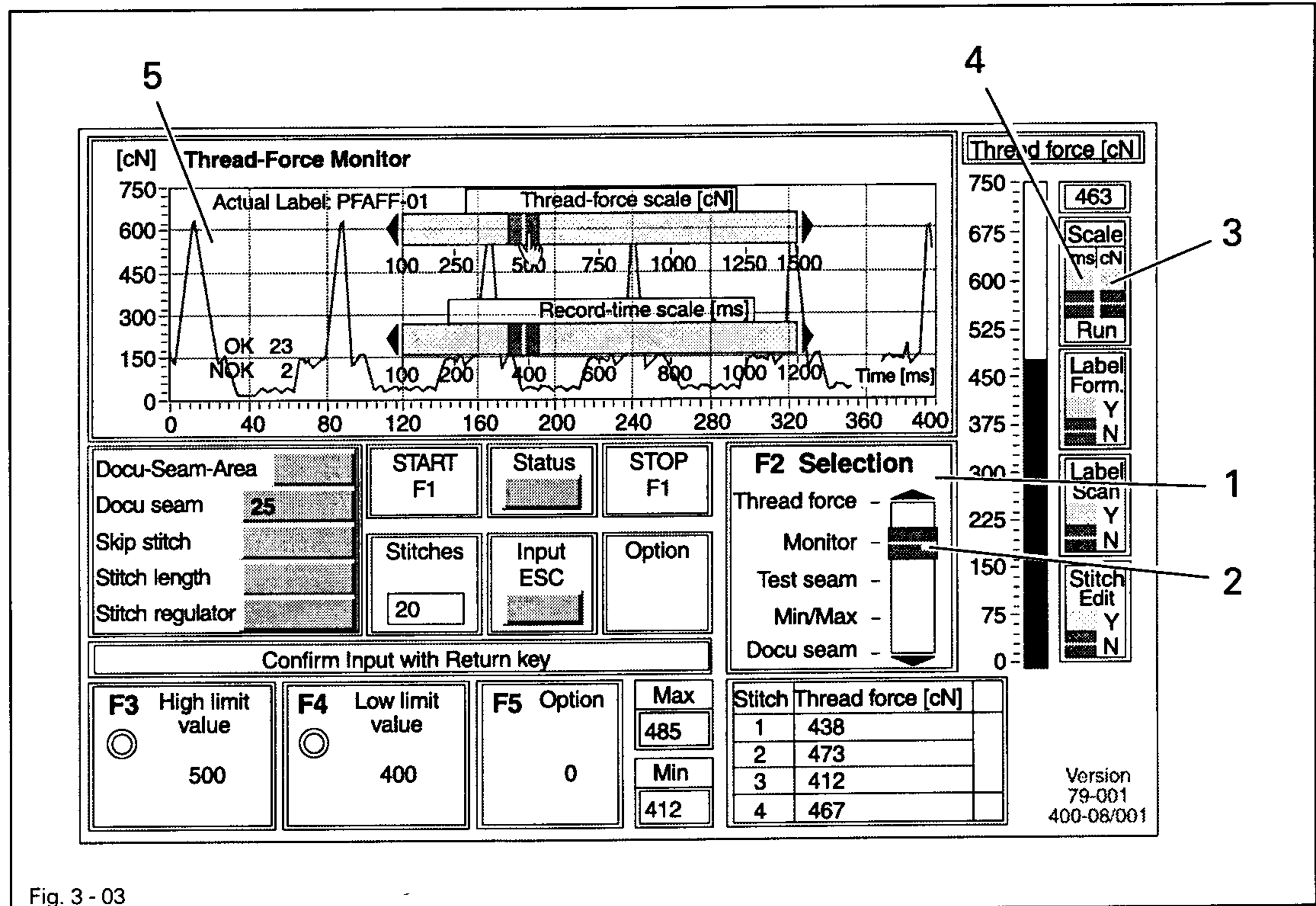


Fig. 3 - 03

- Activate the panel Selection 1 with the key <F2>.
- By using the <arrow keys> or clicking the mouse, set the slide switch 2 to the Monitor function.
- Click with the mouse pointer on the slide switches 3 or 4 for "cN" or "ms" and push upwards.
In both cases, a slide switch appears on the thread force monitor 5 for the adjustment of the full-scale values for the thread force and/or the time axes.
- Click on the desired full-scale value with the mouse pointer.
The slide switch changes to the selected full-scale value and the new values are adopted on the monitor and in the bar graph.
- Push the slide switches 3 and 4 back down with the mouse pointer.

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

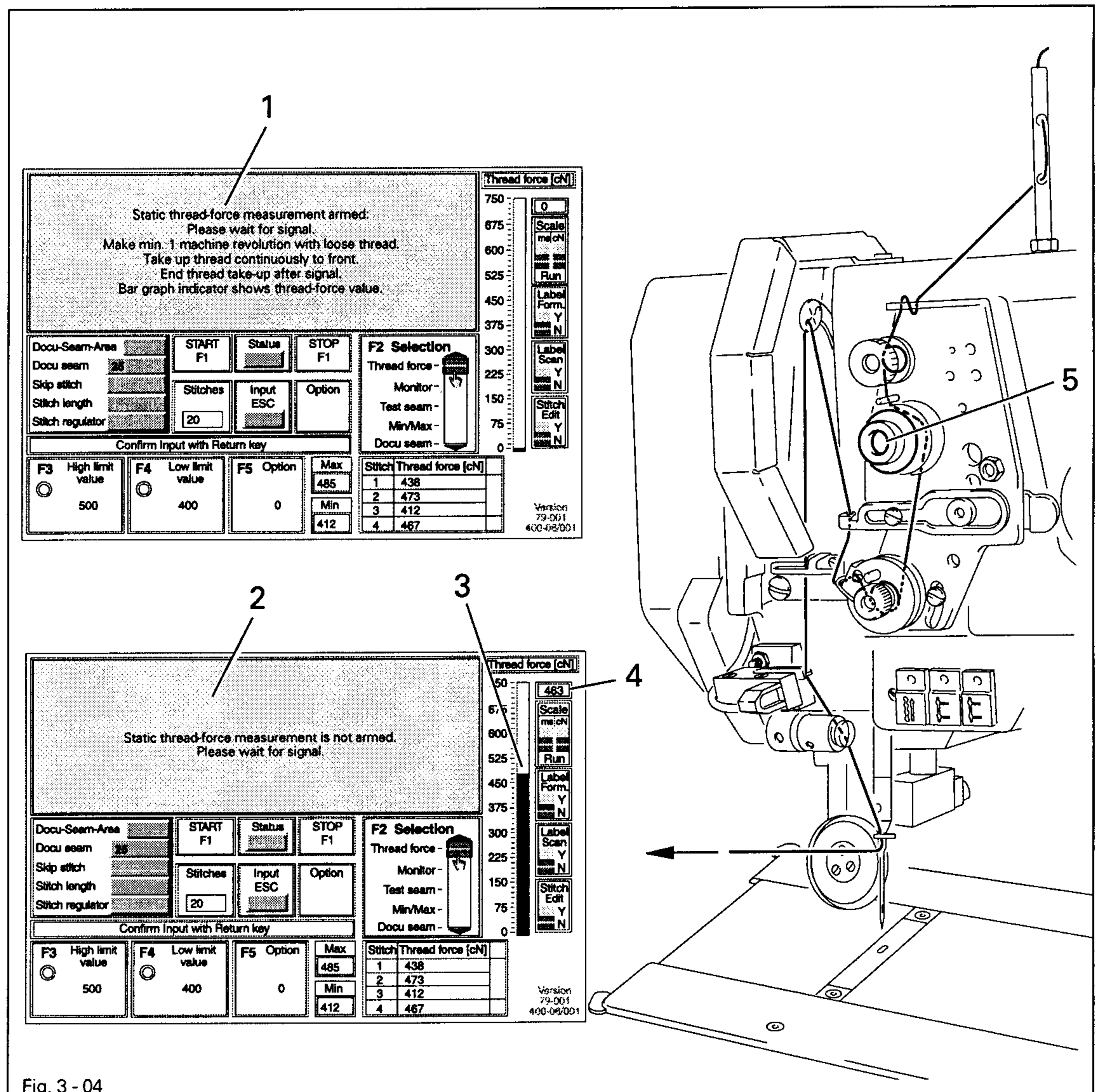
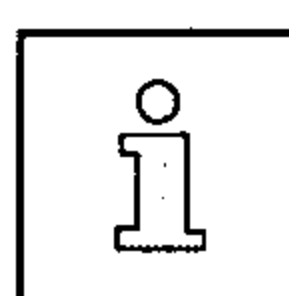


Fig. 3 - 04

- 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 Selection of measuring ranges).
- 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 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.

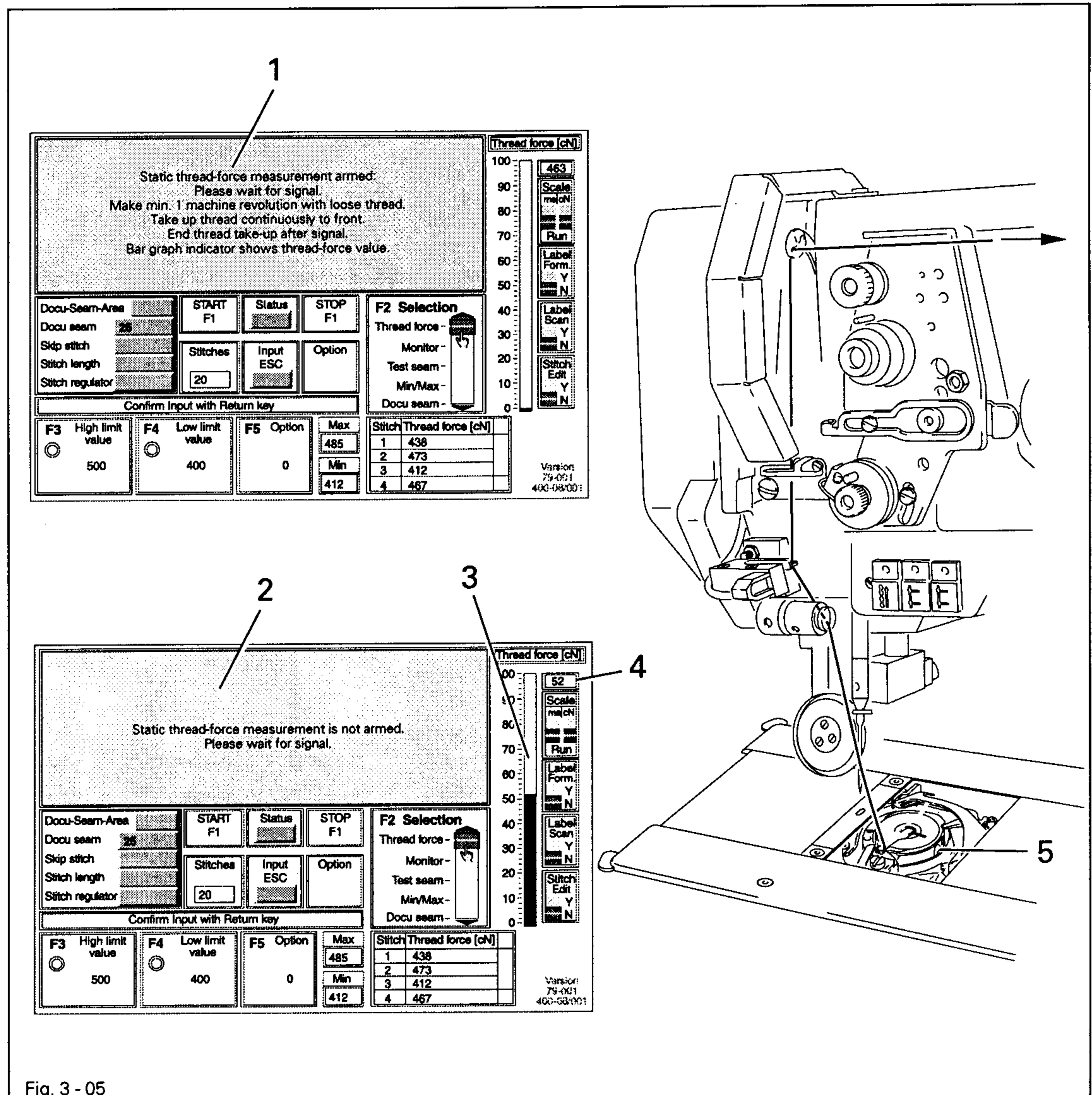
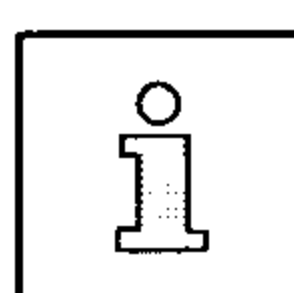


Fig. 3 - 05

- 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 Selection of measuring ranges).
- 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 can be displayed using the **Min/Max** function. These thread forces serve as the basis for setting the limit values.

