PFAFF® Industrial

3519-5/01

INSTRUCTION MANUAL

This instruction manual applies to machines from the serial number **2 814 134** and software version **0361/021** onwards.

296-12-19 384/002
Instruction manual engl. 12.17

PFAFF Industriesysteme
und Maschinen GmbH

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1 Safety

1.01 Directives

The machine was built in compliance with the regulations specified in the EC declaration of conformity and declaration of incorporation.
As a supplement to this instruction manual, please also observe the generally applicable, legal and other regulations and legislation – also in the country of use – and the valid environmental protection regulations! Always comply with the locally applicable regulations of the professional associations and other supervisory authorities!

1.02 General safety instructions

- The machine may only be operated after you have become acquainted with the associated instruction manual and only by operating personnel who have received appropriate training!
- Always read the safety instructions and the instruction manual of the motor manufacturer before starting up the machine!
- Always follow the hazard and safety instructions attached to the machine that must not be removed!
- The machine may only be operated for its intended purpose and only with the associated safety covers, while adhering to all the relevant safety requirements.
- The machine must always be disconnected from the power supply by pressing the main switch or pulling out the mains plug when sewing tools are replaced (such as the needle, presser foot, needle plate etc.) when leaving the workstation and performing maintenance!
- The daily maintenance work may only be carried out by suitably qualified personnel!
- The machine must be isolated from the power supply and pneumatic supplies before any maintenance work and repairs are performed! The only permitted exceptions are for adjustment work and functional tests by appropriately trained technical staff!
- Repairs and special maintenance work may only be carried out by technical staff or people with appropriate training!
- Work on electrical equipment may only be carried out by qualified technical staff!
- Work on parts and equipment under voltage is not permitted!
  Exceptions are regulated by the EN 50110 standards.
- Modifications and changes to the machine may only be made in compliance with all of the relevant safety requirements!
- Only the replacement parts approved by us for usage may be used for repairs! We warn you expressly that spare parts and accessories that are not supplied by us are also not tested and approved by us. Fitting and/or using these products may therefore have negative effects on features which depend on the machine design. We are not liable for any damage caused by the use of non-Pfaff parts.

1.03 Safety symbols

Hazard point!
Special points of attention

Risk of injury to operating personnel and technical staff!

Danger area due to laser beam!

Attention!

Do not operate without the finger guard and safety covers!

Turn off the main switch before set-up, maintenance and cleaning work!

Only one person in the work area!
Only one person may be in the work area of the machine during operation!

Do not lean on!
The feed mechanism can be damaged if you lean on the infeed table!

1.04 Special points of attention for the owner-operator

- This instruction manual is a part of the machine and must be made available to the operating personnel at all times.
- The instruction manual must have been read before the initial start-up.
- The operating personnel and technical staff must be instructed about the machine's safety covers and about safe working methods.
- The owner-operator may only operate the machine in a flawless condition.
- The owner-operator must ensure that no safety covers are removed or disabled.
- The owner-operator must ensure that only authorised persons work on the machine.

Additional information can be requested from the responsible sales centre.

1.05 Operating personnel and technical staff

1.05.01 Operating personnel

Operating personnel are persons responsible for setting up, operating and cleaning the machine, and for error clearance in the work area.

The operating personnel are obligated to comply with the following points:

- The safety instructions provided in the instruction manual must be followed for all work!
- Any work method jeopardising machine safety must be refrained from!
- Tight-fitting clothing must be worn. The wearing of jewellery such as chains and rings is prohibited!
- Care must be taken to ensure that no unauthorised persons are located in the machine's hazard zone!
- Any changes occurring on the machine which impair its safety must be reported to the owner-operator immediately!

1.05.02 Technical staff

Technical staff are persons with technical training in electricity/electronics and mechanics. They are responsible for lubricating, servicing, repairing and adjusting the machine.

The technical staff are obligated to comply with the following points:

- The safety instructions provided in the instruction manual must be followed for all work!
- Turn off the main switch and secure it against reactivation before starting any adjustment and repair work!
- Never work on live parts and equipment! Exceptions are regulated by the EN 50110 standards.
- Reattach the safety covers following repair and maintenance work!

1.06 Danger warnings

A work area of **1** m must be kept free in front of and behind the machine to ensure unobstructed access at all times.

Do not reach into the work area of the machine during the sewing operation!
Risk of injury from the needles in the sewing head and feed unit!

Do not allow any objects to be placed on the table during the adjustment work!
The objects could become jammed or be slung away!
Risk of injury from parts flying around!

Do not look at the laser beam with or without optical aids!
Risk of retinal injuries to the eye from the concentrated light!

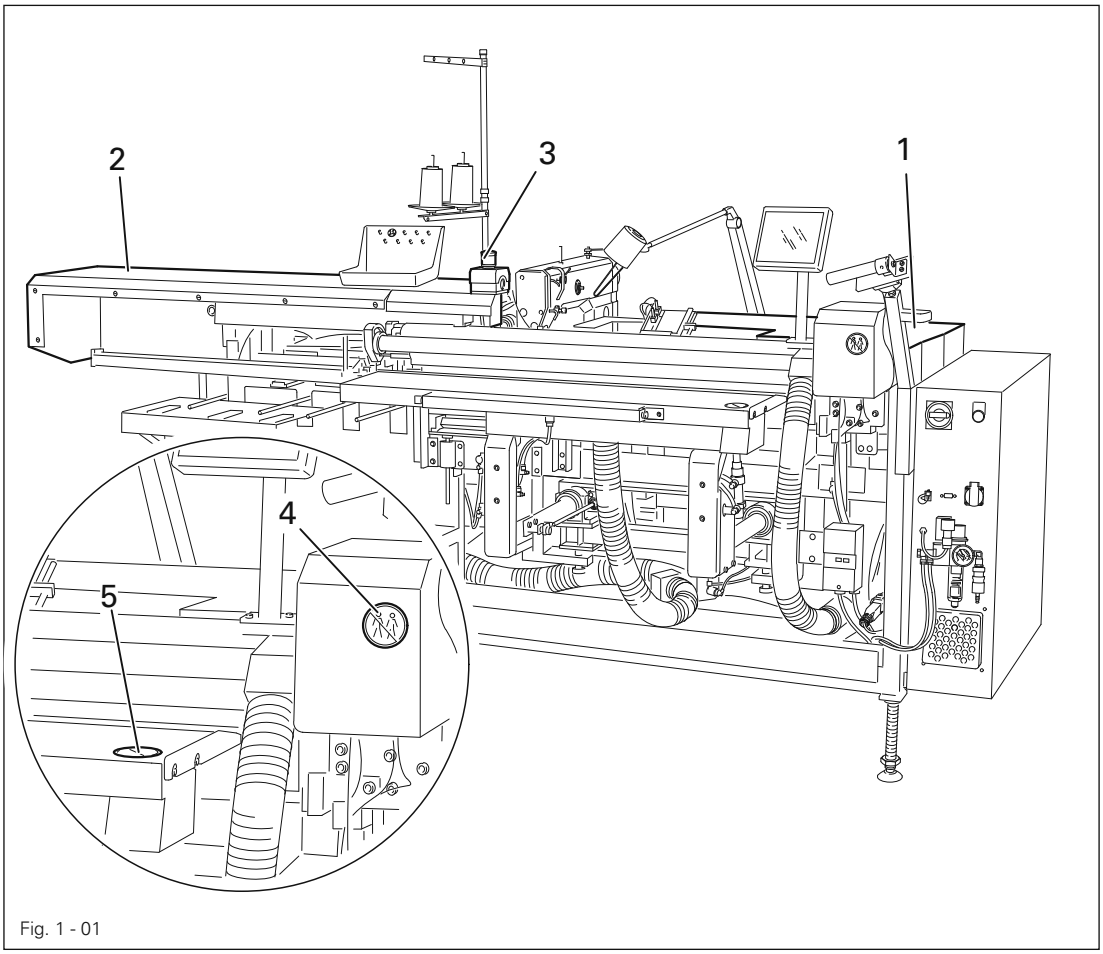


Fig. 1 - 01

Only operate the machine with the closed covers **1** and **2!**
Risk of injury from moving machine parts!

The emergency stop push-button **3** is used to stop the machine immediately in emergency situations.

2 Proper Use

The PFAFF 3519-5/01 is an automatic sewing machine and is used for sewing single and double-point breast darts on jackets.

Any usage not approved by the manufacturer is deemed misuse! The manufacturer shall assume no liability for damage caused by misuse! Proper use also includes compliance with the operating, maintenance, adjustment and repair measures specified by the manufacturer!

3 Technical Data▲

Stitch type: ..... 301 (lockstitch)
Needle system: 134
Needle size in 1/100 mm: ..... 80 - 100

Stitch length: ..... 0.5 - 3.0 mm
Max. stitch count: ..... 4300 stitches/min
Start backtack stitch length: ..... Standard stitch length of half of standard stitch length
Start backtack stitch count: ..... 1 - 9
Starting / end stitch condensation stitch length: ..... 1 - 3 mm
Starting / end stitch condensation stitch count: 1- 9

Size of sewing area
Dart depth: ..... 5 - 12 mm
Dart length: ..... 80 - 395 mm

Max. sewable material thickness: ..... 4 mm

Machine dimensions
Length: ..... approx. 2,800 mm
Width: ..... 1,200 - 1,800 mm
Height: ..... approx. 1400 mm

Weight
Net weight ..... approx. 628 kg
Gross weight ..... approx. 796 kg

Connection data
Operating voltage: ..... 230 V ± 10 %, 50/60 Hz
Max. input power: ..... 3 kVA
Fuse protection: ..... 1 x 16 A, inert
Leakage current: ..... ≤ 5 mA◆

Working air pressure ..... 6 bar
Air consumption: ..... approx. 25 l/working cycle

Ambient temperature
85% rel. humidity (condensation not permitted) ..... 5 - 40 °C

Noise data
Noise emission level at workplace with a sewing speed of 4300 min^{-1}: ..... L_{pA} < 81.9 dB(A)■
(Noise measurement in accordance with DIN 45 635-48-A-1, ISO 11204,
ISO 3744, ISO 4871)

▲ Subject to alterations

◆ Due to the use of network filters there is a nominal leakage current of ≤ 5 mA.

