PFAFF® Industrial

2438 plusline

INSTRUCTION MANUAL

This instruction manual applies to machines from the following serial numbers **2 657 257** and software version **0307/001** onwards:

296-12-18 708/002
Betriebsanleitung engl. 06.09



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

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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 pollution 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

- The machine must only be operated by adequately trained operators and only when the instruction manual has been fully read and understood!
- All notices on safety and the instruction manual of the motor manufacturer are to be read before the machine is put into operation!
- All notes on the machine concerning danger and safety must be observed!
- The machine must be used for the purpose for which it is intended and must not be operated without its safety devices; all regulations relevant to safety must be adhered to.
- When part sets are changed (e.g. needle, presser foot, needle plate, feed dog or bob-bin), during threading, when the workplace is left unattended and during maintenance work, the machine must be isolated from the power supply by turning off the on/off switch or removing the plug from the mains!
- Daily maintenance work must only be carried out by appropriately trained persons!
- Repairs and special maintenance work must only be carried out by qualified technical staff or persons with appropriate training!
- During maintenance or repairs on the pneumatic system the machine must be isolated from the compressed air supply! The only exception to this is when adjustments or function checks are carried out by appropriately trained technical staff!
- Work on the electrical equipment must only be carried out by technical staff who are qualified to do so!
- Work on parts or equipment connected to the power supply is not permitted! The only exceptions to this are specified in regulations EN 50110.
- Conversion or modification of the machine must only be carried out under observation of all relevant safety regulations!

- Only spare parts which have been approved by us are to be used for repairs! We draw special attention to the fact that spare parts and accessories not supplied by us have not been subjected to testing nor approval by us. Fitting and/or use of any such parts may cause negative changes to the design characteristics of the machine. We shall not accept any liability for damage caused by the use of non-original parts.

1.03 Safety symbols



Danger!
Special points to observe.



Danger of injury to operating or technical staff!



Electric voltage!
Danger 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 work-ing 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 machine, so that easy access is possible at all times.

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

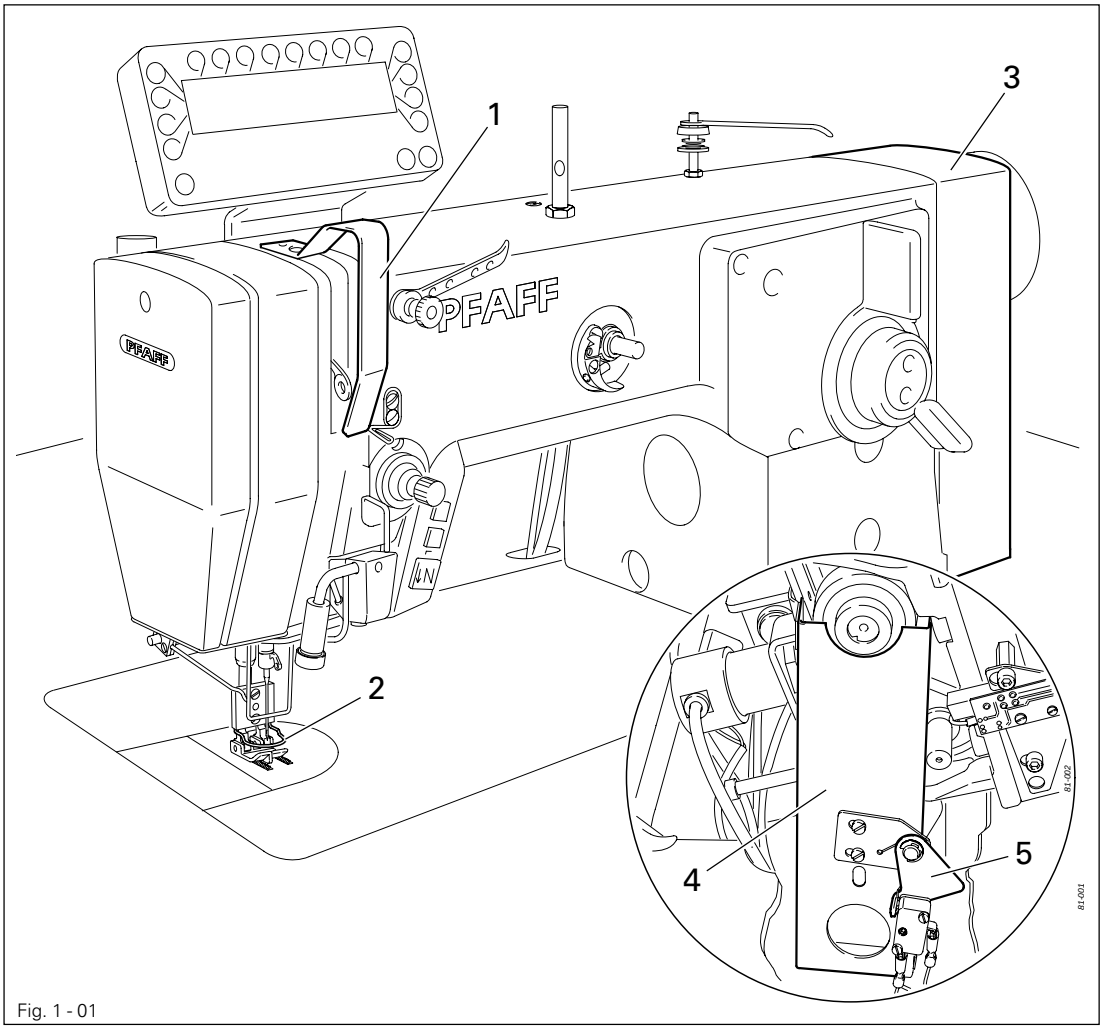


Fig. 1 - 01

Do not operate the machine without the take-up lever guard **1**!
Danger of injury through the movement of the take-up lever.

Do not operate the machine without finger guard **2**!
Danger of injury from the movement of the needle!

Do not operate the machine without machine covers **3** and **4**!
Danger of injury from moving belts!

Do not operate the machine without start inhibitor **5**!
Danger of injury if the machine is started accidentally!

2 Proper use

The **PFAFF 2438** is a high-speed zigzag machine with bottom feed and automatic material edge detector.
The machine is used for sewing labels on linings in industry.



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▲

Stitch type: ..... 301 (lockstitch)
Max. sewing speed: ..... 4500 spm ◆
Max. stitch length ..... 2.5 mm

Needle system: ..... 438 KK
Needle size in 1/100 mm: 80

Effective balance wheel diameter: ..... 65 mm
Presser foot clearance: ..... 7 - 9 mm
Clearance width: ..... 260 mm
Clearance height: ..... 130 mm

Sewing head dimensions:
Length: ..... ca. 535 mm
Width: ..... ca. 265 mm
Height (above table): ..... ca. 330 mm
Bed plate dimensions: ..... 476 x 177 mm

Connection data:
Operating voltage: ..... 230 V ± 10%, 50/60 Hz
Max. power consumption: ..... 1.2 kVA
Fuse protection: ..... 1 x 16 A, inert

Noise data:
Noise emission level at workplace with a sewing speed of 2800 spm: ..... L_{pA} < 80 dB(A) ■
(Noise measurement in accordance with DIN 45 635-48-A-1, ISO 11204, ISO 3744, ISO 4871)

Net weight of sewing head: ..... ca. 48 kg
Gross weight of sewing head: ..... ca. 56 kg

▲ Subject to alterations

◆ Depending on the material, operation and stitch length

■ K_{pA} = 2.5 dB

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 regulations; 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

All 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 these machines consist of 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:



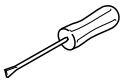
Note, information



Cleaning, care



Lubrication



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

7 Controls

7.01 Main switch

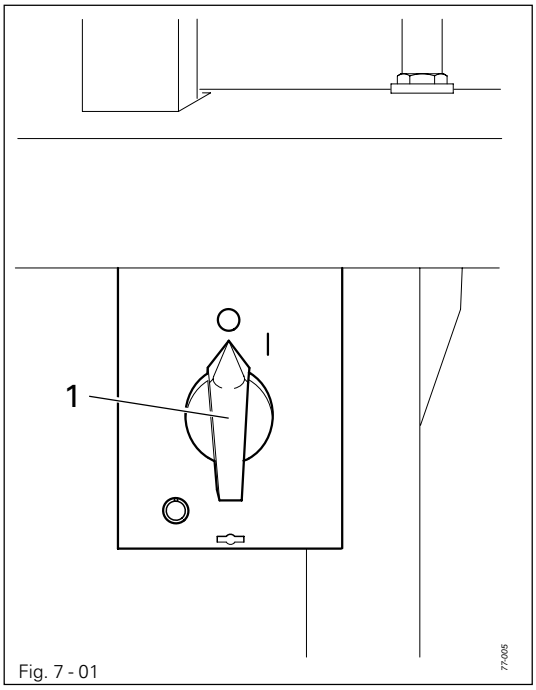


Fig. 7 - 01

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

7.02 Keys on the machine head

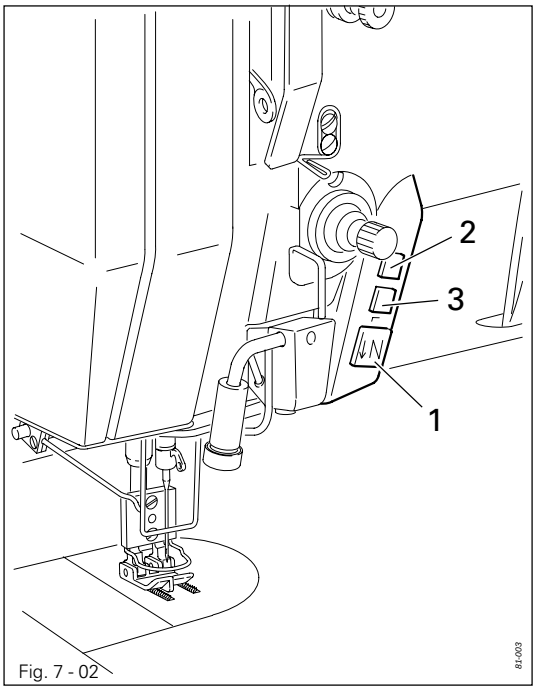


Fig. 7 - 02

- By operating the respective key, the following functions are carried out:

  Key **1**: Reverse sewing

  Key **2**: Raise needle, without thread trimming

  Key **3**: Sew single stitch

7.03 Pedal

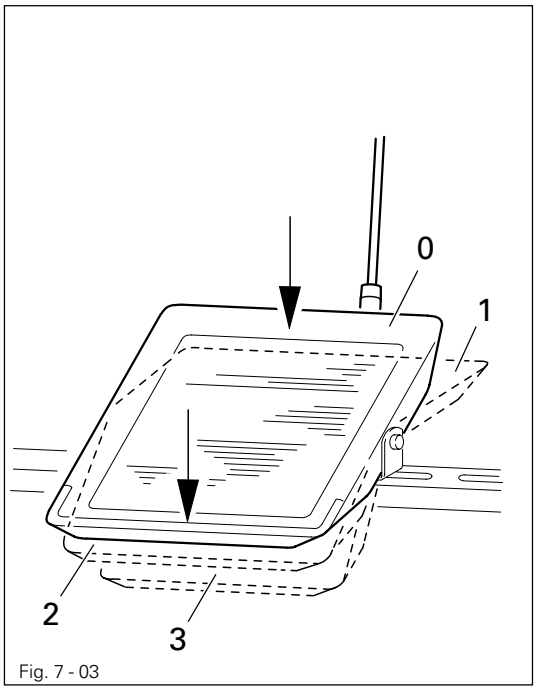


Fig. 7 - 03

0 = Neutral position

1 = Sewing

2 = Raise presser foot

3 = Trim thread/reset bobbin thread control or remaining bobbin thread count function

7.04 Lever for raising presser foot

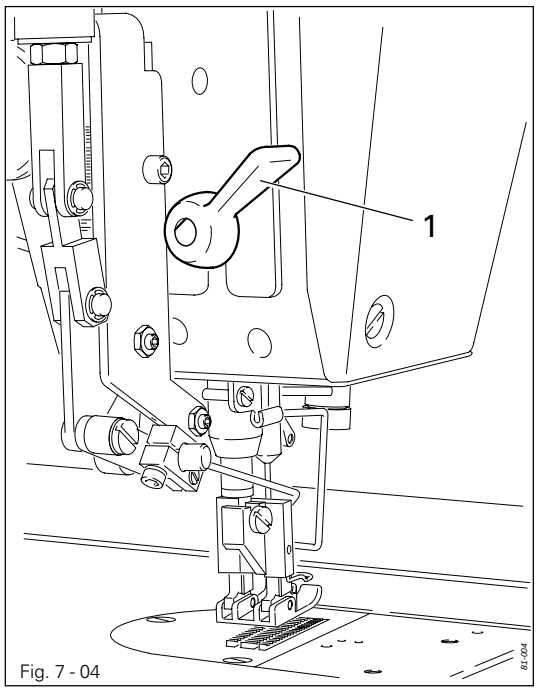


Fig. 7 - 04

- The presser foot is raised by turning lever **1.**

7.05 Adjustment lever for zigzag stitch and needle position

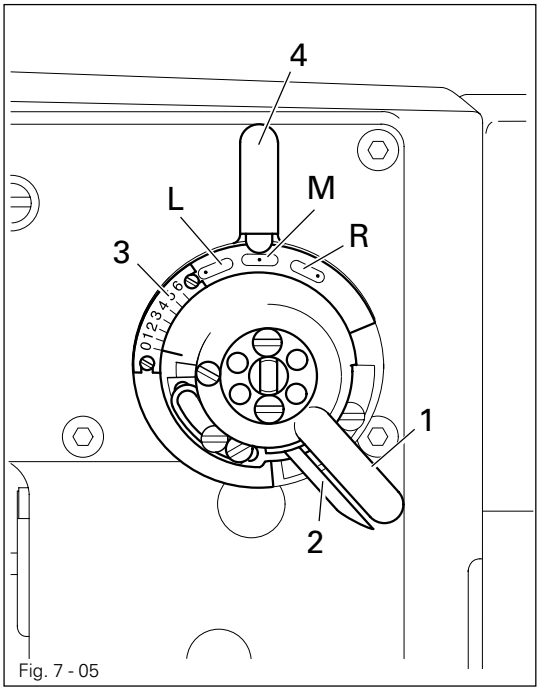


Fig. 7 - 05

- The zigzag stitch adjustment lever **1** is used for adjusting the width of the zigzag stitch.
- To change the position of the adjustment lever, the locking lever **2** must be pressed against the adjustment lever **1**.

The current zigzag-stitch width can be seen on scale **3**.

- By turning the needle-position adjustment lever **4** the required needle position can be set.

L = needle-position left
M = needle-position center
R = needle-position right

7.06 Bobbin thread control

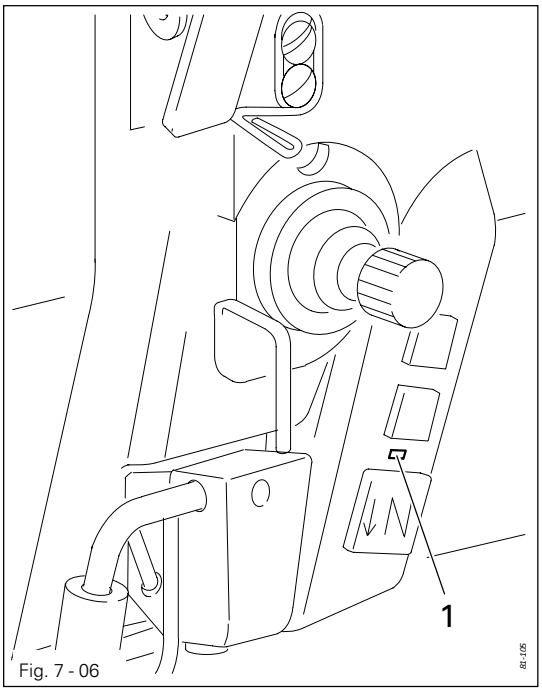


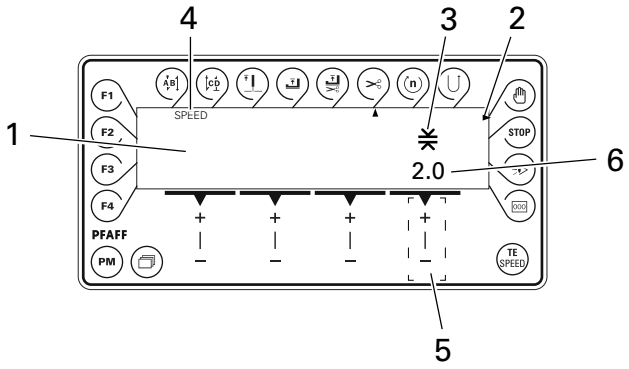
Fig. 7 - 06

- When the remaining thread quantity is reached LED **1** flashes.

After thread trimming a bobbin symbol appears on the display with the number of remaining stitches. To enter the number of remaining stitches, see **Chapter 9.10 Setting the remaining stitches for the bobbin thread control.**

7.07 Control panel

The control panel is used to create and alter seam programs, enter parameter values and read error messages and service settings.

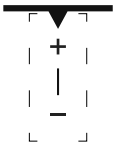


The control panel consists of display **1** and the function keys described below. The display **1** consists of a two-line alpha-numerical LCD display with 16 symbols per line. The special symbols **2, 3,** and texts **4** show the respective status of the function keys and the operating status of the machine.
The control panels switches on all LCD-segments and the horn automatically for a short time during the power-on phase, after which the lettering PFAFF appears on the display, until the higher ranking control unit sends commands to the control panel.

7.07.01 Screen displays

- Activated functions are displayed with a triangular marking **2** below or next to the respective function key.
- In the sewing mode all relevant sewing data is displayed and these 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 13.12 Parameter settings.**
- During the seam program input the inputs are carried out in relevant input menus, see **Chapter 11.01 Seam program input.**

7.07.02 Function keys



The function keys described below are used basically to switch machine functions on and off. If a corresponding value has to be set for the activated function, this is carried out with the corresponding **+/- key.** For example, by pressing and holding the **+/- key 5**, the numerical value **6** shown above the key is changed slowly to begin with. If the **+/- key 5** is held down longer, the numerical value **6** is changed more quickly.



Start backtacks

- If this key is pressed, the backtacks at the beginning of the seam (start backtacks) are switched on or off. The number of forward stitches (A) or reverse stitches (B) for the start backtacks can be changed by pressing the +/- key underneath. To convert from double backtack to single backtack set the number of stitches for the corresponding seam section at zero.



End backtacks

- If this key is pressed, the backtacks at the end of the seam (end backtacks) are switched on or off. The number of reverse stitches (C) or forward stitches (D) can be changed by pressing the +/- key underneath. To convert from double backtack to single backtack set the number of stitches for the corresponding seam section at zero.



Needle position

- If this key is pressed the "needle raised after sewing stop" function is switched on or off. When the function is switched on, the needle positions at t.d.c. after sewing stops.



Foot position after stop

- If this key is pressed the "foot raised after sewing stop" function is switched on or off. When the function is switched on, the presser foot is raised after sewing stops.



Foot position after trimming

- If this key is pressed the "foot raised after thread trimming" function is switched on or off. When the function is switched on, the presser foot is raised after thread trimming.



Thread trimmer

- If this key is pressed the thread trimming function is switched on or off.



Speed

- If this key is pressed the corresponding function is switched on or off. When the function is switched on, the current seam section is sewn at the speed entered irrespective of the pedal position.



Reverse sewing

- If this key is pressed the corresponding function is switched on or off. When the function is switched during programmed sewing, the corresponding seam section is sewn in reverse.



Manual seam end

- If this key is pressed the corresponding function is switched on or off. When the function is switched on, the move to the next seam section is not carried out by stitch counting or sensor, but manually with the use of the pedal (position "-2").



Programmed stop

- If this key is pressed the corresponding function is switched on or off. When the function is switched on, the machine stops automatically at the end of a seam section.



Sensor

- If this key is pressed the corresponding function is switched on or off. When the function is switched on, the move to the next seam section is carried out by sensor.



Stitch counting

- If this key is pressed the corresponding function is switched on or off. When the function is switched on, the machine moves to the next seam section after sewing the number of stitches entered.



TE/Speed

- If this key is pressed once while the machine is in the sewing mode, the input menu for the maximum speed is selected. If no input is made within 5 seconds, the sewing mode is selected again.
- If this key is pressed twice (within 5 seconds) while the machine is in the sewing mode, the machine switches to parameter input.
- If this key is pressed once while the machine is in the parameter input mode, the altered values are stored and the sewing mode is selected.



Scrolling

- If this key is pressed the machine scrolls among the displays (parameters), if more than 4 parameters are directly accessible in the sewing mode.



PM

- If this key is pressed the programmed sewing function is switched on or off. When the function is switched on, the letters "PM" appear on the display of the control panel. The parameters related to the program are shown in the alpha-numerical part of the display.



F1

- If this key is pressed the service menu is selected, see **Chapter 13.14 Service functions.**



F2

No function



F3

- If this key is pressed the adjustment of the light barrier is started, see **Chapter 13.10 Adjustment of the transmitted light sensors.**



F4

- If this key is pressed, the next bartack is not sewn.

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, it must be ensured that the frame and the table top which you intend to use can hold the weight of the machine and the motor, even while sewing.

8.01 Mounting

The necessary electricity supply must be available at the machine's location.
There must be a stable and horizontal surface and adequate lighting at the machine's location.

Due to reasons of packaging, the table top is lowered for transport. The following is a description of how to adjust the height of the table top.

8.01.01 Adjusting the table-top height

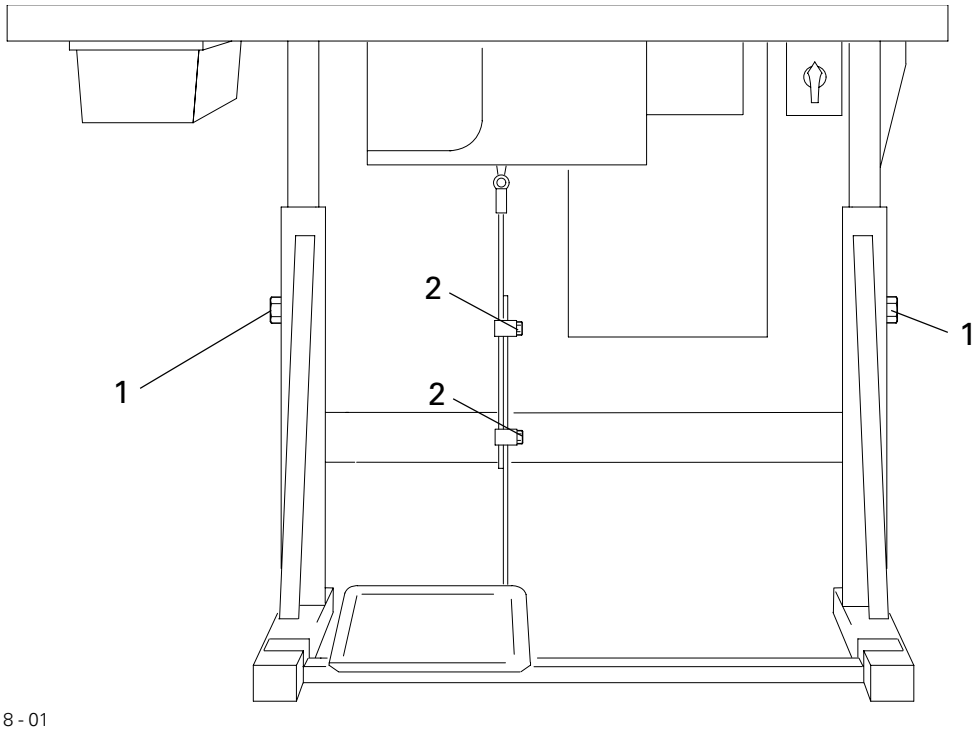


Fig. 8 - 01

- Loosen screws 1 and 2 and set the desired table-top height.
- Tighten screws 1 well.
- Adjust the position of the pedal so that you can operate it comfortably and tighten screw 2.

8.01.02 Fitting the machine cover

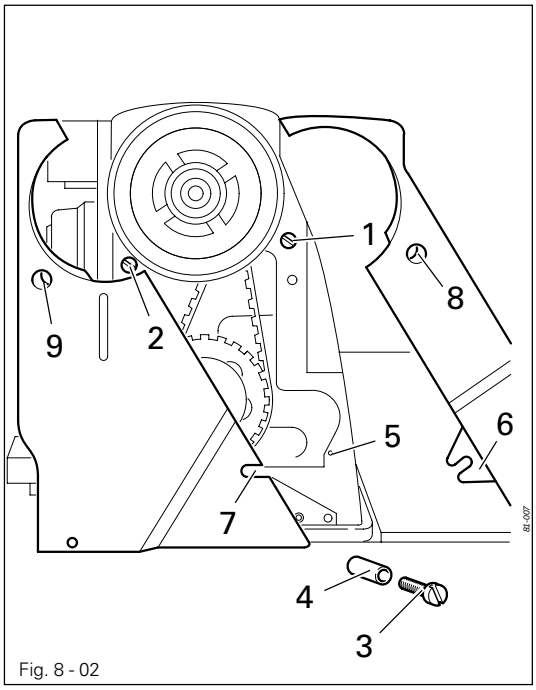
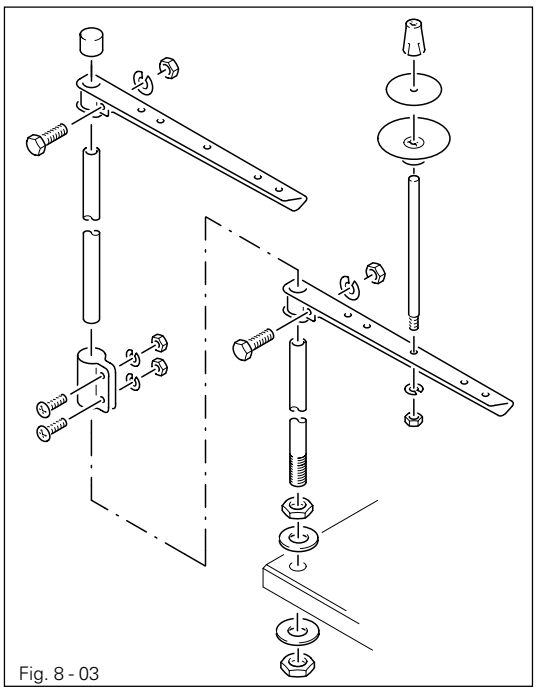


Fig. 8 - 02

- Slide the slots of the left and right belt guard sections behind the heads of screws **1** and **2**.
- Screw screw **3** with distance sleeve **4** into tapped hole **5**.
- Making sure that the bracket **6** is behind slot **7** and in front of distance sleeve **4**, adjust the belt guard.
- Tighten screws **1** and **2** (accessible through holes **8** and **9**) and screw **3**.

8.01.03 Fitting the reel stand


Fig. 8 - 03

- Fit the reel stand as shown in **Fig. 8 - 03**.
- Afterwards insert the stand in the hole in the table top and secure it with nuts provided.

8.01.04 Connecting the plug-in connections and earth cables

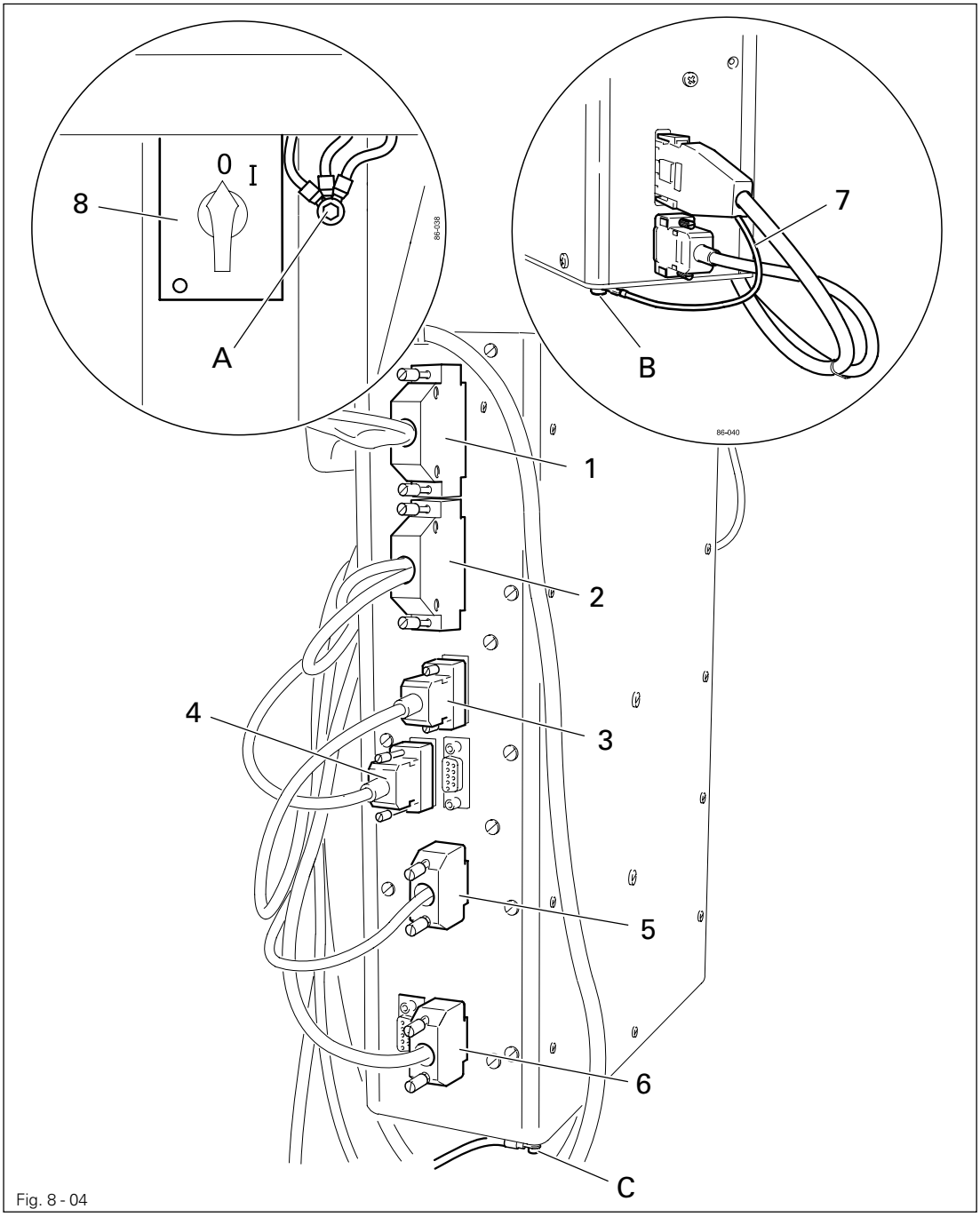


Fig. 8 - 04

- Connect plugs 1-6 as labelled in the control box.
- Screw the earth cable from the sewing head to earth point A.
- Screw the earth cable 7 from the motor to earth point B.
- Connect earth point C and earth point A with an earth cable.
- Fasten the earth cable of the main switch 8 to earth point A.

8.02 Commissioning

- Examine the machine, in particular the electric cables and pneumatic connection tubes for any damage.
- Clean the machine thoroughly and then oil it.
- Have qualified personnel check whether the machine can be operated with the available voltage and whether it is connected properly in the terminal box. If there are any irregularities do **not** operate the machine under any circumstances.
- When the machine is running, the balance wheel must turn towards the operator. If this is not the case, have the motor adjusted by qualified personnel (Parameter "800").
- Connect the machine to the compressed air system. The pressure gauge should show a pressure of 6 bar. If necessary, adjust the value, see **Chapter 12.05 Checking/adjusting the air pressure.**

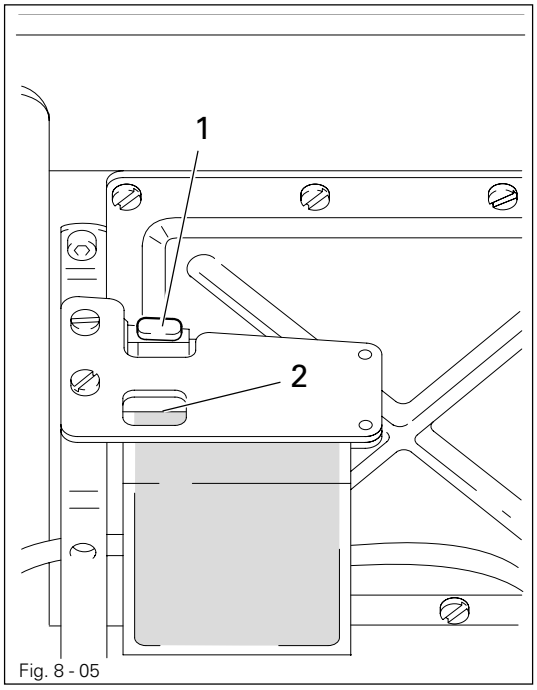


Fig. 8 - 05

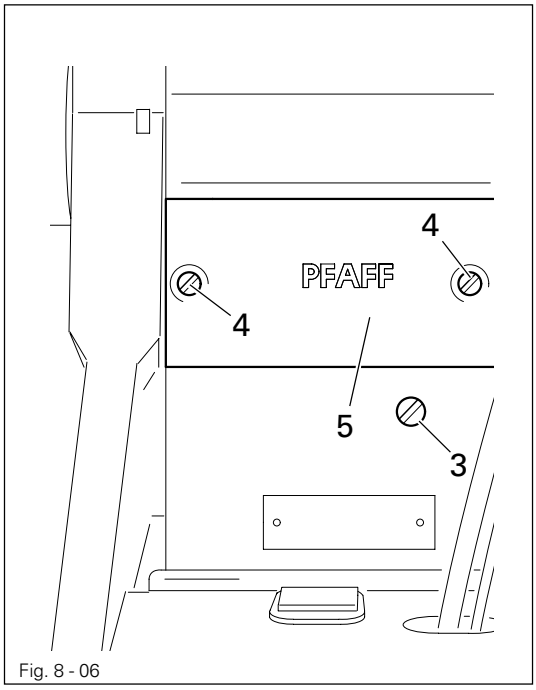


Fig. 8 - 06

- Before commissioning the machine remove plug **1** from its hole and fill in oil up to marking **2**, see **Chapter 12.02 Oiling the hook.**



Plug **1** serves as a safety device for transportation and should not be used during sewing operations.

- Before commissioning the machine remove screw **3** and fill in oil up to the marking (inspection glass on the front side of the machine), see **Chapter 12.03 Oiling the zigzag drive.**

8.03 Switching the machine on/off

- Switch the machine on, see **Chapter 7.01 Main switch.**
- Carry out a test run.

8.04 Mounting/checking the start inhibitor

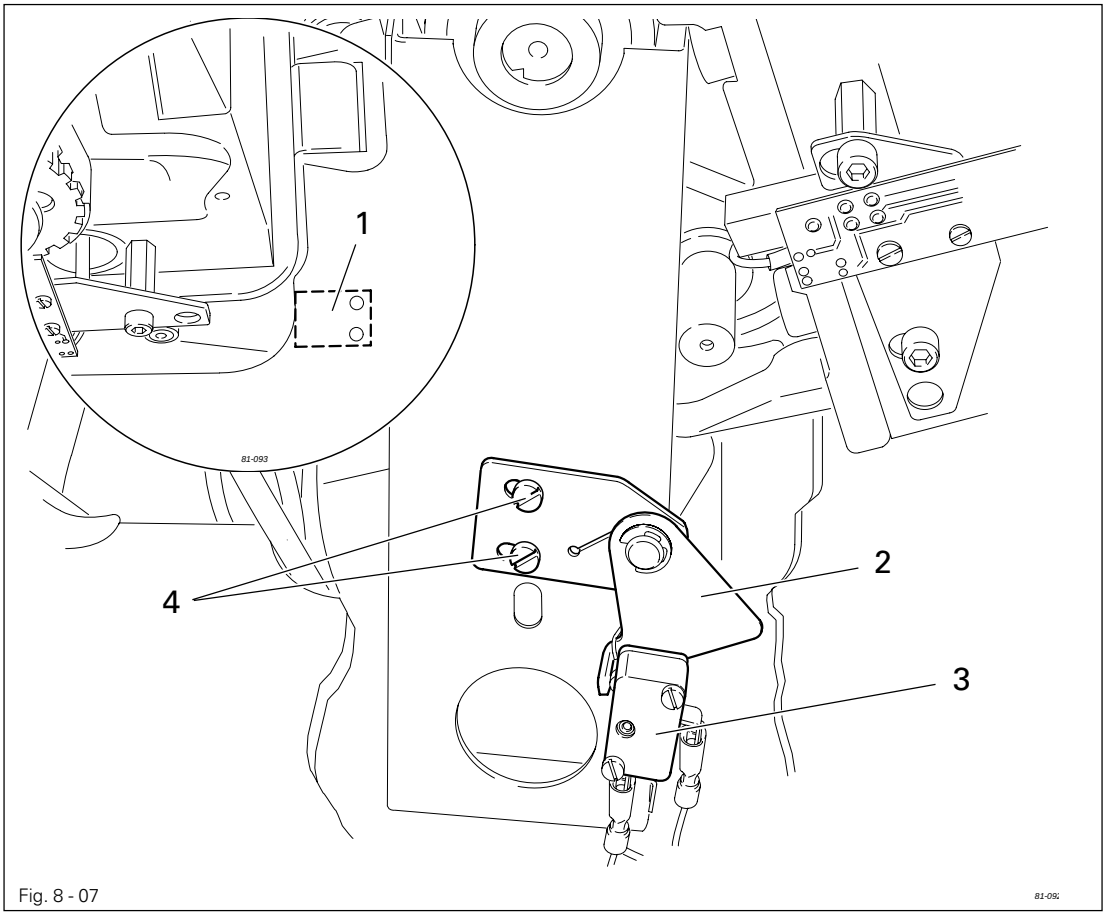


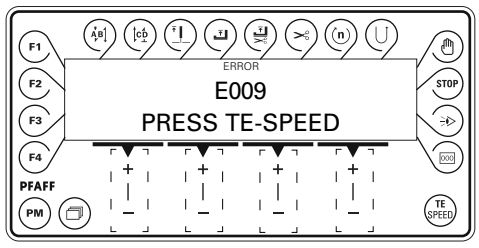
Fig. 8 - 07

81-09

Mounting the start inhibitor

- For machines delivered without a table, the plate **1** from the accessories should be mounted under the table top, so that the switch lug **2** is resting on plate **1** when the sewing head is in an upright position.
- After loosing the screws **4**, adjust switch **3** so that the switch is off when the sewing head is tilted over and activated by switch lug **2** when the sewing head is upright.

Checking the start inhibitor



- Switch the machine on at the main switch and tilt it over.
  The error message "E009" must appear on the control panel.
- If the message does not appear, check the setting of switch **3**.
- Set the sewing head upright and acknowledge the error message by pressing the **TE/ Speed** key. The machine is ready for operation again.

