PFAFF® Industrial

3307-1/..
3307-4/..

INSTRUCTION MANUAL

3307-5/..

This instruction manual applies to machines from the following serial numbers **2 752 431** and software version **0366/001** onwards:

296-12-19 032/002
Betriebsanleitung engl. 06.09

This Instruction Manual is valid for all models and subclasses listed in the chapter "Specifications ".

PFAFF Industriesysteme
und Maschinen AG

Hans-Geiger-Str. 12 - IG Nord
D-67661 Kaiserslautern

Contents .....Page

Contents ..... Page

Contents ..... Page

Contents ..... Page

1 Safety

1.01 Regulations

This machine is constructed in accordance with the European regulations indicated in the conformity and manufacturer's declarations.
In addition to this instruction manual, please also observe all generally accepted, statutory and other legal requirements, including those of the user's country, and the applicable pol-lution control regulations!
The valid regulations of the regional social insurance society for occupational accidents or other supervisory authorities are to be strictly adhered to!

1.02 General notes on safety

- This machine may only be operated by adequately trained operators and only after having completely read and understood the Instruction Manual!
- All Notes on Safety and Instruction Manuals of the motor manufacturer are to be read before operating the machine!
- The danger and safety instructions on the machine itself are to be followed!
- This machine may only be used for the purpose for which it is intended and may not be operated without its safety devices. All safety regulations relevant to its operation are to be adhered to.
- When exchanging sewing tools, when threading the machine, when leaving the machine unattended and during maintenance work, the machine is to be separated from the power supply by switching off the On/Off switch or by removing the plug from the mains!
- Everyday maintenance work is only to be carried out by appropriately trained personnel!
- Repairs and special maintenance work may only be carried out by qualified service staff or appropriately trained personnel!
- Work on electrical equipment may only be carried out by appropriately trained personnel!
- Work is not permitted on parts and equipment which are connected to the power supply! The only exceptions to this rule are found in the regulations EN 50110.
- Modifications and alterations to the machine may only be carried out under observance of all the relevant safety regulations!
- Only spare parts which have been approved by us are to be used for repairs! We expressly point out that any replacement parts or accessories which are not supplied by us have not been tested and approved by us. The installation and/or use of any such products can lead to negative changes in the structural characteristics of the machine. We are not liable for any damage which may be caused by non-original parts.

1.03 Safety symbols

Danger!

Special points to observe.

Danger of injury to operating or technical staff!

Caution

Do not operate without finger guard and safety devices.

Before threading, changing bobbin and needle, cleaning etc. **switch off main switch**.

1.04 Important notes for the user

- This instruction manual belongs to the equipment of the machine and must be available to the operating staff at all times.
- This instruction manual must be read before the machine is operated for the first time.
- Both operating and technical staff must be instructed on the safety devices of the machine and on safe working methods.
- It is the duty of the user to operate the machine in perfect running order only.
- The user must ensure that none of the safety devices are removed nor put out of working order.
- The user must ensure that only authorized persons operate and work on the machine.

For further information please refer to your PFAFF agency..

1.05 Notes for operating and technical staff

1.05.01 Operating staff

Operating staff are the persons responsible for setting up, operating and cleaning the machine and for eliminating any malfunctioning in the sewing area.

The operating staff is obliged to observe the following points:

- The notes on safety in this instruction manual must always be observed!
- Any working methods, which adversely affect the safety of the machine, must be avoided.!
- Loose-fitting clothing should be avoided. No jewellery, such as chains and rings, should be worn!
- Ensure that only authorised persons enter the danger area of the machine!
- Any changes occurring on the machine, which may affect its safety, must be reported to the user immediately.

1.05.02 Technical staff

Technical staff are persons who have been trained in electrical engineering/electronics and mechanical engineering. They are responsible for lubricating, servicing, repairing and adjusting the machine.

The technical staff is obliged to observe the following points:

- The notes on safety in this instruction manual must always be observed!
- Before carrying out any adjustment or repair work the main switch must be switched off and measures taken to prevent it from being switched on again!
- Never work on parts or equipment still connected to the power supply! Exceptions are only permissible in accordance with the regulations EN 50110.
- All safety covers must be replaced after the completion of maintenance or repair work!

1.06 Danger warnings

A working area of **1 m** must be kept free both in front of and behind the mach-ine, so that easy access is possible at all times.

Never put your hands in the sewing area during sewing!
Danger of injury by the needle!

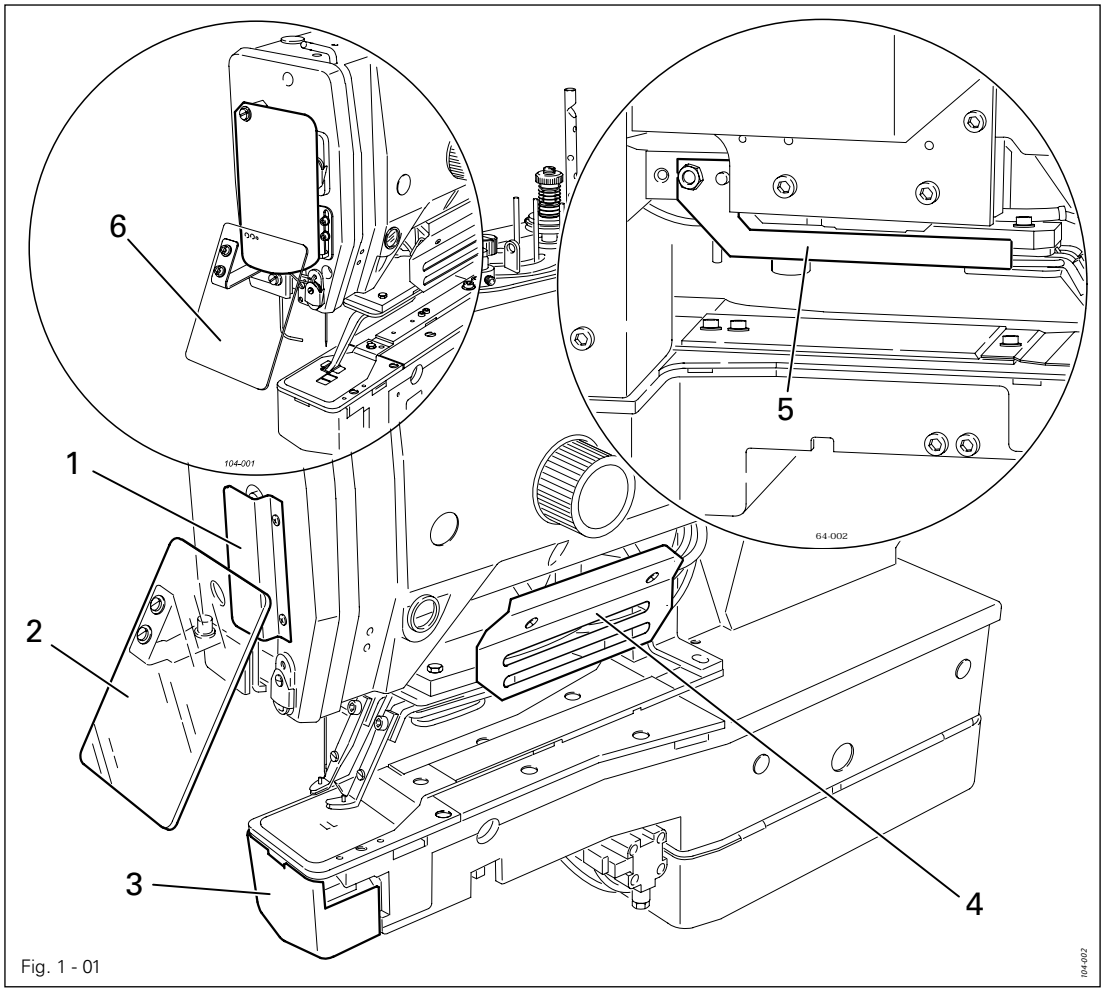


Fig. 1 - 01

Do not use the machine without take-up lever guard **1** (subclasses -1/.. and -5/..), or only with cover **6** closed (subclass -4/..)!
Danger of injury through the movement of the take-up lever.

Do not operate the machine without eye shield **2!**
Danger of injury from flying needle or button fragments!

Only operate the machine with cover **3** closed!
Danger of injury from rotating hook!

Do not operate the machine without protective covers **4** and **5!**
Danger of injury from clamp drive!

2 Proper use

The **PFAFF 3307-1/..** is used for attaching buttons to articles of clothing automatically.

The **PFAFF 3307-4/..** is used for automatic basting stitch work on articles of clothing.

The **PFAFF 3307-5/..** is used for the automatic attachment of self-shank buttons.

Any use of these machines which is not approved by the manufacturer shall be considered as improper use! The manufacturer shall not be liable for any damage arising out of improper use! Proper use shall also be considered to include compliance with the operation, adjustment, service and repair measures specified by the manufacturer!

3 Specifications

3.01 General information▲

Max. sewing speed: ..... 2000 spm
Stitch type: 107
Needle bar stroke: ..... 46 mm
Max. thickness of workpiece: ..... 4 mm
Max. work clamp clearance: ..... 17 mm
Fabric clearance (crosswise to sewing arm): ..... 235 mm
Fabric clearance (lengthwise to sewing arm): ..... 30 mm
Max. size of sewing area: ..... 8 x 12 mm◆
Number of stitches: ..... freely programmable
Feed type: ..... intermittent

Power supply: ..... 230 V +10%, 50 / 60 Hz
Power consumption: ..... max. 0.6 kVA
Input power rating: ..... 0.7 kVA
Fuse protection: ..... 1 x 16 A, inert

Working air pressure: ..... 6 bar
Air consumption: ..... ~1,2 l / work cycle

Noise data:
Noise emission level at workplace with a sewing speed of 1800 spm
Sewing cycle 2.5 sec. on and 2.5 sec. Off: ..... L_{pA} = 68,5 dB(A)■
(Noise measurement in accordance with DIN 45 635-48-A-1, ISO 11204, ISO 3744, ISO 4871)

Sewing head dimensions:
Length: ..... approx. 514 mm
Width: ..... approx. 200 mm
Height: ..... approx. 450 mm
Weight of sewing head: ..... approx. 65 kg

Dimensions of base:
Length: ..... approx. 1060 mm
Width: ..... approx. 600 mm
Height: ..... approx. 820 mm
Weight of base incl. control box: ..... approx. 45 kg

Needle system:
Sub-class -1/01 ..... 134 - 35
Sub-class -1/02, -1/03, -4/.. and -5/.. 190
Needle size for fine materials: ..... 70 - 100
Needle size for medium-weight materials: ..... 100 - 120

▲ Subject to alterations

◆ Depending on cut-out size of bed plate

■ K_{pA} = 2,5 dB

3.02 Seam pattern sizes

When changing part sets parameter "**204**" must be adapted to the cut-out size of the bed plate, see Chapter **8**.04 Setting the seam pattern size.
If this instruction is not observed there is a risk of severe damage to the machine!

Value for parameter "204"	Cut-out size of the bed plate	Size of seam pattern
1	7 mm x 7 mm	5 mm x 5 mm
2	8 mm x 8 mm	6 mm x 6 mm
3	9 mm x 9 mm	7 mm x 7 mm
4	10 mm x 10 mm	8 mm x 8 mm
5	11 mm x 11 mm	8 mm x 9 mm
6	10 mm x 14 mm	8 mm x 12 mm

4 Disposal of Machine

- Proper disposal of the machine is the responsibility of the customer.
- The materials used for the machine are steel, aluminium, brass and various plastic materials. The electrical equipment comprises plastic materials and copper.
- The machine is to be disposed of according to the locally valid pollution control regula-tions; if necessary, a specialist ist to be commissioned.

Care must be taken that parts soiled with lubricants are disposed of separately according to the locally valid pollution control regulations!

5 Transportation, packing and storage

5.01 Transportation to customer's premises

The machines are delivered completely packed.

5.02 Transportation inside the customer's premises

The manufacturer cannot be made liable for transportation inside the customer's premises nor to other operating locations. It must be ensured that the machines are only transported in an upright position.

5.03 Disposal of packing materials

The packing materials of this machine comprise paper, cardboard and VCE fibre. Proper disposal of the packing material is the responsibility of the customer.

5.04 Storage

If the machine is not in use, it can be stored as it is for a period of up to six months, but It should be protected against dust and moisture.
If the machine is stored for longer periods, the individual parts, especially the surfaces of moving parts, must be protected against corrosion, e.g. by a film of oil.

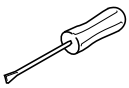
6 Explanation of symbols

In this instruction manual, work to be carried out or important information is accentuated by symbols. These symbols have the following meanings:

Note, information

Cleaning, care

Lubrication



Maintenance, repairs, adjustment, service work
(only to be carried out by technical staff)

7 Controls

7.01 Main switch

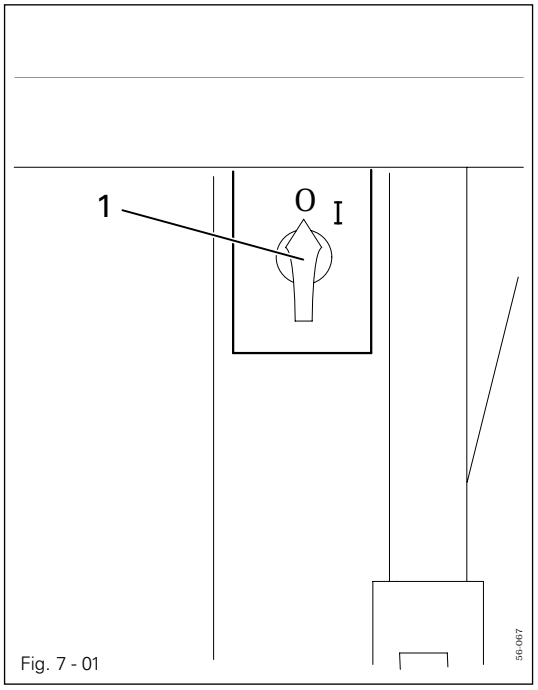


Fig. 7 - 01

- The machine is switched on or off by turning the main switch **1.**

7.02 Pedal

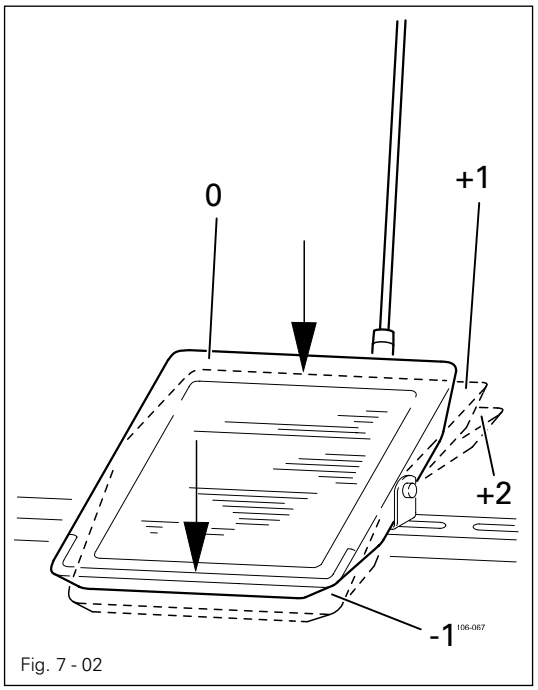


Fig. 7 - 02

-1 = Close/open button holding cylinder (only on subclass -5/..)

0 = Neutral position

+1 = Lower button clamp (or work clamp or button holder)

+2 = Sewing

7.03 Balance wheel

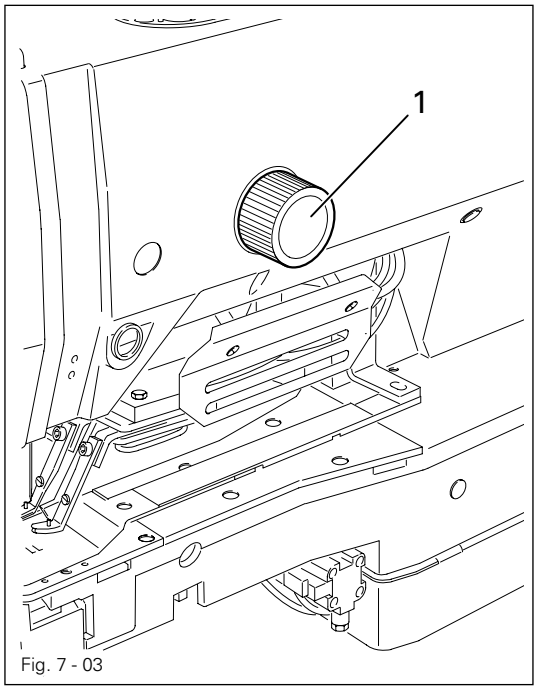


Fig. 7 - 03

- By pressing and holding down balance wheel **1,** it is possible to adjust the needle bar manually.

7.04 Adjusting the button clamp (only on subclass -1/.).

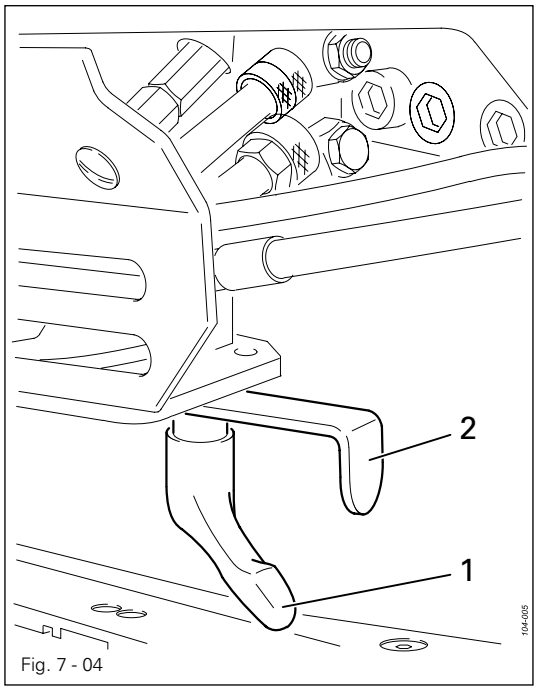


Fig. 7 - 04

- After loosening T-screw **1,** with sliding bar **2** the button clamp is adjusted to match the button size, see Chapter **9.05 Adjusting the button clamp to the button size**.

7.05 Missed stitch detection key

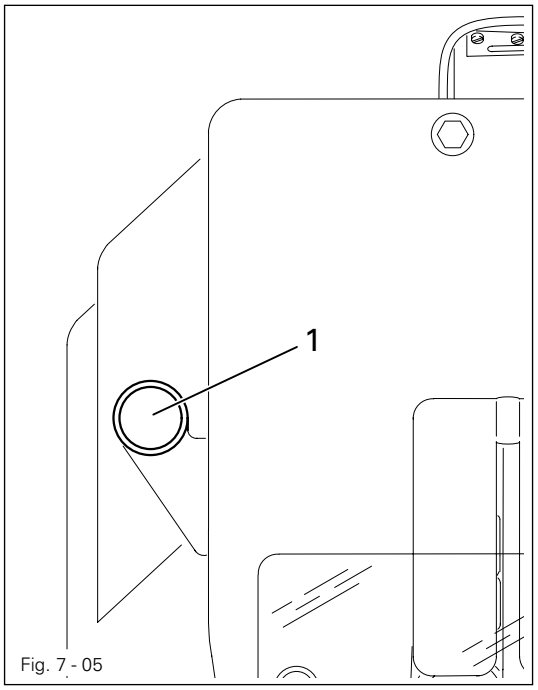


Fig. 7 - 05

- Key **1** lights up, when an error is detected in the sewing process.
- Acknowledge the error signal by pressing key **1.**

7.06 Control panel

The control panel is used to call up machine functions for setting up the machine and for sewing operation, for entering parameter values and for reading error messages and service settings.

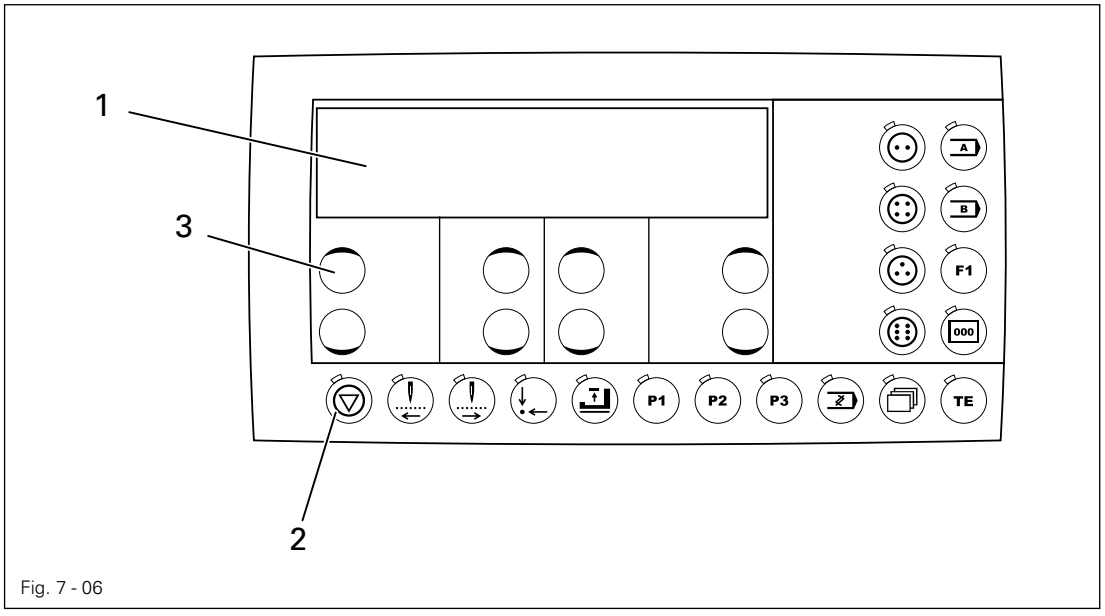


Fig. 7 - 06

The control panel consists of the display **1** and the function keys described below. The display **1** consists of a two-line alphanumerical LCD display with **16** symbols per line. The function keys **2** are located below and to the right of the display. The status of the function keys **2** and the operating status of the machine are shown by LEDs in the respective keys.

Every time the function keys 2 are operated, a key tone sounds as confirmation of the input. If the input required is invalid, e.g. because the max. permissible value for the parameter input has been reached, a double tone is audible. An SD-card reader for data transfer is integrated.

7.06.01 Screen displays

- In the sewing mode all relevant sewing data is displayed and can be changed directly, depending on the status of the machine, see also Chapter **10 Sewing**.
- During the parameter input the selected parameter number with the corresponding value is displayed, see Chapter **13.41 Parameter settings**.

7.06.02 Symbole im Display

	Speed		Stem length
	Piece counter		SD-memory-card
	Program number		Machine memory
	"Enter" function"		

7.06.03 Function keys

The functions keys described below are used essentially to switch machine functions on and off. When the function is switched on, the **diode in the key is illuminated**.
If a corresponding value has to be fixed for the activated function, this can be carried out with the corresponding **+/- keys 3.**

By pressing and holding the corresponding **+/- key**, firstly the numerical value displayed above it is altered slowly. If the **+/- key** is pressed longer, the numerical value changes more quickly. The respective **+/- keys** shown opposite are described below.

Stop

- When operated during a sewing cycle, the machine is stopped.
- When entering the code number this key corresponds to the figure **1.**

Tacting forwards

- This key is used to tact forwards through the entire sewing cycle step by step.
- When entering the code number this key corresponds to the figure **2.**

Danger of needle breakage!
Before tacting move the needle to its t.d.c. using the balance wheel.

Tacting in reverse

- This key is used to tact in reverse through the entire sewing cycle step by step.
- When entering the code number this key corresponds to the figure 3.

Danger of needle breakage!
Before tacting move the needle to its t.d.c. using the balance wheel.

Basic position

- In the sewing mode the machine moves to the basic position.
- When entering the code number this key corresponds to the figure 4.

Button clamp raised/lowered

- In the sewing mode the button clamp (or work clamp or button holder) is raised/lowered.
- When entering the code number this key corresponds to the figure 5.

Direct fetch key P1

- The direct fetch key can be allocated to a button seam pattern or a sequence. The currently selected seam pattern or the currently selected sequence is allocated to the key by pressing this for approx. 2 sec.
- When entering the code number this key corresponds to the figure 6.

Direct fetch key P2

- The direct fetch key can be allocated to a button seam pattern or a sequence. The currently selected seam pattern or the currently selected sequence is allocated to the key by pressing this for approx. 2 sec.
- When entering the code number this key corresponds to the figure 7.

Direct fetch key P3

- The direct fetch key can be allocated to a button seam pattern or a sequence. The currently selected seam pattern or the currently selected sequence is allocated to the key by pressing this for approx. 2 sec.
- When entering the code number this key corresponds to the figure 8.

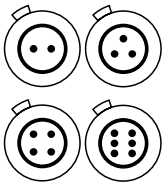
Programming

- This key is used to enter the seam pattern programming mode for different button types.
- When entering the code number this key corresponds to the figure 9.

Piece counter

- Press this key to reset the piece counter (LED has no function).

Further functions can be selected with the keys described below, which are each equipped with an LED. When the LED lights up, the corresponding function is activated / switched on.



Button type

- With these keys the type of button required (two-, four-, three- or six-hole button) can be selected.
- When entering the code number this key corresponds to the figure **0.**

A key

- This key is reserved for special functions.

B key

- This key is reserved for special functions.

F1 key

- This key is reserved for special functions.

TE

- This key can be used to switch between sewing operation (LED off) and input mode (LED on). It is also used to acknowledge error messages.

8 Mounting and commissioning the machine

The machine must only be mounted and commissioned by qualified personnel! All relevant safety regulations are to be observed!

If the machine is delivered without a table, be sure that the frame and the table top which you intend to use can hold the weight of the machine and the motor. It must be ensured that the supporting structure is sufficiently sturdy, even during sewing operations.

8.01 Installation

The site where the machine is installed must be provided with suitable connections for the electric current, see Chapter **3 Specifications**.
It must also be ensured that the standing surface of the machine site is firm and horizontal, and that sufficient lighting is provided.

8.01.01 Adjusting the table height

For packing reasons the table top is in the lowered position. The table height is adjusted as described below..

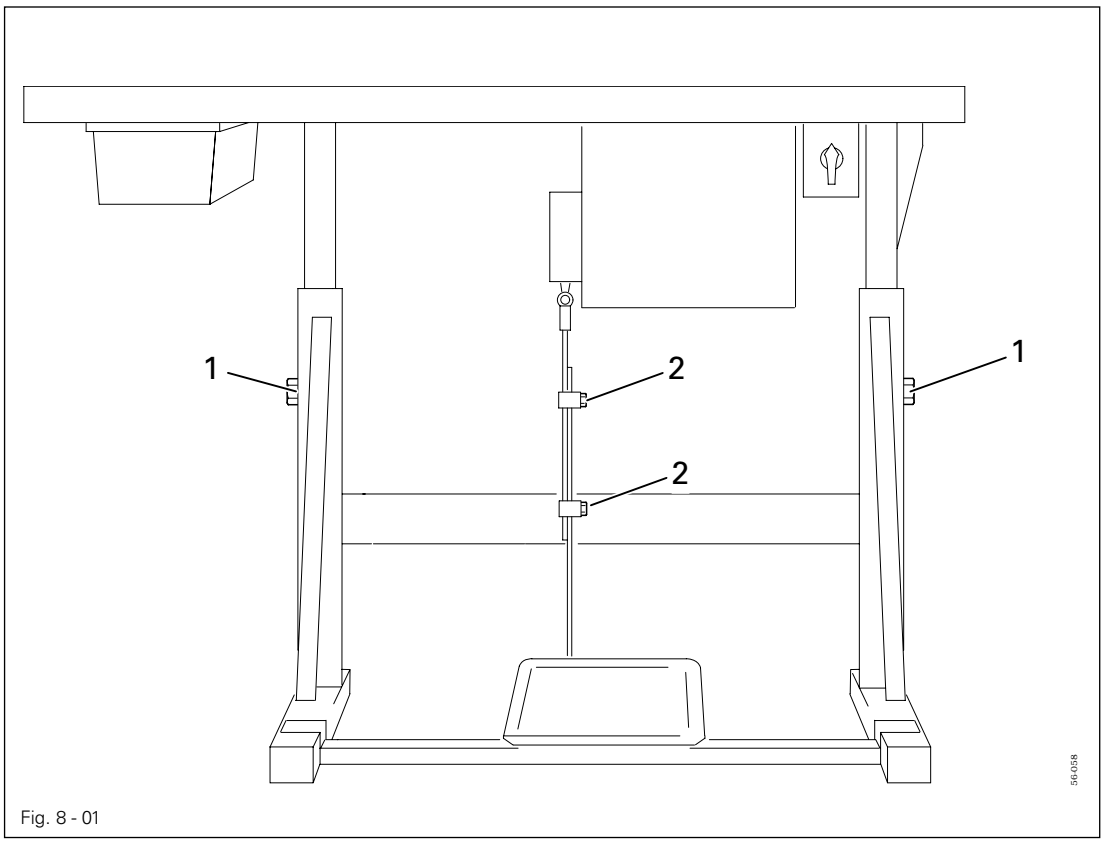


Fig. 8 - 01

- Loosen screws **1** and **2** and set the table height as required.
- Firmly tighten screw **1**.
- Set the required pedal position and tighten screws **2**.

8.01.02 Drilling template for the table-top

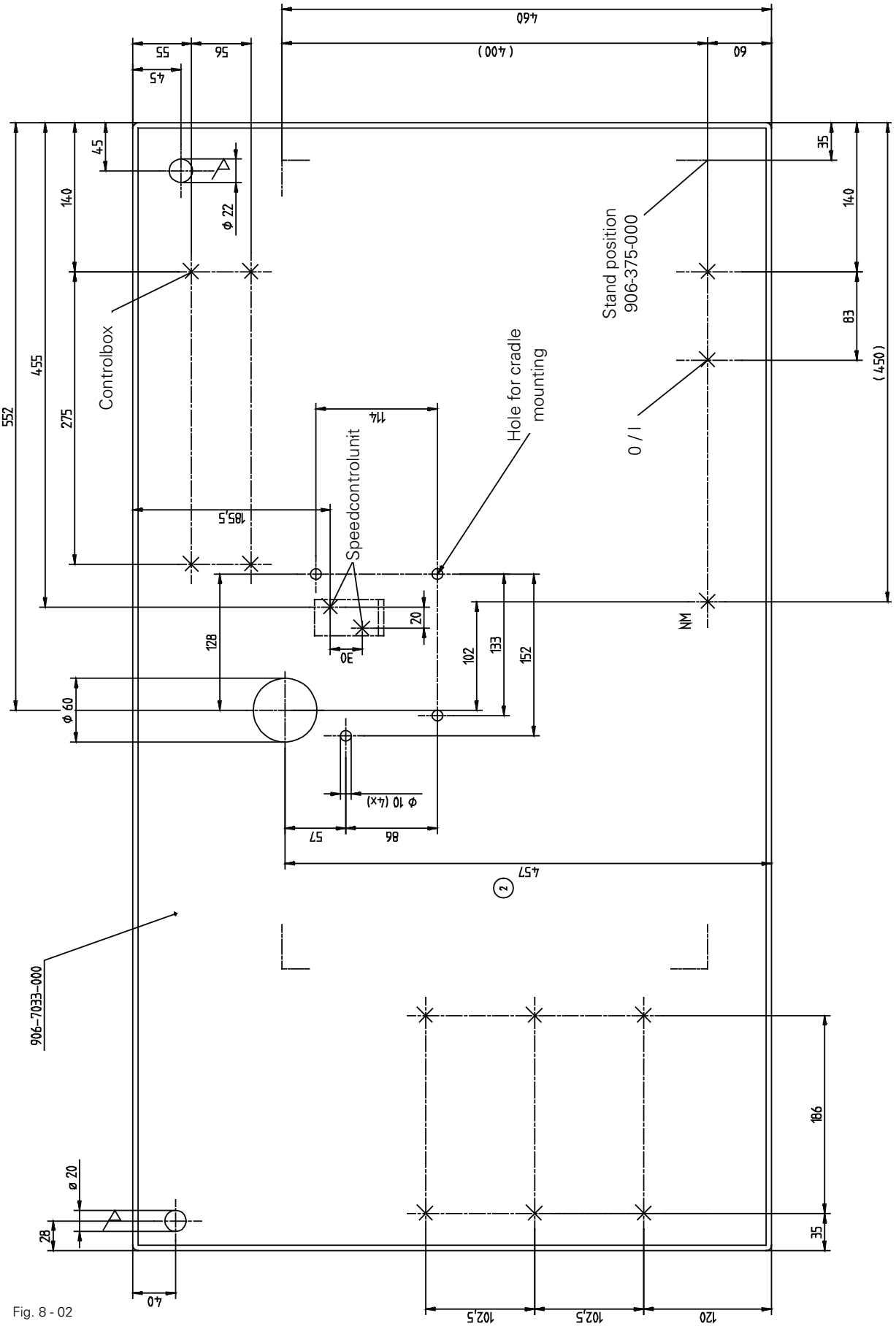


Fig. 8 - 02

8.01.03 Connecting the plug-in connections and earth cable

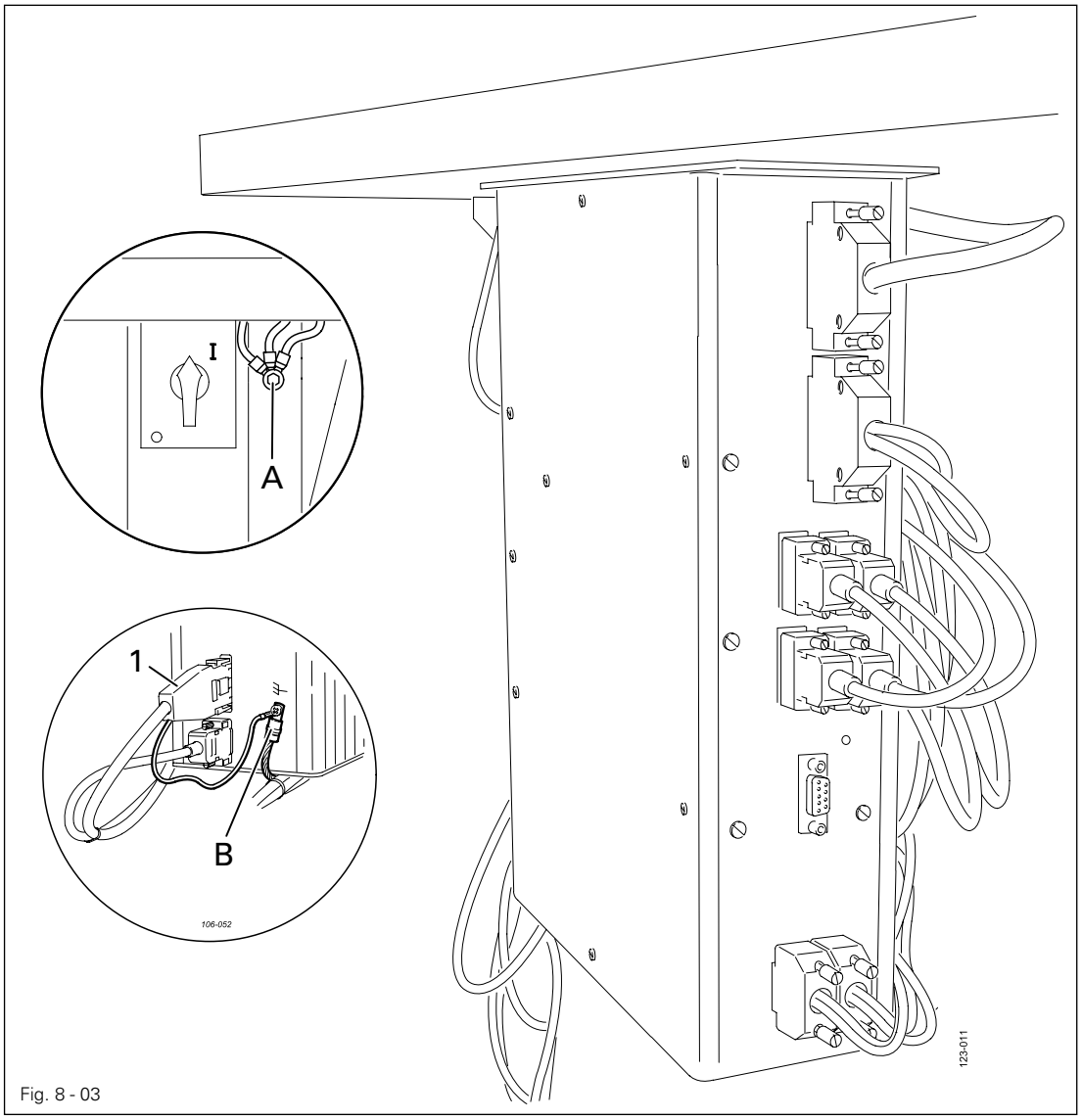


Fig. 8 - 03

- Connect all plugs as labelled in the control box.
- Screw the earth cable from the machine and from the main switch to earth point A.
- Connect earth points A and B with an earth cable.
- Screw the earth cable of plug **1** to earth point B.

8.01.04 Fitting the reel stand

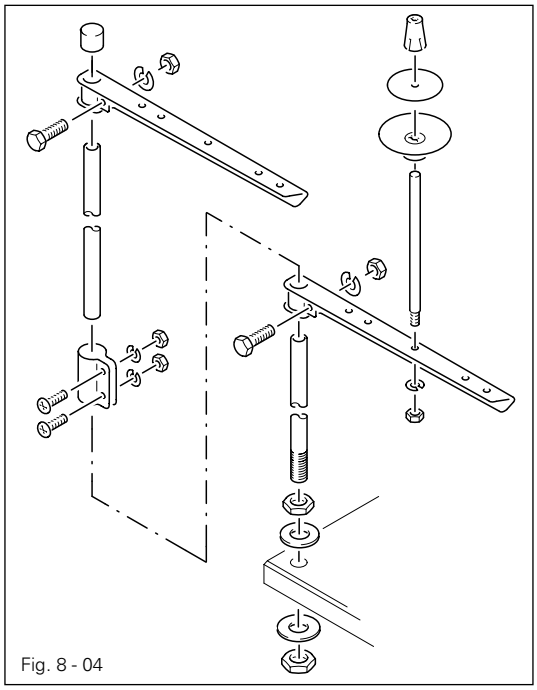


Fig. 8 - 04

- Fit the reel stand as shown in Fig. 8 - 04.
- Afterwards insert the stand in the hole in the table top and secure it with nuts provided.

8.02 Commissioning

- Clean the machine thoroughly and then check the oil level (see Chapter 12 Care and Maintenance).
- Check the machine, in particular the electric leads and pneumatic connection tubes, for any damage.
- Have mechanics ensure that the machine's motor can be operated with the available electricity supply.
- Connect the machine to the compressed air system. The manometer should show a pressure of 6 bar.
- If necessary, set this value (see Chapter 12.05 Checking / adjusting the air pressure).
- Before the machine is commissioned, the seam pattern sizes set in the machine control unit must be checked, see Chapter 8.04 Setting the seam pattern size.

8.03 Switching the machine on / off

- Switch the machine on or off (see Chapter 7.01 Main switch).

8.04 Setting the seam pattern size

After the machine has been switched on for the first time, first of all the seam pattern sizes set in the machine control unit must be checked and corrected if necessary. The seam pattern size depends on the cut-out size of the bed plate and is set with parameter "**204**". If these instructions are not observed there is a risk of severe **damage to the machine**!

8.04.01 Establishing the value for parameter "204"

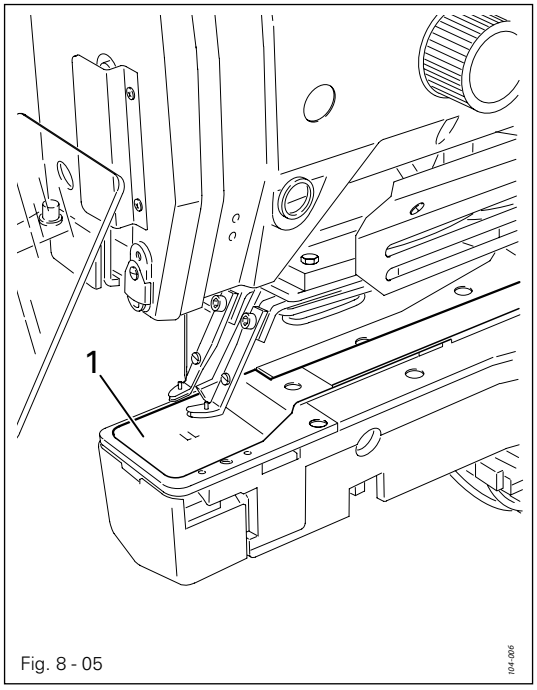


Fig. 8 - 05

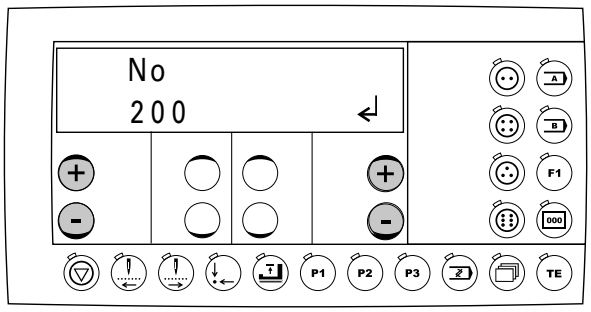
- Measure the size of the cut-out in bed plate **1**.
- With the use of the table below determine the value for parameter "**204**".
- Set „parameter "**204**", which is the seam pattern size, in accordance with Chapter **8.04.02 Changing parameter "204"**.

Value for parameter "204"	Bed plate cut-out size	Seam pattern size
1	7 mm x 7 mm	5 mm x 5 mm
2	8 mm x 8 mm	6 mm x 6 mm
3	9 mm x 9 mm	7 mm x 7 mm
4	10 mm x 10 mm	8 mm x 8 mm
5	11 mm x 11 mm	8 mm x 9 mm
6	10 mm x 14 mm	8 mm x 12 mm

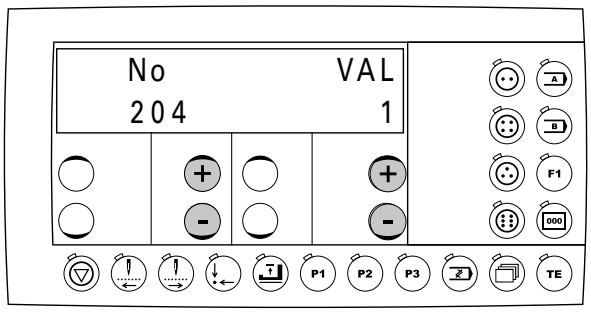
8.04.02 Altering parameter "204"

- Switch on the machine.

- Press the "**TE**" key to select the input mode (LED in the key is on).



- Select the function group "**200**" by pressing the left **+/- keys**.
- Confirm the selection by pressing the right plus key.
- If necessary enter the access code, see Chapter **13.41.02** Entering/altering the access code.



- Select parameter "**204**" by pressing the left **+/- keys**.
- Select the value calculated for the seam pattern size by pressing the right **+/- keys**, see Chapter **8.04.01 Calculating the value for parameter** "**204**".

- By selecting the sewing mode, the altered value is taken over and the machine changes to the sewing mode (LED in the key goes off).

9 Setting up

All instructions and regulations in this instruction manual must be observed. Special attention must be given to all safety regulations!

All setting-up work must only be done by personnel with the necessary training. For all setting-up work the machine must be isolated from its power supply by turning off the on/off switch or removing the machine plug from the electric power socket!