■ K_{pA} = 2.5 dB

4 Disposal of the Machine

- It is up to the customer to dispose of the machine properly.
- The materials used for the machine include steel, aluminium, brass and various plastics. The electrical equipment consists of plastics and copper.
- The machine must be disposed of in accordance with the locally valid environmental protection regulations, with a specialised company being contracted if necessary.

Please ensure that parts coated with lubricants are disposed of separately in accordance with the locally valid environmental protection regulations!

5 Transportation, Packaging and Storage

5.01 Transport to the customer's premises

All machines are completely packed for delivery.

5.02 Transport within the customer's premises

The manufacturer assumes no liability for transport within the customer's premises or to the individual usage sites. Please ensure that the machines are only transported in a vertical position.

5.03 Disposal of the packaging materials

The packaging materials of these machines consist of paper, cardboard and VCI fleece. It is up to the customer to dispose of the packaging properly.

5.04 Storage

The machine can be stored for up to 6 months when not in use. It must then be protected from dirt and moisture. For longer storage periods, the machine's single components, especially its sliding surfaces, must be protected against corrosion, e.g. by an oil film.

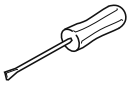
6 Work Symbols

Activities to be performed or important information in this instruction manual are emphasised by symbols. The symbols used have the following meaning:

Note, information

Cleaning, care

Lubrication



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

7 Operating Controls

7.01 Main switch

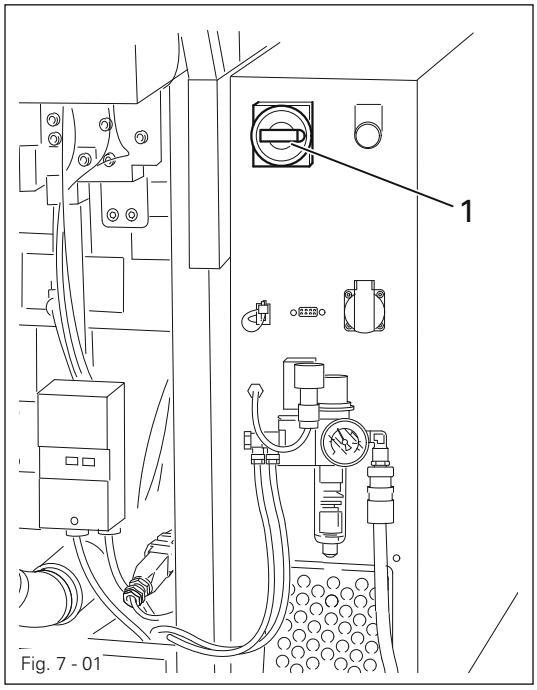


Fig. 7 - 01

- Turning the main switch **1** switches the power supply on or off.

7.02 Push-buttons on the machine control unit

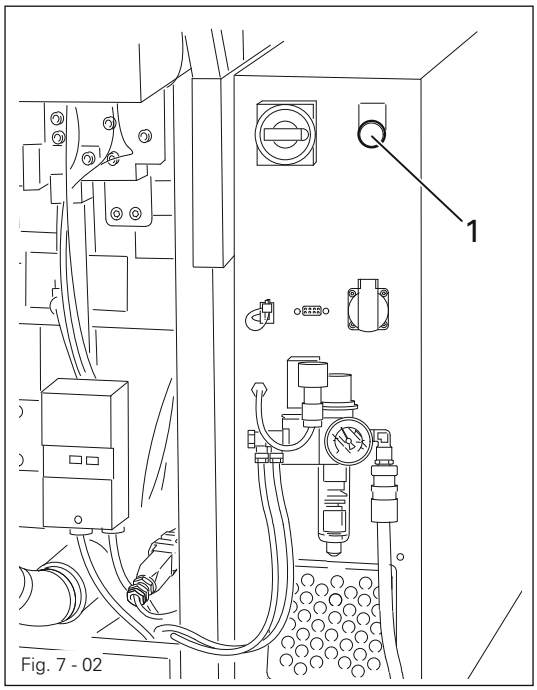


Fig. 7 - 02

- Pressing the push-button **1** after switching on the power supply via the main switch, see **chapter 7.01 Main switch**, switches the machine control unit on and the machine is ready for operation.

The push-button **1** lights up when the machine is ready for operation.

7.03 Switch for the suction air blower (option)

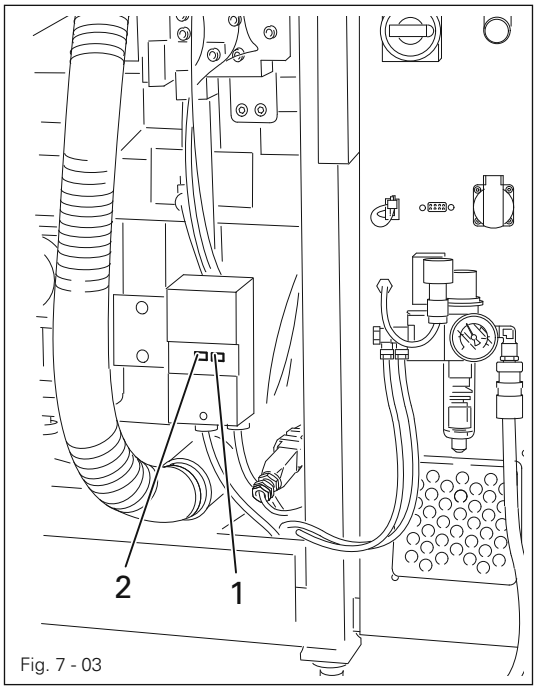


Fig. 7 - 03

The suction blower integrated into the machine is only required if there is no vacuum network at the erection site.

- Pressing the push-button **1** switches the suction air blower on.
- Pressing the push-button **2** switched the suction air blower off.

7.04 Emergency stop push-button

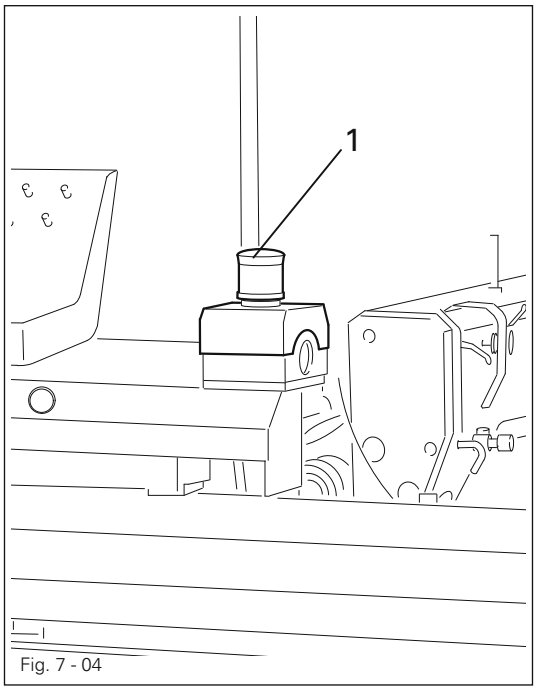


Fig. 7 - 04

- Pressing the emergency stop push-button **1** stops the machine immediately in emergency situations.

The emergency stop push-button **1** must only be pressed in emergency situations!

After releasing the depressed EMERGENCY STOP push-button **1,** the machine can be switched on again via the push-button on the machine control unit, see **chapter 7.02 Push-buttons on the machine control unit**.

7.05 Control panel

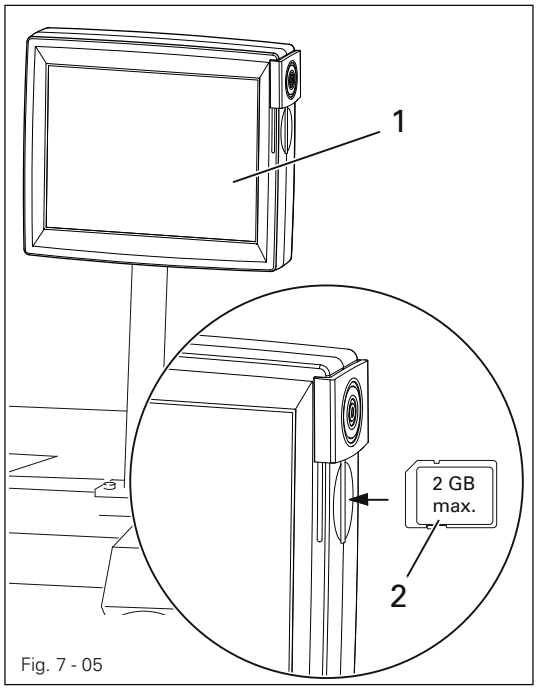


Fig. 7 - 05

The current operating statuses are indicated on the control panel **1.** The machine is operated with constant dialogue between the control unit and the operator; different pictograms and / or texts are displayed for this purpose according to the operating status of the machine.
Pictograms or texts with a border represent functions that can be called up by pressing on the respective point on the monitor. Pressing the respective function causes its immediate actuation or activation/ deactivation or another menu will appear, e.g. for entering a value.