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

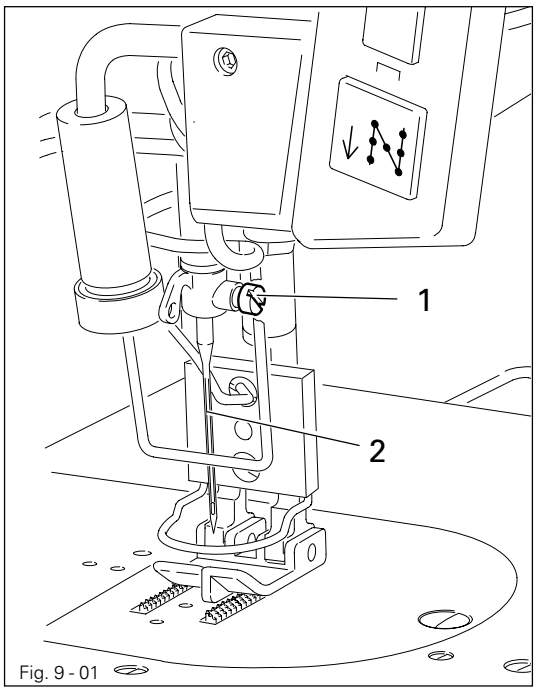


Fig. 9 - 01

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

Only use needles of system **438 KK.**

- Bring the needle bar into its highest position.
- Loosen screw **1**.
- Insert the needle **2** as far as possible.
- The long needle groove must be facing forwards.
- Tighten screw **1.**

9.02 Winding the bobbin thread / adjusting the primary thread tension

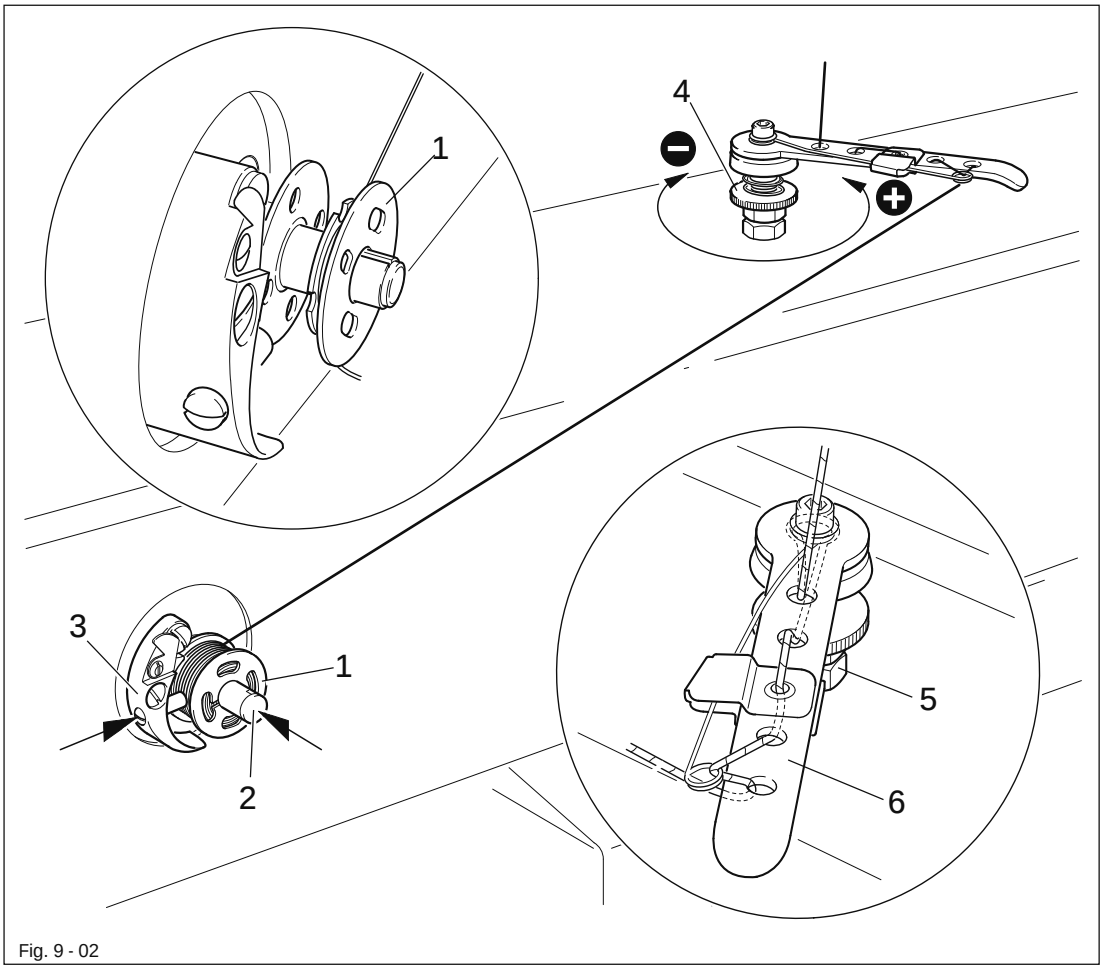


Fig. 9 - 02

- Place empty bobbin 1 onto bobbin winder spindle 2 with the remaining thread chamber towards the outside.
- Insert the thread as shown in the above illustration and wind it around the bobbin 1 a few times in a clockwise direction.
- Switch on the bobbin winder by pressing the bobbin winder spindle 2 and lever 3 at the same time.

The bobbin is filled during sewing.

If the machine is only operated for winding (without sewing), a bobbin case must be inserted in the hook!
Otherwise the hook can be damaged by the thread jamming!

- The thread tension on bobbin 1 can be set with milled screw 4.
- The bobbin winder stops automatically, when bobbin 1 has been filled sufficiently.

If the thread is wound unevenly:

- Loosen nut 5.
- Turn thread guide 6 accordingly.
- Tighten nut 5.

9.03 Removing/inserting the bobbin case

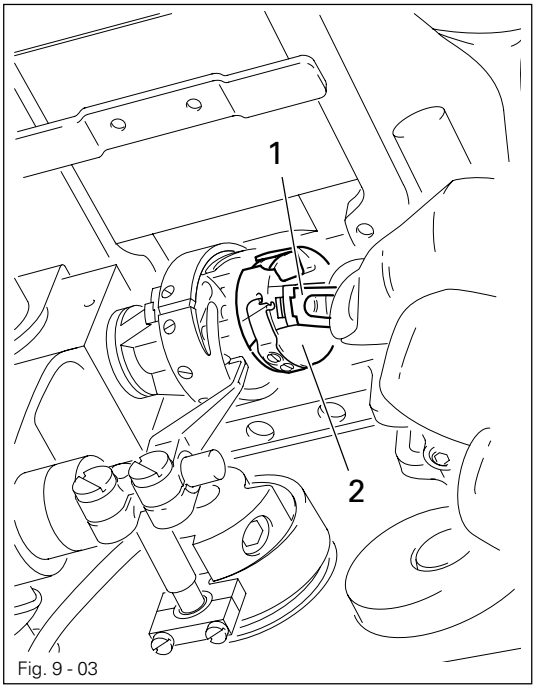


Fig. 9 - 03



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

Removing the bobbin case.

- Lift clip **1** and remove bobbin case **2**.

Inserting the bobbin case:

- Insert bobbin case **1** until you feel it click into place.

9.04 Threading the bobbin case / Adjusting the bobbin thread tension

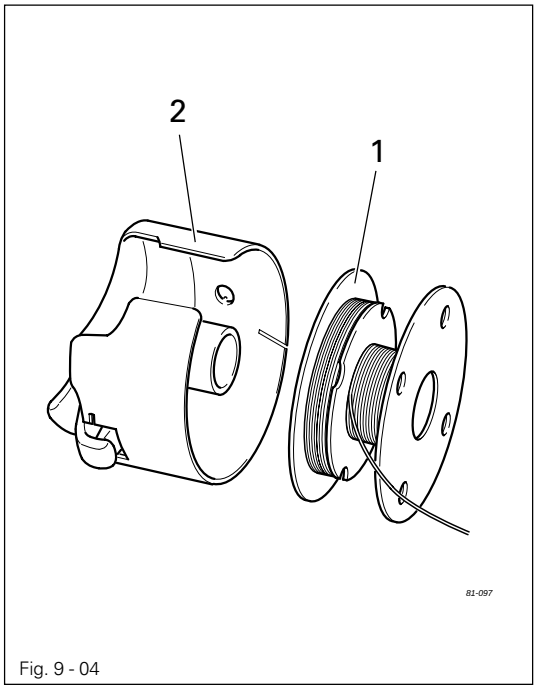


Fig. 9 - 04

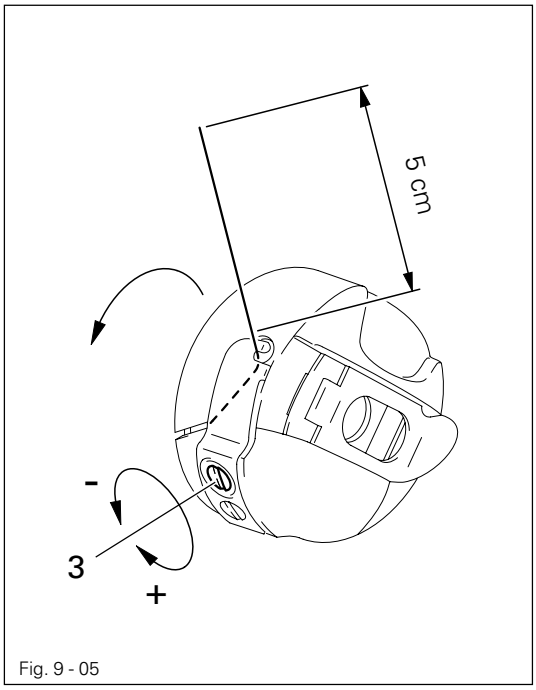
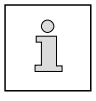


Fig. 9 - 05

- Insert bobbin **1** into bobbin case **2** as shown in the above illustration.
- Pass the thread through the slot under the spring as shown in the adjacent illustration.
- Adjust the thread tension by turning screw **3**.



When the thread is pulled, the bobbin must rotate in the direction of the arrow.

9.05 Threading the needle thread / Adjusting the needle thread tension

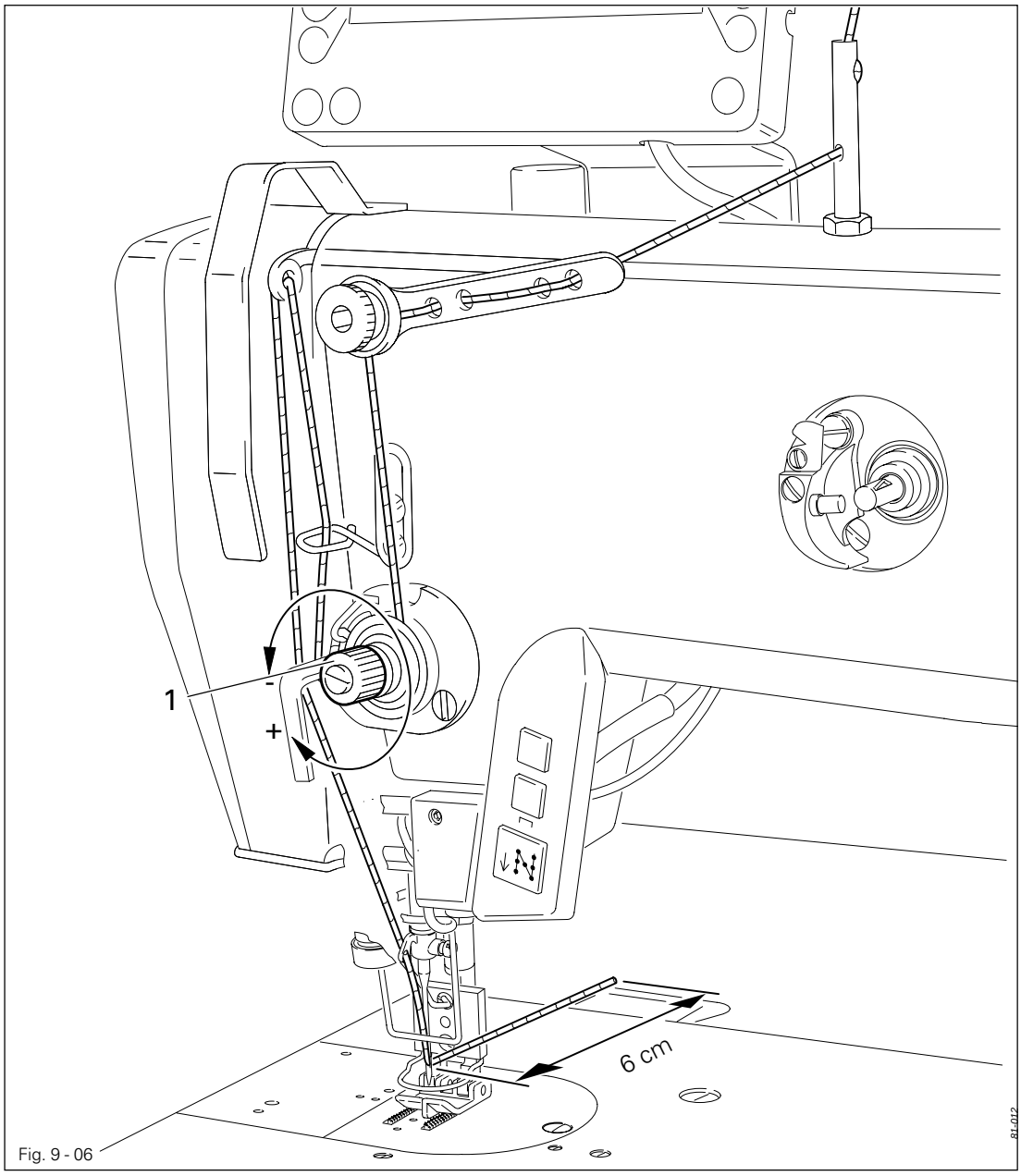


Fig. 9 - 06

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

- Thread the needle thread as show in the above illustration.
- Adjust the needle thread tension by turning milled screw **1**.

9.06 Setting the zigzag stitch and the stitch position

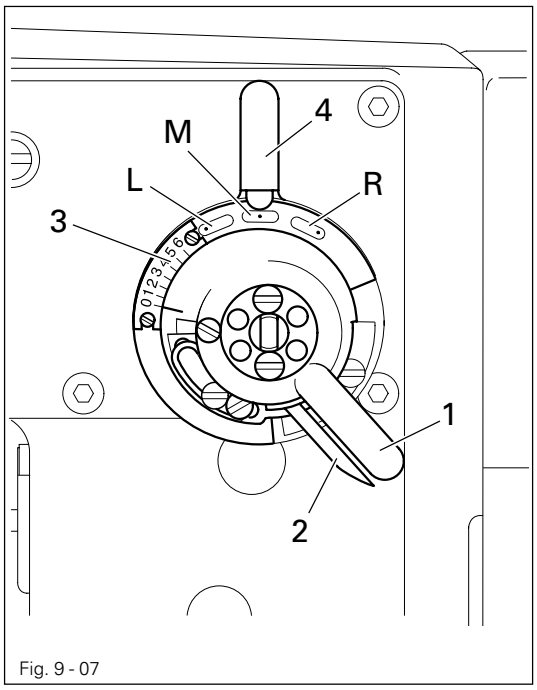


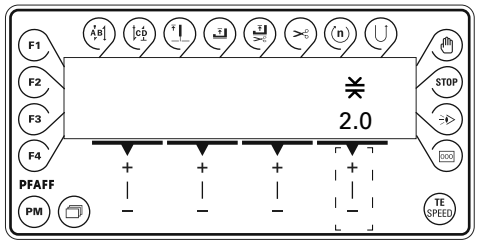
Fig. 9 - 07

- Set the zigzag stitch width by turning the zigzag lever **1**.
- To vary the adjustment press catch **2** against zigzag lever **1**.
- The setting can be read from scale **3**.
- Set the stitch position by turning stitch position lever **4**.

L = stitch position on left
M = stitch position in the middle
R = stitch position on the right

9.07 Entering the stitch length

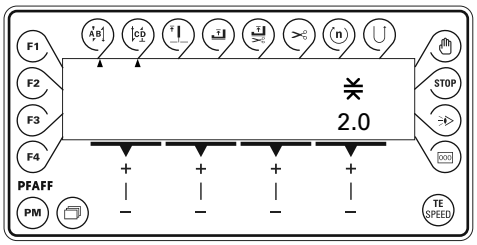
- Switch on the machine.
  After the machine has been switched on, the current stitch length is displayed.



- Adjust the stitch length by pressing the corresponding **+/- key.**

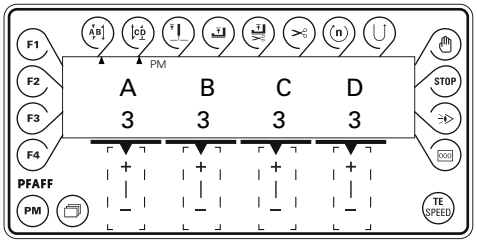
9.08 Entering the start and end backtacks

- Switch on the machine.



- Switch on the corresponding function by pressing the **start backtack** and/or **end backtack** keys. (Arrow appears under the corresponding function key.)

- Change to the input menu for start and end backtacks by pressing the **scroll** key.



A
- By pressing the corresponding **+/- key** select the desired value for the number of forward stitches (A) of the start backtack.

B
- By pressing the corresponding **+/- key** select the desired value for the number of reverse stitches (B) of the start backtack.

C
- By pressing the corresponding **+/- key** select the desired value for the number of reverse stitches (C) of the end backtack.

D
- By pressing the corresponding **+/- key** select the desired value for the number of forward stitches (D) of the end backtack.

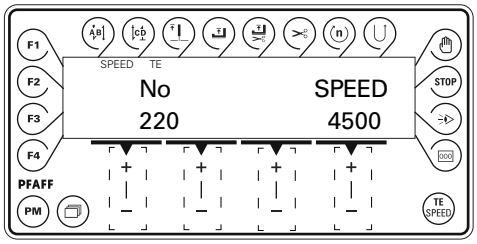
- Call up the stitch length input menu again by pressing the **scroll** key.

9.09 Entering the maximum speed

- Switch on the machine.

TE SPEED

- Press the **TE/Speed** key to call up the input menu for the maximum speed.
  The status texts "Speed" and "TE" appear on the display.



SPEED

- Set the maximum speed by pressing the corresponding **+/- key.**

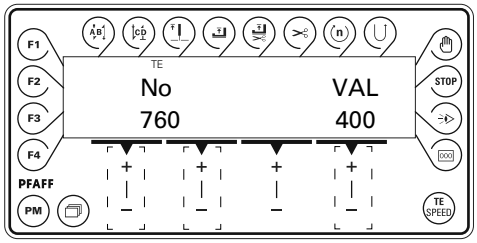
9.10 Setting the remaining stitches for the bobbin thread control

When the bobbin thread monitor signals that the bobbin thread has been used up, there is still a little thread on the bobbin.

- Switch on the machine.

2 x TE SPEED

- Press the **TE/Speed** key twice to enter the parameter input function.



No

- Select the parameter "760" by pressing the corresponding **+/- key.**

VAL

- By pressing the corresponding **+/- key** set the number of remaining stitches which can still be sewn after the detection of the bobbin thread monitor (depends on the thread size).

TE SPEED

- By pressing the **TE/Speed key** the value is taken over and the machine changes to the sewing mode.

The bobbin thread rest counter can only be used when parameter "660" is set at "1" or "2".

10 Sewing

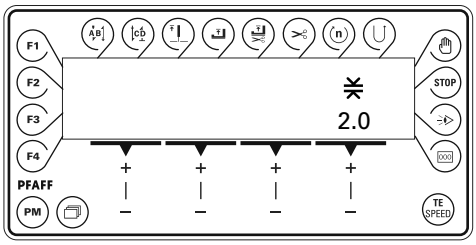
In the sewing mode all relevant settings for the sewing operation are displayed. Functions can be switched on or off by pressing a key. Values for the most important parameters can be changed directly.
In this mode a difference is made between **manual sewing** and **programmed sewing.** To change from manual to programmed sewing, press the PM key. In programmed sewing the text "PM" appears on the display. The program numbers 1 – 15 can each be used for one seam program with up to 15 seam sections.

PM

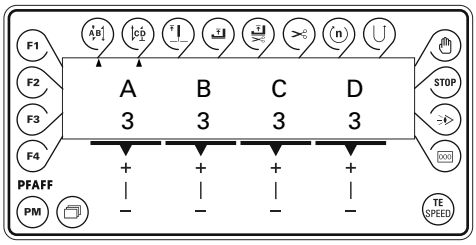
10.01 Manual sewing

PM

After the machine has been switched on **(Chapter 7.01 Main switch)** and the manual sewing mode has been selected with the **PM** key, the display appears for entering the stitch length, also see **Chapter 9.07 Entering the stitch length.**



If the backtack function is switched on, the display appears for entering the backtack values, also see **Chapter 9.08 Entering the start and end backtacks.**
It is possible to switch from one display to the other by pressing the **scroll** key.



Further functions in manual sewing, also see **Chapter 7.06.02 Function keys:**

	Start backtacks on/off		Presser foot raised at end of seam on/off
	End backtacks on/off		Thread trimming on/off
	Needle position raised on/off		Reverse sewing on/off
	Presser foot raised on/off		Sensor on/off

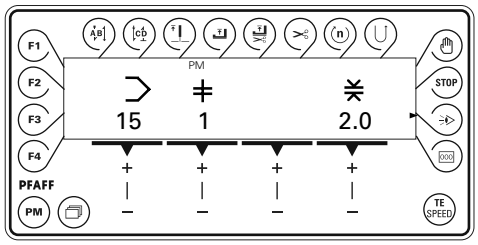
Sewing is carried out with the pedal functions, see **Chapter 7.03 Pedal.**

10.02 Programmed sewing

In programmed sewing various seam programs can be called up by selecting the corresponding program number. A number of seam sections with corresponding functions can be allocated to each seam program. The number of possible seam programs and seam sections is set with the parameters "492" or "493", see **Chapter 13.12 Parameter settings.** In addition to just sewing, that is to say working through seam programs, in programmed sewing seam programs can be entered and altered, also see **Chapter 11.01 Entering seam programs.**



After the machine has been switched on **(Chapter 7.01 Main switch)** and the programmed sewing mode has been selected with the **PM** key, the display appears for selecting the program number, seam section and stitch length.





If other functions, such as sensor or stitch count have been activated, it is possible to switch to other displays for entering corresponding values by pressing the **scroll** key.



The number of backtack stitches is set in manual sewing, see **Chapter 9.08 Entering the start and end backtacks.** The values entered apply to all seam programs.

Functions in programmed sewing, also see **Chapter 7.07.02 Function keys:**


Start backtacks on/off


End backtacks on/off


Needle position raised on/off


Presser foot raised on/off


Presser foot raised after thread trimming on/off


Thread trimming on/off


Fixed speed on/off


Reverse sewing direction on/off


Manual seam end on/off



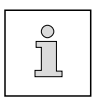
Programmed stop on/off


Sensor on/off



Stitch count on/off

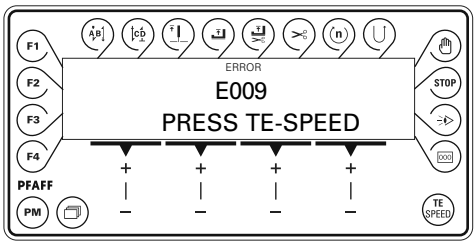
Sewing is carried out with the pedal functions, see **Chapter 7.03 Pedal.**



If several seam sections belong to one seam program, the separate seam sections are sewn automatically one after the other.

10.03 Error messages

If a fault occurs, the text "ERROR" appears on the display, together with an error code and short instructions. An error message is caused by incorrect settings, faulty elements or seam programs as well as by overload conditions.
For an explanation of the error codes see **Chapter 13.13 Explanation of the error messages.**



- Correct the error.



- Acknowledge error correction by pressing the **TE/Speed** key.

11 Input

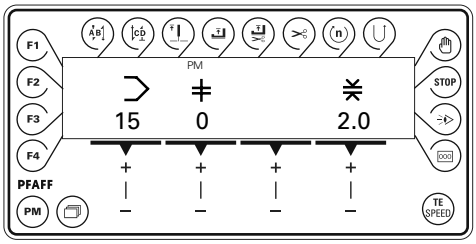
In this chapter the input of seam programs is described.

11.01 Seam program input

- Switch on the machine.

PM

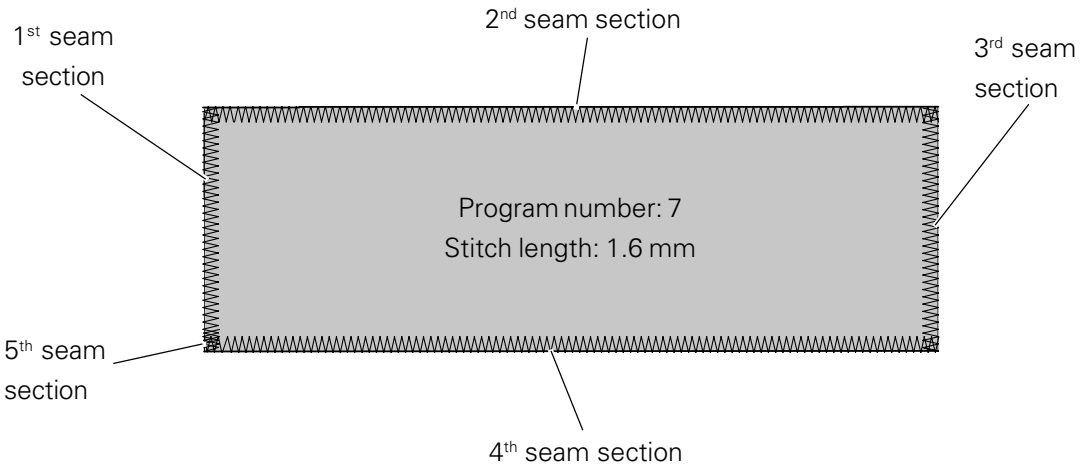
- Press the PM key to call up programmed sewing.
  The text "PM" must appear on the display.



After selecting programmed sewing, seam programs can be entered. The input is carried out by switching functions on or off or by entering values for the seam section of a seam program. All functions available in programmed sewing can be used for the seam program input, see **Chapter 10.02 Programmed sewing.**
The seam program input is described in the following example.

11.02 Example of a seam program input

A seam program consists of the program number and at least one seam section with allocated functions.
Below is an example of a seam program input for a label.



Overview of the input steps

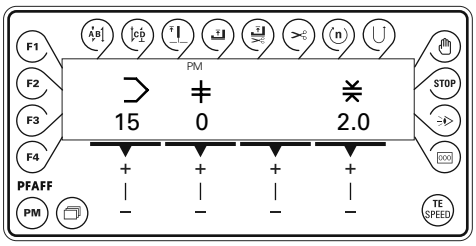
Step				A/B	C/D								STOP		
1	7	0	1.6	-	-	-	-	●	-	-	-	-	●	●/0.0	-
2	7	1	1.6	-	-	-	-	●	-	-	-	-	●	●/0.0	-
3	7	2	1.6	-	-	-	-	●	-	-	-	-	●	●/0.0	-
4	7	3	1.6	-	-	-	-	●	-	-	-	-	●	●/0.0	-
5	7	4	1.6	-	-	-	-	●	-	-	-	-	●	●/0.0	-
6	7	5	1.6	-	-	-	-	●	●	-	-	-	-	-	●/5
7	7	6	0.0	-	-	-	-	-	-	-	-	-	-	-	-

Entering programmed sewing

- Switch on the machine.

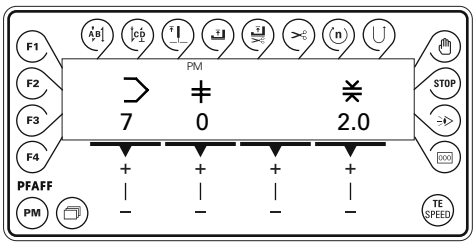
PM

- Press the PM key.
  The text "PM" must appear on the display.



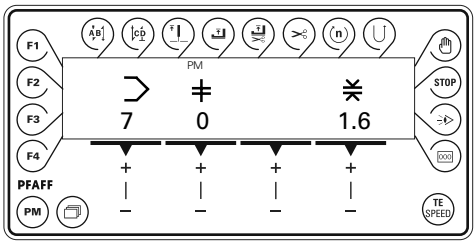
Selecting the program number

- Select program number "7" with the corresponding +/- key.

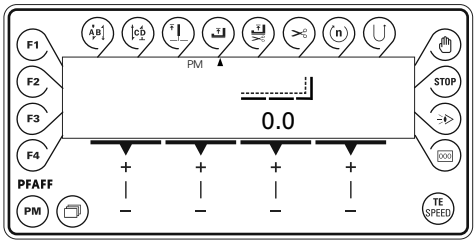


Selecting the stitch length

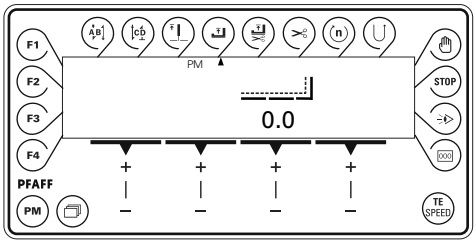
- Set the value for the stitch length at "1.6" with the corresponding +/- key.



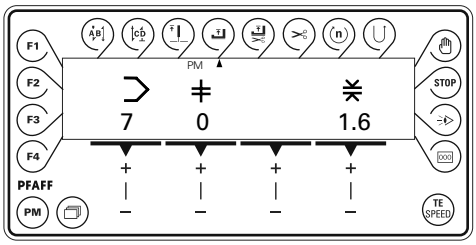
- Press the **scroll** key to enter the seam depth.



- Set the value for the seam depth at "0" with the corresponding +/- key.



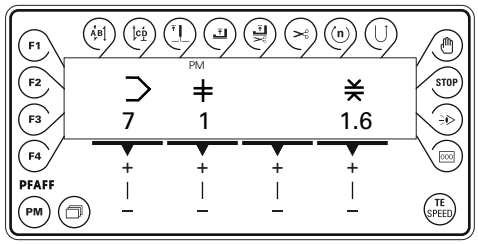
- Press the **scroll** key to select the first seam section.



The values entered in the seam section "0" apply for all seam sections, if these are not altered within the individual seam sections.

Selecting seam section 1

- Select seam section "1" with the corresponding +/- key.



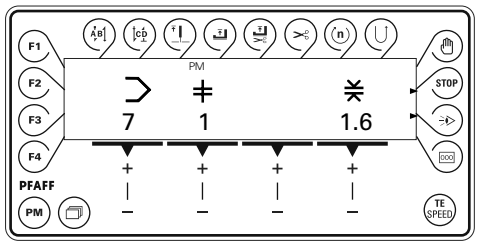
Selecting the functions for seam section 1

- The machine should stop at the end of the seam section.
- The end of the seam section should be recognised by sensor.
- The presser foot should rise after thread trimming.
- The seam depth should be "0" (input made in seam section "0").

- Press the **programmed stop** key, to stop the machine automatically at the end of the seam section.

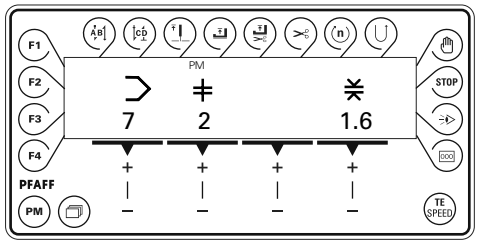
- Press the **sensor** key for recognition of the end of the seam section by sensor.

- Press **foot position after trimming** to raise the presser foot after thread trimming.



Selecting seam section 2

- Select seam section "2" with the corresponding +/- key.



Selecting the functions for seam section 2

- The machine should stop at the end of the seam section.
- The end of the seam section should be recognised by sensor.
- The presser foot should rise after thread trimming.
- The seam depth should be "0" (input made in seam section "0").



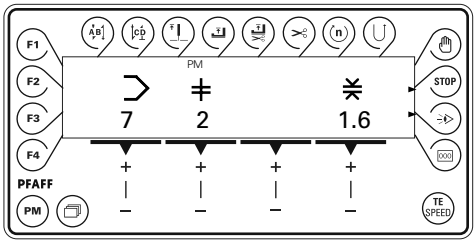
- Press the **programmed stop** key, to stop the machine automatically at the end of the seam section.



- Press the **sensor** key for recognition of the end of the seam section by sensor.



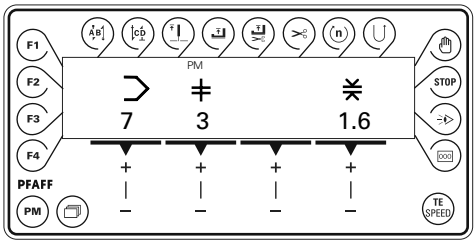
- Press **foot position after trimming** to raise the presser foot after thread trimming.



Selecting seam section 3



- Select seam section "3" with the corresponding **+/- key.**



Selecting the functions for seam section 3

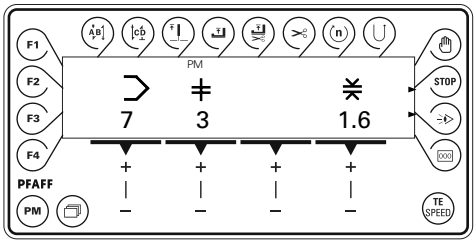
- The machine should stop at the end of the seam section.
- The end of the seam section should be recognised by sensor.
- The seam depth should be "0" (input made in seam section "0").



- Press the **programmed stop** key, to stop the machine automatically at the end of the seam section.

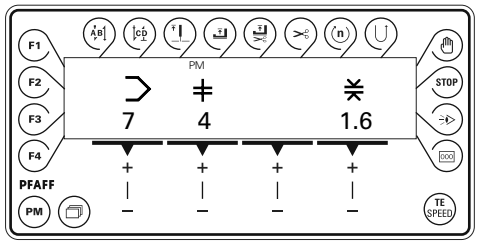


- Press the **sensor** key for recognition of the end of the seam section by sensor.



Selecting seam section 4

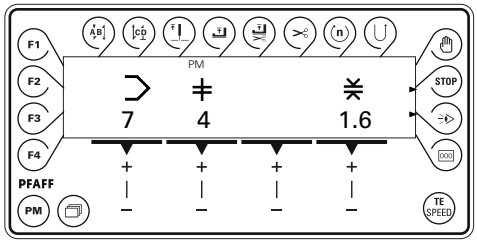
- Select seam section "4" with the corresponding +/- key.



Selecting the functions for seam section 4

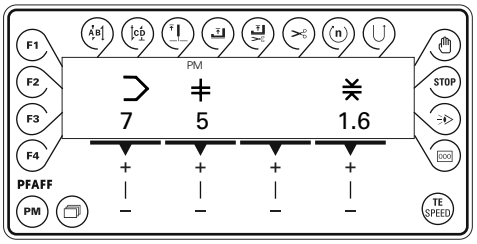
- The machine should stop at the end of the seam section.
- The end of the seam section should be recognised by sensor.
- The presser foot should rise after thread trimming.
- The seam depth should be "0" (input made in seam section "0").

- Press the **programmed stop** key, to stop the machine automatically at the end of the seam section.
- Press the **sensor** key for recognition of the end of the seam section by sensor.
- Press **foot position after trimming** to raise the presser foot after thread trimming.



Selecting seam section 5

- Select seam section "5" with the corresponding +/- key.



Selecting the functions for seam section 5

- The machine should stop at the end of the seam section.
- The thread should be trimmed at the end of the seam section.
- The presser foot should rise after thread trimming.
- The end of the seam section should be recognised by stitch counting (5 stitches).



- Press the **programmed stop** key, to stop the machine automatically at the end of the seam section.



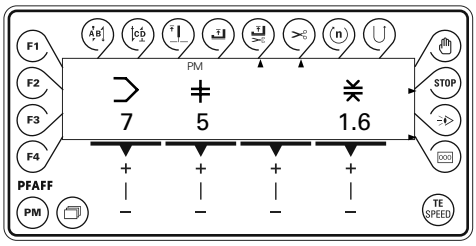
- Press the **thread trimming** key for automatic trimming of the thread a the end of the seam section.



- Press **foot position after trimming** to raise the presser foot after thread trimming.

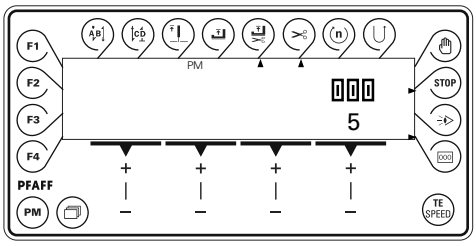


- Press the stitch count key to enable the recognition of the end of the seam section by the number of stitches.





- Press the **scroll** key to enter the number of stitches.

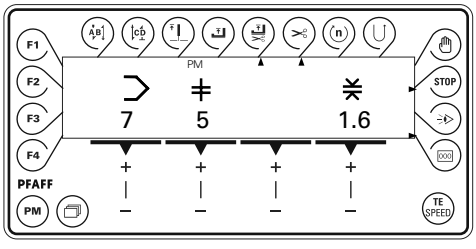




- Enter the number of stitches for stitch counting with the corresponding **+/- key.**

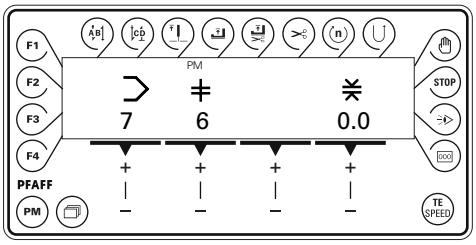


- Press the **scroll** key to finish the seam program.



Finishing the seam program

- Select seam section "6" with the corresponding +/- key.

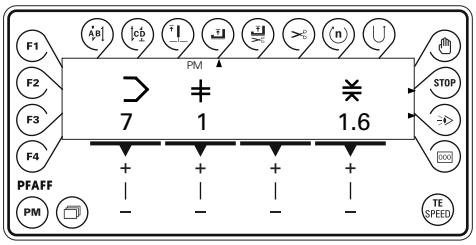


- Set the stitch length value at "0.0" with the corresponding +/- key.

By setting the stitch length in seam section 6 at zero, seam section 5 is recognised as the last seam section in the seam program and the seam program input is finished.

Sewing a test seam

- Select seam section "1" with the corresponding +/- key.



- Using the pedal functions sew a test seam.