9.01 Inserting the needle

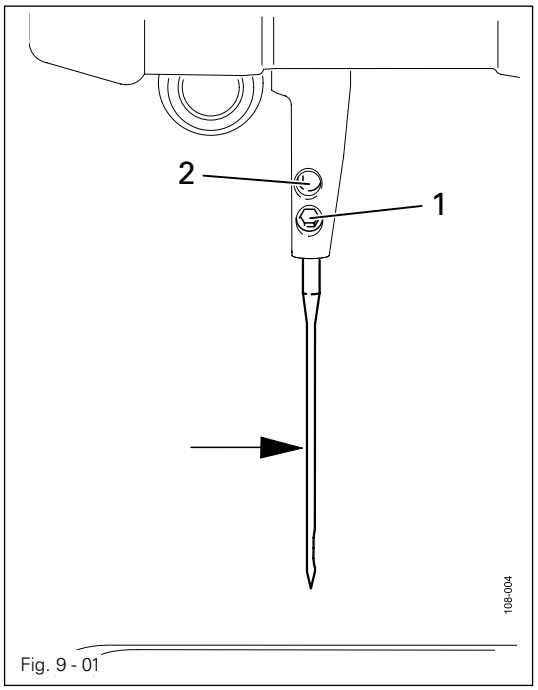


Fig. 9 - 01

Switch off the machine! Danger of injury if the machine is started accidentally!

Only use needles from the system intended for the machine, see Chapter **3 Specifications.**

- Loosen screw **1**.
- Insert the needle as far as possible. The long needle groove (see arrow) must be facing forwards.
- Tighten screw **1**.

Through hole **2** it is possible to check whether the needle has been inserting as far as possible.
Broken needles can be removed by inserted suitable tools in hole **2**.

9.02 Threading the sewing threads on the subclass -1/..

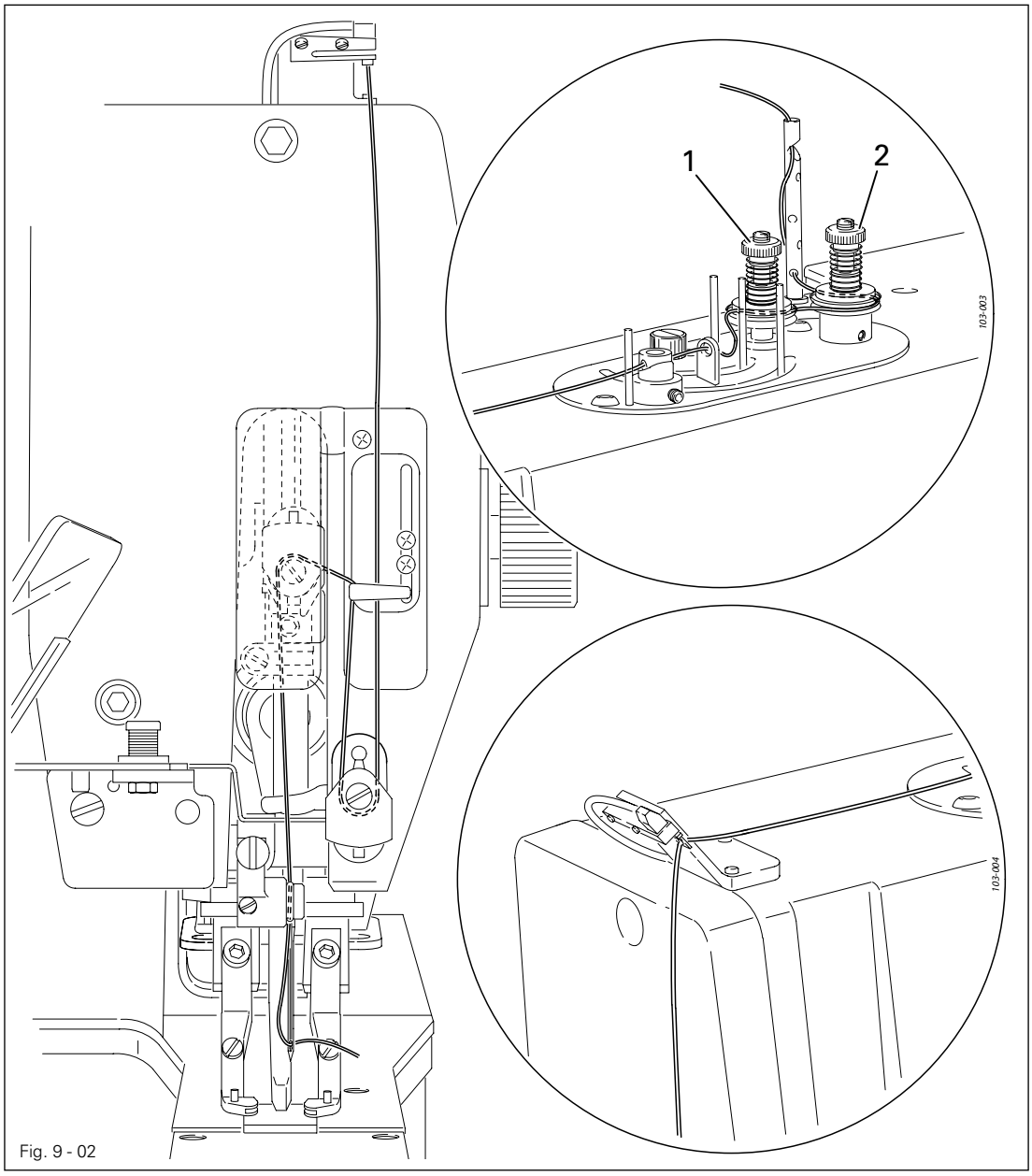


Fig. 9 - 02

Switch off the machine!
Danger of injury if the machine is started accidentally!

- Thread needle thread as shown in Fig. 9-02.
- By turning milled screws 1 and 2 adjust the tension of the needle thread to avoid material puckering or thread breakage.

For thin, soft materials a lower thread tension is required, for thicker fabrics a higher thread tension.

Thread the needle from the front!

9.03 Threading the sewing threads on the subclass -4/.. and -5/..

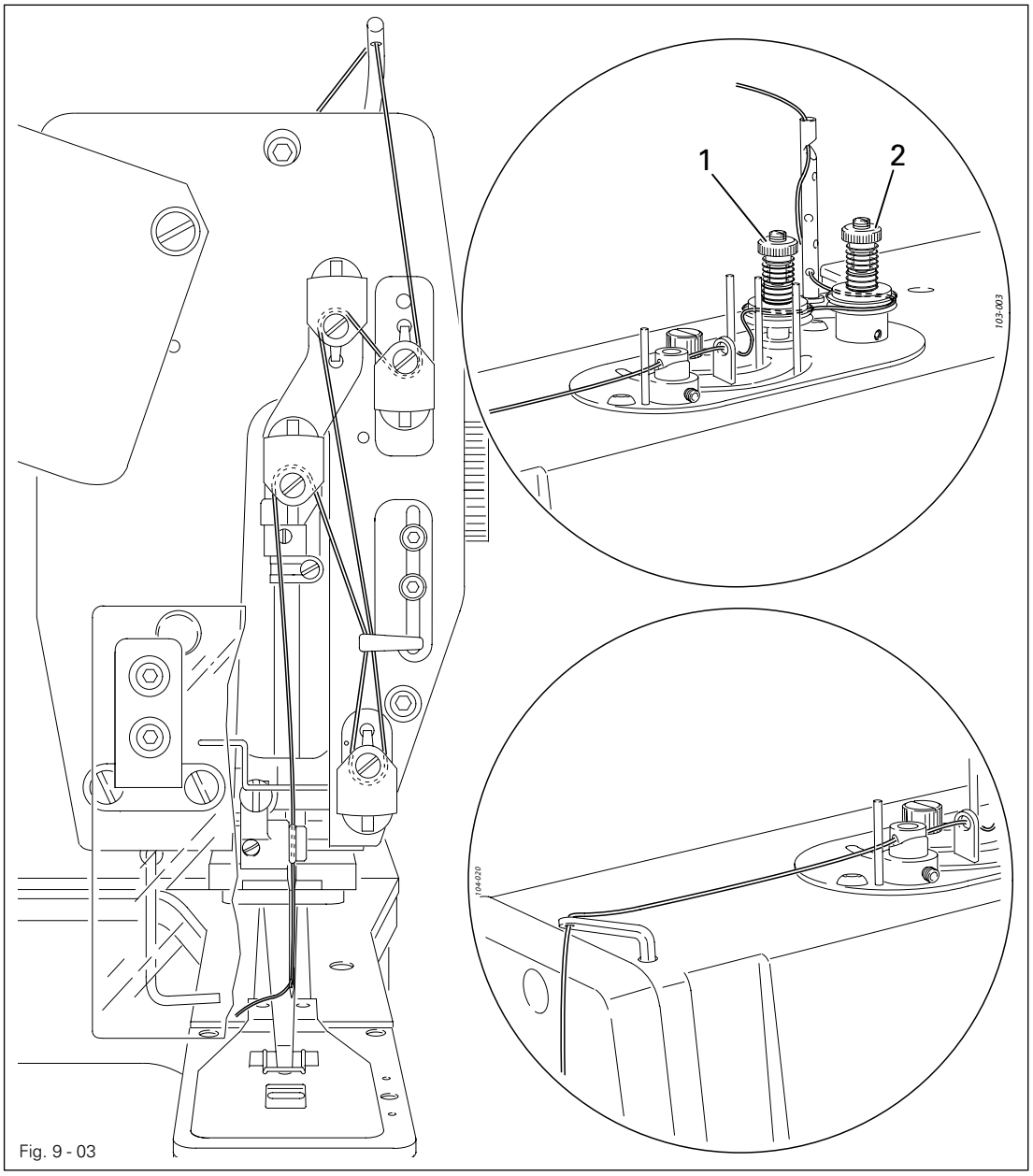


Fig. 9 - 03

Switch off the machine!
Danger of injury if the machine is started accidentally!

- Thread needle thread as shown in Fig. 9-03.
- By turning milled screws 1 and 2 adjust the tension of the needle thread to avoid material puckering or thread breakage.

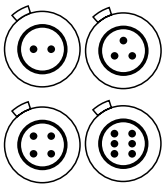
For thin, soft materials a lower thread tension is required, for thicker fabrics a higher thread tension.

Thread the needle from the front!

9.04 Selecting the button type and program number

To select a button type and program number, a program for the corresponding button must already have been entered with the seam pattern input, see **Chapter 11.01 or 11.02 Seam pattern input.**

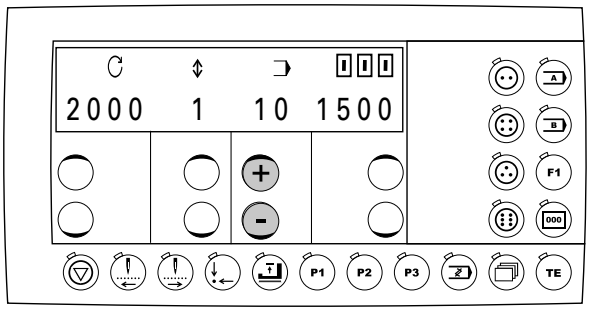
- Switch on the machine.
  The sewing mode is activated automatically.



- On machines from subclass -**1**/… select the desired button type with the corresponding key.

  or

- On machines from subclass -**4**/… the three-hole button must be selected to activate the basting function.



- Select the required program number (**1**-**99**) with the corresponding plus/minus key.

9.05 Adjusting the button clamp to the button size (only for sub-class -1/…)

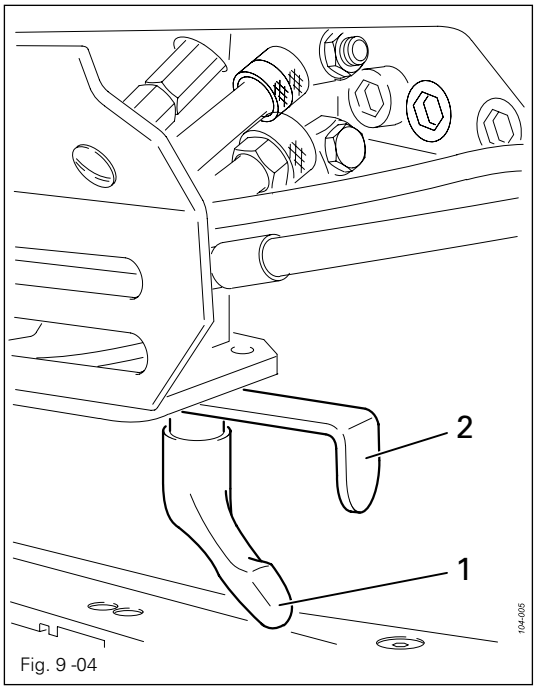


Fig. 9 -04

- Loosen T-screw **1**.
- Open the button clamp with sliding bar **2** and insert the button.
- Move sliding bar **2** to the right and tighten T-screw **1**.

The button must fit easily into the button clamp, but without play.

Adjusting the button clamp to the button size

(on subclass -1../ with added feature clamp)

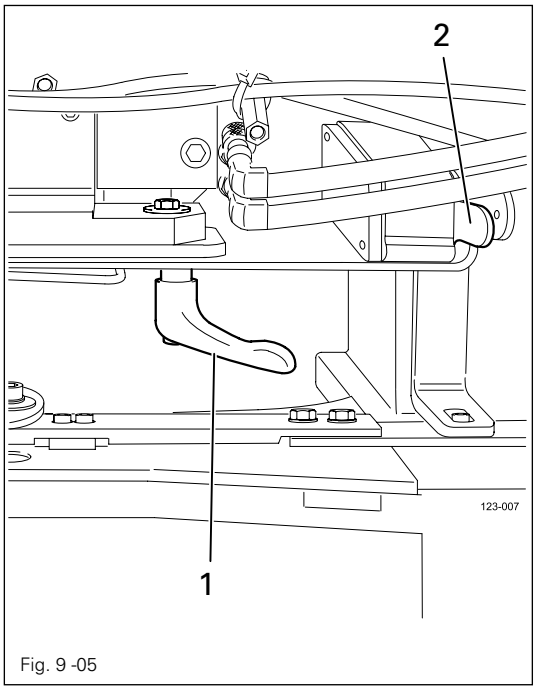


Fig. 9 -05

- Loosen T-screw **1**.
- Open the button clamp with sliding bar **2** and insert the button.
- Move sliding bar **2** to the right and tighten T-screw **1**.

The button must fit easily into the button clamp, but without play.

9.06 Adjusting the stem length (optional)

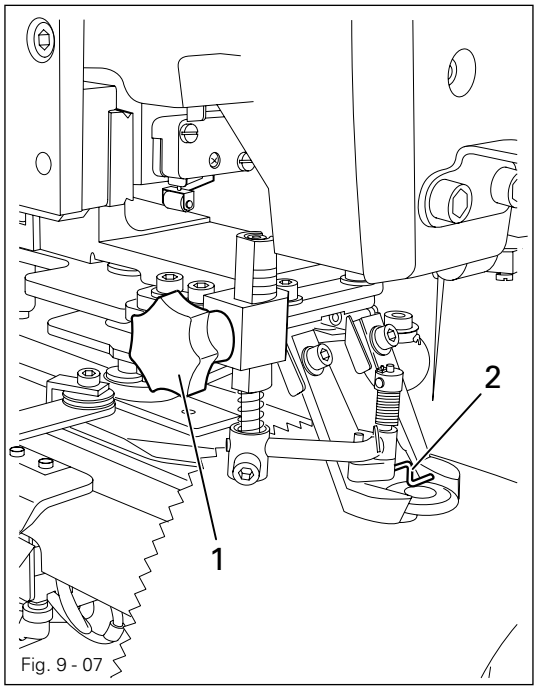


Fig. 9 - 07

- Loosen screw **1**.
- Adjust stem finger **2** as required.
- Tighten screw **1**.

9.07 Adjusting the height of the foot (on subclass -4/..)

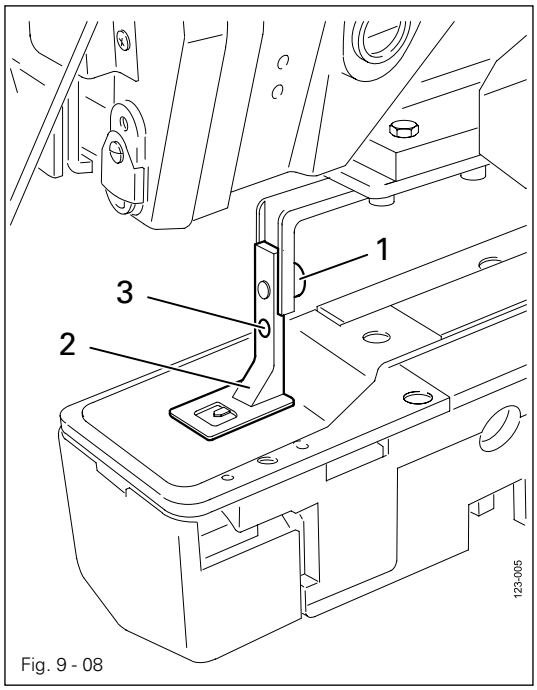


Fig. 9 - 08

- Loosen screw **1**.
- Adjust foot **2** to match the material thickness.
- Tighten screw **1**.

For very thick materials screw on foot **2** at hole **3**.

9.08 Inserting and removing the SD-memory card

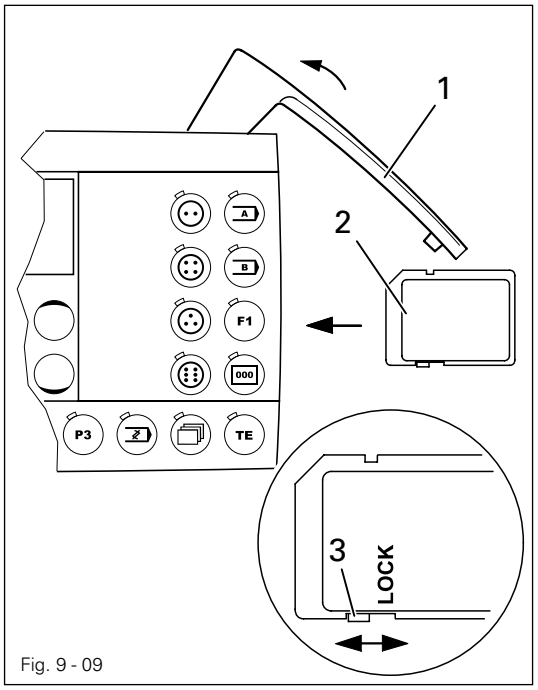


Fig. 9 - 09

Inserting the SD-memory card

- Open cover **1**.
- Insert SD-memory card **2** into the card slot with the label at the front.
- Close cover **1** again.

Removing the SD-memory card

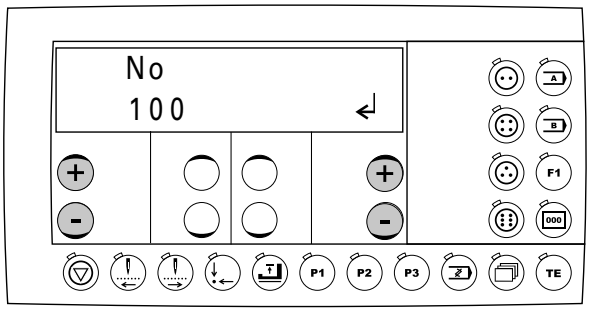
- Open cover **1**.
- Press the edge of the SD-memory card **2** lightly – the SD-card is ejected.
- Close cover **1** again.

By moving slide **3** it is possible to activate (position "LOCK") or deactivate the write protection function of the SD-memory card. To store, process or delete data on the SD-memory card, the write protection function must be deactivated.

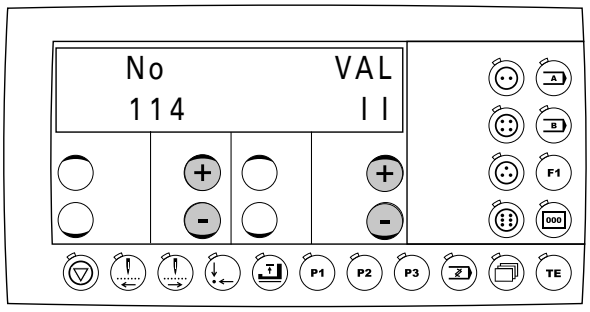
9.09 Activating the sequence mode

To activate the sequence mode, the sequence must have been entered beforehand, see Chapter 11.04 Entering a sequence.

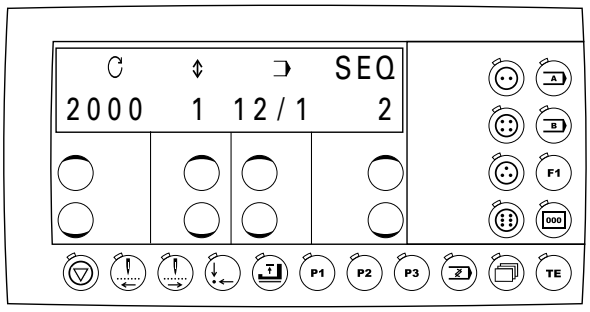
- Switch on the machine
- Select the input mode (LED in the key is on).



- Call up the function group "100" by pressing the left +/- keys.
- Confirm the selection by pressing "+" on the right +/- keys.



- Select parameter "114" (sequence mode) by pressing the left +/- keys.
- By pressing the right +/- keys select value "II" to switch on the sequence mode.
- Conclude the parameter input (LED in the key goes off) by switching to the sewing mode.



Screen displays:

2000: Maximum speed

The value can be changed directly with the corresponding +/- keys.

1: Stem length

The value can be changed directly with the corresponding +/- keys.
(1 = no stem; 2 = short stem; 3 = long stem)

12/1: Number of seam patterns / current seam pattern

The current seam pattern can be selected directly with the corresponding +/- key.

2: Current sequence

The current sequence can be selected directly with the corresponding +/- key.

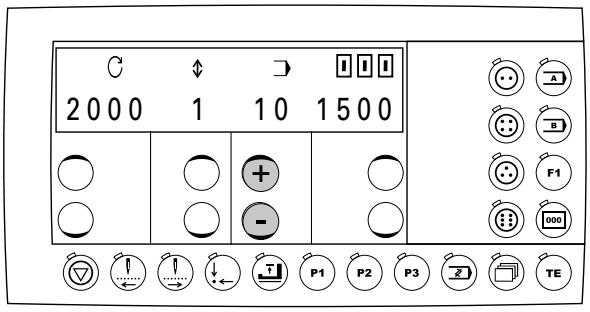
When working through the sequences, the machine switches automatically to the next seam pattern in the sequence after finishing the current seam pattern. After the last seam pattern the machine switches back to the first seam pattern of the sequence.

10 Sewing

The machine must be installed, connected and set up in accordance with Chapter **8 Installation and Commissioning**.

The screen display on the control panel and consequently the operation of the machine is dependent among other things on the subclass and the sequence mode being activated, see Chapter **9.09 Activating the sequence mode**.

- Switch on the machine.



Screen displays:

2000: **Maximum speed**
The value can be changed directly with the corresponding **+/- keys**.

1: **Stem length**
The value can be changed directly with the corresponding **+/- keys**.
(**1** = no stem; **2** = short stem; **3** = long stem)

10: **Program number**
The seam pattern can be selected directly with the corresponding **+/- key**. In conjunction with the four keys for button type (two-hole button, four-hole button, three-hole button and six-hole button), for each button type **99** stored seam patterns can be selected.

1500: **Piece counter**
The value can be changed directly with the corresponding **+/- keys**.
To set the counter at "**0**", press the "piece counter" key.

The function of the other keys and symbols is explained in **Chapter 7.06 Control panel.**

10.01 Sewing with sub-class -1/..

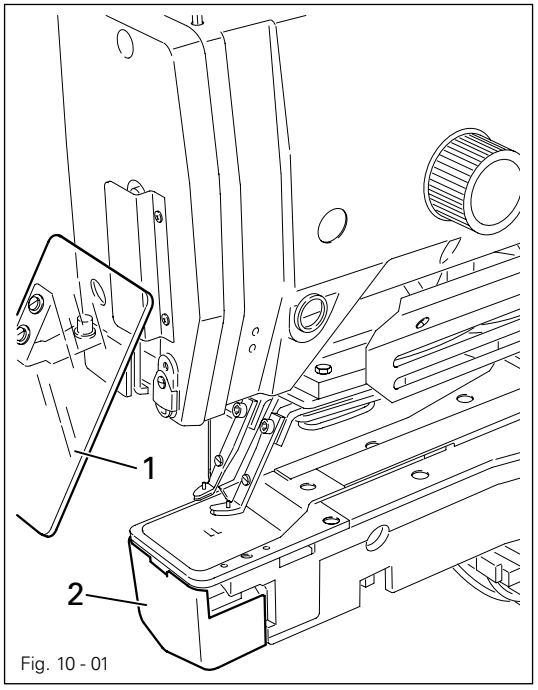


Fig. 10 - 01

Do not operate the machine without eye shield **1**!
Danger of injury from flying needle or button fragments!

Only operate the machine with cover **2** closed!
Danger of injury from rotating hook!

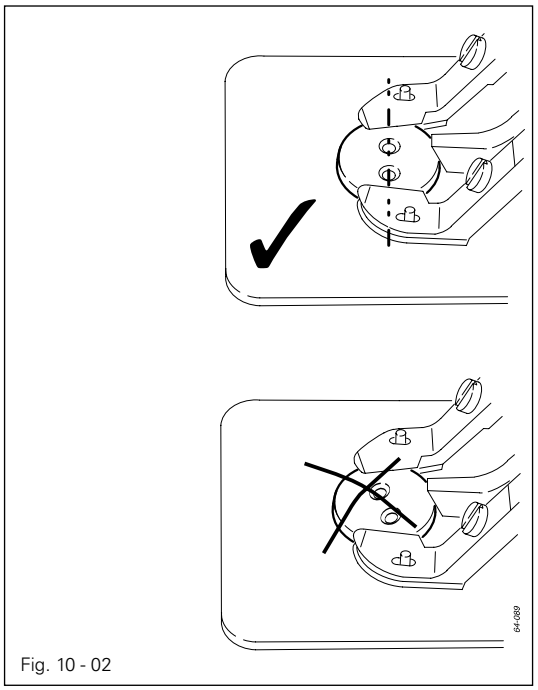


Fig. 10 - 02

- Insert the needle, see Chapter **9.01 Inserting the needle**.
- Thread the needle, see Chapter **9.02 Threading the needle thread**.
- Switch on the machine, see Chapter **8.03 Switching the machine on/off**.
- Select the button type and corresponding program number, see Chapter **9.04 Selecting the button type and program number**.
- Insert the button in the button clamp as shown in the illustration.
- Place the material under the button.
- Lower the button clamp with the pedal and start the sewing operation, see Chapter **7.02 Pedal**.

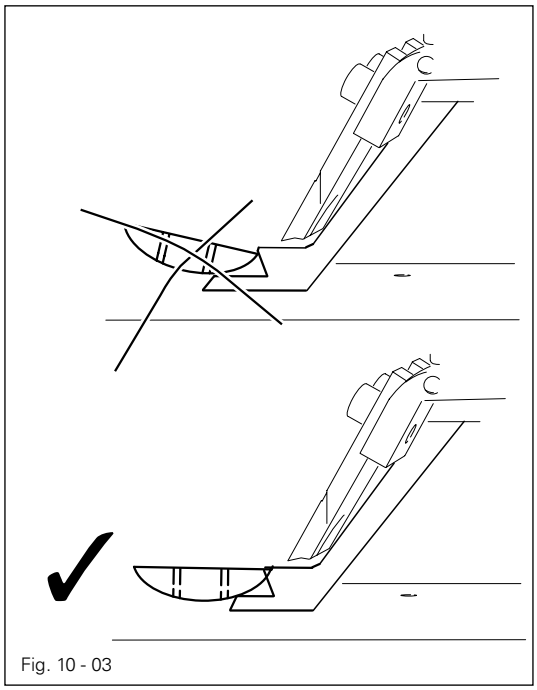


Fig. 10 - 03

Danger of needle breakage!
Make sure that the button is placed in a level position in the button clamp!

- If the button cannot be placed in a level position, the button guide **1** must be appropriately re-machined.

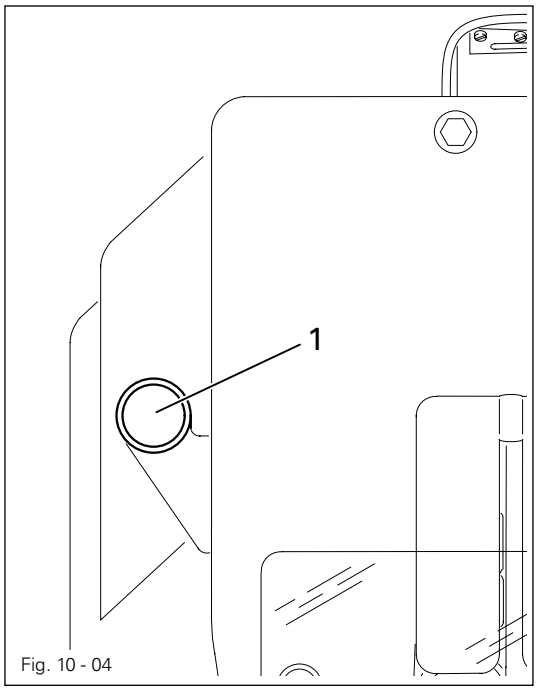


Fig. 10 - 04

The machine is equipped with a missed stitch detection function, which helps to control the sewing process. If an error occurs, key **1** lights up. The machine start function is blocked.
Following work steps must be carried out:

- Remove the workpiece.
- Press key **1** (lamp goes off).
- Remove the button, place button and material in position again and restart the sewing process.

An error signal can be caused e.g. by an incorrectly positioned button or by an incorrectly set needle. If key **1** still lights up, the machine adjustment must be checked by qualified staff.

10.02 Sewing with sub-class -4/..

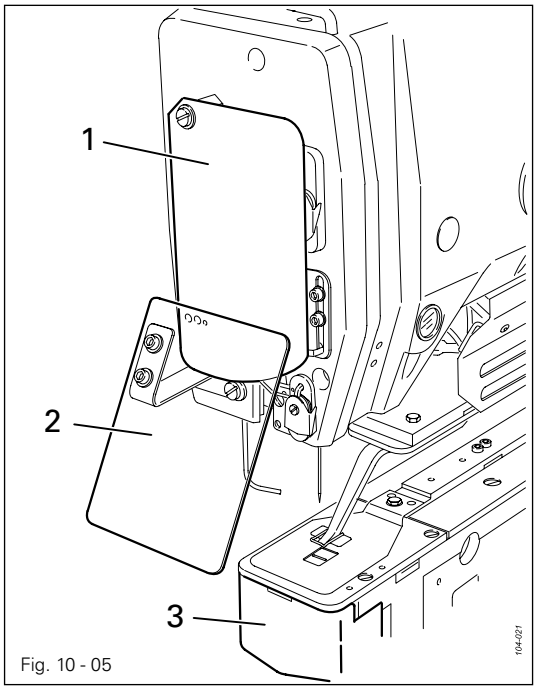


Fig. 10 - 05

Only operate the machine with cover **1** closed!
Danger of injury due to the motion of the take-up lever!

Do not operate the machine without eye shield **2**!
Danger of injury from flying needle or button fragments!

Only operate the machine with cover **3** closed!
Danger of injury from rotating hook!

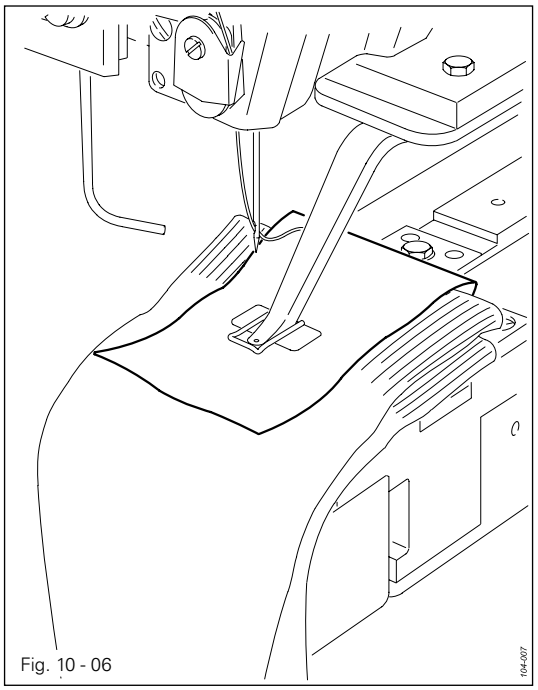


Fig. 10 - 06

- Insert the needle, see Chapter **9.01 Inserting the needle**.
- Thread the needle, see Chapter **9.02 Threading the needle thread**.
- Switch on the machine, see Chapter **8.03 Switching the machine on/off**.
- Select the button type (three-hole button with loosen stitch) and the corresponding program number, see Chapter **9.04 Selecting the button type and program number.**
- Place the material under the work clamp as shown in the opposite illustration.
- Lower the work clamp with the pedal and start the sewing operation, see Chapter **7.02 Pedal**.

10.03 Sewing with sub-class -5/..

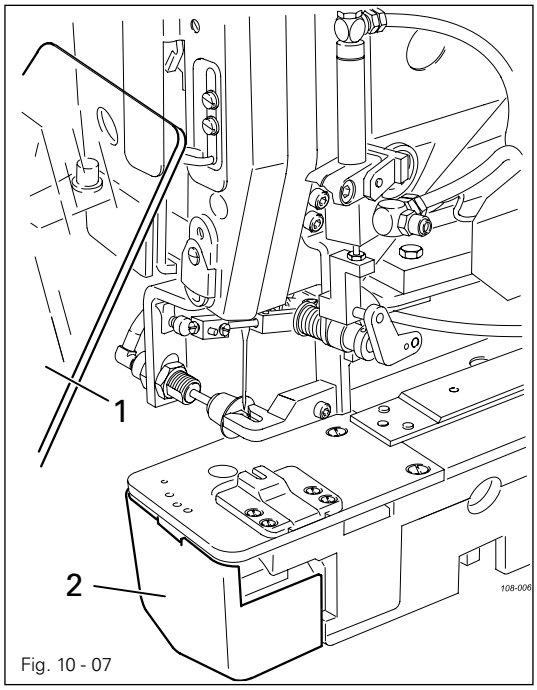


Fig. 10 - 07

Only operate the machine with cover **1** closed!
Danger of injury due to the motion of the take-up lever!

Do not operate the machine without eye shield **2**!
Danger of injury from flying needle or button fragments!

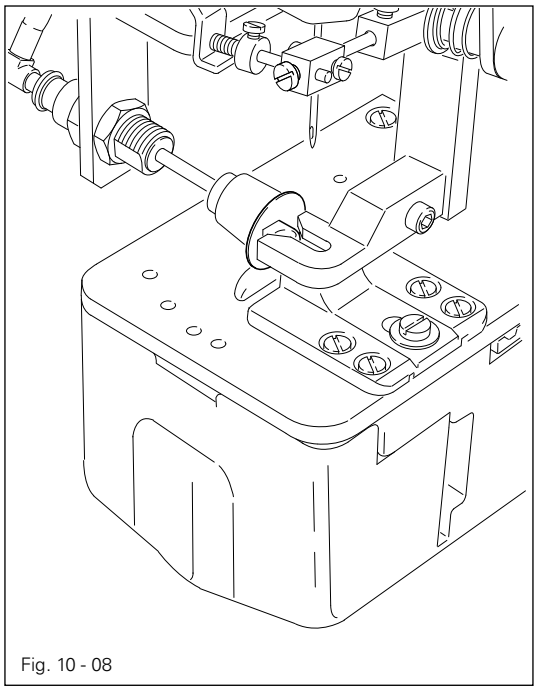
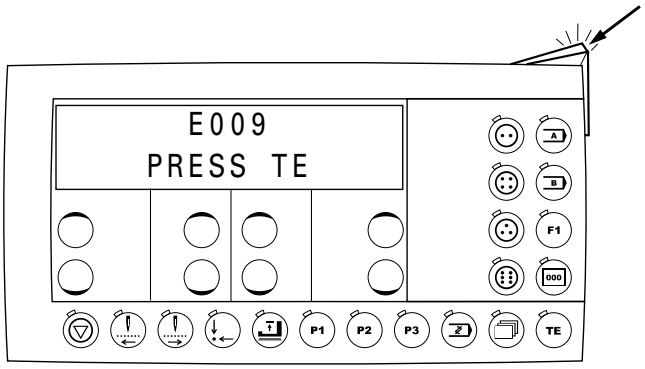


Fig. 10 - 08

- Insert the needle, see Chapter **9.01 Inserting the needle.**
- Thread the needle, see Chapter **9.02 Threading the needle thread**.
- Switch on the machine, see Chapter **8.03 Switching the machine on/off**.
- Select the button type (self-shank button) and the corresponding program number, see Chapter **9.04 Selecting the button type and program number**.
- Place the self-shank button in the button holder and fix it in position with the button holding cylinder, see Chapter **7.02 Pedal**.
- Place the material under the button holder.
- Lower the button holder with the pedal and start the sewing operation, see Chapter **7.02 Pedal**.

10.04 Error messages

If a malfunction occurs, an error code appears on the display together with short instructions. In addition the diode in the memory card slot lights up red. An error message may be caused by incorrect settings, defective elements or seam programs, as well as by overload conditions.
For a description of the error codes see Chapter 13.42 Description of the error messages.



- Eliminate the error.

- Acknowledge the elimination of the error by pressing the "TE" key.
  The diode in the memory card slot lights up yellow.

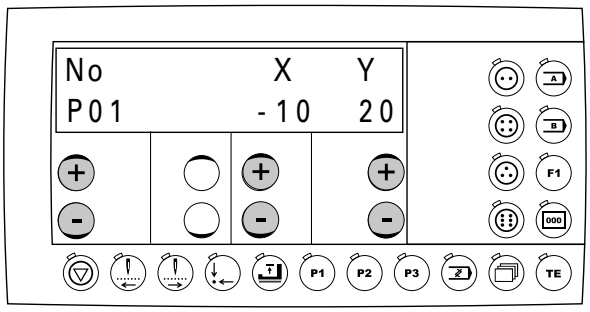
11 Input

11.01 Seam pattern input on machines from subclasses -1/.. and -5/..

For each button type (two-hole, four-hole or three-hole button) 99 programs (seam patterns) can be entered and stored. The seam pattern input is carried out by calling up or entering certain seam parameters. The seam pattern input is described below for each button type.

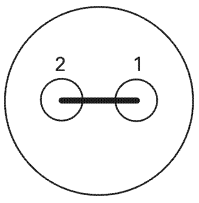
11.01.01 Seam pattern input for two-hole and self-shank buttons

- Switch on the machine.
- Select the program number and button type, see Chapter **9.04 Selecting the button type and program number**.
- Call up the programming mode



- Select the desired parameter (**P01, P02** etc.) with the left **+/- keys**.
- With the two corresponding **+/- keys** move to or select the desired positions (X and Y) or values.

Parameter input two-hole button



P01	First needle entry position
P02	Second needle entry position
P07	Total number of stitches (**1-99**).
P10	End knotting function: I = off, II = on In self-shank button programs the end knotting function must be switched off!

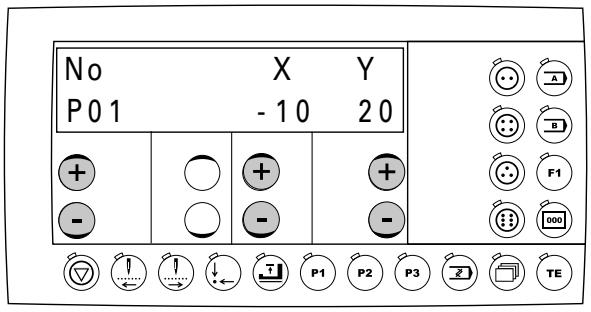
- Operate the left **+/- keys** to take over the values entered and to call up the next or previous parameter.

- Press the "programming" key to take over the values entered and to call up the sewing mode.

To achieve the best results, cutting should take place at the left needle entry position. This is achieved through the number of stitches and the location of the needle entry positions.

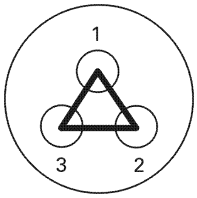
11.01.02 Seam pattern input for three-hole buttons

- Switch on the machine.
- Select the program number and button type, see Chapter **9.04 Selecting the button type and program number.**
- Call up the programming mode



- Select the desired parameter (**P01, P02** etc.) with the left **+/- keys**.
- With the two corresponding **+/- keys** move to or select the desired positions (**X** and **Y**) or values.

Parameter input three-hole button

	P01	First needle entry position
	P02	Second needle entry position
	P03	Third needle entry position
	P07	Total number of stitches (2-99)
	P09	Seam pattern:1 = seam cycle, 2 = point, 3 = basting
	P10	End knotting function: I = off, II = on

- Operate the left **+/- keys** to take over the values entered and to call up the next or previous parameter.

- Press the "programming" key to take over the values entered and to call up the sewing mode.

To achieve the best results, cutting should take place at the left needle entry position. This is achieved through the number of stitches and the location of the needle entry positions.

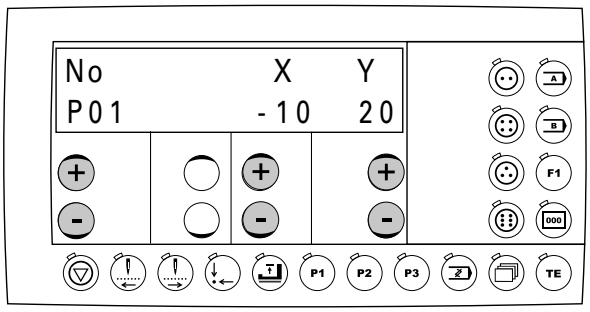
Seam pattern for the three-hole button

	Seam cycle (P09 = 1)
	Point (P09 = 2)
	Basting (P09 = 3)

11.01.03 Seam pattern input for four-hole buttons

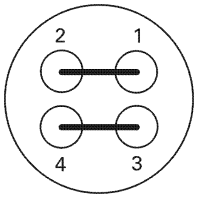
- Switch on the machine.
- Select the program number and button type, see Chapter **9.04 Selecting the button type and program number.**

- Call up the programming mode



- Select the desired parameter (**P01, P02** etc.) with the left **+/- keys**.
- With the two corresponding **+/- keys** move to or select the desired positions (**X** and **Y**) or values.

Parameter input four-hole button



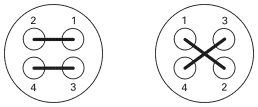
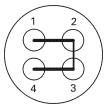
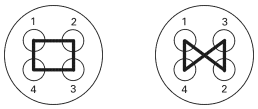
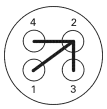
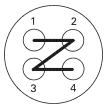
P01	First needle entry position
P02	Second needle entry position
P03	Third needle entry position
P04	Fourth needle entry position
P07	Total number of stitches (2-99)
P08	Intermediate trimming: I = off, II = on
P09	Stitch formation: 1 = normal, 2 = seam cycle, 3 = arrow, 4 = Z
P10	End knotting function: I = off, II = on

- Operate the left **+/- keys** to take over the values entered and to call up the next or previous parameter.

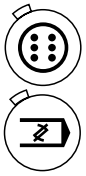
- Press the "programming" key to take over the values entered and to call up the sewing mode.

To achieve the best results, cutting should take place at the left needle entry position. This is achieved through the number of stitches and the location of the needle entry positions.