Activated functions are indicated by pictograms shown inversely. Pictograms or texts without a border are only used for display purposes and cannot be called up by pressing them.
The SD card **2** in the control panel can be used to import seam programs and operating software.

7.06 Pedal

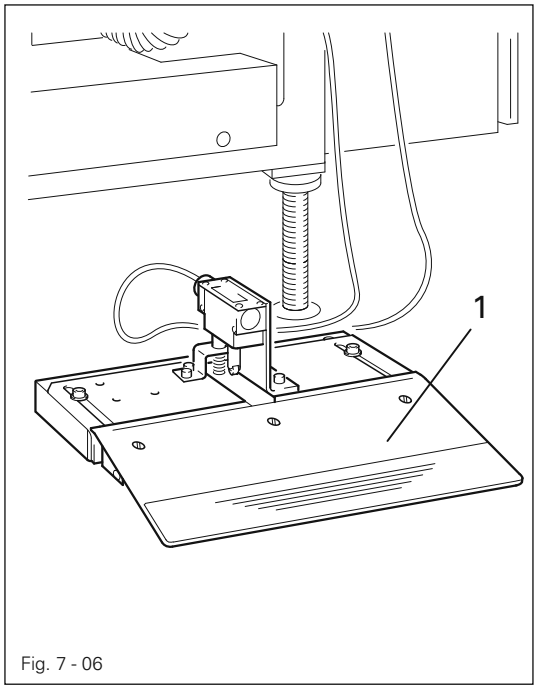


Fig. 7 - 06

- Pressing the pedal **1** switches the suction air for the infeed table and the positioning tube on or off.

7.07 Start keys

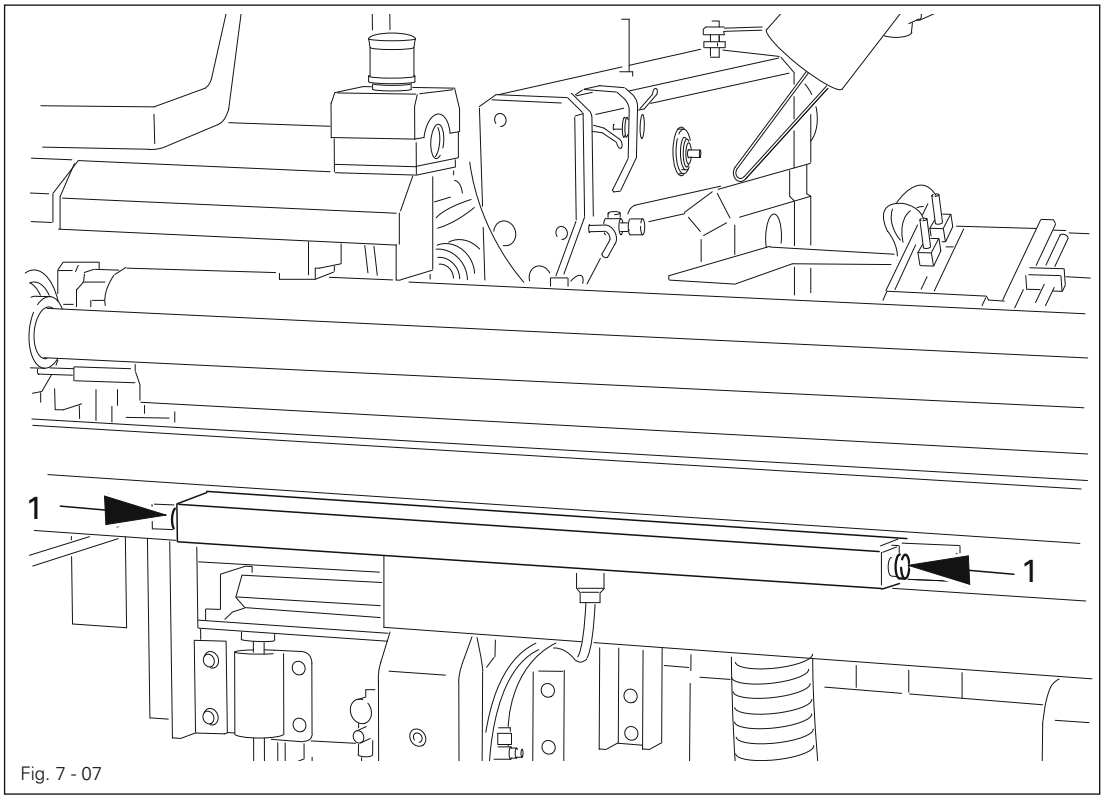


Fig. 7 - 07

- The sewing cycle is started by pressing the two start keys **1** at the same time.

After processing the sewing cycle, the lit start keys **1** show that the next sewing cycle can be started.

- When the threading aid function is active, the infeed table is moved forward and the hook area of the sewing head becomes accessible after pressing both of the start keys **1** at the same time.

7.08 Key for small parts stacker

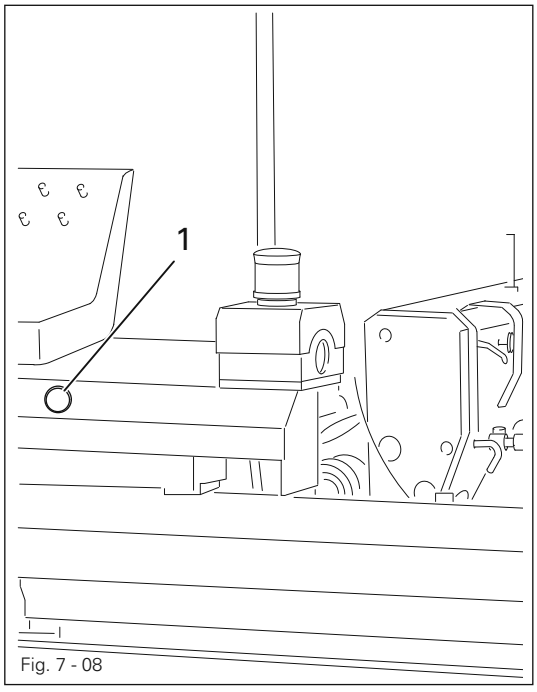


Fig. 7 - 08

- Pressing the key **1** switches the small parts stacker on or off.

8 Set-up and Initial Start-up

The machine may only be set up and started up by qualified personnel! All of the relevant safety regulations must always be complied with in this process!

8.01 Set-up

Suitable electrical and compressed air supply connections must be provided at the erection site, see **chapter 3 Technical Data**. The erection site must also have a firm and level subsurface and adequate lighting.

8.01.01 Aligning the machine

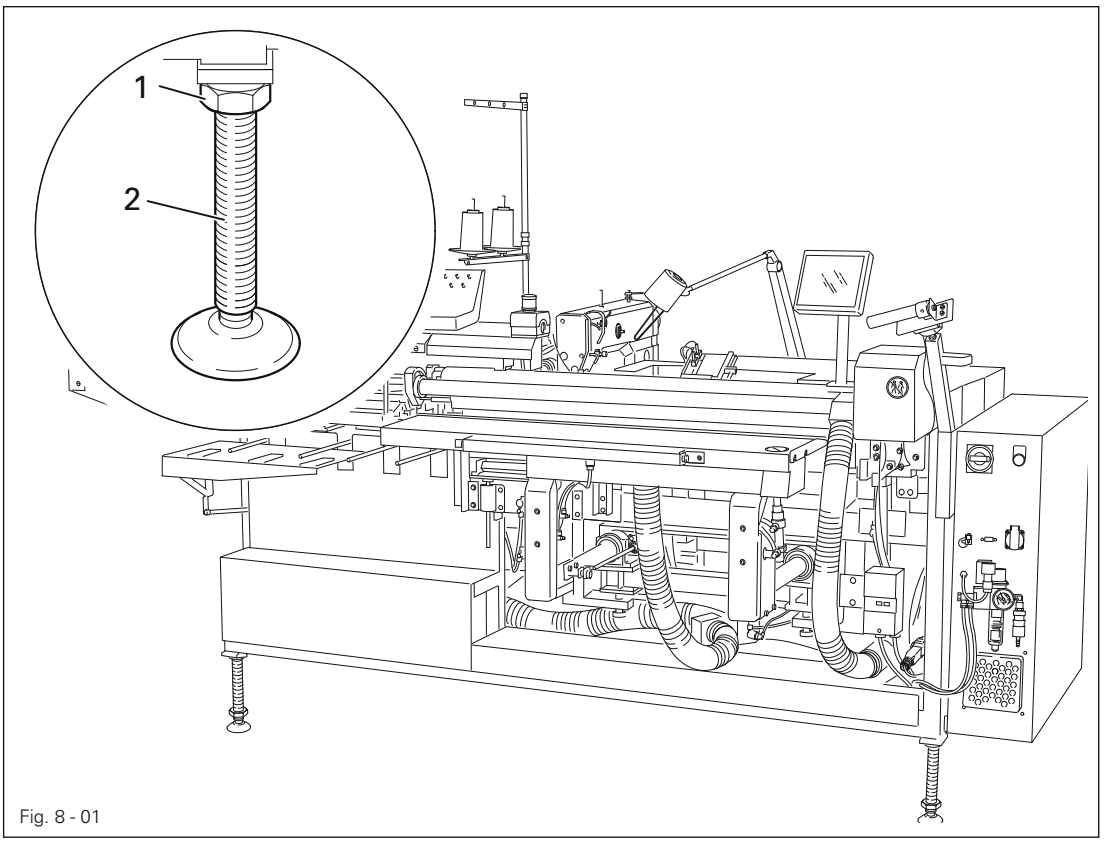


Fig. 8 - 01

- Loosen the nuts **1** and turn the feet **2** so that the machine is horizontal.
- Tighten the nuts **1.**

The alignment on the lower frame tubes can be checked with a spirit level.