11.03 Program recording forms

Step				A/B	C/D								STOP			
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																

Step				A/B	C/D								STOP			
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																

Step				A/B	C/D								STOP		
1															
2															
3															
4															
5															
6															
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Step				A/B	C/D								STOP		
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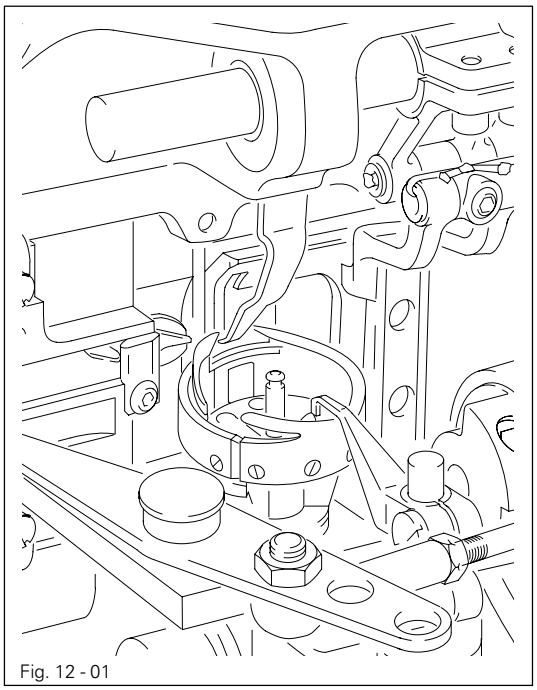
12 Care and maintenance

Cleaning	daily, several times by continuous operation
Checking the oil level (hook oil tank)	once a year▲
Checking the oil tank(zigzag eccentric lubrication)	daily, before operation
Checking/adjusting the air pressure	daily, before each operation
Cleaning the air filter/lubricator	Cleaning the air filter/lubricator

▲ This maintenance interval if for an average machine running time in a single shift operation. If the machine running times are longer, shorter maintenance intervals are recommended.

12.01 Cleaning

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


Fig. 12 - 01

- Tilt back the machine head.
- Clean the hook and the hook compartment daily, more often if in continuous operation.

Use both hands to set the machine upright!
Danger of crushing between sewing head and table top!

12.02 Lubricating the hook



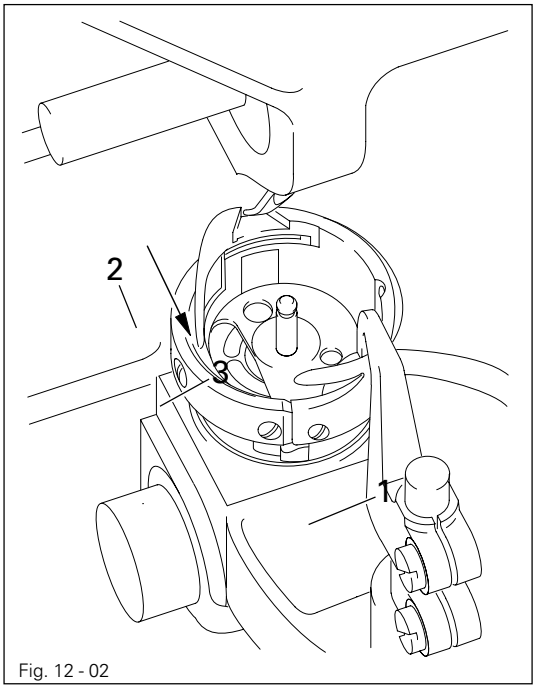
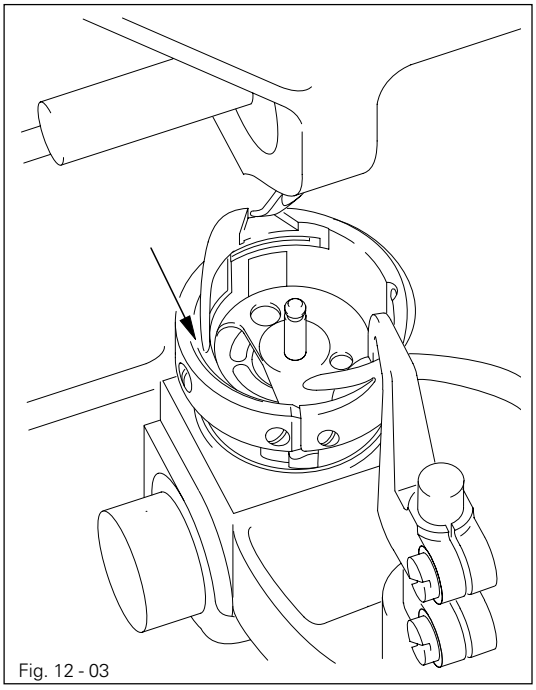


Fig. 12 - 02


Fig. 12 - 03



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

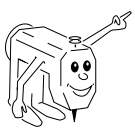


Only use oil with a mean viscosity of 10.0 mm^2/s at 40°C and a density of 0.847 g/cm^3 at 15°C.

- Lay the machine head on its back.
- Fill the oil reservoir **1** up to the upper marking **3** through hole **2**.
- Before operating the machine for the first time or after longer stationary periods, add a few additional drops of oil into the hook race (see arrow in **Fig. 12-03**).



Return the machine to its upright position with both hands. Danger of crushing between machine head and table top!



We recommend PFAFF sewing machine oil.
Part no. 280-1-120 105.

12.03 Oiling the zigzag drive



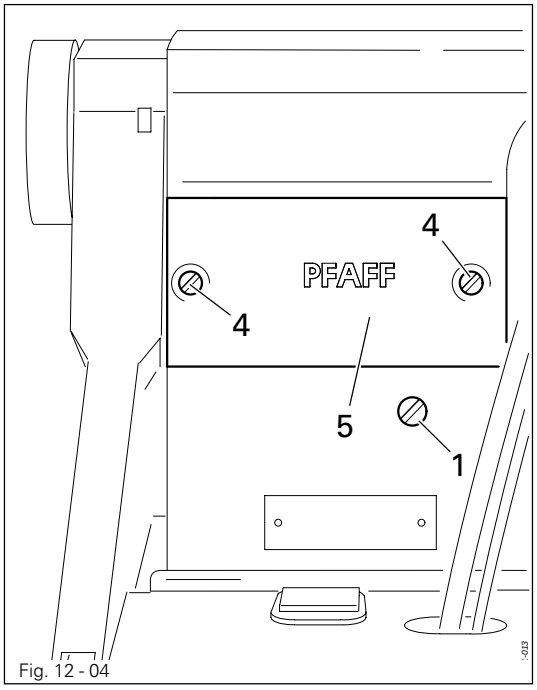


Fig. 12 - 04

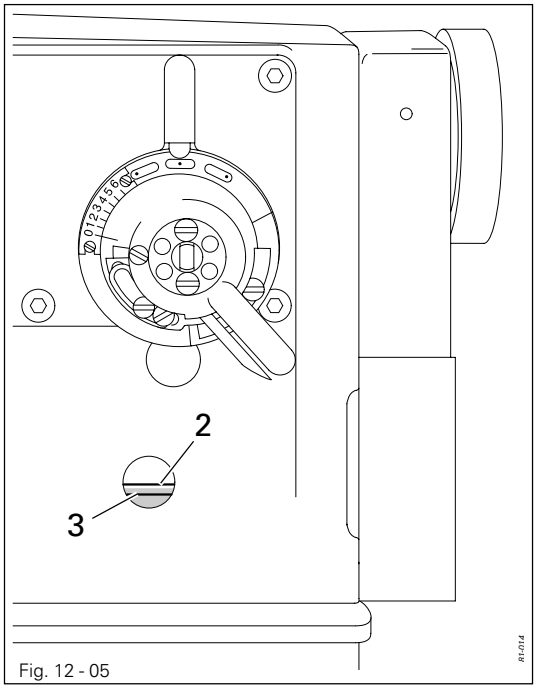


Fig. 12 - 05



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



Only use oil with a mean viscosity of 22.00 m^2/s at 40° C and a density of 0.865 g/cm^3 at 15° C.

- Check the oil level before each operation.
- If necessary, remove screw **1** and fill in oil up to top marking **2**.
- Tighten screw **1**.

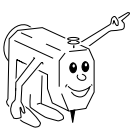


Never allow the oil level to sink below the minimum mark **3**!
Danger of damage to the machine!



To fill in larger quantities of oil, e.g. when filling for the first time before commissioning, it is better to remove cover **5**.

- Loosen screws **4** and remove cover **5**.
- Take care that no dirt gets into the case.
- Fill in oil up to the top marking **2**.
- Clean the surface of cover **5,** the case and the seal.
- Replace cover **5** and tighten screws **4**.



We recommend PFAFF sewing machine oil, part no. 280-1-120 144.

12.04 Cleaning the air filter of the air-filter / lubricator



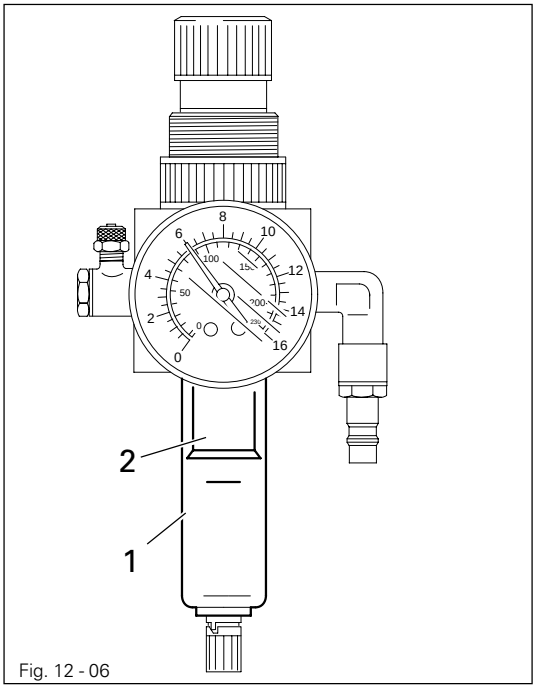


Fig. 12 - 06



Switch the machine off!
Disconnect the air hose at the air-filter / lubricator.

To drain water bowl 1:

- Water bowl **1** drains itself automatically when the compressed-air hose is disconnected from the air-filter / lubricator.

Cleaning filter 2:

- Unscrew water bowl **1**.
- Take out filter **2**.
- Clean filter **2** with compressed air or isopropyl alkohol (part No. 95-665 735-91).
- Screw in filter **2** and screw on water bowl **1**.

12.05 Checking/adjusting the air pressure

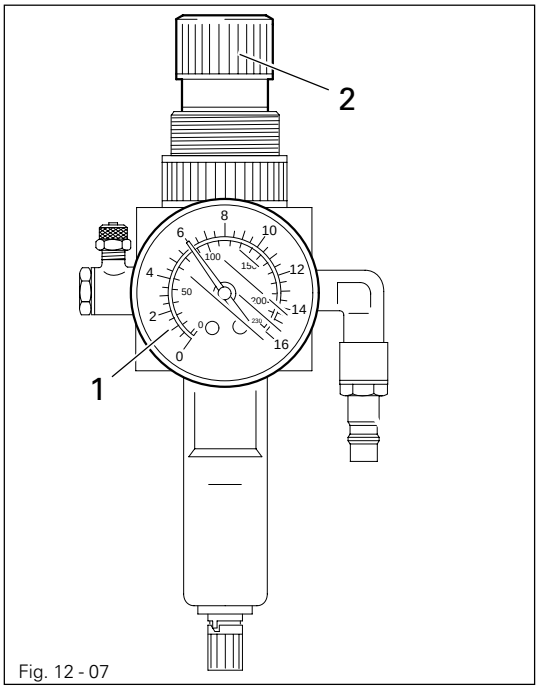


Fig. 12 - 07

- 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**.

13 Adjustment



On the PFAFF 2438 no clamp may be fastened to the needle bar, as this would damage the special coating of the needle bar.

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.



The machine must be switched off for all adjustment work!
Danger of injury if the machine is started accidentally!

13.02 Tools, gauges and other accessories for adjusting

- 1 set of screwdrivers with blade widths from 2 to 10 mm
- 1 set of wrenches with jaw widths from 7 to 14 mm
- 1 set of Allan keys from 1.5 to 6 mm
- 1 metal rule, (Part No. 08-880 218-00)
- Locking pin (5 mm diameter), part no. 13-030 341-05
- Feed dog adjustment gauge, part no. 91-119 995-05
- Hook bearing adjustment gauge, part no. 91-119 996-05
- Needles, threads and test material

13.03 Abbreviations

TDC = top dead center
BDC = bottom dead center

13.04 Check and adjustment aid

By blocking with holes **1** - **5** the required needle bar positions can be fixed exactly.

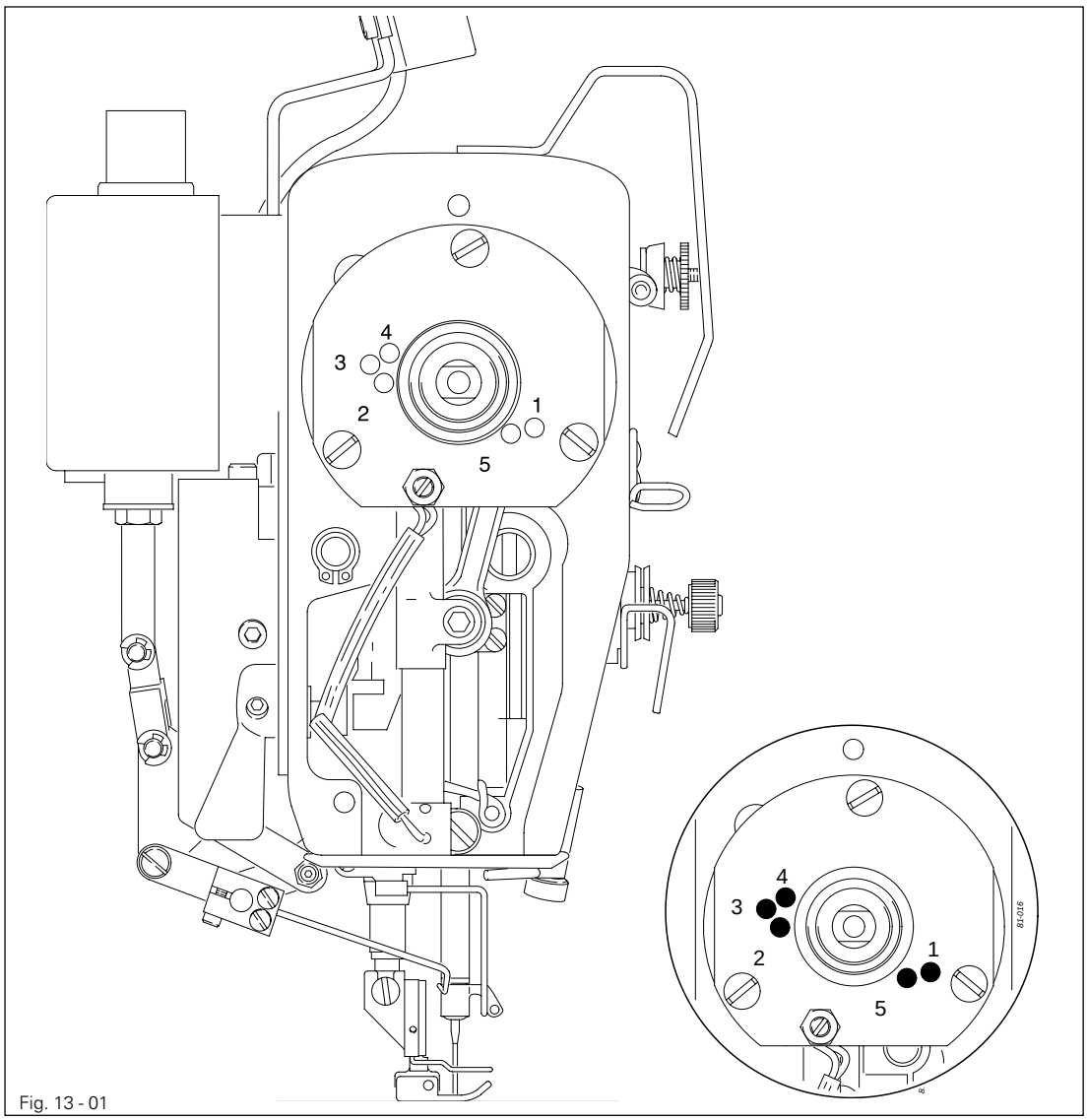


Fig. 13 - 01

- Turn the balance wheel until the needle bar has approximately reached the required position.
- Place the 5 mm blocking pin in the appropriate hole and put pressure on it.
- Turn the balance wheel forwards and backwards a little until the blocking pin moves into the slot in the crank behind the bearing plate, thus blocking the machine.

Hole 1	=	2.0 mm after the bottom dead center of the needle bar (2.0 past tdc)
Hole 2	=	Top dead center of the needle bar (tdc)
Hole 3	=	0.25 mm after the top dead center of the needle bar (0.25 past bdc)
Hole 4	=	1.0 mm after the top dead center of the needle bar (1.0 mm past tdc)
Hole 5	=	4 mm after the bottom dead center of the needle bar (4.0 past bdc)

13.05 Adjusting the basic machine

13.05.01 Balancing weight

Requirement
With the needle bar at bdc the largest eccentricity of the balancing weight **1** must be pointing upwards.

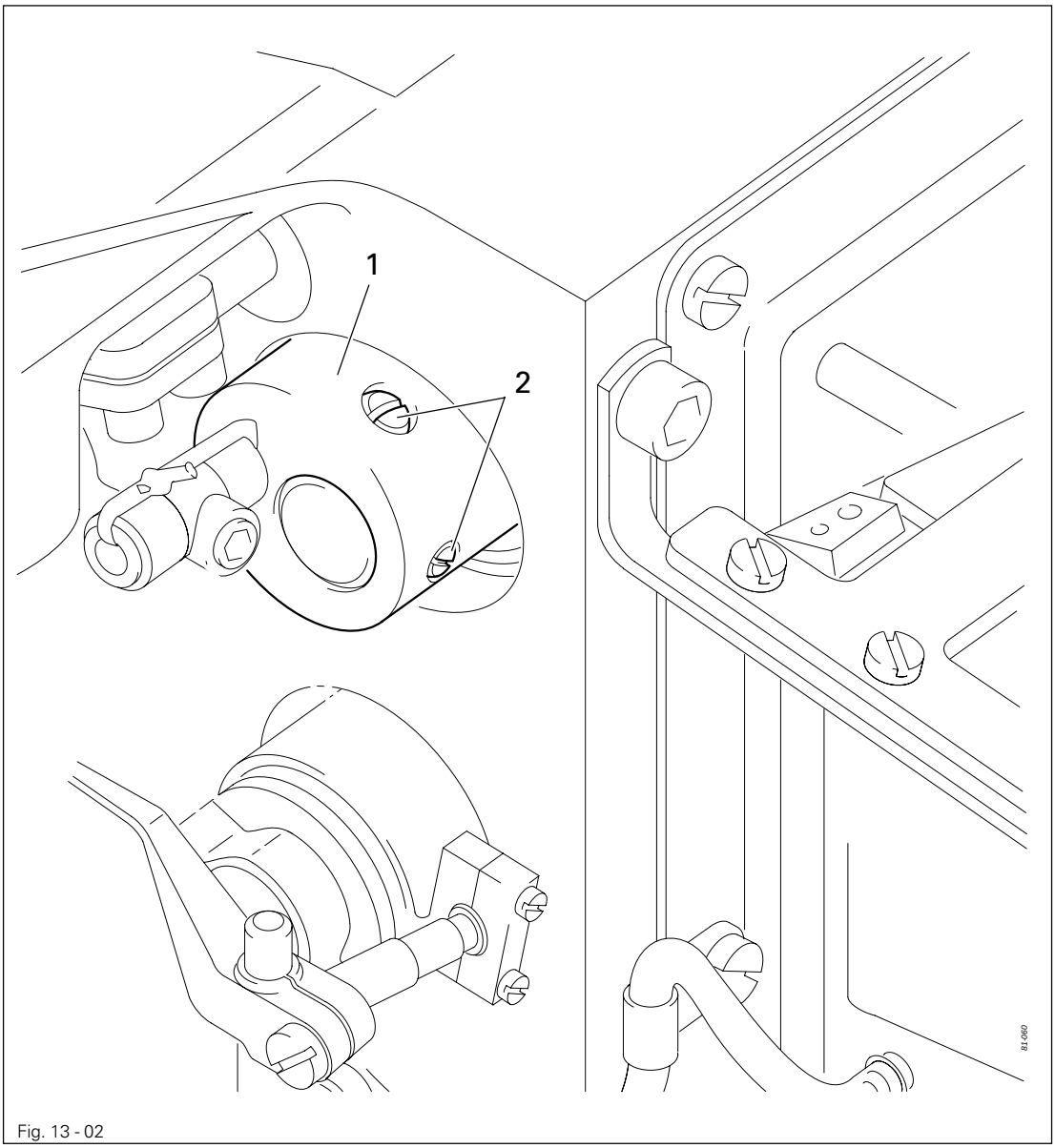


Fig. 13 - 02

- Bring the needle bar to b.d.c.
- Adjust the balance weight **1** (screw **2**) in accordance with the **requirement.**

13.05.02 Centering the needle in the needle hole (in sewing direction)

Requirement
With the zigzag setting at "**0**" and the needle position set at "**middle**" the needle must enter the center of the needle hole as viewed in the direction of sewing.

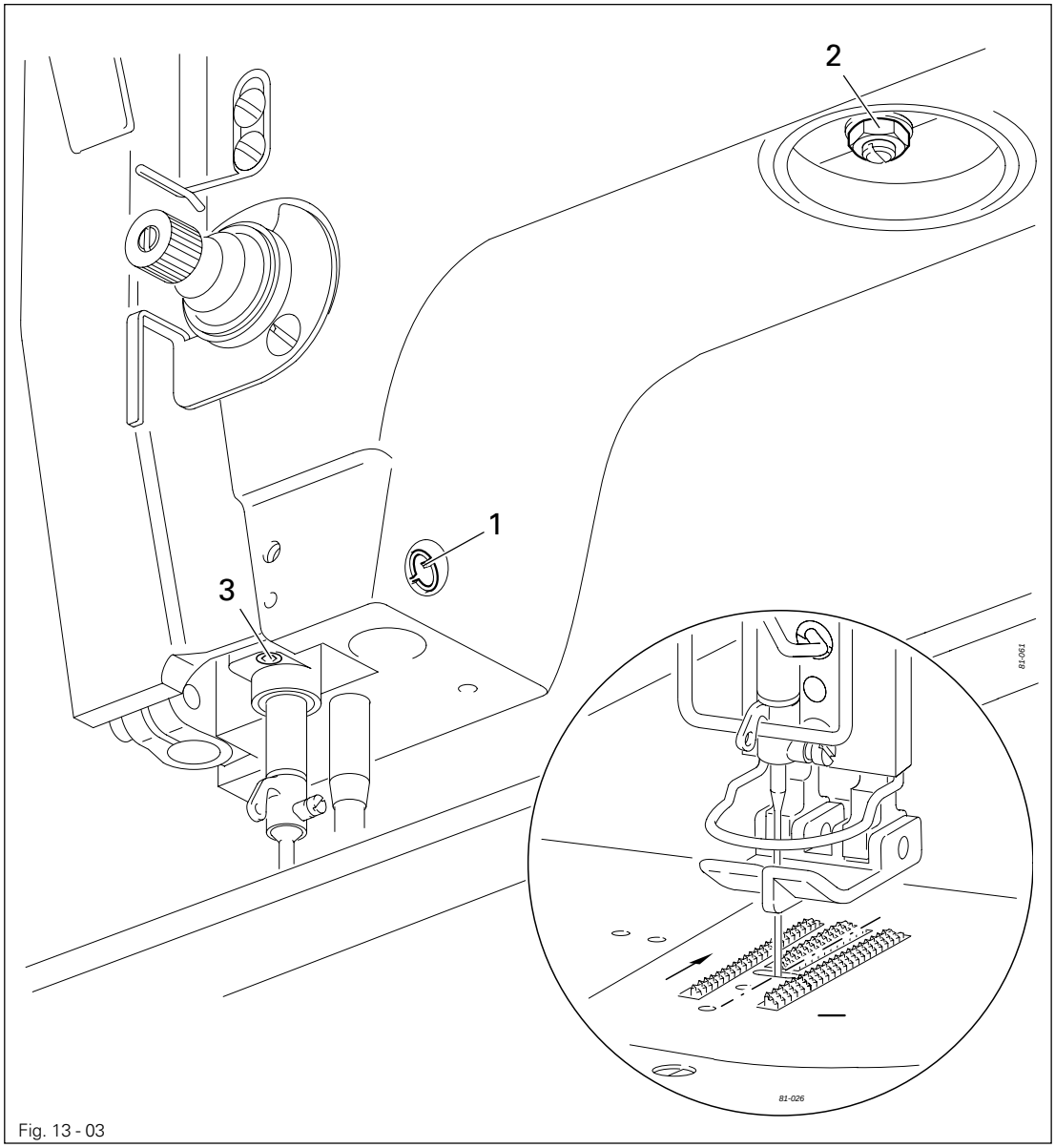
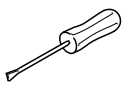


Fig. 13 - 03



- Bring the needle bar to b.d.c.
- Adjust the eccentric pin **1** (nut **2** and screw **3**) in accordance with the **requirement.**

13.05.03 Parallel guiding of the needle bar

Requirement
Guide bar **5** must be parallel to the needle bar.

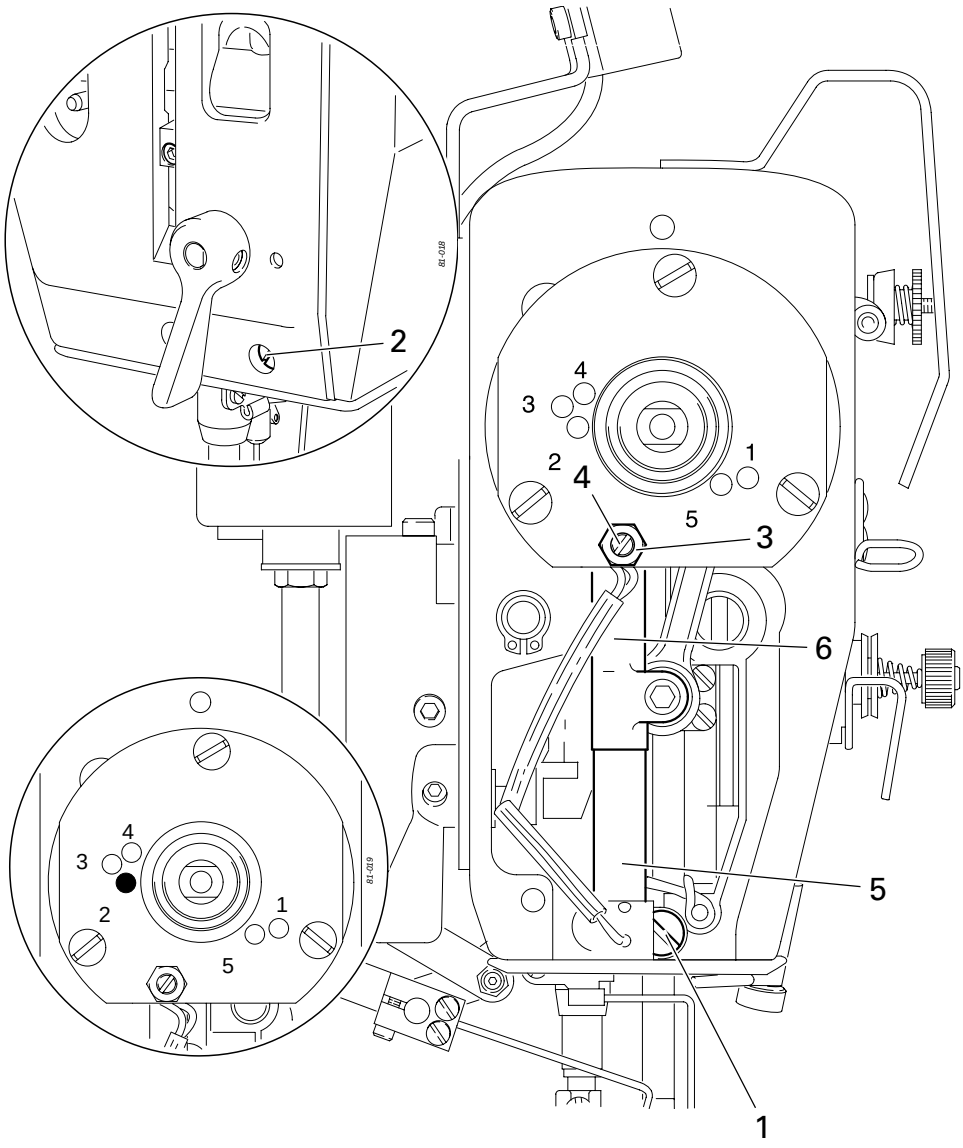


Fig. 13 - 04

- Bring the needle bar to tdc (hole 2).
- Loosen screws **1**,**2** and nut **3**.
- The largest eccentricity of pin **4** must be facing downwards.
- Bring the groove on guide bar **5** into a position in which it rests against eccentric pin **4**, turn eccentric pin **4** in accordance with the **requirement** and tighten nut **3**.
- Push guide bar **5** downwards and then upwards as far as possible. Bushing **6** must not move laterally during this movement (readjust eccentric pin **4** if necessary).
- Move guide bar **5** until it rests against eccentric pin **4** and tighten screws **1** and **2**.

13.05.04 Locking lever

Requirement
The zigzag stitch adjustment lever **3** must be able to be locked in any position.

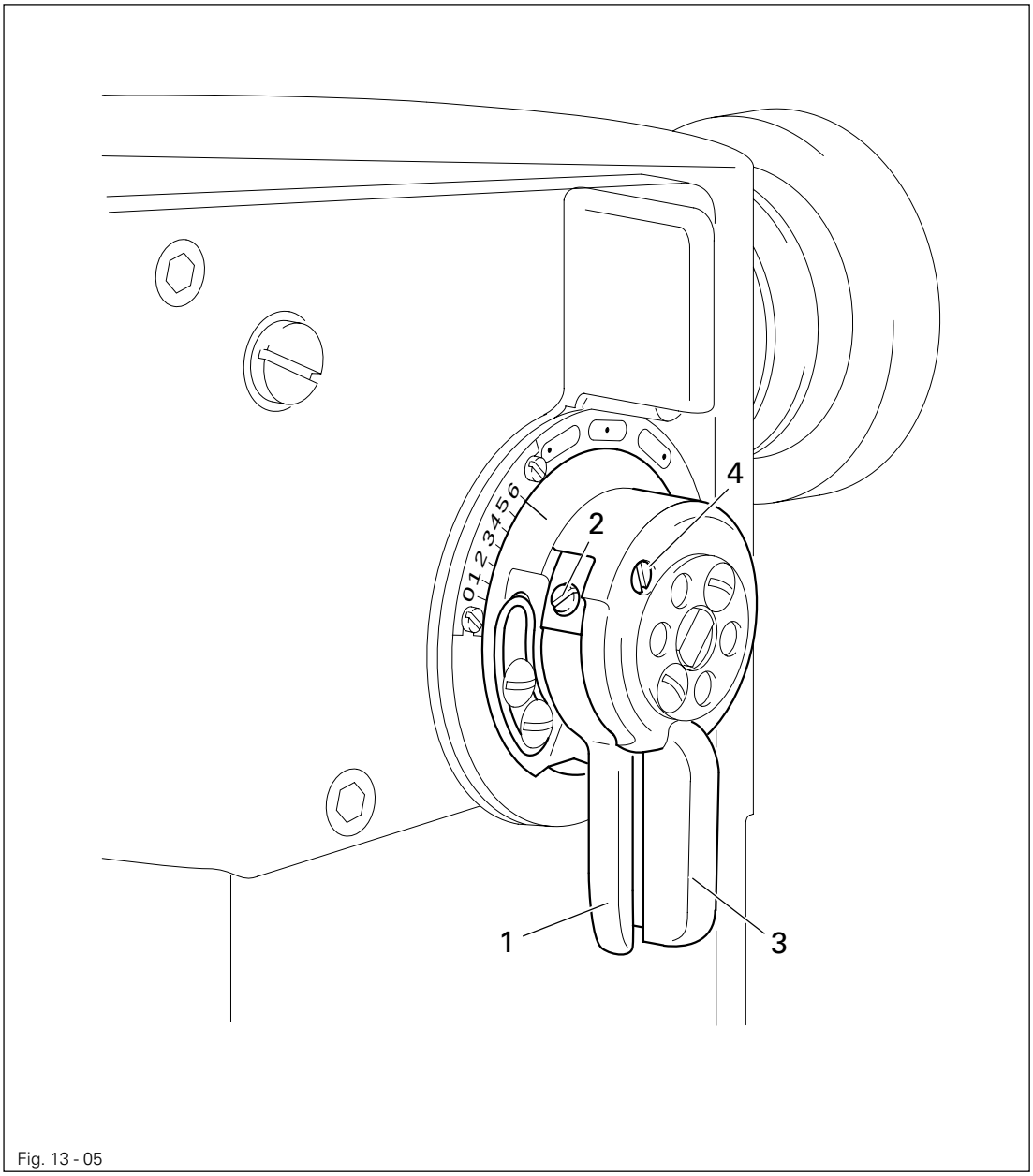
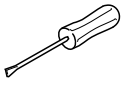


Fig. 13 - 05



- Loosen screw **2**.
- Press locking lever **1** against the zigzag stitch adjustment lever **3**.
- Turn pivot pin **4** as far as possible to the left.
- Release locking lever **1**.
- Locking lever **1** must be parallel to the zigzag stitch adjustment lever **3**.
- Tighten screw **2**.

13.05.05 Zero stitch and zigzag stitch scale

Requirement

With the zigzag stitch set at "**0**":

1. the needle bar must not move laterally when the balancewheel is turned and
2. the marking "**0**" on scale **1** must be at marking **2**.

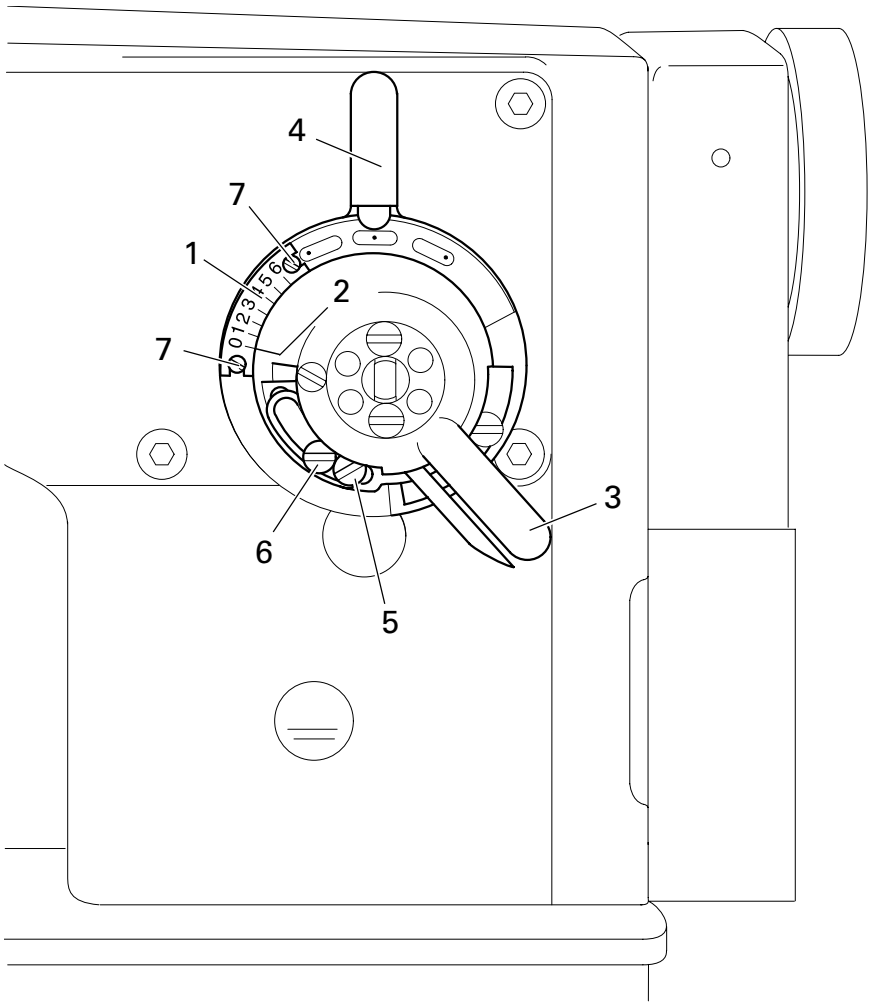
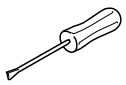
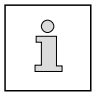


Fig. 13 - 06



- Set the needle position adjustment lever **4** to "**middle**" and loosen screws **5** and **6**.
- Run the machine slowly and turn the zigzag stitch adjustment lever **3** to the right until the needle bar no longer moves laterally.
- Turn the machine off. Move screw **5** to the right until it touches and then tighten it.
- Loosen screws **7** and move scale **1** in accordance with **requirement 2**.
- Tighten screws **7**.



Screw **6** remains loose for the following adjustment.

13.05.06 Centering the needle in the needle hole (crosswise to sewing direction)

Requirement
With the zigzag stitch set at "**0**" and the needle position setting at "**middle**" the needle must enter the center of the needle hole as seen across the direction of sewing.

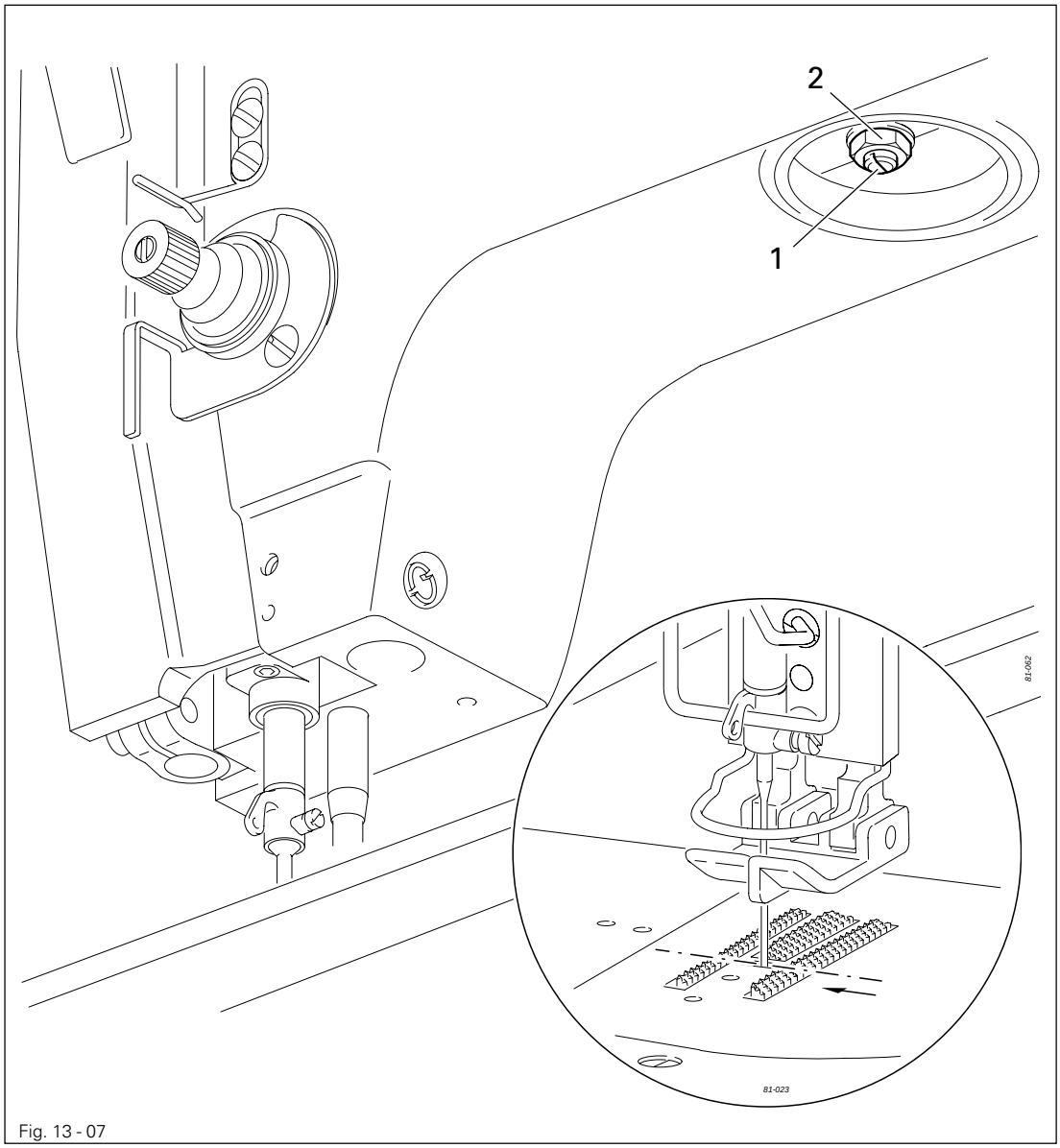


Fig. 13 - 07

- Adjust the eccentric pin **1** (nut **2**) in accordance with the **requirement.**

13.05.07 Zigzag stitch width

Requirement
At the largest zigzag stitch setting, marking **1** must be at the largest zigzag value on scale **2**.