3.09.01 Determining limit values

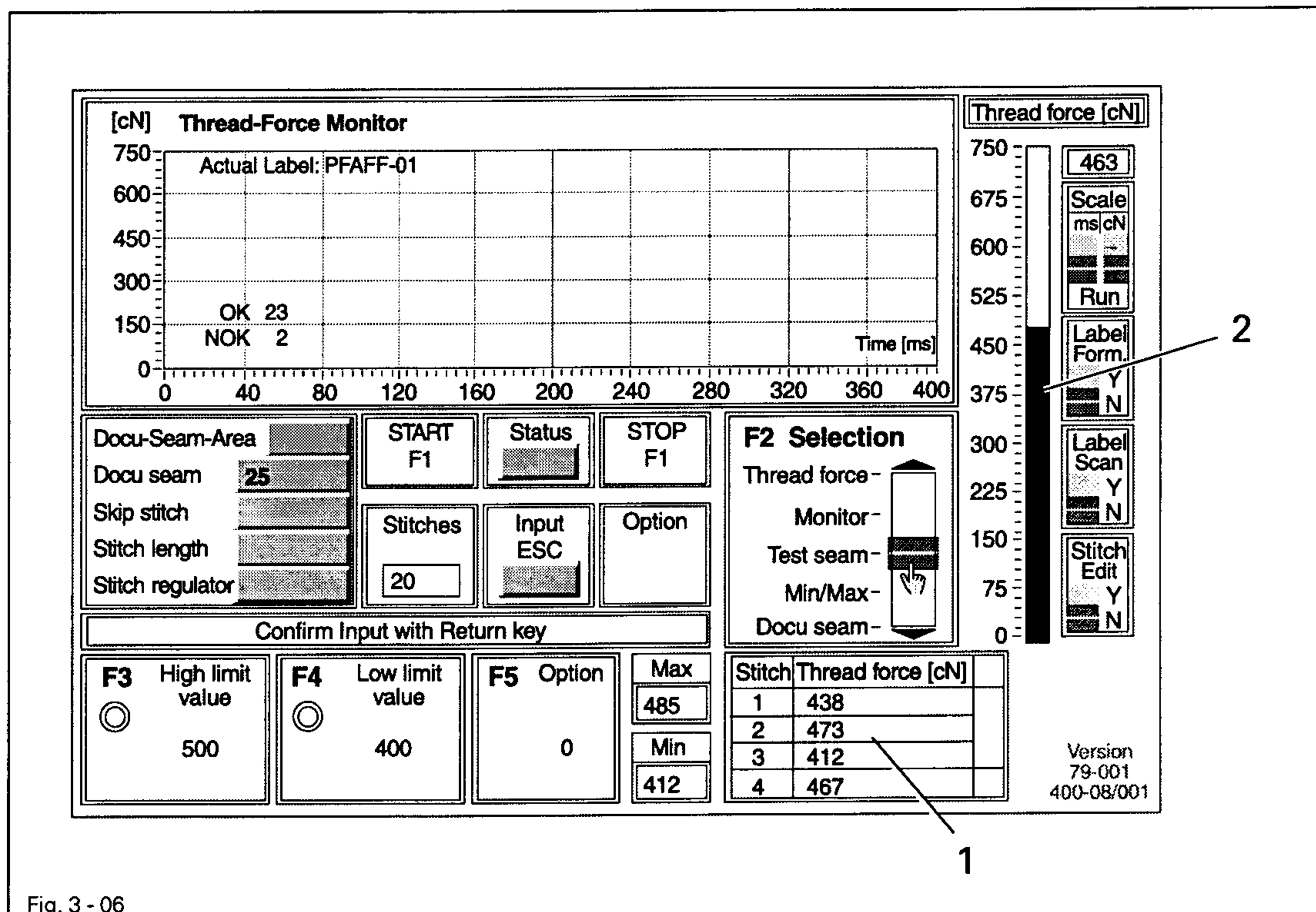
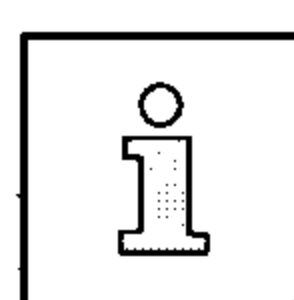


Fig. 3 - 06



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 2.

3.09.02 Setting limit values

After the maximum or minimum thread force by stitching off the test seam are established (see Chapter 3.06.01 Determining limit values), the limit values for the thread force can be entered.

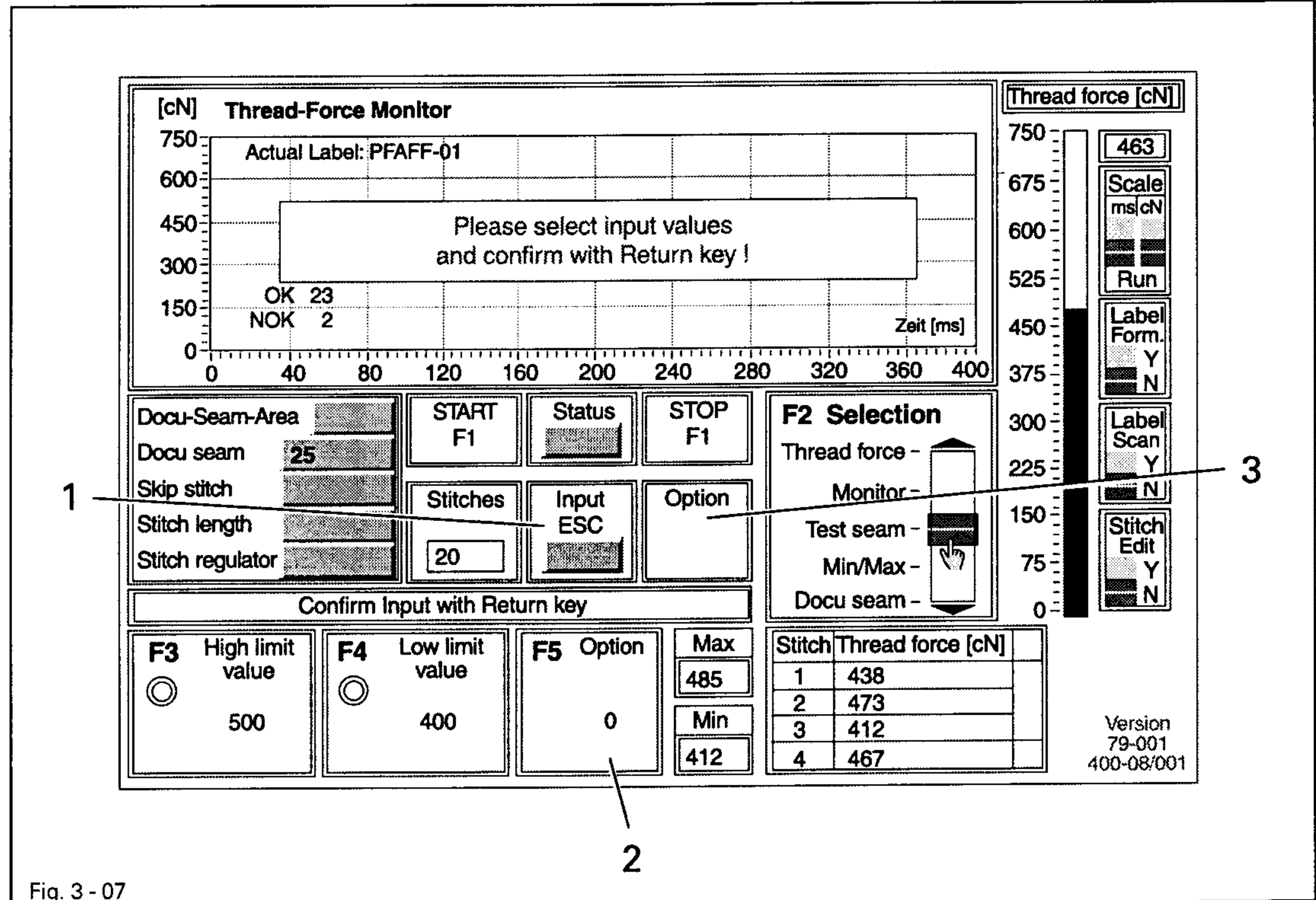
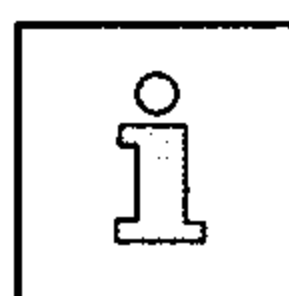


Fig. 3 - 07



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.
 - 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.

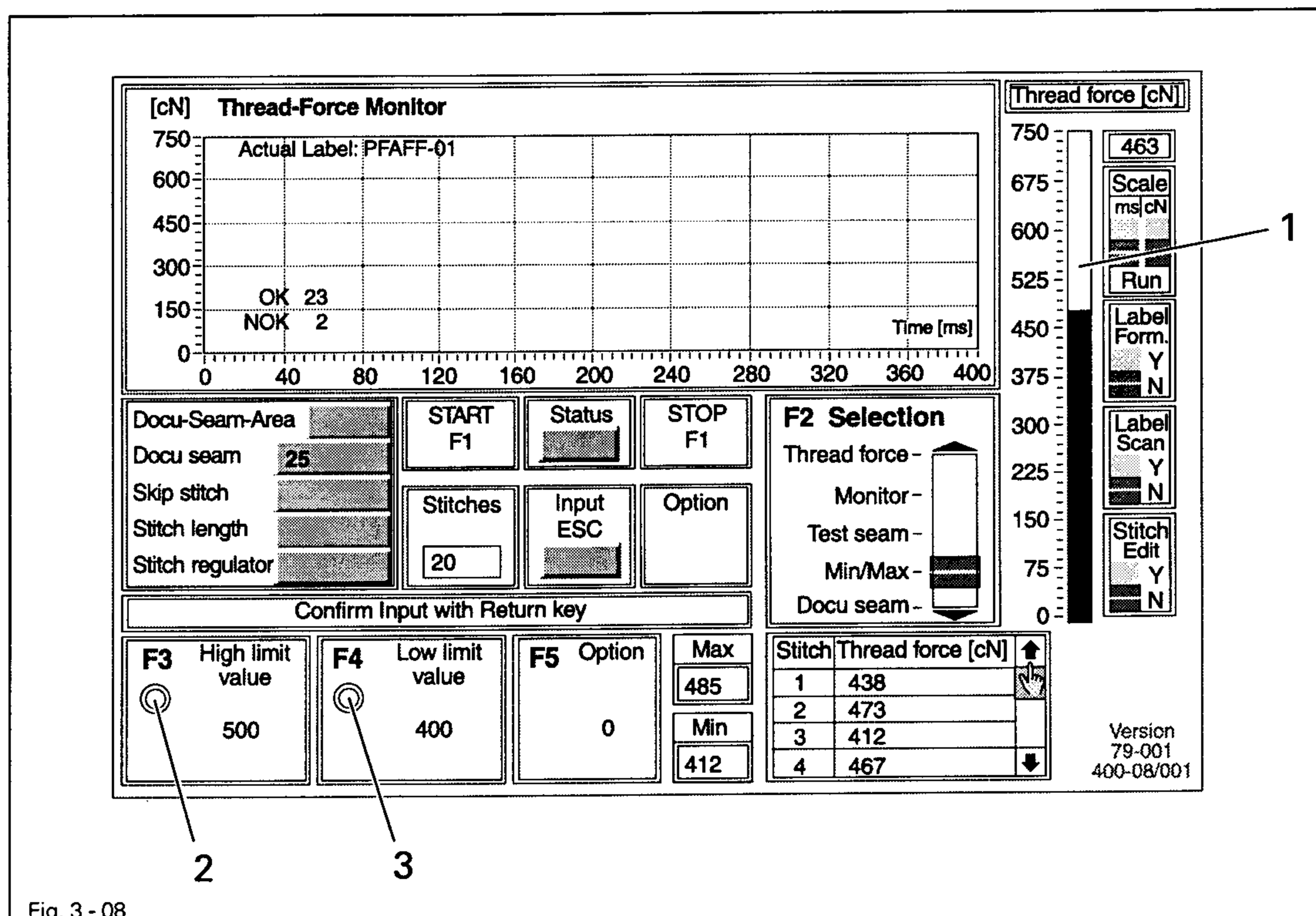


Fig. 3 - 08

- 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, if the Min/Max function has been selected.

- Correct the limit values, if necessary.

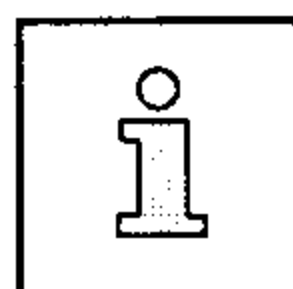
3.09.04 Monitoring the number of stitches (calculated stitch length)

- Click on the slider in the panel **Stitch Edit** and move it to "Y" (for yes).
The input window **Selection** opens.
- Click on the key **Seam length/Stitch length**.
- 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: 400 mm
Setpoint no. of stitches: 80
+/- number of stitches: 3

Result: 82 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 4.88 mm (400 mm : 82). 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**".