8.01.02 Removing the transit support on the infeed table

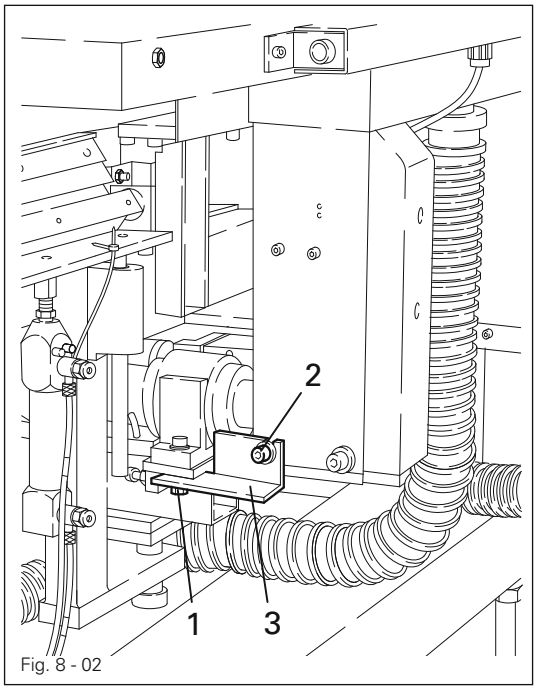


Fig. 8 - 02

- Unscrew the screw **1.**
- Loosen the screw **2** and remove the angle bracket **3.**
- Tighten the screw **2** again.

8.01.03 Removing the sewing machine transit support

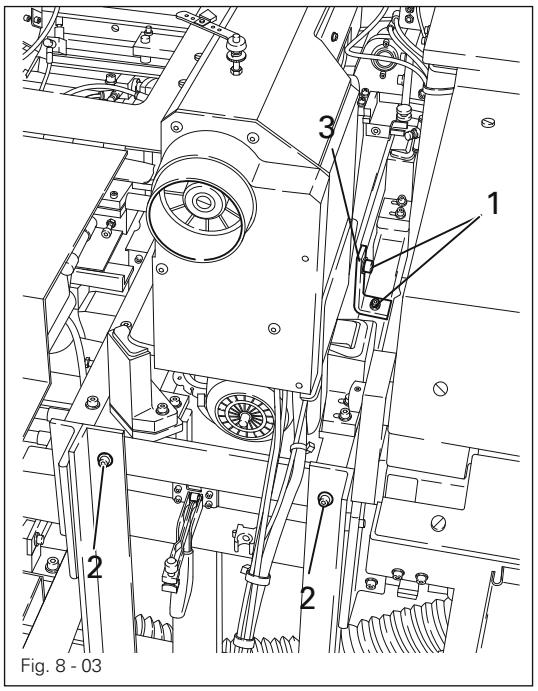


Fig. 8 - 03

- Unscrew the screws **1** and **2.**
- Remove the angle bracket **3.**

8.01.04 Removing the loading clamp transit support

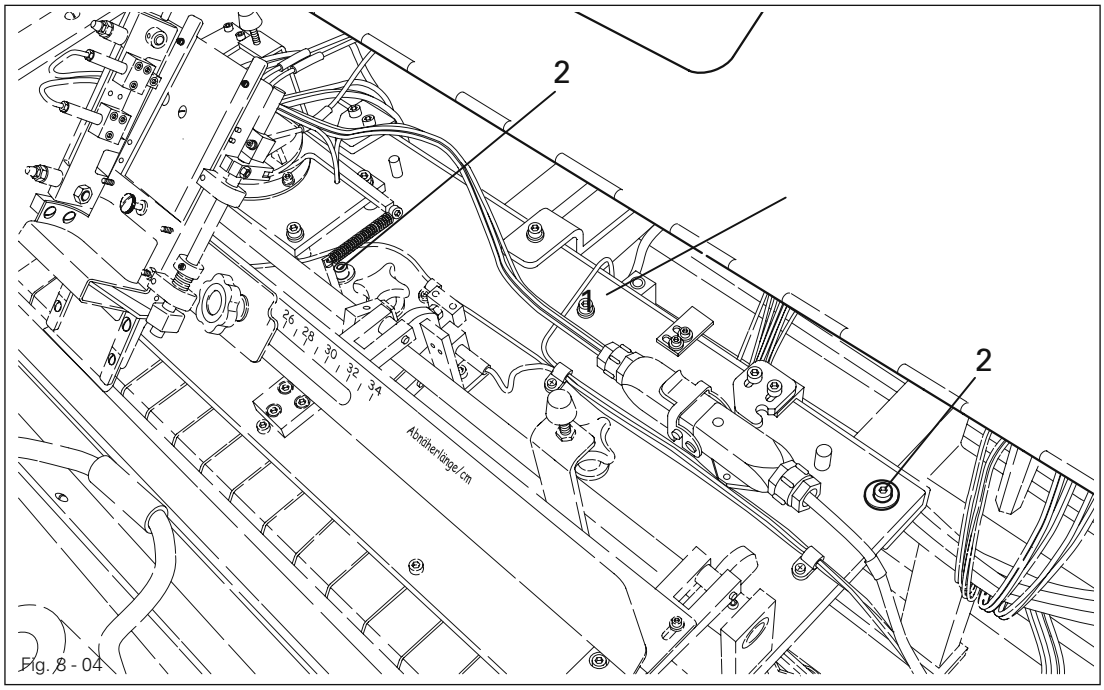


Fig. 8 - 04

- Open the cover **1.**
- Unscrew the screws **2.**
- Close the cover **1** again.

8.01.05 Assembling the reel stand

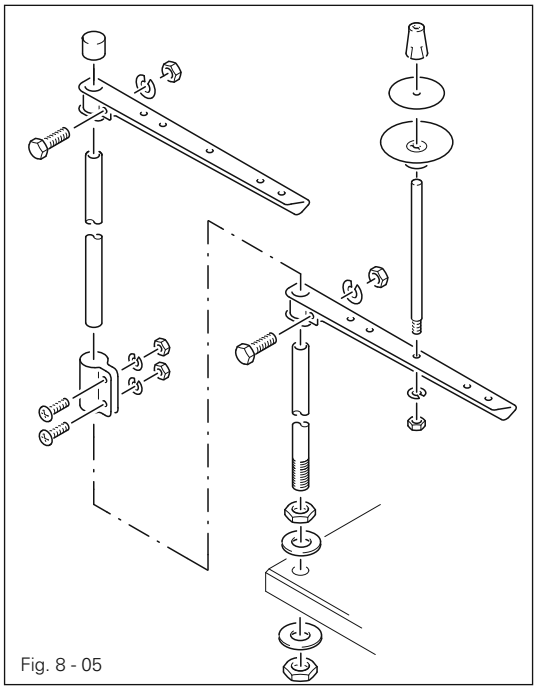


Fig. 8 - 05

- Assemble the reel stand as shown in the adjacent illustration.
- Then insert the stand into the hole on the machine stand and secure it with the enclosed nuts.

8.01.06 Connecting the pedal

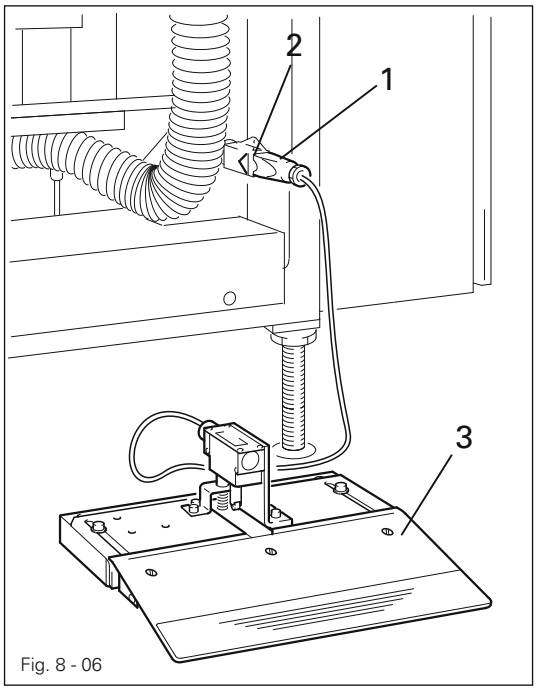


Fig. 8 - 06

- Insert the connector **1** into the corresponding bushing on the machine stand.
- Secure the connector with the lever **2.**

Secure the supply cable to the pedal **3** on the machine stand (e.g. with cable clips) to prevent a tripping hazard!

8.02 Initial start-up

- Before the initial start-up, clean the machine thoroughly and lubricate or fill the oil, see **chapter 12 Maintenance and Care**!
- Inspect the machine and in particular the electric lines and pneumatic connecting hoses for possible damage.
- Arrange for technical staff to check whether the machine may be operated at the existing mains voltage and whether it is connected properly.

Do **not** operate the machine if there are any differences!

The machine must only be connected to a grounded socket!