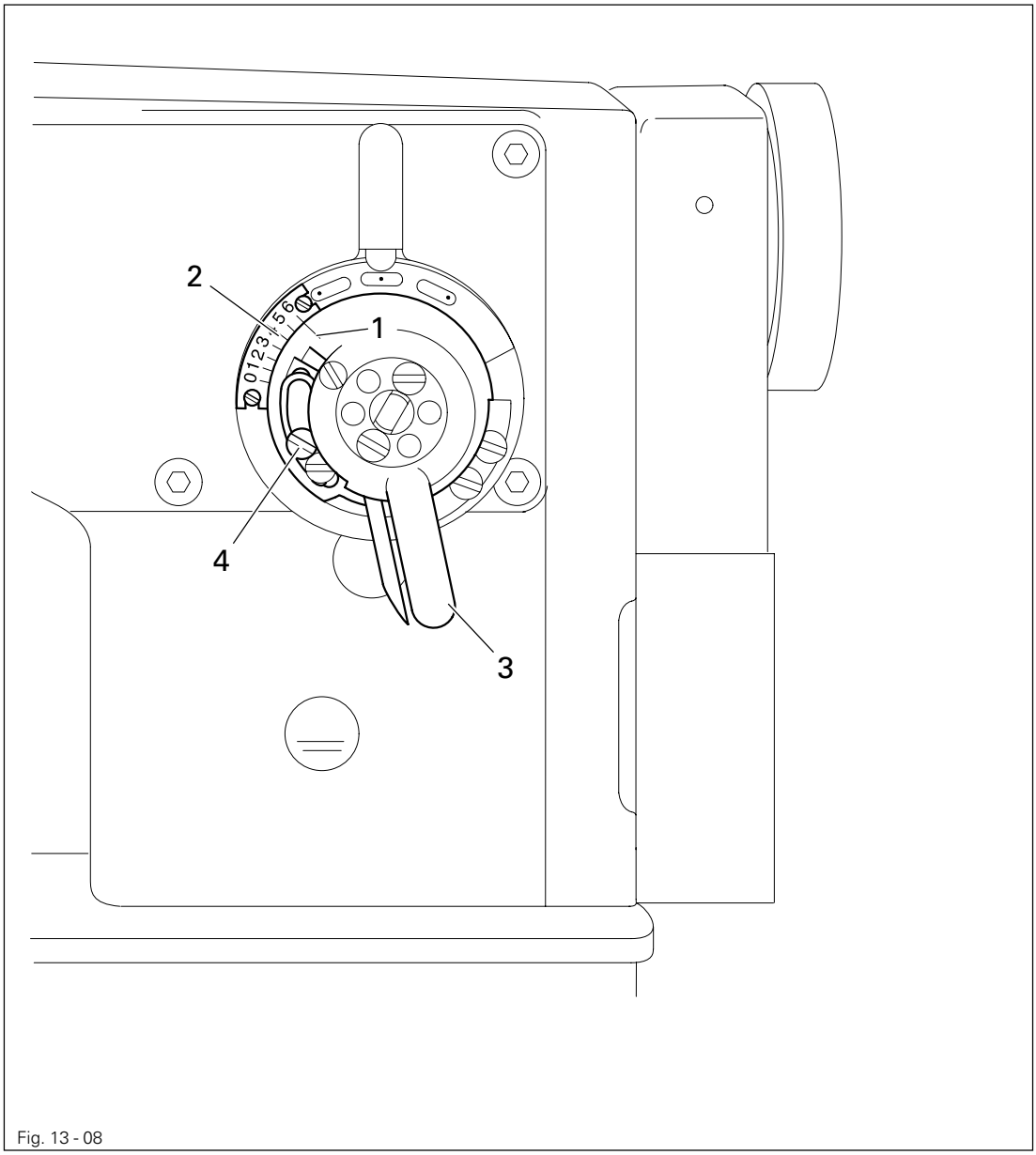
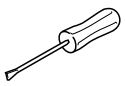


Fig. 13 - 08



- Turn the zigzag stitch adjustment lever **3** in accordance with the **requirement**.
- Move screw **4** upwards until it touches and then tighten it.



If the machine is equipped with a needle plate with a smaller hole than is marked on the scale, the zigzag limit must be set according to the needle hole width on the needle plate.

13.05.08 Zigzag stitch motion

Requirement
When the needle bar is at tdc coming from the right bdc (hole 2), the needle bar must not move laterally when the zigzag stitch adjustment lever is moved back and forth.

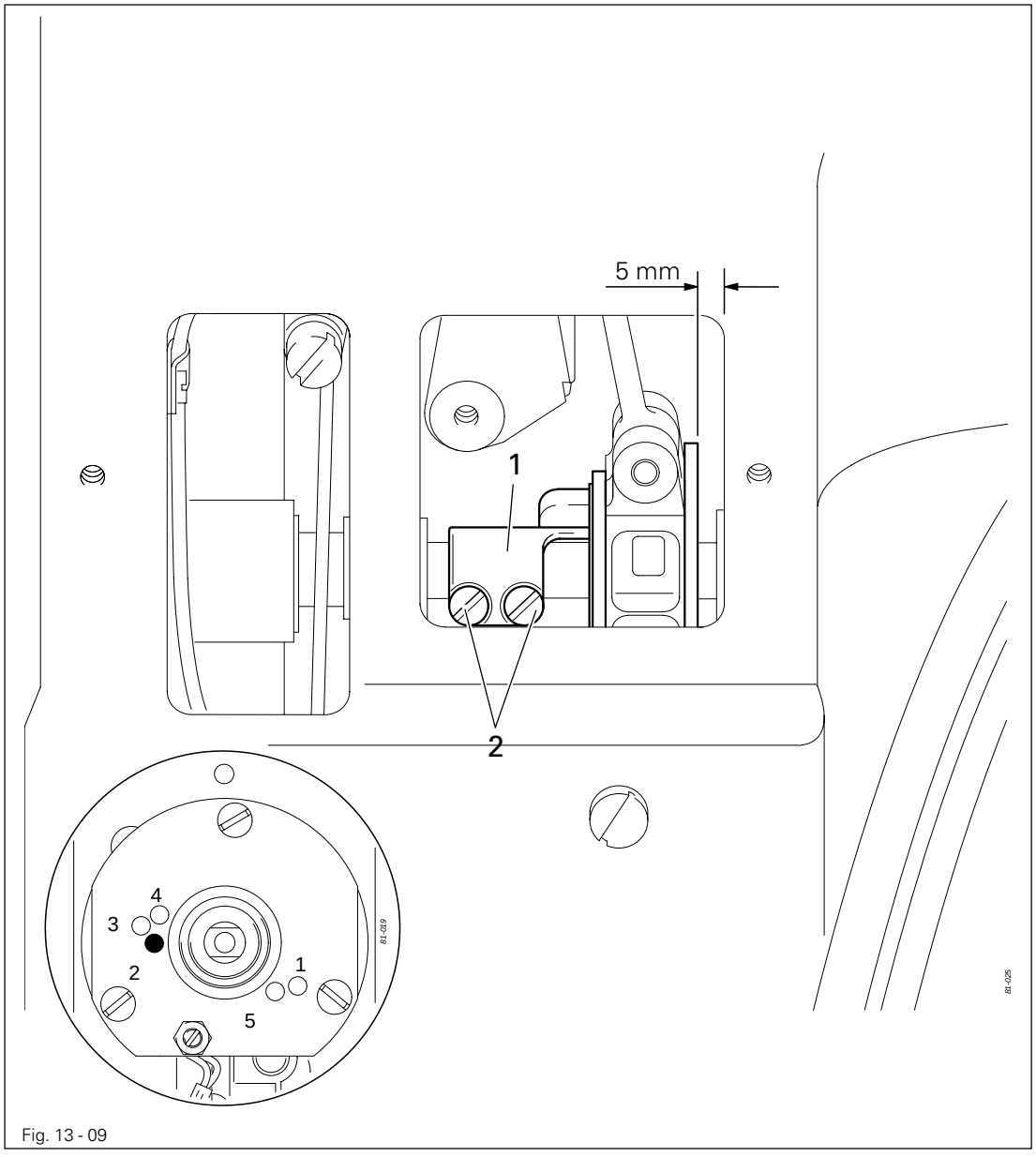
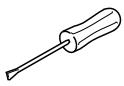


Fig. 13 - 09



- Adjust zigzag stitch eccentric **1** (screws **2**) in accordance with the **requirement**, taking care that the zigzag eccentric **1** is at a distance of approx. **5 mm** from the inside right wall of the case.

13.05.09 Needle penetration symmetry

Requirement

1. With the zigzag stitch setting at "**0**" the needle must enter the middle of the needle hole.
2. At the largest setting of the zigzag stitch the right and left needle-penetrations must be the same distance from the middle penetration.

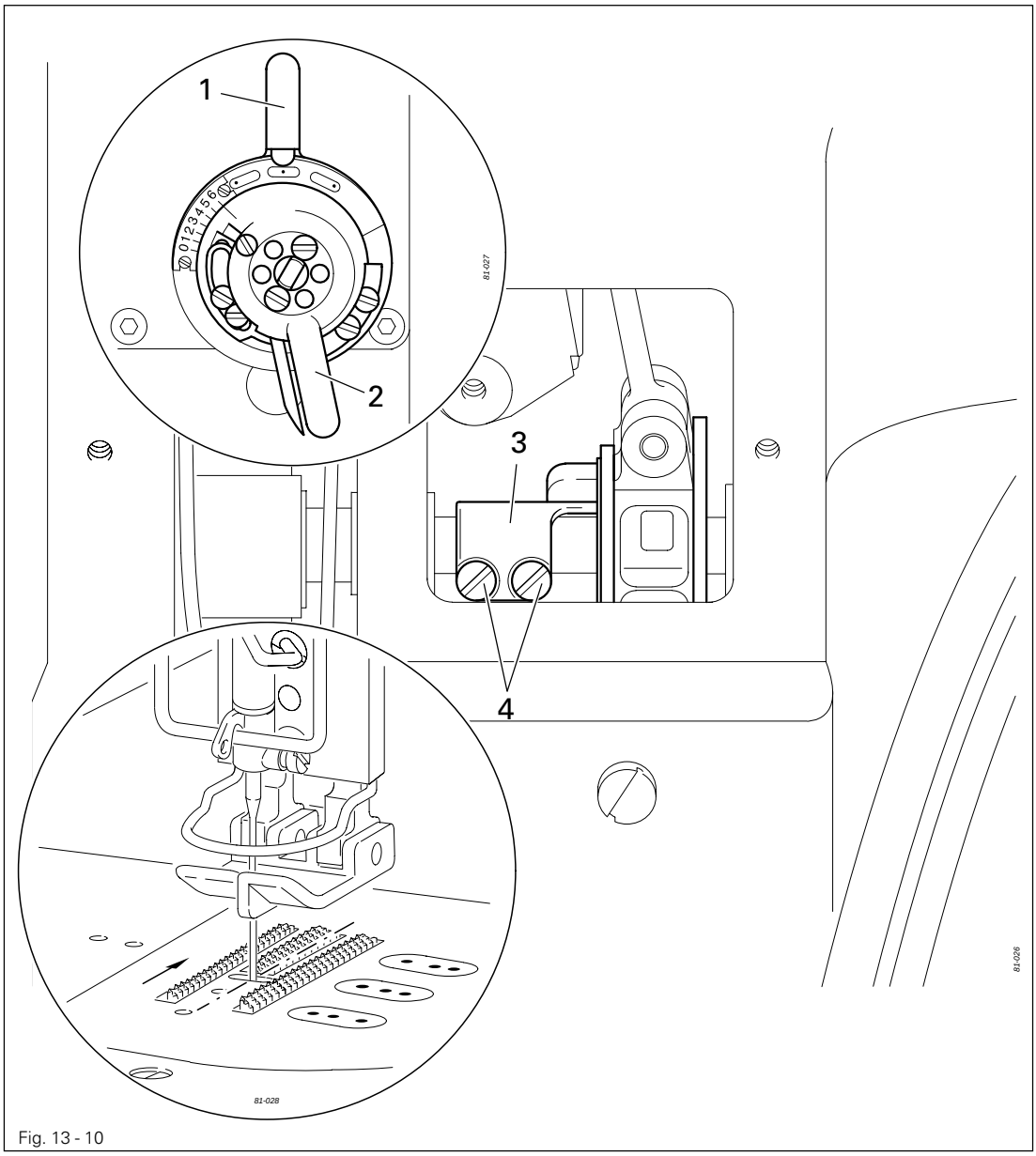


Fig. 13 - 10

- Move the needle position lever **1** to "**middle**" and the zigzag stitch adjustment lever **2** to "**0**".
- Place a piece of paper underneath the presser foot and perforate it with the needle.
- Raise the needle a little and set the zigzag stitch adjustment lever **2** to the largest setting.
- Perforate the paper to the right and left by turning the balancewheel back and forth.
- Without turning it, move zigzag stitch eccentric **3** (screw **4**) in accordance with the **requirement.**

13.05.10 Needle position adjustment lever

Requirement
The left and right throws of the needle must be the same size at the largest zigzag stitch setting and at the left or right needle position.

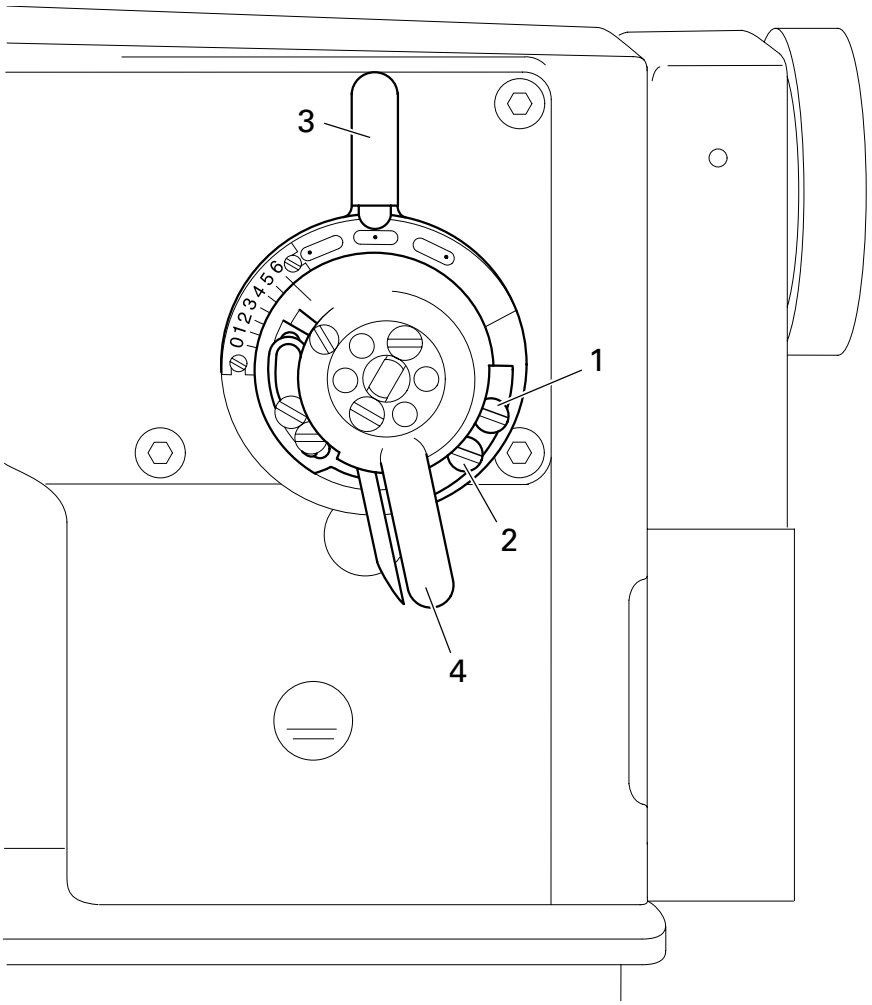
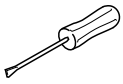


Fig. 13 - 11



- Loosen screws **1** and **2**.
- Set the needle position adjustment lever **3** to "**middle**" and the zigzag stitch adjustment lever **4** at the largest zigzag stitch.
- Place a piece of paper underneath the presser foot and perforate it to the left and right with the needle.
- Set the zigzag stitch adjustment lever **4** at "**0**" and move the needle position adjustment lever **3** to the right/left until the needle is exactly over the perforations made in the last step.
- For the left needle-position bring screw **1** to a position where it touches and tighten it and for the right needle-position do the same with screw **2**.

13.05.11 Zero position of the bottom feed dog (with closed gear box)

Requirement

1. When the stitch length is set at "0", the shaft crank **3** should not carry out a feeding motion when the balance wheel is turned.
2. Toothed segment **1** should be centred to the stepping motor axis.
3. Toothed segment **1** and toothed wheel should function smoothly and without backlash.

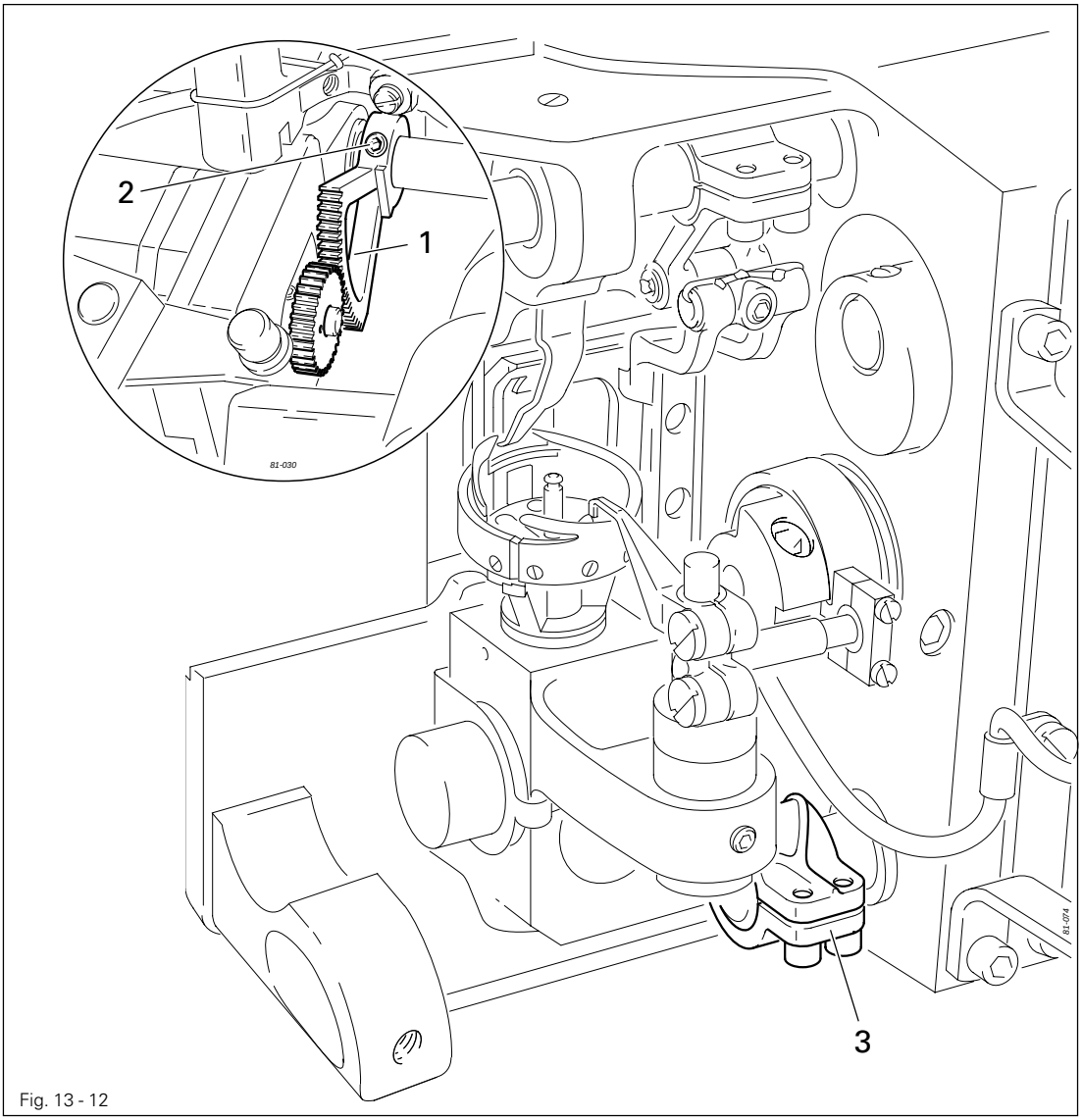
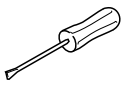


Fig. 13 - 12



- Switch on the machine.
- Set parameter "834" at "0".
- Switch off the start inhibitor by setting parameter "624" at "II".
- Adjust toothed segment **1** (screws **2**) in accordance with the **requirements.**
- Switch on the start inhibitor again.
- Switch off the machine.

13.05.12 Zeroing the bottom feed (with open gearbox)

Requirement
With the stitch length set at "**0**" the bottom feed dog must not carry out any feeding motion when the balance wheel is turned.

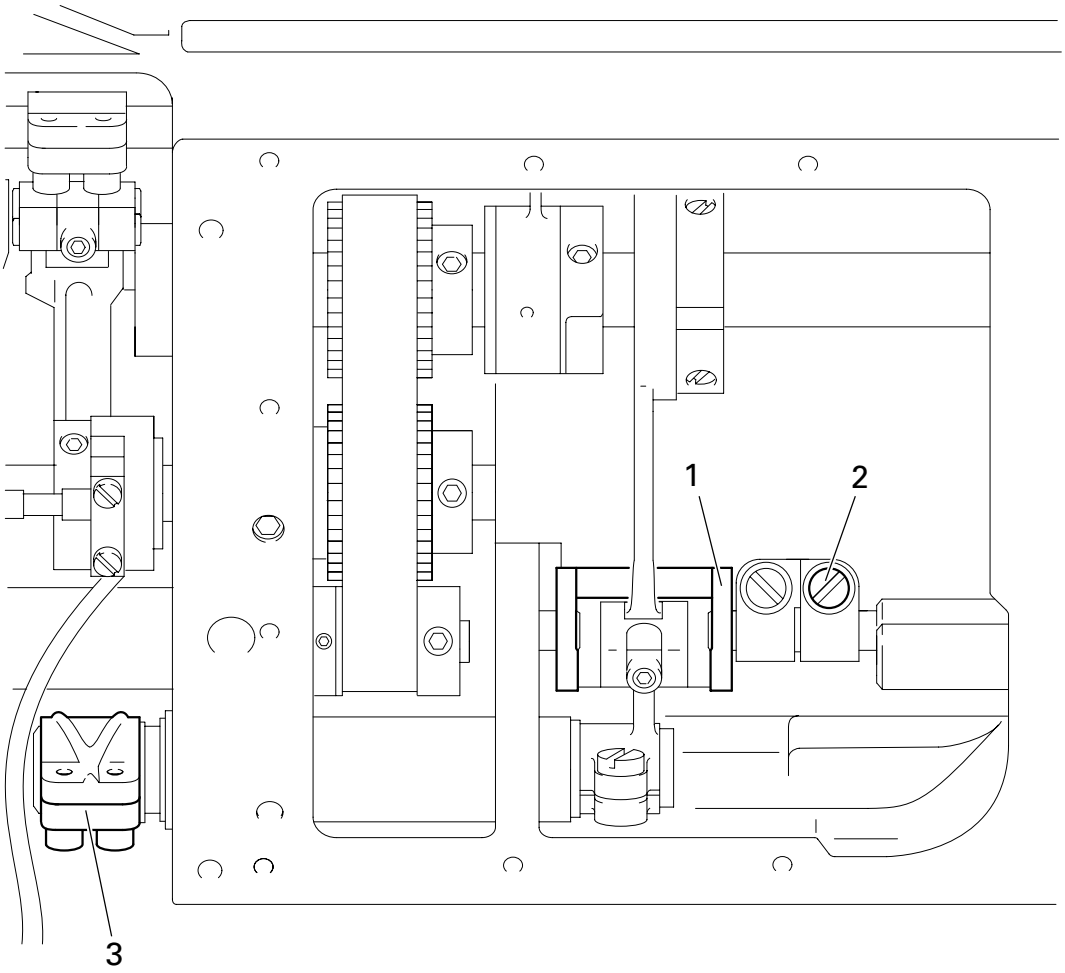


Fig. 13 - 13

- Switch on the machine.
- Set parameter "834" at "0".
- While continuously turning the balance wheel, adjust reversing crank **1** (screw **2**) in accordance with the **requirement.**
- Switch off the machine.

13.05.13 Feeding motion of the bottom feed dog

Requirement
With the maximum stitch length set and the needle bar position 1.0 past tdc (hole 4), the bottom feed dog must not move when the reverse feed lever is pressed.

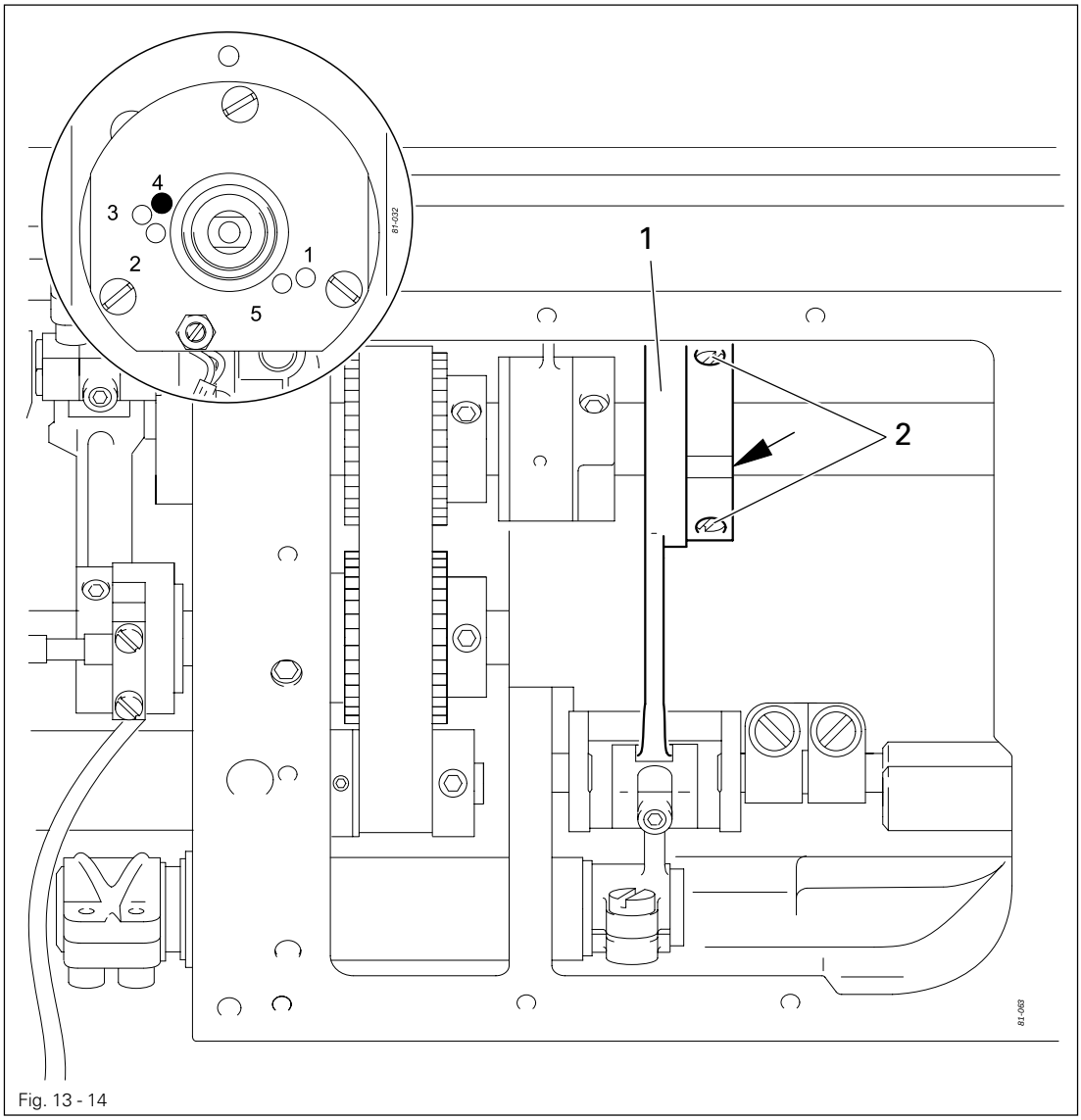


Fig. 13 - 14

- While continuously operating the reverse feed control, adjust feeding eccentric **1** (screws **2**) in accordance with the **requirement** (the counter-sinking in feeding eccentric **1** must be visible).

An axial displacement of feeding eccentric **1** is not allowed.

13.05.14 Lifting motion of the bottom feed dog

Requirement
With the stitch length set at "**0**" and the needle bar position at 0.25 mm past tdc (hole 3) the bottom feed dog must be at its upper point of reversal.

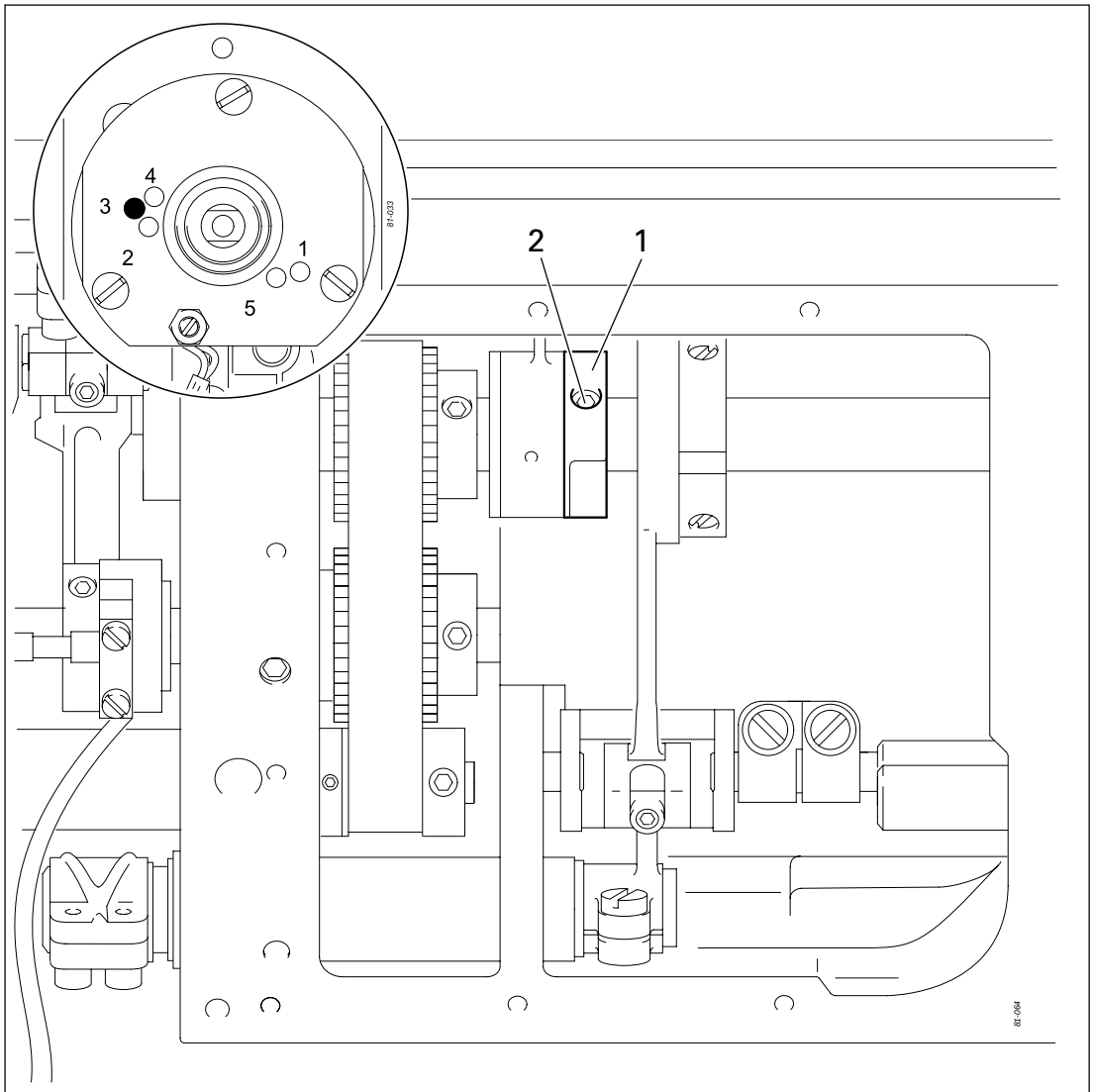


Fig. 13 - 15

- Adjust feed lifting eccentric **1** (screw **2**) in accordance with the **requirement.**

An axial displacement of feed lifting eccentric **1** is not allowed.

13.05.15 Drive belt in the gearbox housing

Requirement
Drive belt 4 must be tightened so that the machine runs freely and the belt sprockets do not have any noticeable play.

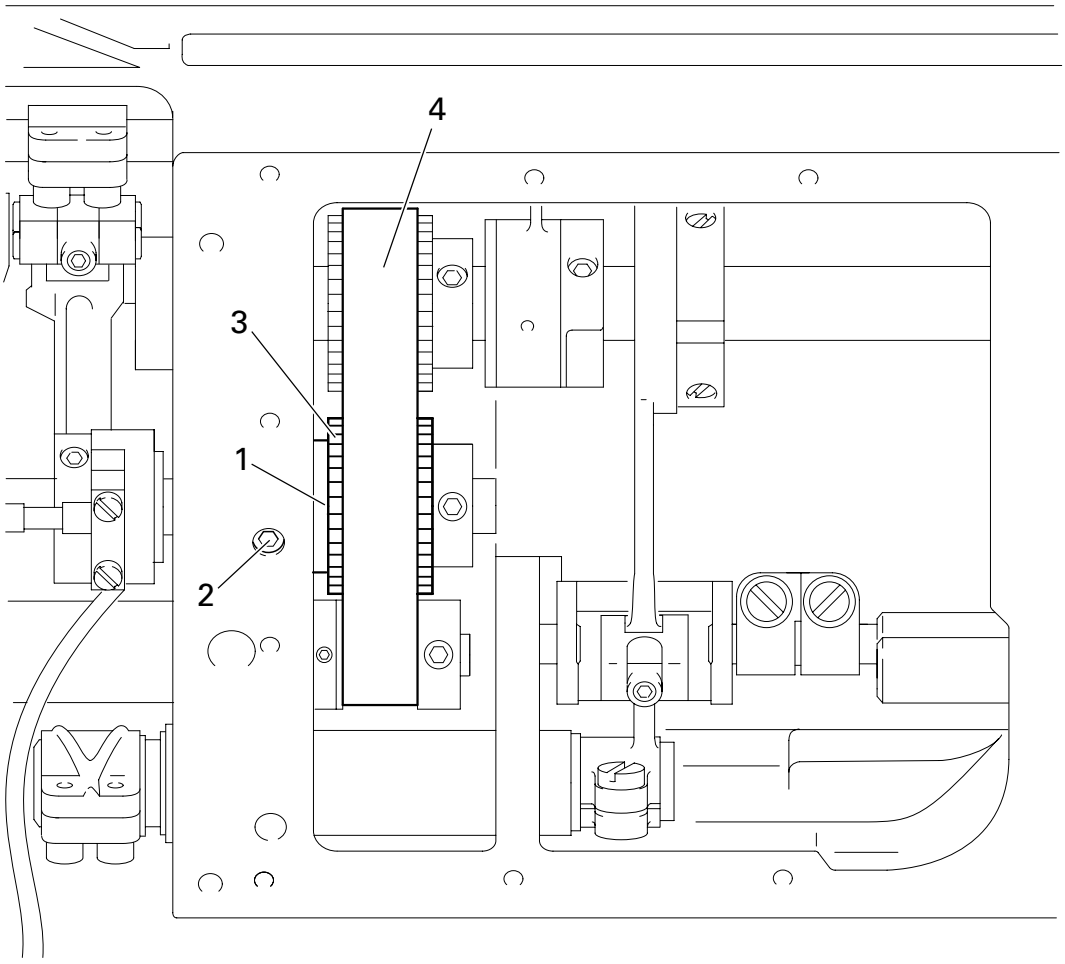


Fig. 13 - 16

- Adjust eccentric bearing bush **1** (screw **2**) in accordance with the **requirement** and so that drive belt **4** is in the centre of bobbin opener drive wheel **3**.

13.05.16 Hook bearing bracket

Requirement
The hook shaft must be touching the hook bearing bracket adjustment gauge 1 at the top and the side.