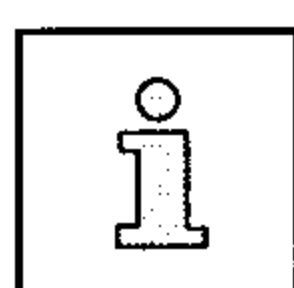
If the value "0" is entered for the seam length, the function "**monitoring the number of stitches**" is deactivated.

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.
- 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.
- 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.
- 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.

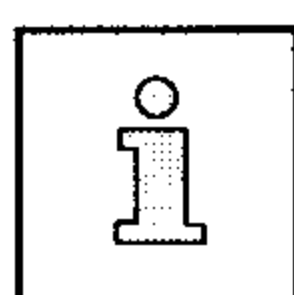


Do not install new directories because program access is done automatically to existing label directories.

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 45 x 155 mm.

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



Do not install new directories because there is on automatically program acces to existing label diectories.

Input of clear text

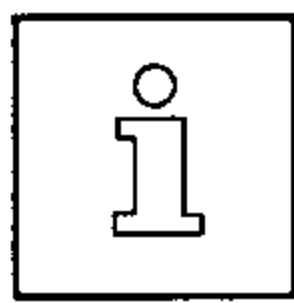
Three rows with approximately 50 characters each can be entered.

- 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 possibilities 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.



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.

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

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 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

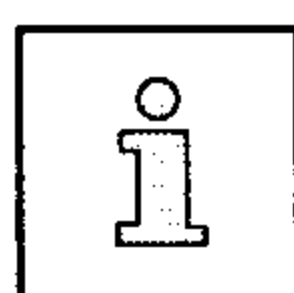
Label output:

- 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.

Seiko, 28 mm x 89 mm

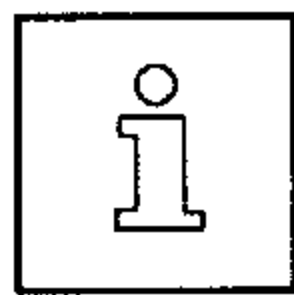
Label output:

- 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?

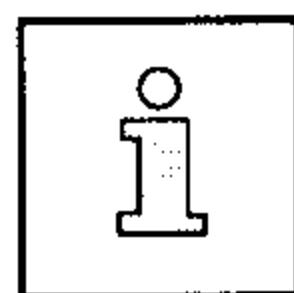
No: Program exit, return to WINDOWS platform

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 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 actual 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.

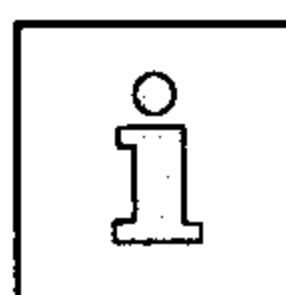
Cycle

This is a setting which means, after how many docu seams a new scan operation must be executed, for example: 5.

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.

- 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.
- If there is no input of settings, no question for scan operation before the sewing process is asked.
- Starting up the system, you are always asked for a scan operation (independent of the actual cycle counter when you have left the program), but only if settings were saved.



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

3.10 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 under the control of the docu-seam system.

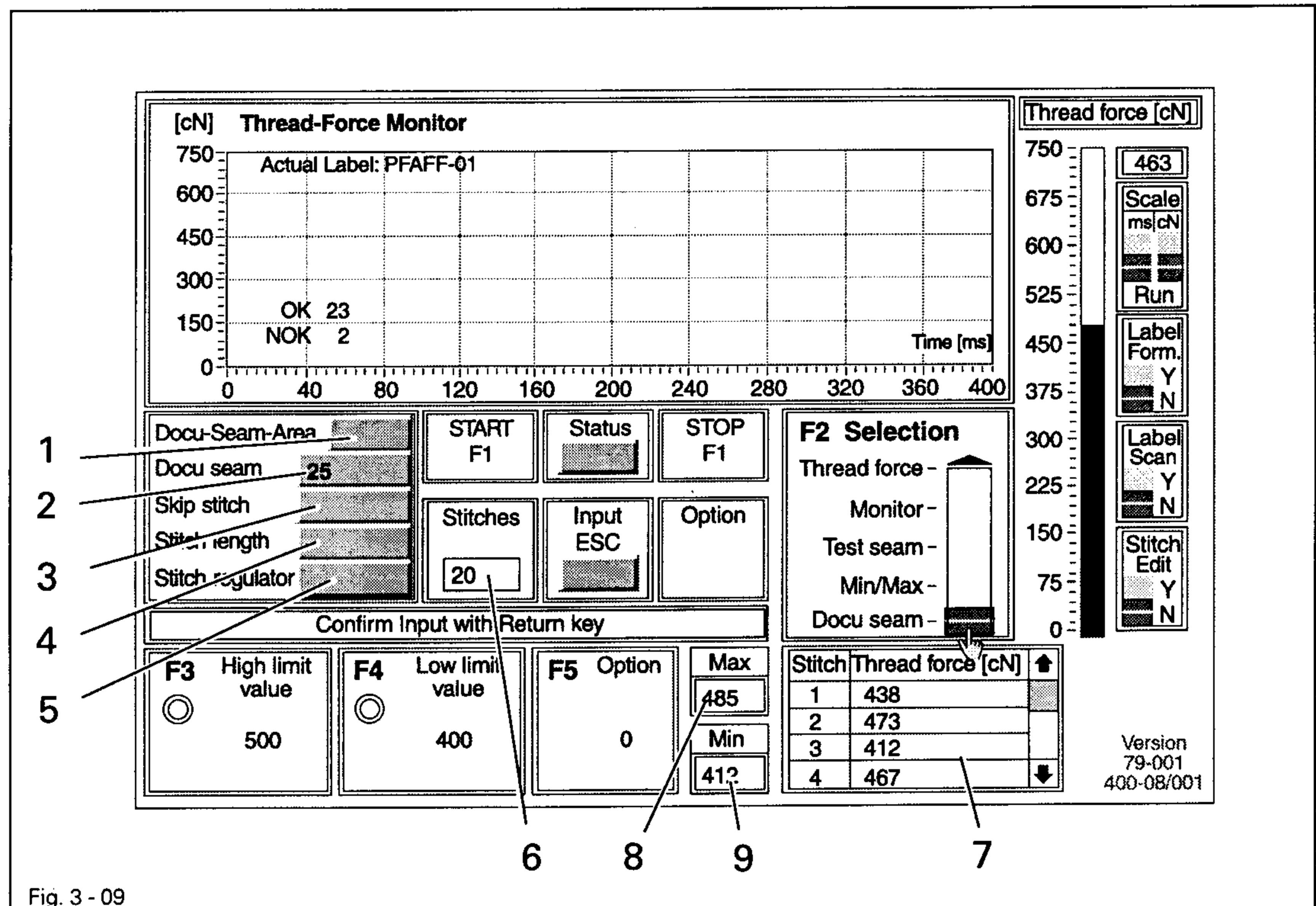
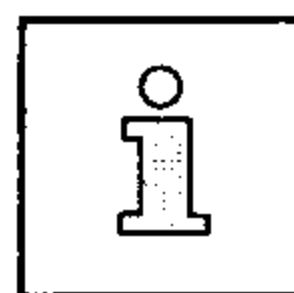


Fig. 3 - 09

- 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 3.14 parameter settings.

- Stitch off the seam.
As soon as the docu-seam area is reached, the seam control 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:

- 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 the display panel 2
- The Docu-seam OK-indicator is increased by 1
- Total number of stitches in the docu-seam area is displayed (display panel 6)
- Thread force table 7 contains all the individual stitches with the accompanying thread force
- Maximum/minimum occurring thread force is displayed (display panels 8 and 9)
- Seam file is stored on the hard disk
- The appropriate label is printed

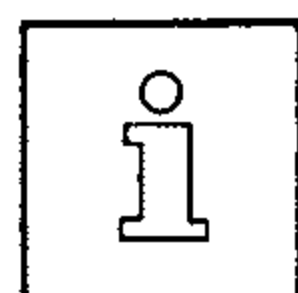
Docu-seam is not in order:

- Display panel 2 and, if necessary, display panels 3, 4 or 5 are red
- PC interface receives no signal
- Docu-seam number is given
- The Docu-seam NOK-indicator is increased by 1
- Total number of stitches in the docu-seam area is displayed (display panel 6)
- Thread force table 7 contains all the individual stitches with the accompanying thread force
- Maximum/minimum occurring thread force is displayed (display panels 8 and 9)
- Seam file is stored with the extension NOK
- No label is printed

3.11 Output functions of the Docu-Seam-System

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

- After calling up the Monitor function, the temporal flux of the thread force 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:

- Press <F2> (Selection function).
- During the recording of the signal, switch over from "Monitor" function to "Test-seam" function (using arrow keys or mouse click).

- In addition, each individual stitch is listed in the thread force table, together with the accompanying thread force (for test and docu-seams). Seams with a maximum of 999 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 slide.
- If a docu-seam is evaluated as good or bad, the seam file is stored with the following parameters on the hard disk:
 - Identification number, Barcode contents, ● Seam No., ● date, ● time, ● label size, ● label name, ● number of stitches, ● label output ● Clear text ● Thread force values of all stitches, ● high/low limit value, ● option, ● seam length, ● setpoint of number of stitches, ● +/- number of stitches, ● stitch length (calculated), ● setpoint of stitch-regulator position, ● +/- tolerance, ● actual position of stitch regulator ● Scan data, ● cross check number

The thread force values of seam files can be processed further with a standard spreadsheet program, for example to prepare diagrams and statistics.
- The stored seam files can be deleted or further processed in WINDOWS (access path: **c:\pfaff\seam file**)
- It is recommended that the user should archive the stored seam files at time intervals determined by him-/herself, e.g. on a disk, and then delete the archived seam files on the hard disk (Option: Network).
- On the access path **c:\pfaff\counter**, the file **sc.txt** is at your disposal.

- The file SC includes 4 rows:

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 reset in this file.

- If existing files are given the same name again, WINDOWS error signal appears.

3.12 Configuration Program

This program is needed to preinstall (in the factory) the language selection and to teach in the stitch-regulator data.

If, at a later date, only the language has to be changed, the corresponding language identification number can be selected in the file poti-ref.txt.

3.12.01 Language selection

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.

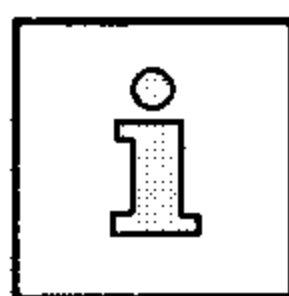
In the Configuration program:

- Call up the Configuration program with a double click on the program symbol.
- Bring the slide switch into the correct position with the mouse.
- Click on the field "Return" with the mouse.
The selected language is taken over.

3.12.02 Teach in the stitch-regulator position

- 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".
- 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.

- Save the input values by clicking on the field "Save data".



To deactivate the function **Monitoring the stitch-regulator position** (e.g. for the PFAFF 3715-1/...), the value for the adaption of stitch regulator must be "0".

3.12.03 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.

3.13 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

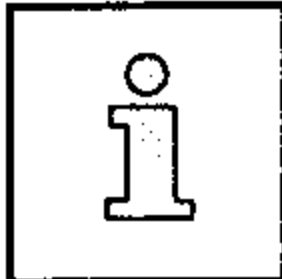

Seiko Smart Label Printer 220

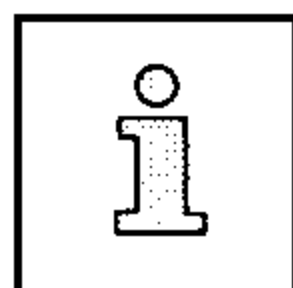
Supplier: Inmac Micro Warehouse
Postfach 1280
65433 Flörsheim
Telephone: 0180/5237266, Telefax: 0180/5228229

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

3.14 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 Min/Max, Test seam, Monitor or Threadforce). In this configuration the machine can be used without Docu-Seam-System.		
10		Docu-Seam-monitoring: yes (Selection slider F2 may be positioned on Docu-Seam). If this condition is not fulfilled, 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 fulfilled, a watchdog function is blocking the machine, a sewing operation is not possible.		
		II = no (selection slider F2 must be positioned on Min/Max, Test seam, 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



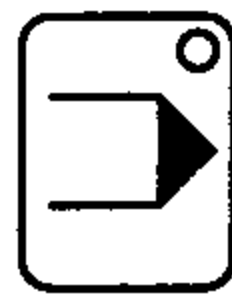
Because of process security watch the parameter 683 and Configuration 9 or 10!
For information please see instruction manual of motor manufacturer.