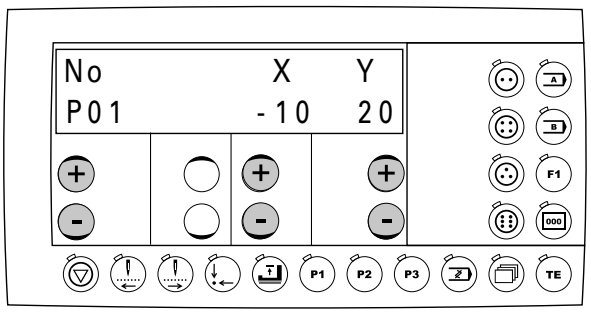
Seam pattern examples for the four-hole button

	Seam patterns with intermediate cutting (P06 = II), without seam cycle (P09 = 1).
	Seam patterns witouth intermediate cutting (P06 = I), and without seam cycle (P09 = 1).
	Seam patterns with seam cycle (P09 = 2), the intermediate cutting function is switched off automatically.
	Seam pattern "arrow" (PO9 = 3) the intermediate cutting function is switched off automatically.
	Stitch formation "Z" (P09 = 4) the intermediate trimming function is switched off automatically.

11.01.04 Seam pattern input for six-hole buttons

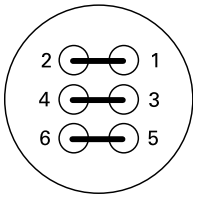


- Switch on the machine.
- Select the program number and button type, see Chapter **9.04 Selecting the button type and program number.**
- Call up the programming mode



- Select the desired parameter (**P01, P02** etc.) with the left **+/- keys**.
- With the two corresponding **+/- keys** move to or select the desired positions (**X** and **Y**) or values.

Parameter input six-hole button

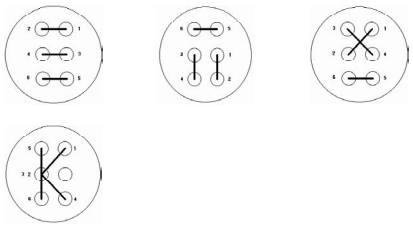
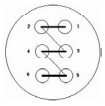
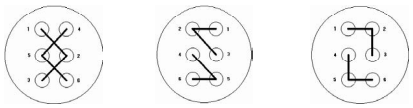
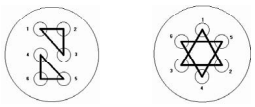
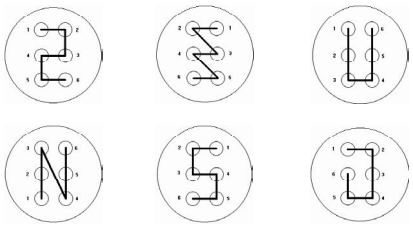
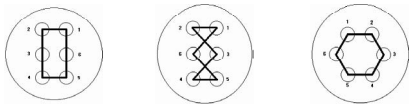
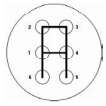
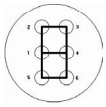
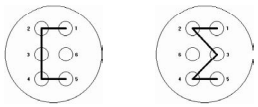
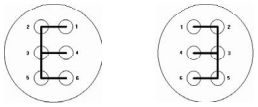
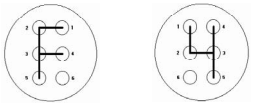
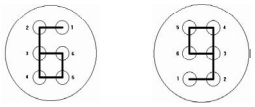
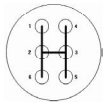


P01	First needle entry position
P02	Second needle entry position
P03	Third needle entry position
P04	Fourth needle entry position
P05	Fifth penetration position
P06	Sixth penetration position
P07	Total number of stitches (2-99)
P08	Intermediate trimming: I = off, II = on
P09	Seam pattern: 1 - 17 (see seam example)
P10	End knotting function: I = off, II = on

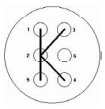
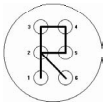
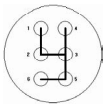
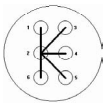
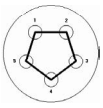
- Operate the left **+/- keys** to take over the values entered and to call up the next or previous parameter.
- Press the "programming" key to take over the values entered and to call up the sewing mode.

To achieve the best results, cutting should take place at the left needle entry position. This is achieved through the number of stitches and the location of the needle entry positions.

Seam pattern examples for the six-hole buttons

	Stitch formation 1 (P09 = 1) Stitch sequence 1 – 2; 3 – 4; 5 – 6 Seam patterns with intermediate cutting (P08 = II)
	Stitch formation 1 (P09 = 1) Stitch sequence 1 – 2; 3 – 4; 5 – 6 Seam patterns without intermediate cutting (P08=I)
	Stitch formation 2 (P09 = 2) Stitch sequence 1 – 2 – 3; 4 - 5 – 6 Seam patterns with intermediate cutting (P08 = II)
	Stitch formation 3 (P09 = 3) Stitch sequence 1 – 2 - 3 – 1; 4 - 5 – 6 - 4 Seam patterns with intermediate cutting (P08 = II)
	Stitch formation 4 (P09 = 4) Stitch sequence 1 – 2 – 3 – 4 – 5 – 6 – 5 – 4 – 3 – 2– 1
	Stitch formation 5 (P09 = 5) Stitch sequence 1 – 2 - 3 – 4 - 5 – 6 –1
	Stitch formation 6 (P09 = 6) Stitch sequence 1 – 2 - 3 – 4 - 5 – 4 – 1 – 6 – 1 – 4 -3 – 2 -1
	Stitch formation 7 (P09 = 7) Stitch sequence 1 – 2 - 3 – 4 – 1 - 5 – 6 – 4 – 1 – 2 - 3 – 4 – 6 – 5 - 1
	Stitch formation 8 (P09 = 8) Stitch sequence 1 – 2 - 3 – 4 – 5 – 4 – 3 – 2 -1
	Stitch formation 9 (P09 = 9) Stitch sequence 1 – 2 - 3 – 4 – 3 - 5 – 6 – 5 - 3 – 2 -1
	Stitch formation 10 (P09 = 10) Stitch sequence 1 – 2 - 3 – 4 – 3 - 5– 3 – 2 -1
	Stitch formation 11 (P09 = 11) Stitch sequence 1 – 2 - 3 – 4 - 5 – 6 – 3 – 6 - 5 – 4 – 3 – 2 -1
	Stitch formation 12 (P09 = 12) Stitch sequence 1 – 2 - 3 – 4 – 3 - 5 – 3 – 2 – 6 - 2 -1

Seam pattern examples for the six-hole buttons

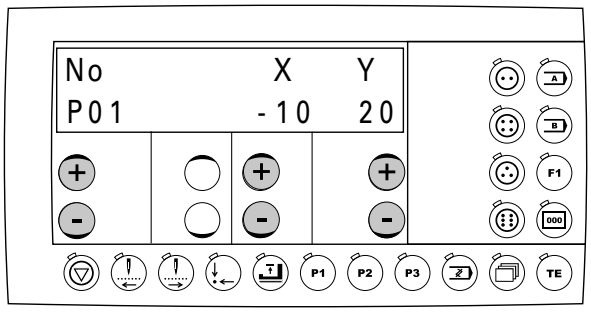
	Stitch formation 13 (P09 = 13) Stitch sequence 1 – 2 - 3 – 2 - 4 – 2 - 5 – 2 -1
	Stitch formation 14 (P09 = 14) Stitch sequence 1 – 2 - 3 – 4 – 5 - 2 – 6 - 2 – 5 – 4 – 3 – 2 -1
	Stitch formation 15 (P09 = 15) Stitch sequence 1 – 2 - 3 – 4 – 3 - 5 – 6 – 5 – 3 – 2 -1
	Stitch formation 16 (P09 = 16) Stitch sequence 1 – 2 - 3 – 2 - 4 – 2 - 5 – 2 - 6 – 2 -1
 	Stitch formation 17 (P09 = 17) Stitch sequence 1 – 2 - 3 – 4 - 5 –1

Pfaff does not guarantee that all selectable stitch formations can be sewn reliably in all the possible needle penetration point combinations.
To achieve the best possible sewing result, the first penetration point should be at the back and the first tack should be sewn in the X-direction. If necessary use the soft start function (parameter **501**) for a better sewing start and add extra stitches (parameter **503**) at the seam start, or change the direction of the formation! A reduction of the maximum speed can also improve the sewing result.

11.02 Seam pattern input on sub-class -4/.. machines

99 programs (basting seams) can be entered and stored under the button type, three-hole button. The basting seams can be entered when starting up or by entering certain seam parameters. The basting seam input is described below.

- Switch on the machine.
- Select the program number and button type, see Chapter **9.04 Selecting the button type and program number.**
- Call up the programming mode.



- Select the desired parameter (**P01, P02** etc.) with the left **+/- keys**.
- With the two corresponding **+/- keys** move to or select the desired positions (**X** and **Y**) or values.

Parameter input basting seam

P01	First needle entry position
P02	Second needle entry position
P03	Third needle entry position
P07	Total number of stitches (2-99)
P09	⚠ This parameter must be set at the value "3"!
P10	End knotting function: I = off, II = on

- Operate the left **+/- keys** to take over the values entered and to call up the next or previous parameter.

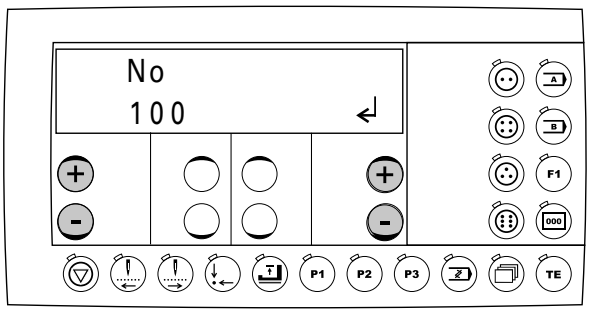
- Press the "programming" key to take over the values entered and to call up the sewing mode.

To achieve the best results, cutting should take place at the left needle entry position. This is achieved through the number of stitches and the location of the needle entry positions.

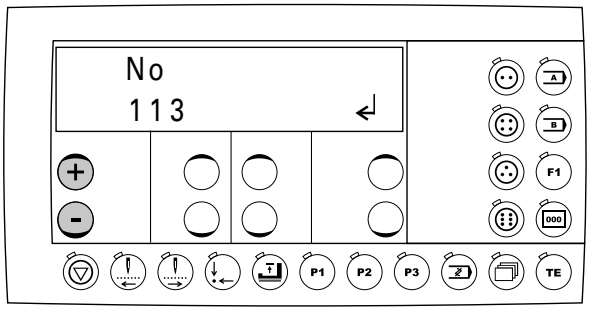
11.03 Sequence input

In one sequence up to 99 seam patterns can be stored in any order. When working with the sequence (sequence mode) the seam patterns are processed one after the other in the order specified. After the last seam pattern in the sequence, the first seam pattern is repeated again. Below is a description of a sequence input with two seam patterns.

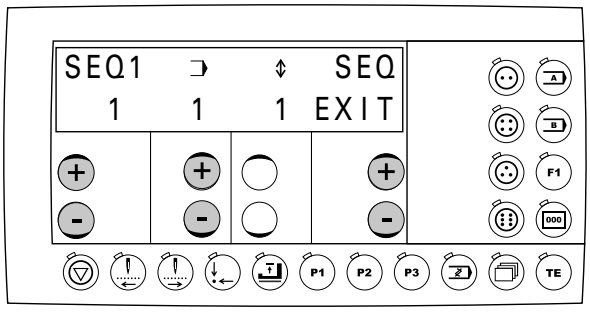
- Switch on the machine.
- Call up the input mode (LED in the key lights up).



- Select the function group "**100**" by pressing the left **+/- keys**.
- Confirm the selection by pressing "**+**" on the right **+/- keys**.



- Select parameter "**113**" by pressing the left **+/- keys**.
- Confirm the selection by pressing "+" on the right **+/- keys**.



- Select the required seam pattern by pressing the middle **+/- keys**.
- Select the next position by pressing "**+**" on the left **+/- keys**.
- Select the next seam pattern by pressing the middle **+/- keys**.
- After entering the seam patterns, conclude the sequence input by pressing the right **+/- keys** ("EXIT").

11.04 Program Management

In the program management the program numbers of the programs filed in the machine memory or on the inserted SD-memory card are displayed. The programs (seam patterns) can be deleted or copied. Commercially available SD-memory cards with a storage capacity of max. 2 GByte can be inserted in the control panel. The machine data is stored in the file "MD" in the sub-directory \P3307. The button-hole programs are filed as follows:

The 2-hole button programs are in directory \P3307\P2 in the files 01 – 99.

The 3-hole button programs are in directory \P3307\P3 in the files 01 – 99.

The 4-hole button programs are in directory \P3307\P4 in the files 01 – 99.

The 6-hole button programs are in directory \P3307\P6 in the files 01 – 99.

The stem-wrapping programs are in directory \P3307\PU in the files 01 – 99.

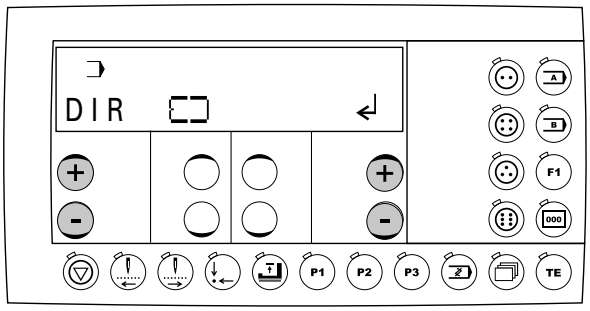
The desired button type is selected by pressing the corresponding key. A description of how to insert or remove the SD-memory card is given in Chapter 9.08 Inserting/removing the SD-memory card.
Should the SD-memory cards need to be formatted on the PC, they must be formatted in the format "FAT16". Alternatively the SD-memory cards can also be formatted on the corresponding machine with the formatting function, see Chapter 11.04.08 Formatting the SD-memory card.

11.04.01 Calling up the program management

- Switch on the machine.

- Call up the input mode. (The LED in the key is on.)

- Call up the program management.
- Select the desired button type.



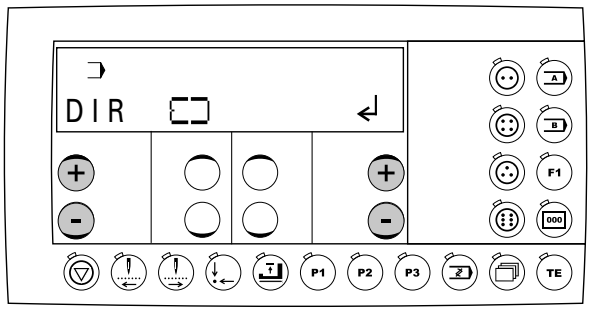
After the program management has been called up, the first menu item appears (display of programs in the machine memory).
Confirm the selection of the menu item with the "Enter" function by pressing the right **plus key.**
Scroll through the other menu items by pressing the left **+/- keys**, see following chapter.

The following menu items are available in the program management:

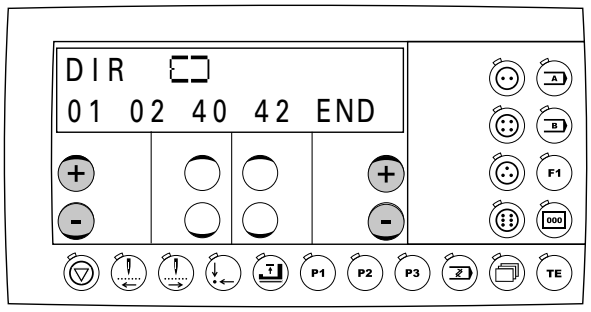
- Displaying programs in the machine memory
- Displaying programs on the connected SD-memory card
- Copying individual programs to the SD-memory card
- Copying individual programs to the machine memory
- Deleting programs in the machine memory
- Deleting programs on the SD-memory card
- Formatting the SD-memory card

11.04.02 Displaying programs in the machine memory

- Call up the program management and select the desired button type, see Chapter **11.04.01 Calling up the program management.**



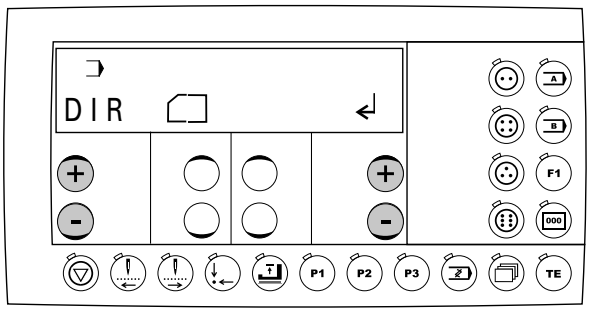
- Press the left **+/- keys** until the corresponding menu item appears.
- Confirm the selection of the menu item by pressing the right **plus key**.



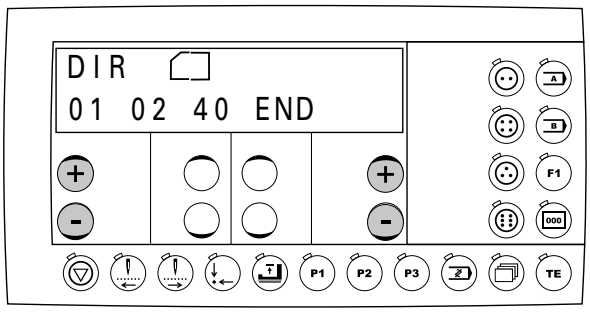
- Press "**+**" on the right **+/- keys** to scroll through the display of the machine memory (programs **1** – **99**). Only assigned program spaces will be displayed.
- Press the left **+/- keys** to select the other menu items of the program management.

11.04.03 Displaying programs on the SD-memory card

- Call up the program management and select the desired button type, see Chapter **11.04.01 Calling up the program management.**



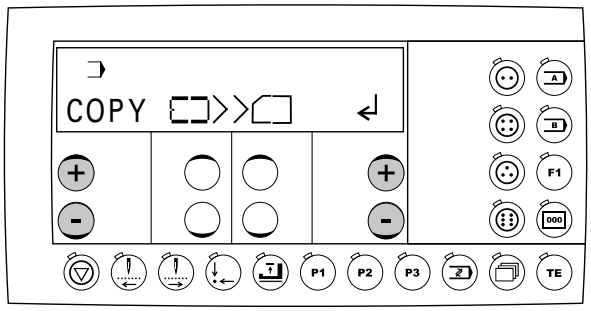
- Press the left **+/- keys** until the corresponding menu item appears.
- Confirm the selection of the menu item by pressing the right **plus key**.



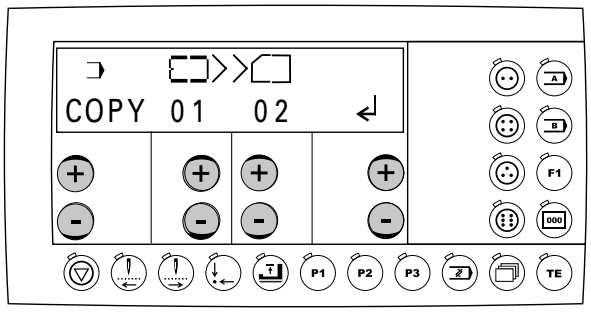
- By pressing "**+**" on the right **+/- keys** it is possible to scroll through the display of the SD-memory card (**1 – 99** programs). Only assigned program spaces will be displayed.
- Press the left **+/- keys** to select the other menu items of the program management.

11.04.04 Copying programs to the SD-memory card

- Call up the program management and select the desired button type, see Chapter **11.04.01 Calling up the program management.**



- Press the left **+/- keys** until the corresponding menu item appears.
- Confirm the selection of the menu item by pressing the right **plus key**.

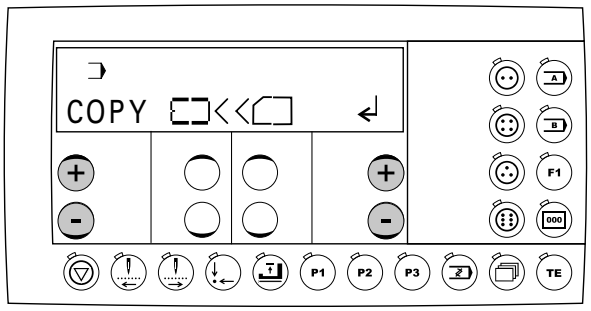


- Press the **+/- keys** under the machine memory symbol to select the seam patterns which are to be copied from the machine memory onto the SD-memory card (programs **1 – 99**).
- Select the program numbers to be stored on the SD-memory card by pressing the **+/- keys** under the memory card symbol.
- Confirm the copying process by pressing the right **plus key**.
- Press the left **+/- keys** to select the other menu items of the program management.

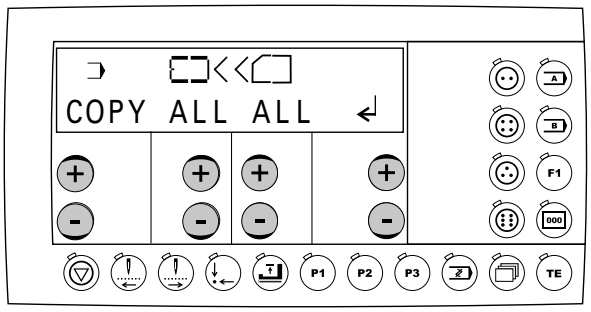
If the entire contents of the machine "**ALL**" are selected, all the seam patterns for the selected button type will be copied to the SD-memory card.
If a seam pattern already exists on the SD-memory card, a confirmation enquiry is displayed. If the right **plus key** is pressed, the seam pattern will be overwritten. If the right **minus key** or the "basic position" key are pressed, the process is stopped.

11.04.05 Copying programs to the machine memory

- Call up the program management and select the desired button type, see Chapter **11.04.01 Calling up the program management.**



- Press the left **+/- keys** until the corresponding menu item appears.
- Confirm the selection of the menu item by pressing the right **plus key**.

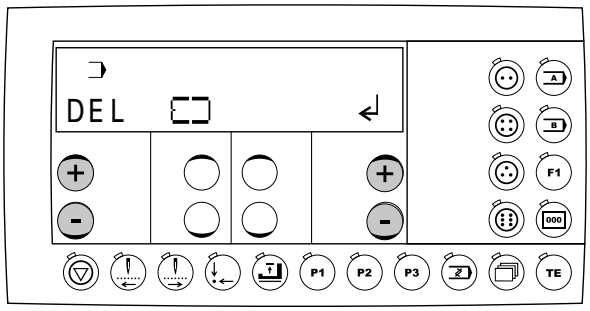


- Press the **+/- keys** under the memory card symbol to select the seam patterns which are to be copied from the SD-memory card to the machine memory (programs **1 – 99**).
- Select the program numbers to be stored in the machine memory by pressing the **+/- keys** under the machine memory symbol.
- Confirm the copying process by pressing the right **plus key**.
- Press the left **+/- keys** to select the other menu items of the program management.

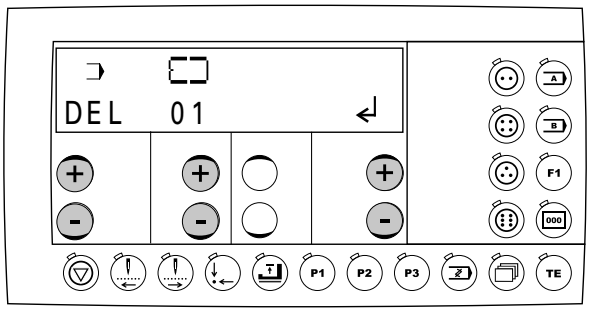
If the entire contents of the memory card "**ALL**" are selected, all the seam patterns for the selected button type will be copied to the machine memory.
If a seam pattern already exists in the machine memory, a confirmation enquiry is displayed. If the right **plus key** is pressed, the seam pattern will be overwritten. If the right **minus key** or the "basic position" key are pressed, the process is stopped.

11.04.06 Deleting programs in the machine memory

- Call up the program management and select the desired button type, see Chapter **11.04.01 Calling up the program management.**



- Press the left **+/- keys** until the corresponding menu item appears.
- Confirm the selection of the menu item by pressing the right **plus key**.

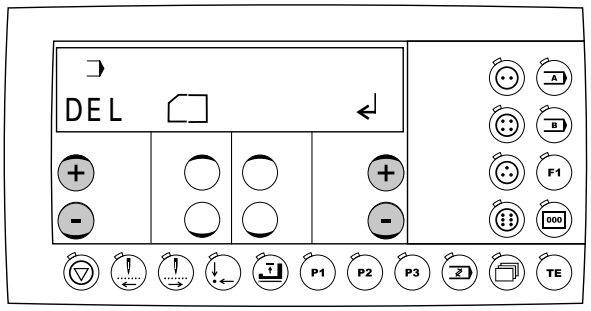


- Press the **+/- keys** under the machine memory symbol to select the seam patterns which are to be deleted from the machine memory (programs **1 – 99**).
- Confirm the deleting process by pressing the **plus key**.
- Press the left **+/- keys** to select the other menu items of the program management.

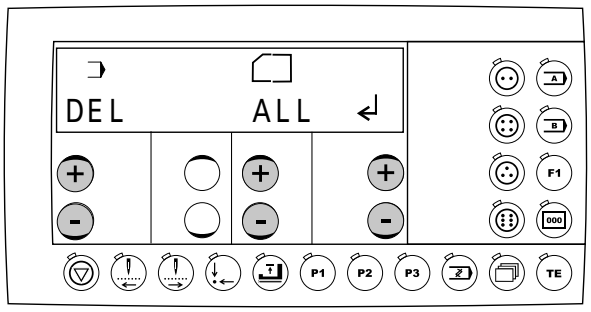
If the entire contents of the machine "**ALL**" are selected, all the seam patterns for the selected button type will be deleted from the machine memory.
The machine data "**MD**" cannot be deleted. Before the deleting action a confirmation enquiry is displayed. If the right **plus key** is pressed, the seam pattern will be overwritten. If the right **minus key** or the "basic position" key are pressed, the process is stopped.

11.04.07 Deleting programs on the SD-memory card

- Call up the program management and select the desired button type, see Chapter **11.04.01 Calling up the program management.**



- Press the left **+/- keys** until the corresponding menu item appears.
- Confirm the selection of the menu item by pressing the right **plus key**.

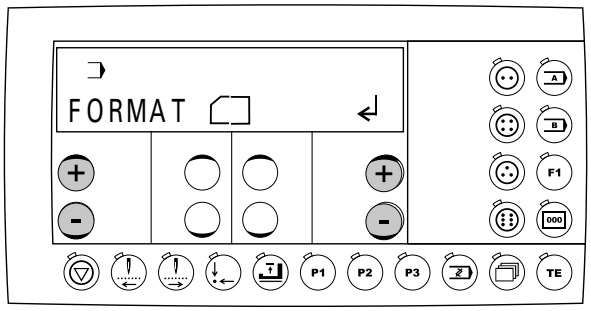


- Press the **+/- keys** under the memory card symbol to select the seam patterns which are to be deleted from the SD-memory card (programs **1 – 99**).
- Confirm the deleting process by pressing the right **plus key**.
- Press the left **+/- keys** to select the other menu items of the program management.

If the entire contents of the memory card "**ALL**" are selected, all the seam patterns for the selected button type will be deleted from the memory card. Before the deleting action a confirmation enquiry is displayed. If the right **plus key** is pressed, the seam pattern will be overwritten. If the right **minus key** or the "basic position" key are pressed, the process is stopped.

11.04.08 Formatting the SD-memory card

- Call up the program management and select the desired button type, see Chapter **11.04.01 Calling up the program management.**



- Press the left **+/- keys** until the corresponding menu item appears.
- Confirm the selection of the menu item by pressing the right **plus key**.

Before formatting begins, a confirmation enquiry is made. Press the right **plus key** to confirm the formatting process. Press the right **minus key** or the "basic position" key to stop the formatting process.

If the card cannot be read, it will be completely formatted. If it can be read and the directory **\P3307** exists for the 3307, the machine data and the sub-directories for all button types in this directory will be deleted.
If the directory **\P3307** does not exist for the 3307, only the directory will be created. This ensures that programs from other machines and other files are not lost.

- Press the left **+/- keys** to select the other menu items of the program management.

12 Care and maintenance

12.01 Maintenance intervals

RCleaning the hook compartment	daily
Cleaning the entire machine	once a week
Cleaning the air filter/lubricator (air filter)	as required
Top up oil (gears and needle drive)	once a month
Lubricate gear shaft	once a month
Checking the air pressure	daily, before operation

During all cleaning work the machine must be disconnected from the power supply by switching off the main switch or pulling out the plug! Danger of injury if the machine is started accidentally!

12.02 Cleaning the machine

The cleaning cycle required for the machine depends on following factors:

- Single or several shift operation
- Amount of dust resulting from the workpiece

It is therefore only possible to stipulate the best possible cleaning instructions for each individual case.

For all cleaning work the machine must be disconnected from the mains by switching off the on/off switch or by removing the mains plug! Danger of injury if the machine suddenly starts up .

To avoid breakdowns, the following cleaning work is recommended for single shift operation:

- Clean hook compartment and needle area of sewing head several times daily.
- Clean the entire machine at least once a week.

12.03 Cleaning the hook compartment

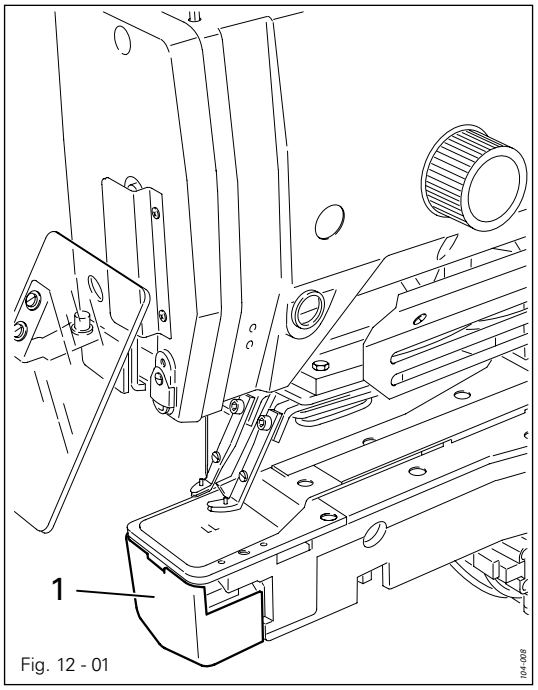


Fig. 12 - 01

Switch off the machine!
Danger of injury if the machine is started accidentally!

- Open the hook compartment cover **1**.
- Clean the hook and the hook compartment daily, more often if in continuous operation.

12.04 Cleaning the air filter/lubricator

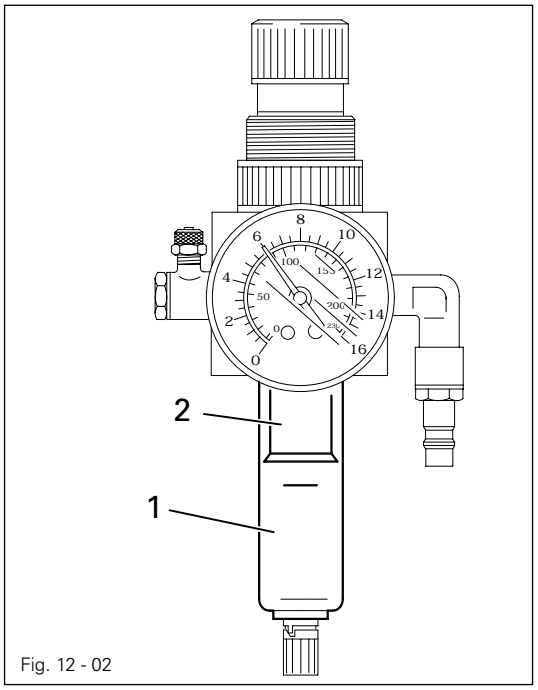


Fig. 12 - 02

Switch off the machine!
Remove the compressed air tube from the air filter.

Empty the water tank 1:

- The water tank **1** empties automatically after the removal of the compressed air tube of the air filter.

Clean filter 2:

- Unscrew water tank **1**.
- Remove filter **2**.
- Clean filter **2** with compressed air or with isopropyl alcohol (part no. **95-665 735-91**).
- Replace filter **2** and screw water tank **1** back into place.

12.05 Checking/adjusting the air pressure

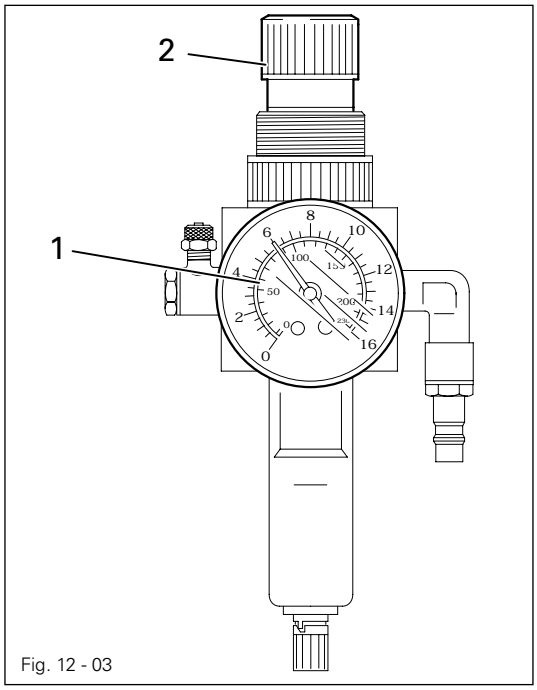


Fig. 12 - 03

- Before operating the machine, always check the air pressure on gauge **1**.
- Gauge **1** must show a pressure of **6** bar.
- If necessary adjust to this reading.
- To do so, pull knob **2** upwards and turn it so that the gauge shows a pressure of **6** bar.

12.06 Top up the oil for needle drive

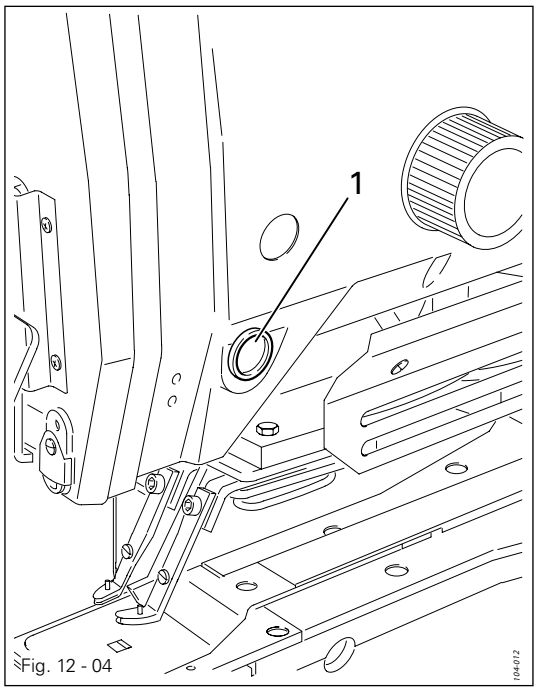
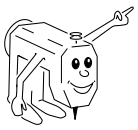


Fig. 12 - 04

Top up oil once a month.

- Pour in oil through the hole in inspection glass **1** up to the bottom edge of the hole.

Only use oil with a mean viscosity of **31.0 mm²/s** at 40° C and a density of **0.870 g/cm³** at 15° C.



We recommend
PFAFF sewing machine oil,
part no. **280-1**-120 145

12.07 Topping up oil for the gears

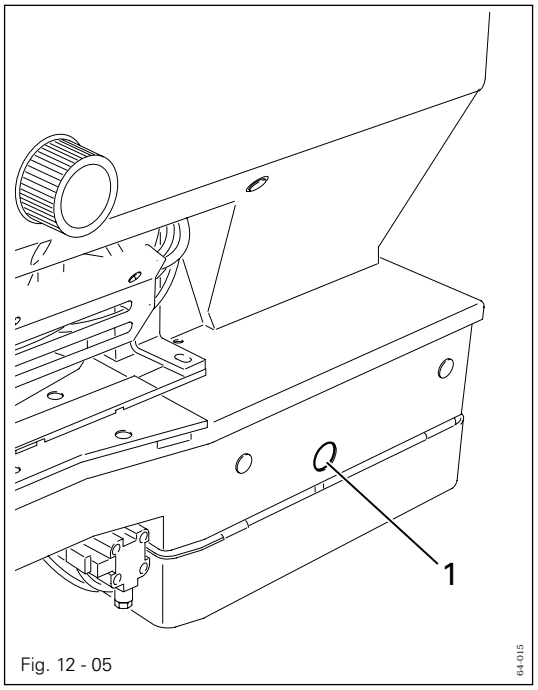


Fig. 12 - 05

Top up oil once a month.

- Pour in oil through the hole in inspection glass **1**.

Only use oil with a mean viscosity of **31.0 mm²/s** at 40° C and a density of **0.870 g/cm³** at 15° C.

We recommend
PFAFF sewing machine oil,
part no. **280-1**-120 145

12.08 Lubricating the gear shaft

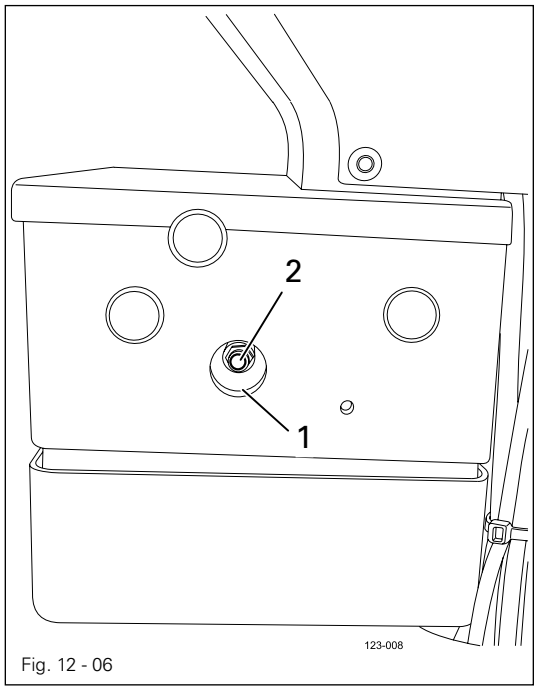


Fig. 12 - 06

Lubricate the gear shaft once a month.

- Remove the cover from hole **1**.
- Use the lubricating nipple **2** of a grease gun to lubricate the gear shaft.

Only use Gleitmo **585** M heavy duty grease, part no. 280-1-120 069.

13 Adjustment

Unless stated otherwise, the machine must be disconnected from the electric and pneumatic power supply!

13.01 Notes on adjustment

All following adjustments are based on a fully assembled machine and may only be carried out by expert staff trained for this purpose.
Machine covers, which have to be removed and replaced to carry out checks and adjustments, are not mentioned in the text.
The order of the following chapters corresponds to the most logical work sequence for machines which have to be completely adjusted. If only specific individual work steps are carried out, both the preceding and following chapters must be observed.
Screws, nuts indicated in brackets ( ) are fastenings for machine parts, which must be loosened before adjustment and tightened again afterwards.

For all the general settings in these adjustment instructions, illustrations of the subclass -1/.. have been used, the relevant points of which can be transferred to subclass -4/ and -5/.. .
In the heading appropriate reference will be made to special settings, which are only valid for certain subclasses.

13.02 Tools, gauges and other accessories

- 1 set of screwdrivers with blade widths from 2 to 10 mm
- 1 et of wrenches with jaw widths from 7 to 14 mm
- 1 set of Allen keys from 1.5 to 6 mm
- 1 offset screwdriver, part no. 91-029 339-91
- 1 metal ruler, part no. 08-880 218-00
- 1 C-clamp, part no. 62-111 600-35
- 1 needle rise gauge 2.4 mm, part no. 61-111 600-01
- 1 adjustment gauge "hook centre", part no. 61-11 637-03
- 1 button gauge, part no. 61-111 635-66
- 1 locking pin "t.d.c. needle", part no. 61-111 635-92
- 1 locking pin "needle drive", part no. 13-030 272-05
- Needles, threads and test material

13.03 Abbreviations

t.d.c. = top dead centre
b.d.c. = bottom dead centre

13.04 Toothed belts of the main drive

Requirement

1. Toothed belt wheels **1** and **5** should be in alignment.
2. Hardly any play should be noticeable between toothed belt wheels **1** and **5** and the toothed belt **6**.

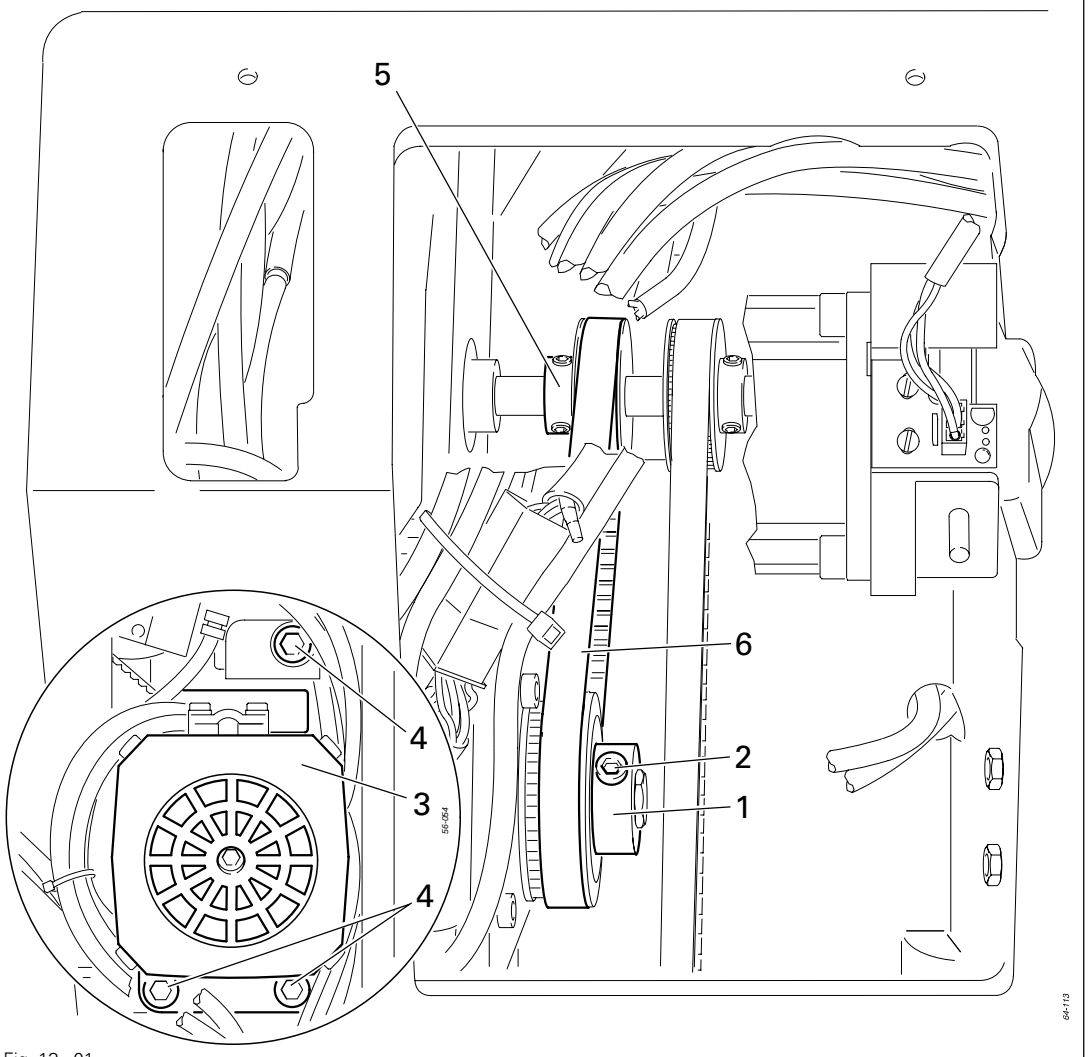


Fig. 13 - 01

- Adjust toothed belt wheel **1** (screws **2**) in accordance with **requirement 1.**
- Move motor **3** (screws **4**) in accordance with **requirement 2.**

If there are operational noises, the adjustments must be repeated.