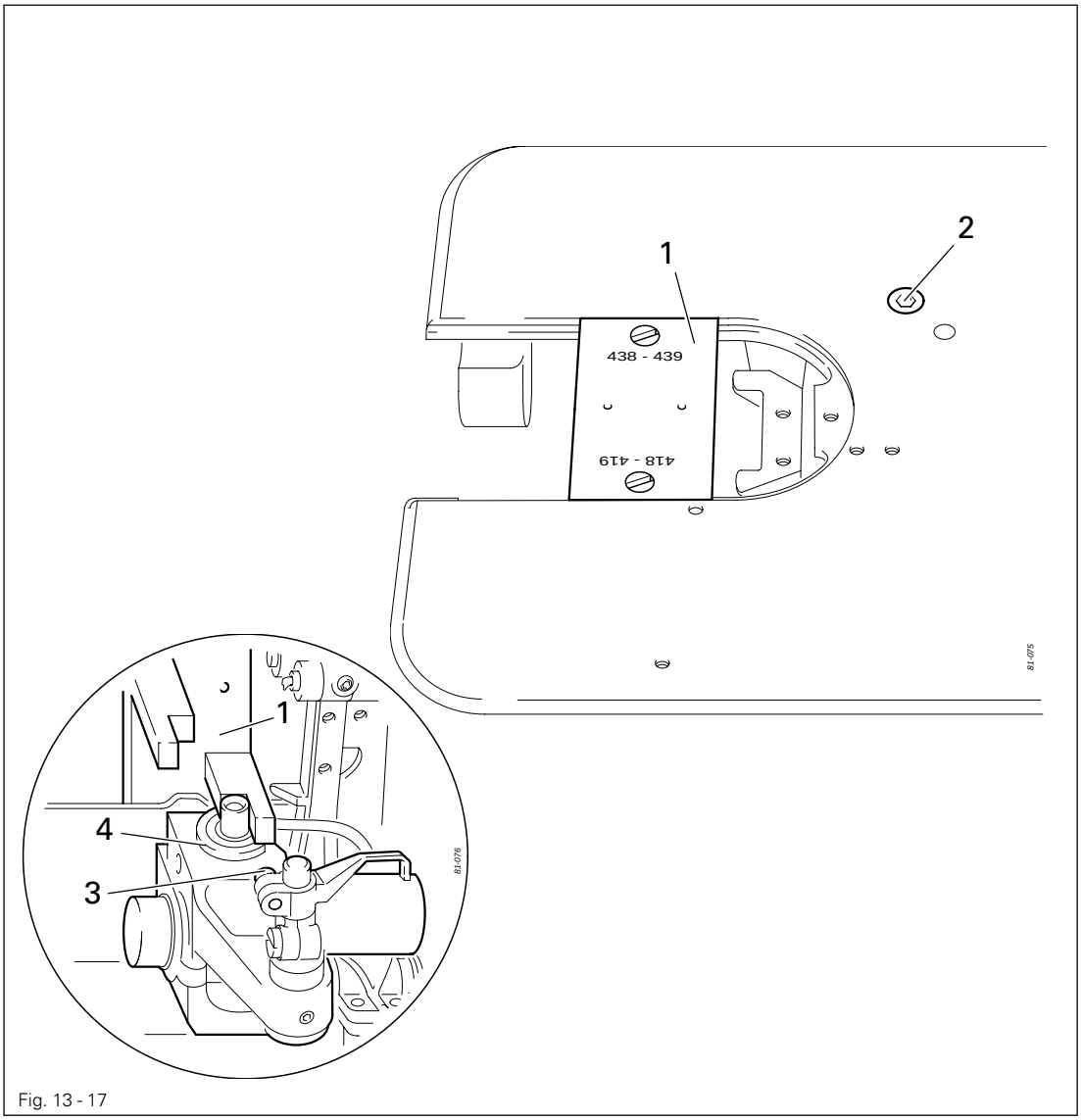


Fig. 13 - 17

- Loosen screw **3**.
- Swing the bobbin case opener to the right and remove the hook.
- Loosen screw **2** and loosen the draw key underneath it by lightly tapping the head of the screw.
- Screw on the hook bearing bracket adjustment gauge.
- It must be possible to read the numbers "438-439" from the front.
- Move or turn hook bearing bracket **4** in accordance with the **requirement**.
- Tighten screw **2**.
- Adjust the bobbin case opener in accordance with **subsection 13.05.21 Bobbin case opener position.**

13.05.17 Hook lubrication

Requirement
When the machine is running at full speed, after about 10 seconds a fine oil streak should be visible on a strip of paper held over the needle plate cutout.

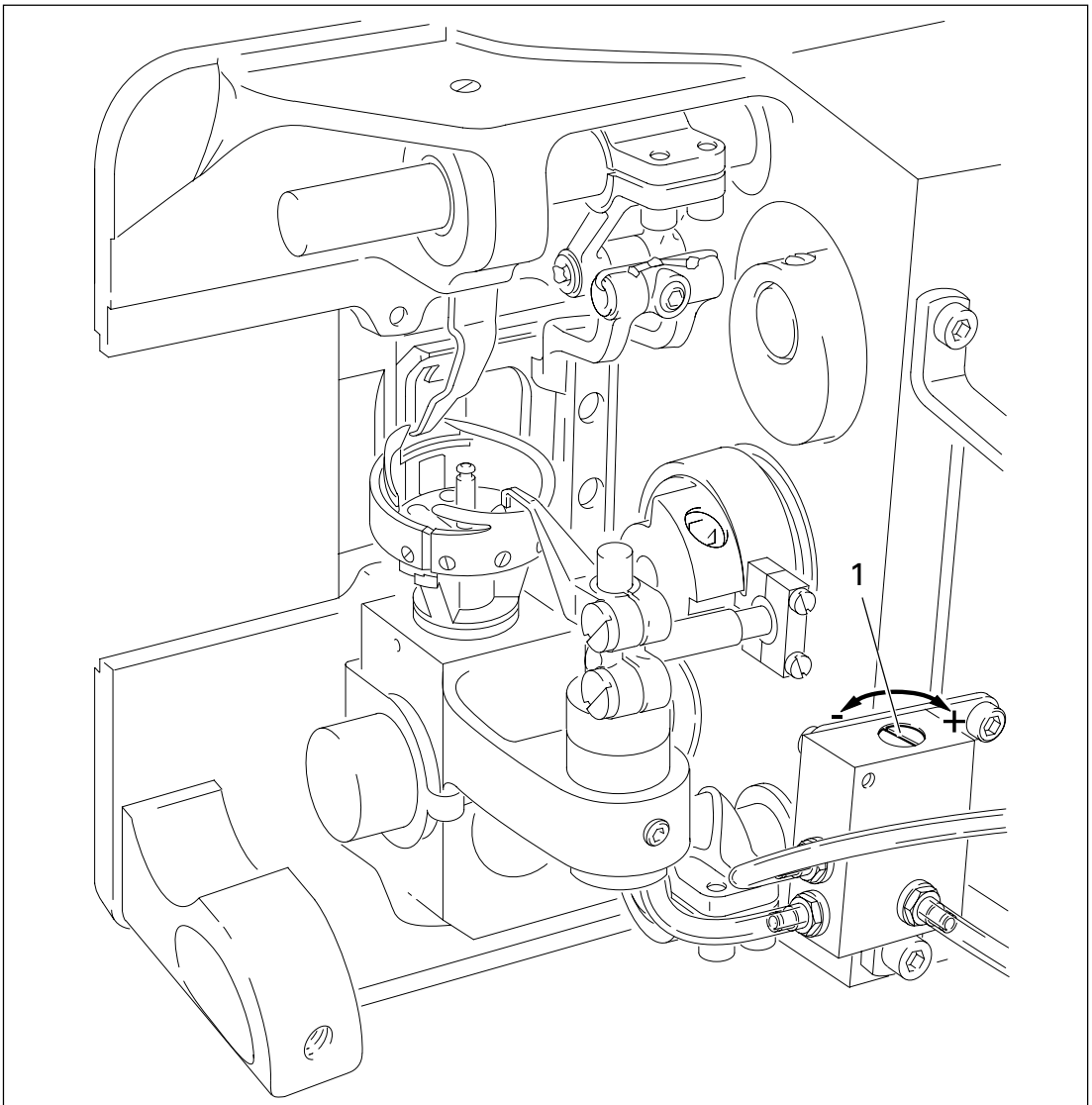
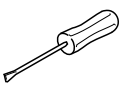


Fig. 13 - 18



- Adjust screw **1** in accordance with the **requirement**.

13.05.18 Pre-adjusting the needle height

Requirement
With the needle bar at tdc (hole 2) the distance between the point of the needle and the needle plate must be **19 mm**.

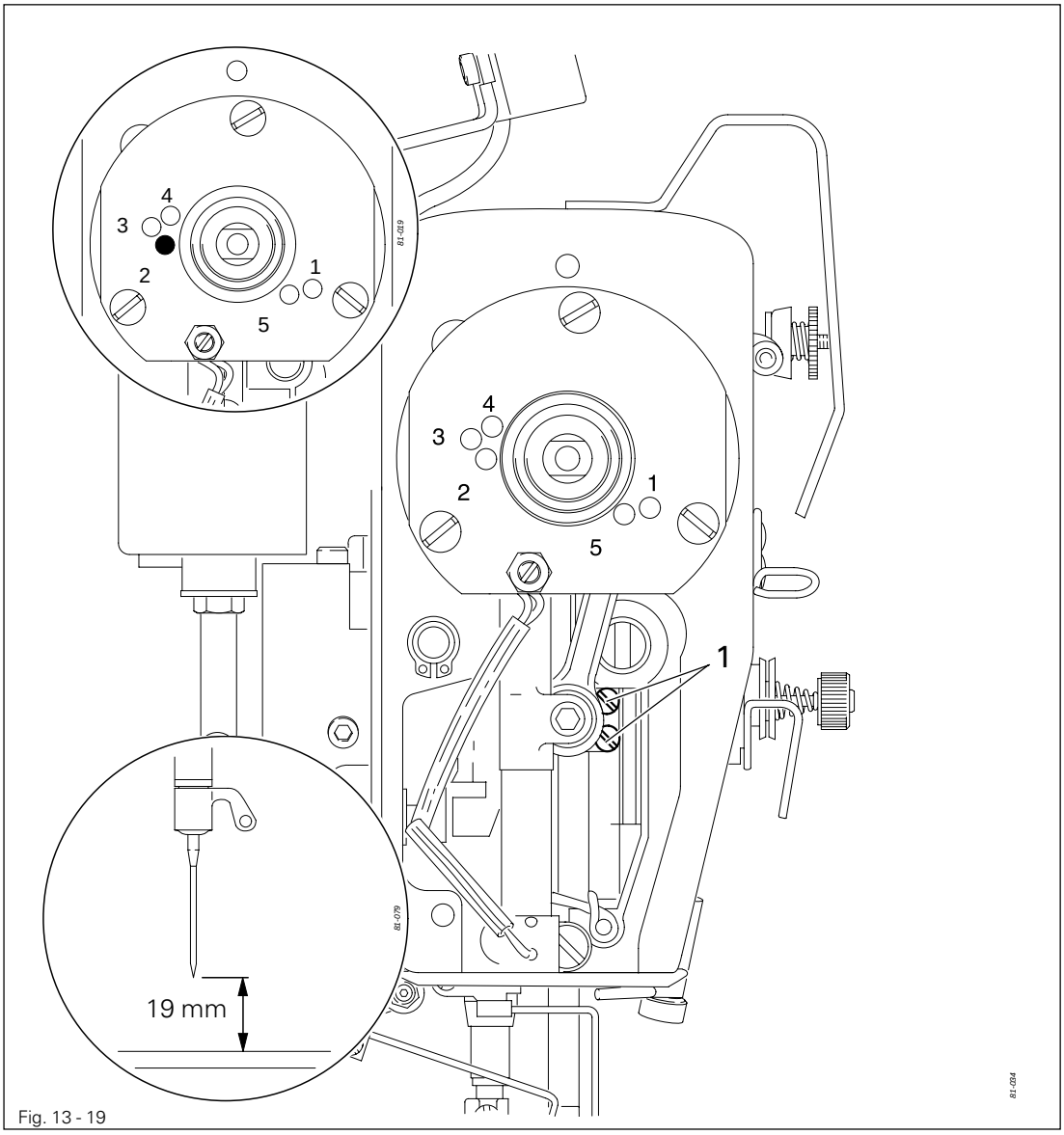


Fig. 13 - 19

- Without turning it, adjust the needle bar (screws **1**) in accordance with the **requirement.**

13.05.19 Needle rise, hook-to-needle clearance and bobbin case positioning-finger

Requirement

1. With the needle position set at "middle", the zigzag stitch setting at "0" and the needle bar position 2.0 past bdc (hole 1) the hook point must be in the middle of the needle and the distance between the needle and the hook point must be **0.05 - 0.1 mm**.
2. The bobbin case positioning-finger must be fitted so that there is a clearance of **0.5 mm** between the bottom section of the bobbin case and the front edge of the bobbin case positioning-finger (see arrow).

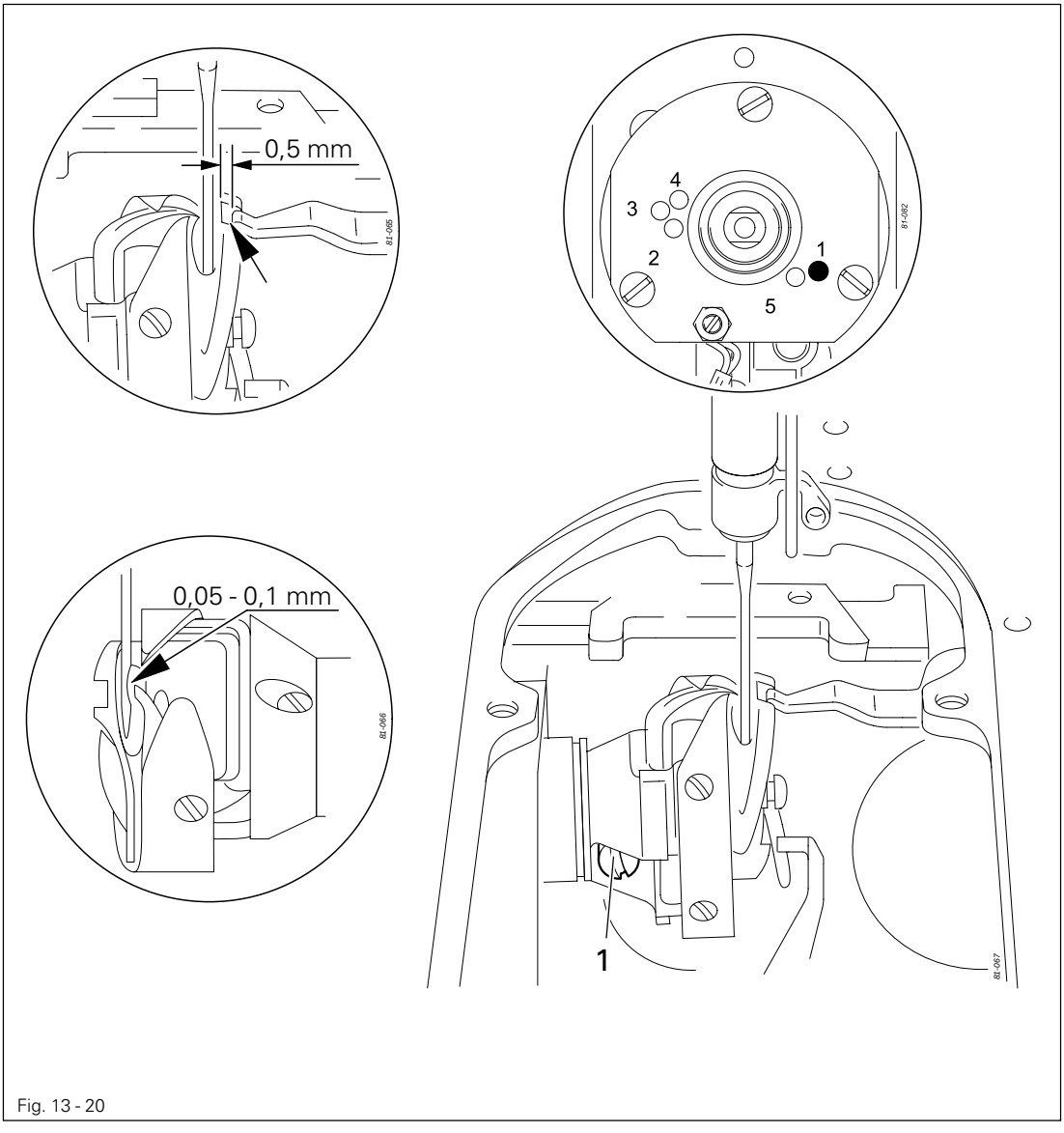


Fig. 13 - 20

- Adjust the hook (screw **1**) in accordance with **requirement 1.**
- Fit the bobbin case position stop in accordance with **requirement 2.**

13.05.20 Final adjustment of the needle height

Requirement
With the zigzag stitch set at "0", the needle position set at "left" and the hook point in the middle of the needle, the top edge of the needle eye must be **0.5 mm** underneath the hook point.

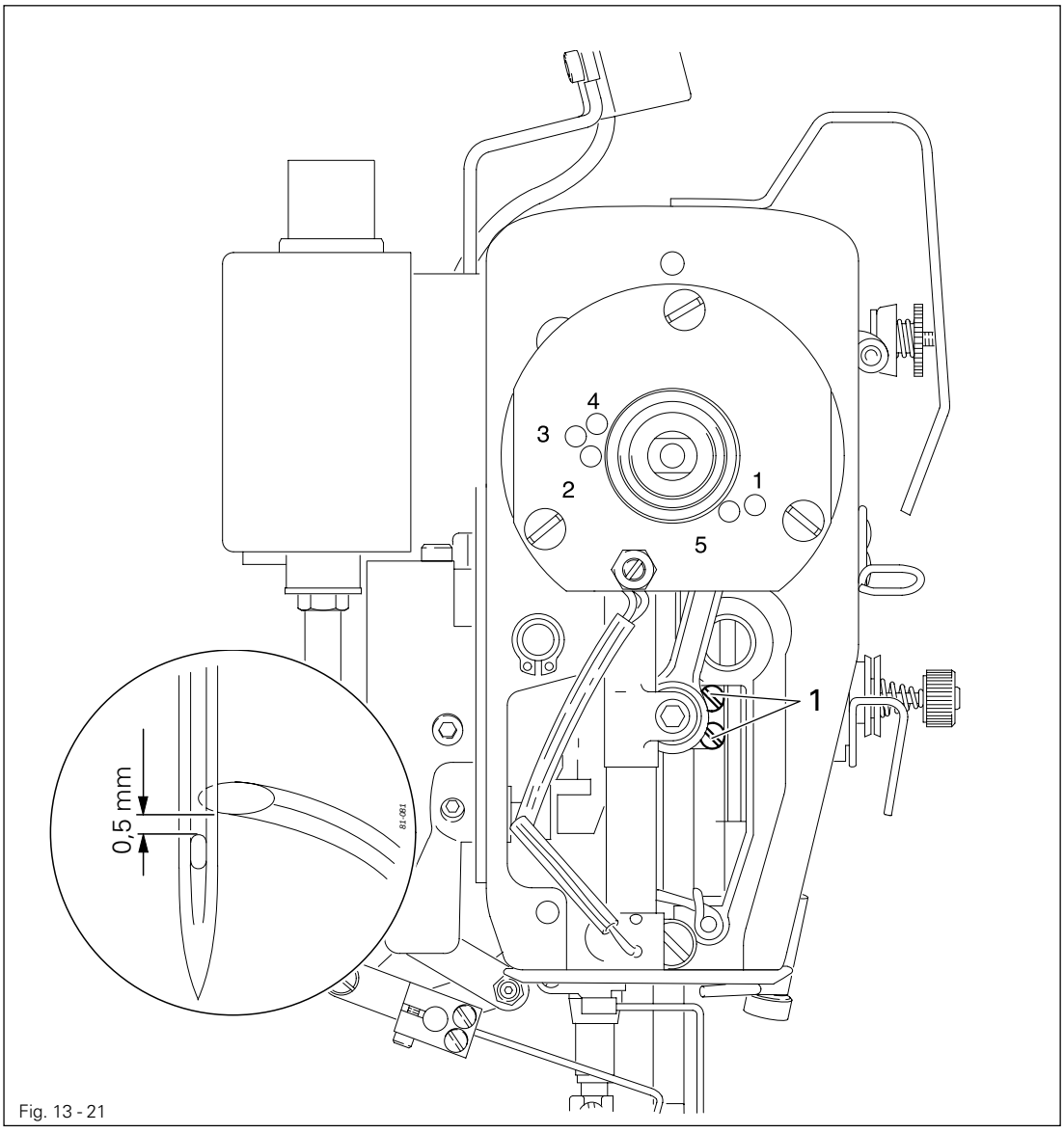
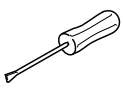


Fig. 13 - 21



- Without turning it, adjust the needle bar (screws **1**) in accordance with the **requirement.**

13.05.21 Bobbin case opener position

Requirement

1. There must be a clearance of **0.5 mm** between the top edge of the bobbin case opener and the inner edge of the bottom section of the bobbin case.
2. Between the bobbin case opener finger and the bottom section of the bobbin case opener there must be a clearance of **0.8 mm**.
3. At the left point of reversal of the bobbin case opener the bobbin case positioning-finger must be approx. **0.3 mm** from the right side of the groove in the bottom section of the bobbin case.

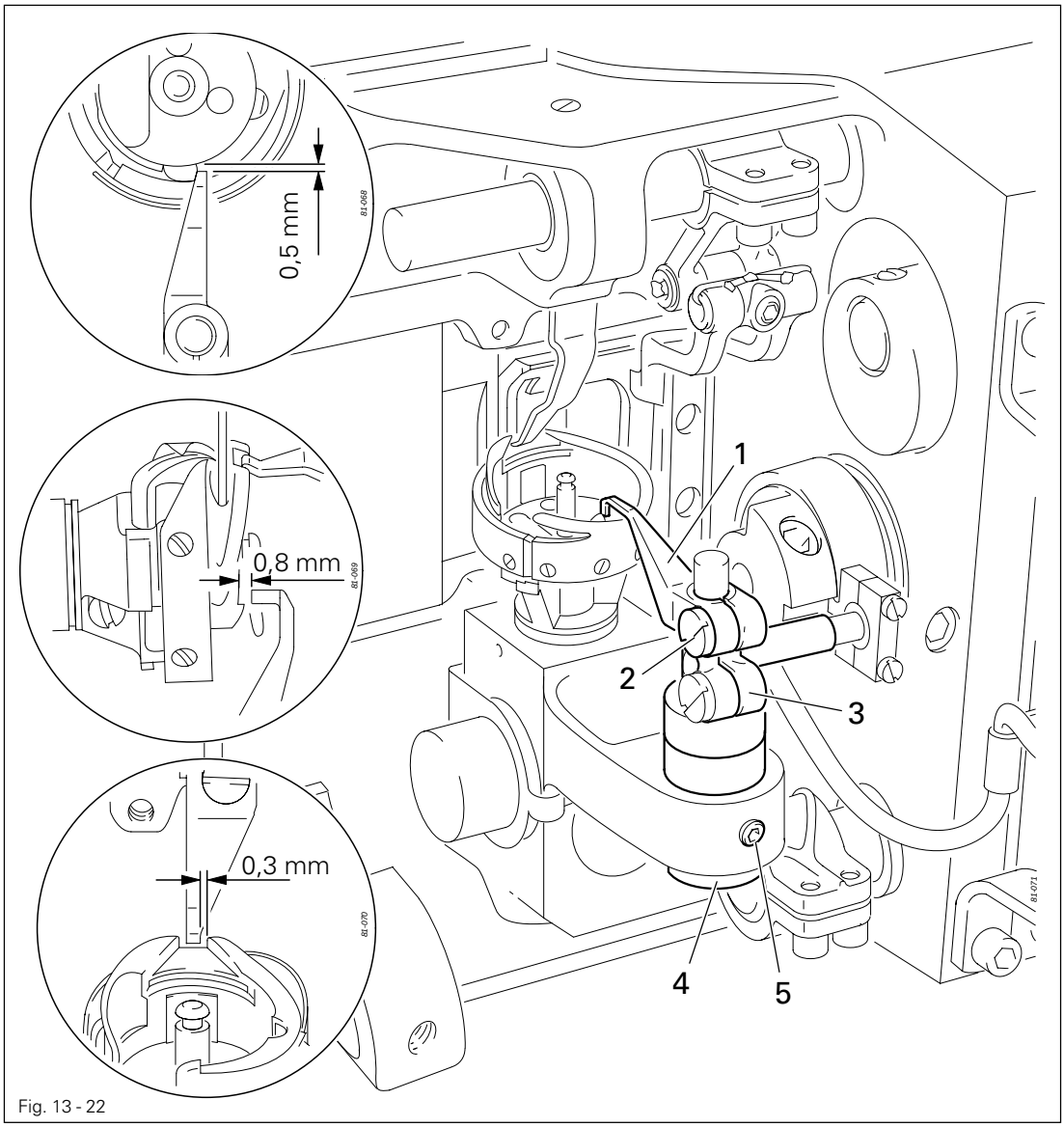
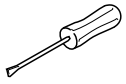


Fig. 13 - 22



- Loosen screw **2**.
- Place bobbin opener **1** on the right side of the bobbin case base, press it against clamp crank **3** located underneath this and slightly tighten screw **2**.
- Adjust eccentric bearing bush **4** (screw **5**) in accordance with **requirements 1** and **2**.
- Adjust bobbin opener **1** in accordance with **requirement 3** and tighten screw **2**, taking care to see that bobbin opener **1** is touching clamp crank **3**.

13.05.22 Bobbin case opener motion

Requirement
With the needle bar 2.0 past bdc (hole 1) the bobbin case opener 3 must be at its right point of reversal.

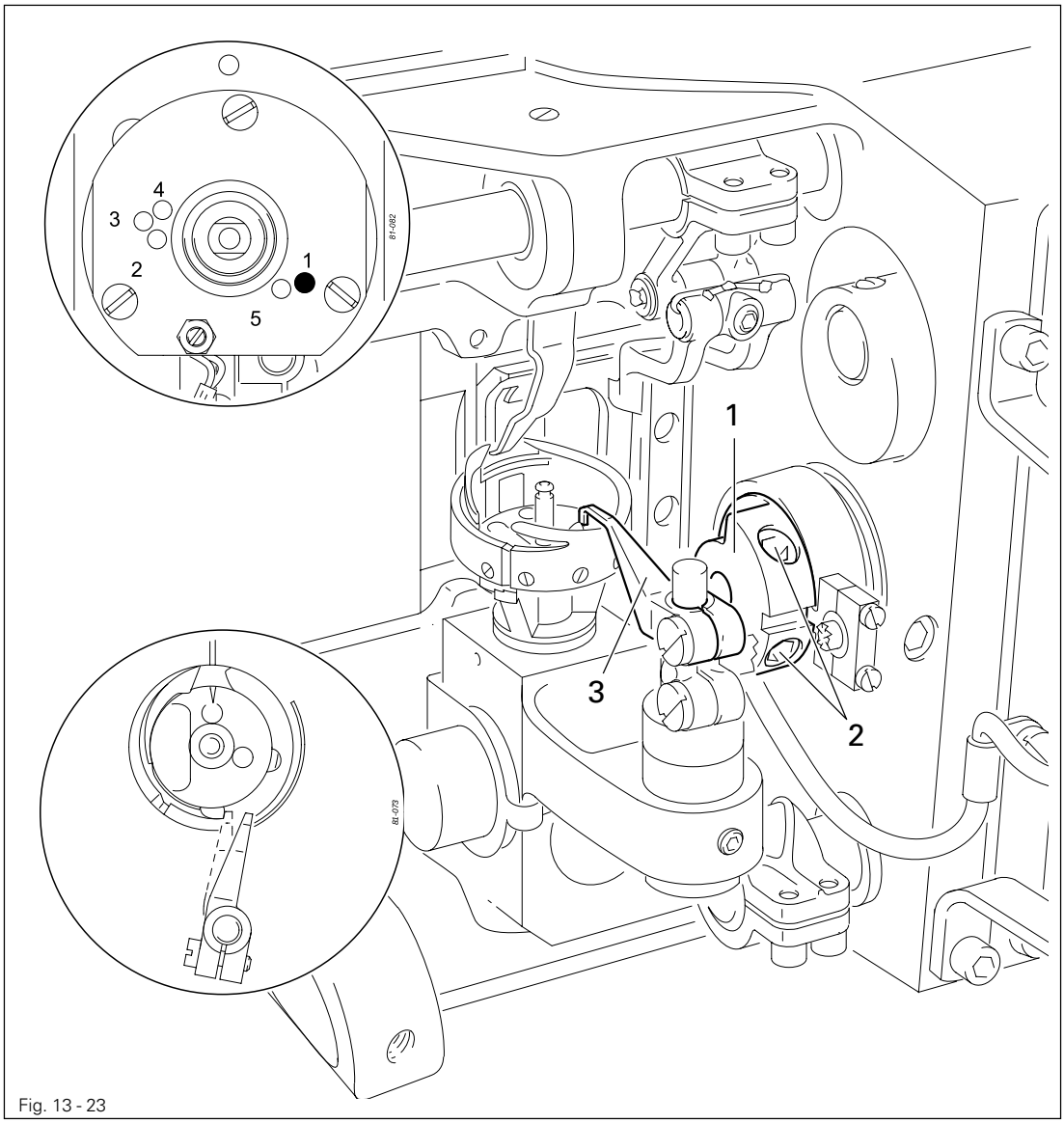


Fig. 13 - 23

- Adjust bobbin opener eccentric **1** (screws **2**) in accordance with the **requirement.**

13.05.23 Bottom feed dog height

Requirement
With the stitch length set at "0" and the needle bar position at 0.25 past tdc (hole 3) the bottom feed dog must be in the middle of the needle plate cutout and be touching the feed dog height-adjustment gauge along its entire length.

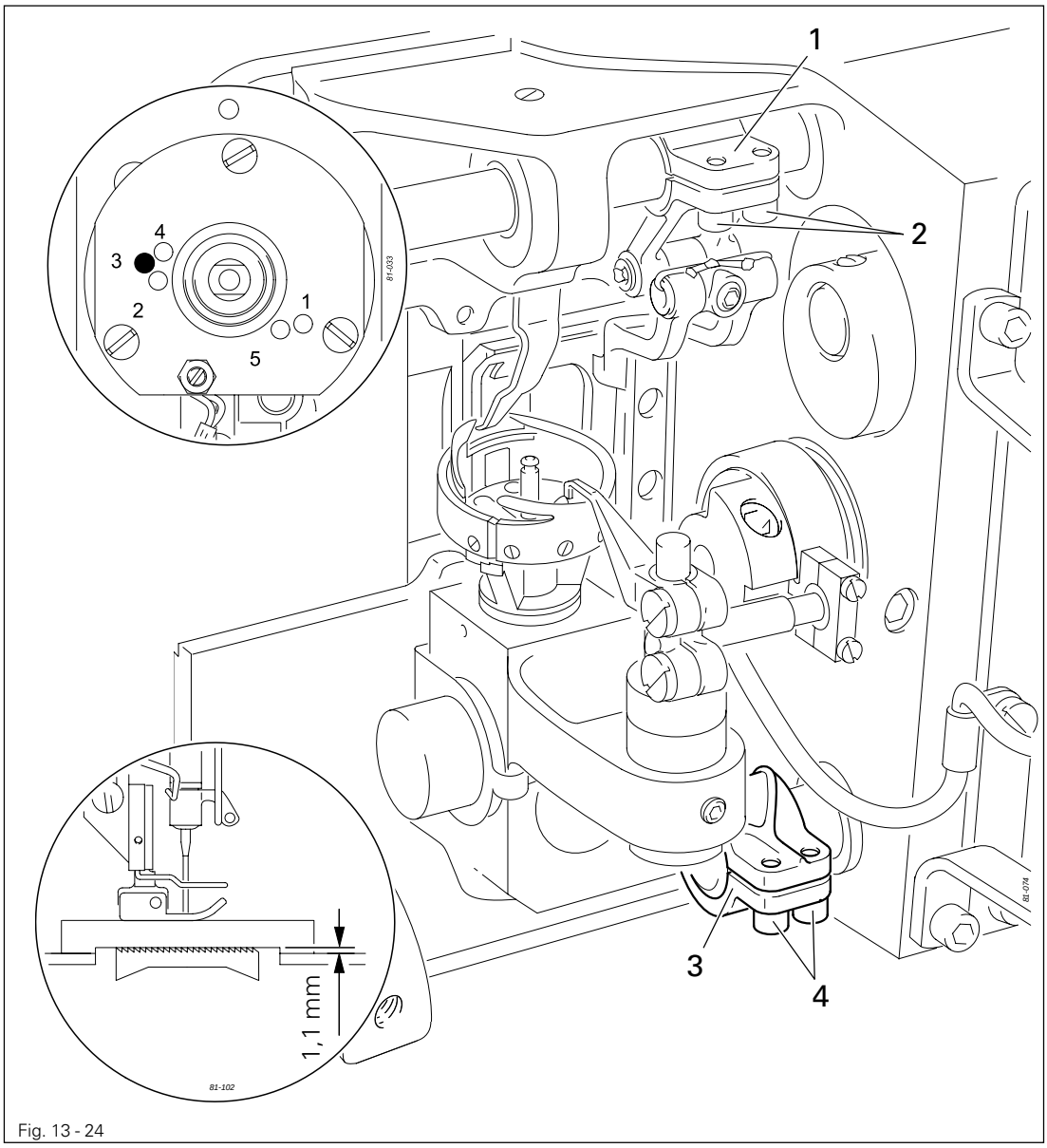


Fig. 13 - 24

- Position the feed dog adjustment gauge underneath the presser foot with the cutout facing downwards.
- Lower the presser foot onto it.
- Press the feed dog carrier up and position the feed dog in the middle of the needle plate cutout.
- Adjust lifting crank **1** (screws **2**) and clamp bushing **3** (screws **4**) in accordance with the **requirement.**

13.05.24 Presser foot to needle plate clearance

Requirement
When the hand lever is raised, the needle should penetrate exactly in the "**needle hole centre**" of the presser foot and the presser foot to needle plate clearance should be **7 mm.**

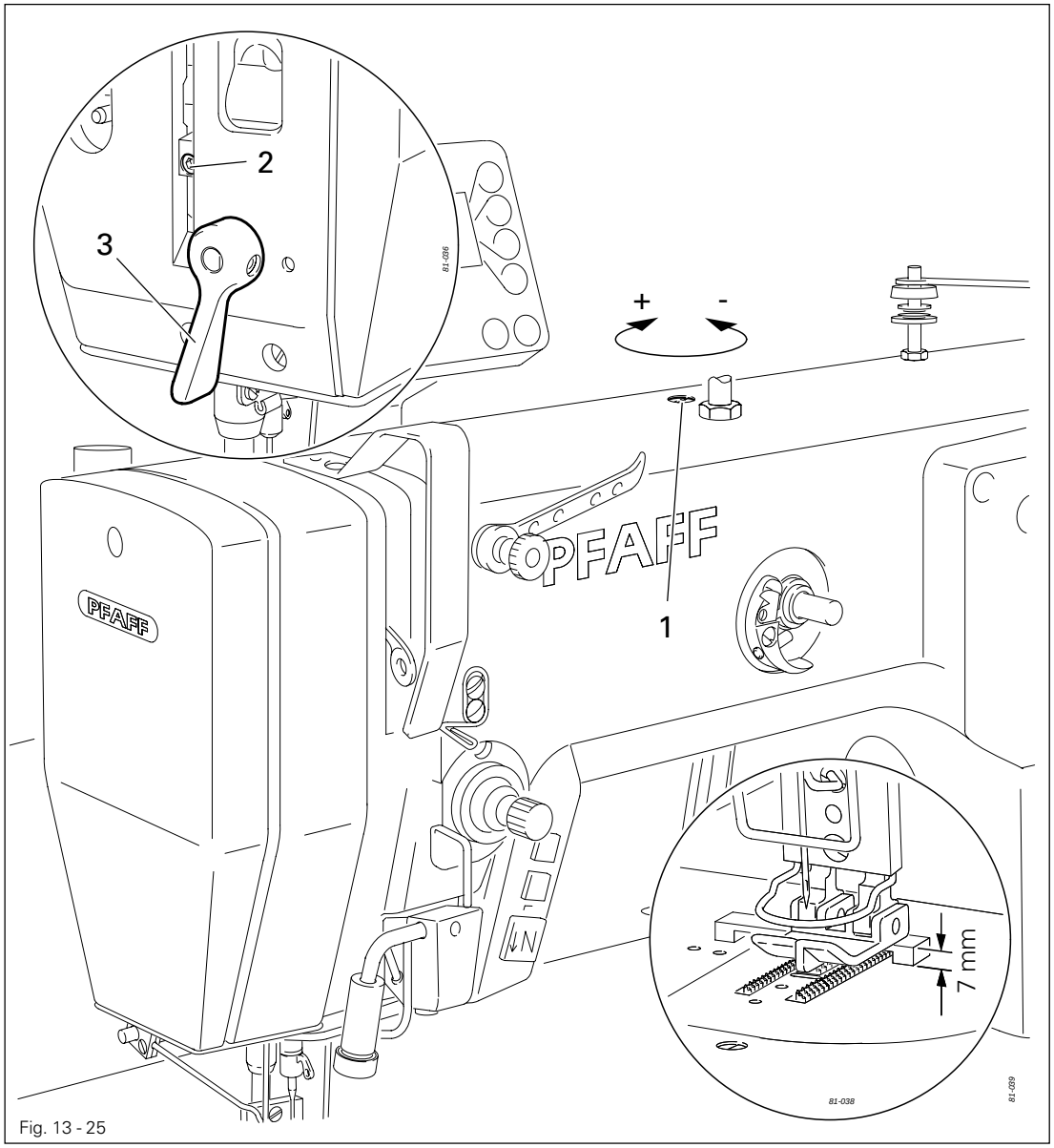


Fig. 13 - 25

- Set the zigzag stitch adjustment lever at "**0**" and the stitch position adjustment lever at "**centre**".
- Let the presser foot drop onto the needle plate and reduce the pressure on the presser bar by turning screws **1**.
- Place the feed dog adjustment gauge under the presser foot with the recess at the bottom.
- Loosen screw **2** and raise hand lever **3**.
- Allow the needle to penetrate the needle hole and align the presser foot in accordance with the **requirement.**
- Press the presser bar lifting piece down and tighten screw **2**.

13.05.25 Presser foot pressure

Requirement
Even at top sewing speed the material should be fed without problems. There should be no pressure marks on the material.