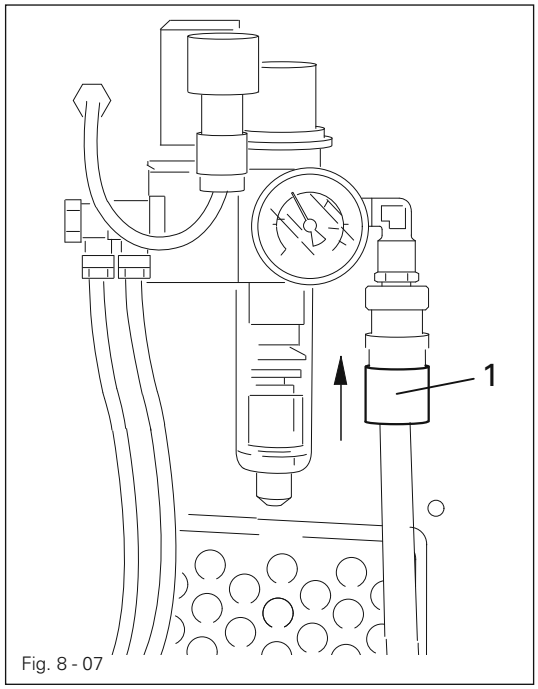


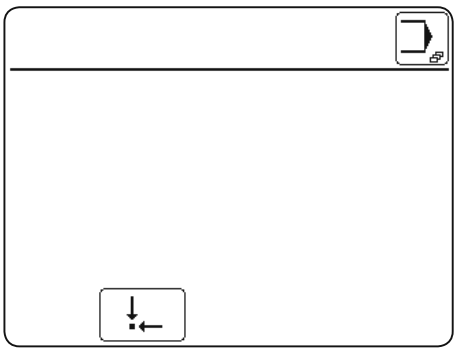
Fig. 8 - 07

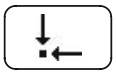
- Connect the machine to the compressed air system and push the slide closure **1** upwards.
- It must have a supply pressure of **6** bar. Set this value if necessary, see **chapter 12.06 Monitoring / adjusting the air pressure**.

8.03 Switching the machine on / off

Switch the machine on

- Switch on the main switch, see **chapter 7.01 Main switch**.
- Switch on the machine control unit, see **chapter 7.02 Push-buttons on the machine control unit**.





- Move the machine to home position after booting up the machine control unit to confirm the switch-on process.
- Switch on the suction air blower if necessary, **see chapter 7.03 Switch for the suction air blower**.
- Carry out a test run, see **chapter 10 Sewing**.

Switch the machine off

- Switch off the main switch.

Description of further functions on the display

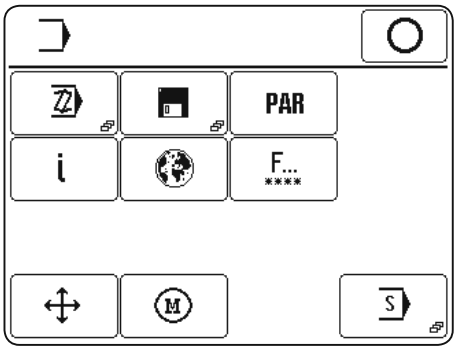
Input menu

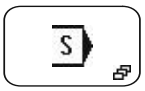
This function is used to call up input mode, see **chapter 11 Input**.

8.04 Setting the control panel (only for the control panel BDF T1)

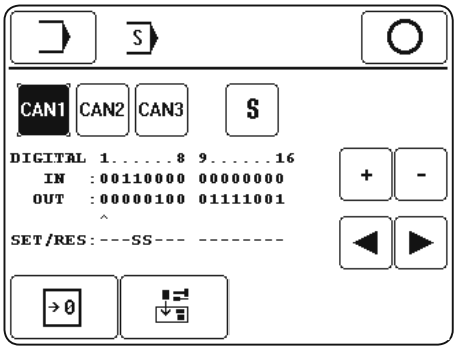
- Switch the machine on.

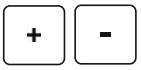
- Call up "Input" mode.





- Call up the service menu.





- Change the display contrast.

Never reduce the display contrast to such an extent that the display can no longer be read!

- Conclude the input.

9 Set-up

Observe and comply with all regulations and information in this instruction manual. Pay particular attention to all safety regulations!

All set-up work may only be carried out by appropriately instructed personnel. Disconnect the machine from the electricity mains for all set-up work by operating the main switch or by removing the mains plug!

9.01 Inserting the needle

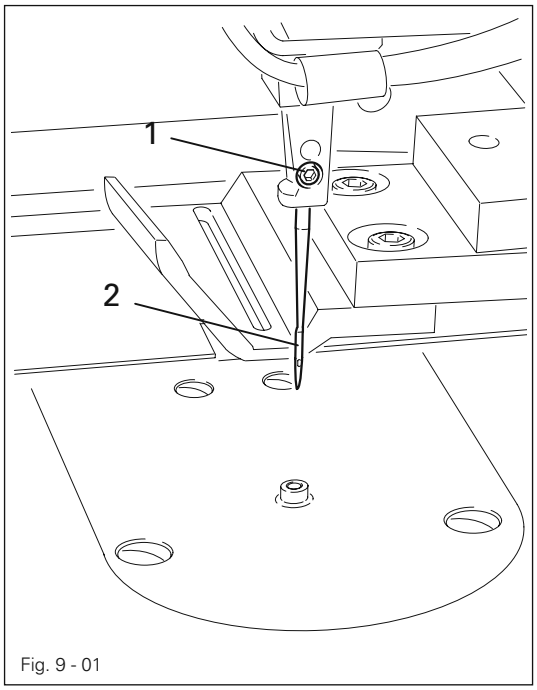


Fig. 9 - 01

Only use needles of the system intended for the machine, see **chapter 3 Technical Data**!

- Switch on the machine, see **chapter 8.03 Switching the machine on / off**.
- Call up the threading aid function.
  The workholder bar moves out of the needle area, the presser foot is lowered and the sewing start is disengaged.
- Loosen the screw **1** and insert the needle **2** into the needle bar until you feel it stop.
- Adjust the needle **2** so that the long needle groove is pointing forwards and tighten the screw **1.**

- Move the machine to the last position prior to the threading.

or

- Move the machine to home position.

9.02 Threading the needle thread / adjusting the needle thread tension

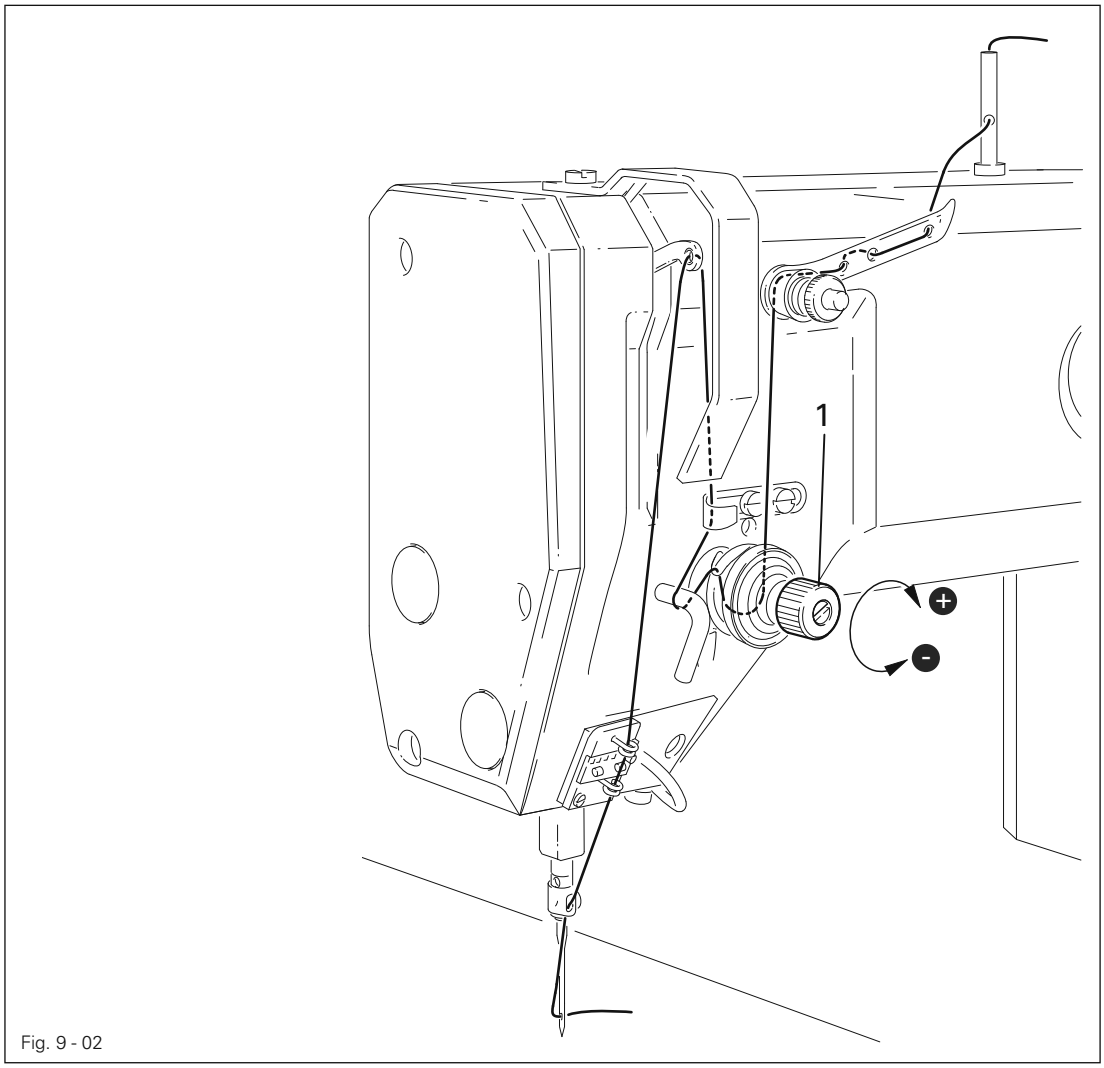


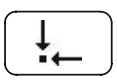
Fig. 9 - 02

- Switch on the machine, see **chapter 8.03 Switching the machine on / off**.