13.05 Top needle bar position (reference position)

Requirement
Needle bar **4** should be positioned at its t.d.c. with access to one of the screws **1**.

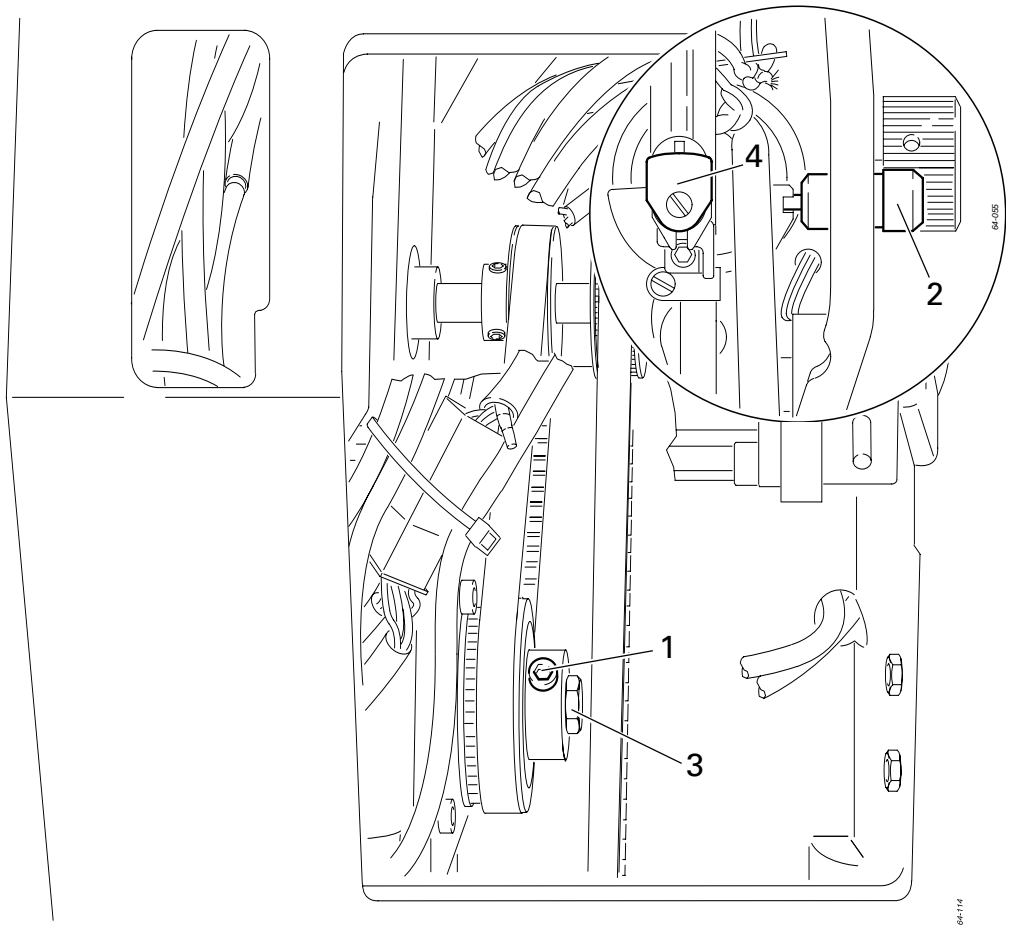
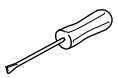
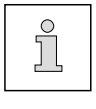


Fig. 13 - 02



- Remove the needle.
- Loosen screws **1**.
- Using the balance wheel, position the needle bar at its t.d.c. and lock it with locking pin **2** (part no. 61-111 635-92).
- Switch on the machine, select parameter 612.
- With screw **3** turn the motor shaft so that the value for parameter 612 is at "0".
- Confirm the value.
- Confirm the value with "Enter function".
- Tighten screws **1** (to begin with only one screw is accessible).
- Switch off he machine and remove locking pin **2**.



This setting can change again by ± 3 increments after checking.

13.06 Pre-adjusting the needle height

Requirement

1. When the needle bar is at its t.d.c., there should be a distance of **30 mm** between the needle point and the needle plate.
2. The thread puller **3** should be touching clamp **5** and be positioned in the centre of the face plate cutout.

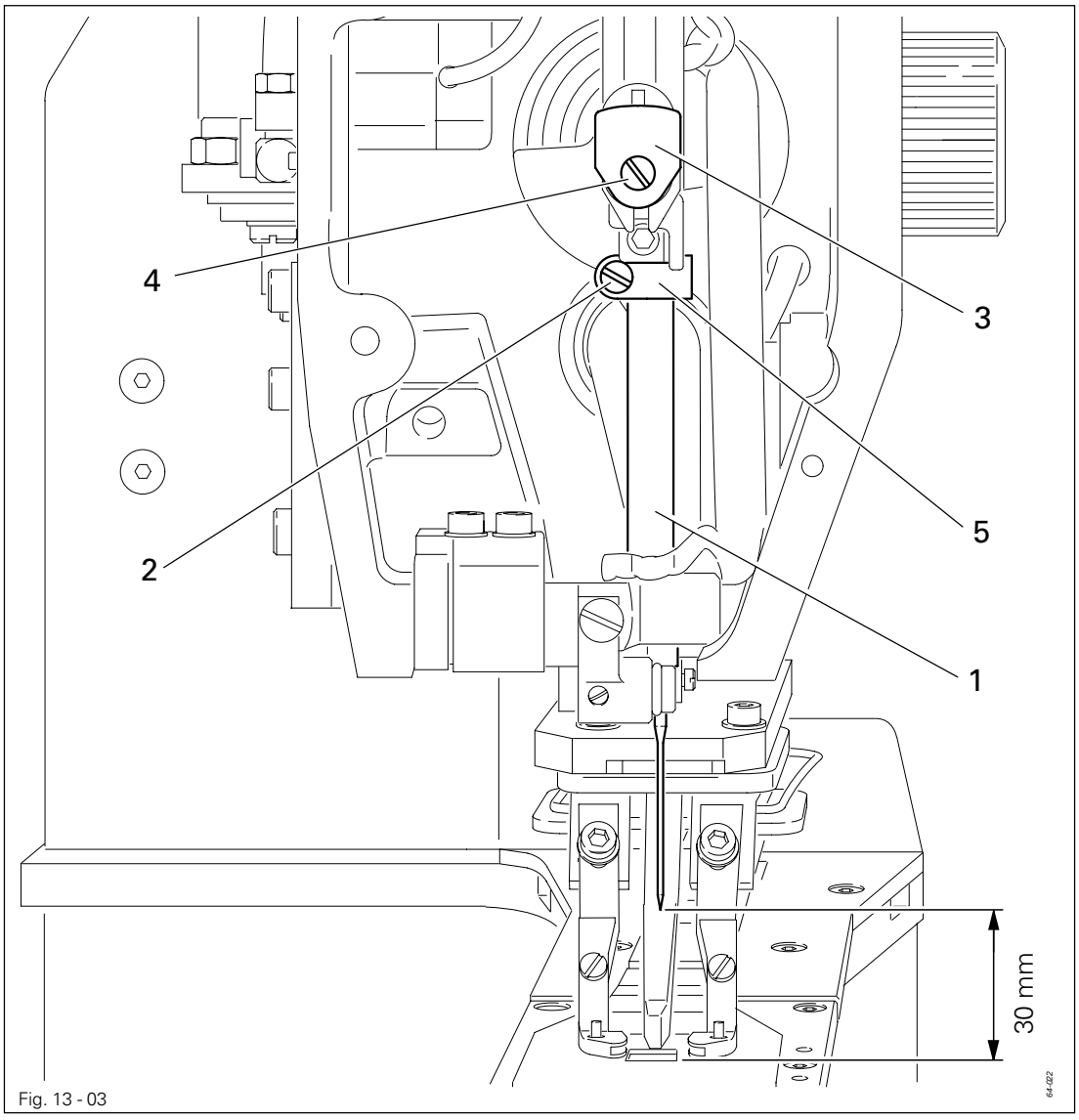
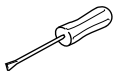


Fig. 13 - 03



- Adjust needle bar **1** (screw **2**) and thread puller **3** (screw **4**) in accordance with the **requirements.**

13.07 Position of the needle to the needle hole

Requirement
When the needle bar is at its b.d.c., in the lengthwise direction of the arm the needle should be positioned in the centre of the needle hole.

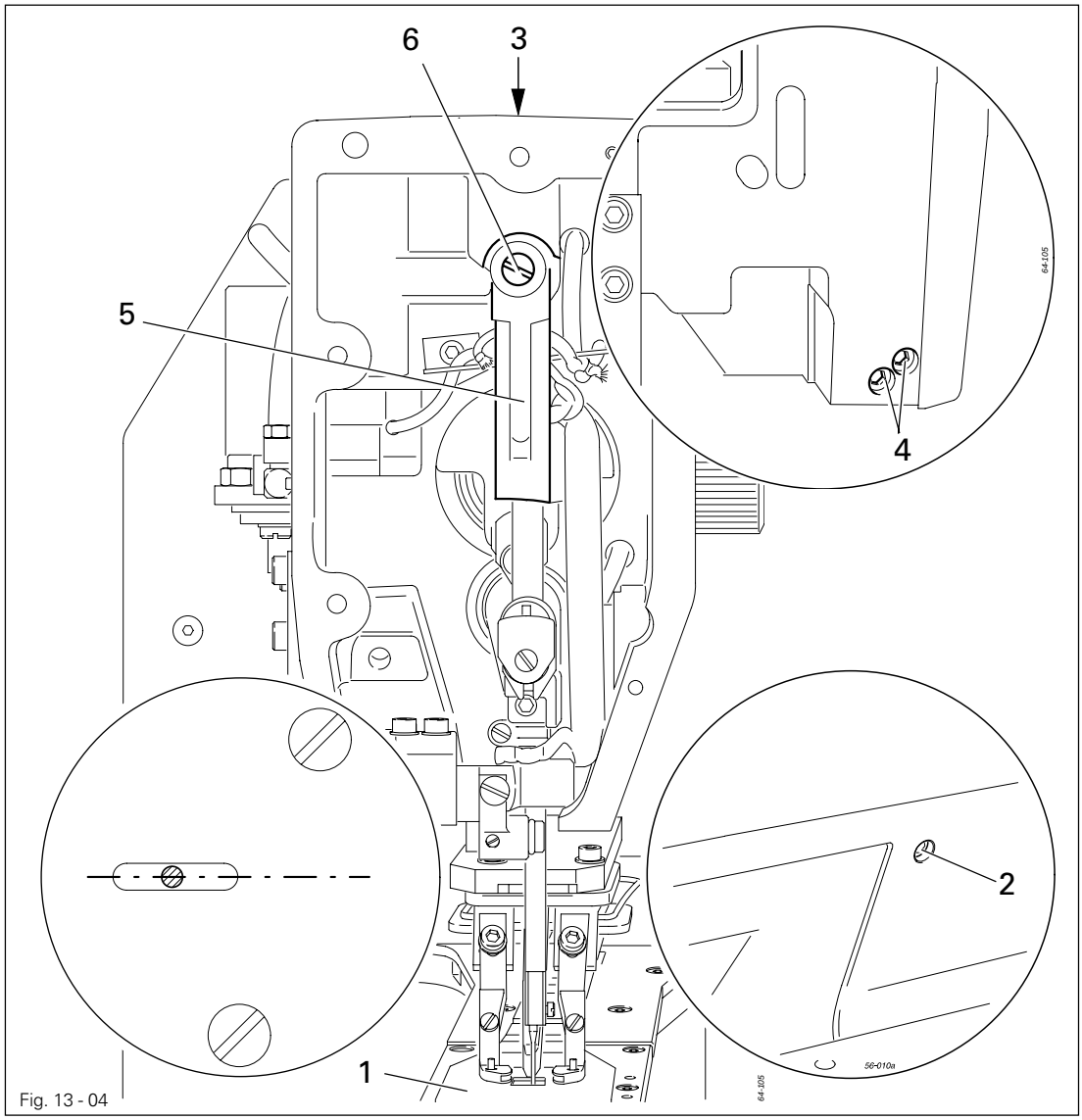


Fig. 13 - 04

- Switch on the machine and set parameter "610" at value "4".
- Unscrew cloth plate **1**.
- Loosen screws **2, 3** and **4**.
- With the balance wheel set the needle bar at its b.d.c.
- Align pendulum **5** in accordance with the **requirement.**
- Tighten screws **4**.
- By moving the needle bar, make sure that pin **6** is not jammed and tighten screw **3**.
- Switch off the machine.

Screw **2** remains loosened for further adjustments.

13.08 Basic position "button clamp raised"

Requirement
When cylinder **3** is retracted completely, switch **1** should operate reliably.

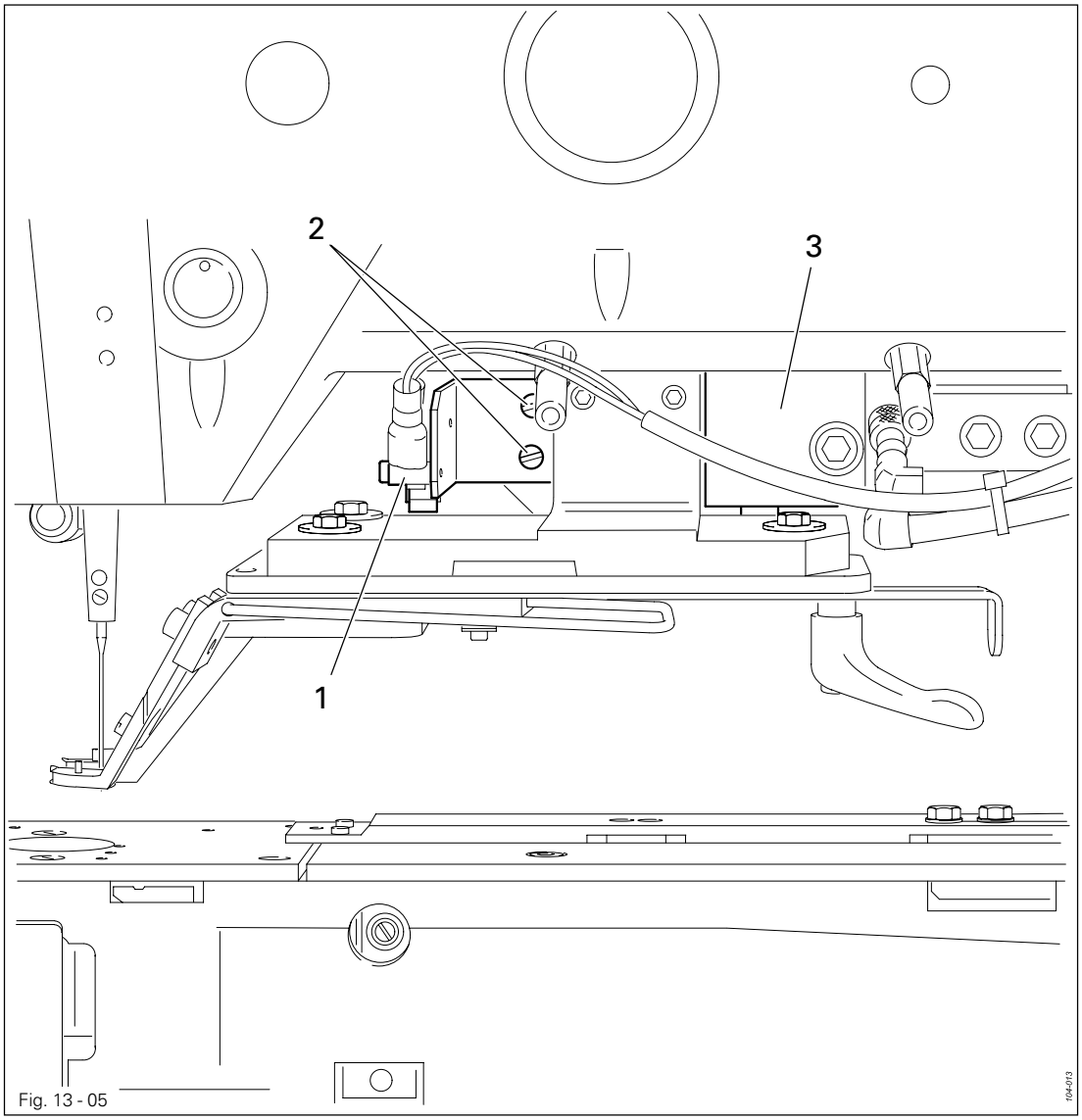


Fig. 13 - 05

- Adjust switch **1** (screws **2**) in accordance with the **requirement.**

13.09 Sensor board of the needle drive (in dismantled condition)

Requirement

1. When parameter "610" is set at "4", the recess in eccentric **1** should match the locking hole in the mounting bracket.
2. The switch lug of eccentric **1** should be axially centred to the hybrid light barrier of the sensor board.

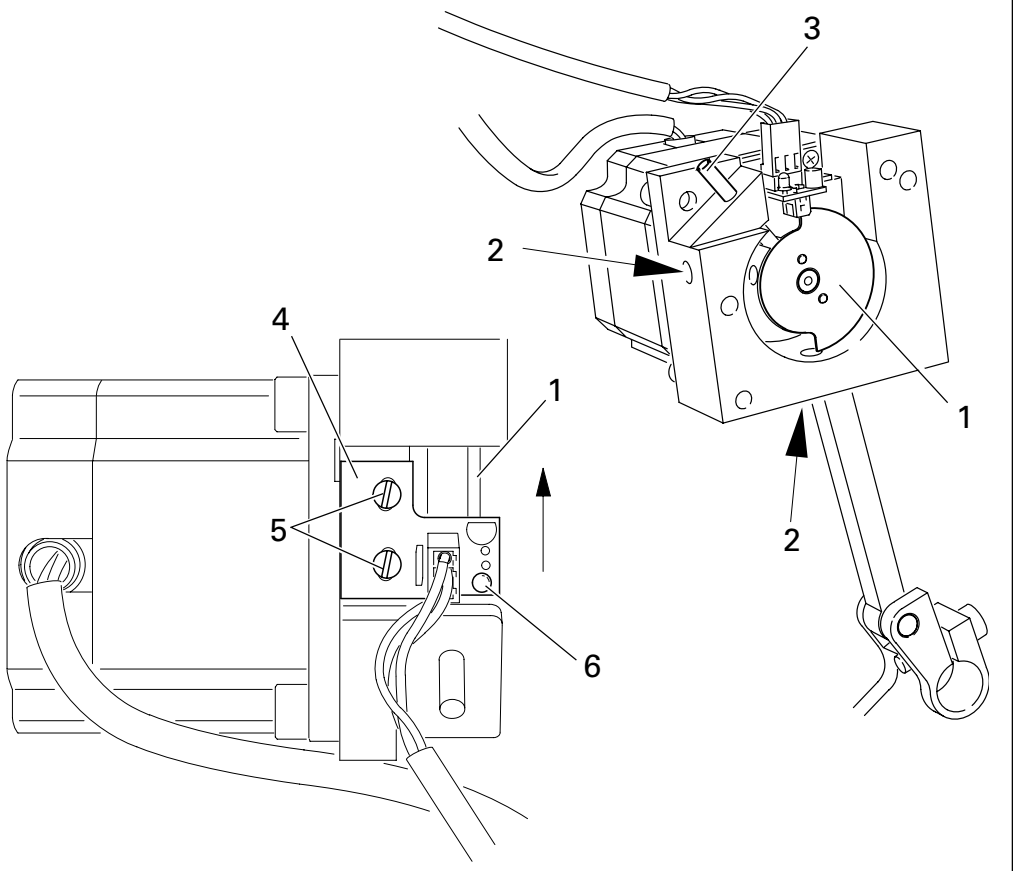


Fig. 13 - 06

To change the sensor board, it is imperative to observe the following work steps!

Electric voltage!
Danger of an electric shock if handled incorrectly!

- Completely remove the needle drive unit (plugs remain connected).
- Loosen screws **2**.
- Lock eccentric **1** by placing the locking pin **3** (part no. 13-030 272-05) in the locking hole of the mounting bracket.

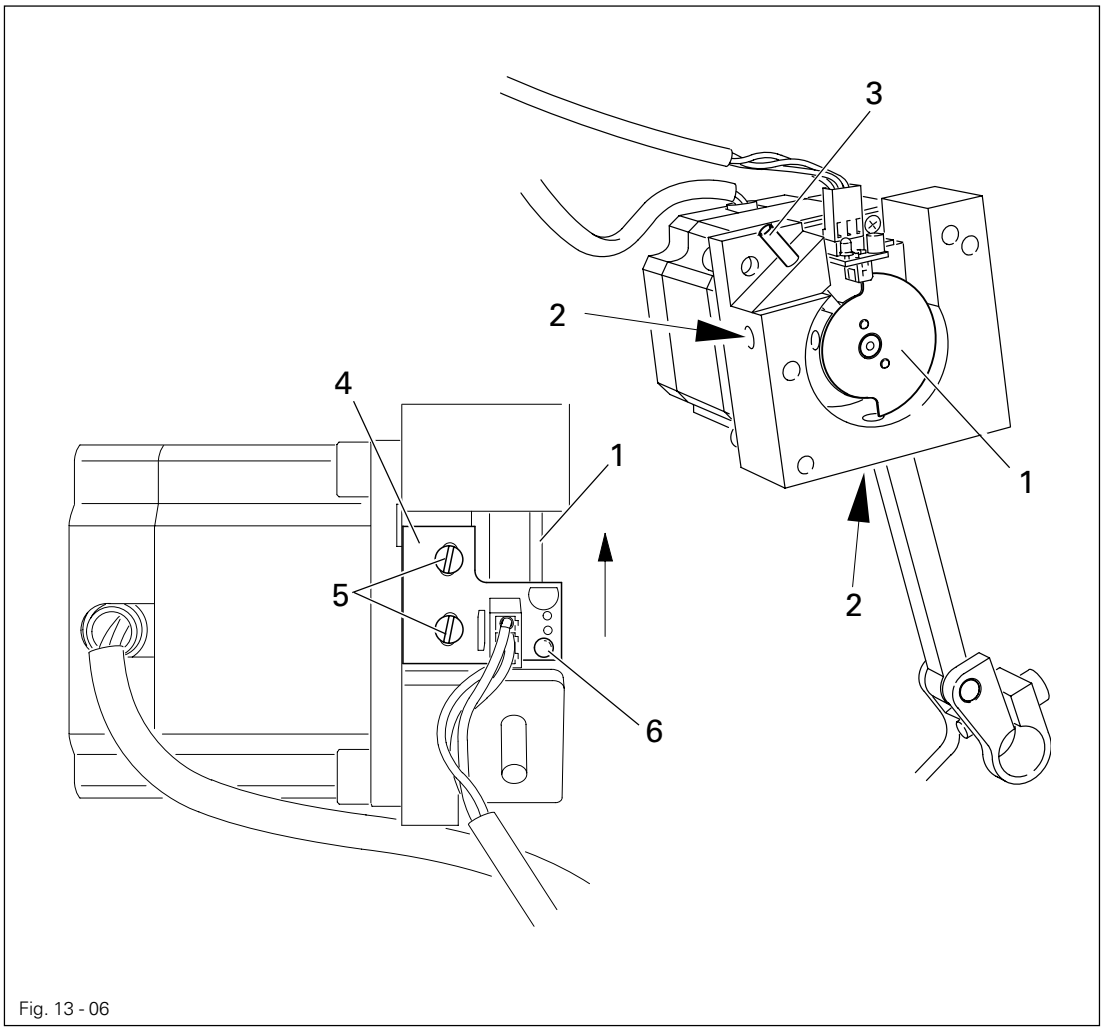


Fig. 13 - 06

- Switch on the machine and wait until the stepping motor has stopped running (ignore error message on the control panel).
- Set parameter "610" at "4" (see **Chapter 13.41.01 Selecting and changing parameters).**
- Making sure that it is touching the rear wall, move board **4** (screw **5**) in the direction of the arrow, until LED **6** lights up and move it back until LED **6** has just extinguished.
- Move eccentric **1** in accordance with **requirement 2** and tighten screws **2**.
- Switch off the machine.
- Remove locking pin **3**.
- Switch on the machine and check the needle drive unit in accordance with **requirement 1.**
- Switch off the machine.
- Install needle drive unit and adjust it in accordance with **Chapter 13.10 Basic setting of the needle drive.**

13.10 Basic setting of the needle drive

Requirement
With the needle bar at its b.d.c. and with eccentric **2** locked, in the crosswise direction of the arm the needle should be in the centre of the needle hole.

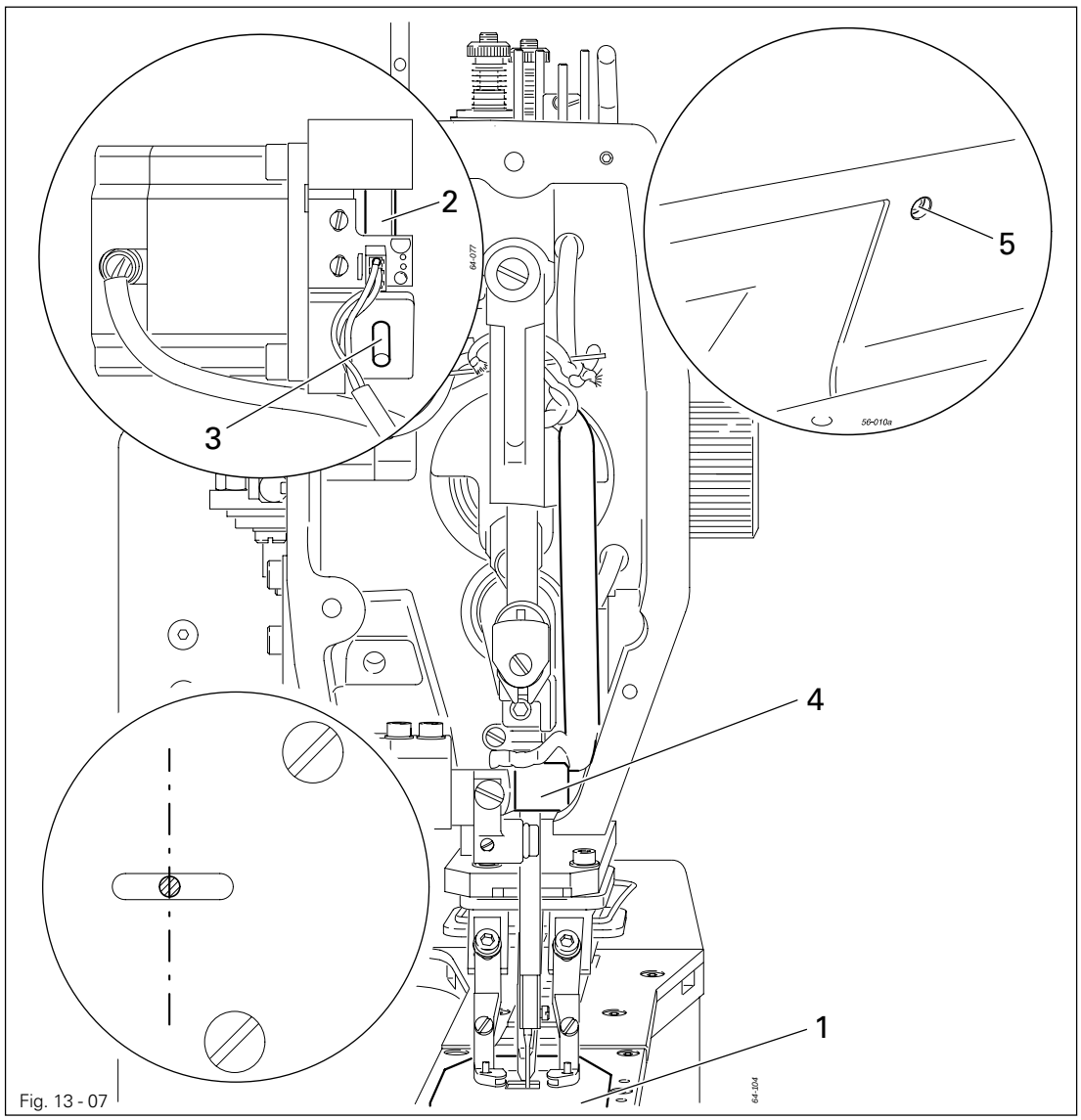


Fig. 13 - 07

- Switch on the machine and set parameter "610" at "4".
- Unscrew cloth plate **1**.
- Using the balance wheel, set the needle bar at its b.d.c. and lock eccentric **2** (locking pin **3**, part no. 13-030 272-05).
- Adjust the needle bar frame **4** (screw **5**) in accordance with the **requirement.**
- Remove locking pin **3**.

13.11 Position of the hook shaft to the needle

Requirement
When parameter "610" is set at "1", the hook shaft should be centred to the needle.

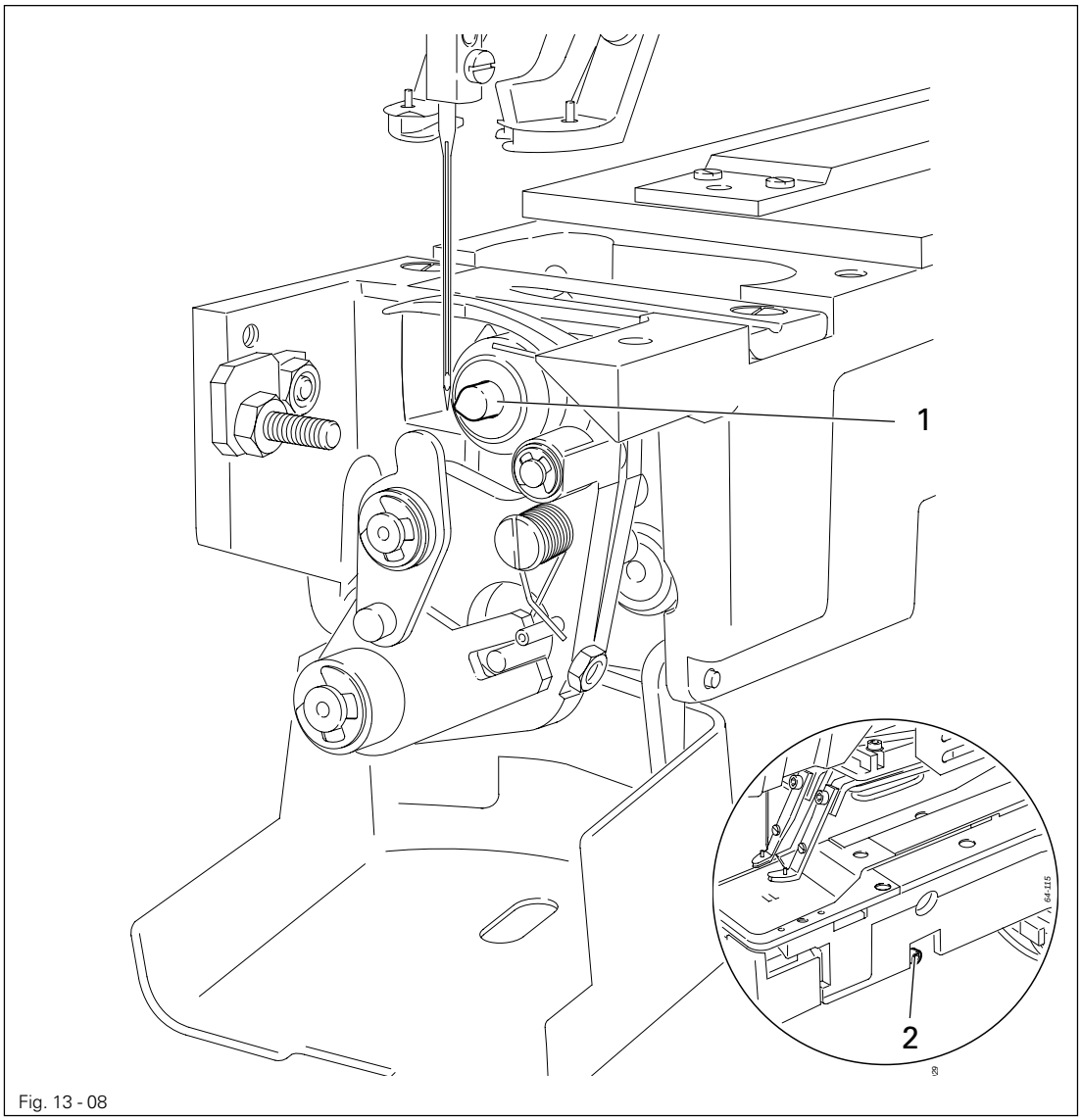
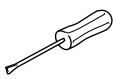


Fig. 13 - 08



- Remove needle plate and cloth plate.
- Remove hook and fit hook gauge **1** (part no. 61-111 637-03).
- Loosen screw **2**.
- Switch on the machine and set the parameter "610" at "1".
- Using the balance wheel, set the needle bar at its b.d.c. and set the hook gauge **1** at the centre of the needle.
- Tighten screw **2**.
- Switch off the machine and remove hook gauge **1**.

The needle plate and cloth plate as well as the hook remain dismantled for further adjustments.

13.12 Adjusting the drag link mechanism

Requirement

When the needle bar is at t.d.c.

1. The milled slot in shaft **3** should be in alignment with the milled slot of the cast iron bracket **7**.
2. The milled slot of crank **4** should be in alignment with the front edge of driving crank **6**.

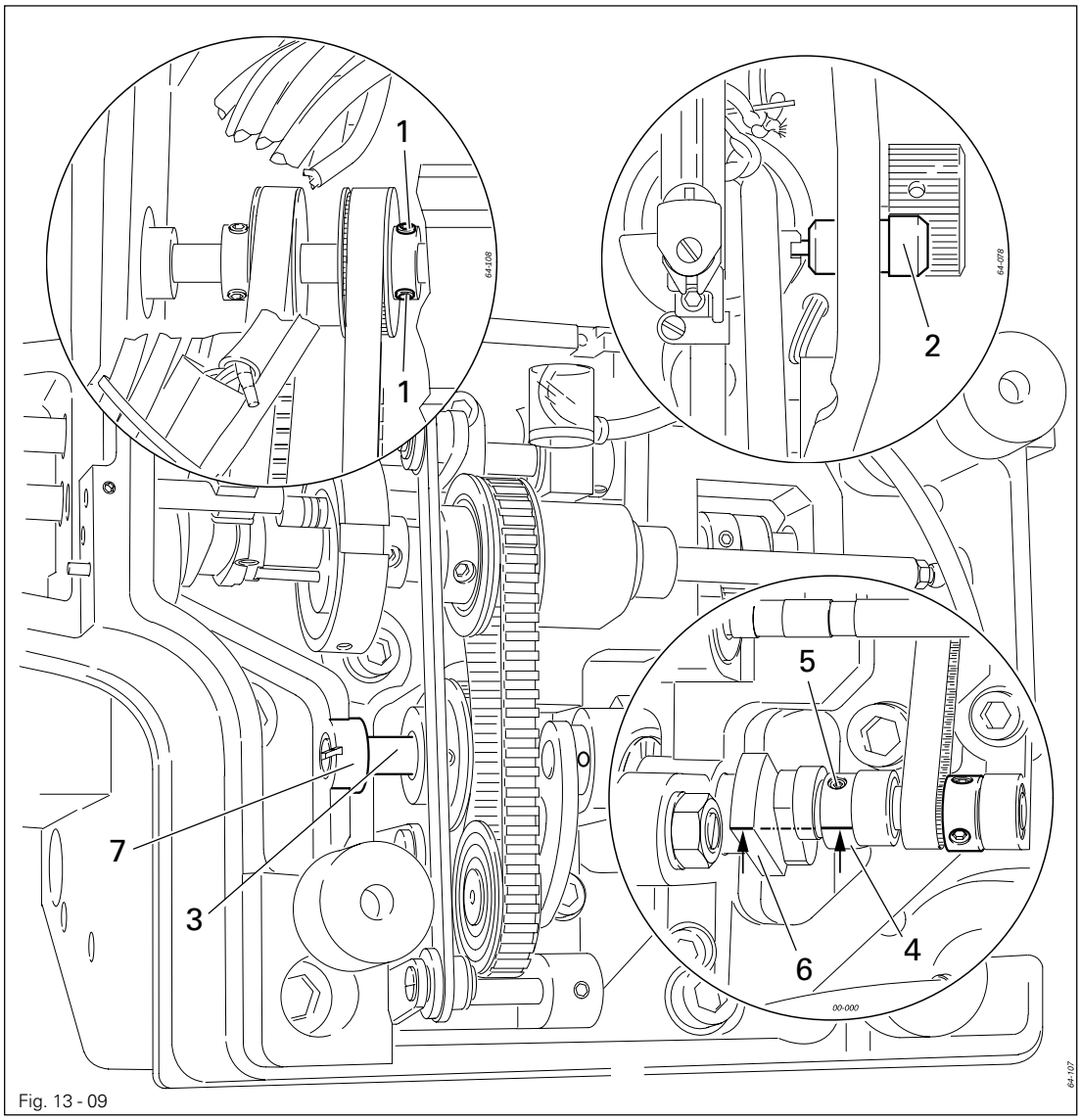


Fig. 13 - 09

- Loosen screw **1** on the arm shaft.
- Using the balance wheel, set the needle bar at t.d.c. and lock it with locking pin **2**.
- Adjust shaft **3** in accordance with **requirement 1** with the aid of the needle rise gauge (2.4 mm).
- Tighten screws **1.**
- Turn crank **4** (screws **5**) in accordance with **requirement 2.**
- Remove locking pin **1**.

If the position described in **requirement 2** is not reached, driving crank **6** must be installed accordingly.

13.13 Needle rise and hook clearance

Requirement
When the needle bar is positioned 2.4 after b.d.c. and parameter "610" is set at "1", the point of hook **1** should be positioned at "needle centre" and be at a distance of **0.1 mm** from the needle.

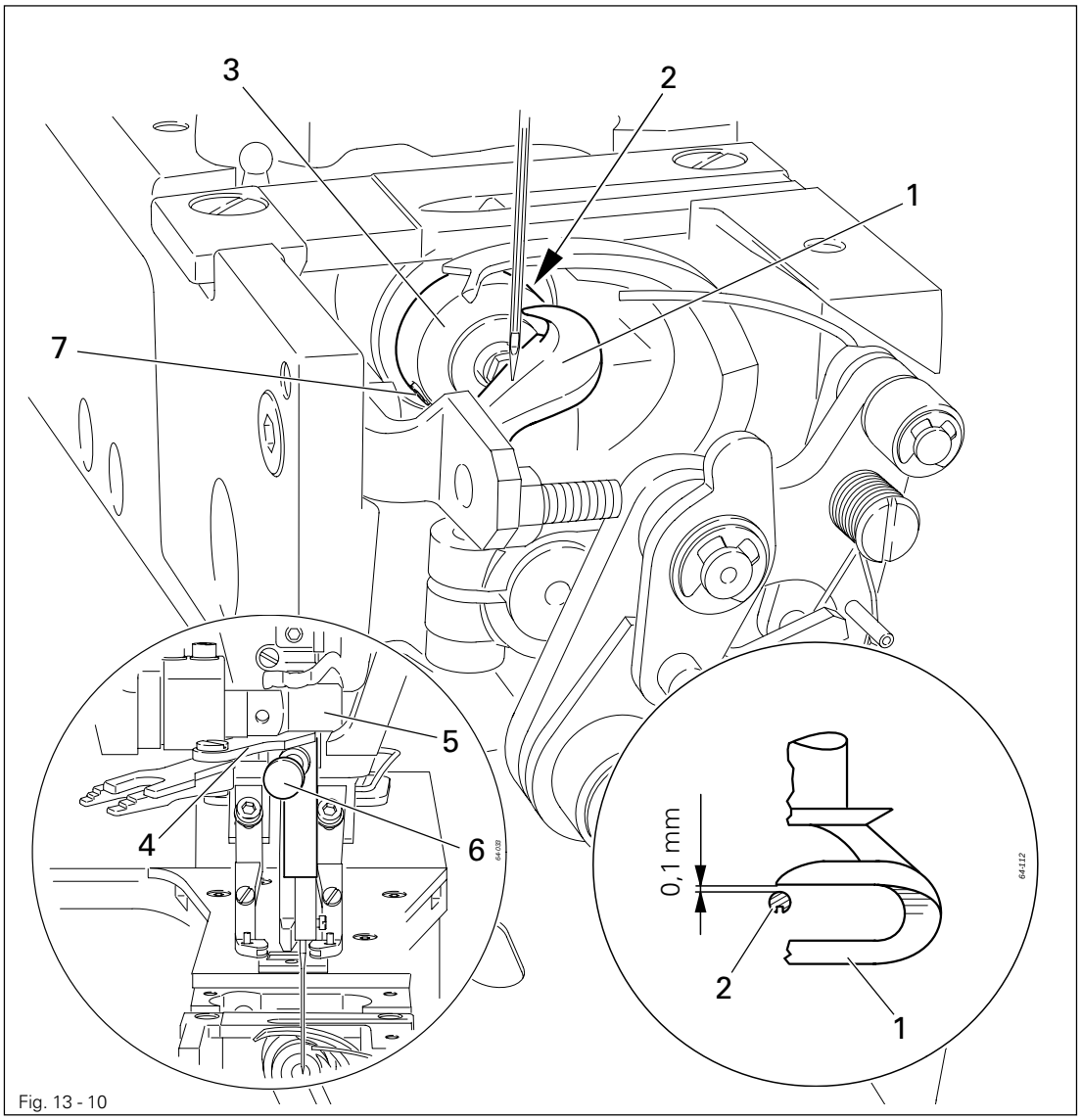
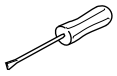


Fig. 13 - 10



- Dismount thread brake.
- Insert hook **1** so that screw **2** of collar **3** is on the surface of the hook shaft.
- Slightly tighten screw **2**.
- Switch on the machine and set parameter "610" at "1".
- Turn the balance wheel in the direction of sewing until the needle bar is in its bottom stroke.
- Fit needle rise gauge **4** (2.4 mm) to needle bar frame **5** and fasten with C-clamp **6**.
- Remove the needle rise gauge **4**.
- Turn the balance wheel in the direction of sewing until C-clamp **6** is touching the needle bar bearing **5**.
- Adjust hook **1** (screws **2** and **7**) in accordance with the **requirement.**

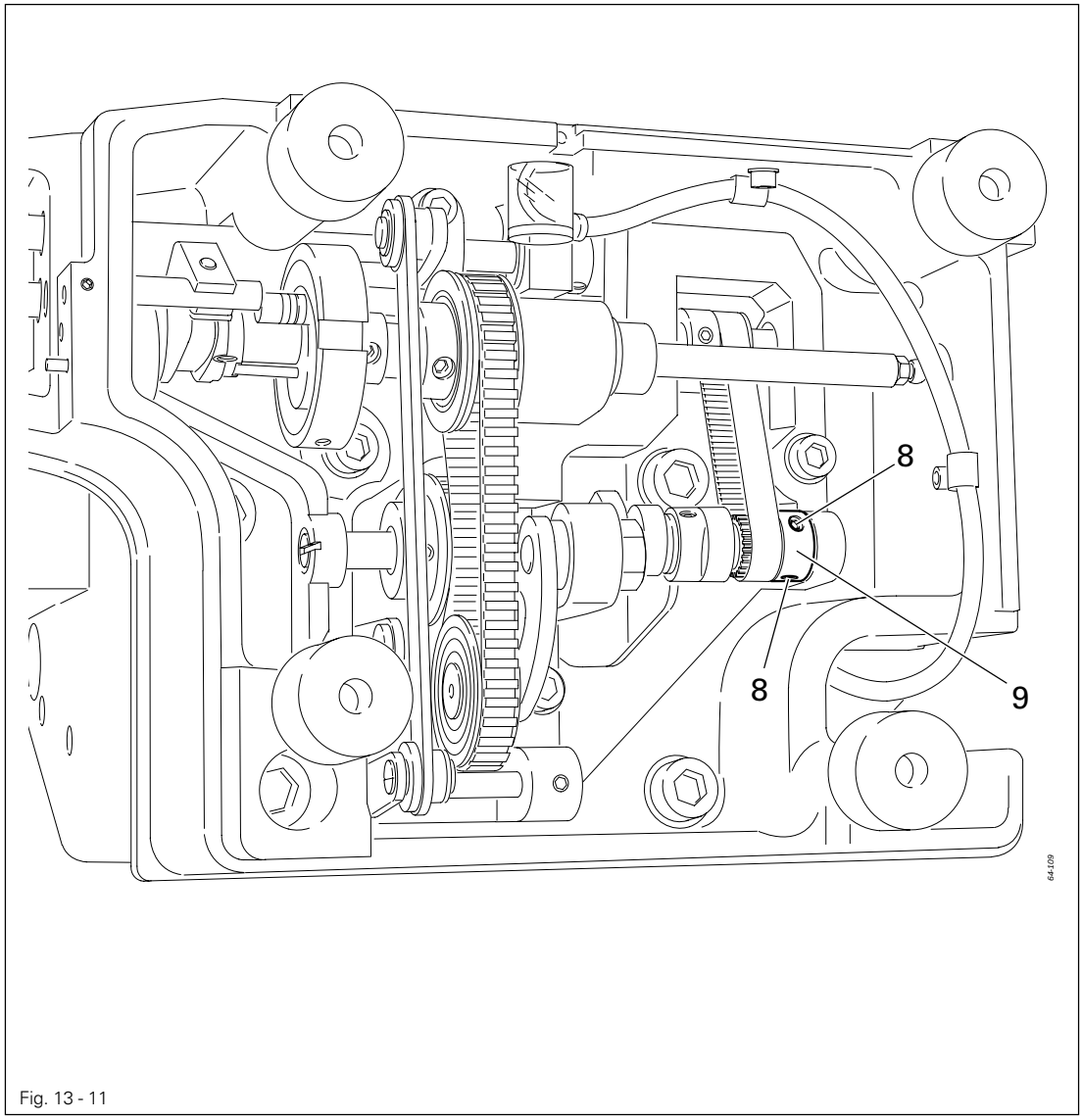


Fig. 13 - 11

- Remove C-clamp **6**.
- Fit thread brake.