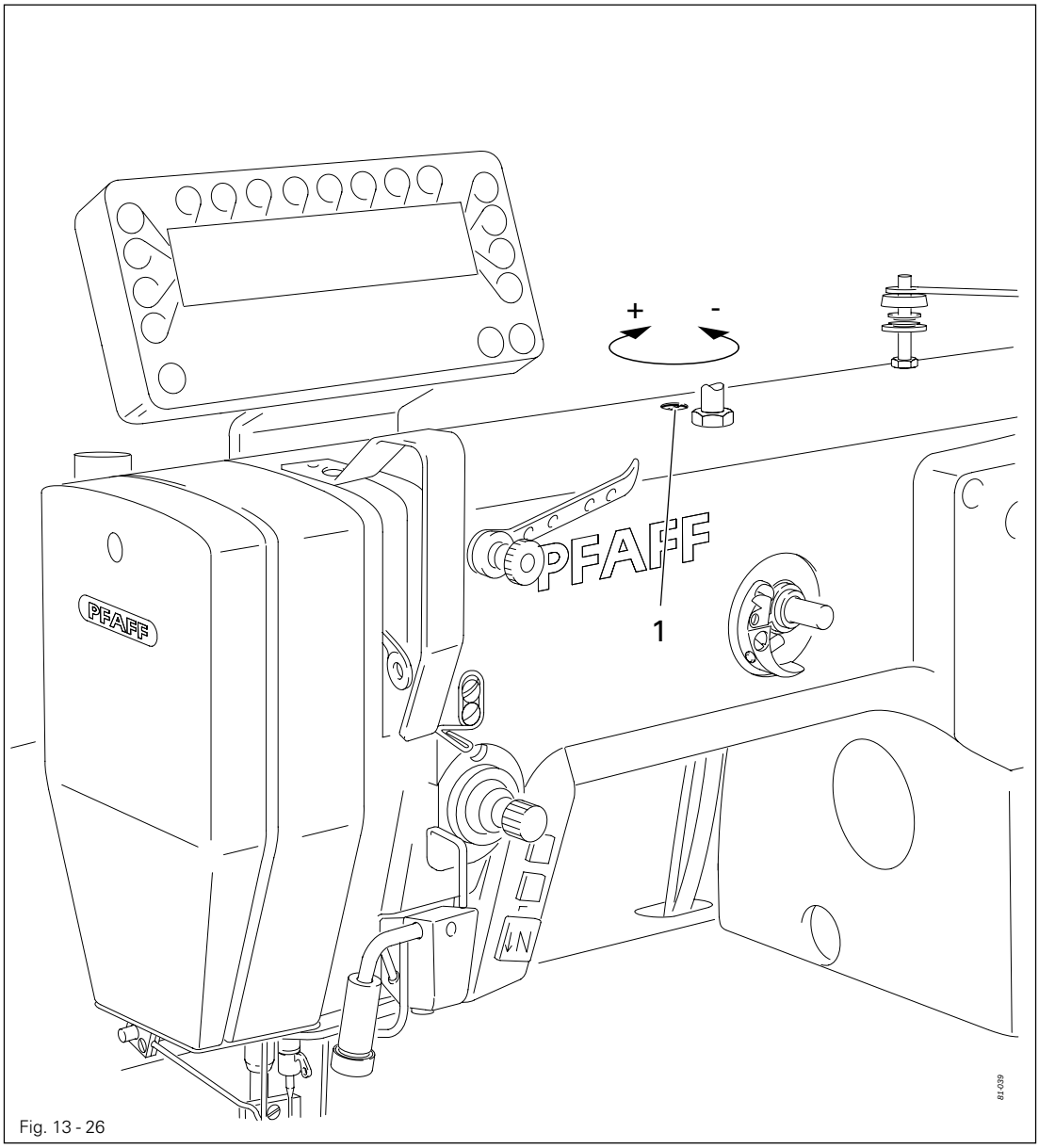


Fig. 13 - 26

- Turn screw **1** in accordance with the **requirement.**

The presser foot pressure (screw 1) can be increased (**+**) or reduced (**-**) as required.

13.05.26 Thread diverter pin

Requirement
With the needle bar at bdc the top edge of the thread guide hole must be at the same height as the bottom edge of the thread diverter.

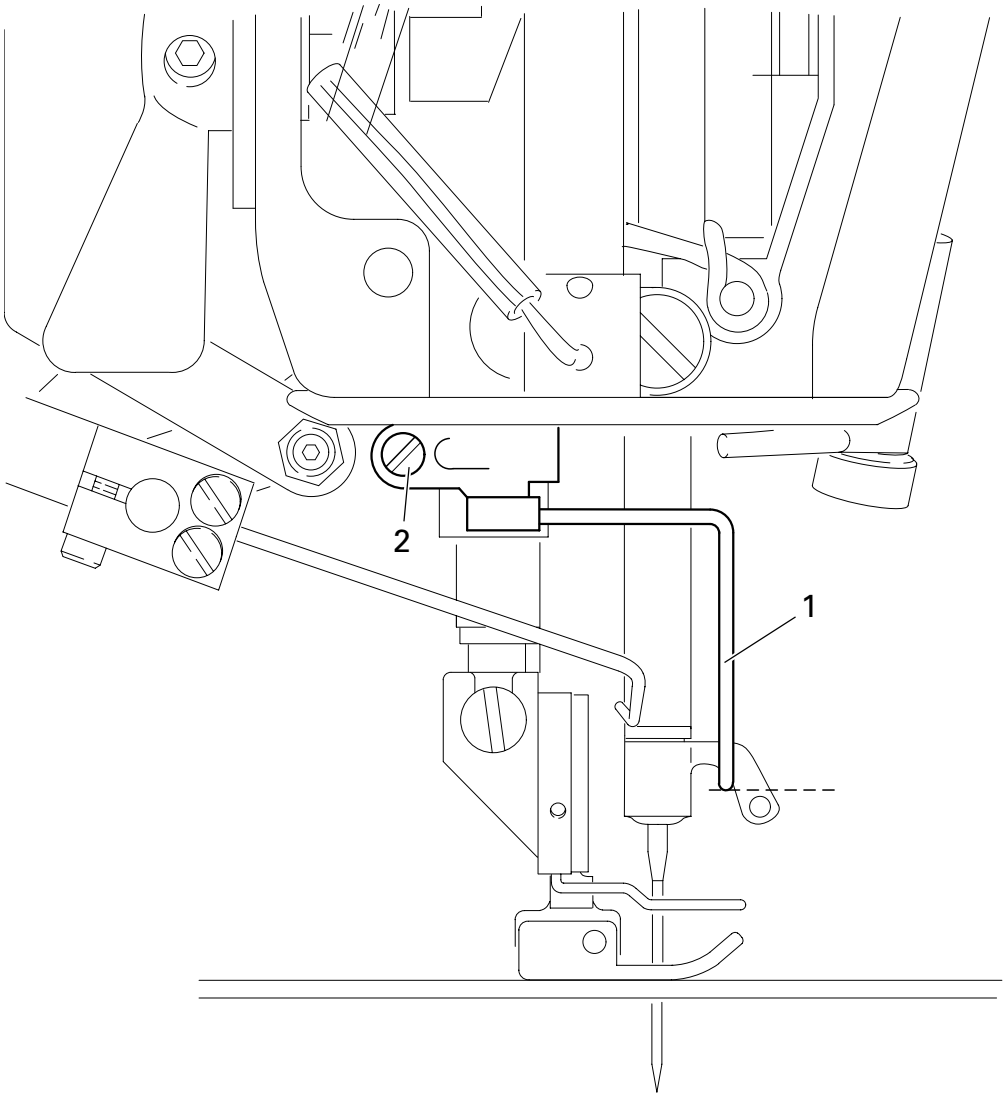


Fig. 13 - 27

- Adjust thread guide bar **1** (screw **2**) according to the **requirement,** taking care that it is parallel to the bed-plate.

13.05.27 Limiting the knee lever stroke

Requirement
When the knee lever is pressed the hand lever must drop automatically and the presser foot must be just over **7 mm** above the needle plate.

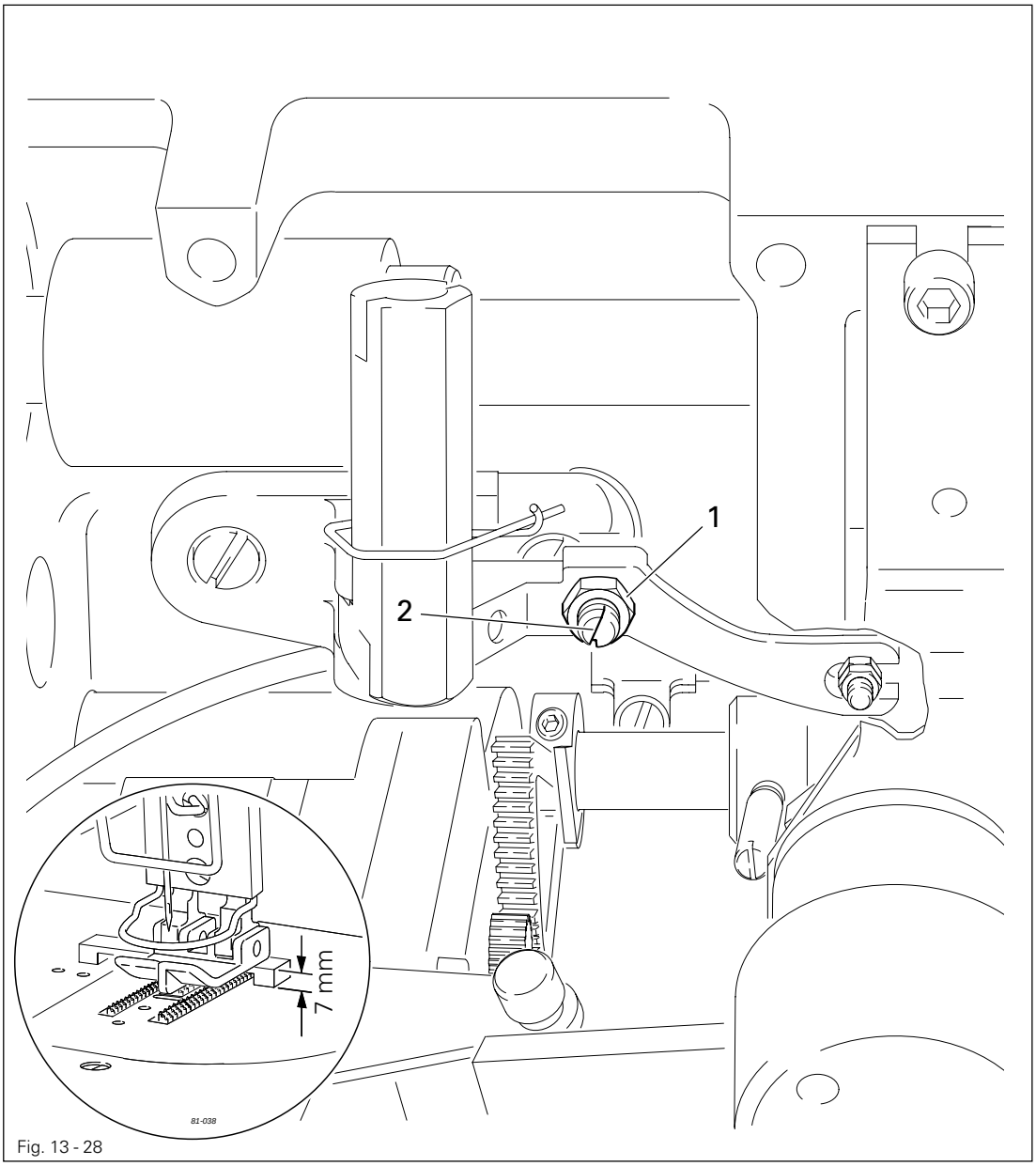
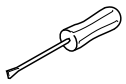


Fig. 13 - 28



- Place the feed dog gauge under the presser foot with its recess facing downwards.
- Lower the presser foot onto the gauge.
- Loosen nut **1** and turn screw 2 out a few turns.
- Move the knee lever to the right until a noticeable resistance is felt, making sure that the presser foot is not lifted off the gauge, and hold it at this position.
- Turn screw **2** in as far as it will go, then back out by one turn, and lock it in place with nut **1**.



The knee lever is not a part of the delivery.

13.05.28 Knee lever play

Requirement
When lightly pressing the knee lever there should be a noticeable play between nut **1** and fork **3**.

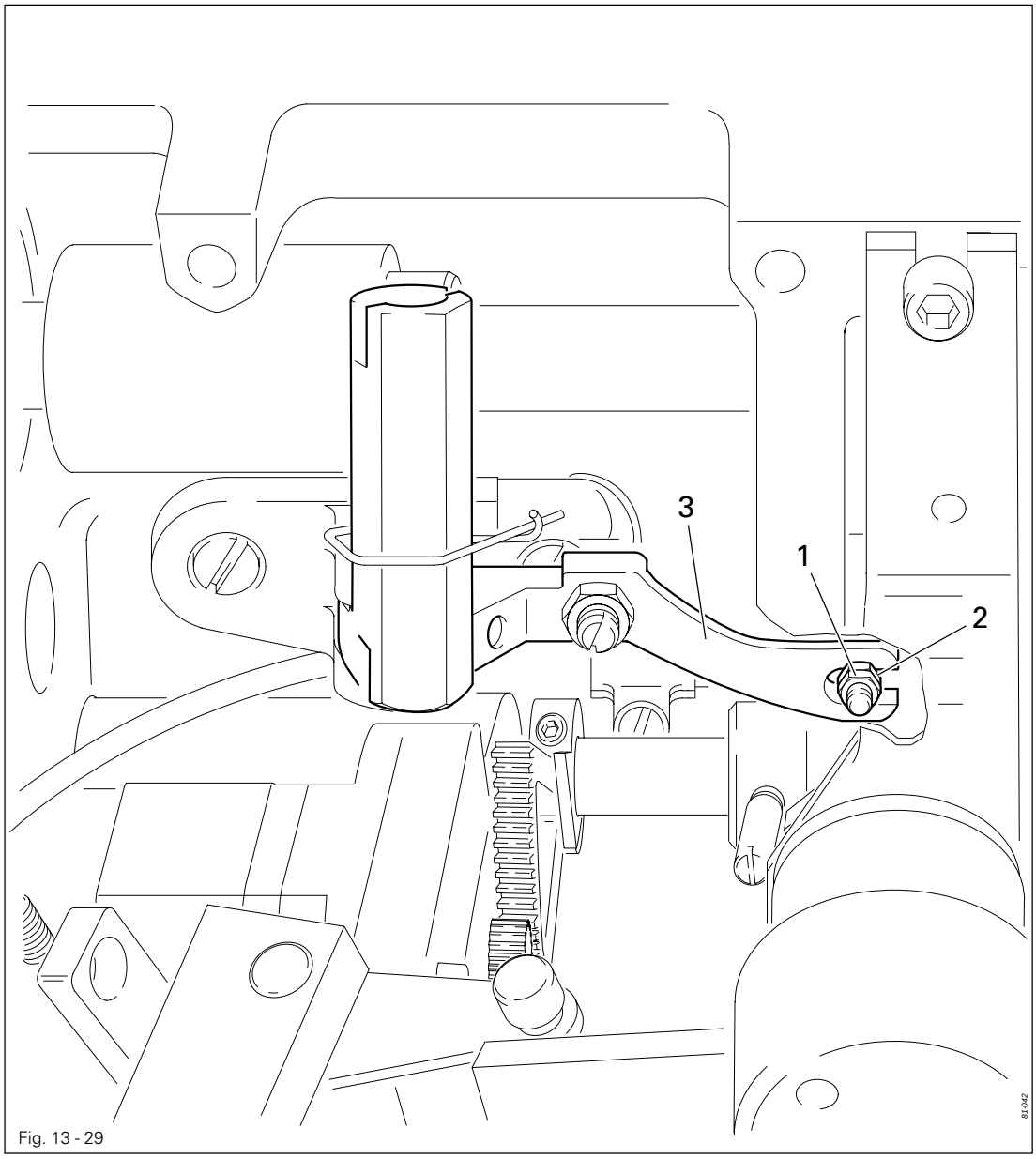


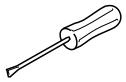
Fig. 13 - 29

- Adjust nut **1** (nut **2**) in accordance with the **requirement** and lock it with nut **2**.

The knee lever is not a part of the delivery.

13.05.29 Setting the zero point of the feed regulator

Requirement
When the feed regulator is set at "0", at maximum speed (4500 spm) the needle should always penetrate at the same point.



- Unthread the machine.
- Switch the machine on.
- Place the workpiece under the presser foot.
- Let the machine sew at maximum speed and check the **requirement.**
  (The workpiece should not move).
- Change the value for parameter **834** within the permissible values in accordance with the **requirement.**



The permissible values for parameter 834 are "-1", "0" or "1".
If the zero point of the feed regulator cannot be set by selecting one of the permissible values, the mechanical setting must be checked or corrected, see **Chapter 13.05.11 Zero position of the bottom feed dog.**



The zero point of the feed regulator is always recognisable in a range of 3 values. When making the adjustment, the average value must be selected.

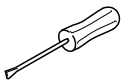
- Switch off the machine.



More information about selecting and changing parameters and explanations (functions) of the individual parameters is contained in **Chapter 13.12 Parameter settings.**

13.05.30 Stitch length adjustment forwards and in reverse

Requirement
At a maximum speed of 400 spm, the stitch length selected on the control panel should not differ from the actual stitch length when sewing forwards or in reverse.



- Thread the machine.
- Switch the machine on.
- Selected the stitch length being used on the control panel.
- With parameter **607** limit the maximum speed to 400 spm.
- Set parameter **846** at **100**.
- Place the workpiece under the presser foot.
- Sew a seam with at least 20 stitches.
- Measure the length of the seam over 20 stitches and calculate the actual stitch length.
- If the difference, measured over 20 stitches, is larger than +/- 0.5 mm, the value for parameter 846 must be corrected.
- Take the value for parameter **846** from the table or calculate it with the aid of the formula:

$$\frac{\text{Set stitch length}}{\text{Actual stitch length}} \times 100$$

Stitch length 2.2 mm		Stitch length 2.0 mm		Stitch length 1.6 mm		Stitch length 1.4 mm	
Length over 20 stitches	Value for parameter 846 / 847	Length over 20 stitches	Value for parameter 846 / 847	Length over 20 stitches	Value for parameter 846 / 847	Length over 20 stitches	Value for parameter 846 / 847
56,0	78	52,0	77				
55,5	79	51,5	78				
55,0	80	51,0	78				
54,5	**81**	**50,5**	**79**				
54,0	81	50,0	80	42,0	76		
53,5	82	49,5	81	41,5	77		
53,0	83	49,0	82	41,0	78		
52,5	84	48,5	82	40,5	79		
52,0	85	48,0	83	40,0	80	36,0	77
51,5	85	47,5	84	39,5	81	35,5	79
51,0	86	47,0	85	39,0	82	35,0	80
50,5	87	46,5	86	38,5	83	34,5	81
50,0	88	46,0	87	38,0	84	34,0	82
49,5	89	45,5	88	37,5	85	33,5	84
49,0	90	45,0	89	37,0	86	33,0	85
48,5	91	44,5	90	36,5	88	32,5	86
48,0	92	44,0	91	36,0	89	32,0	87
47,5	93	43,5	92	35,5	90	31,5	89
47,0	94	43,0	93	35,0	91	31,0	90
46,5	95	42,5	94	34,5	93	30,5	92
46,0	96	42,0	95	34,0	94	30,0	93
45,5	97	41,5	96	33,5	96	29,5	95
45,0	98	41,0	98	33,0	97	29,0	97
44,5	99	40,5	99	32,5	98	28,5	98
44,0	100	40,0	100	32,0	100	28,0	100

- Select the calculated value for parameter **846.**
- Switch off the machine.



The adjustment of the reverse stitch length is carried out as described in the above work steps **with the reverse feed key pressed.**
More information about selecting and changing parameters and explanations (functions) of the individual parameters is contained in **Chapter 13.12 Parameter settings.**

13.05.31 Bobbin winder

Requirement

1. When the bobbin winder is switched on, the bobbin winder spindle should be driven reliably, whereby the friction wheel **5** should not touch drive wheel **1** when the bobbin winder is switched off.
2. The bobbin winder should switch off automatically, when the thread is approx. **1 mm** from the edge of the bobbin winder.
3. The eccentric pin **3** should be positioned in the centre of the large bobbin chamber.

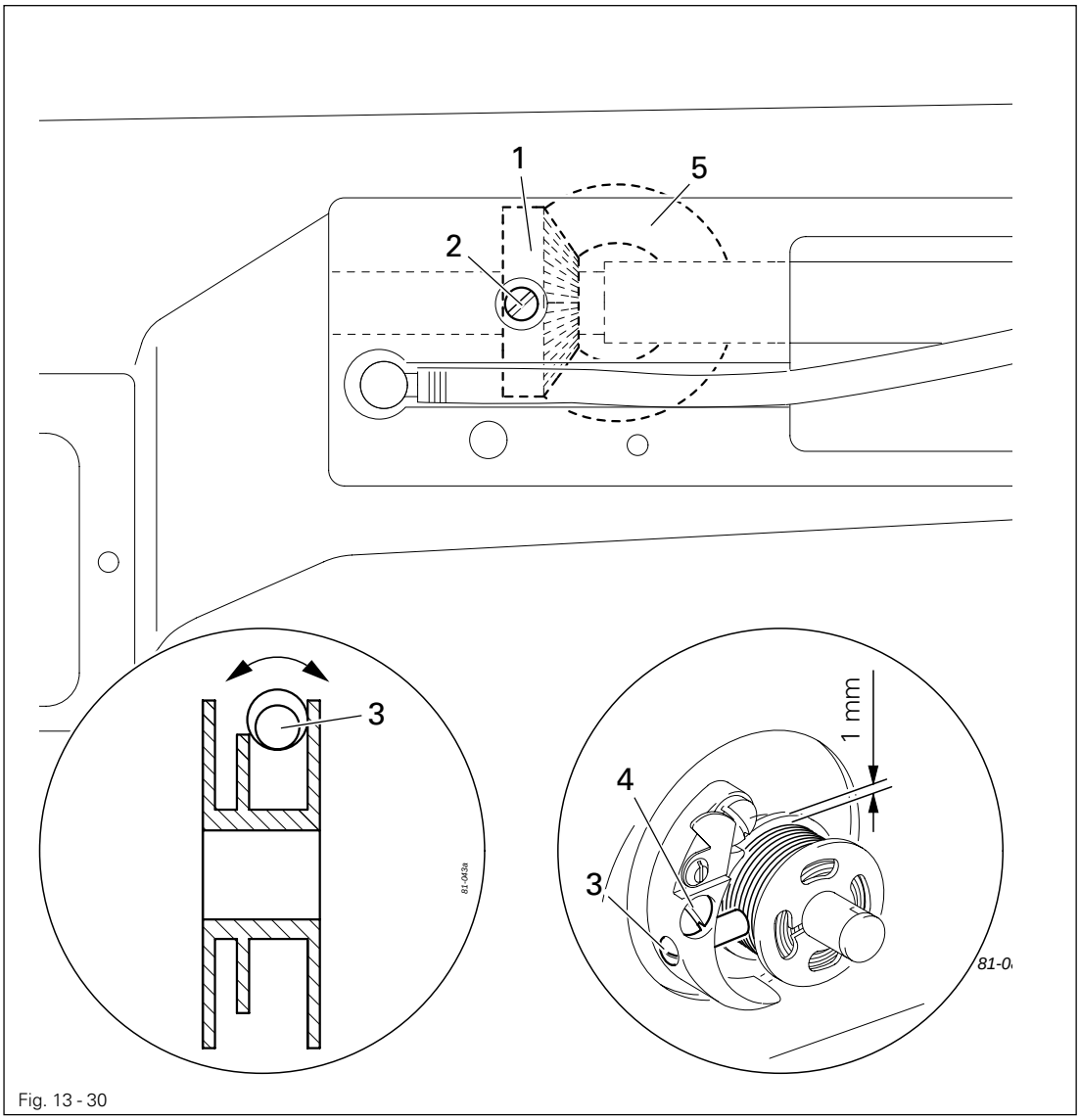


Fig. 13 - 30

- Adjust drive wheel **1** (screw **2**) in accordance with **requirement 1.**
- Place a bobbin on the bobbin winder, thread the bobbin and switch on the bobbin winder.
- Adjust pin **3** (screw **4**) in accordance with **requirement 2** and turn it in accordance with **requirement 3.**

13.06 Adjusting the thread trimmer

13.06.01 Axial position of the control cam

Requirement

1. Roller **5** should be at a distance of **0.3 mm** from the control cam **1**.
2. Adjustment ring **3** should be touching the control cam **1**.

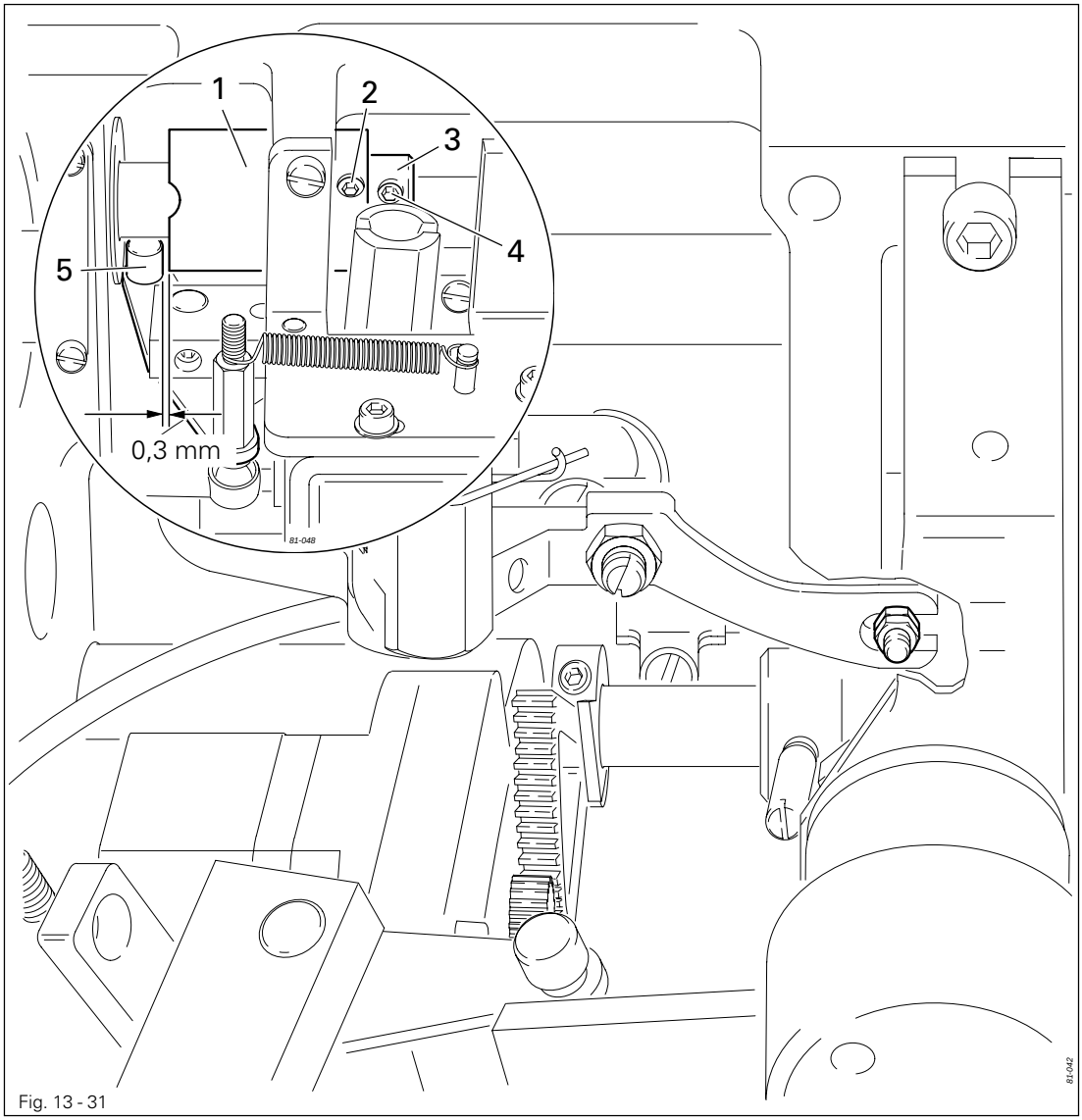


Fig. 13 - 31

- Shift control cam **1** (screw **2**) and adjustment ring **3** (screw **4**) in accordance with the **requirements.**

13.06.02 Preliminary adjustment of the control cam

Requirement

1. In the needle rise position (hole **1**) the roller lever **4** should lock into the corresponding groove of the control cam.
2. The control cam **1** should be touching adjustment ring **3**.

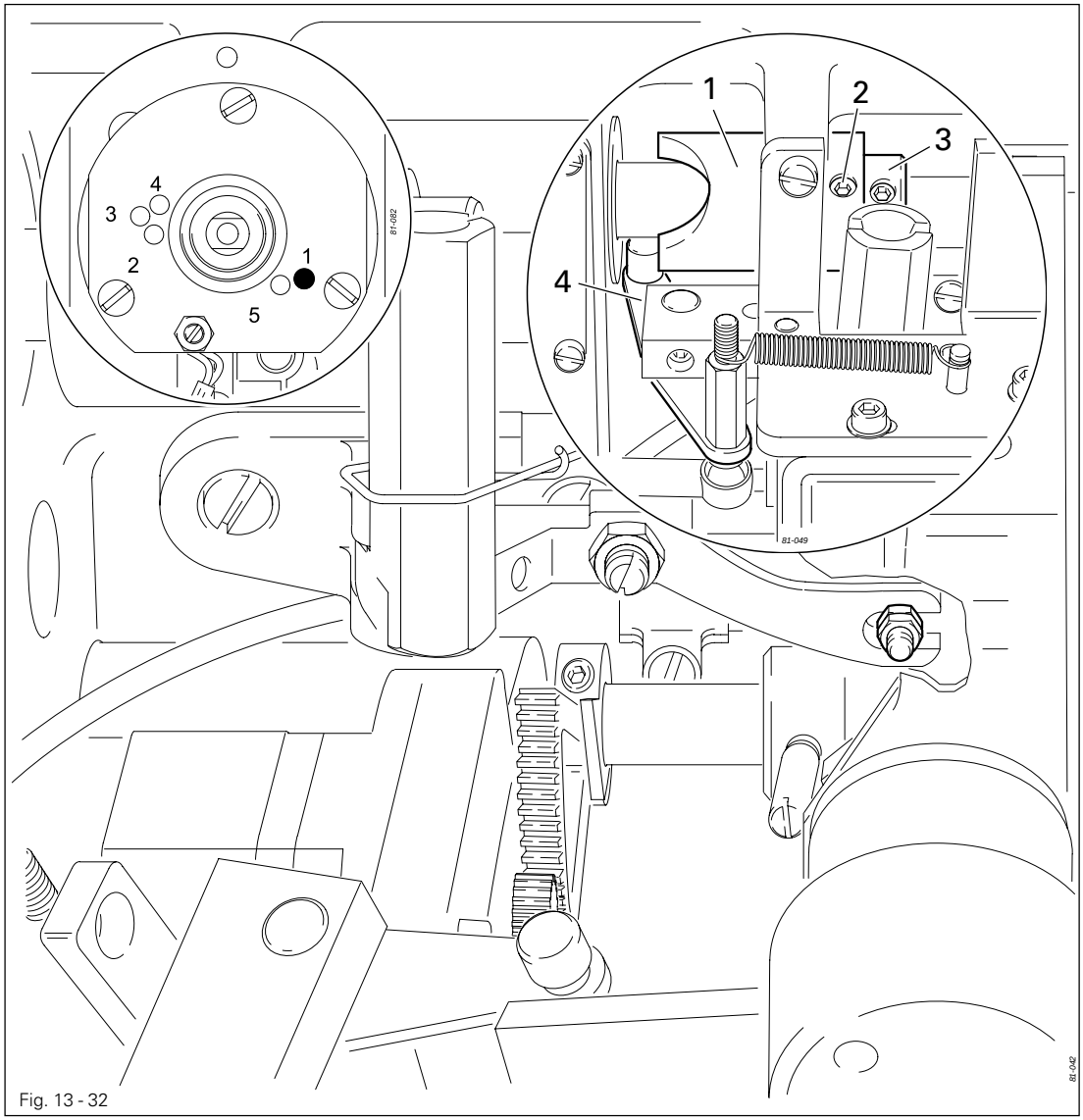


Fig. 13 - 32

- Turn control cam **1** (screws **2**) in accordance with **requirement 1** and shift it in accordance with **requirement 2.**

13.06.03 Position of the thread catcher and cutting test

Requirement
When the thread trimmer is in its neutral position, the edge of thread catcher **6** should be flush with the edge of the mounting plate **4**.

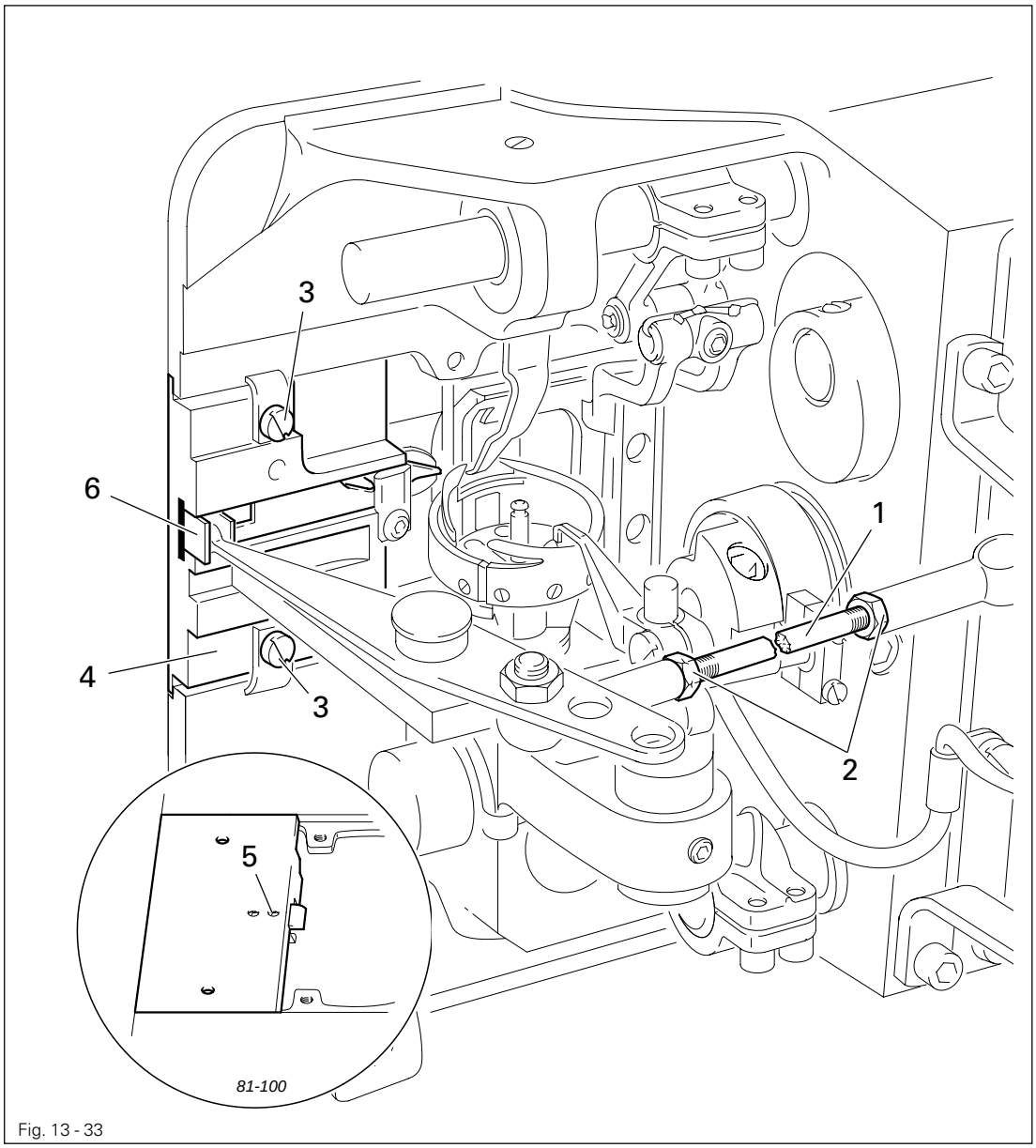


Fig. 13 - 33

- Turn linkage rod **1** (nuts **2**, left and right thread) in accordance with the **requirement.**
- During the cutting test, remove linkage rod **1**, loosen screws **3** and remove mounting plate **4**.
- Carry out the cutting test with double thread.
- By turning screw **5** adjust the cutting pressure.
- Fit mounting plate **4** so that its edge is flush with the edge of the bed-plate.
- Tighten screws **3** and replace linkage rod **1**.

13.06.04 Readjustment of the control cam

Requirement

1. When the end of the hook guard **3** is level with of the right edge of the bobbin case position finger **4**, the thread catcher **5** should begin moving forwards.
2. The control cam **1** should be touching adjustment ring **6**.

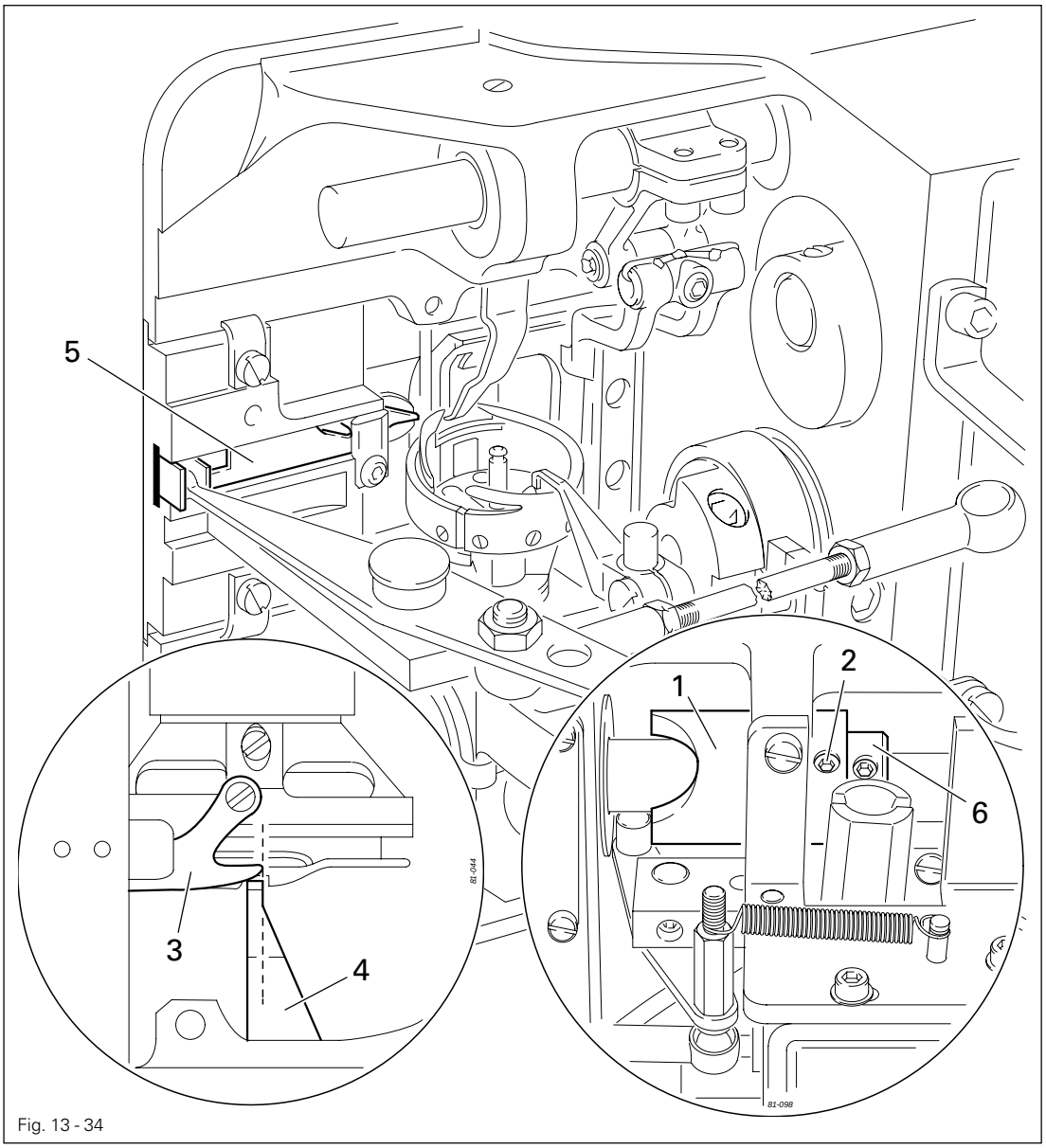


Fig. 13 - 34

- Bring the needle bar to b.d.c.
- Turn control cam **1** (screws **2**) in accordance with **requirement 1** and shift it in accordance with **requirement 2.**

13.06.05 Needle thread tension release

Requirement

1. When solenoids **3** are activated, the tensions disks **4** should be at least **0.5 mm** apart.
2. When the thread trimmer is in its neutral position and the sewing foot is positioned on the needle plate, the tension should be fully effective.