- Call up the threading aid function.
  The workholder bar moves out of the needle area, the presser foot is lowered and the sewing start is disengaged.
- Thread the needle thread as shown in Fig. **9 - 02.** Please ensure that the needle is threaded from the left.
- Adjust the needle thread tension by turning the adjusting wheel **1.**

- Move the machine to the last position prior to the threading.

or



- Move the machine to home position.

9.03 Winding the bobbin thread / adjusting the bobbin thread tension

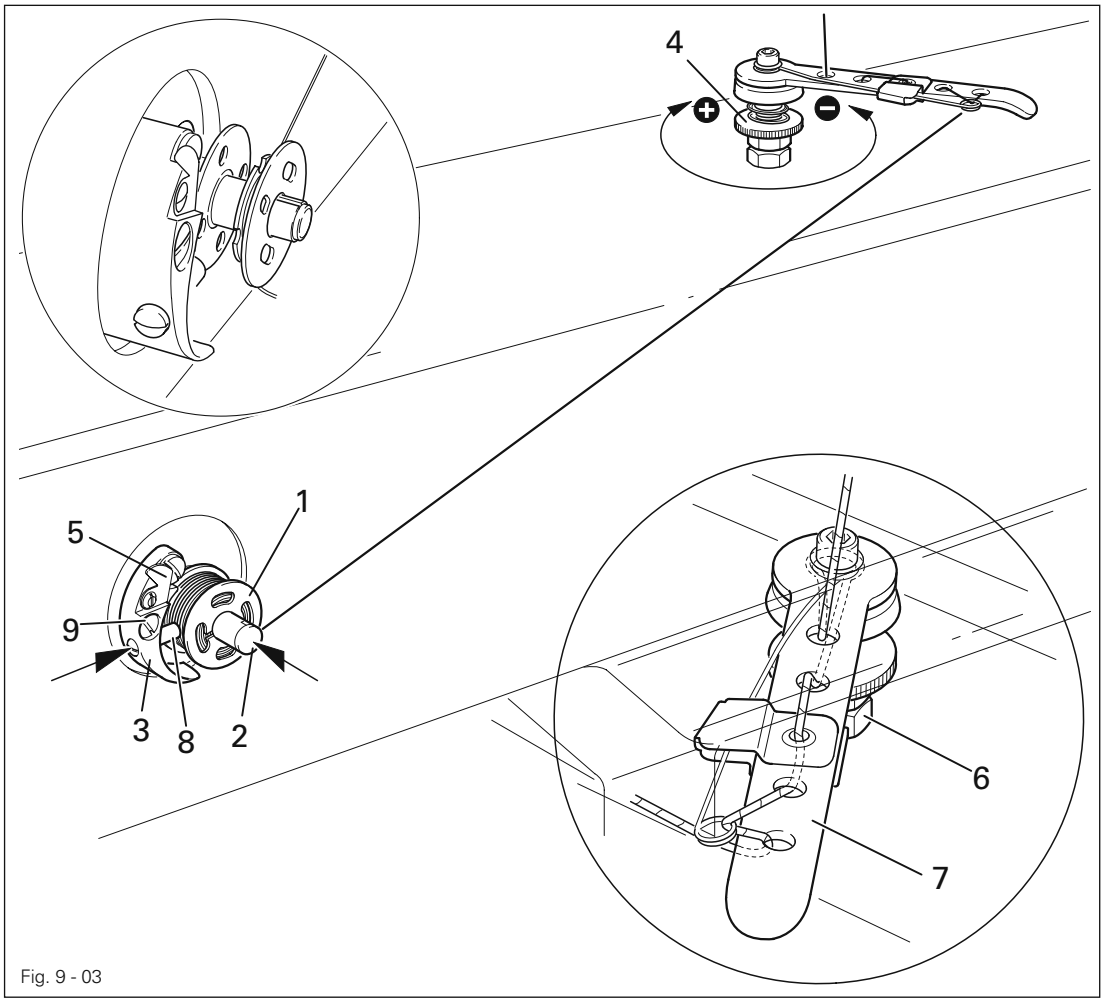


Fig. 9 - 03

- Switch on the machine, see **chapter 8.03 Switching the machine on / off**.
- Fit the empty bobbin **1** onto the bobbin winder spindle **2** with the rest thread chamber on the outside.
- Thread in the thread as shown in Fig. **9-03** and wind it round the bobbin **1** a few times in an anti-clockwise direction.
- Switch on the bobbin winder by pressing the bobbin winder spindle **2** and the lever **3** simultaneously.

The bobbin **1** fills up during sewing.

If the machine is only run for bobbin winding (without sewing), a bobbin case must be fitted in the hook!

Otherwise a jammed thread may damage the hook!

- The tension of the thread on the bobbin **1** can be adjusted with the knurled thumb screw **4.**
- The winder will stop automatically when the bobbin **1** is sufficiently full.
- Remove the filled bobbin **1** and cut the thread with the knife **5.**
- The fill amount of the bobbin **1** can be adjusted with the pin **8** (loosen the screw **9** and tighten it again).

If the thread is wound unevenly:

- Loosen the nut **6.**
- Turn the thread guide **7** accordingly.
- Tighten the nut **6.**

See **chapter 13.05.08 Bobbin winder** to adjust the fill amount.

9.04 Changing the bobbin / adjusting the bobbin thread tension

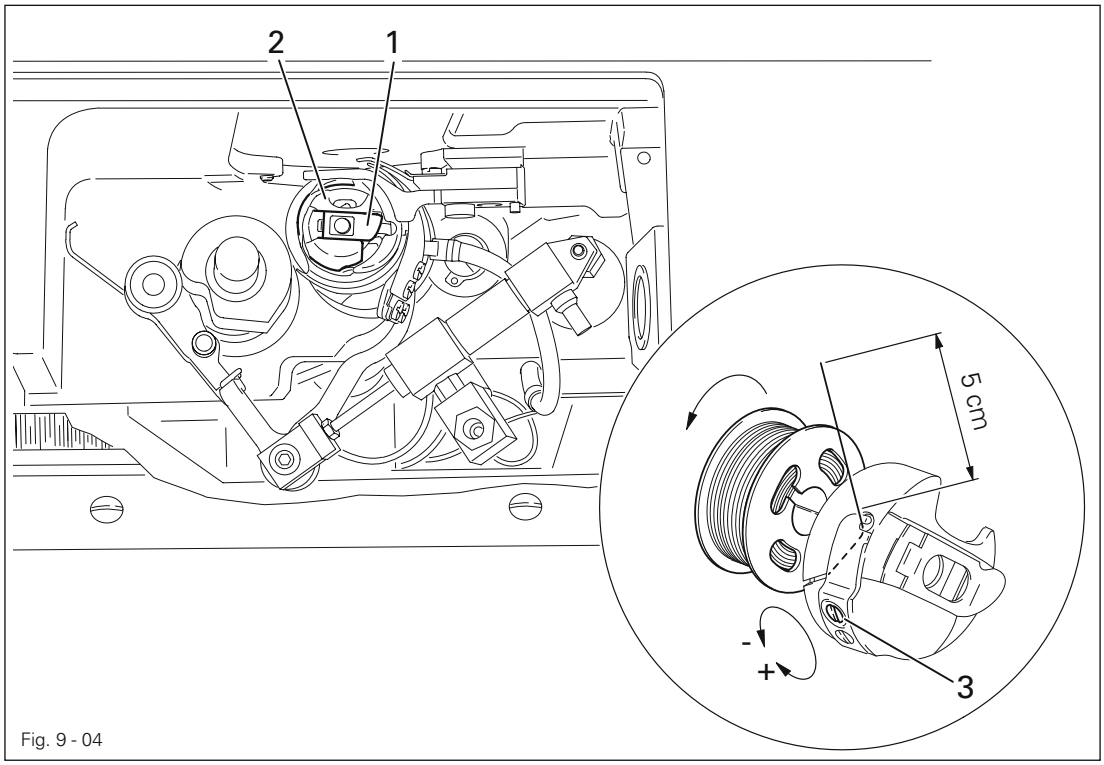


Fig. 9 - 04

- Switch on the machine, see chapter **8.03** Switching the machine on / off.

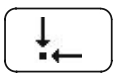
- Call up the threading aid function.
  The workholder bar moves out of the needle area, the presser foot is lowered and the sewing start is disengaged.
- Press both start keys at the same time, see **chapter 7.07 Start keys**.
  The infeed table moves forward and the hook area of the sewing head becomes accessible.

- Raise the lever **1** and remove the bobbin case **2** together with the bobbin.
- Insert the filled bobbin in the bobbin case **2** so that the bobbin turns in the direction of the arrow when taking up the thread.
- Pass the thread through the slot under the spring as shown in Fig. **9-04.**
- Adjust the bobbin thread tension by turning the screw **3.**

- Raise the lever **1** and insert the bobbin case **2** together with the bobbin into the hook.
- Release the lever **1** and press the bobbin case into the hook until you feel it snap in.

- Move the machine to the last position prior to the threading.

or



- Move the machine to home position.