3.15 Examples of seam programming

3.15.01 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

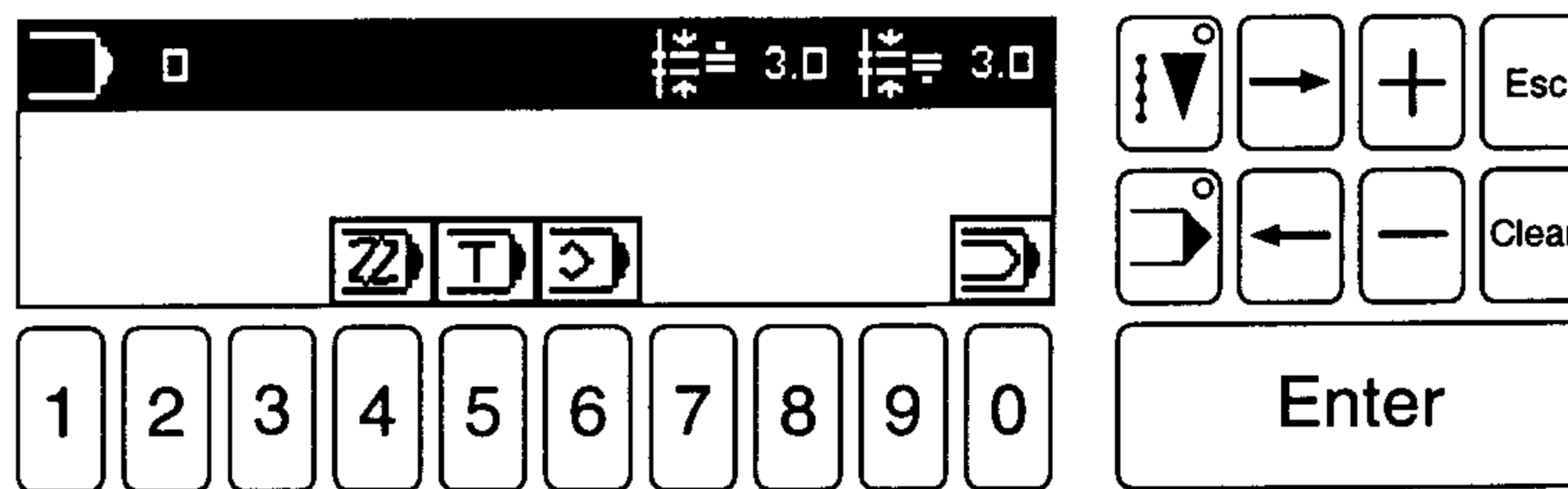


Fig. 3 - 10



- Call up the function Programming (Number key 4)

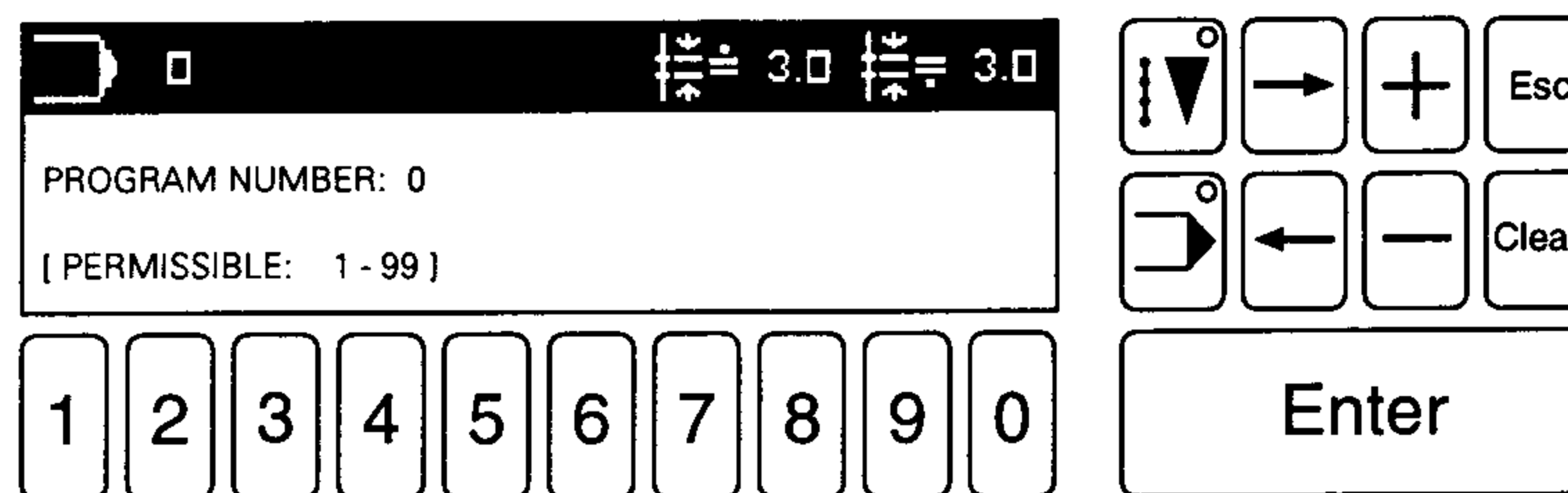


Fig. 3 - 11



- Enter programm number 7.



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

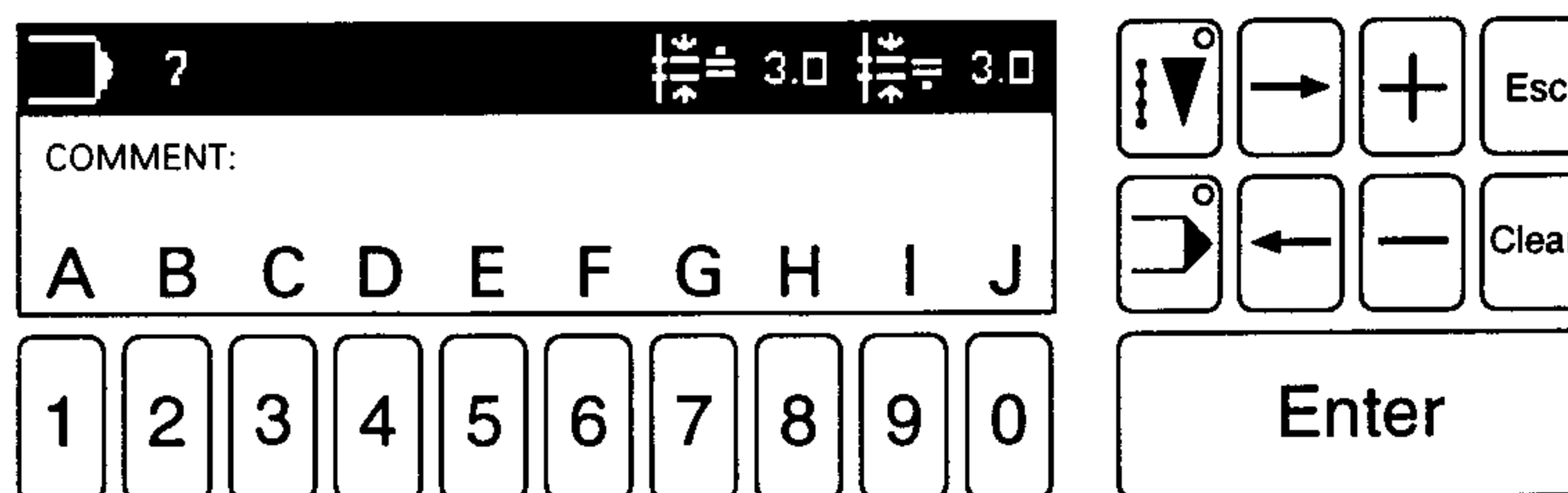
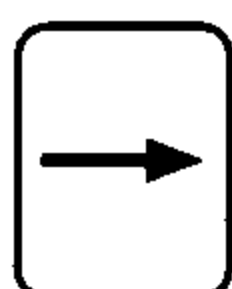


Fig. 3 - 12



- Select letter D.



- Press right arrow key.



- Select letter O.

- Complete comment using the above method.

Enter

- Confirm input with Enter key.

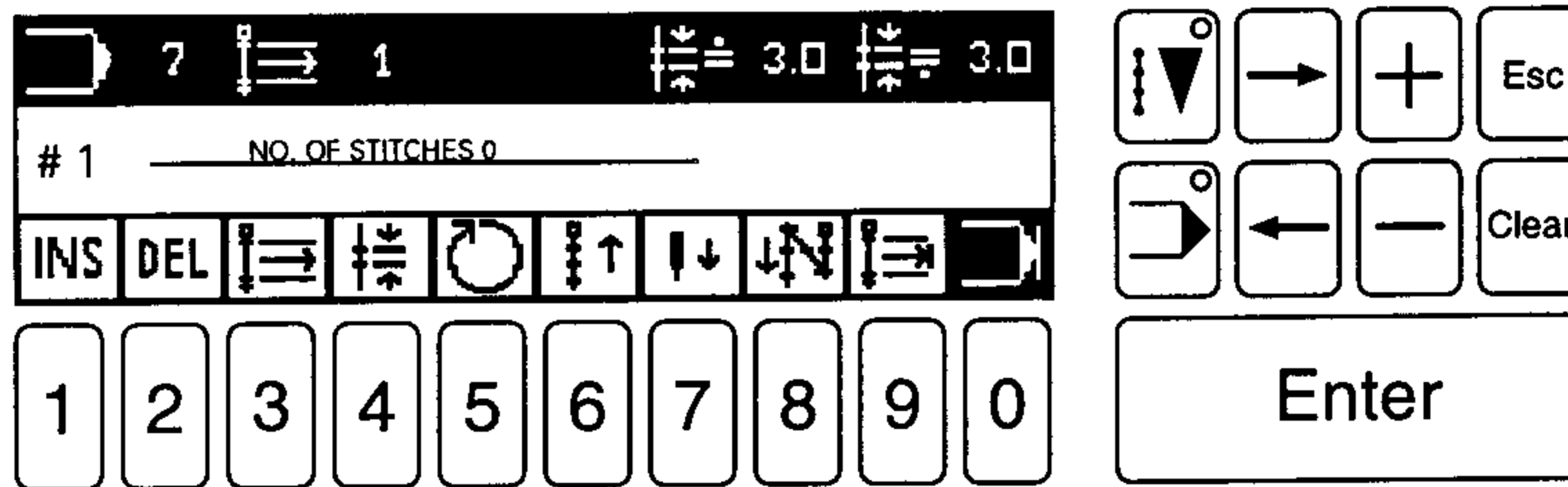


Fig. 3 - 13

- 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).

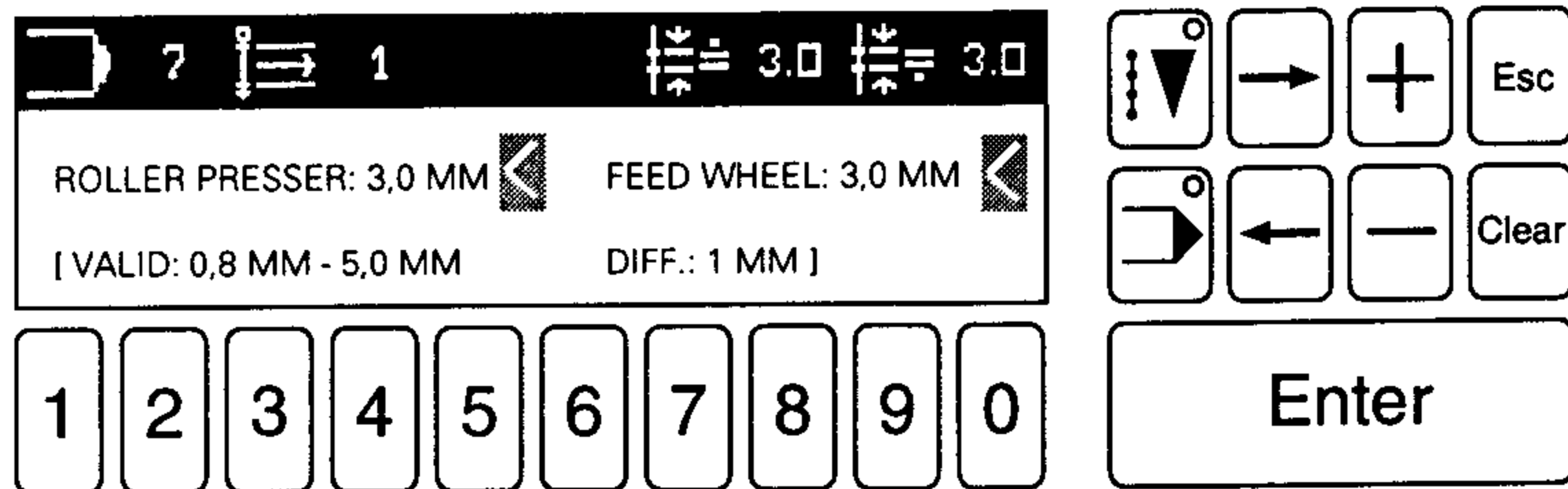
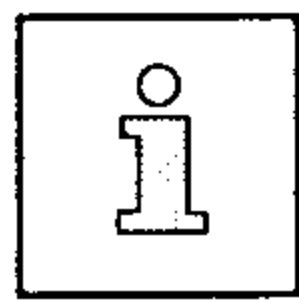


Fig. 3 - 14



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.