If the adjustment possibilities on the hook are insufficient, a greater correction can be made with the hook shaft mechanism.
Loosen screws **8** and turn toothed belt wheel **9** or the hook shaft accordingly.

On the subclass -4/.. in certain circumstances it may be necessary to increase the hook point to needle clearance to **approx. 0.5 mm**.

13.14 Readjusting the needle height

Requirement

1. When parameter "610" is set at "2" and the hook point is centred to the needle, the top edge of the needle eye should be **0.5 mm** below the bottom edge of the hook point.
2. Thread puller **3** should be touching clamp **5** and be positioned in the centre of the face plate recess.

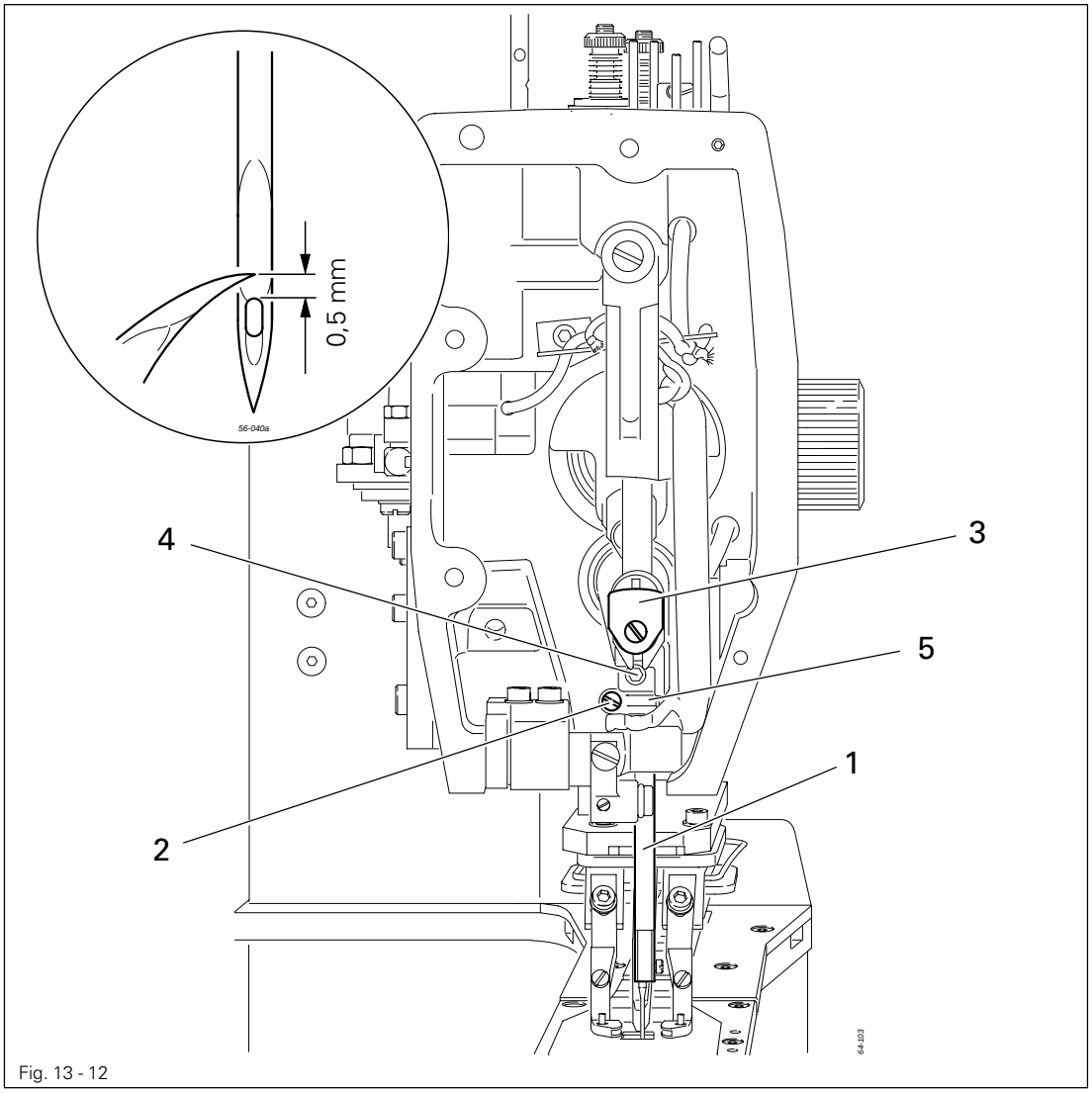


Fig. 13 - 12

- Switch on the machine and set parameter "610" at "2".
- Turn the balance wheel in the direction of sewing until the needle bar is at its bottom stroke.
- Set the hook point to the centre of the needle by continuing to turn the balance wheel.
- Adjust needle bar **1** (screw **2**) and thread puller **3** (screw **4**) in accordance with the **requirements.**
- Switch off the machine.

When checking the left needle entry position (parameter "610" at value "3"), the distance between the top edge of the needle eye and the lower edge of the hook point is greater.

13.15 Adjusting the loop spreader

Requirement

1. When the needle bar is positioned at t.d.c., the milled slot in control cam **4** should be at the bottom.
2. In the needle rise position, loop spreader **7** should begin its reverse movement.
3. When the needle is descending (in the direction of sewing) loop spreader **7** should be at its bottom left stroke, when the needle has reached the top edge of the needle plate.

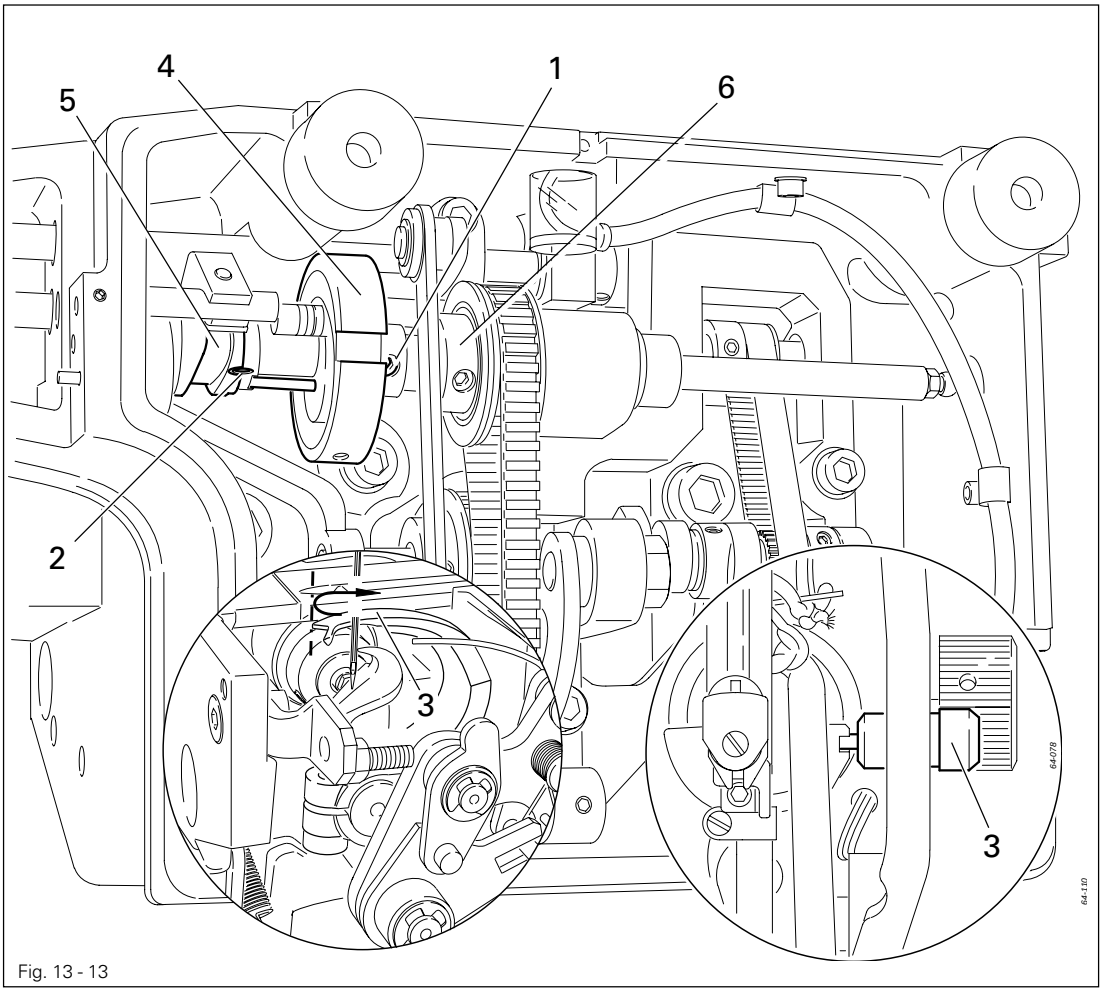
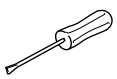


Fig. 13 - 13



- Loosen screws **1** and **2**.
- With the balance wheel set the needle bar at its t.d.c. and lock it with locking pin **3**.
- Adjust control cam **4** together with control cam **5** in accordance with **requirement 1.**
- Move control cam **4** together with control cam **5** to touch drive wheel **6** and tighten screws **1** and **2**.
- Remove locking pin **3**.
- Carry out a check in accordance with **requirements 2** and **3**.

13.16 Position of the loop spreader to the needle

Requirement

When the needle bar is positioned at b.d.c. and parameter "610" is set at "3"

1. There should be a distance of **2.4 mm** between the front edge of the loop spreader **1** and the needle.
2. There should be a distance of approx. **1.6 mm** between loop spreader **1** and the needle.

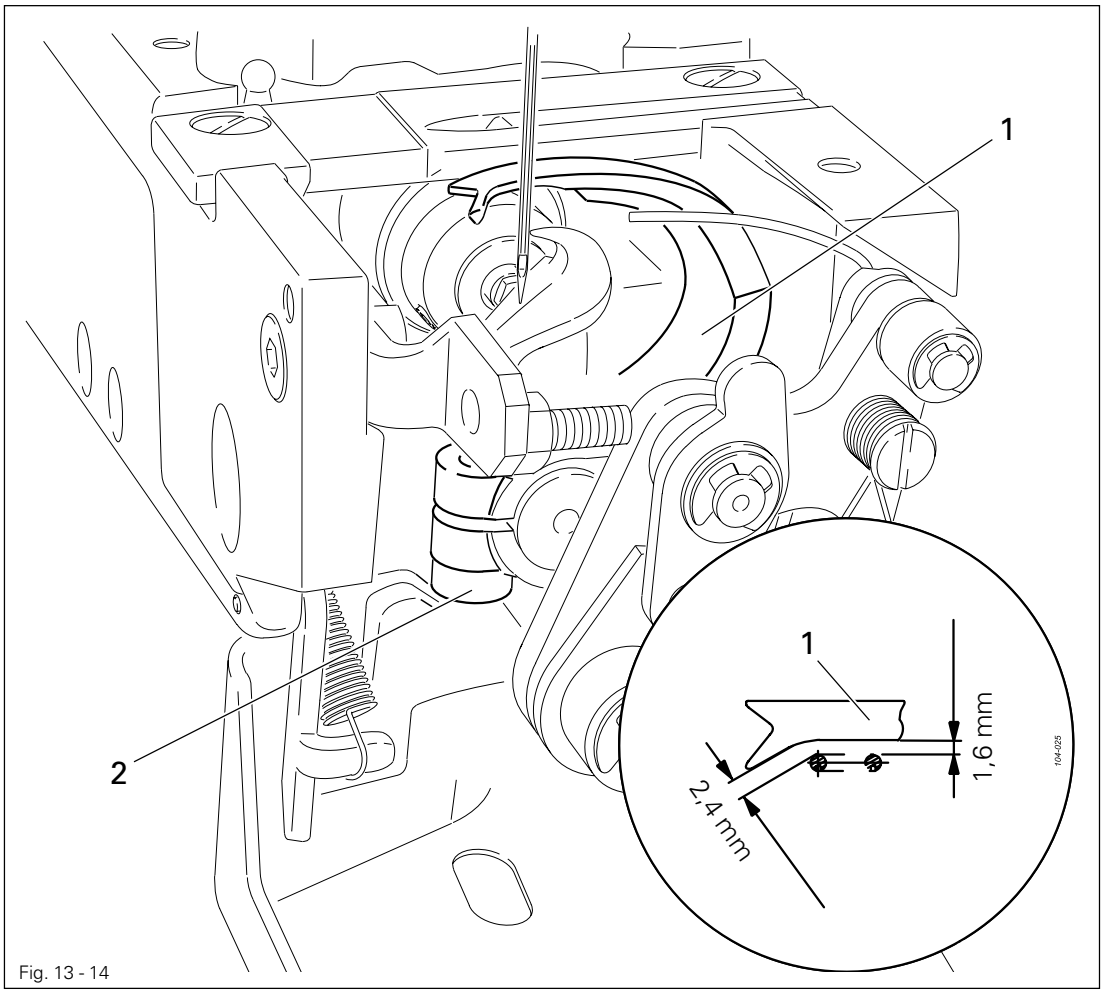


Fig. 13 - 14

- Switch on the machine and set parameter "610" at "3".
- Position the needle at its b.d.c. by turning the balance wheel.
- Adjust loop spreader **1** (screw **2**) in accordance with **requirements 1** and **2**.
- Switch off the machine.

13.17 Adjusting the thread trimmer

Requirement

1. When extended the outer edges of pins **5** and **6** should be at a distance of **103 mm** from each other.
2. When the thread trimmer is in its neutral position, the stationary knife **7** should be parallel to the edge of thread puller **8**.
3. When the thread trimmer is in its cutting position, knife **9** should cut **approx. 1 mm.**

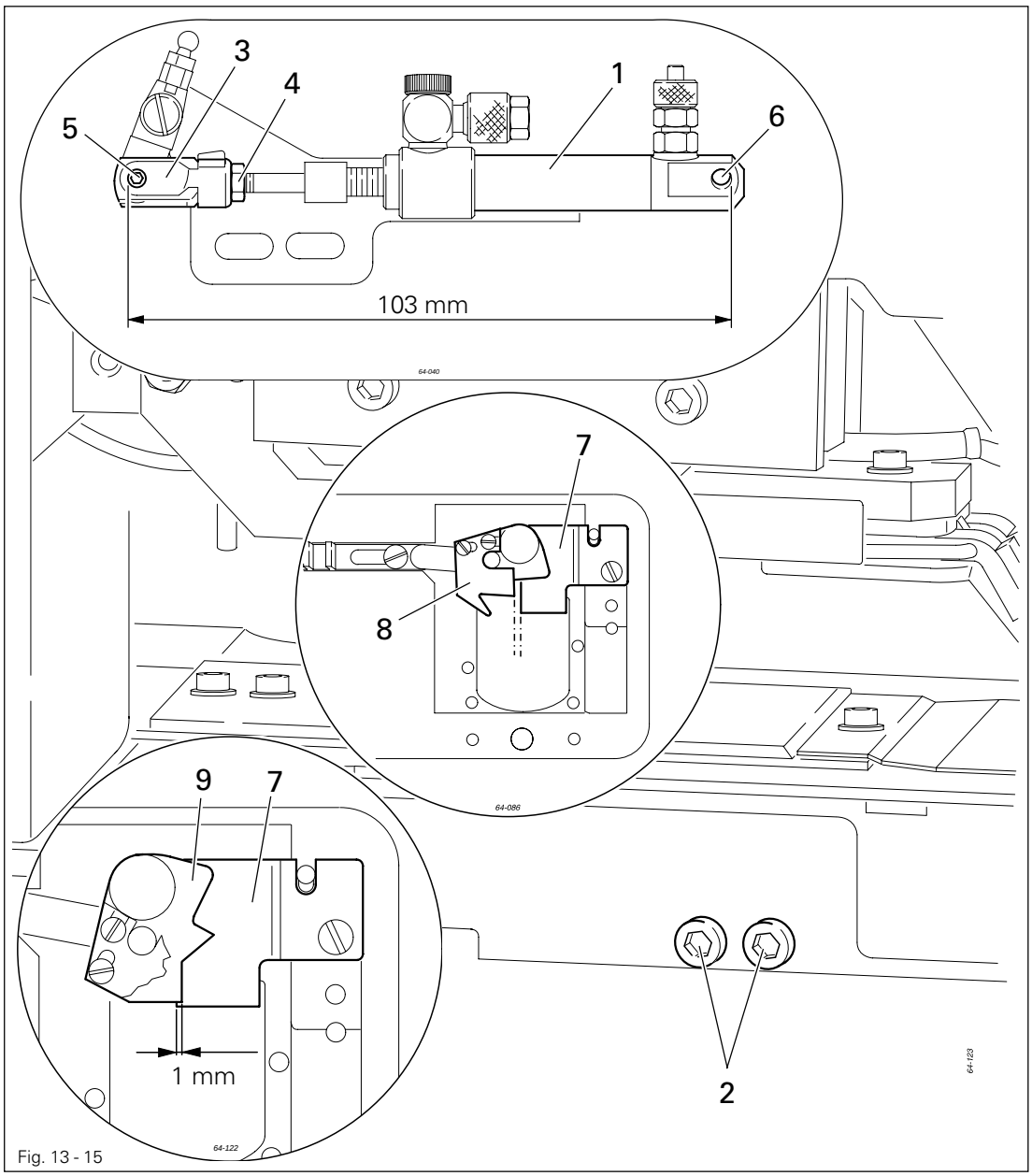


Fig. 13 - 15

- Remove cylinder **1** (screws **2**).
- Adjust hinged section **3** (nut **4**) in accordance with **requirement 1.**
- Install cylinder **1** (screws **2**) and adjust in accordance with **requirement 2** and **3**.
- Carry out a functional test of the thread trimmer with parameter "603" (output 4).

13.18 Manual cutting test

Requirement
In a manual cutting operation the thread should be cut reliably.

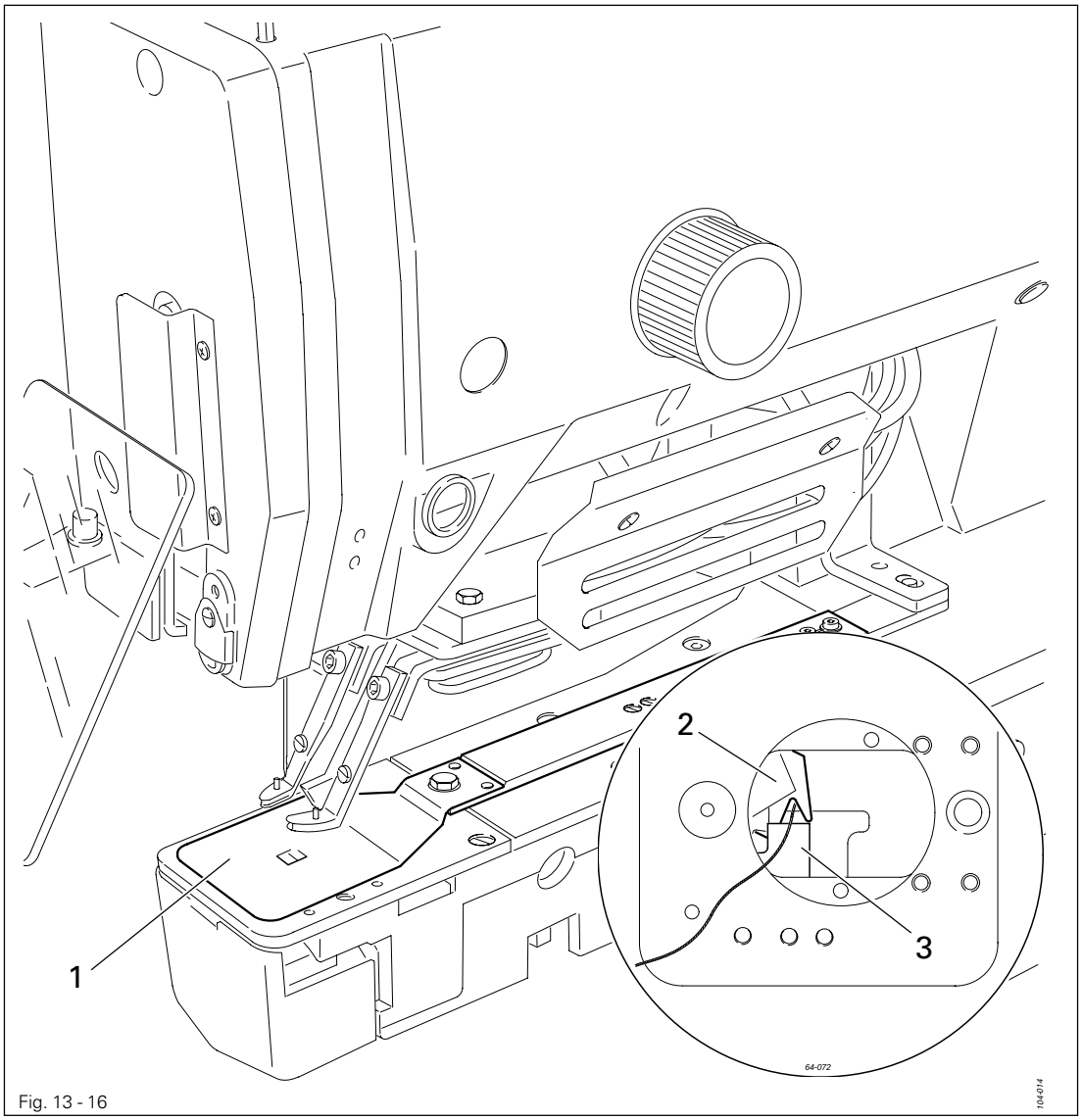


Fig. 13 - 16

- Dismount cloth plate **1** and needle plate insert.
- Place the thread between thread catcher **2** and knife **3**.
- Disconnect the machine from the pneumatic power supply.
- Check the **requirement** by carrying out a manual cutting operation.
- Mount the needle plate, taking care to see that the spherical head of the cutting cylinder grips into the corresponding guide section of the needle plate.

13.19 Adjusting the thread catcher

Requirement
In the cutting position the hook **3** should be vertical and the thread catcher **1** should grip reliably in the stitch triangle.

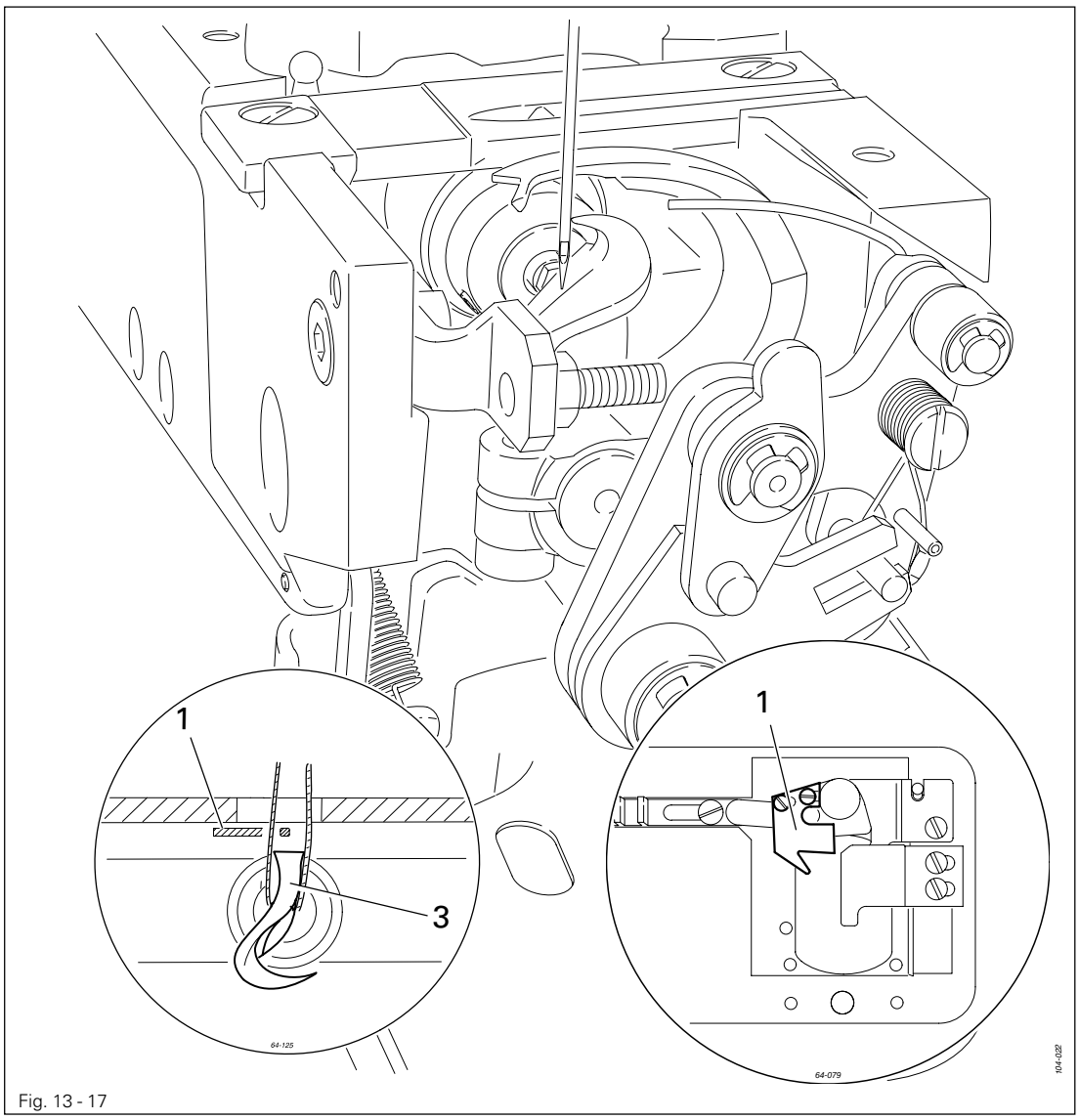


Fig. 13 - 17

- Switch on the machine and set parameter "403" at the maximum value.
- Select the sewing mode and carry out a sewing operation.
- Switch the machine off in the cutting position at the on/off switch and disconnect it from the pneumatic power supply.
- Carry out the cutting operation manually, checking the **requirement** while doing so.
- If necessary, switch on the machine and with the parameters "614" and "615" set the thread catcher **1** in accordance with the **requirement**.
- If the hook **3** is not vertical in the cutting position, check the setting in accordance with **Chapter 13.05 Top needle bar position (reference position).**
- Switch off the machine and check the cutting operation.
- Switch on the machine, reset parameter "402" to its initial value and switch off the machine.

13.20 Adjusting the thread loop support

Requirement
Both at the extreme right point of penetration and at the extreme left point of penetration the needle should be at a distance of **approx. 0.5 mm** from the thread loop support **1**.

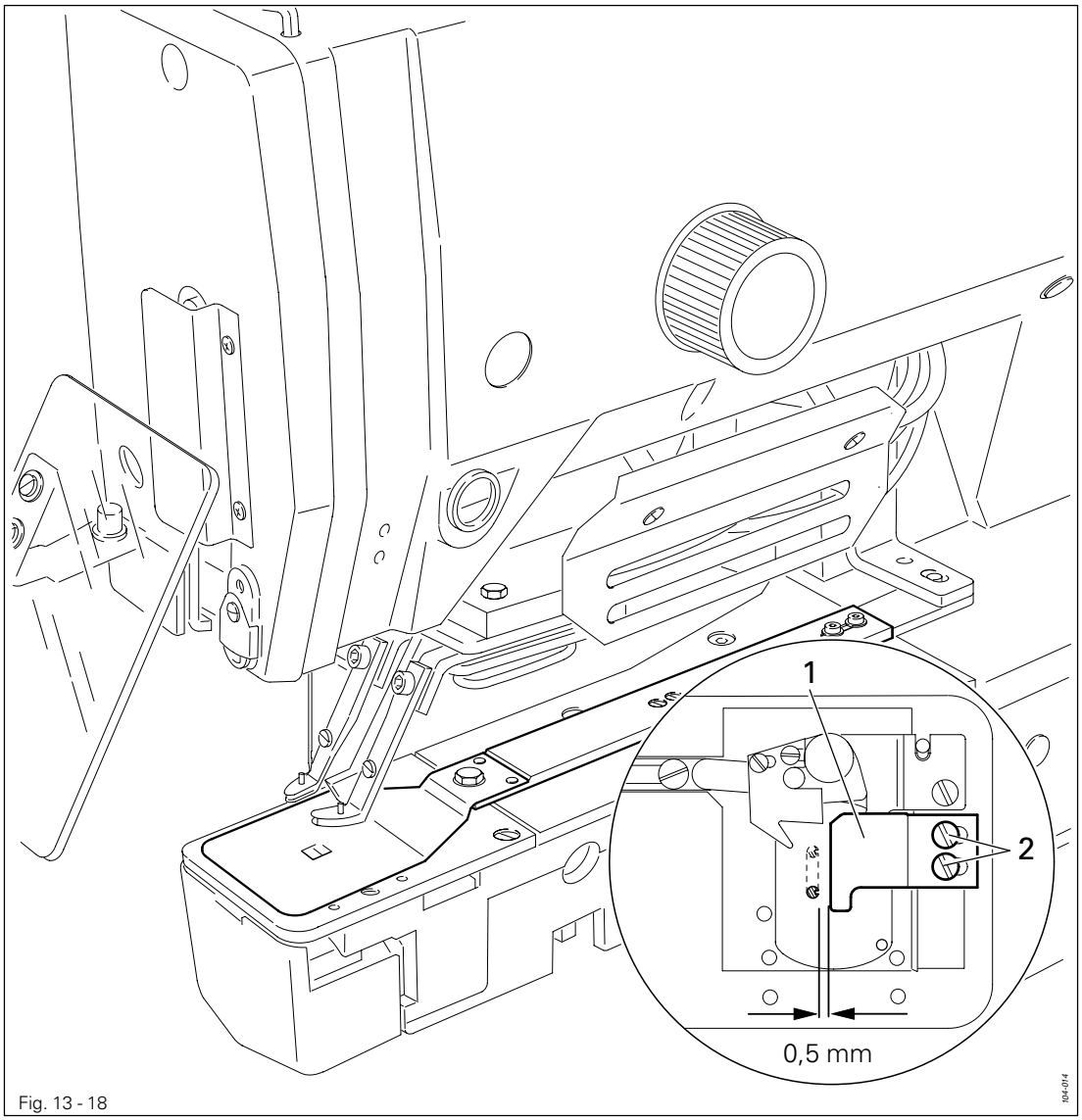


Fig. 13 - 18

- Switch on the machine and bring the needle into the relevant position (value "1, 2 or 3") with parameter "610".
- Adjust thread loop support **1** (screws **2**) in accordance with the **requirement.**
- Switch off the machine.

The thread loop support **1** is also used as a knife guard.

13.21 Basic position of the button clamp drive

Requirement

1. After selecting parameter "610" (with value 4) it must be possible to block lever **2** with gauge (4.6 mm).
2. Switch lug **5** should be positioned in the centre of the recess of the light barrier **3**.

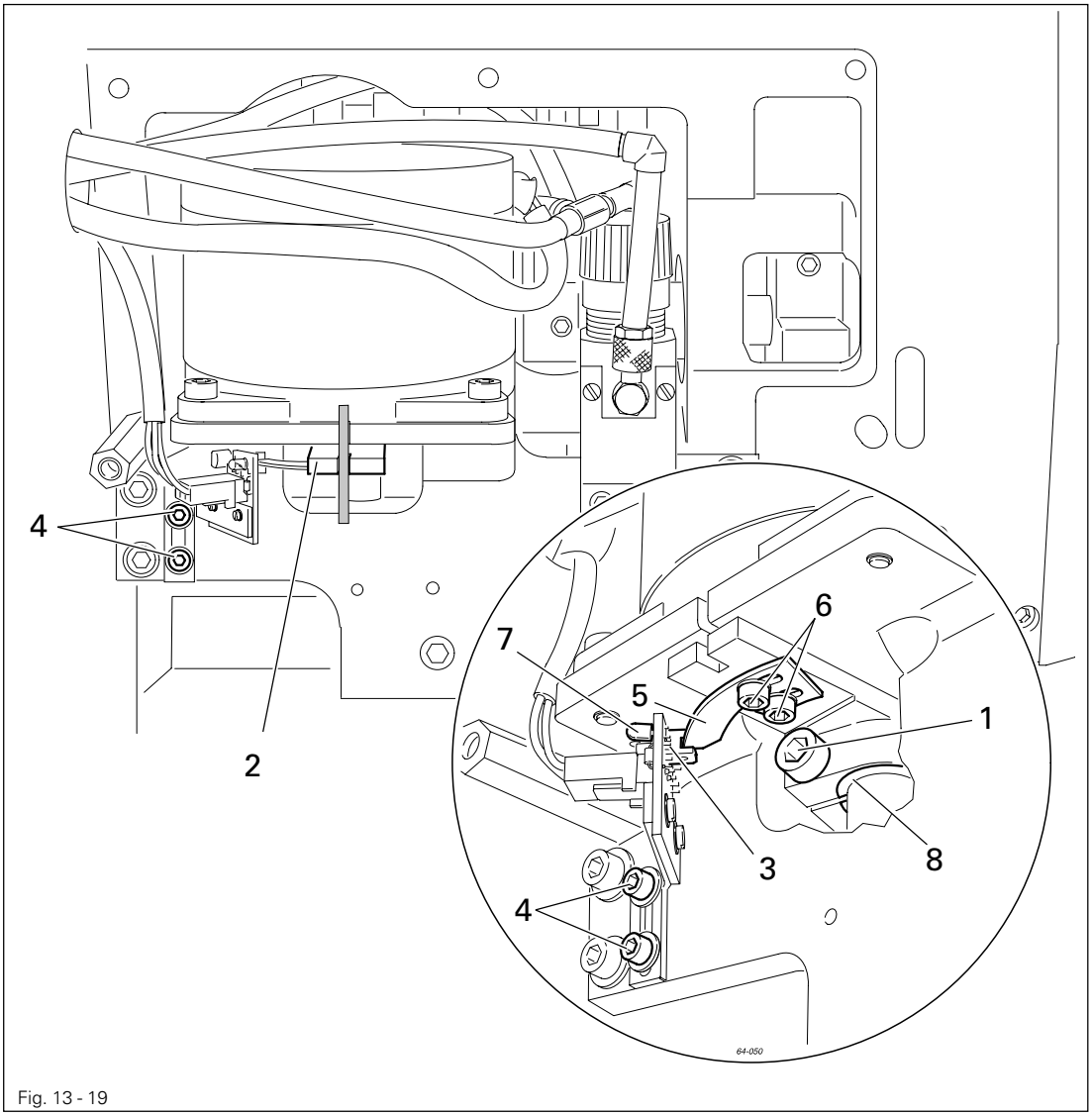
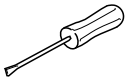
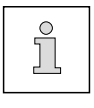


Fig. 13 - 19



- Loosen screw **1**.
- Switch on the machine and set parameter "610" at value "4".
- Adjust lever **2** in accordance with **requirement 1** (lock with gauge).
- Tighten screw **1**.
- Adjust light barrier **3** (screws **4**) in accordance with **requirement 2.**
- With lever **2** locked, move the switch lug **5** (screws **6**), until LED **7** lights up and then move it back again until LED **7** has just extinguished.
- Switch off the machine and remove the gauge.



Spring clip **8** serves as an adjustment aid and should be touching lever **2**. The open side of the spring clip **8** should be in alignment with the clamp groove of lever **2**.

13.22 Aligning the button clamp (only on subclass -1/..)

Requirement
After parameter "610" has been selected (with value 4, 5, 6, 7 and 8), the needle should penetrate the centre of the respective hole of button gauge **2**.

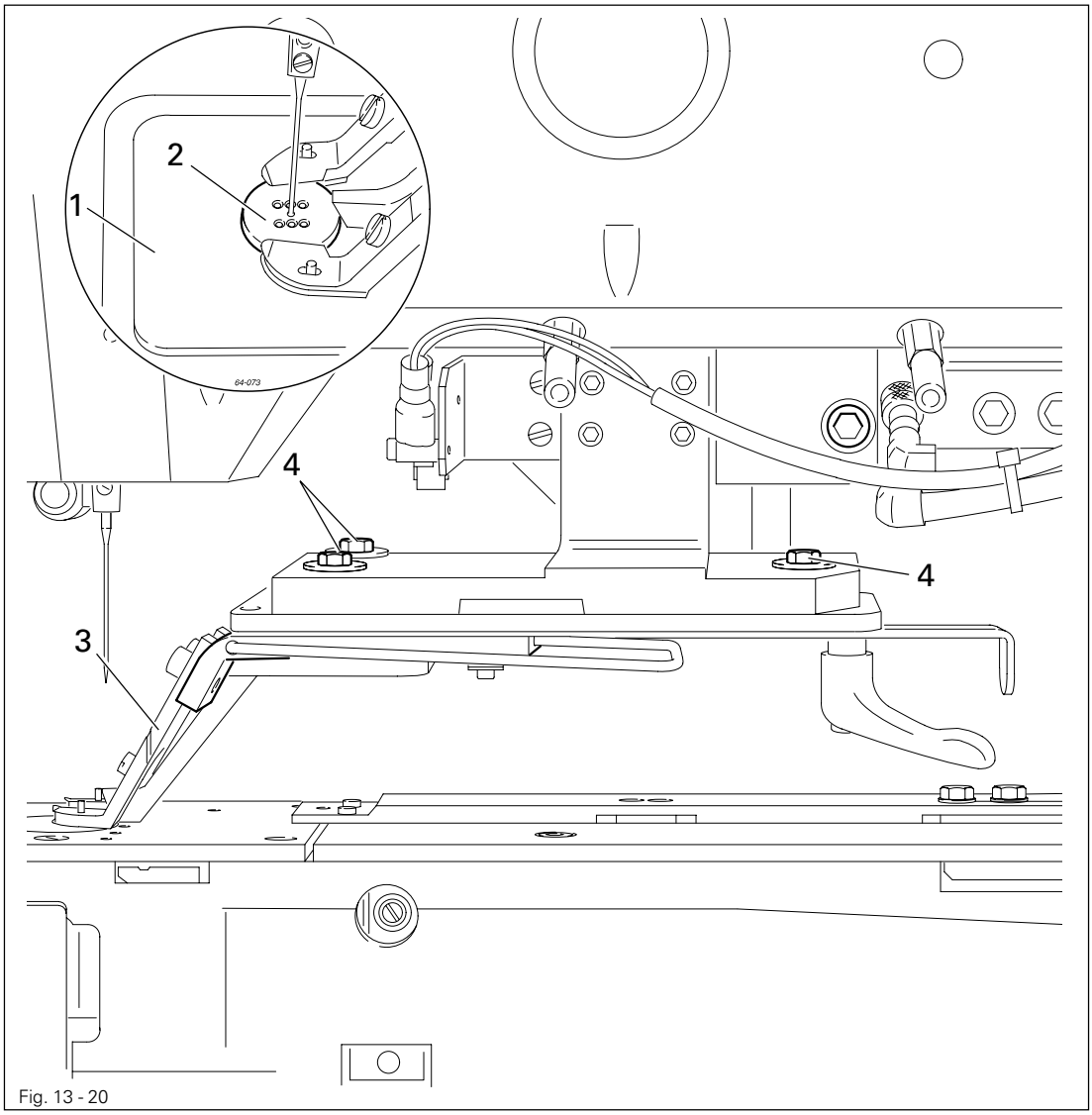


Fig. 13 - 20

- Remove cloth plate **1**.
- Switch on the machine and set parameter "610" at "4" (button gauge: centre).
- Insert and align button gauge **2** (part no. 61-111 635-66).
- Press down the button clamp by hand.
- Adjust button clamp **3** (screws **4**) in accordance with the **requirement**.
- Check the remaining penetration positions of the needle in the respective hole of the button gauge **1** with the values "5", "6", "7" and "8" of parameter "610" in accordance with the **requirement.**
- Connect the machine to the pneumatic power supply and check the setting again.
- If necessary correct the position of the button clamp **3** (screws **4**).
- Switch off the machine and disconnect it from the pneumatic power supply.
- Remove the button gauge and mount the cloth plate.

13.23 Aligning the work clamp (only on subclass -4/..)

Requirement

1. After selecting value "4" for parameter "610", work clamp **1** should be centred to the needle and be positioned at the front edge of the needle hole.
2. When value "6" is set, needle **3** should be positioned to the left of work clamp **1**, and when value "7" is set, needle **3** should be positioned to the right of it.