9.05 Changing the insert for darts

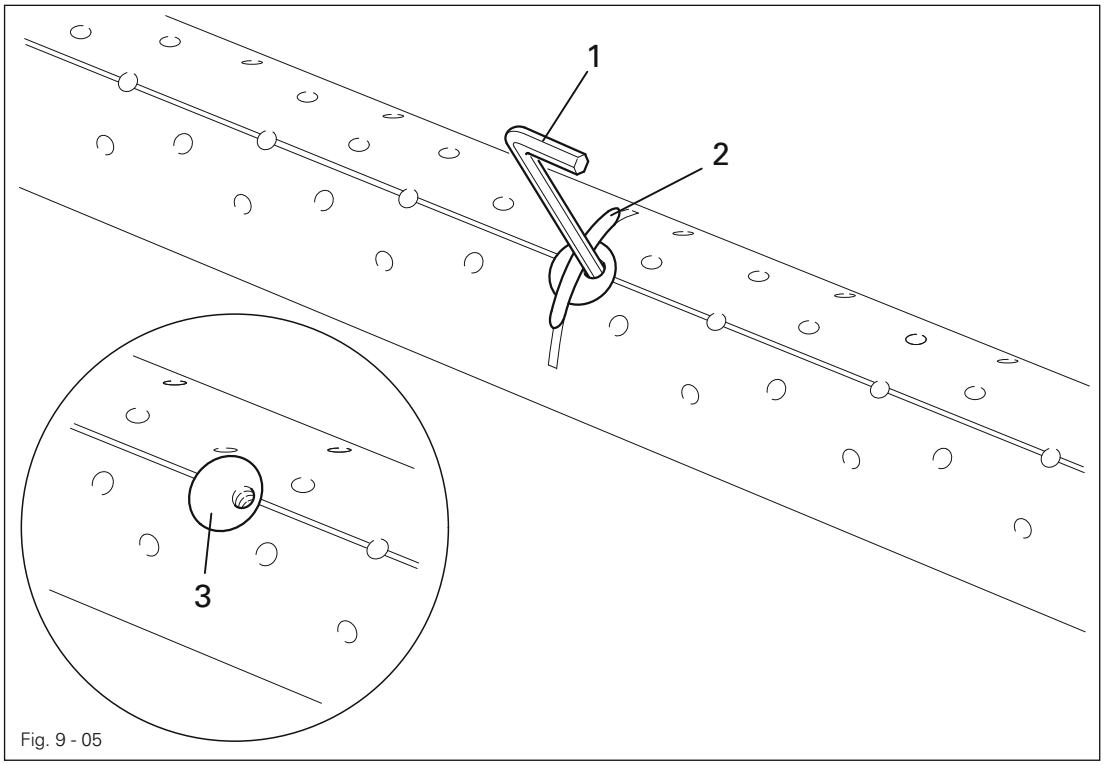


Fig. 9 - 05

- Screw the pin **1** provided into the threaded hole of the insert **2.**
- Pull out the insert **2.**
- Insert a new insert according to the dart depth.

Use the blind insert **3** for double-point darts.

9.06 Adjusting the ironing compensation strip feeder

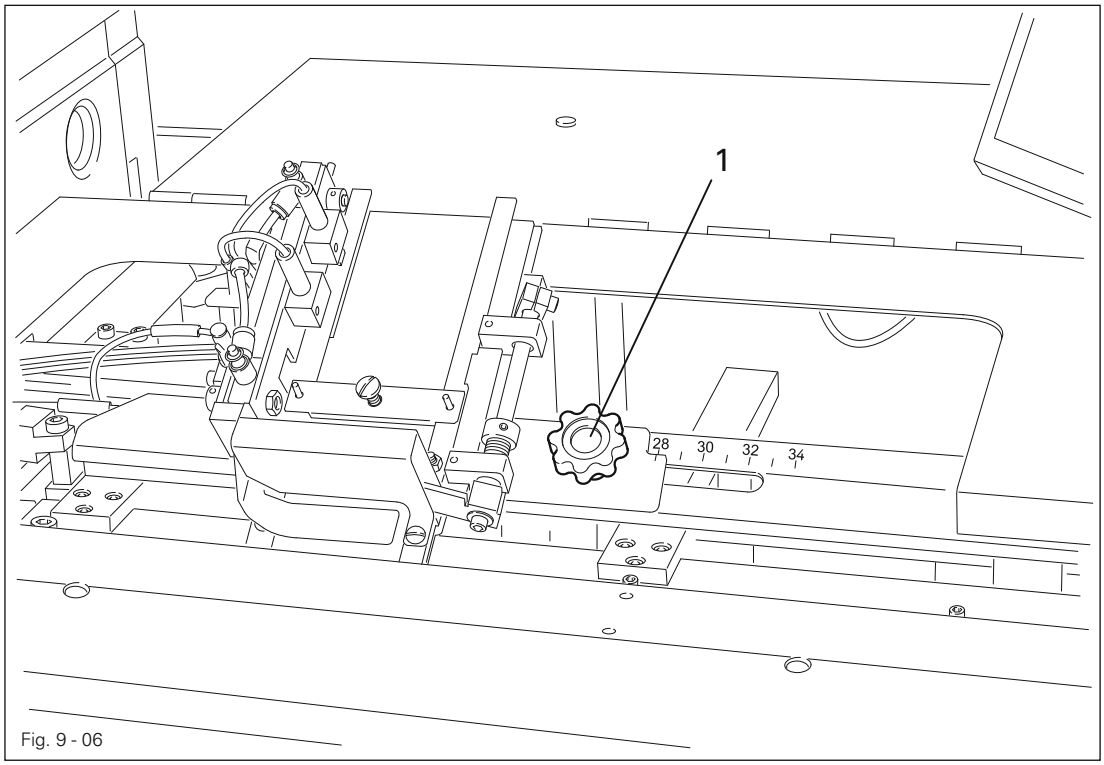


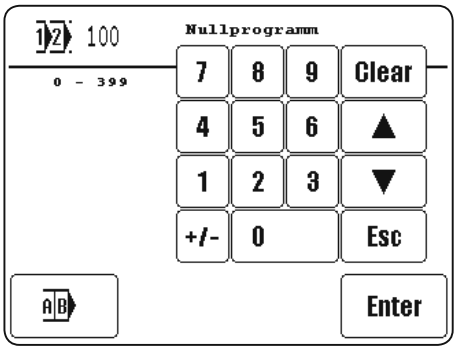
Fig. 9 - 06

- Loosen the screw **1.**
- Adjust the ironing compensation strip feeder according to the dart length.

9.07 Selecting a program number

- Switch the machine on.

- Call up the menu to input the program number.



- Select the desired program number.
  The program numbers are allocated as follows:

Program numbers 0 - 199:	Single-point darts
Program numbers 200 - 299:	Double-point darts
Program numbers 300 - 399:	Tapered darts

- Confirm the selection and leave the selection menu.

Description of further functions

Clear
This function sets the value to "0".

Arrow keys
These functions increase or decrease the value.

Esc
This function cancels the entry without the value entered being taken over.

Group selection
This function opens the menu to select or compile a program group, see **chapter 9.08 Selecting / compiling program groups**.

9.08 Selecting / compiling program groups

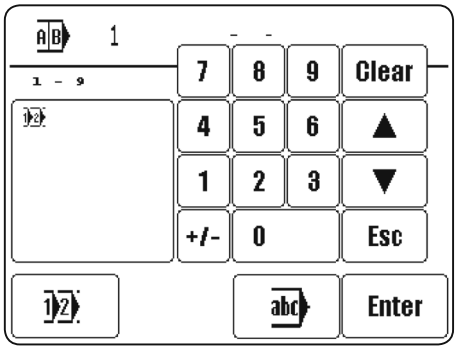
9.08.01 Selecting a program group

The corresponding group of seam programs can also be se lected instead of a program number. This assumes that the individual seam program has been assigned to a group, see chapter 9.08.02 Compiling a program group.

- Switch the machine on.

- Call up the menu to input the program number.

- Call up the menu to input the group number.



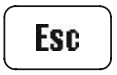
- Select the desired group number.

- Confirm the selection and leave the selection menu.

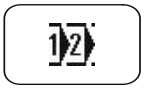
Description of further functions

Clear
This function sets the value to "0".

Arrow keys
These functions increase or decrease the value.



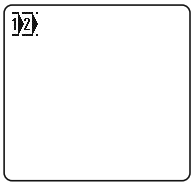
Esc
This function cancels the entry without the value entered being taken over.



Program number selection
This functions opens the menu for selecting a seam program number, see chapter 9.07 Selecting a program number.

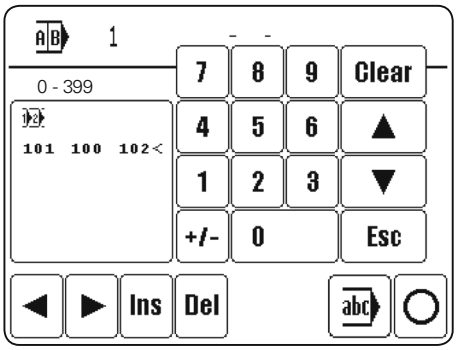
9.08.02 Compiling a program group

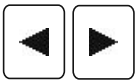
Up to 10 seam programs can be assigned to a program group. The seam programs in a selected program group appear as a function on the display when sewing and can be selected directly.



- Call up the menu to input the group number and select the desired group number without leaving the selection menu, see **chapter 9.08.01 Selecting a program group**.
- Call up group programming.

- Compile a program group from the existing seam programs by entering the program numbers on the number block.