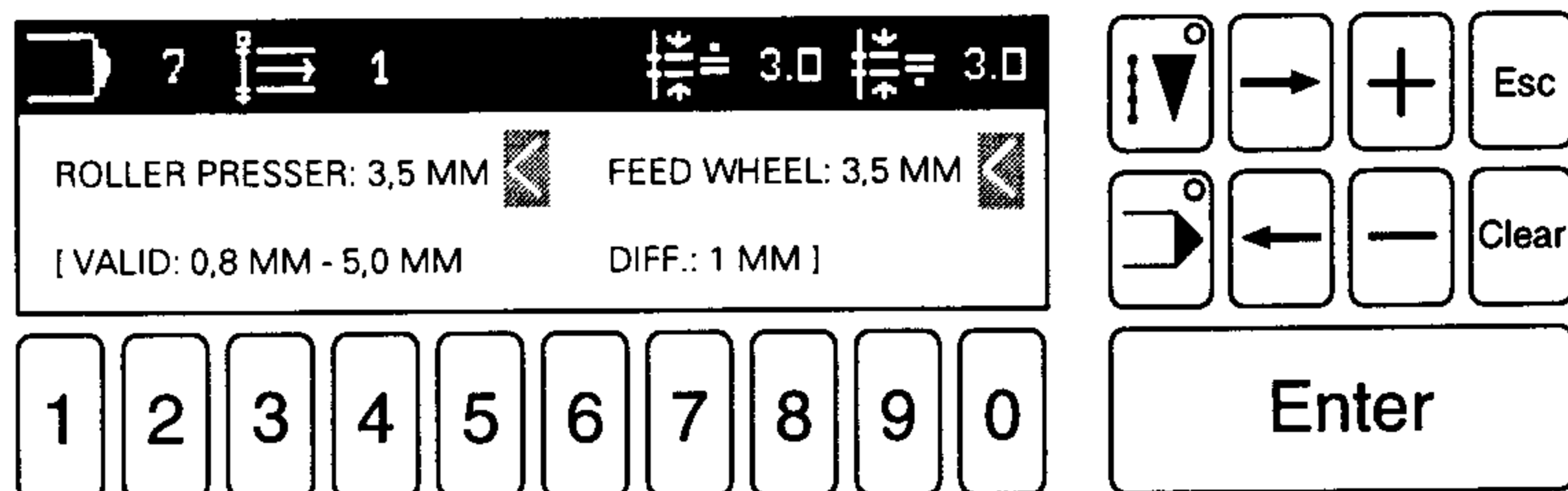


Fig. 3 - 15

Enter

- Confirm stitch length input with Enter key.

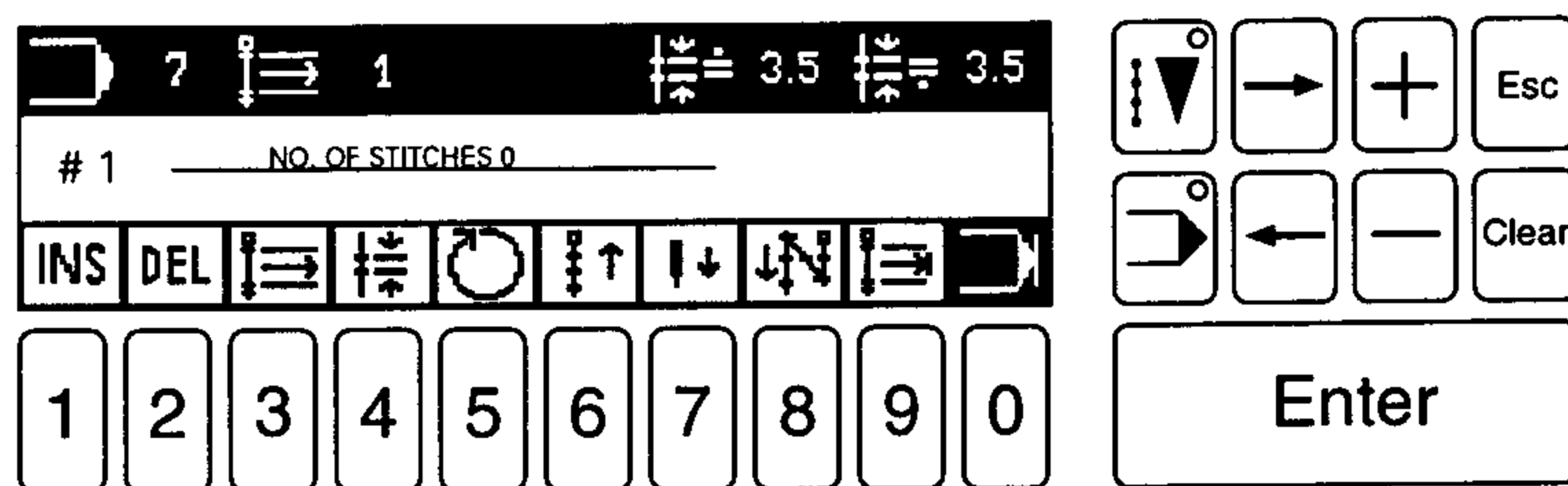


Fig. 3 - 16



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

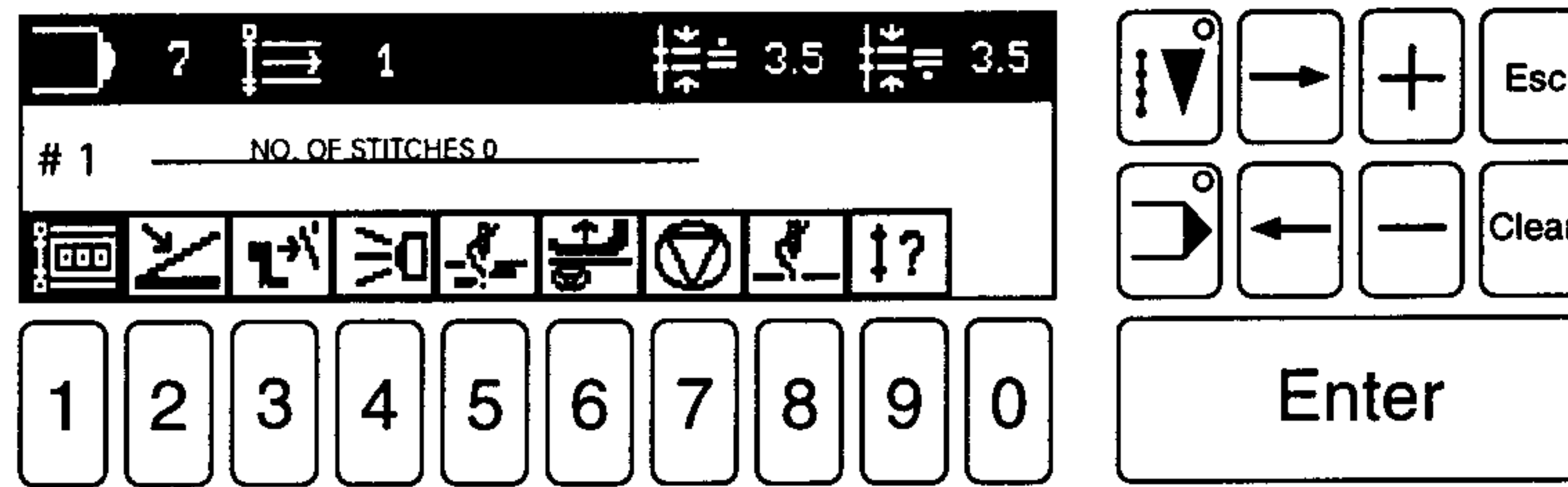


Fig. 3 - 17



- 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.

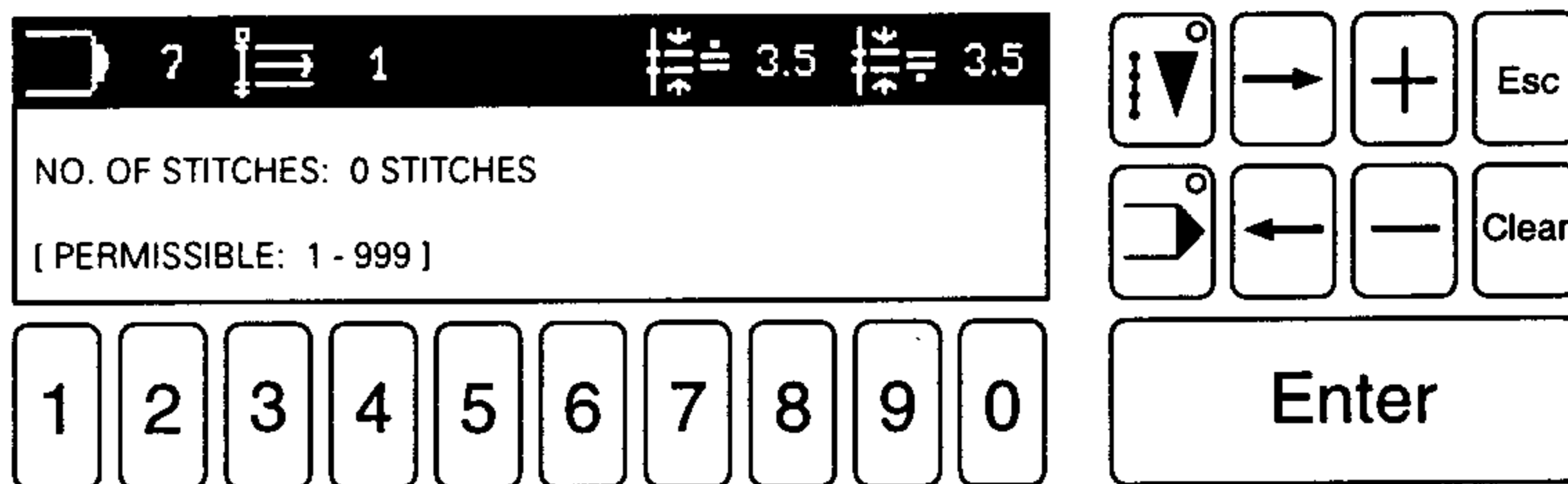
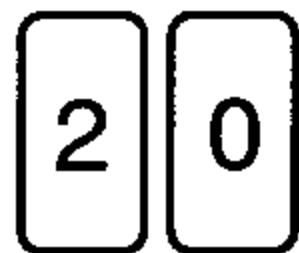


Fig. 3 - 18



- Enter the desired number of stitches.



- Confirm input with Enter key.