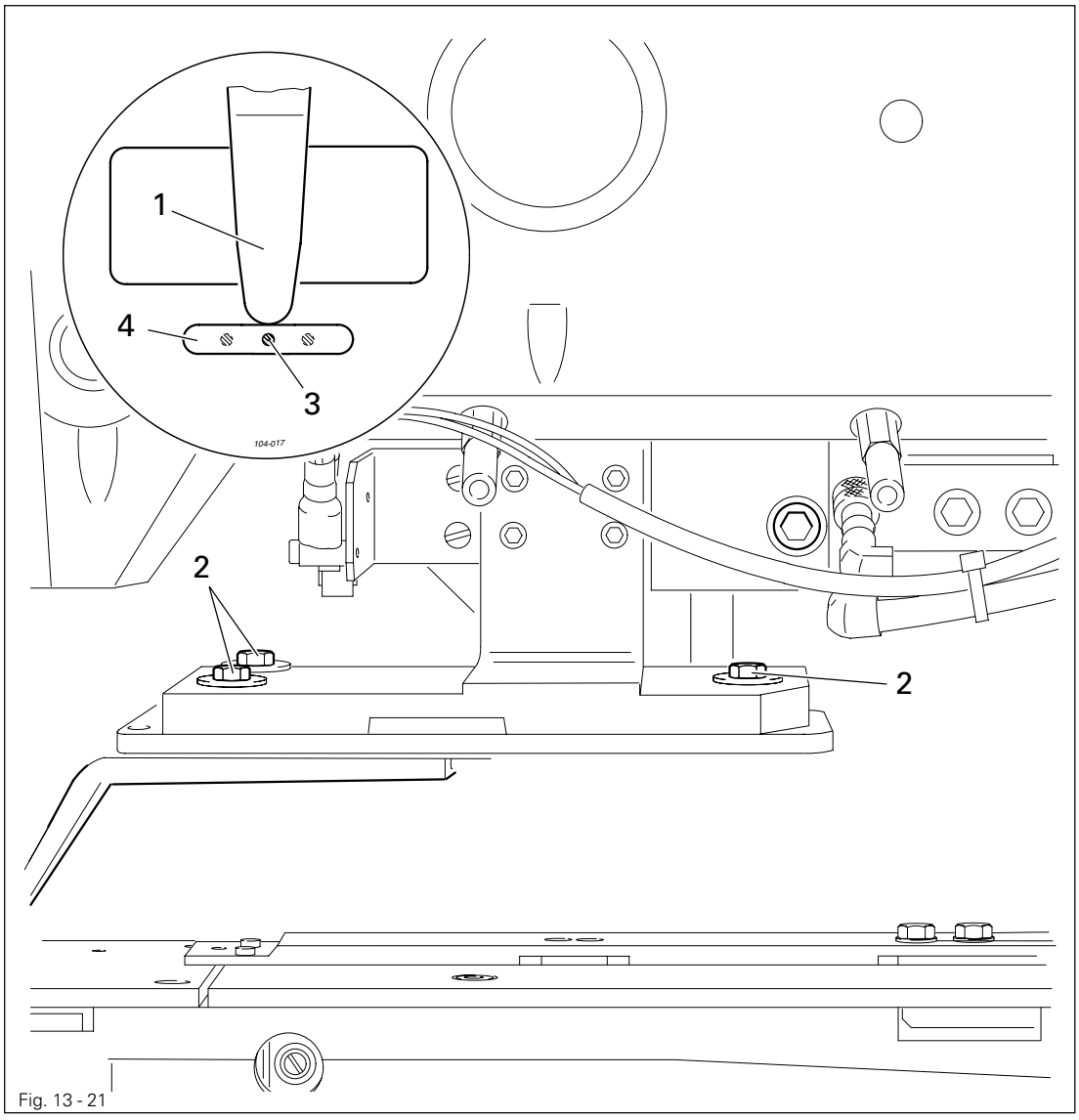
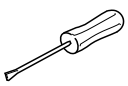


Fig. 13 - 21



- Switch on the machine and set parameter "610" at "4" (button gauge: centre).
- Push down work clamp **1** by hand.
- Adjust work clamp **1** (screws **2**) in accordance with **requirement 1**.
- Check the other needle entry positions for values "6" and "7" of parameter "610" in accordance with **requirement 2**.
- Connect the machine to the pneumatic power supply and check the setting again.
- If necessary correct the position of work clamp **1** (screws **2**).
- Switch off the machine and disconnect it from the pneumatic power supply.

13.24 Aligning the button holder and button support (only on sub-class -5/..)

Requirement
After parameter "610" has been set to value "4", the needle, at a distance of **5 mm** from the edge of the needle hole, should be centred to the needle hole of the button holder and button support.

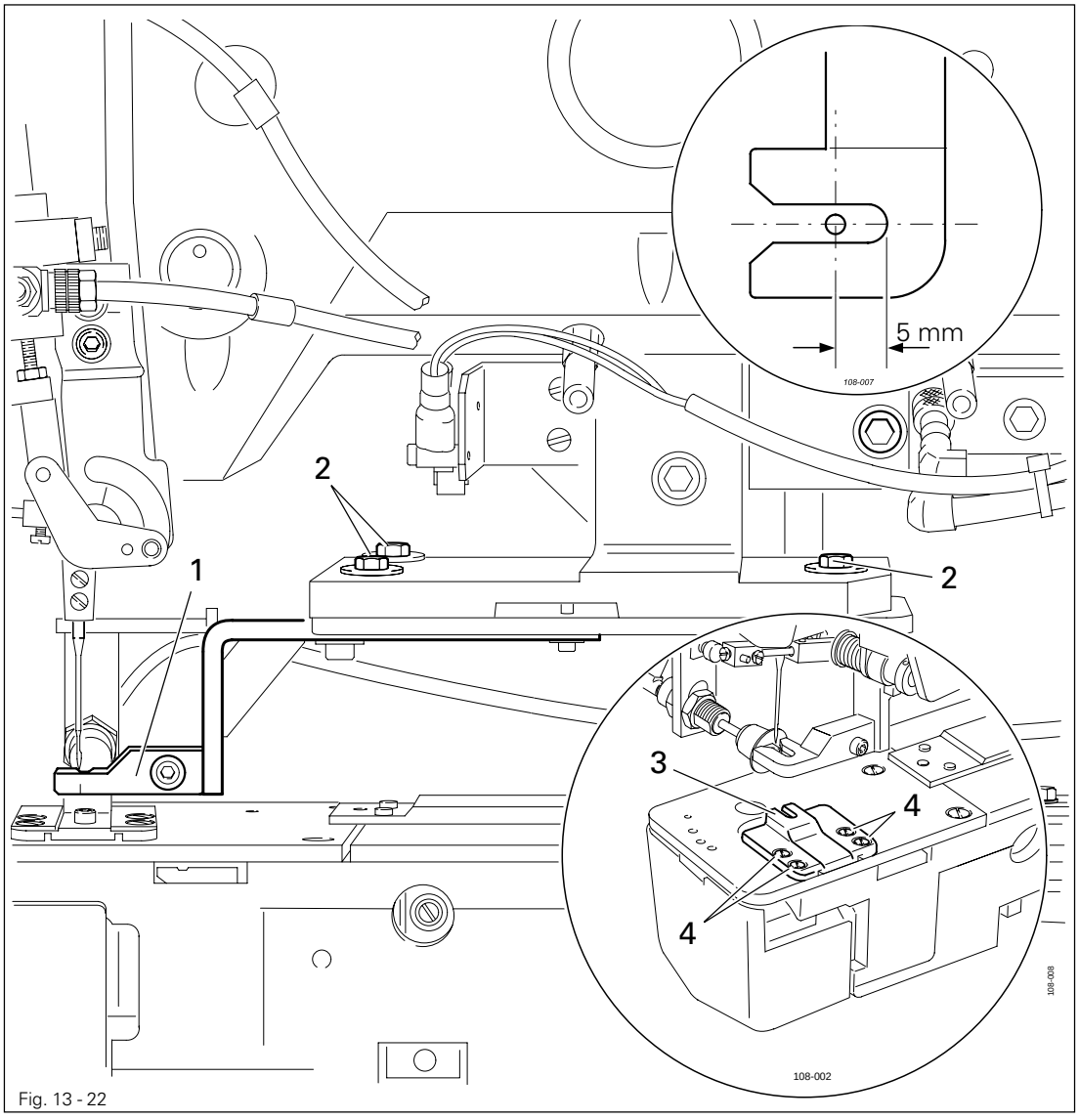


Fig. 13 - 22

- Switch on the machine and set parameter "610" at "4" (button gauge: centre).
- Adjust button holder **1** (screws **2**) and button support **3** (screw **4**) in accordance with the **requirement**.
- Connect the machine to the pneumatic power supply and check the setting again.
- If necessary, correct the position of button holder **1** (screws **2**) and button support **3** (screw **4**).
- Switch off the machine and disconnect it from the pneumatic power supply.

13.25 Adjusting the clamp pressure (only on sub-class -1/..)

Requirement
The clamp pressure is pre-set at 3 bar and may have to be adapted to the requirements.

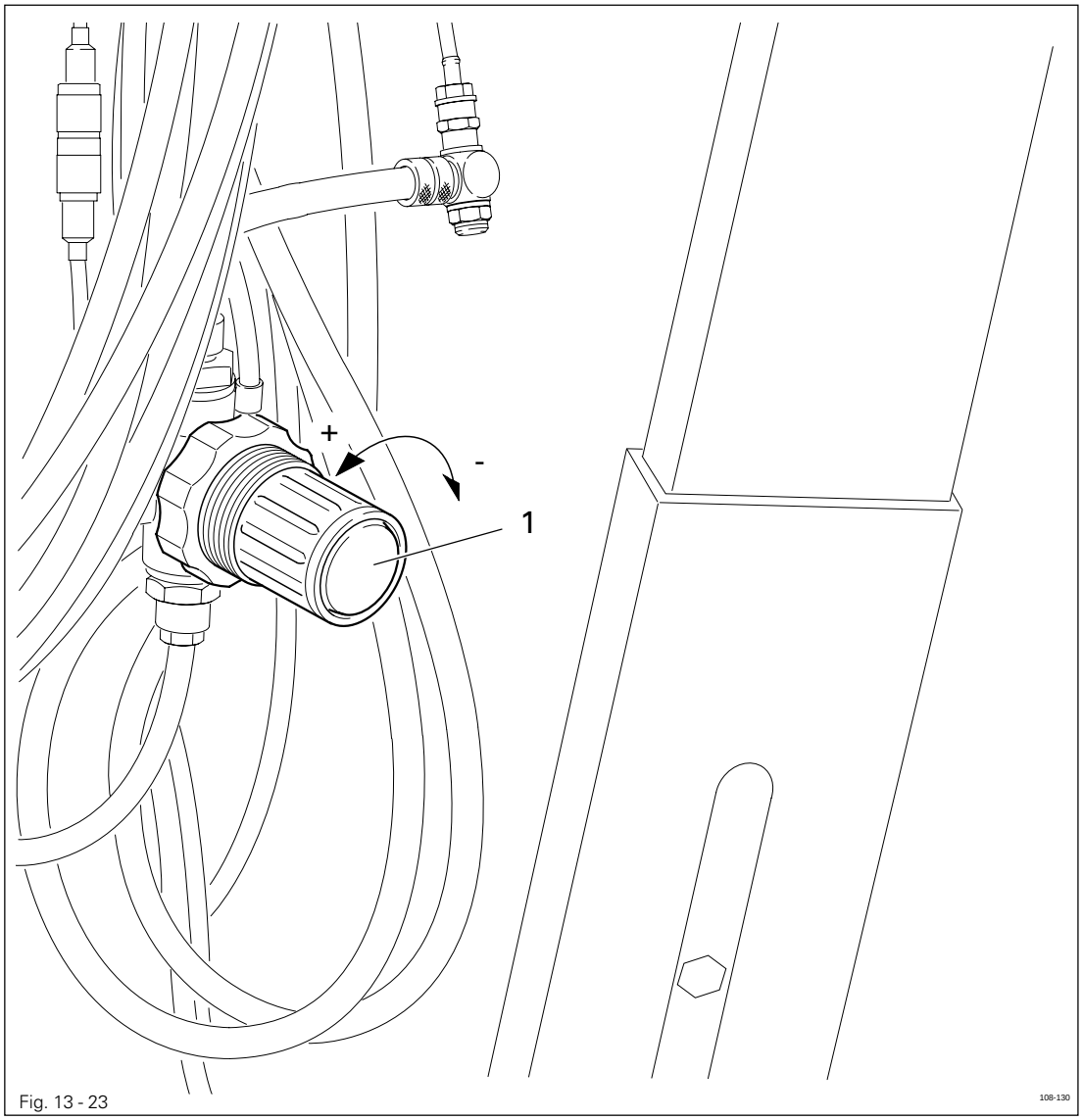


Fig. 13 - 23

- Connect the machine to the pneumatic system.
- Turn regulator 1 in accordance with the requirement.
- Disconnect the machine from the pneumatic system.

After adjusting the clamp pressure, the alignment of the button clamp must be checked and adjusted, if necessary, see Chapter 13.22 **Aligning the button clamp**.

13.26 Adjusting the holding power of the added-feature clamp

(only on subclass -1/..)

Requirement
It should be possible to turn the button easily by hand in the jaws of added-feature clamp **3**.

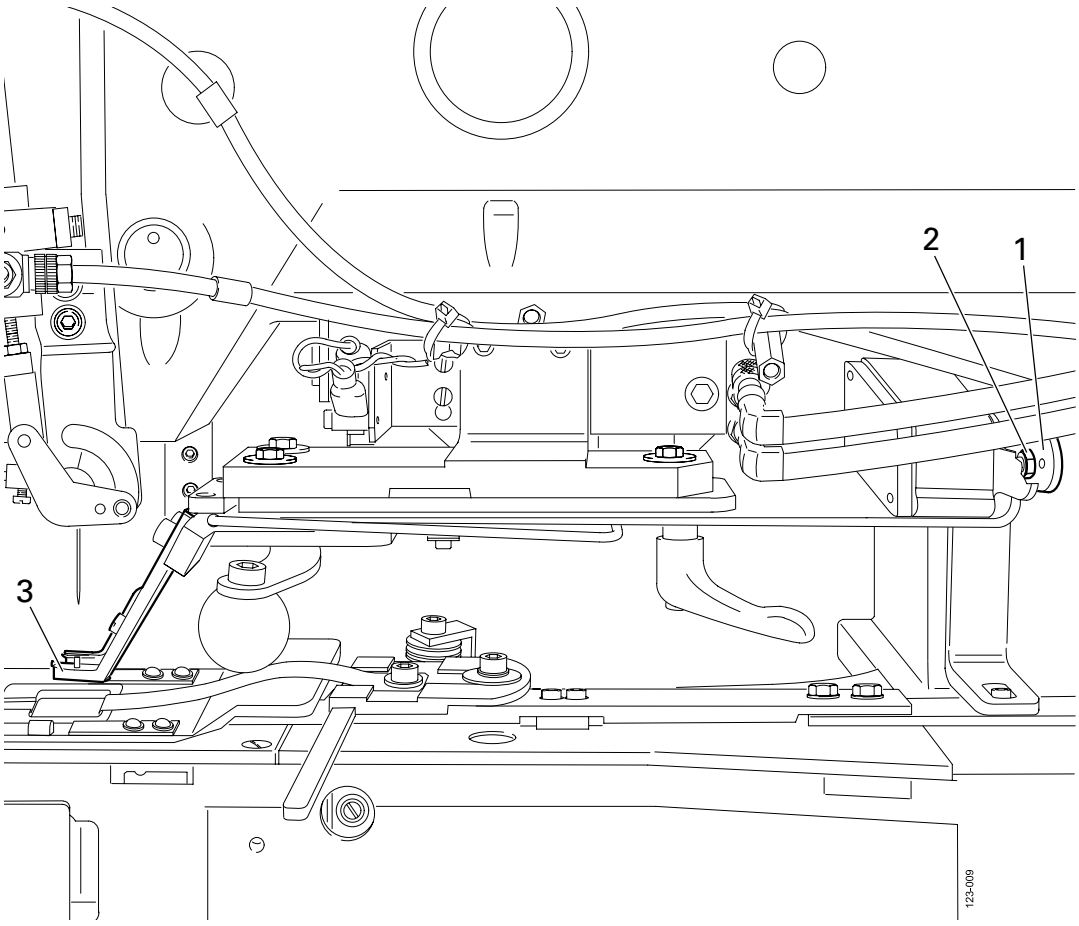


Fig. 13 - 24

- Switch on the machine and insert the button.
- Set the button size, see **Chapter 9.05 Adjusting the button clamp to the button size…**
- Adjust screw **1** (nut **2**) in accordance with the **requirement.**
- Switch off the machine.

13.27 Aligning the cloth plate (only on subclass -1/.. and -4/..)

Requirement
When the machine is in its basic position, the cut-out of cloth plate **1** should be in the centre of the needle hole.

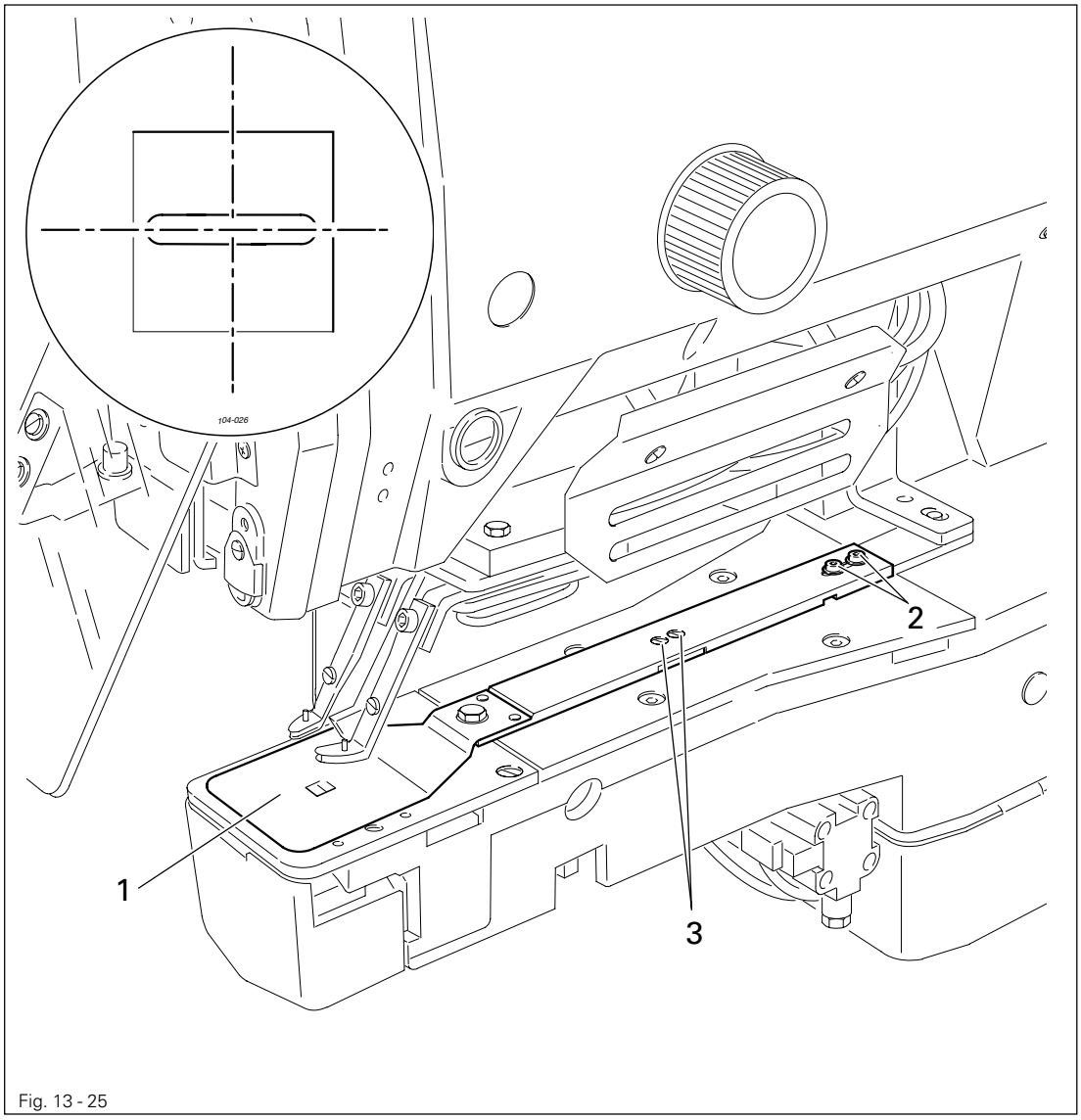
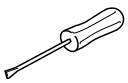


Fig. 13 - 25



- Switch on the machine and set parameter "610" at value "4".
- Align cloth plate **1** (screws **2**) in accordance with the **requirement.**
- Switch off the machine.

13.28 Basic setting of the end knotting equipment

Requirement
Retaining finger **5** should be parallel to loop spreader **7**.

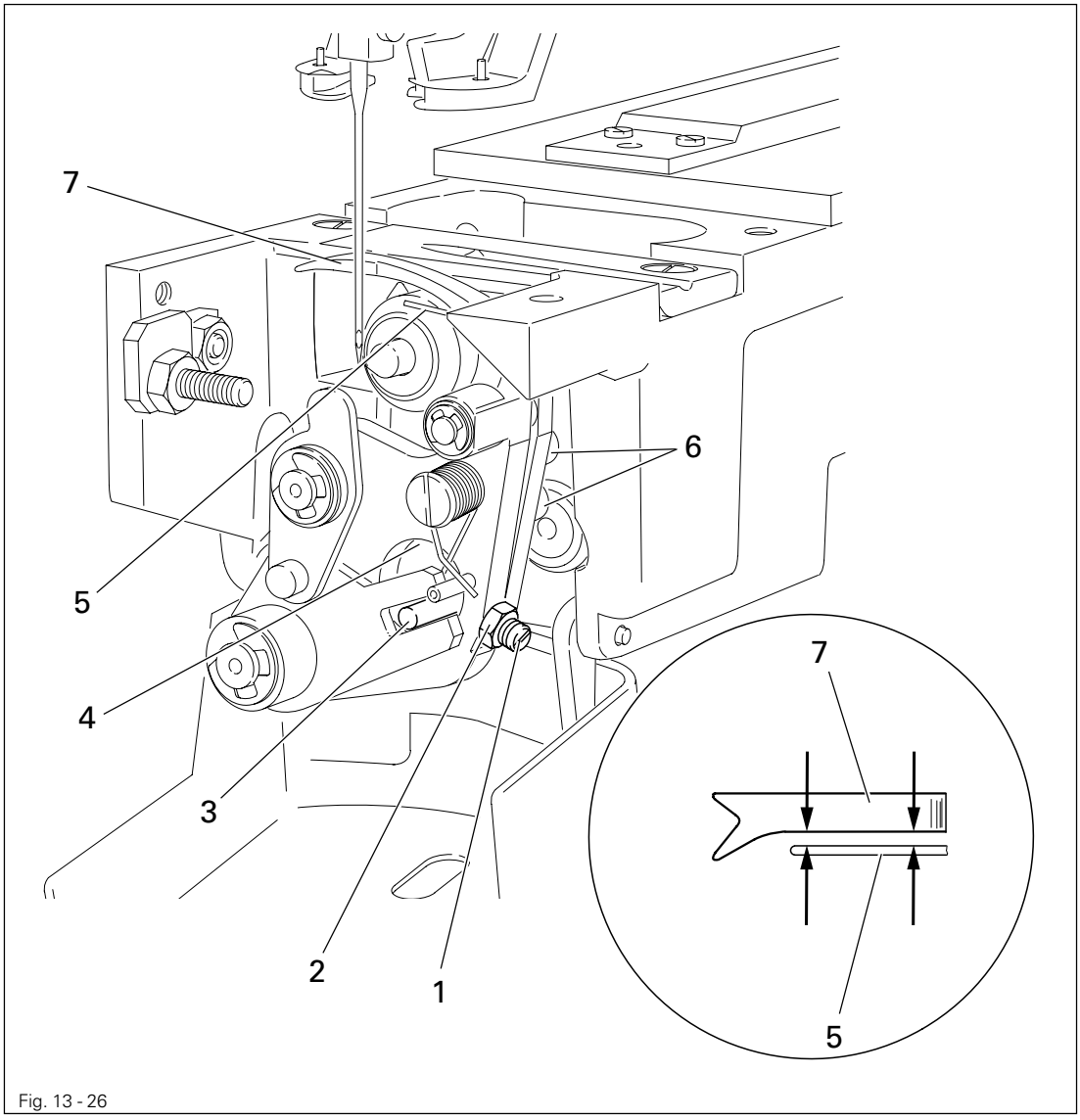


Fig. 13 - 26

- Dismount cloth plate and needle plate.
- First of all remove screw **1** (nut **2**), until pin **3** is touching the wall of hole **4**.
- Then turn screw **1** round once and fix with nut **2**.
- Align retaining finger **5** (screws **6**) in accordance with the **requirement.**

13.29 Adjusting the retaining finger of the end knotting equipment

Requirement

When parameter "610" is set at "1" and the machine is in the needle rise position

1. The bottom edge of retaining finger **2** should be **0.5 mm** above the hook point.
2. There should be a distance of **0.5 mm** between retaining finger **2** and the needle.
3. There should be a distance of **6 mm** between retaining finger **2** and the centre of the needle.

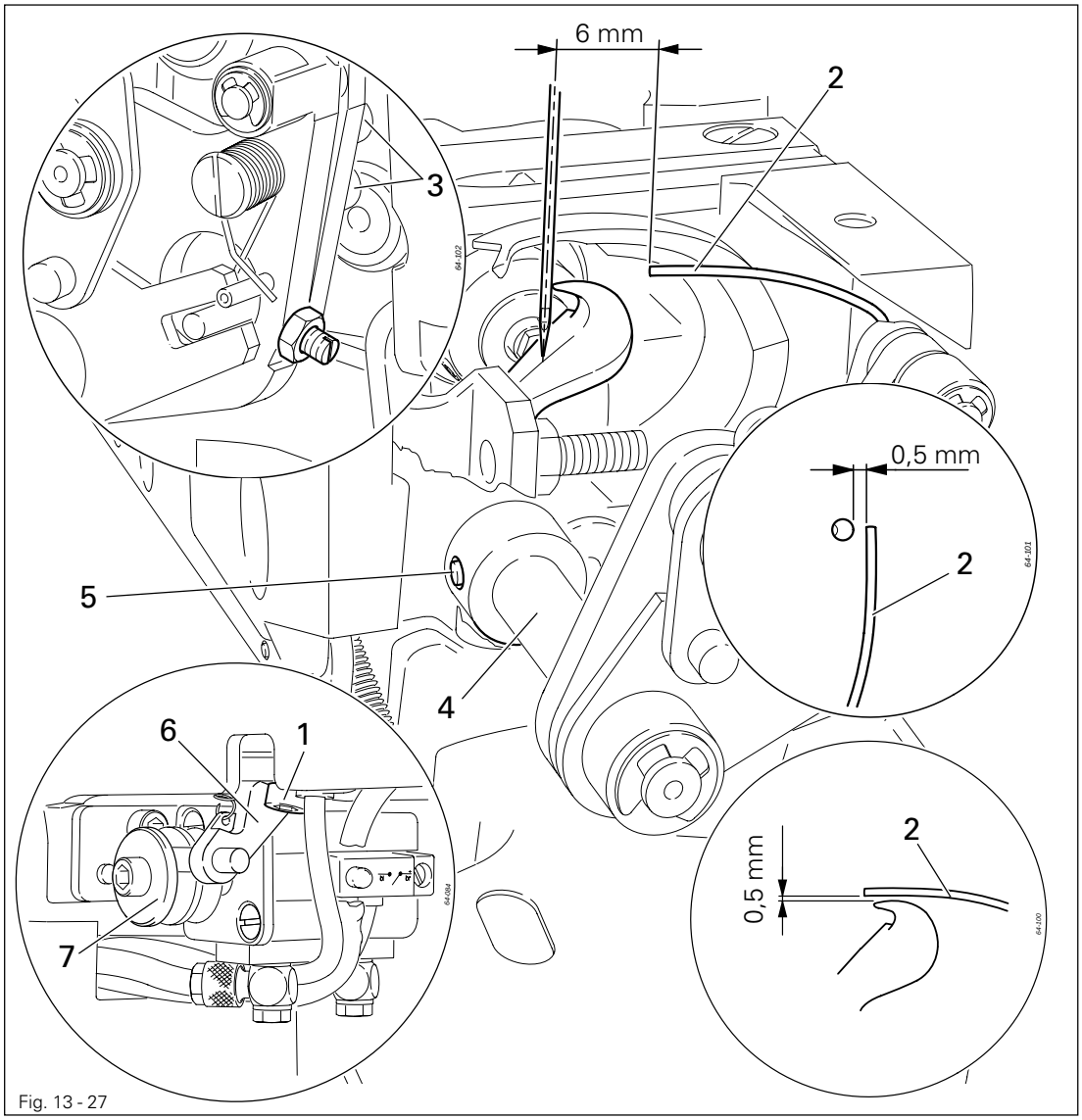


Fig. 13 - 27

- Switch on the machine and connect it to the pneumatic system.
- Set parameter "610" at value "1" and set needle rise position.
- Loosen screw **1**.
- Adjust retaining finger **2** (screw **3**) in accordance with **requirement 1**.
- Adjust shaft **4** (screw **5**) in accordance with **requirement 2**.
- Switch off the machine.
- Adjust retaining finger **2** (screw **1**) in accordance with **requirement 3.**

When tightening screw **1** take care to see that lever **6** engages reliably in part **7** and does not block the cylinder.

13.30 Adjusting the lifting lever of the end knotting equipment

Requirement
When parameter "610" is set at "1" and the machine is in the needle rise position, the retaining finger **1** should be positioned **5 mm** behind the centre of the needle and the lifting lever **4** should be touching screw **2**.

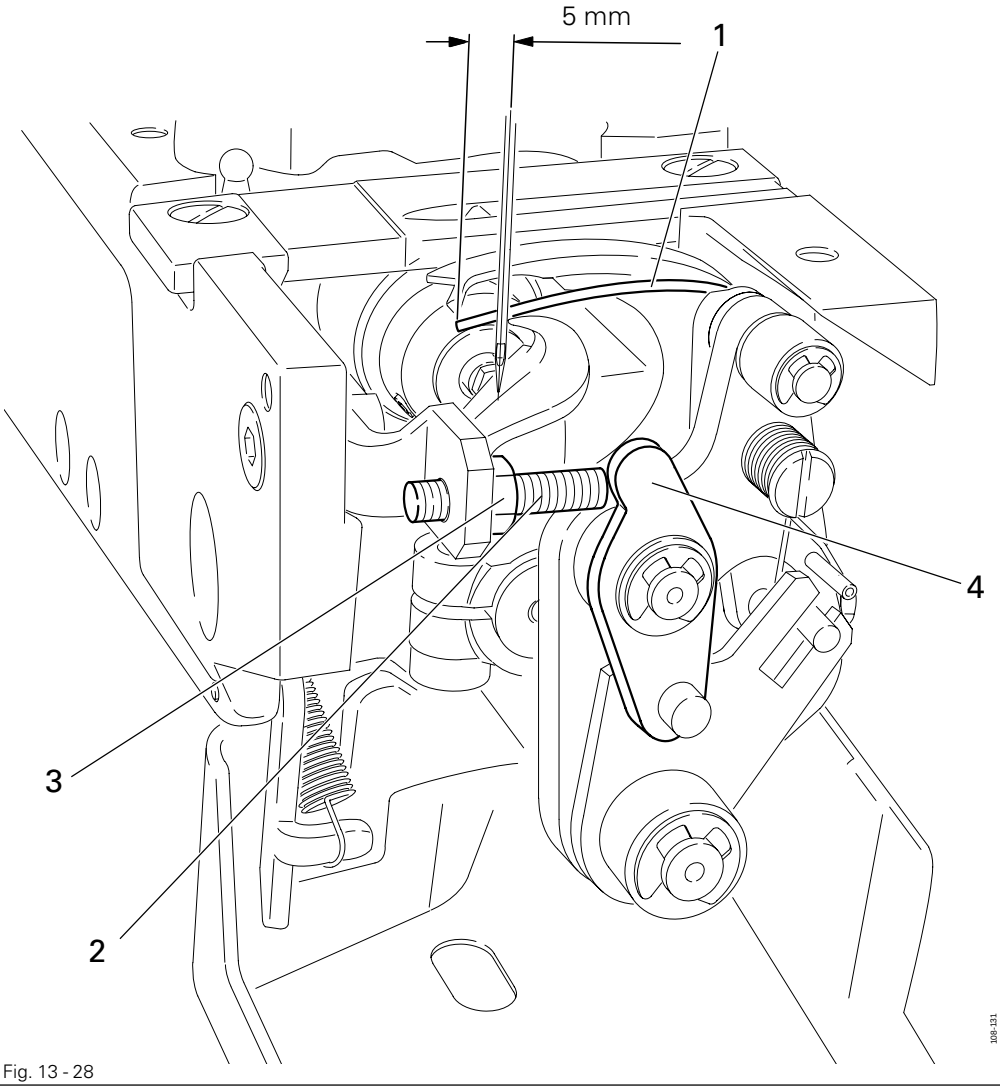


Fig. 13 - 28

- Switch on the machine, set parameter "610" at "1" and bring the needle bar into the needle rise position.
- Disconnect the machine from the pneumatic power supply.
- Position the retaining finger **1** by hand.
- Turn screw **2** (nut **3**) in accordance with the **requirement.**
- Switch off the machine.

Make sure that the retaining finger **1** does not touch the loop spreader.

13.31 Adjusting the reed switch

Requirement
When parameter "610" is set at "1" and the machine is in the needle rise position, the reed switch **1** should operate exactly at the moment when the tip of the retaining finger **3** is positioned at the centre of the needle.

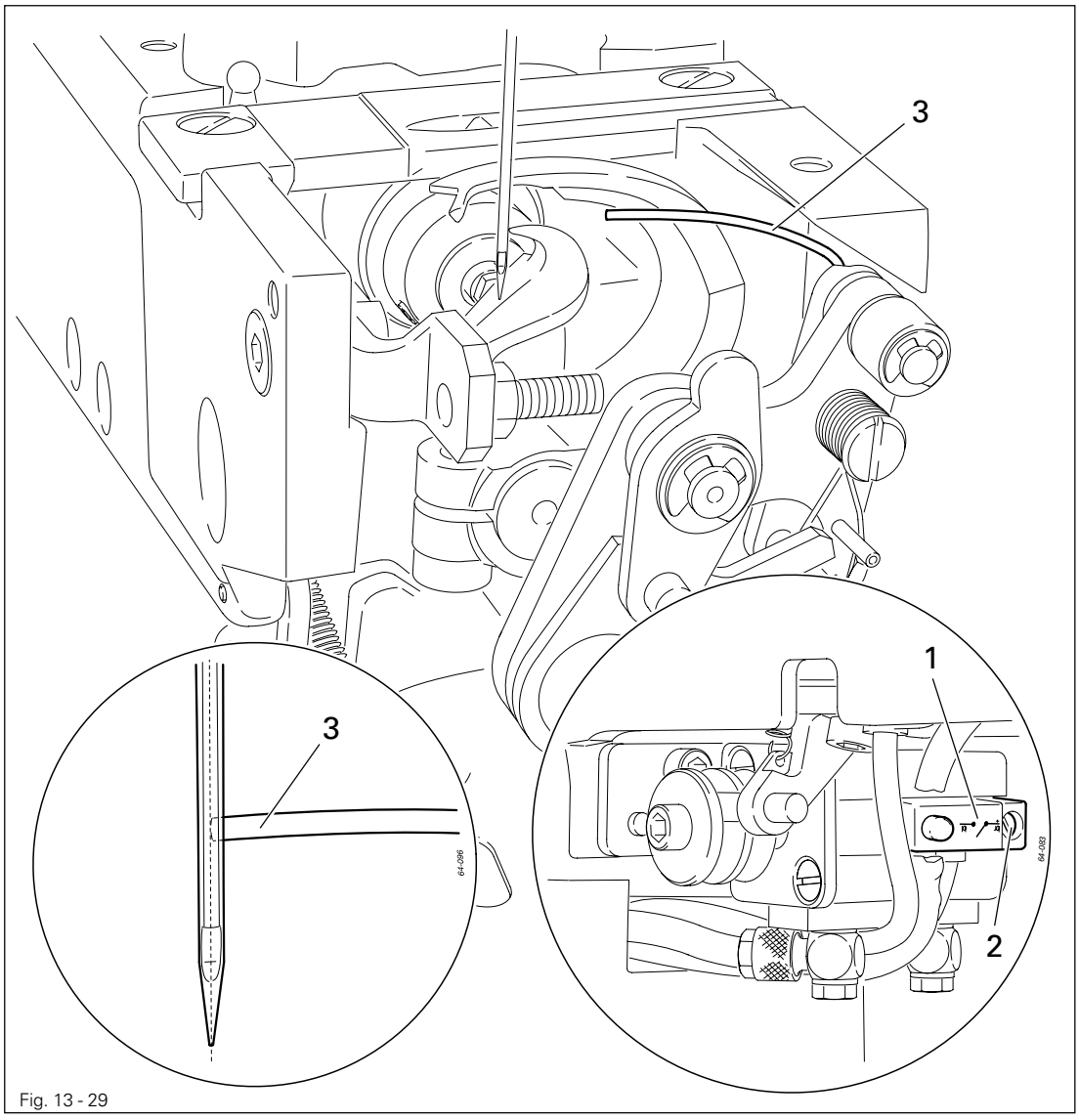


Fig. 13 - 29

- Switch on the machine, set parameter "610" at "1" and bring the needle bar into the needle rise position.
- Loosen screw **1** and move the reed switch 2 completely to the right.
- Place the point of the retaining finger at the centre of the needle and hold it in this position.
- Move reed switch **2** to the left, until reaching the switch point.
- Fasten screw **1**.
- Check the switch status of reed switch **2** with parameter "602" (position 4).
- Switch off the machine.

13.32 Setting the angle for the end knotting (only on subclasses -1/.. and -4/..)

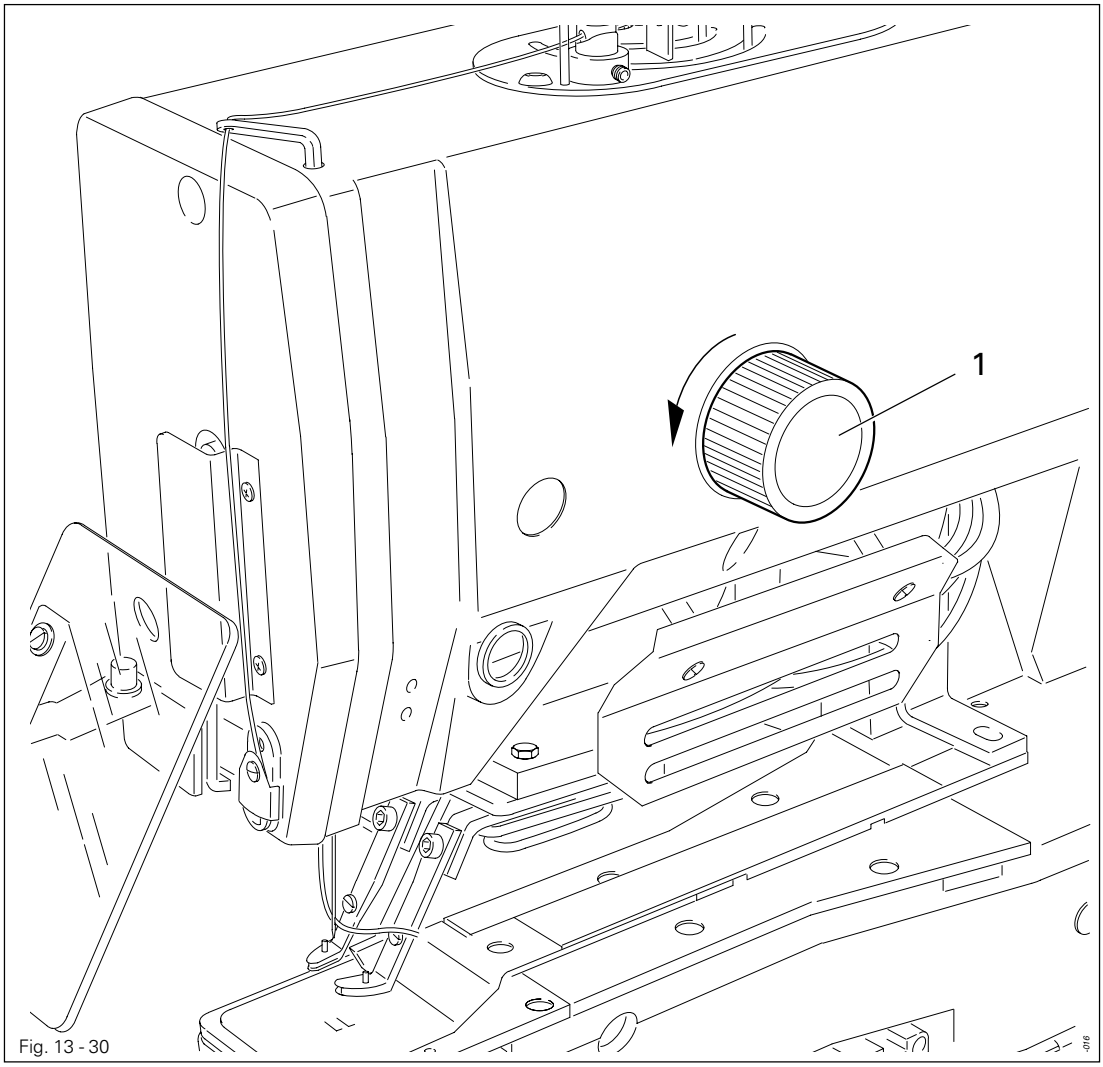
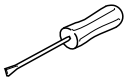


Fig. 13 - 30



- Switch on the machine.
- Switch on the end knotting function, see **Chapter 11 Input**
- By turning the balance wheel **1** to "40" set parameter "506" (engaging position).
- By turning the balance wheel **1** to "70" set parameter "507" (disengaging position).
- Carry out ten sewing operations. Select parameter "604" and interpret the values for the engaging and disengaging position of the last ten sewing operations.
  For uneven values (engaging position) the value should be "70".
  For even values (disengaging position) the value should be "90".
- Change parameters "506" and "507" accordingly, a deviation of +/- 1 is permitted.
- Switch off the machine.

13.33 Adjusting the moment tension

Requirement

1. When the needle bar is at its t.d.c. eccentric **1** should be positioned with its largest eccentricity towards the top.
2. Tension disks **3** should open **approx. 10 mm** before t.d.c. needle bar and close again **approx. 10 mm** after t.d.c. needle bar.