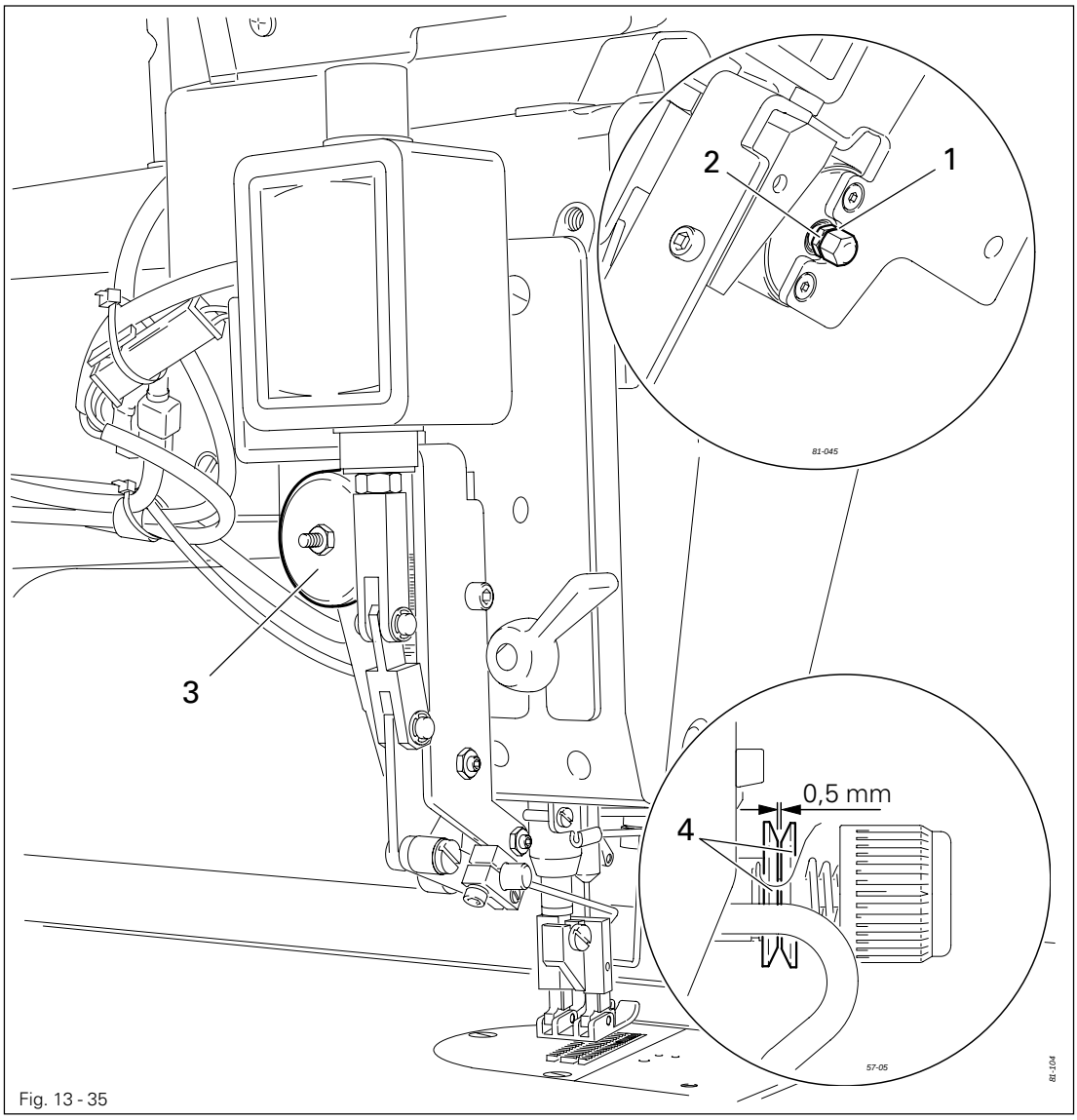


Fig. 13 - 35

- Unscrew the thread wiper.
- Turn nut **1** (nut **2**) in accordance with the **requirements.**
- Screw thread wiper back into place.

13.07 Adjusting the thread wiper –909/04

13.07.01 Thread wiper motion

Requirement

1. The thread wiper **3** should not touch anything during its motion.
2. With the take-up lever at t.d.c., when the engaging solenoid **4** is activated, the thread wiper **3** should have approx. **1 mm** clearance under the needle point.

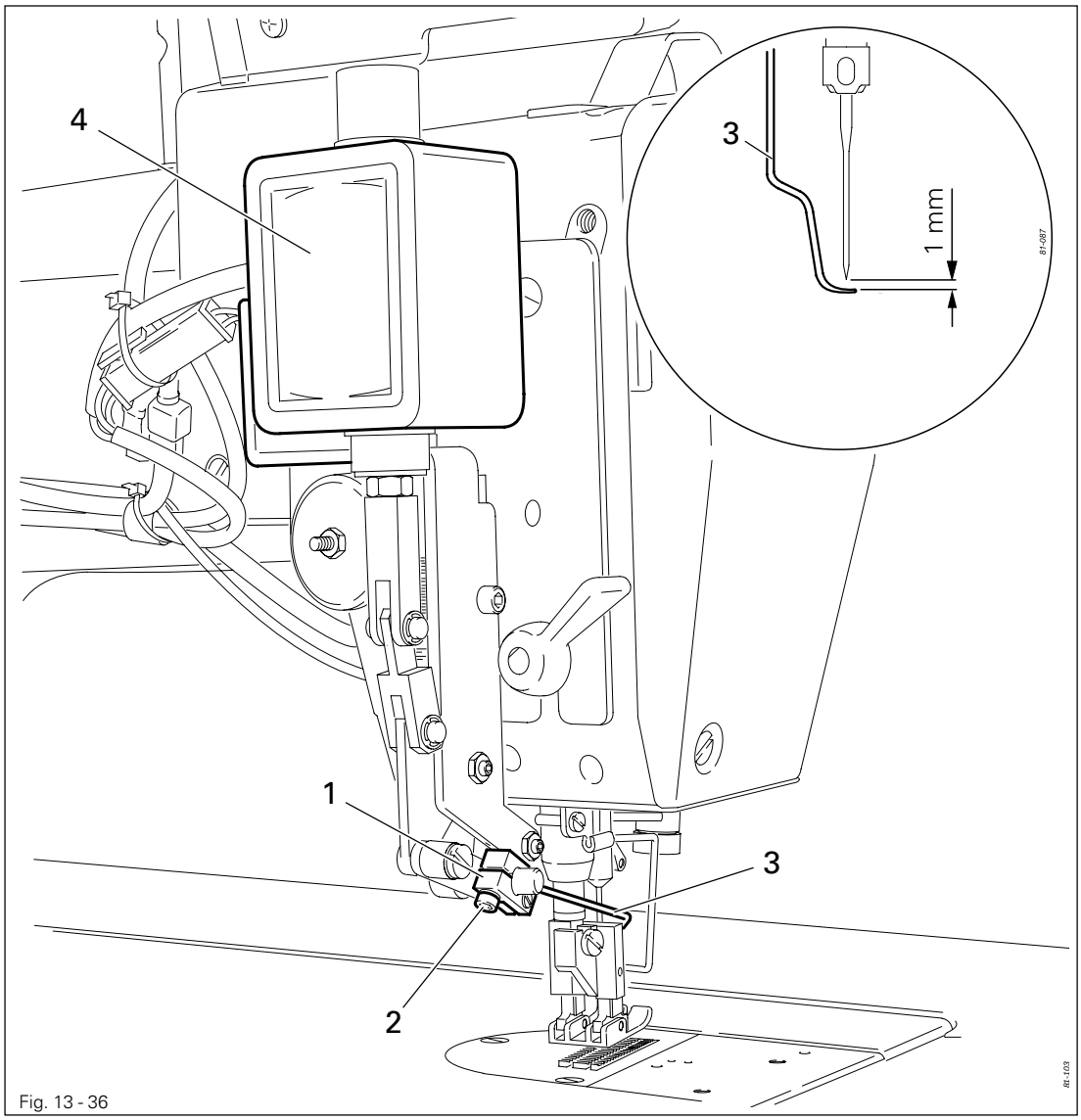


Fig. 13 - 36

- Bring the take-up lever to t.d.c.
- Adjust holder **1** (screw **2**) in accordance with the **requirements.**

13.07.02 Position of the thread wiper

Requirement

Seen in the direction of sewing

1. The tip of the thread wiper **5** should be approx. **1 – 1.5 mm** to the right of the needle.
2. At its front point of reversal, thread wiper **5** should be approx. **2 mm** in front of the needle.

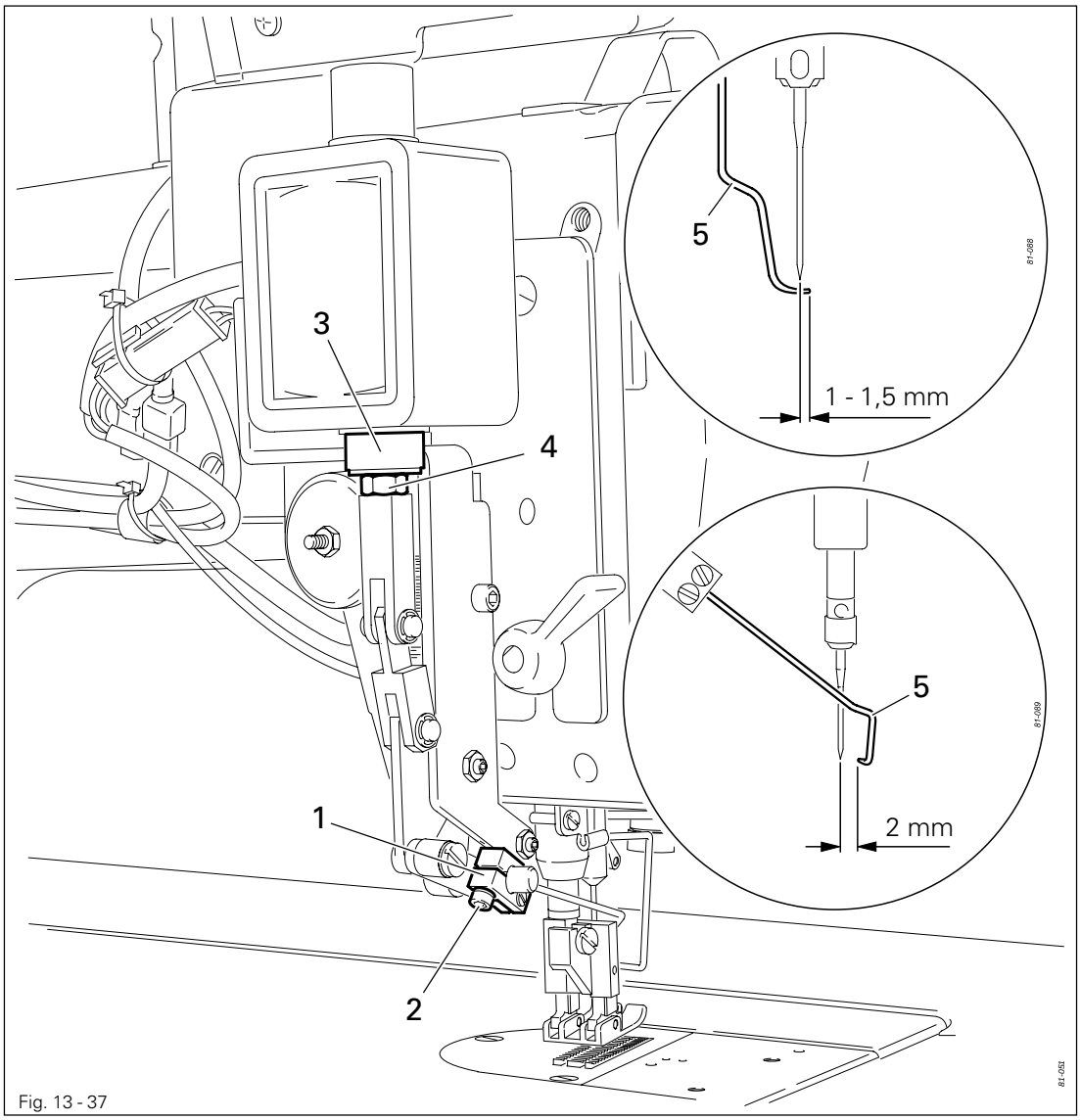


Fig. 13 - 37

- Without twisting it, move holder **1** (screw **2**) on the shaft in accordance with **requirement 1.**
- Turn rod **3** (nut **4**) in accordance with **requirement 2.**

13.08 Adjusting the zigzag sensor

Requirement
At the right point of penetration of the needle (needle position **1**), solenoid **3** should be positioned exactly on switch surface **4**, when the main drive of the machine is at position "**15**".

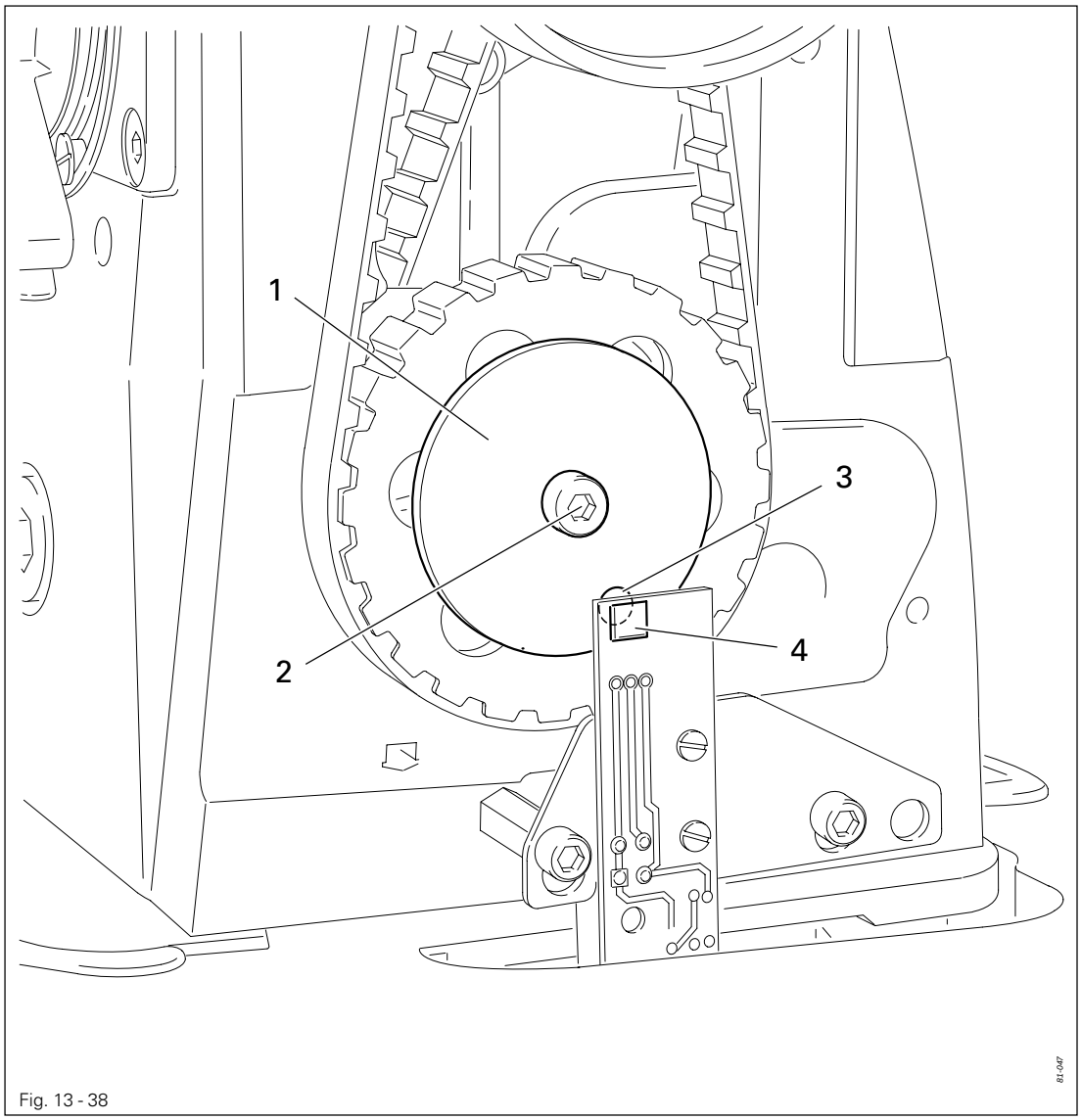


Fig. 13 - 38

- Switch on the machine.
- Select parameter '**702**', see **Chapter 13.12 Parameter settings.**
- Turn the balance wheel until the needle is at its right point of penetration and parameter '**702**' has the value "**15**".
- Turn the mounting plate **1** (screw **2**) in accordance with the **requirement.**
- Switch off the machine.

13.09 Aligning the light transmitter

Requirement
When the work is positioned, the transmitters **PS2** and **PS1** should display the same value (same receiving power).

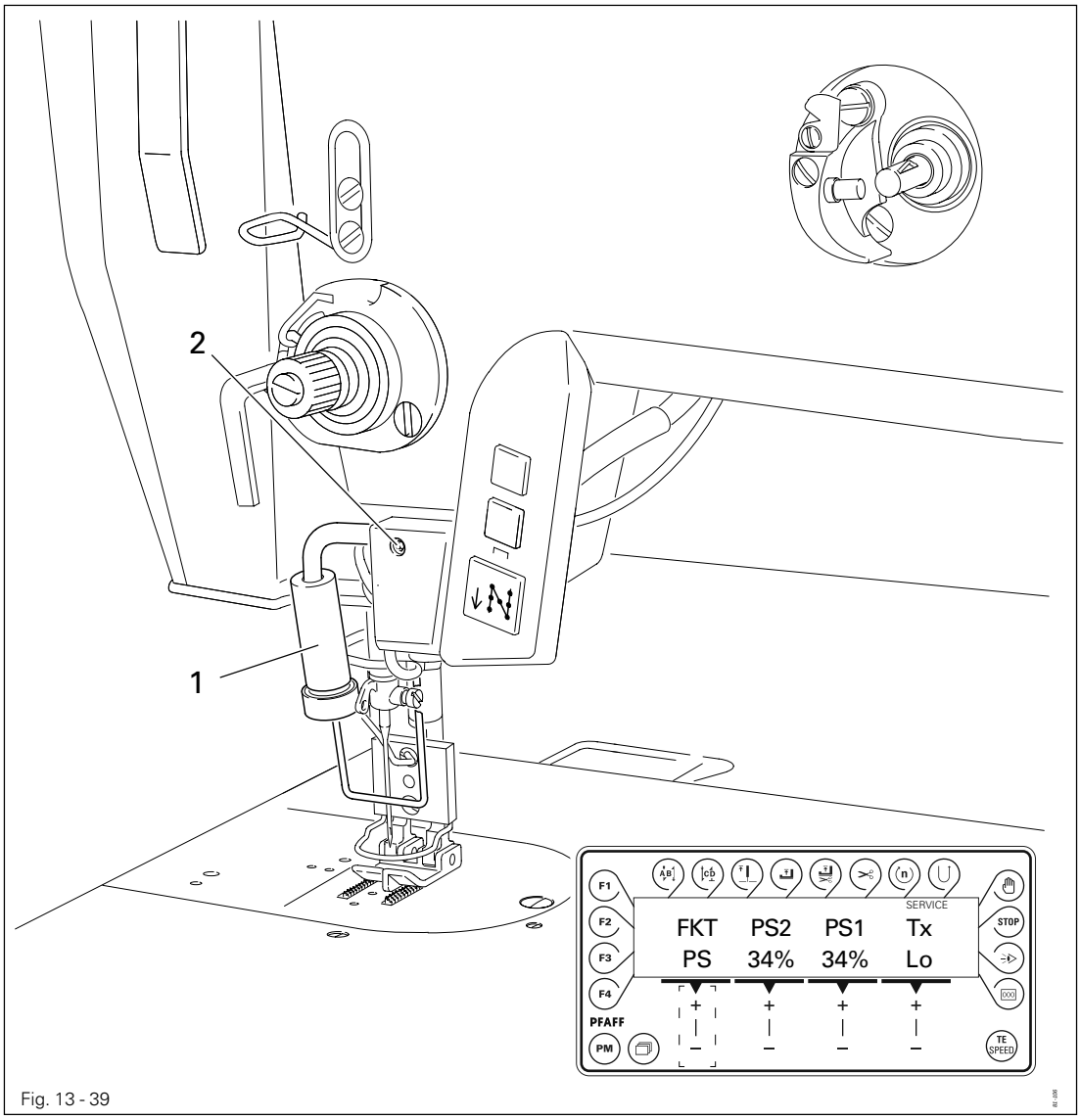


Fig. 13 - 39

- Switch on the machine.
- Select the "PS" function from the service menu, see **Chapter 13.14 Service functions.**
- Adjust light transmitter **1** (screw **2**) in accordance with the **requirement.**
- Switch off the machine.

13.10 Adjustment of the transmitted light sensors

Requirement
The difference between a material ply and a material ply with label should be recognised.

- Switch on the machine.

F3

- Press the **F3** key to select the menu for adjusting the transmitted light sensors.

L -

- To start the adjustment for the material ply, press "**+**" on the corresponding +/- key.
- Move the material ply to and fro under the sensors for a short time.

L -

- To end the adjustment for the material ply, press "**-**" on the corresponding +/- key.

L =

- To start the adjustment for the material ply with label, press "**+**" on the corresponding +/- key.
- Move the material ply with label to and fro under the sensors for a short time.

L =

- To end the adjustment for the material ply with label, press "**-**" on the corresponding +/- key.

Tx

- If necessary, increase the transmitting power with the corresponding +/- key.

TE SPEED

- Press the **TE/Speed** key and sew a test seam.
- Switch off the machine.

13.11 Function control of the bobbin thread monitor

Requirement
When the thread is pulled, the value under "Rx" must change from "1" to "0" (perfect transmission of the incoming signal of the bobbin thread monitor).

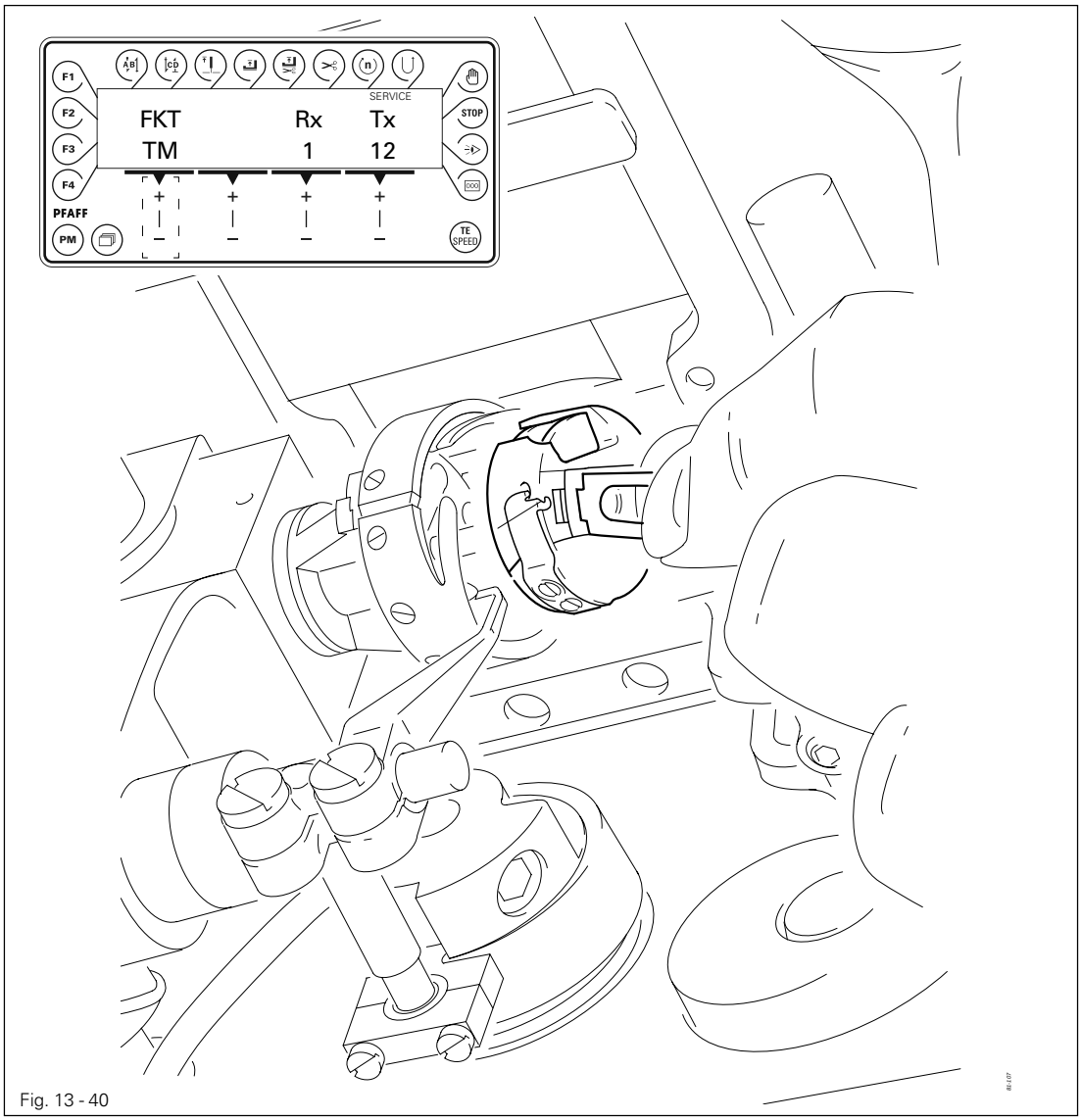


Fig. 13 - 40

- Place the bobbin in the bobbin case and the bobbin case in the hook.
- Switch on the machine.
- Select the "**TM**" function from the service menu, see **Chapter 13.14 Service functions.**
- Pull the bobbin thread while checking the bobbin thread monitor in accordance with the **requirement.**

Tx
- If necessary, increase the transmitting power.
- Switch off the machine.

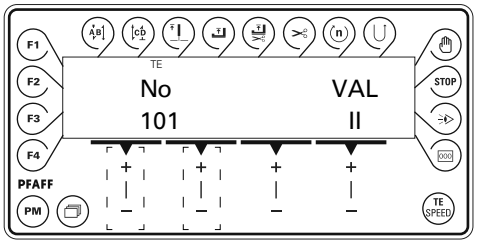
13.12 Parameter settings

13.12.01 Example of a parameter input

- Switch on the machine.

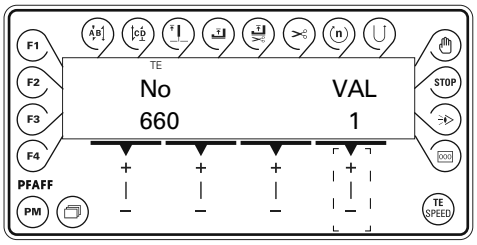
2 x TE SPEED

- Press the **TE/Speed** key twice to enter the parameter input function.
  The status text "TE" appears on the display and the pedal functions are blocked, to avoid the machine starting accidentally.



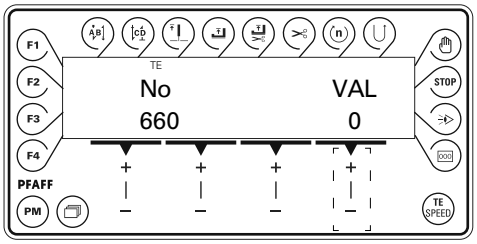
No

- Select the desired parameter, e.g. "660" bobbin thread control, by pressing the corresponding **plus/minus key.**



VAL

- With the corresponding **plus/minus key,** set the desired value for the parameter, e.g. "0" to switch off the bobbin thread control function.



TE SPEED

- By pressing the **TE/Speed** key the value is taken over and the machine switches to the sewing mode.

13.11.03 List of parameters

Group	Parameter	Description	User level	Setting range	Set value
0	10	Bobbin thread monitor-current level	C	8 - 16	12
	11	Bobbin thread monitor-stitch counter (starting value)	C	0 - 255	32
1	100	Control panel contrast [%]	A	80 - 110	90
	101	Control panel key response signal 0=tone off 2=tone on	A	0 - 3	2
	102	Start backtacks forwards	C	0 - 9	3
	103	Start backtacks in reverse	C	0 - 9	3
	105	Start backtacks speed	B	100 - 1500	900
	106	Start backtacks speed ON = pedal-controlled OFF = set with param. "105"	C	ON - OFF	OFF
	107	Pedal-controlled speed start backtacks ON = limited with parameter "105" OFF = limited with parameter "607"	C	ON - OFF	OFF
	108	End backtacks in reverse	C	0 - 9	3
	109	End backtacks forwards	C	0 - 9	3
	110	End backtacks speed	B	100 - 1500	1000
	111	No. of stitches from bright light barrier to seam end in manual sewing	A	1 - 255	6
	113	Start with light barrier ON = only when light barrier is dark OFF = also when light barrier is bright	B	ON - OFF	ON
	114	After light barrier or stitch counting ON = stop OFF = autom. end backtacks and seam end	C	ON - OFF	OFF
	116	Soft start stitches (soft start)	A	0 - 10	1
	117	Speed for soft start stitches	B	180 - 1200	600
	148	Start backtacks ON = double / OFF = single	A	ON - OFF	ON
	149	End backtacks ON = double / OFF = single	A	ON - OFF	ON

Group	Parameter	Description	User level	Setting range	Set value
1	199	Speed for light barrier compensating stitches [min-1]	B	300 - 1500	1500
2	206	Seam interruption with Pedal -2	C	ON - OFF	OFF
	220	Speed level 12 (Poti-reserve) [min-1]	A	300 - 4800	4800
	221	Speed limitation for seam programs [min-1]	B	300 - 4800	4800
	222	Speed constant for seam programs [min-1]	B	300 - 4800	3000
	298	Number of reduced stitches	A	1 - 3	1
	299	Edge guide position in manual sewing [1/10 mm]	A	10 - 185	185
3	323	Edge guide position min [1/10 mm]	B	10 - 50	10
	325	Edge guide position max [1/10 mm]	B	165 - 185	185
4	419	Bartacks: ON = inverted OFF = suppressed	C	ON - OFF	ON
	478	Corner stitch ON = accurate OFF = fast	C	ON - OFF	ON
	492	Number of seam programs	B	1 - 99	99
	493	Number of seam segments per seam program	B	1 - 15	15
5	554	Presser foot after seam segment with pedal forwards: ON = raised / OFF = lowered	C	ON - OFF	ON
	584	Backtack stitches ON = fourfold / OFF = normal	C	ON - OFF	OFF
6	601	Cutting:	C	ON - OFF	ON
	602	ON = Cutting with pedal -1 OFF = Cutting with pedal -2	C	ON - OFF	OFF
	603	ON = Pedal stops after cutting OFF = immediate start after end of seam	C	ON - OFF	ON
	604	Cutting: ON = forwards after semi end backtack OFF = in reverse too	C	ON - OFF	ON
	605	Speed display	B	ON - OFF	OFF

Group	Parameter	Description	User level	Setting range	Set value
6	606	Speed level 1 (min.) [min-1]	B	30 - 550	180
	607	Speed level 12 (max.) [min-1]	B	300 - 4800	4800
	609	Cutting speed [min-1]	B	60 - 500	180
	618	Reversing angle	C	ON - OFF	OFF
	624	Start inhibitor:	C	ON - OFF	ON
	642	Presser foot – time from switch-on to tension reduction (tacting)	C	10 - 50	50
	651	Automatic lowering of presser foot	C	ON - OFF	ON
	660	Bobbin thread monitoring 0 = off 1 = on 2 = bobbin thread reverse counter on	A	0 - 2	1
	668	Thread wiper = 1, Thread clamp = 2, off = 0	B	0 - 2	1
7	700	Logical zero mark [increments]	B	0 - 127	0
	702	Needle position (needle lowered)	B	0 - 30	15
	703	Needle position (take-up lever raised)	B	100 - 127	113
	705	Needle position (end of cutting signal)	B	80 - 127	98
	706	Needle position (start of cutting signal)	B	40 - 80	68
	707	Needle position (start thread tension release)	B	40 - 80	70
	710	Needle position (needle raised without cutting)	B	80 - 127	106
	715	Operating time thread wiper [ms]	B	0 - 2550	120
	718	Moment of standstill brake (rest brake)	B	0 - 100	0
	719	Presser foot-holding current	B	0 - 50	40
	720	Cutting–holding current	B	0 - 50	40
	721	Feed converter-holding current	C	0 - 50	40
	722	Acceleration ramp: 1 = flat, 50 = steep	C	1 - 50	50
	723	Brake ramp: 1 = flat, 50 = steep	C	4 - 50	50

Group	Parameter	Description	User level	Setting range	Set value
7	729	Start delay after lowering presser foot [ms]	B	0 - 2550	120
	730	Lift delay for presser foot after seam end [ms]	B	0 - 2550	0
	731	Stitch count delay for end backtack	C	0 - 2550	70
	732	Delay time for cutting after single end backtack [ms]	C	0 - 2550	30
	733	Delay time from switch on feed conversion to speed start [ms]	C	0 - 200	30
	739	Delay time for speed after start backtack or stitch condensation [ms]	C	0 - 2550	200
	740	Stitch count delay for end backtack [ms]	C	0 - 2550	60
	760	Stitch count to bobbin thread monitor (machine stop in needle lowered position)	A	0 - 50000	1000
	761	Extension thread tension release/pull thread [ms]	B	0 - 2550	0
	791	Stitch count delay for start backtack [ms]	C	0 - 2550	30
	797	Hardware test	B	ON - OFF	OFF
	798	User level 0 = user level A 1 = mechanic level C 11 = service level C	A	0 - 11	0
	799	Selected machine class 1 = 2481-980 2 = 2483-980 3 = 2438-980 4 = 2481-906	C	1 - 4	3
	800	Motor rotating direction when looking at V-Celt pulley 1= anti-clockwise, 0 = clockwise	C	ON - OFF	OFF
8	801	Reversing angle (618 = ON)	C	5 - 106	16
	831	Start delay for stepping motor 2 [increments]	B	0 - 10	5
	832	Needle position (feed start)	B	0 - 127	77
	833	Needle position (feed end)	B	0 - 127	6
	834	Feed regulator-balance [1 semi-step = 5/100mm]	B	-5 - 5	0

Group	Parameter	Description	User level	Setting range	Set value
8	835	Reduced single stitch [%]	A	0 - 100	50
	843	Distance sensor 1 to sensor 2 [1/10mm]	B	75 - 85	80
	844	Distance sensor 1 to needle [2/10mm]	B	80 - 300	100
	845	Speed-controlled stitch length adjustment [% pro 1000 min-1]	B	0 - 3	1
	846	Feed regulator characteristic line adjustment for forward stitch length [%]	A	70 - 100	▲
	847	Feed regulator characteristic line adjustment for reverse stitch length [%]	A	70 - 100	▲
	849	Maximum stitch length [1/10 mm]	A	0 - 60	25
	862	Current for stepping motor axis 1	A	16 - 63	32
	863	Current for current reduction of stepping motor axis 1	A	8 - 63	32
	864	Proportional amplification of the speed control (general)	B	0 - 2500	500
	880	Starting current main drive	C	1 - 10	10
	881	Filter parameter for position controller	C	0 - 12	5
	884	Proportional amplification of the speed control (general)	C	1 - 50	15
	885	Integral amplification of the speed control	C	1 - 50	35
	886	Proportional amplification of the position controller	C	1 - 50	30
	887	Differential amplification of the position controller	C	1 - 50	30
	889	Time for position control (0 = permanently)	C	0 - 2550	200
	890	Proportional amplification of higher ranking speed controller for standstill brake (rest brake)	C	1 - 50	25
	891	Proportional amplification of subordinate speed controller for standstill brake (rest brake)	C	1 - 50	20
9	901	Cutting release-speed	C	180 - 500	400
	956	Current for stepping motor axis 2	B	30 - 63	56

▲ = By the factory adjusted

Group	Parameter	Description	User level	Setting range	Set value
9	957	Current for current reduction of stepping motor axis 2	B	15 - 48	39
	958	Current reduction time stepping motor axis 2	B	0 - 2500	2000
	978	Delay power off stepping motor 2	C	0 - 99	0
	979	Delay power off stepping motor 1	C	0 - 99	0
	985	Position for thread clamp on	B	0 - 127	34
	986	Position for thread clamp off	B	0 - 127	103

13.12 Explanation of the error messages

Message	Description
E001	Pedal not in neutral position
E003	SM 1 (for reference)
E004	SM 2 (for reference)
E009	Start inhibitor at standstill
E010	Incorrect machine class
E040	Transmitted light sensors
E045	Bobbin thread monitoring
E062	Short circuit 24V
E063	Overload switch power supply
E064	Network monitoring
E065	Extint low in operation
E066	Short circuit
E067	Power off
E068	Extint low in operation
E069	No increments
E070	Motor blocking
E071	No incremental connector
E072	No set value connector
E073	Motor running interrupted
E075	Controller locked
E092	Start inhibitor when motor running
E151	System
E155	Sewing motor
E156	Time out communication
E157	Stepping motor ramps

Message	Description
E158	Stepping motor frequency
E170	Incorrect main drive transmission
E171	Logical zero mark invalid
E172	Communication error main drive
E175	Main drive start
E200	Brake path too short
E201	Main drive position
E222	Time-out monitoring

13.14 Service functions

TE SPEED

F1

The service functions help with finding errors and commissioning. After selecting the input mode with the **TE/Speed** key, with the corresponding authorisation (access level B or C), the menu for selecting service functions can be called up by pressing the **F1** key. After the service functions have been called up, the status text "Service" appears on the display.