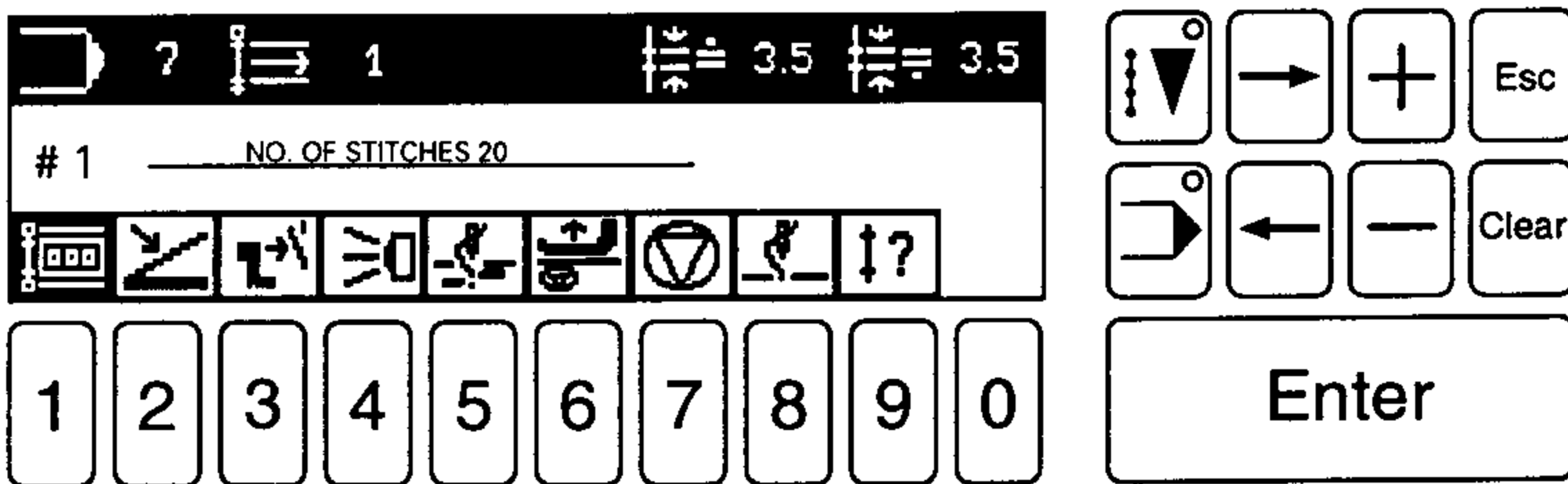


Fig. 3 - 19



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

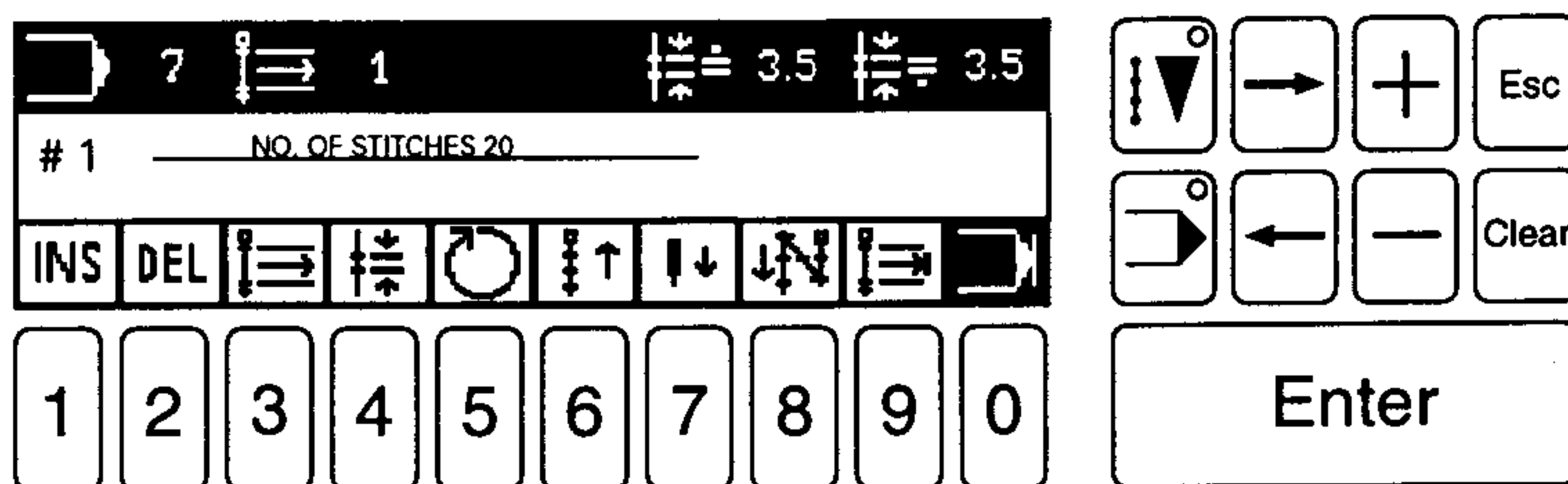


Fig. 3 - 20



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

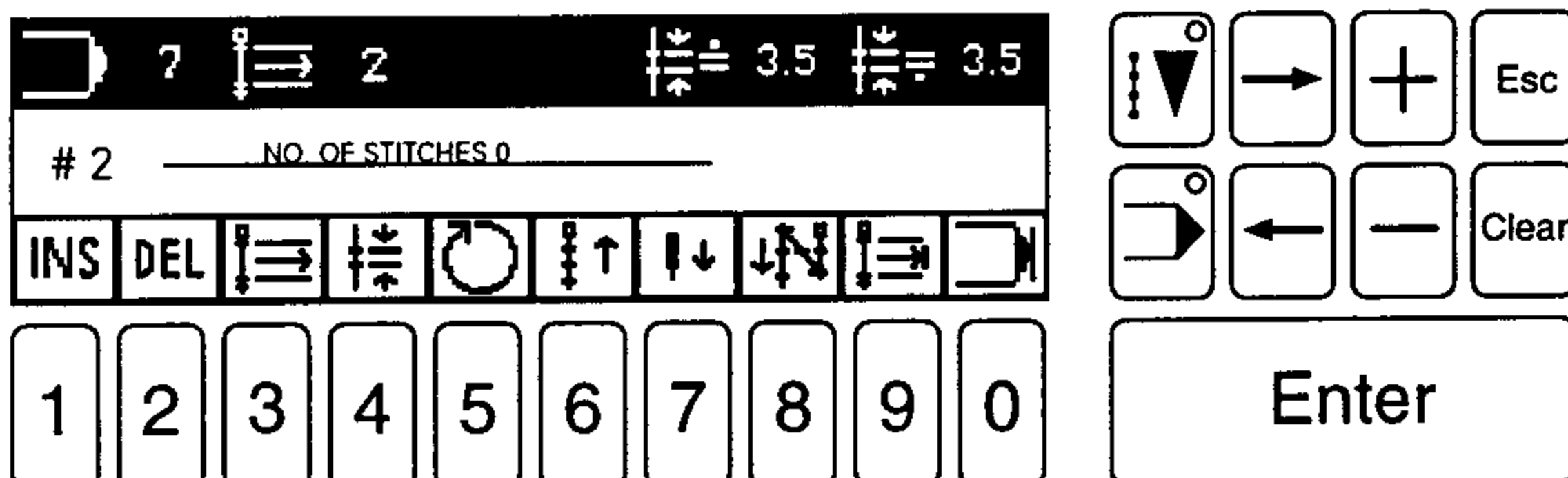


Fig. 3 - 21



- Call up the function stitch length.

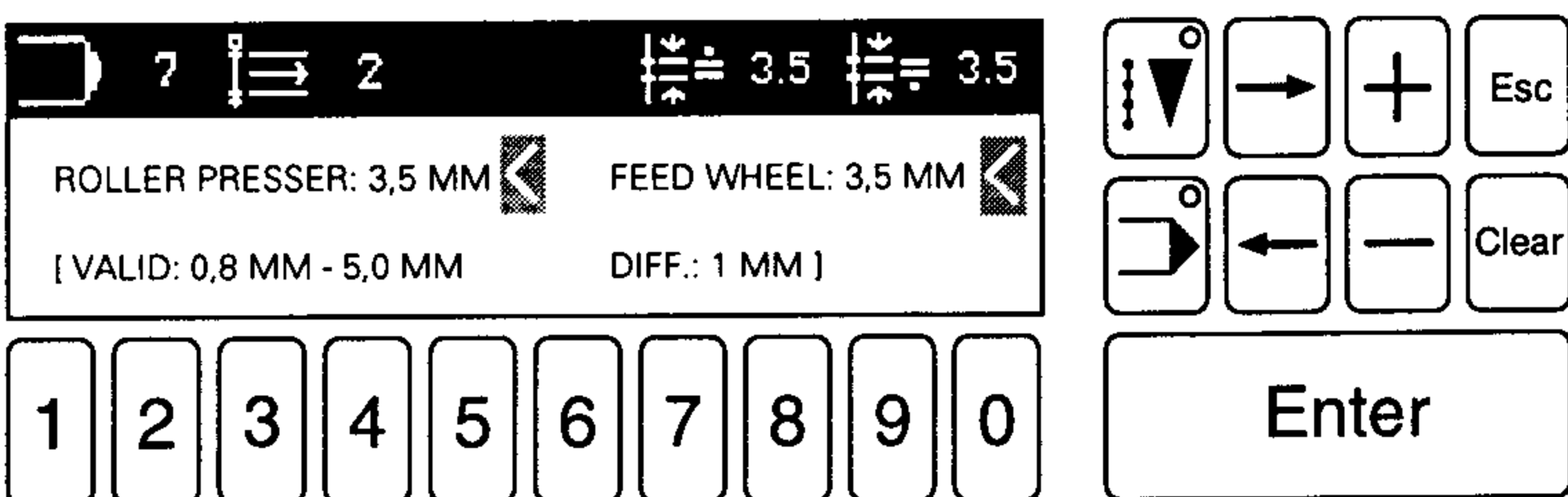
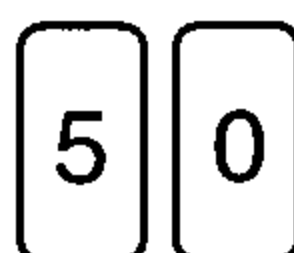


Fig. 3 - 22



- Enter value for the stitch lengths.



- Confirm input with Enter key.

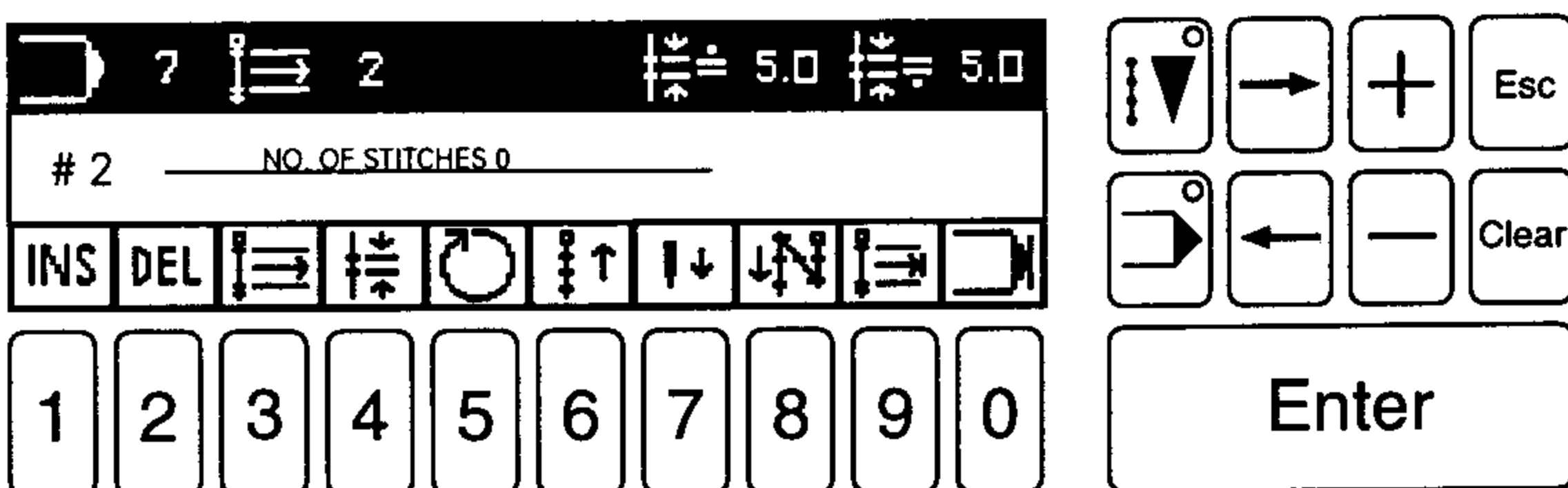
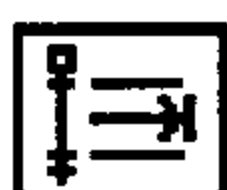