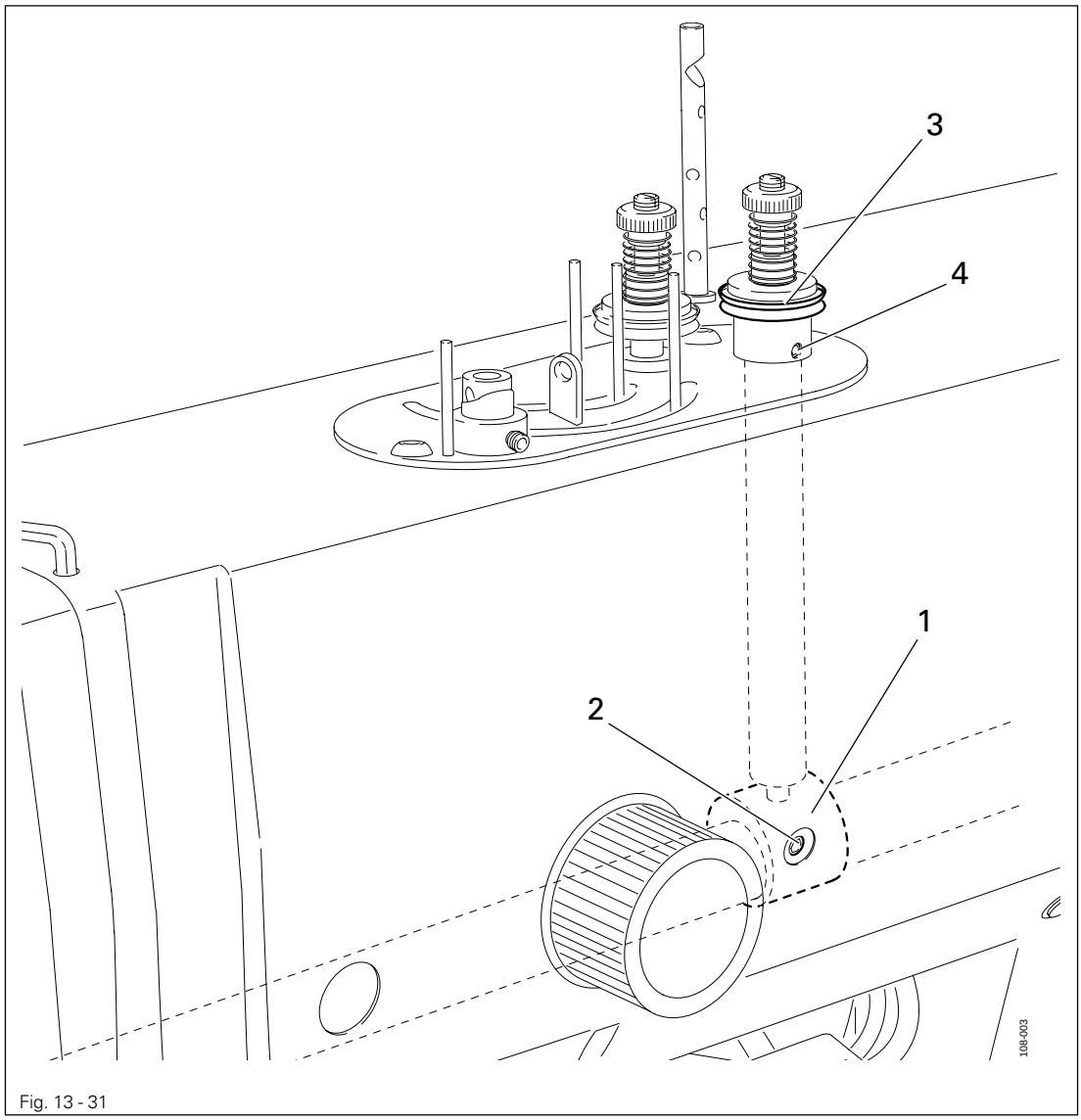
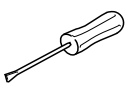


Fig. 13 - 31



- Turn eccentric **1** (screws **2**) in accordance with **requirement 1.**
- Adjust tension disks **3** (screw **4**) in accordance with **requirement 2.**

13.34 Adjusting the thread puller

Requirement

1. When cylinder **6** is retracted, screw **4** should be at a distance of approx. **1 mm** from the inside edge of the slot.
2. When thread puller **3** is in its basic position, it should be resting lightly on the thread and should not touch the edge of the slot when cylinder **6** is extended.
3. The thread should be pulled evenly without any jerks.
4. Thread puller **3** should be set so that a reliable sewing start is guaranteed, but no start thread is standing out.

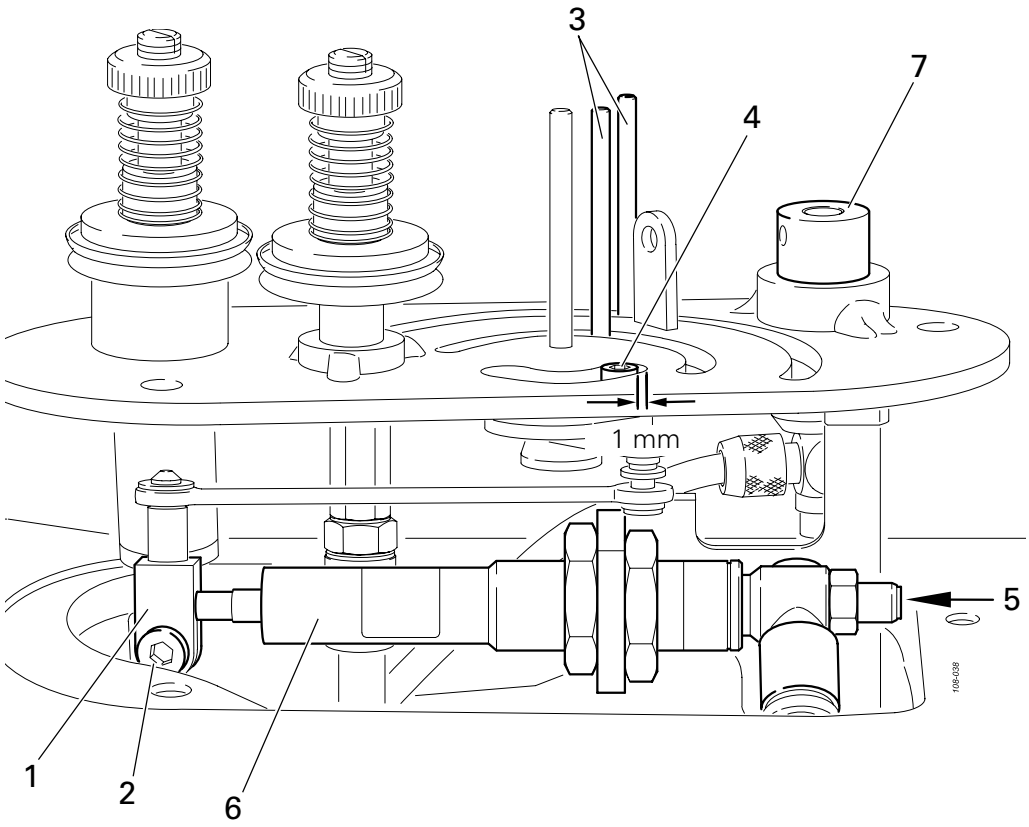


Fig. 13 - 32

- Adjust clamp **1** (screw **2**) in accordance with **requirement 1.**
- Adjust thread puller **3** (screw **4**) in accordance with **requirement 2.**
- First of all, close throttle **5** completely and then adjust it in accordance with **requirement 3**.
- Adjust thread puller with screw **4** in accordance with **requirement 4.**

If required deviations from this basic setting of thread puller 3 are possible.
If necessary, adjust the switch times for thread clamp **7** (parameter "405") and thread puller **3** (parameter "406").

13.35 Adjusting the thread clamp

Requirement
When thread clamp **1** is closed, the thread should be clamped reliably without being cut.

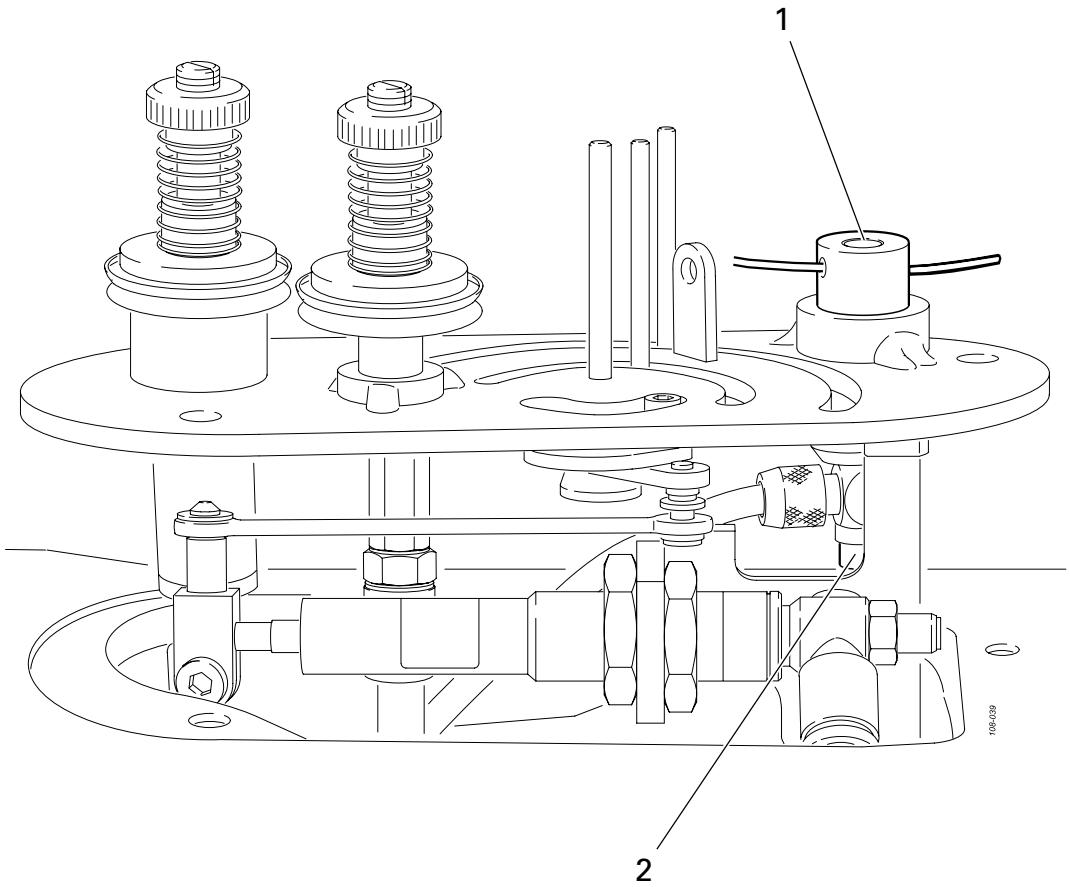
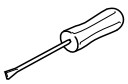
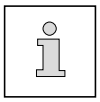


Fig. 13 - 33



- Insert thread in thread clamp **1**.
- Carry out a functional test for the thread clamp with parameter "603" (output 3).
- First of all, close throttle **2** completely and then adjust it in accordance with **requirement.**



Following the adjustment, parameters "504", "508" and "510" must be checked, and adapted if necessary.

13.36 Adjusting the thread regulator

Requirement
When the needle bar is at its b.d.c., the slack needle thread should have been used.

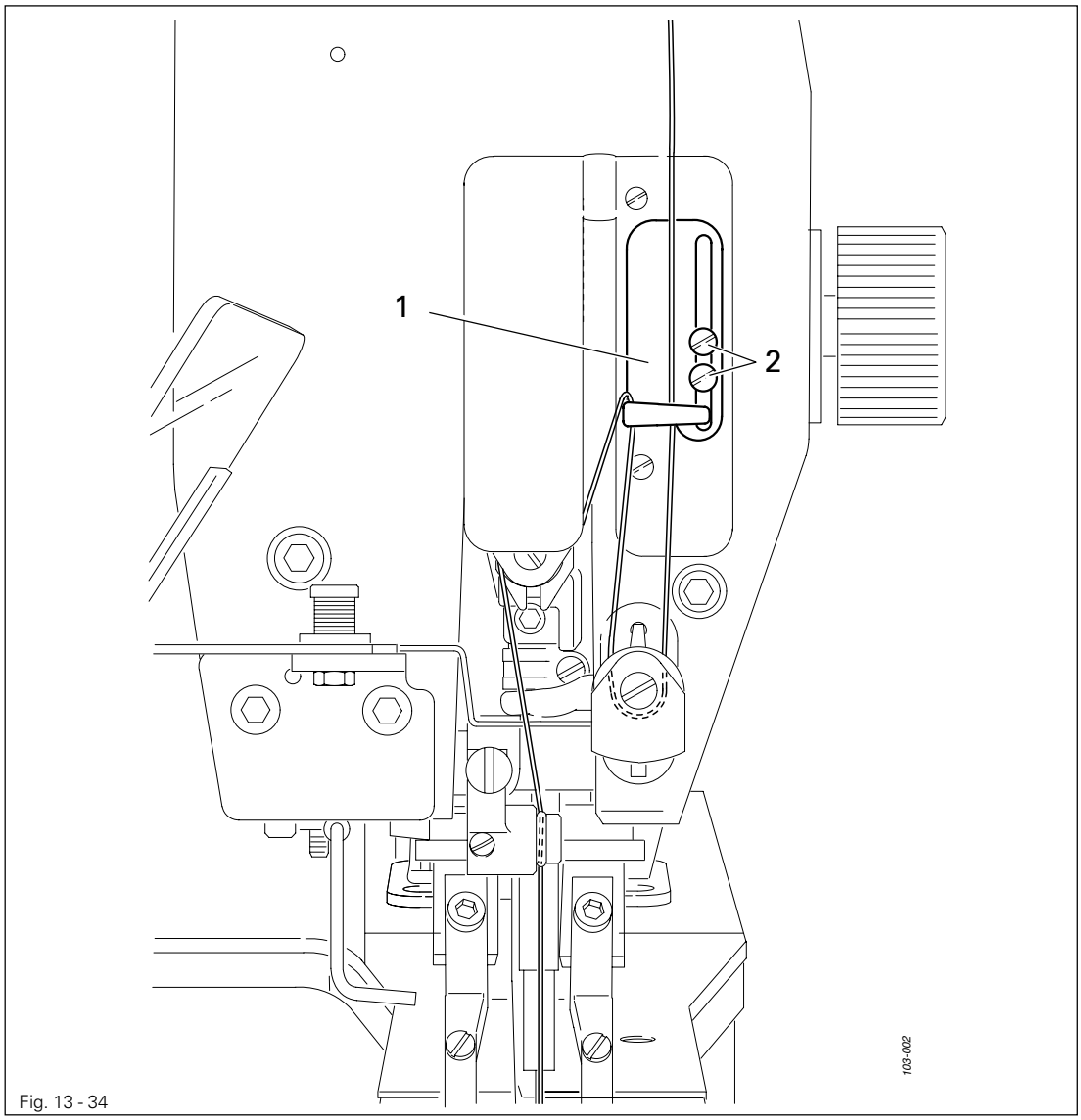
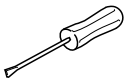


Fig. 13 - 34



- Switch on the machine and connect it to the pneumatic power supply.
- Place the workpiece in position and start the sewing operation.

- Interrupt the sewing operation and bring the needle bar to its b.d.c. by turning the balance wheel.

- Adjust the thread regulator **1** (screws **2**) in accordance with the requirement.
- Switch off the machine and disconnect it from the pneumatic power supply.

13.37 Adjusting the button holding cylinder (only on subclass -5/..)

Requirement
The button holding cylinder **1** should be at the same level as button seat **3**, and without a button inserted it should extend **approx. 1 mm** further than with a button inserted.

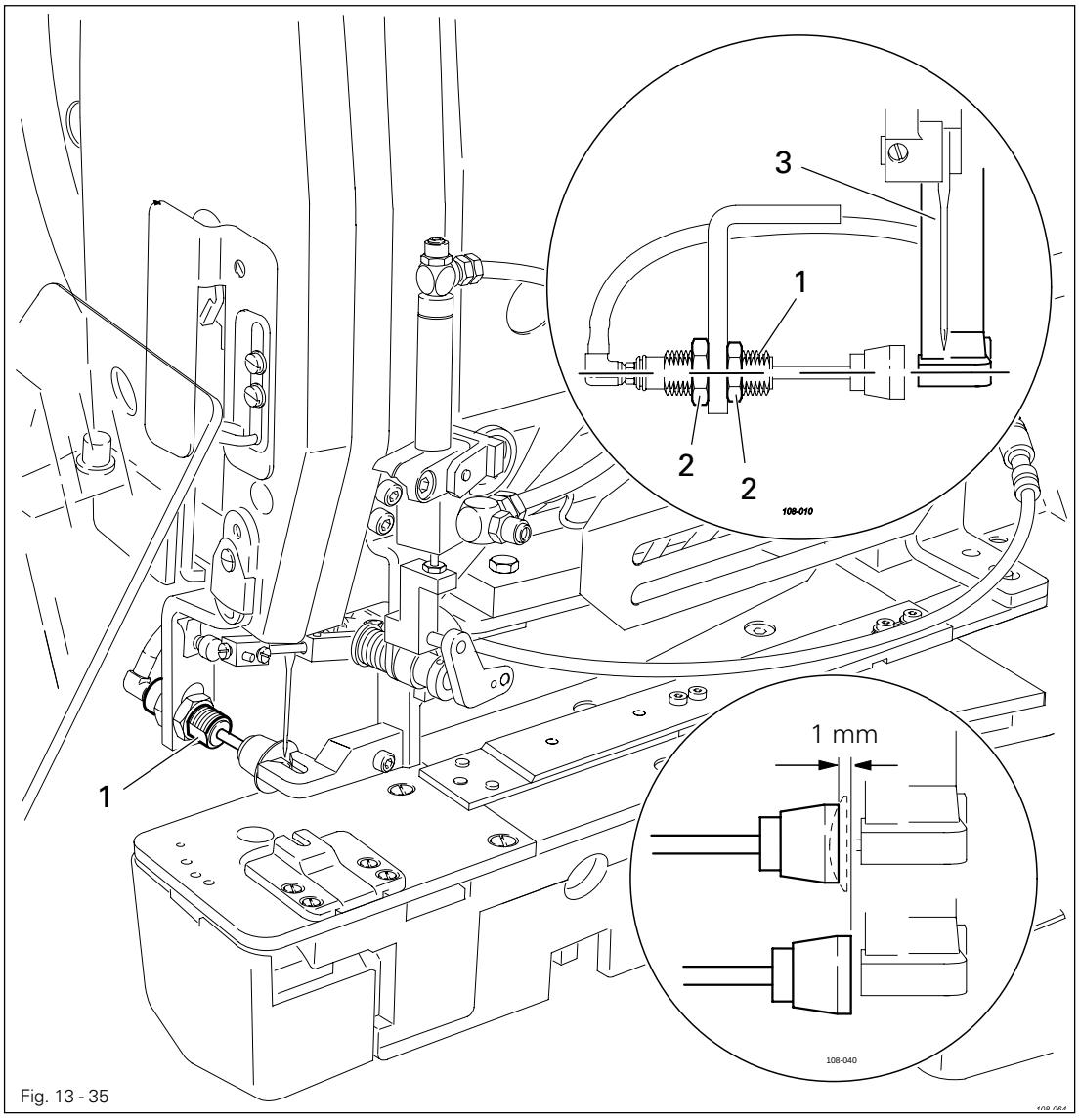
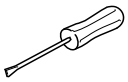


Fig. 13 - 35



- Adjust the button holding cylinder **1** (nuts **2**) in accordance with the **requirement**.

13.38 Adjusting the thread wiper (only on subclass -5/..)

Requirement

1. In cutting position, the thread wiper **1** should be centred to the needle, and with the needle bar at t.d.c. it should swing though under the needle without contact.
2. When the cylinder **6** is extended, bearing block **7** should not collide with adjusting ring **8**, and thread wiper **1** should be **approx. 3 mm** behind the needle.

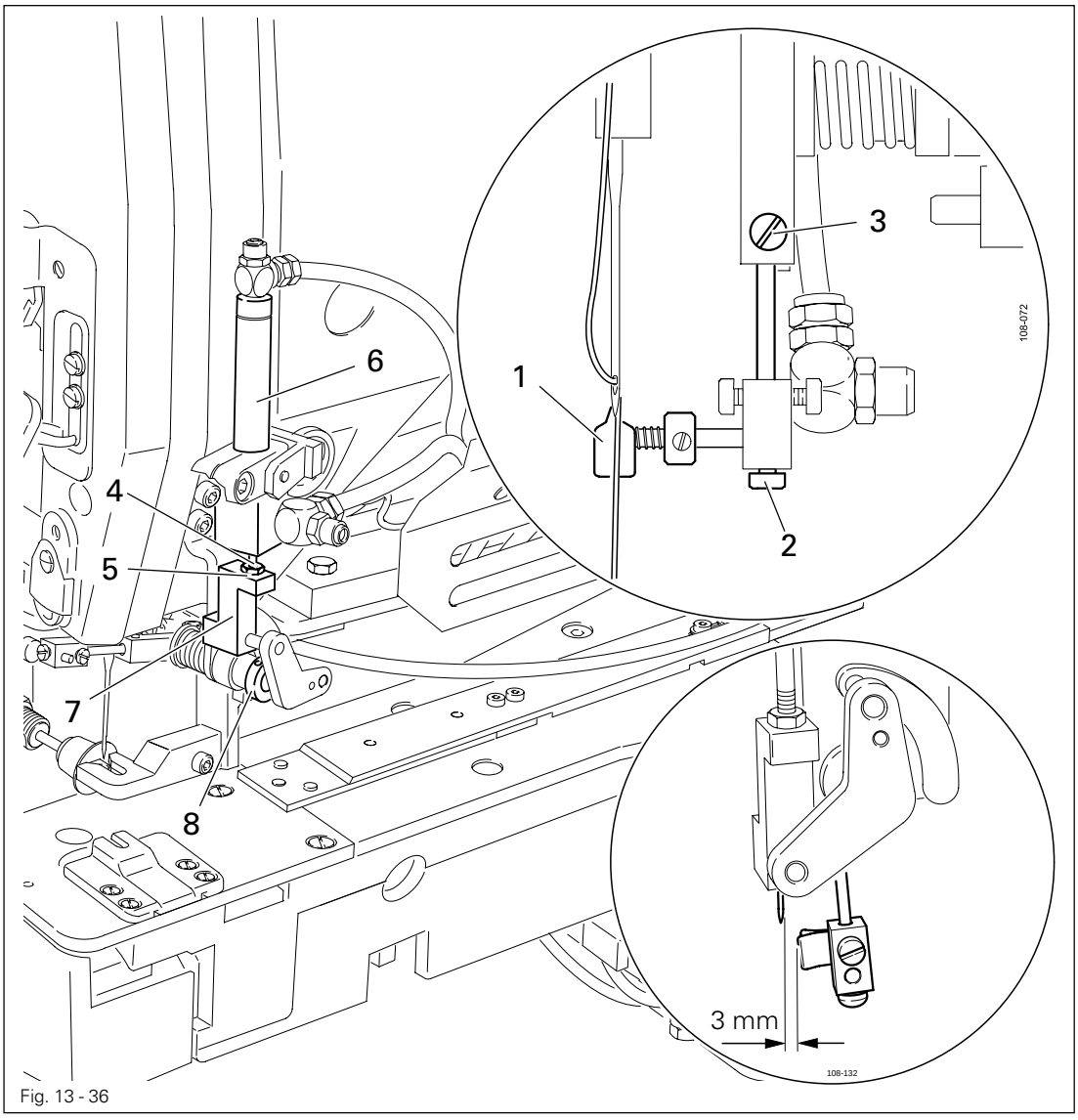


Fig. 13 - 36

- Connect the machine to the pneumatic system and switch it on.
- Engage thread wiper **1** using parameter "603".
- Adjust thread wiper **1** (screws **2** and **3**) in accordance with **requirement 1**.
- Adjust piston rod **4** (nut **5**) in accordance with **requirement 2**.
- Set parameter "403" to its maximum value.
- Check the setting during the sewing process and correct it if necessary.
- Reset parameter "403".
- Switch off the machine and disconnect it from the pneumatic system.

13.39 Adjusting the stem finger to the button

Requirement
As seen in the direction of sewing, stem finger **1** should be positioned in the centre of the holes in the button.

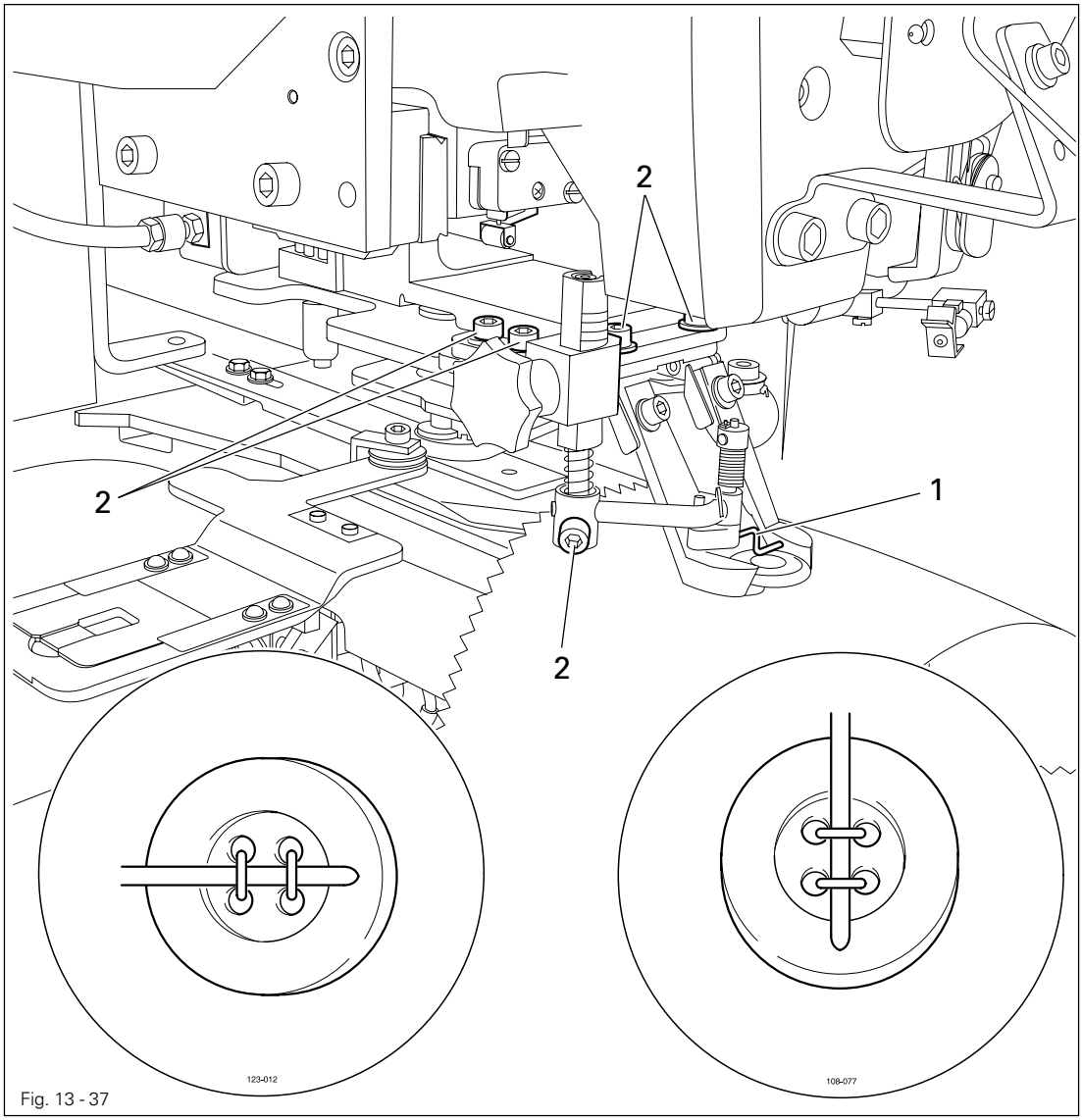
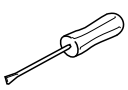


Fig. 13 - 37



- Adjust stem finger **1** (screws **2**) in accordance with the **requirement**.

13.40 Changing the quick-change clamp

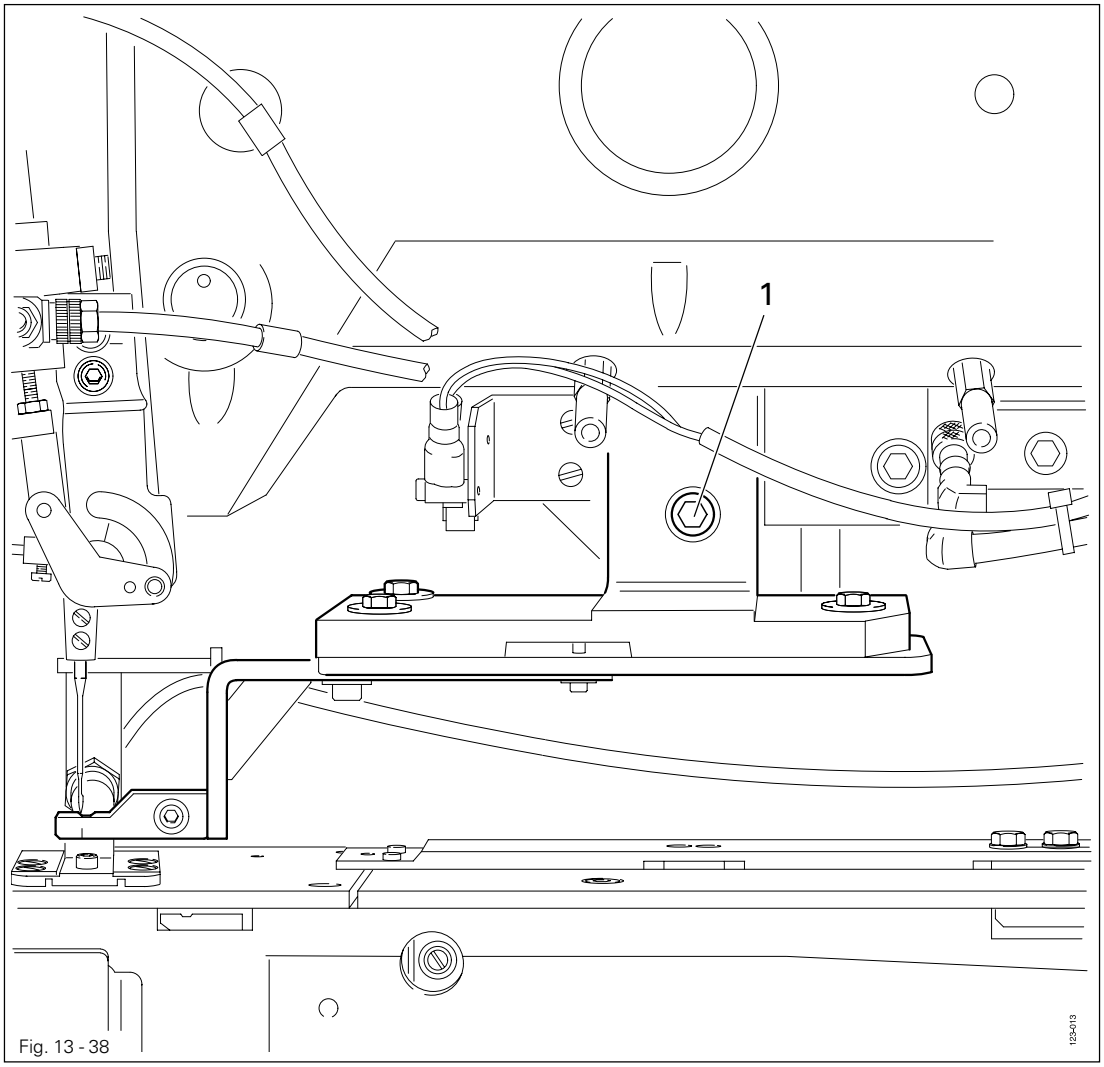
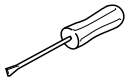


Fig. 13 - 38



- Switch off the machine and disconnect it from the pneumatic system.
- Unscrew screw **1**.
- Remove the clamp.
- Insert the new clamp and fasten it with screw **1**.
- Connect the machine to the pneumatic system.

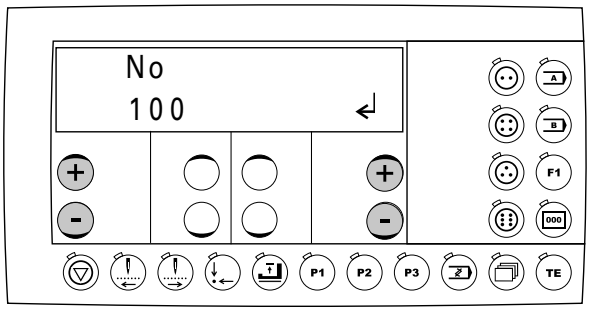
13.41 Parameter settings

13.41.01 Selecting the function group and altering the parameter

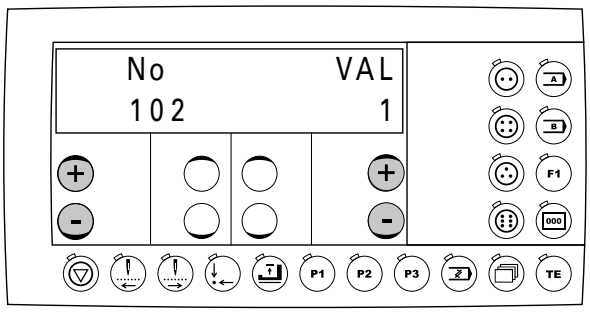
- Switch on the machine.
  When the machine is switched on, it is automatically active in the sewing mode.

TE

- Select the input mode (LED in the key is on).



- Using the left +/- keys select the desired function group.
  With the factory setting of the machine, only free access to function group "100" is possible, the other function groups are protected against unauthorized access by a code.
- Confirm the selection of the desired function group with the "enter" function by pressing "+" on the right +/- key.



- Select the desired parameter by using the left +/- keys, and change to the desired value with the right +/- keys.
- The altered value is taken over by selecting the next parameter.

or

TE

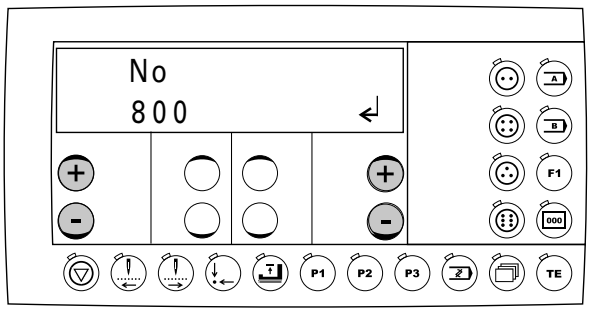
- By calling up the sewing mode the altered value is taken over and the machine changes to the sewing mode (LED in the key goes off).

13.41.02 Entering / altering the access code

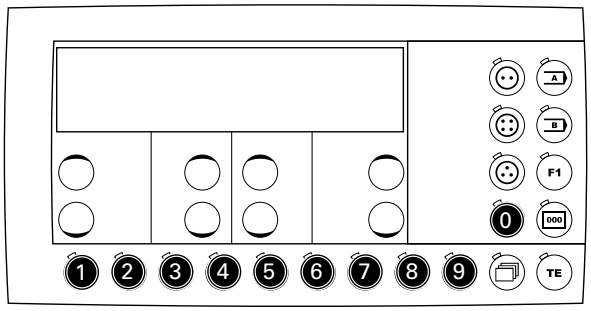
- Switch on the machine.

TE

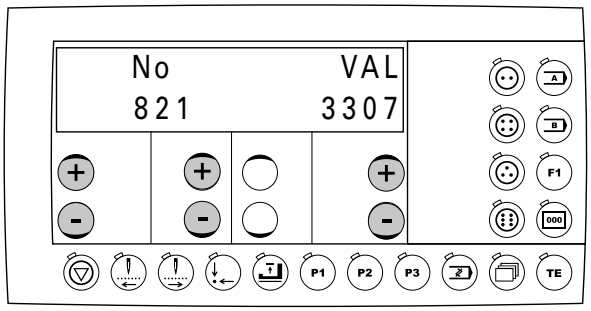
- Select the input mode (LED in the key is on).



- Select the function group "**800**" by pressing the left **+/- keys**.
- Confirm the selection by pressing "+" on the right **+/- keys**.



- Enter the code.
  As shown in the illustration, the figures are entered with the corresponding function keys. The factory setting of the code is "**3307**".



- To alter the access code, call up parameter "**821**" (entering the access code) with the corresponding **+/- keys**.
- Enter the new code.

TE

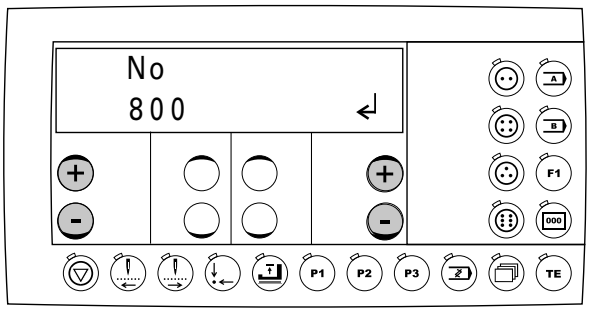
- By calling up the sewing mode the altered value is taken over and the machine changes to the sewing mode (LED in the key goes off).

13.41.03 Allocating access rights

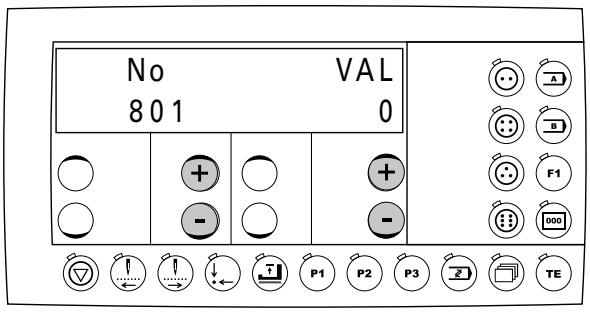
- Switch on the machine.

TE

- Select the input mode (LED in the key is on).



- Select the function group "800" by pressing the left +/- keys.
- Confirm the selection by pressing "+" on the right +/- keys.
- Enter the access code, see Chapter 13.41.02 Entering / altering the access code.



- Select the desired parameter "801" to "820" with the left +/- keys, see Chapter 13.41.04 List of parameters.
- With the right +/- keys release or block the selected parameter.
  - 0: Parameter function is freely accessible
  - 1: Parameter function only accessible after entering access code.

If all parameters ("801" to "820") are set at "0", the access code will not be demanded.

TE

- By calling up the sewing mode the altered value is taken over and the machine changes to the sewing mode (LED in the key goes off).

13.41.04 Parameter list

Group	Parameter	Description	Setting range	Set value
100	101	Display software version	-	-
	102	Button height (with material) 1 = 0 – 6 mm 2 = 6 – 12 mm 3 = 12 mm and above	1 - 3	1
	108	Time delay during continuous operation [s]	0,00 - 2,00	0,30
	109	Continuous operation I = off, II = on	I, II	I
	110	Software version for motor control	-	-
	111	Software version for thread strength module	-	-
	113	Sequence input	1 - 9	-
	114	Sequence mode I = off, II = on	I, II	I
	117	Key ton I = off, II = on	I, II	II
200	201	Delete program	-	-
	202	Machine version 1 = standard/self-shank button (-1/.. / -5/..) 2 = with blind stitching (-3/..) 3 = with stem wrapping (-9/.. 4 = with button feed (-1/11) 5 = with outer clamp (-1/13) 6 = tacking (-4/..)	1 - 6	1
	204	Cloth plate cut-out size see Ch. 3.02 Seam pattern size	1 - 6	1
	205	Missed stitch detection I = off, II = on	I, II	I
	206	Missed stitch detection threshold	0 - 999	120
	207	Fade-out stitches of the misses stitch detection function	0 - 9	6

Group	Parameter	Description	Setting range	Set value
200	208	1 – 120 = Display thread size of last program (max. 120 stitches) 0 = Display calculated optimum threshold (for input in para. "206"	0 -120	
	209	Air jet I = off, II = on Attention! If the thread wiper is attached, the air jet must be switched off!	I, II	I
	210	Turn-on time air jet [s]	0 - 10	1
	211	Initialize clamp at sewing start I = off, II = on	I, II	I
400	401	Raise clamp delay [s]	0,00 - 1,50	0
	402	Start delay after clamp lowered [s]	0,00 - 1,50	0
	403	Delay before thread trimming [s] (Switch time till thread wiper forwards)	0,00 - 2,00	0,06
	404	Thread cutting time [s]	0,00 - 2,00	0,06
	405	Time between "thread clamp closed" and "thread puller on" [s]	0,00 - 2,00	0,10
	406	Waiting time for thread puller [s]	0,00 - 2,00	0,30
	408	Time for added feature clamp / non-pressurized insert plate [s]	0,00 - 1,50	1
500	501	Soft start stitches Soft start speed (spm)	0 - 15 0 - 2000	0 500
	503	Extra stitches at start (start stitches)	0 - 4	0
	504	Delay time thread clamp open at beginning of seam [s]	0 - 2	0,02
	506	Angle position for "end knotting on"	0 - 127	40
	507	Angel position for "end knotting off"	0 - 127	70

Group	Parameter	Description	Setting range	Set value
500	508	No. of stitches with "thread clamp closed" at end of seam* Angle position for "thread clamp closed" at end of seam *No. of stitches (counted back from last stitch) till thread clamp is switched on. (0 last stitch)	0 - 3 0 - 127	0 80
	510	Angle position for "thread clamp open" at last needle penetration before thread trimming	0 - 127	120
	511	Securing stitches before cutting	0 - 2	0
	512	Measuring point of missed stitch detection function with display of the thread strength	0 - 127	115
600	601	Move stepping motor clamp and needle		
	602	Display inputs: 0123456789ABCDEF	Meaning of the display value	
		Position on the Display	0	I
		0: Not assigned	-	-
		1: Not assigned	-	-
		2: Needle in material (NIS)	-	-
		3: End knotting engaged (E16 - X5:7)	off▲	on
		4: Error reset key S101 (E12 - X5:12)	off▲	on
		5: Not assigned (E11 – X5:11)	-	-
		6: Not assigned (E10 – X5:10)	-	-
		7: Not assigned (E9 – X5:9)	-	-
		8: Programmable input 1 (E8 – X5:16))	-	-
		9: Programmable input 2 (E7 – X5:15)	-	-
		A: Not assigned (E6 – X5:14)	-	-
		B: Not assigned (E5 – X5:5)	-	-
		C: Clamp lowered S24 (E4 – X5:4)	raised▲	lowered
		D: Not assigned (E3 – X5:3)	-	-
		E: Reference needle (photoelectric barrier)	switched	not assigned
		F: Reference clamp (photoelectric barrier)	switched	not assigned
		▲= basic position		

Group	Parameter	Description	Setting range	Set value
600	603	Outputs:	Meaning of the display value	
		Position on the Display	0	I
		1: Clamp (X13:1)	lowered	raised▲
		2: Not assigned (X13:3)	-	-
		3: Thread clamp (X13:5)	open	closed▲
		4: Cutting (X13:6)	off▲	on
		5: End knotting (X13:7)	off▲	on
		6: Thread puller (X13:8)	off▲	on
		7: Air jet / thread wiper (X13:9)	off▲	on
		8: Not assigned (X13:10)	-	-
		9: Not assigned (X13:11)	-	-
		10: Not assigned (X13:12)	-	-
		11: Not assigned (X13:13)	-	-
		12: Not assigned (X13:25)	-	-
		13: Not assigned (X13:24)	-	-
		14: Shank button holder (X13:16)	off▲	on
		15: Programmed outlet 1 (X13:17)	-	-
		16: Missed stitch lamp (X5:24)	off▲	on
		▲ = basic position		
	604	Last engaging and disengaging positions for end knotting		
	605	Needle penetration point in fabric	0 - 127	43
	607	Turn sewing motor in sewing direction		
	608	Carry out cold start		
	610	Needle penetration points for adjustment **1:** Centre **2:** Max. penetration point right **3:** Max. penetration point left **4:** Button gauge: centre **5:** Button gauge: front left **6:** Button gauge: back left **7:** Button gauge: back right **8:** Button gauge: front right		

Group	Parameter	Description	Setting range	Set value
600	611	Suppression thread trimming I = off, II = on	I, II	I
	612	Adjusting aid for zero position of stepping motor using synchronisation mark		0
	614	Set cutting position X on right	(-25) - 25	5
	615	Set cutting position X on left	(-25) - 25	8
700	701	P-quota speed controller	1 - 50	10
	702	I-quota speed controller	0 - 100	50
	703	P-quota position controller	1 - 50	20
	704	D-quota position controller	1 - 100	30
	705	Time for position controller	1 - 100	25
	706	P-quota position controller for rest brake	1 - 50	25
	707	D-quota position controller for rest brake	1 - 50	15
	708	Maximum moment for rest brake	0 - 100	0
	709	Minimum machine speed	3 - 64	6
	710	Maximum machine speed	100 - 2000	2000
	711	Maximum motor speed	0 - 100	45
	712	Positioning speed	3 - 35	25
	713	Acceleration ramp	1 - 50	35
	714	Brake ramp	1 - 50	30
	715	Reference position	1 - 127	43
	716	Time-out	0 - 255	40
	717	Starting current motor	3 - 10	6
	718	Anti vibration filter	1 - 10	3
	719	Rotation direction allocation	0 - 1	1
	720	Reference position correction	0 - 127	64
800	801	Right of access function group 100	0 - 1■	0
	802	Right of access function group 200	0 - 1■	1
	803	Right of access function group 300	0 - 1■	1
	804	Right of access function group 400	0 - 1■	1
	805	Right of access function group 500	0 - 1■	1
	806	Right of access function group 600	0 - 1■	1
	807	Right of access function group 700	0 - 1■	1
	808	Right of access function group 800	0 - 1■	1

Group	Parameter	Description	Setting range	Set value
800	809	Right of access key max. speed	0 - 1■	0
	810	Right of access key program number selection	0 - 1■	0
	811	Right of access key piece counter	0 - 1■	0
	812	Right of access F1 key	0 - 1■	0
	813	Right of access key two-hole button	0 - 1■	0
	814	Right of access key four-hole button	0 - 1■	0
	815	Right of access key three-hole button	0 - 1■	0
	816	Right of access key six-hole button	0 - 1■	0
	817	Right of access key program group A	0 - 1■	0
	818	Right of access key program group B	0 - 1■	0
	819	Right of access programming key	0 - 1■	0
	820	Right of access SD-memory card	0 - 1■	0
	821	Enter access code (status on delivery: 3307)	0 - 9999	3307

■ 0 = free access, 1 = access only with code input

13.42 Description of the error messages

Display	Description
Error 1	System error
Error 2	Sewing motor ERROR **2/BB/xxx** BB = **30:** Timeout **20:** Dead man **10:** Speed **0B:** StopX **0A:** Reset stitch counter **09:** Write parameter **05:** Positioning sewing head shortest route **03:** Positioning sewing head in reverse **02:** Positioning sewing head forwards xxx = Error in sewing motor control unit, see Chapter **13.43** Sewing motor errors
Error 3	Input insert plate at front (E**6** –X**5:14**)
Error 4	Missed stitch detection with number of missed stitch **0:** Error during initialisation of missed stitch detection
Error 5	Input Clamp lowered (E**4** –X**5:4**) "Switch clamp" locked, as main drive not in raised position.
Error 6	Time monitoring while running through sewing program
 Error 7 - 1 Error 7 - 2 Error 7 - 3 Error 7 - 4 Error 7 - 5	Stepping motor motion: Delay X not ready Delay Y not ready Delays X and Y not ready Ramp X not ready Ramp Y not ready
Error 8	Stitch length
Error 9	Sewing figure outside area
  Error 10 - 1 Error 10 - 2 Error 10 - 3 Error 10 - 4 Error 10 - 5 Error 10 - 6 Error 10 - 7 Error 10 - 8 Error 10 - 9 Error 10 - 10 Error 10 - 11 Error 10 - 12 Error 10 - 13 Error 10 - 14	Error when moving to home position Outputs not ready Raise clamp Insert position not reached Blind stitching and input "blind stitching on" = **0** No blind stitching and input "blind stitching on" = **1** or input "insert plate at front" = **1** Pedal operated X-centre not reached X-centre not left Y-centre not reached Y-centre not left Time monitoring home test Absolute position – **0.3** not reached home test Absolute position + **0.6** not reached home test Needle raised position not reached
Error 11	Stepping motor step frequency too high
Error 12	Error in sewing program

Display	Description
Error 13	Stepping motor – targeted position outside sewing area
	Time monitoring outputs
Error 14 - 3	Thread clamp
Error 14 - 6	Thread puller
Error 14 - 10	Material shift
Error 14 - 15	Programmable output 1
Error 14 - 16	Programmable output 2
Error 15	Input not incoming
Error 16	Non-permissible delay when sewing drive in operation
Error 17	Cutting without previous sewing
Error 18	Incorrect command in data set
Error 19	Incorrect program number
Error 20	Not assigned
Error 21	Power unit overloaded (24 V)
Error 22	Mains voltage
Error 23	Power unit 24 V too low
Error 24	No stepping motor motion prepared (NIS)
Error 25	Stepping motor still not started (NIS)
Error 26	Input blind stitching off (E5 – X5:5)
	Error in SD-memory card reader
Error 27 - 1	No SD-memory card inserted
Error 27 - 2	Wrong card (does not match the 3307)
Error 27 - 3	Card not inserted correctly
Error 27 - 4	Card with write protection
Error 27 - 5	Data error on SD-memory card
Error 27 - 6	Formatting failed
Error 27 - 7	File does not match the 3307
Error 27 - 8	Incorrect file size
Error 27 - 9	Transfer error
Error 27 - 10	Data could not be deleted
	Button feed
Error 28 - 1	Clamp not raised
Error 28 - 2	Loading position S1 not reached
Error 28 - 3	Stop position S2, or basic position S3 not reached
Error 28 - 4	Loading control (button not in position)
	CAN-error
Error 29 - 1	Timeout
Error 29 - 2	Incorrect answer
Error 29 - 4	Data lost
Error 30	Error end knotting with penetration point number

13.43 Sewing motor errors

Number	Description
33	Invalid parameter value
34	Brake path too short
35	Communication error
36	Init not ready
37	Command overrun
64	"Mains off" during initialisation
65	Excess current directly after "mains on"
66	Short circuit
68	Excess current during operation
69	No increments
70	Motor stalling
71	No incremental plug
73	Fault in motor operation
74	Incremental transducer missing for transmission/reduction
75	Regulator blocked
170	Invalid transmission
171	Invalid zero mark
173	Motor blocked in 1st stitch
175	Interior starting error
222	Dead man monitoring

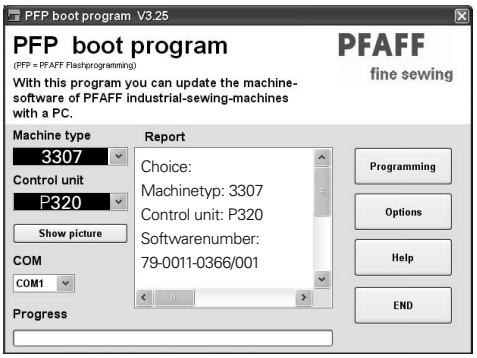
13.44 Internet update of the machine software

The machine software can be updated with PFAFF flash programming. For this purpose the PFP boot program (from **version 3.25** on) and the appropriate control software for the machine type must be installed on a PC. The transfer of the data to the machine can be carried out with a null modem cable (part no. **91-291 998-91)** or with an SD-card. The SD-card must be formatted in the **FAT16** format and must not exceed a capacity of **2 GBytes**.