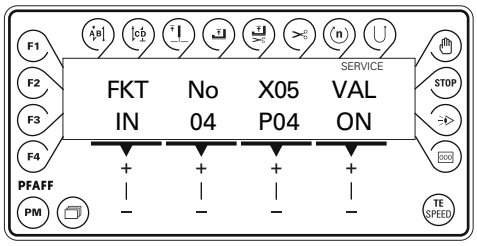
- Switch on the machine.

TE SPEED

- Press the **TE/Speed** key to call up the input mode.

F1

- Press the **F1** key within 5 seconds to call up the service functions.



FKT

The individual service functions are shown under "FKT" and can be selected with the corresponding **+/- key.**

Overview of the service functions

FKT	Explanation
IN	Read out inputs With the corresponding **+/- key** the number of the input "No" can be selected.
OUT	Set/reset outputs With the corresponding **+/- key** the number of the output "No" can be selected and set accordingly "VAL" (ON/OFF).
PED	Read out set value transmitter
POS	Read out main drive position
SM1	Move stepping motor SM1 (edge guide) By selecting the type "POS" and entering the desired value with the corresponding **+/- keys**, the edge guide positions in the position entered. By selecting the type "REF" and confirming the selection with the corresponding **+/- keys**, the edge guide is moved to the reference position.

FKT	Explanation
SM2	Move stepping motor SM2 (feed regulator) By selecting the type "POS" and entering the desired value with the corresponding **+/- keys**, the feed regulator positions in the position entered. By selecting the type "REF" and confirming the selection with the corresponding **+/- keys**, the feed regulator is moved to the reference position.
DM	Adjust main drive By selecting the type "POS" and entering the desired value with the corresponding **+/- keys**, the main drive positions in the position entered. By selecting the type "SPD" and confirming the selection with the corresponding **+/- keys**, the value for the speed is changed accordingly. By selecting the type "SC" and entering the desired value with the corresponding **+/- keys**, the value for the stitch count is changed accordingly.
RES	Carry out reset By selecting the type "PAR" and confirming the selection with the corresponding **+/- keys**, the values for all parameters are reset (master reset). By selecting the type "PRG" and confirming the selection with the corresponding **+/- keys**, all seam programs are deleted.
TM	Adjust bobbin thread monitor With the corresponding **+/- key** the transmitting power of the bobbin thread monitor "Tx" can be changed.
PS	Adjust transmitted light sensors With the corresponding **+/- key** the transmitting power of the transmitted light sensors "Tx" can be changed (Lo/Hi).
VER	Display software version

Plug assignment

CAN

Pin-No.	Comment	Function	Plug marking	Signal marking
X11A.2	CAN	CAN-	CAN_HIGH	CAN_TxD
X11A.3	CAN			Gnd
X11A.7	CAN	CAN+	CAN_LOW	CAN_RxD

Set value transmitters

Pin-No.	Comment	Function	Plug marking	Signal marking
X11B.4	pedal			+5V
X11B.5	pedal			+5V
X11B.6	pedal			Gnd
X11B.7	pedal 2	set value		SW2 (analog)
X11B.8	pedal 1	set value		SW1 (analog)
X11B.9	pedal			Gnd

Sensors

Pin-No.	Comment	Function	Plug marking	Signal marking
X15.1	Sensors	current source UFW		P7.3
X15.2	Sensors	DLS outside (LS2)		P5.3 (analog)
X15.3	Sensors	DLS inside (LS1)		P5.6 (analog)
X15.4	Sensors	ZZ-Sensor 2438	E9	E9/Port_E9
X15.5	Sensors	current source DLS	A10/PortA10	O10
X15.6	Sensors		+5V	+5V
X15.7	Sensors	UFW-Out		UFW_MESS
X15.8	Sensors		+24V	+24V
X15.9	Sensors		0V	0V

RS232

Pin-No.	Comment	Function	Plug marking	Signal marking
X1A.1	BDF-S2/T1		+24V	+24V
X1A.2	BDF-S2/T1		RxD	RxD
X1A.3	BDF-S2/T1		TxD	TxD
X1A.4	BDF-S2/T1		+5V	+5V
X1A.5	BDF-S2/T1		Gnd	Gnd
X1A.6	BDF-S2/T1		-	
X1A.7	BDF-S2/T1		RTS	RTS
X1A.8	BDF-S2/T1		CTS	CTS
X1A.9	BDF-S2/T1		Gnd	Gnd

OTE

Pin-No.	Comment	Function	Plug marking	Signal marking
X1B.1	OTE			Gnd
X1B.2	OTE	SSI-Out (TxD)		SSOut
X1B.3	OTE	SSI-Clock		SSClk
X1B.4	OTE			+24V
X1B.5	OTE			+5V
X1B.6	OTE	SSI-strobe (Mode)		SSStr
X1B.7	OTE	SSI-In (RxD)		SSIn
X1B.8	OTE	(light barrier 1)		(LS1)
X1B.9	OTE			

Incremental transmitter

Pin-No.	Comment	Function	Plug marking	Signal marking
X3.1	incr.transm.	track A 256inc./rev.		FA_MINI
X3.2	incr.transm.	track B 256inc./rev.		FB_MINI
X3.3	incr.transm.	SyMa 360°/256		
X3.4	incr.transm.	Autodetect		ADTC
X3.5	incr.transm.			+5V
X3.6	incr.transm.			+5V
X3.7	incr.transm.			Gnd
X3.8	incr.transm.	Ext. SyMa 180°		EXTSM_MINI
X3.9	incr.transm.			Gnd

Stepping motor 1 (edge guide)

Pin-No.	Comment	Function	Plug marking	Signal marking
X4B.1	SM1/FSL	phase A.2	A11	
X4B.2	SM1/FSL	phase A.1	A12	
X4B.3	SM1	phase B.2	A21	
X4B.4	SM1	phase B.1	A22	
X4B.5	SM1			
X4B.6	SM1			
X4B.7	SM1	+5V (with 120R ?)		
X4B.8	SM1	reference SM1	SM_REF1	SM_REF1
X4B.9	SM1	Gnd		

Stepping motor 2 (stitch length)

Pin-No.	Comment	Function	Plug marking	Signal marking
X4A.1	SM2	Phase A.2	B11	
X4A.2	SM2	Phase A.1	B12	
X4A.3	SM2	Phase B.2	B21	
X4A.4	SM2	Phase B.1	B22	
X4A.5	SM2			
X4A.6	SM2			
X4A.7	SM2	+5V (with 120R ?)		
X4A.8	SM2	reference SM2	SM_REF2	SM_REF2
X4A.9	SM2	Gnd		

Outputs

Pin-No.	Comment	Function	Plug marking	Signal marking
X13.01	PWM	FSL-solenoid(Y8)	A1	O1.1
X13.02		FSL-solenoid(Y8+)	A1	O1.2
X13.03	PWM	PFH-solenoid(Y4)	A2	O2.1
X13.04		PFH-solenoid(Y4+)	A2	O2.2
X13.05		WI-solenoid(Y3)	A3	O3
X13.06	PWM	SN-solenoid(Y2)	A4	O4
X13.07			A5	O5
X13.08		RAFI-LED(H1)	A6	O6
X13.09			A7	O7
X13.10			A8	O8
X13.11			A9	O9
X13.12	(from DX)	current source DLS	A10/PortA10	O10
X13.13			A11	O11
X13.14			+24V	+24V
X13.15			+24V	+24V
X13.16			A14	O14
X13.17			A15	O15
X13.18			A16	O16
X13.19		SN-solenoid(Y2+)	+24V	+24V
X13.20		WI-solenoid(Y3+)	+24V	+24V
X13.21			+24V	+24V
X13.22		RAFI-LED(H1+)	+24V	+24V
X13.23			+24V	+24V
X13.24			A13	O13
X13.25			A12	O12

Inputs

Pin-No.	Comment	Function	Plug marking	Signal marking
X5.01		TUM-key(S1)	E1	E7
X5.02		NPW-key(S2)	E2	E8
X5.03		EST-key(S2)	E3	E2
X5.04		ANLSP-switch(S14)	E4	E4
X5.05		EST-knee switch(S13)	E5	E5
X5.06		knee switch2	E15	E15
X5.07			E16	E16
X5.08			E14	E14
X5.09	(from DX)	ZZ-Sensor 2438	E9	E9/Port_E9
X5.10			E10	E10
X5.11			E11	E11
X5.12			E12	E12
X5.13			E13	E13
X5.14			E6	E6
X5.15			E7	E1
X5.16			E8	E3
X5.17		S1-S2-S3(Gnd)	0V	0V
X5.18			0V	0V
X5.19		ANLSP-switch(Gnd)	0V	0V
X5.20		EST-knee switch(Gnd)	0V	0V
X5.21			0V	0V
X5.22			0V	0V
X5.23			+24V	+24V
X5.24			A16	output_A16
X5.25			+24V	+24V

13.15 Internet update of the machine software

The machine software can be updated with PFAFF flash programming. For this purpose the PFP boot program and the appropriate control software for the machine type must be installed on a PC. To transfer the data to the machine, the PC and the machine control unit must be connected with an appropriate null modem cable (part no. 91-291 998-91).



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/de/service/download/steuerungssoftware.html

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!

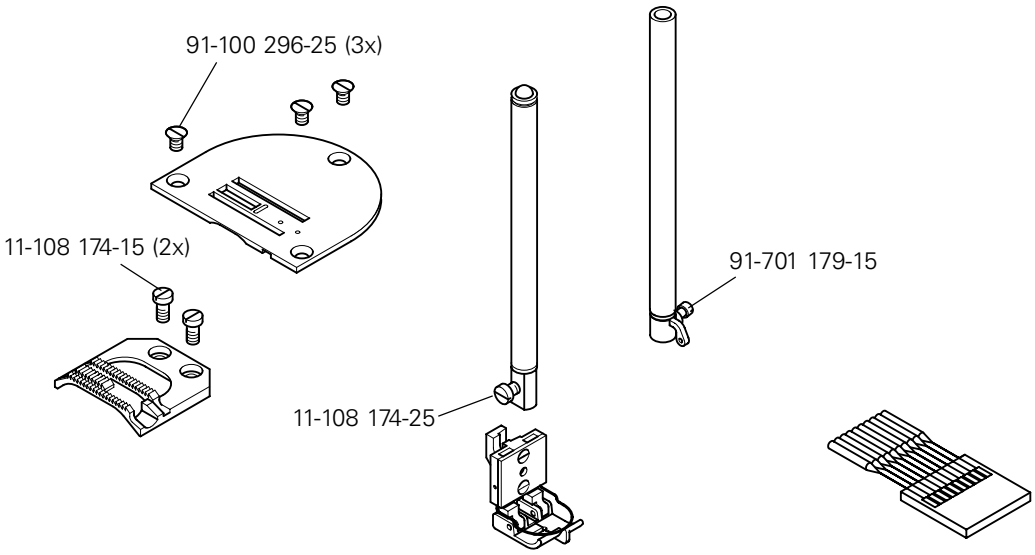
- Switch off the machine.
- Connect the PC (serial interface or appropriate USB-adapter) and the machine control unit (RS232). To do so disconnect the plug of the control panel.
- Switch on the PC and start the PFP boot program.
- Select the machine type.
- Press the "programming" button.
- Switch on the machine, keeping the boot key 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.
- 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.



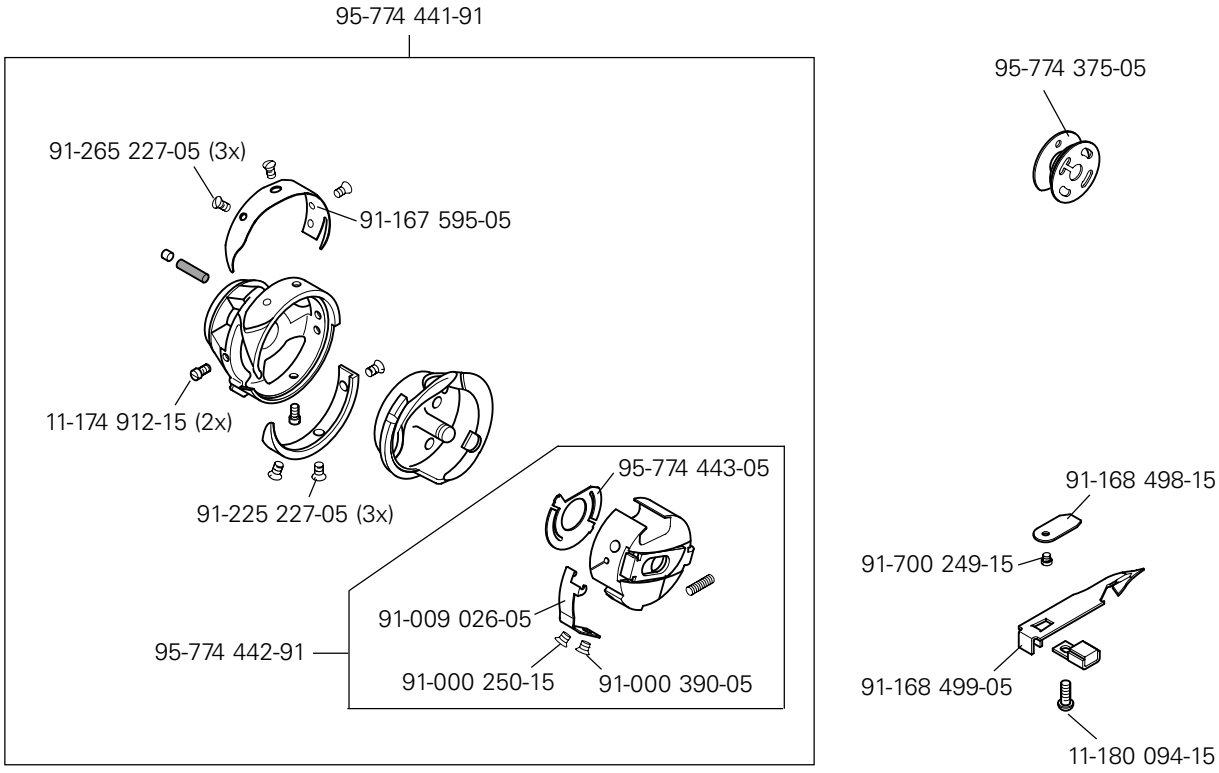
More information and assistance is at your disposal in the file "PFPHILFE.TXT", which can be called up from the PFP boot program by pressing the "help" button.

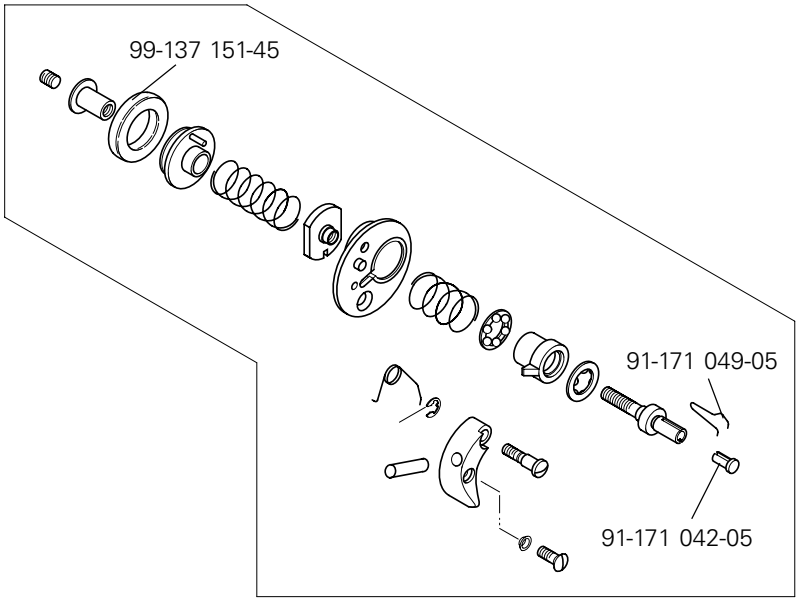
14 Wearing parts

This is a list of the most important wearing parts.
You can order a detailed spare parts list for the complete machine under part no. 296-12-18 708.



System 134

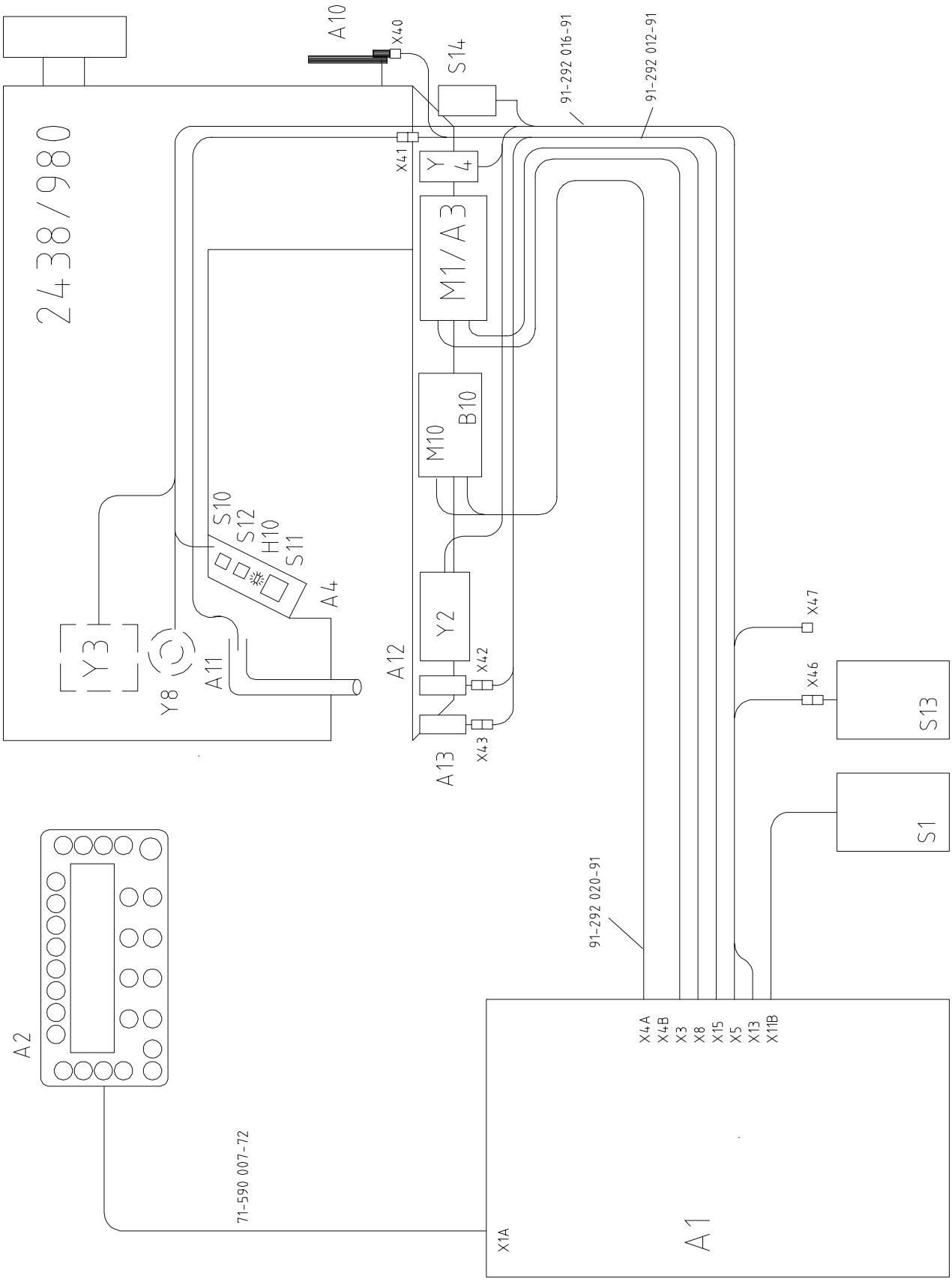


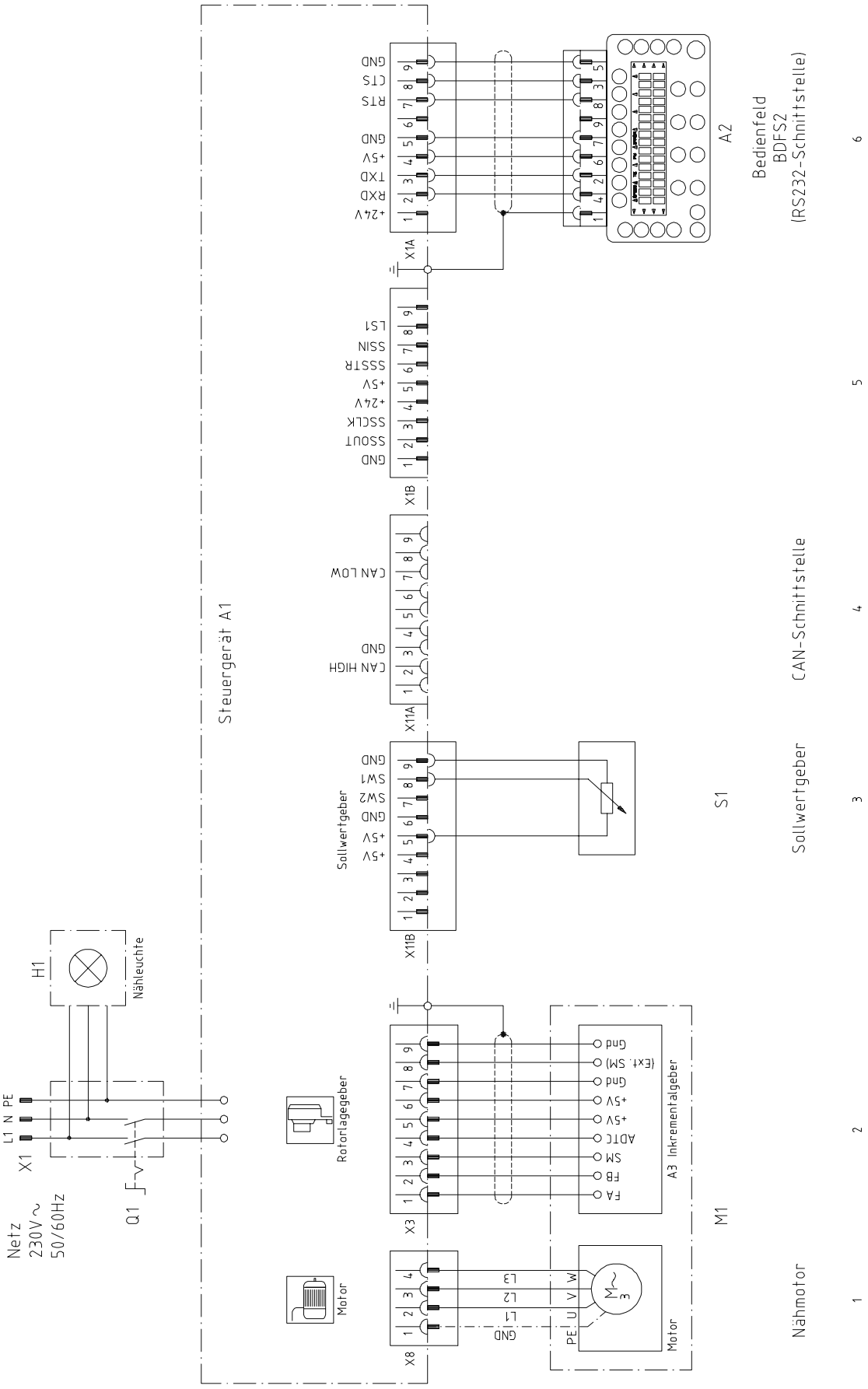

99-137 151-45
91-171 049-05
91-171 042-05

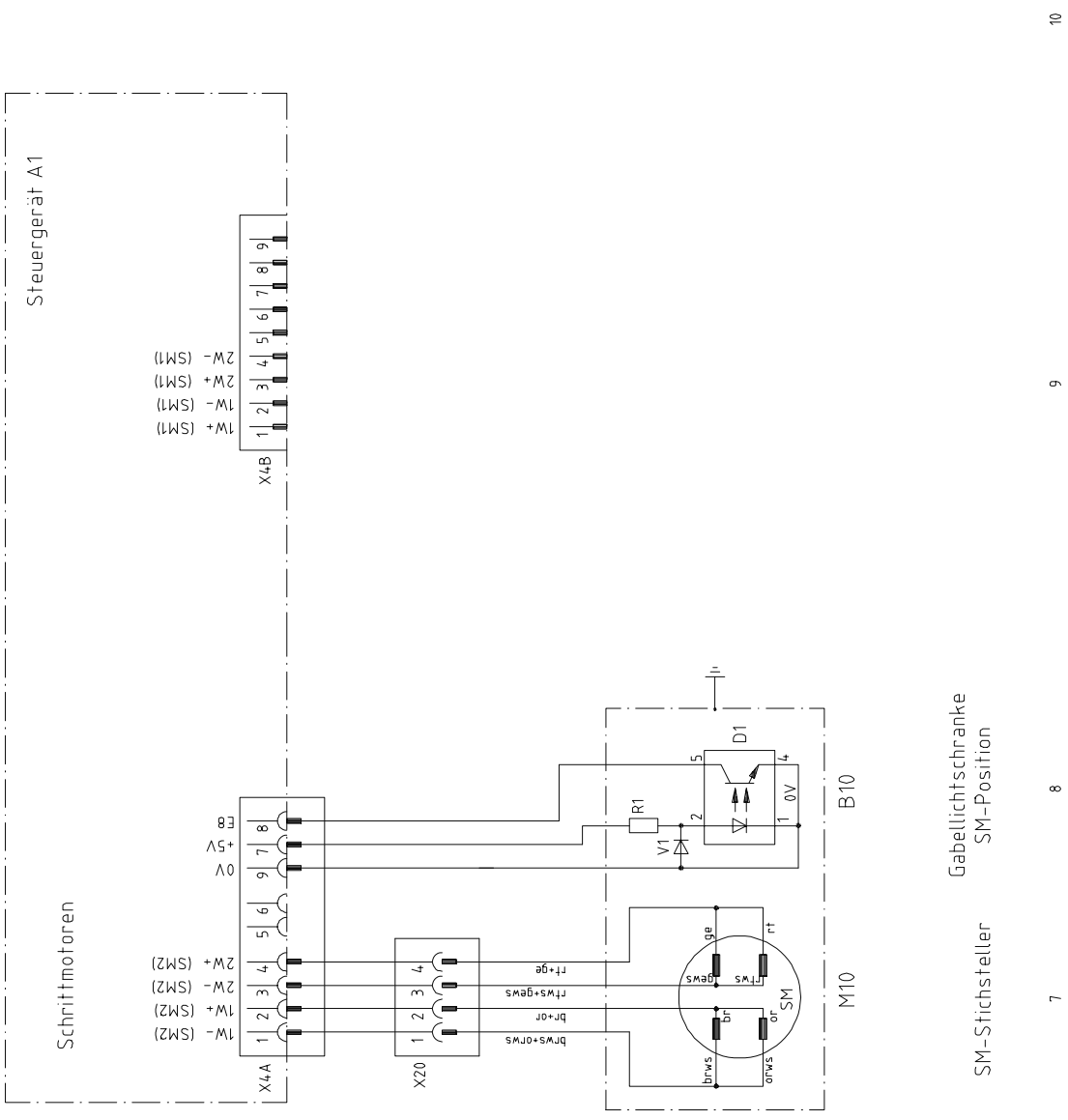
15 Circuit diagrams

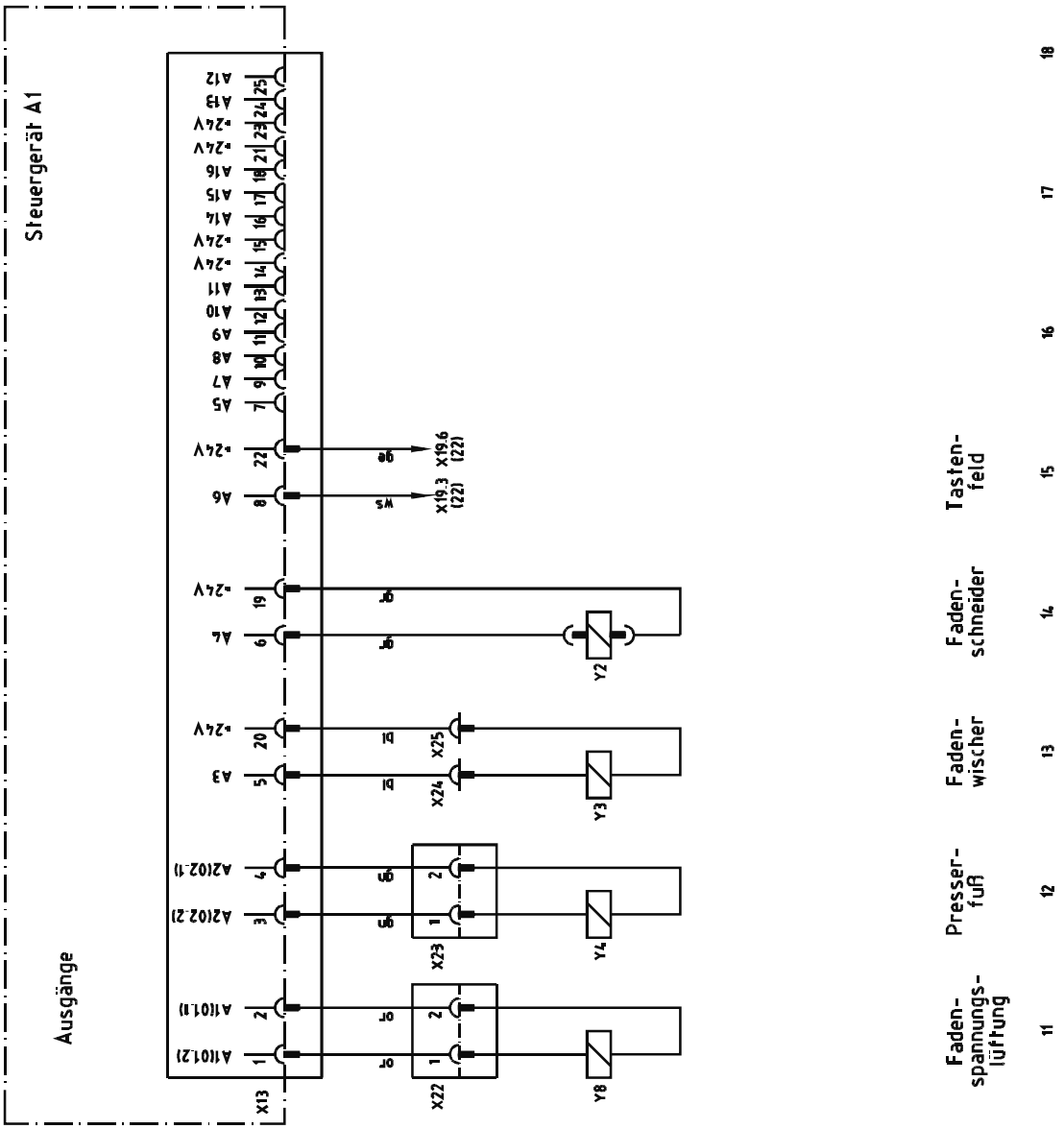
Reference list for circuit diagrams

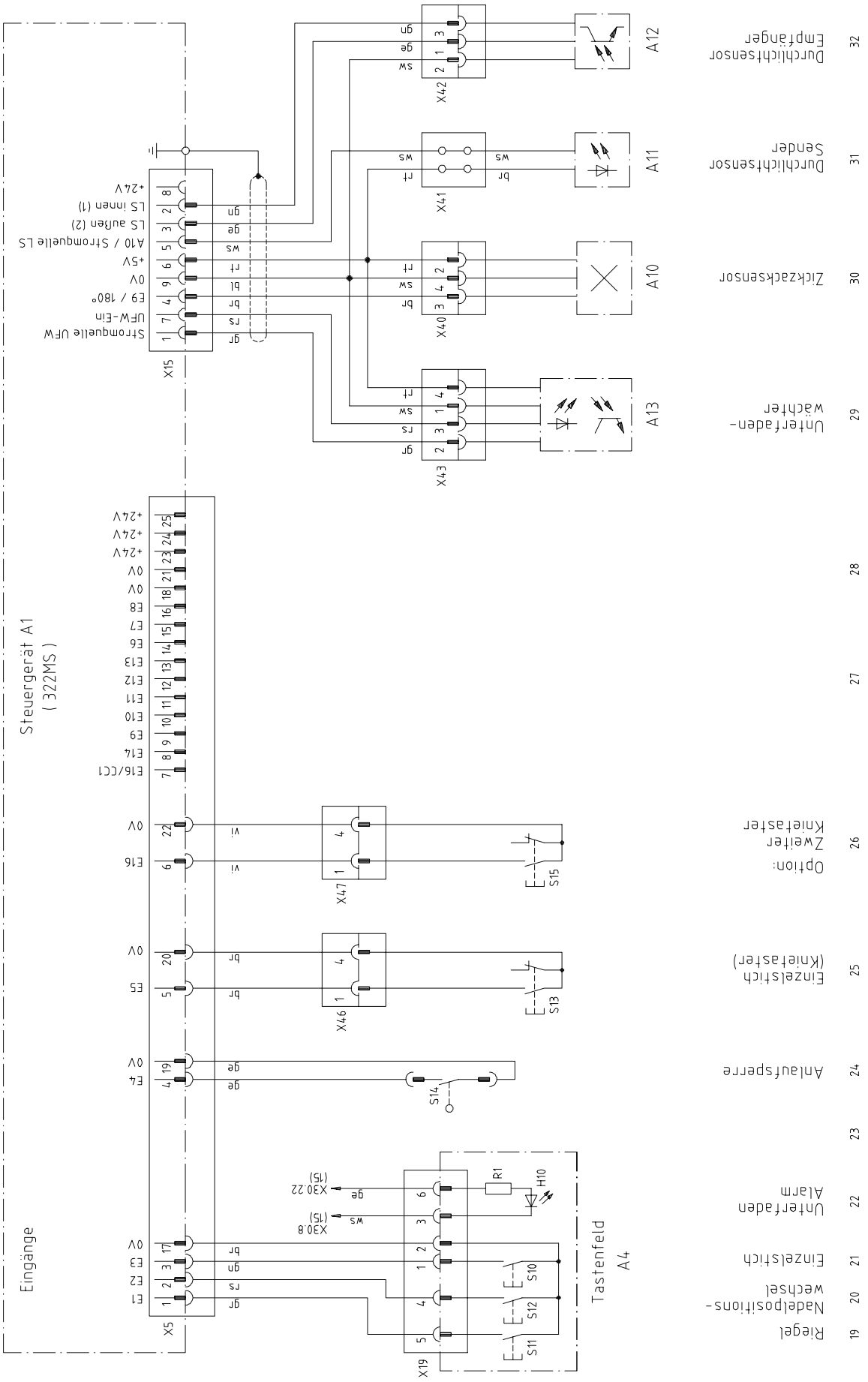
A1	Controller Quick P322MS
A2	Control panel BDF S2
A3	Incremental transmitter (included in M1)
A4	Keyboard
A10	Zigzag sensor
A11	Light transmitter
A12	Light receiver
A13	Bobbin thread monitor
S1	Set value transmitter
S10	Single stitch (included in A4)
S11	VR by hand (backtack) (included in A4)
S12	Needle position (included in A4)
S13	Knee switch (single stitch)
S14	Start inhibitor
S15	2nd knee switch
H1	Sewing lamp
H10	Bobbin thread alarm (included in A4)
Q1	Main switch
M1	Sewing motor
M10	Stepping motor (feed regulator)
B10	Hybrid light barrier (included in M10)
Y2	900 (thread trimmer)
Y3	W1 (thread wiper)
Y4	PFA (presser foot)
Y8	FSL (thread tension release)
X40	Zigzag sensor
X41	DLS – light transmitter
X42	DLE – light receiver
X43	UFW – bobbin thread monitor


2438/980
A10
X40
S14
91-292 016-91
91-292 012-91
X41
Y4
M1/A3
M10
B10
S10
S12
H10
S11
A4
Y3
Y8
A11
A12
Y2
X42
X43
A13
X47
X46
S13
S1
91-292 020-91
A2
71-590 007-72
X4A
X4B
X3
X8
X15
X5
X13
X11B
X1A
A1


Steuergerät A1
Netz
230V~
50/60Hz
L1 N PE
X1
Q1
H1
Nähleuchte
Motor
X8
GND
L1
L2
L3
PE U V W
M1
A3 Inkrementalgeber
Gnd
(Ext. SM)
Gnd
+5V
ADTC
SM
FB
FA
X3
Rotorlagegeber
X11B
Sollwertgeber
+5V
+5V
GND
SW2
SW1
GND
S1
Sollwertgeber
X11A
CAN HIGH
GND
CAN LOW
CAN-Schnittstelle
X1B
GND
SSOUT
SSCLK
+24V
+5V
SSSTR
SSIN
LS1
X1A
+24V
RXD
TXD
+5V
GND
RTS
CTS
GND
A2
Bedienfeld
BDFS2
(RS232-Schnittstelle)
Nähmotor
1
2
3
4
5
6


Steuergerät A1
Schrittmotoren
X4A
X4B
X20
1W- (SM2)
1W+ (SM2)
2W- (SM2)
2W+ (SM2)
0V
+5V
E8
1W+ (SM1)
1W- (SM1)
2W+ (SM1)
2W- (SM1)
brws+orws
br+or
rtws+gews
rt+ge
B10
M10
D1
R1
V1
0V
SM
SM-Stichsteller
Gabellichtschranke
SM-Position
10
9
8
7


Steuergerät A1
Ausgänge
X13
A12
A13
+24V
+24V
A16
A15
A14
+24V
+24V
A11
A10
A9
A8
A7
A5
+24V
A6
+24V
A4
+24V
A3
A2(02-1)
A2(02-2)
A1(01-1)
A1(01-2)
X19.6 (22)
X19.3 (22)
X25
X24
X23
X22
Y2
Y3
Y4
Y8
Tasten-feld
Faden-schneider
Faden-wischer
Presser-fuß
Faden-spannungs-lüftung
15
14
13
12
11
16
17
18


Steuergerät A1
(322MS)
Eingänge
X5
X15
X19
X40
X41
X42
X43
X46
X47
A10
A11
A12
A13
A4
S10
S11
S12
S13
S14
S15
H10
R1
Stromquelle UFW
UFW-Ein
E9 / 180°
0V
+5V
A10 / Stromquelle LS
LS aufen (2)
LS innen (1)
+24V
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E16/CC1
E16
X30.8 (15)
X30.22 (15)
Durchlichtsensor Empfänger
Durchlichtsensor Sender
Zickzacksensor
Unterfaden-wächter
Option: Zweiter Knietaster
Einzelstich (Knietaster)
Anlaufsperre
Unterfaden Alarm
Einzelstich
Nadelpositions-wechsel
Riegel
19
20
21
22
23
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31
32

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