Fig. 3 - 23



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

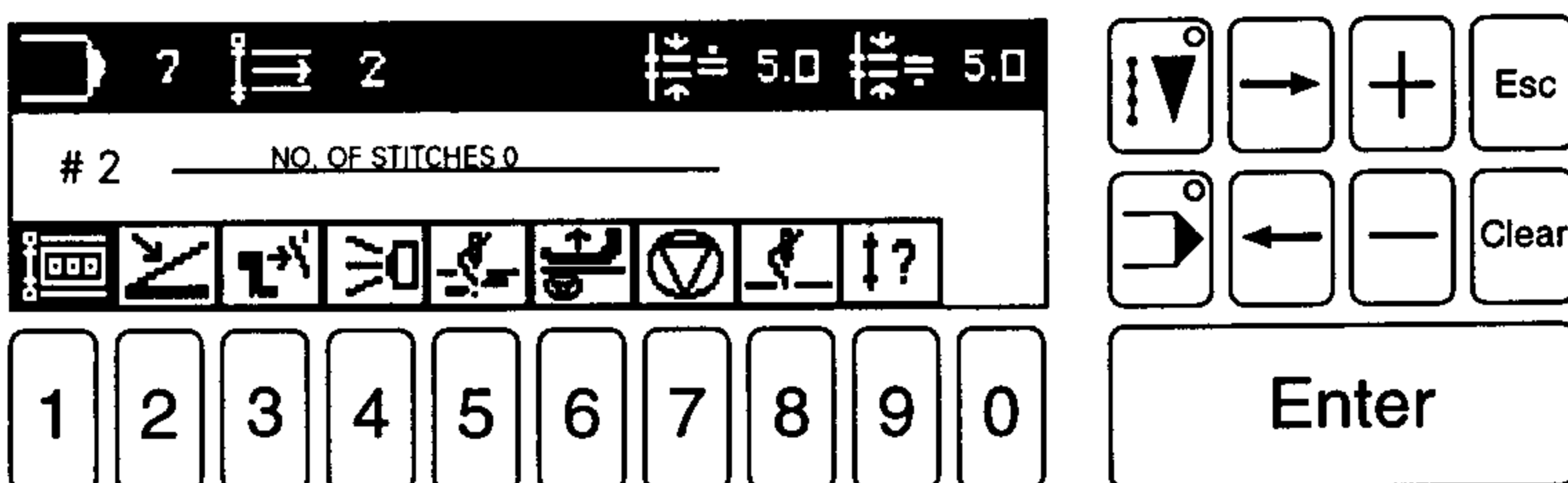


Fig. 3 - 24



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

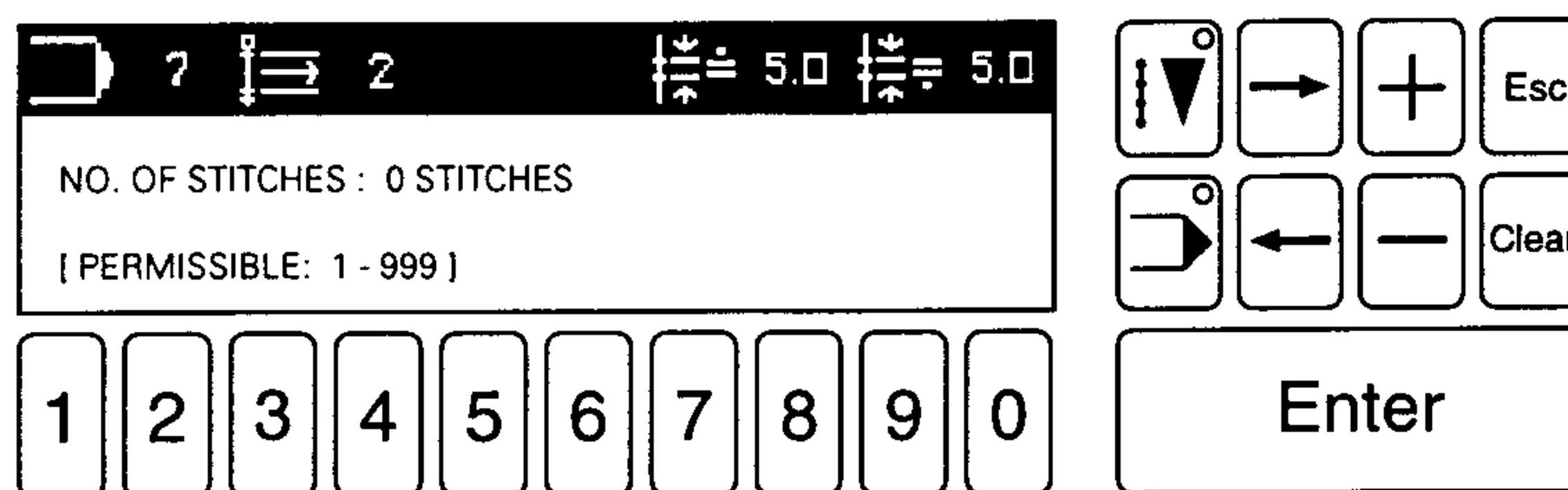
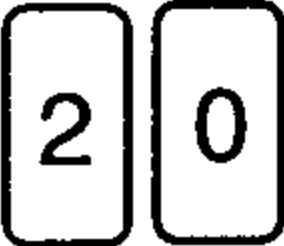





Fig. 3 - 25

-  ● Enter desired number of stitches.
-  ● Confirm number of stitches with Enter key.
-  ● Switch on the function Docu-seam area.
-  ● Switch on the function Stop.

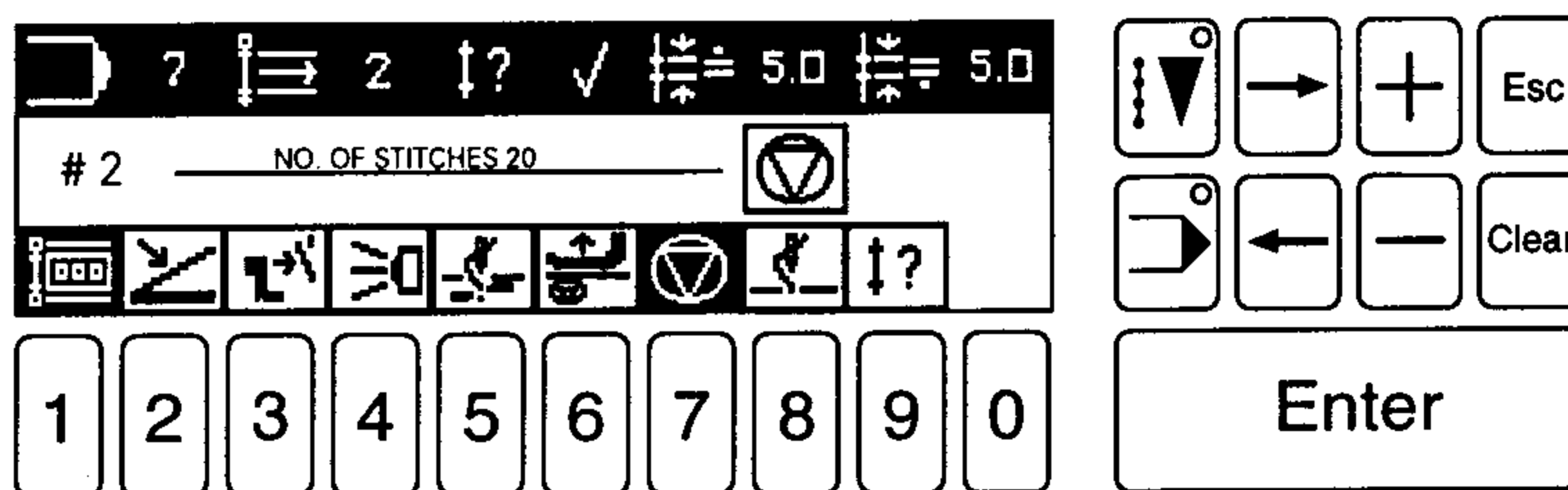


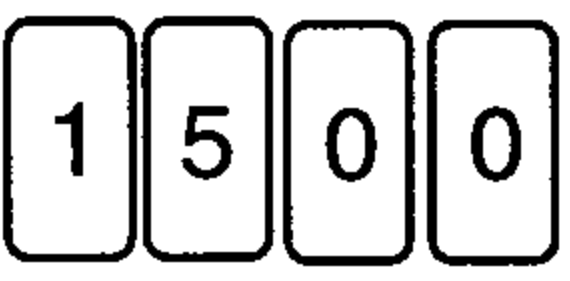




Fig. 3 - 26

-  ● Press Enter key to teach in the end of the seam area.
-  ● Call up the function Speed.
-  ● Enter desired speed.
-  ● Confirm speed with Enter key.
-  ● 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.

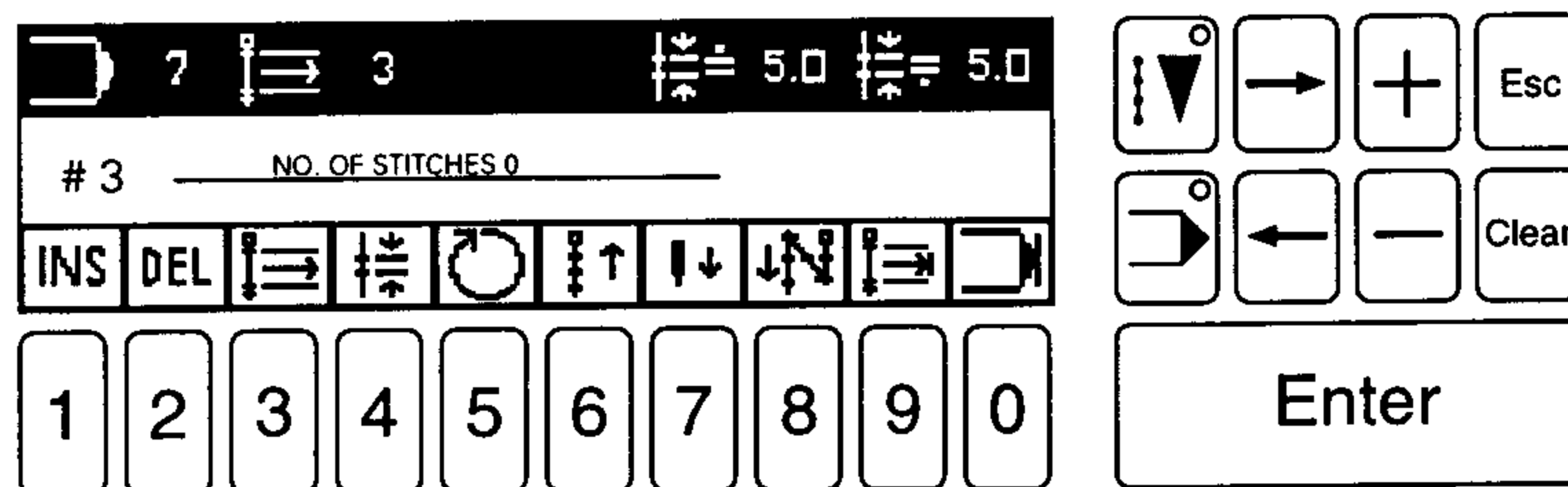
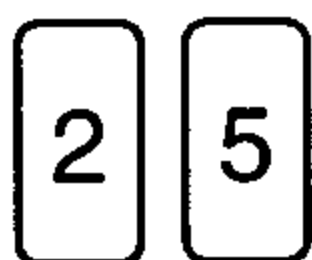


Fig. 3 - 27



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



- Enter value for the stitch lengths.



- Confirm input with Enter key.



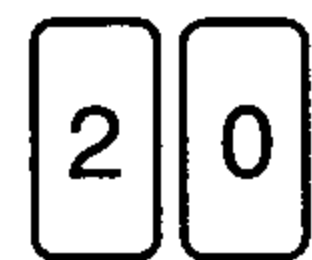
- Call up the function for **end of seam area** (Number key 9).



- 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 menu for input.



- Enter number of stitches.



- Confirm number of stitches with Enter key.