The PFP boot program and the control software of the machine type can be downloaded from the PFAFF-homepage using the following path:
www.pfaff-industrial.com/pfaff/de/service/downloads

13.44.01 Update with null modem cable

- After downloading the PFP tool and the control software, open the PFP program.
- Select the **machine type** and under control unit **P320.**
- The software version is displayed under **report**.



- Switch off the machine.
- Connect the PC (serial interface or appropriate USB-adapter) and the machine control unit (**RS232**). To do so disconnect the plug of the control panel.

While the machine software is being updated, no setting up, maintenance or adjustment work may be carried out on the machine!

- Switch on the machine, keeping the boot key **1** pressed.
- Press the "OK" button.
  The software update is carried out, the update progress is shown on the bar display of the PFP boot program.
- During the updating process the machine must not be switched off.
- When the update has been completed, switch off the machine and end the PFP boot program.
- End the connection between the PC and the machine control unit and reconnect the control panel to the machine control unit.

- Switch on the machine
- A plausibility control is carried out and, if necessary, a cold start.

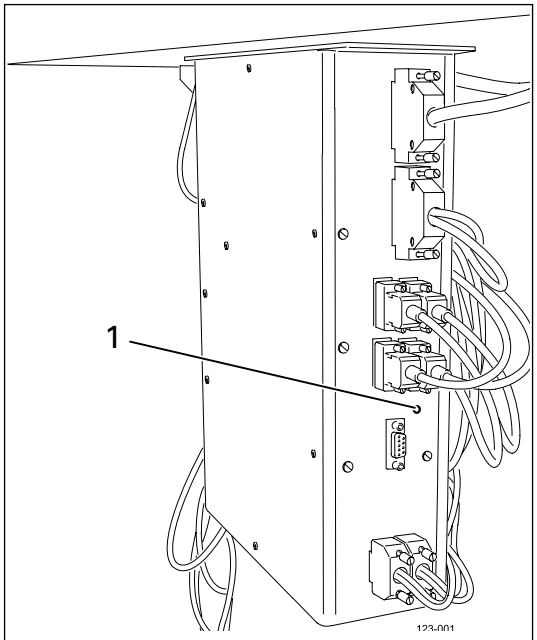
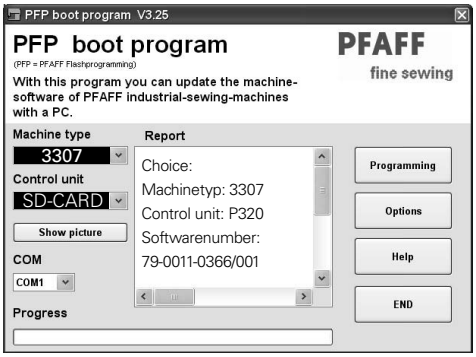


Fig. 13 - 46

More information and assistance is at your disposal in the file "PFPHILFE.TXT", which can be called up from the PFP boot program by pressing the "help" button.

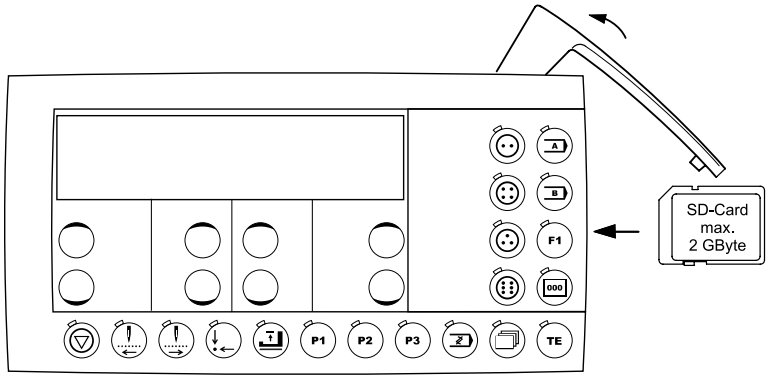
13.44.02 Update with SD-card

- After downloading the PFP tool and the control software, open the PFP program.
- Select the machine type and under control unit SD-CARD.
- The software version is displayed under report.



- Under **programming** copy the software to the drive with the SD-card.

- With the machine switched off insert the SD-card into the control panel.



To update the machine software carry out the following steps:

While the machine software is being updated, no setting up, maintenance or adjustment work may be carried out on the machine!

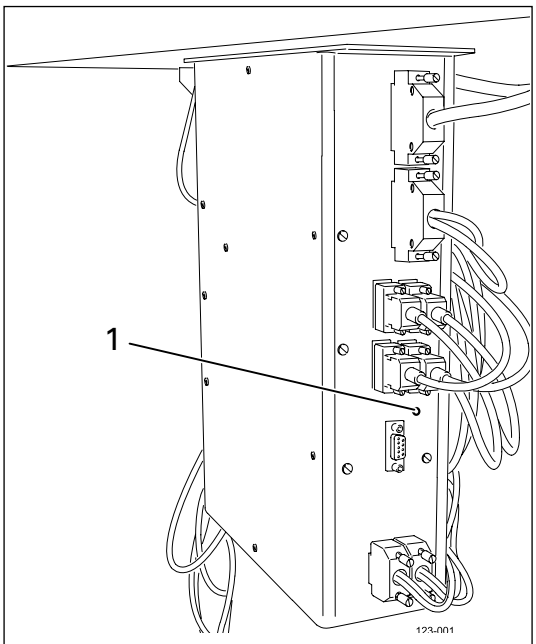


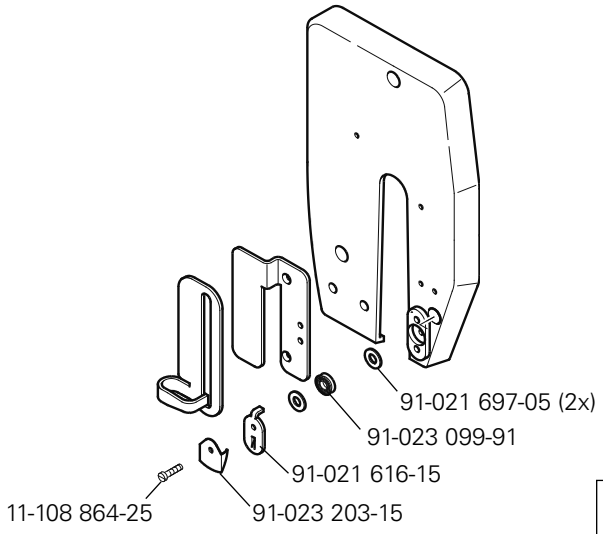
Fig. 13 - 46

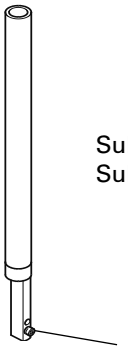
- Switch on the machine, keeping the boot key **1** pressed.
- Press the "TE" key.
  The software update is carried out. During the updating process the diode in the memory card slot flashes.
- During the updating process the machine must not be switched off.
- When the update has been completed, switch off the machine and remove the SD-card.
- Switch on the machine
- A plausibility control is carried out and, if necessary, a cold start.

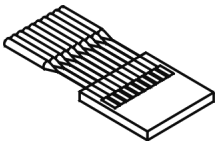
More information and assistance is at your disposal in the file "PFPHILFE.TXT", which can be called up from the PFP boot program by pressing the "help" button.

14 Wearing parts

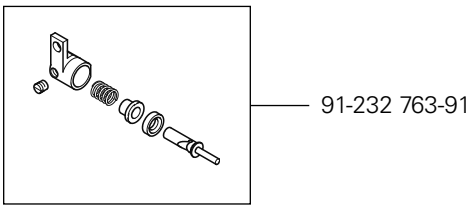
This is a list of the most important wearing parts.
A detailed parts list for the complete machine is included with the accessories. In case of loss, the parts list can be downloaded from the internet address www.pfaff-industrial.com/pfaff/de/service/downloads As an alternative to the internet download the parts lists can also be ordered in book form under part no. **296-12-19 032.**

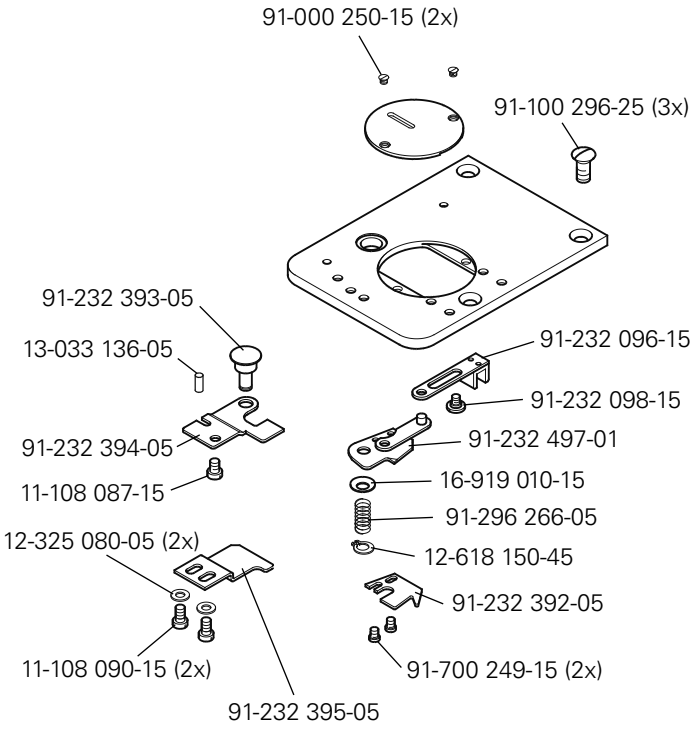


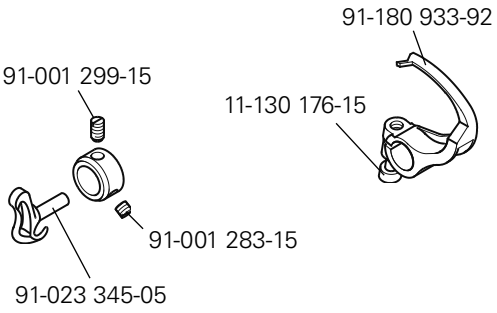


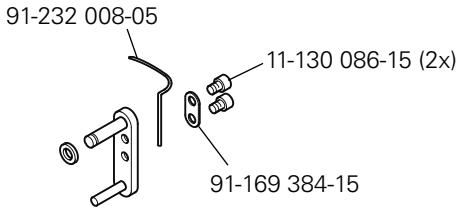


Sub-class -1/01, System 134-35
Sub-class -1/02, -1/03, -4/.., -5/.. System 190



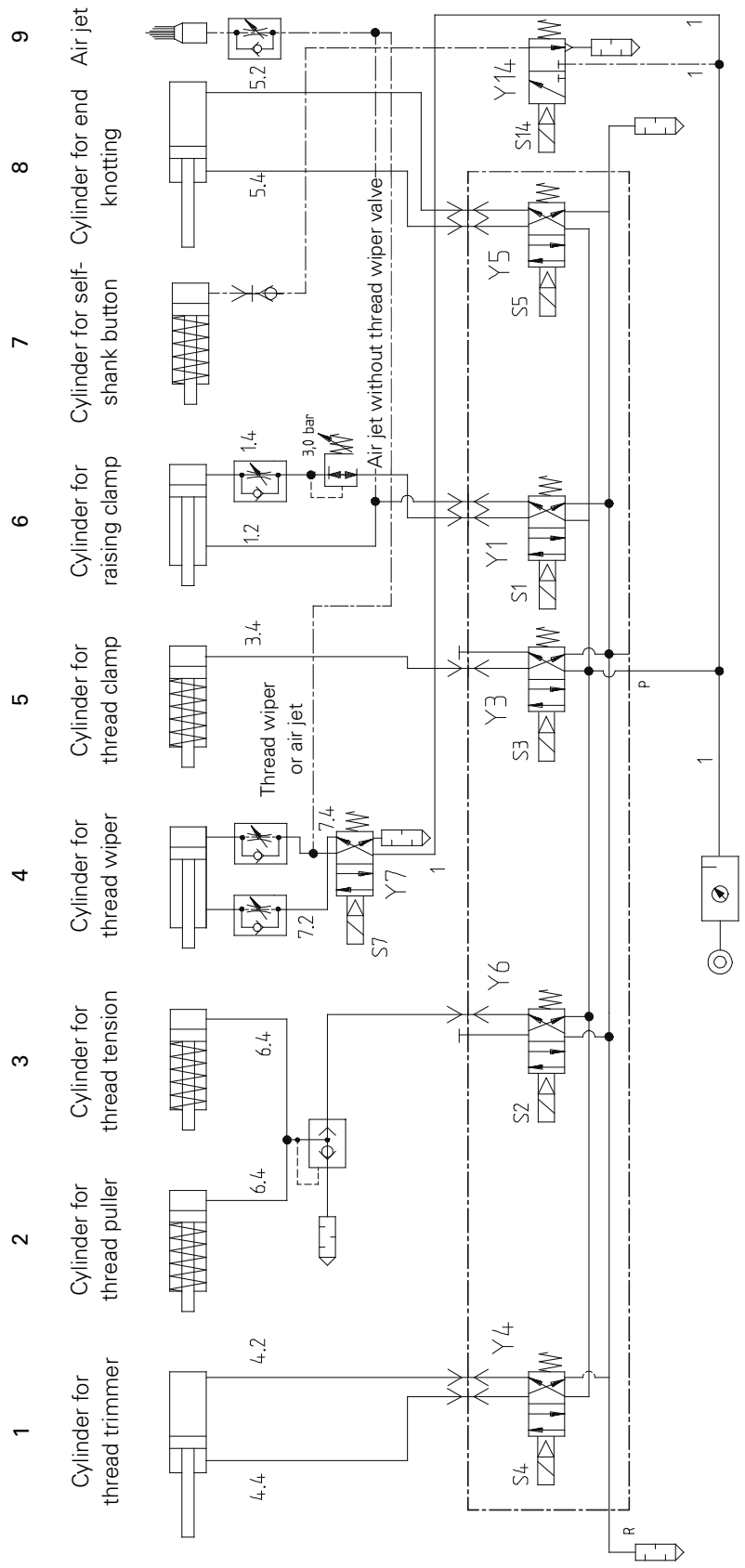






15 Pneumatics-switch diagram

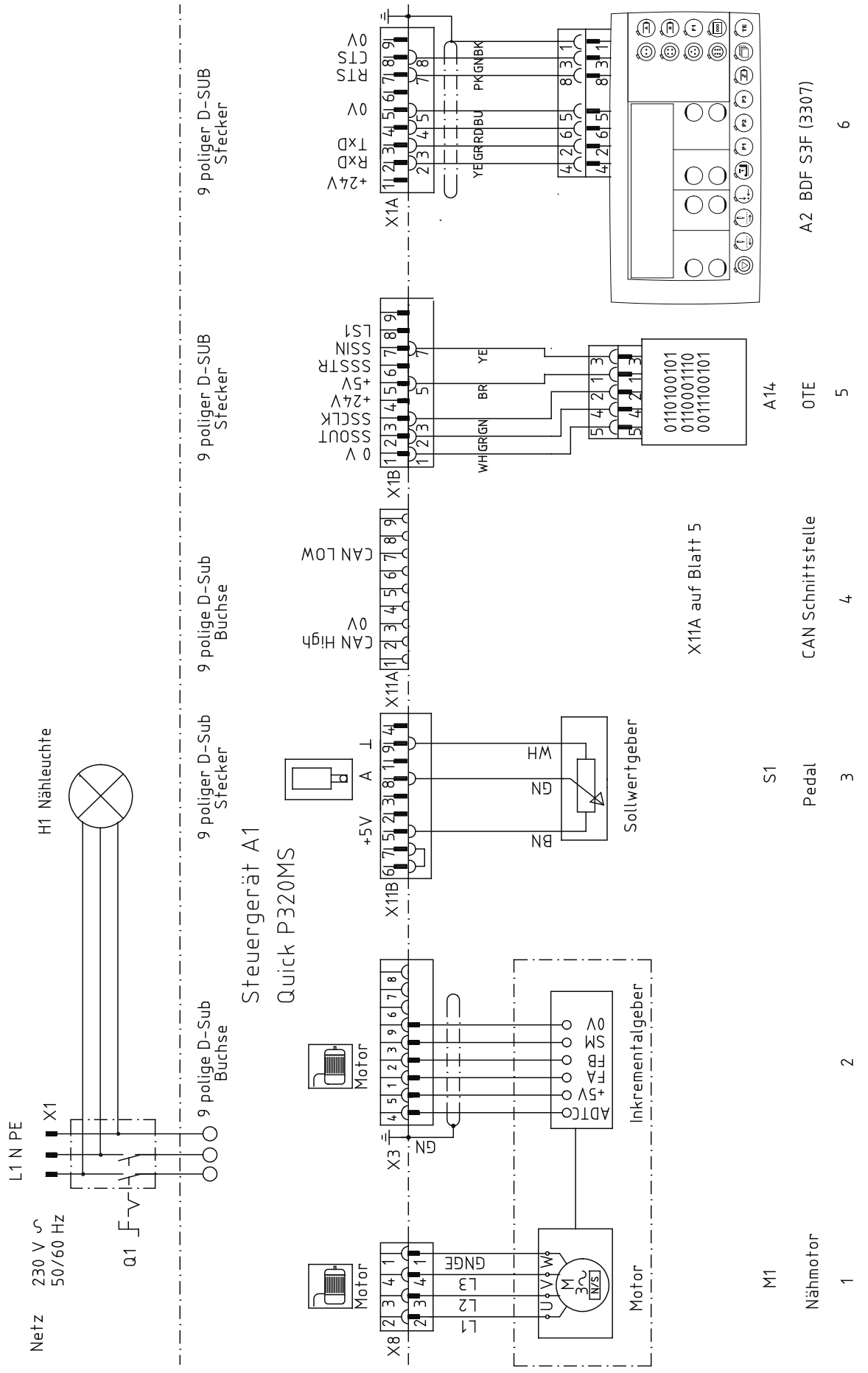
The control elements and valves are in the machine's basic position.Main switch -ON, compressed air -ON

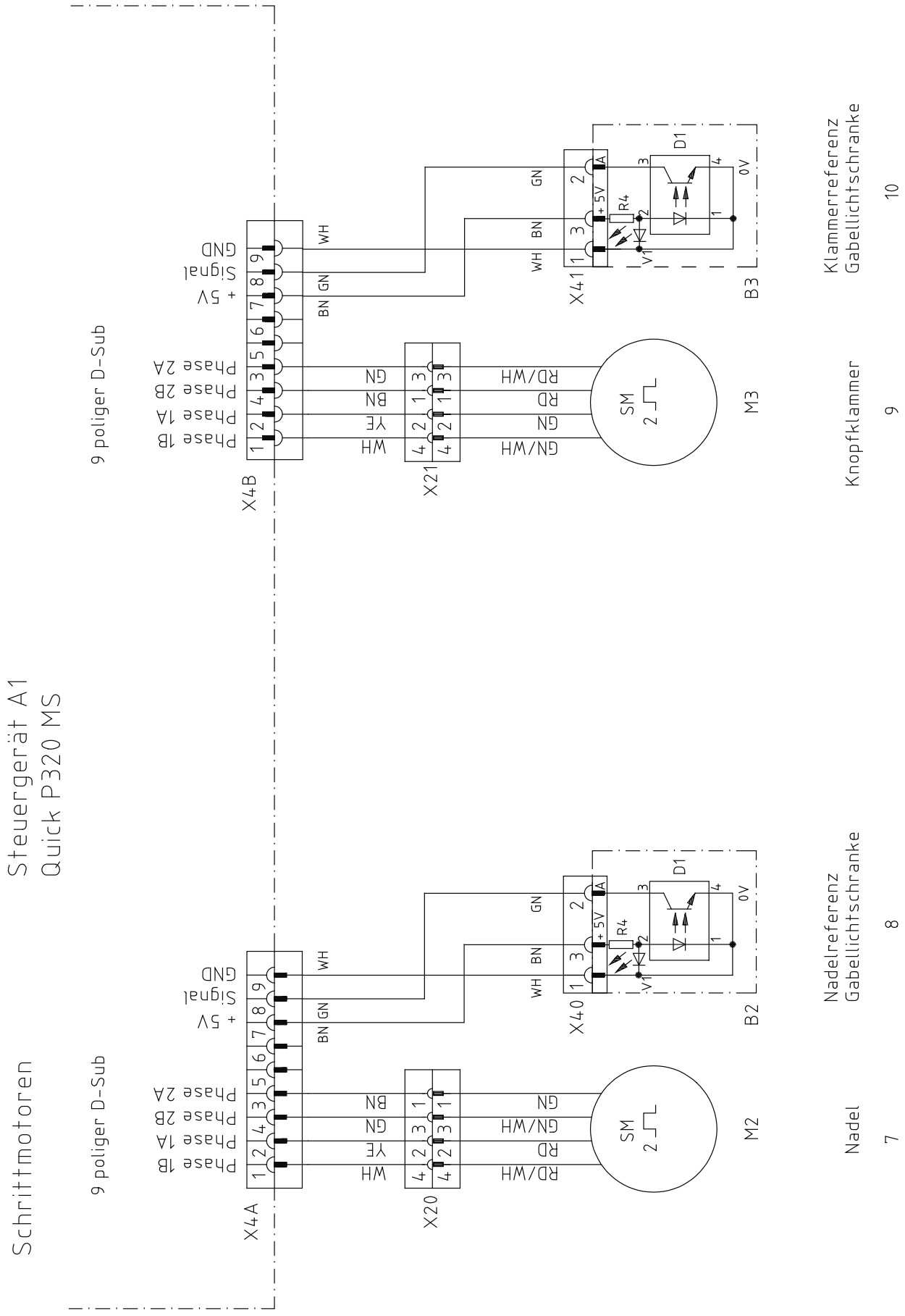


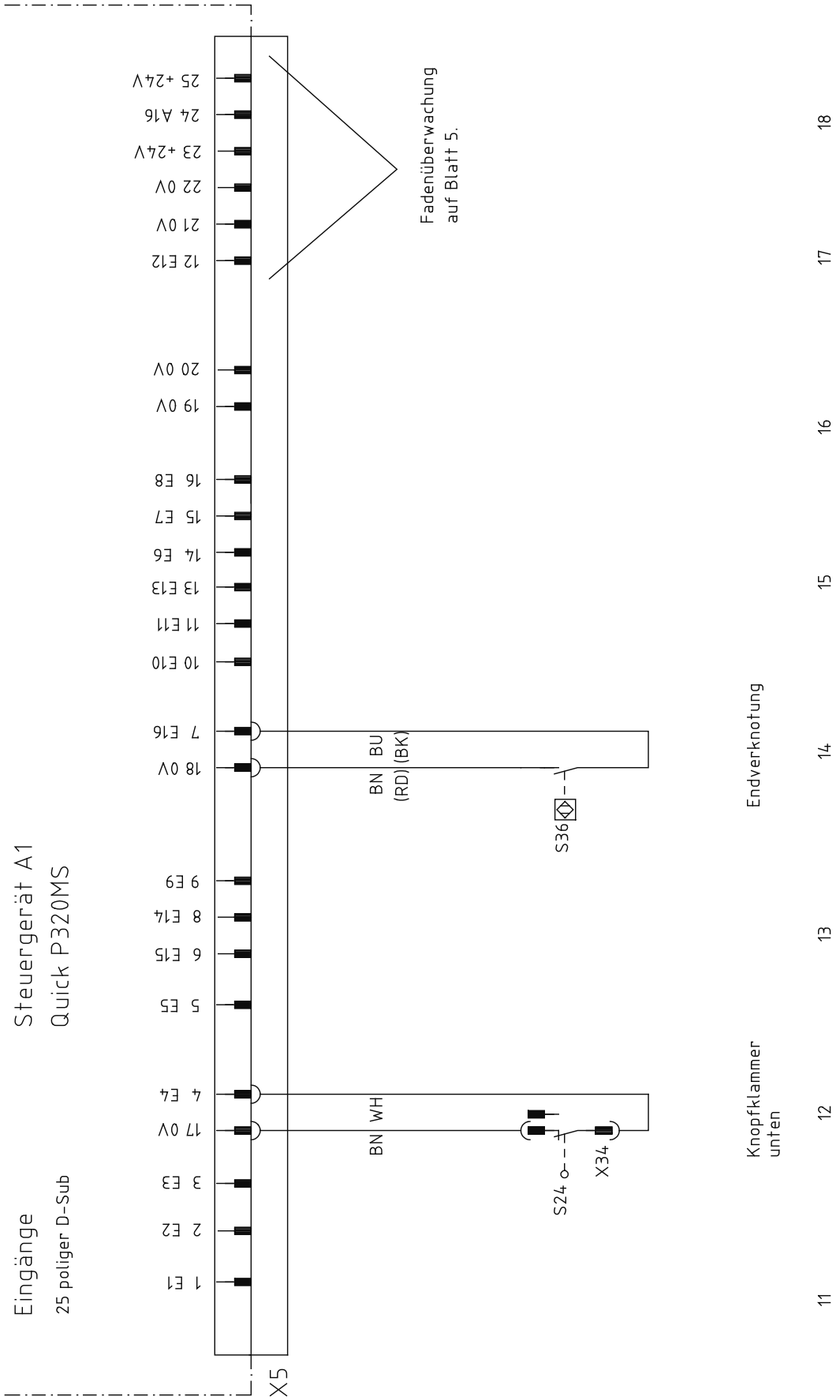
16 Circuit diagrams

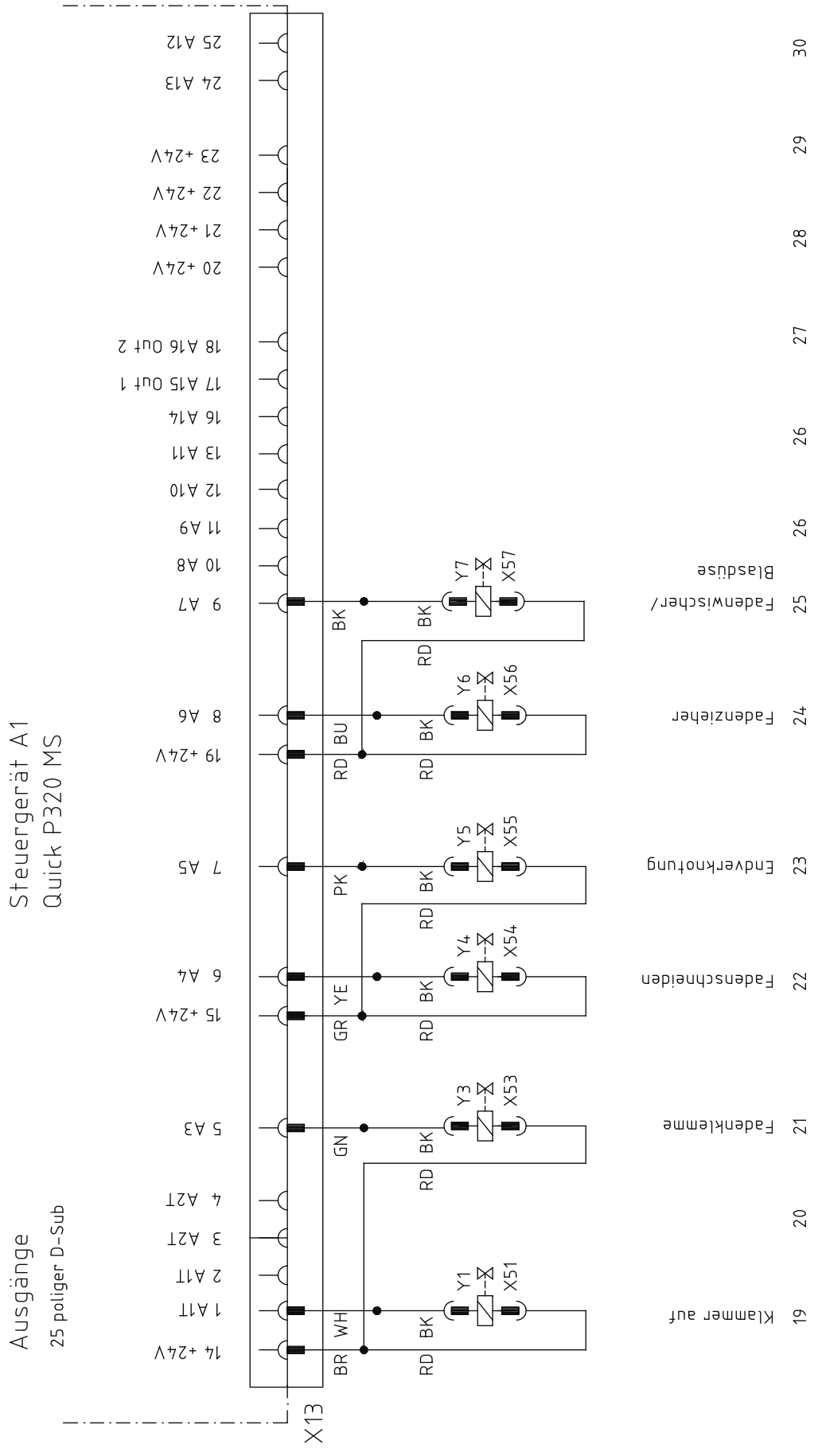
Reference list for circuit diagrams

A1	Controller Quick P320MS
A2	Control panel BDF S3 F
A14	Sewing head recognition system (OTE)
A100	Thread strength- module
A110	Thread strength – alarm + reset
B2	Hybrid light barrier needle reference
B3	Hybrid light barrier clamp reference
B100	Thread strength sensor
H1	Sewing lamp
H101	Lamp – alarm
M1	Sewing motor
M2	Stepping motor needle
M3	Stepping motor button clamp
Q1	Main switch
S1	Pedal speed control unit
S24	Key button clamp lowered
S36	Solenoid switch end knotting
S101	Key – reset
X1	Mains plug
X1A	Control panel BDF S3 F
X1B	Sewing head recognition system (OTE)
X3	Incremental transmitter (sewing motor)
X4A	Stepping motor needle and hybrid light barrier
X4B	Stepping motor button clamp and hybrid light barrier
X5	Inputs
X8	Sewing motor
X11A	CAN interface
X11B	Pedal speed control unit
X13	Outputs
X20	Stepping motor needle
X21	Stepping motor button clamp
X34	Key button clamp lowered
X47	Hybrid light barrier needle reference
X48	Hybrid light barrier button clamp reference
X51	Clamp open
X53	Thread clamp
X54	Thread trimming
X55	End knotting
X56	Thread puller / air jet
X57	Thread wiper
X101	Thread strength – module sensor + supply
X102	Thread strength – module CAN interface
X103	Thread strength – module RS232
X110	Thread strength – alarm + reset
X111	Thread strength – sensor
Y1	Clamp open
Y3	Thread clamp
Y4	Thread trimming
Y5	End knotting
Y6	Thread puller
Y7	Thread wiper


Netz 230 V ~ 50/60 Hz
L1 N PE
X1
Q1
H1 Nähleuchte
9 polige D-Sub Buchse
9 poliger D-Sub Stecker
Steuergerät A1
Quick P320MS
X8
X3
X11B
X11A
X1B
X1A
Motor
Inkrementalgeber
Sollwertgeber
CAN High
CAN LOW
X11A auf Blatt 5
A14
OTE
CAN Schnittstelle
S1
Pedal
M1
Nähmotor
A2 BDF S3F (3307)
1
2
3
4
5
6


Steuergerät A1
Quick P320 MS
Schrittmotoren
9 poliger D-Sub
X4A
X4B
X20
X21
X40
X41
B2
B3
M2
M3
SM
D1
R4
V1
+ 5V
0V
GND
Signal
Phase 1B
Phase 1A
Phase 2B
Phase 2A
Nadel
Nadelreferenz
Gabellichtschranke
Knopfklammer
Klammerreferenz
7
8
9
10


Steuergerät A1
Quick P320MS
Eingänge
25 poliger D-Sub
X5
25 +24V
24 A16
23 +24V
22 0V
21 0V
12 E12
20 0V
19 0V
16 E8
15 E7
14 E6
13 E13
11 E11
10 E10
7 E16
18 0V
9 E9
8 E14
6 E15
5 E5
4 E4
17 0V
3 E3
2 E2
1 E1
Fadenüberwachung
auf Blatt 5.
BN BU
(RD) (BK)
S36
BN WH
S24
X34
Endverknotung
Knopfklammer
unten
11
12
13
14
15
16
17
18


Steuergerät A1
Quick P320 MS
Ausgänge
25 poliger D-Sub
X13
14 +24V
1 A1T
2 A1T
3 A2T
4 A2T
5 A3
15 +24V
6 A4
7 A5
19 +24V
8 A6
9 A7
10 A8
11 A9
12 A10
13 A11
16 A14
17 A15 Out 1
18 A16 Out 2
20 +24V
21 +24V
22 +24V
23 +24V
24 A13
25 A12
BR
WH
GN
GR
YE
PK
BU
RD
BK
Y1
X51
Y3
X53
Y4
X54
Y5
X55
Y6
X56
Y7
X57
Klammer auf
Fadenklemme
Fadenschneiden
Endverknotung
Fadenzieher
Fadenwischer/
Blasdüse
19
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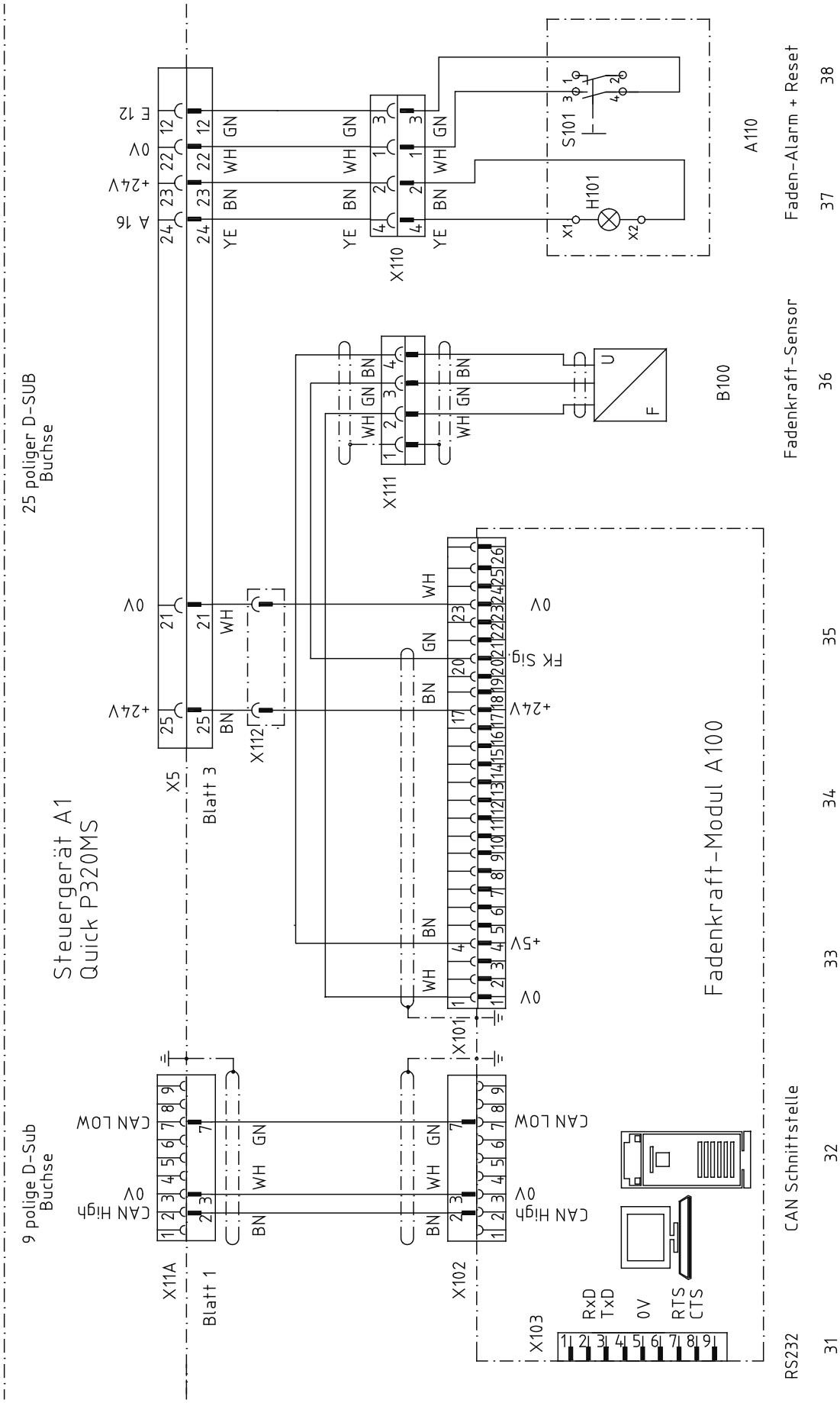
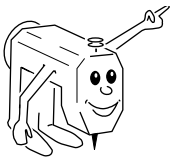

Steuergerät A1
Quick P320MS
25 poliger D-SUB Buchse
9 polige D-Sub Buchse
Blatt 1
Blatt 3
X11A
X5
X112
X101
X102
X103
X110
X111
A110
B100
S101
H101
Fadenkraft-Modul A100
Fadenkraft-Sensor
Faden-Alarm + Reset
CAN Schnittstelle
RS232
CAN LOW
CAN High
0V
+24V
+5V
FK Sig.
RxD
TxD
RTS
CTS
WH
BN
GN
YE
31
32
33
34
35
36
37
38



Notes

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