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

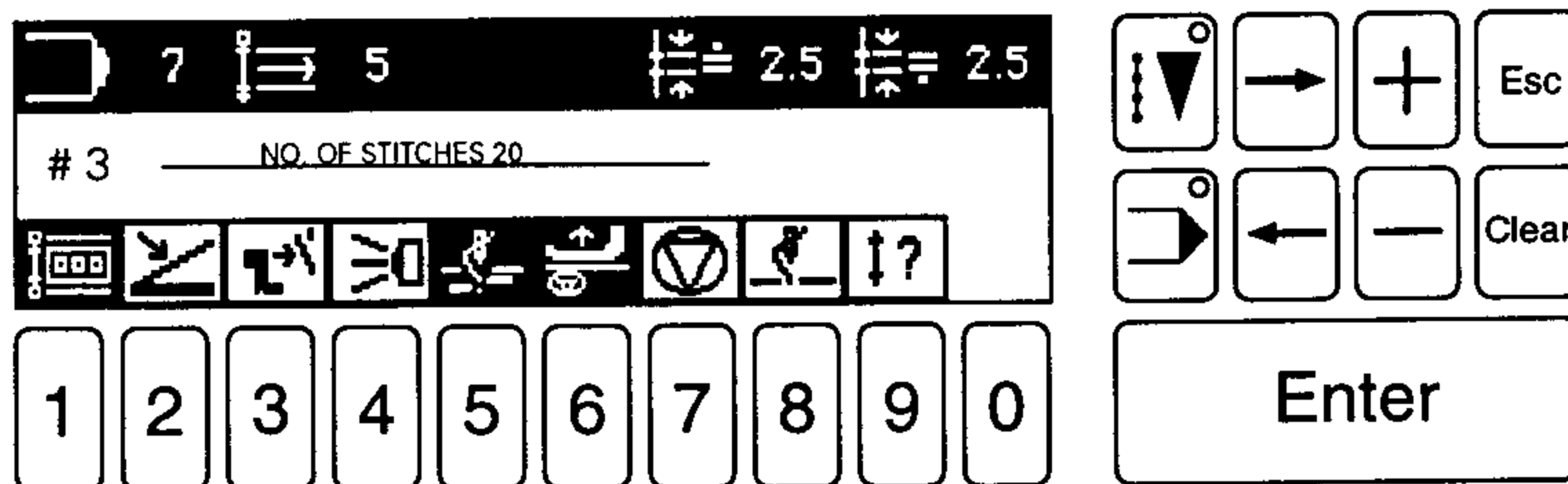


Fig. 3 - 28



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



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

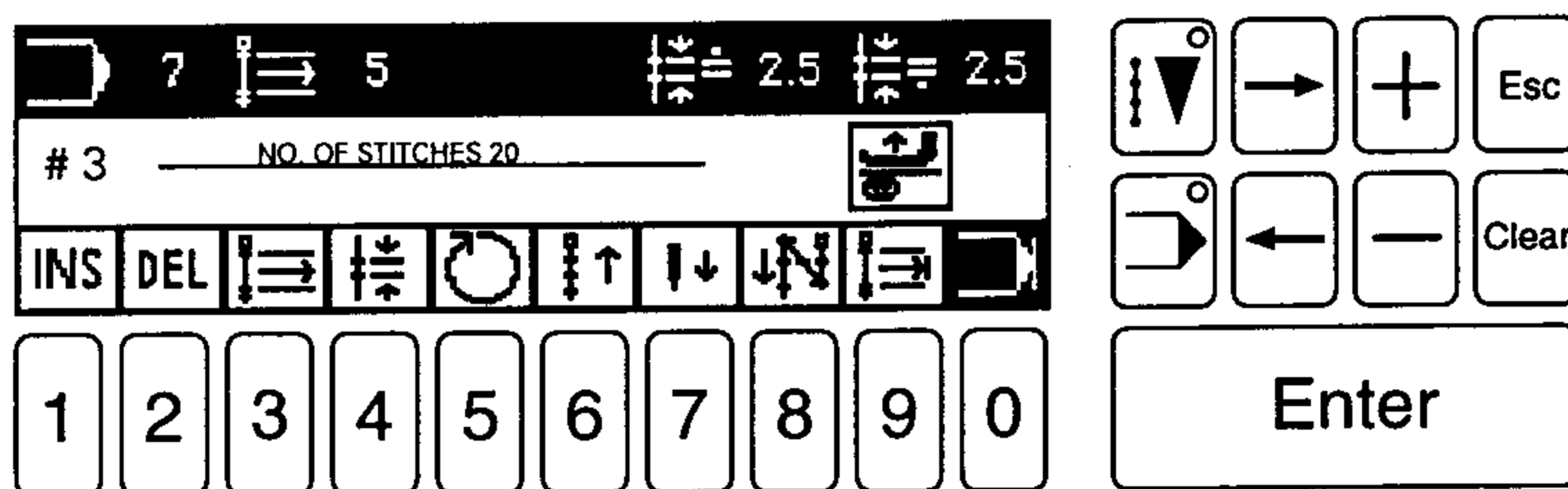


Fig. 3 - 29



- Press Enter key to save the seam programm.

3.15.02

PFAFF 3715-2/..

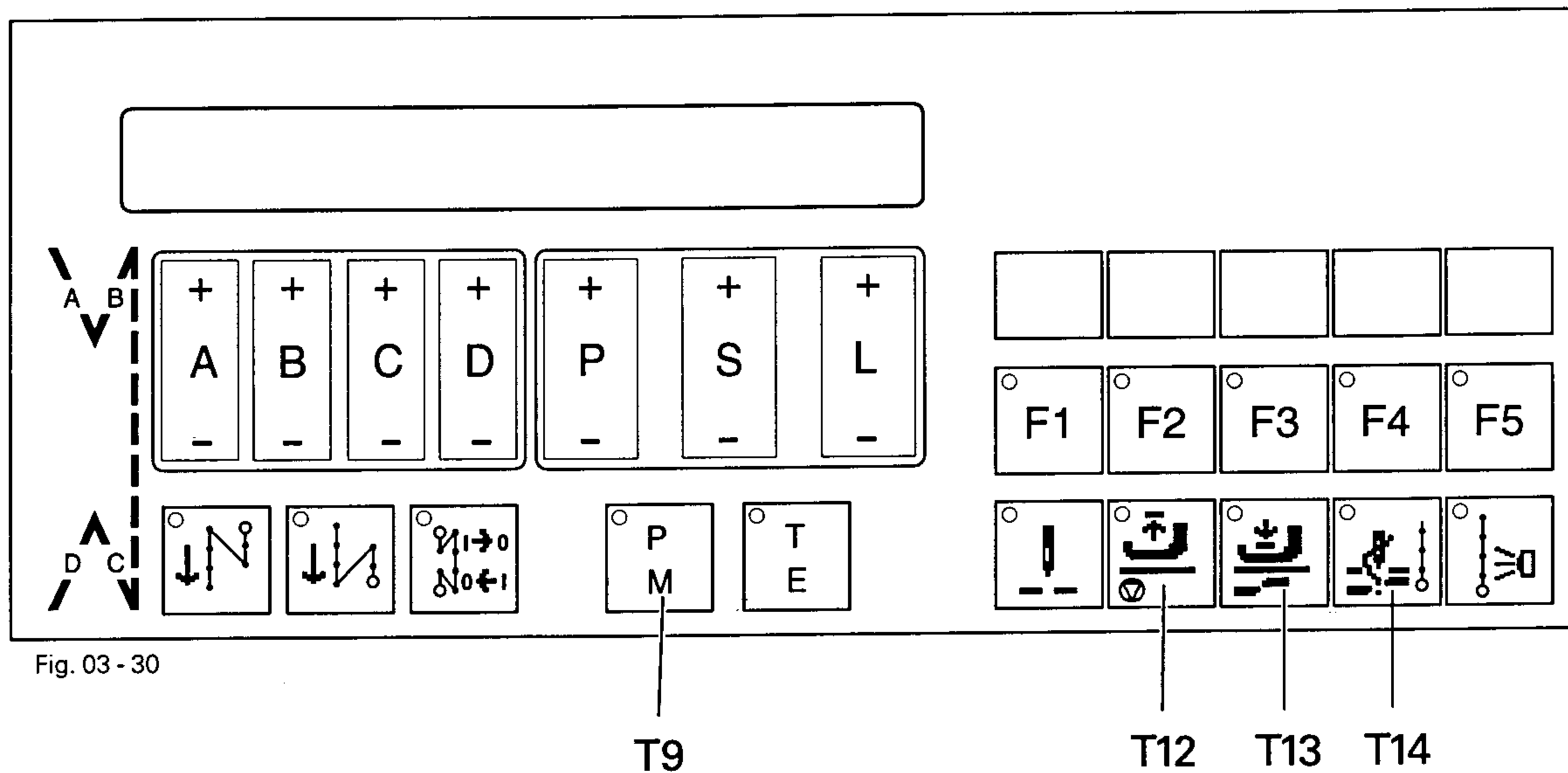


Fig. 03 - 30

Programming "before the docu-seam area"

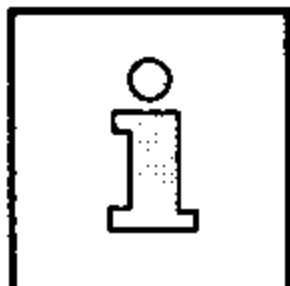
- Switch on mains switch;
- Key T9 on; PM-LED is on
- P +/- on 1; Program start on program number 1
- D +/- on 2; Switching program 1 to program 2
- A +/- on 2000; Speed = 2000 min⁻¹
- S +/- on 1; Select seam section 1
- L +/- on 20; Enter 20 as number of stitches
- Press F1; LED on, i.e. forward to 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).

3.16 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 offabric.

- 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

3.17 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 position "/":
 - 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 Appendix

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.

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 Fotocell for detection of the Docu-Seam-Area

Switching to the Docu-Seam-Area can be done by means of a fotocell controller instead using the knee switch. The connection to the motor controller is established either by the controller cable from the knee switch or the the fotocell (Reflection-Light-Sensor). Parameters 994 and 995 are set as follows: I = Kneeswitch, II = Fotocell.

The reflection area (area on the stitch plate) must be lightly polished, to secure a correct function. If adaptations of the fotocell switching level are necessary use the yellow adjustment screw at the front side of the fotocell housing. Blinking of the yellow fotocell LED means the material detection is instable. For the notch size and shape we recommend an equal sided triangle (positive notch, outside the seam) with a height of 15 mm. Before changing from knee switch to fotocell or the other way, the Docu-program must be stopped by pressing **F1**.

4.03 Password input 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 on the 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 9 display is deleted and the Error sign ! is indicated, the machine still remains locked. Quitting the Error sign by pressing the controller key **S+** , the machine is finally unlocked and the seam can be finished.

4.04 Scanning after thread cutting

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 und 4.10.03).

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.

4.05 Selecting Seam/Monitor

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).

4.06 Extensions to Option F5

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=400 cN
Option F5= 3, F6= +50 cN, F7= -70 cN

If the High Limit Value is set to 600 cN (interrupted red line), and the Lower Limit Value is set to 400 cN (interrupted red line), and 3 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 400 cN -70 cN = 330 cN (bold red line).

Each measured thread force, which leaves the exceeded tolerance range of 330 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.

4.07 Label output with Gemini T, 45 mm x 155 mm

Instead of using password 3 with 6 characters to create the identification number (see chapter 3.09.09) you can now enter these 6 characters into a manual input field to create the identification number. In label output click on the field **Text, Part-Code in ID-Barcode** then the input field for numbers and capital letters opens.

Password 3 can also be used but it is only saved in the corresponding seam file.

4.08 Label output with Gemini T, 90 mm x 49 mm

The existing label version 90 mm x 49 mm/01 is still available (see chapter 3.09.09).

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)

4.09 **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.

4.10 **Exit-Functions**

This integration of Exit functions leads to a flexible reaction when the production process changes. These functions too can be secured by password in **DS-Setup** by opening **Functions** and moving the slider **Scan-Exit** on the wanted position.

Green: Execute Exit without password

Red: Execute Exit with password

4.10.01 Program 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 process 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.

4.10.02 Scanning

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.

4.10.03 Label selection

If your label name selection was made by mistake, enter **EXIT** to to execute a new label selection.

4.11 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.

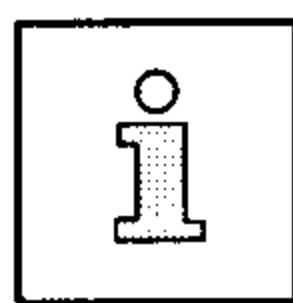
- | | |
|------------------------|--|
| - WD... Watch Dog | blinks: Program runs in Docu seam |
| - BT.....Bobbin Thread | red: Alarm signal of bobbin thread monitor |
| - Cut....Cut | red: Thread cutting |
| - Stop..Stop | red: Machine stops, Error 9 |

4.12 Additional features

- The number of total stitches within the Docu-seam area was increased from 999 to 4999.
- In case of a NOK seam the LED indicators are reset automatically after thread cutting.
- All necessary informations of these extensions are saved in the corresponding seam file.
- The inputs for password 3 (e.g. also part codes) were extended from 10 inputs to 20.
- The zero position of the dynamic thread force signal in **Monitor** can be shifted with the arrow keys (lower left corner of the Monitor field).
This shifting has **no** influence on the measurements which are executed in the Docu-seam area.

4.13 Additional parameters

- | | | |
|-----|----|---|
| 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 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. |
| 994 | I | Switching to Docu seam by knee switch |
| | II | Switching to Docu seam by fotocell |
| 995 | I | Switching to Docu seam by knee switch |
| | II | Switching to Docu seam by fotocell |



In case of controlling the docu seam area by sewing program, parameters 994 and 995 must be set on I and neither the fotocell nor the knee switch should be connected to the motor controller.

4.14 Changes to Selection slider F2

4.14.01 Save

Switching from **Monitor** to **Save** the dynamic thread-force signal is saved on the screen.

4.14.02 Test Seam

Now the original Docu seam can be simulated (Parameter 683 remains I), but neither a label is printed nor a Identification-number or a seamfile are generated.

The word **Test** is written into the indicator LED **Docu-Seam-Area**.

Only in **Test seam** inputs into the fields **F3-F7** can be made.

4.14.03 Docu Seam

Because of the extensions in **Test seam** you cannot enter values within **F3-F7** if the slider **F2** is on **Docu seam**.

4.15 Label output with 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
- 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)

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)

4.15.01 Scan-Exit function

In connection with this label you can use a **Scan-Exit** function. It offers the possibility to download process parameters very quick when a change to another sewing process must be executed.

Entering the word **EXIT** by keyboard or **EXIT** is read in barcode by the scanner, the file with the existing label names opens immediately. An existing label name with the included process data can be selected and downloaded immediately.

Existing label names in barcode can be read with the scanner at once, means the sewing process parameters are downloaded to the Docu PC .

This function can be released or blocked, see chapter 3.03 **Release functions**.

4.16 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 3.03.

Move the function slider to green, an input field in the setup program is indicated 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.

4.17 Loading a label name from external device

This function can be released or blocked in the setup program, see chapter 3.03. 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.

4.18 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

4.18.01 Mechanical adjustment of thread force

This is the conventional standard adjustment using the knureld screw, means entering data by the Docu-Seam-System is not possible.

4.18.02 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.

4.18.03 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.

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