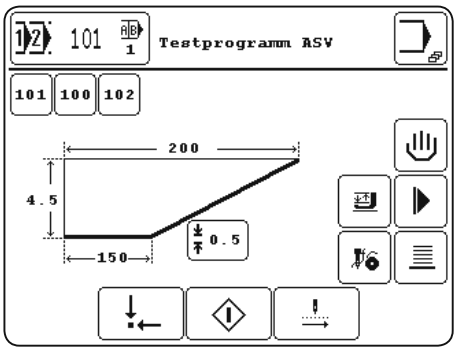




- The cursor in the window shows which seam program is removed from the group or at which point a new seam program is inserted. The cursor can be moved with the arrow keys.

- Insert (INS) the seam program at the current cursor position or delete (DEL) a marked seam program from the sequence, as required.

- Conclude group programming.



10 Sewing

The machine may only be operated by properly instructed personnel! The operating personnel must make sure that only authorised persons are in the danger zone of the machine!

The sewing mode is available for the production in particular in addition to input mode, see **chapter 11 Input**. All relevant functions and settings for the production are shown here on the display depending on the program selection and the machine status. The machine normally works in automatic mode but it can be switched to manual mode to set up and test processes.

The following conditions must be fulfilled for the production:

- All safety devices must be fitted and all covers must be closed, see **chapter 1.06 Hazard information**.
- The machine must be set up and started up properly as explained in **chapter 8 Set-up and initial start-up**.
- All set-up work must have been carried out, see **chapter 9 Set-up**.

10.01 Inserting the workpiece

10.01.01 Inserting the workpiece using the positioning tube

Workpieces with a striped or checked patter can be aligned with the aid of the laser beam.

Do not look at the laser beam with or without optical aids!
Risk of retinal injuries to the eye from the concentrated light!

Single-point darts

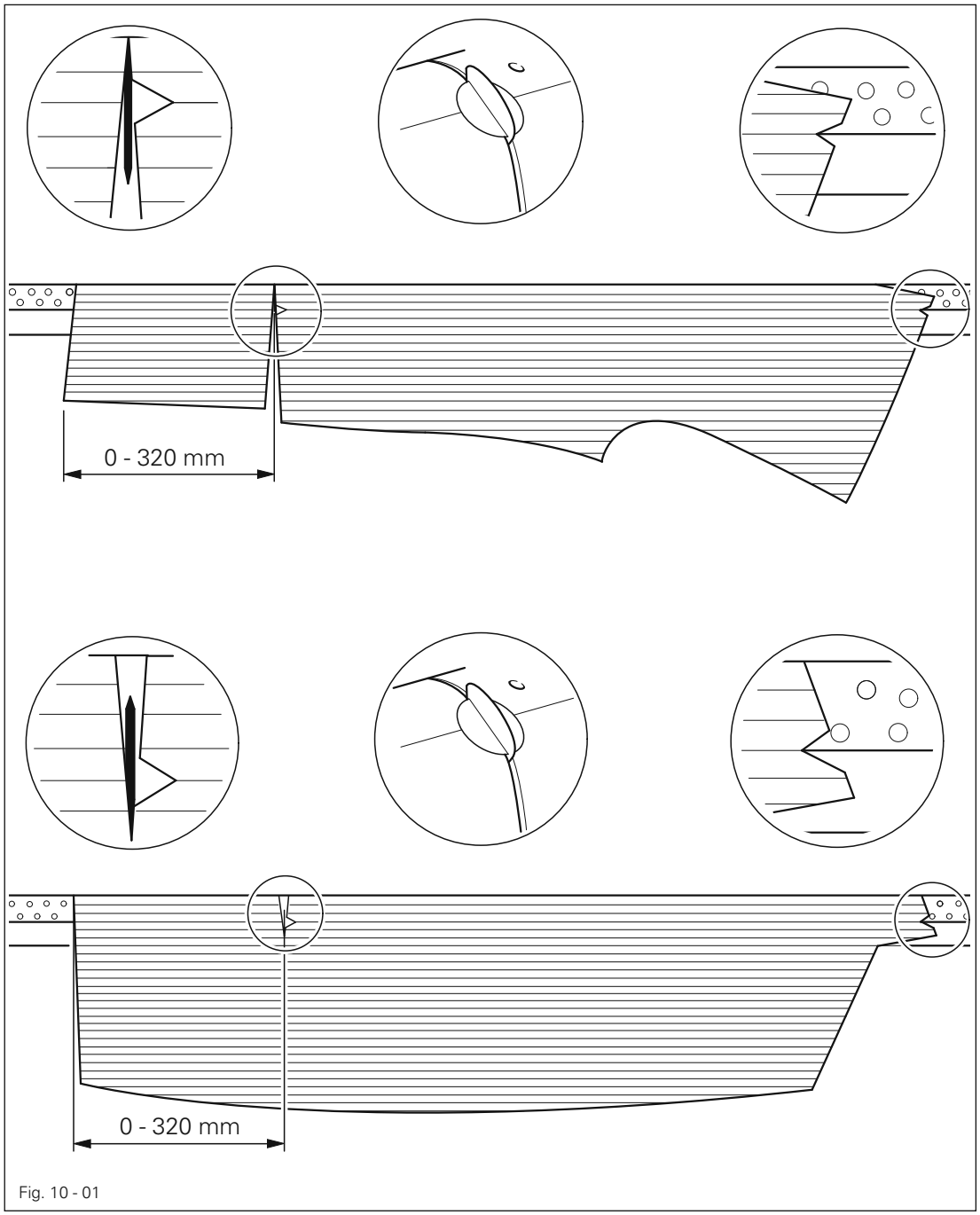


Fig. 10 - 01

Double-point darts

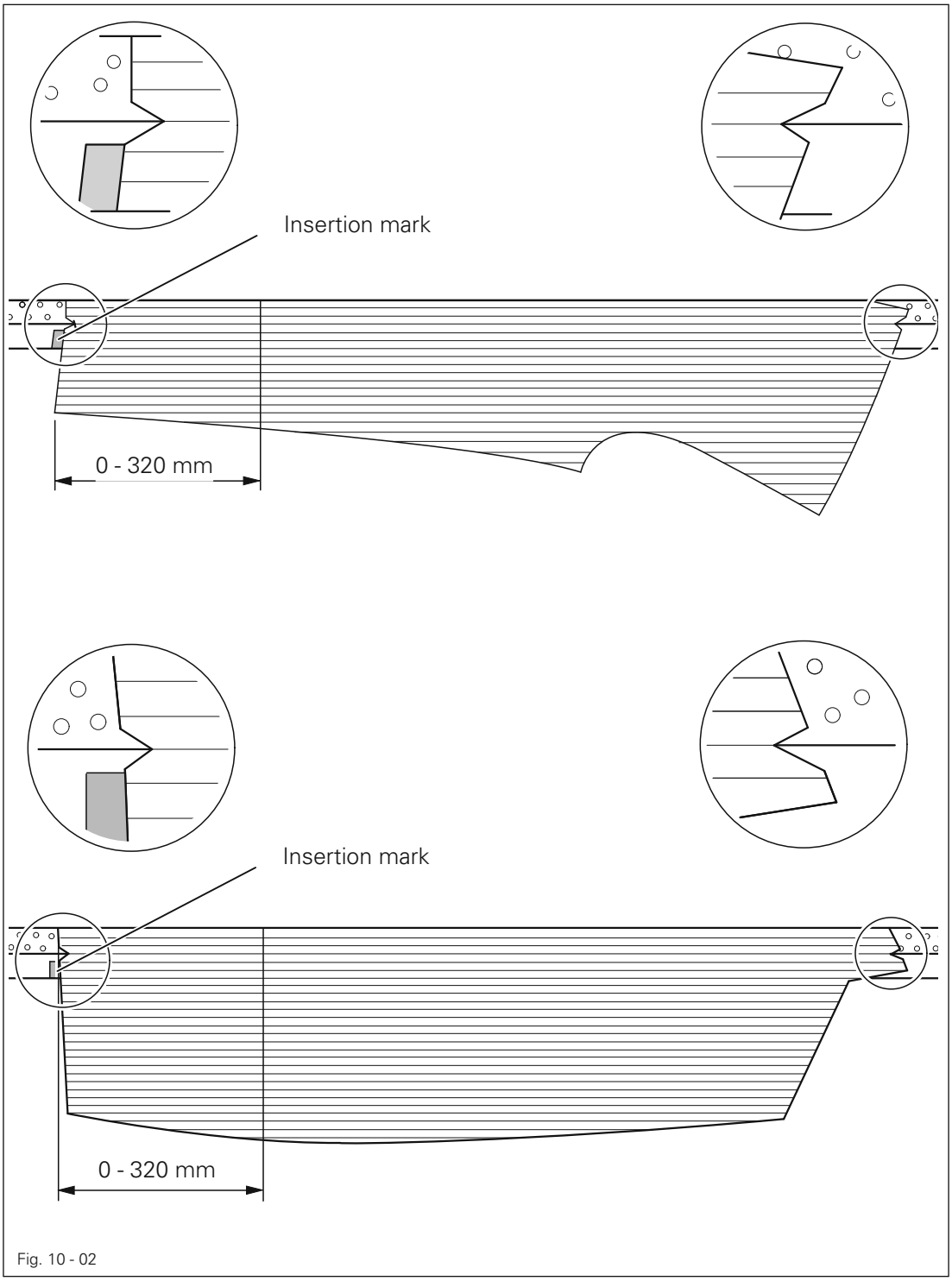


Fig. 10 - 02

10.01.02 Inserting the workpiece using the infeed table

Double-point darts

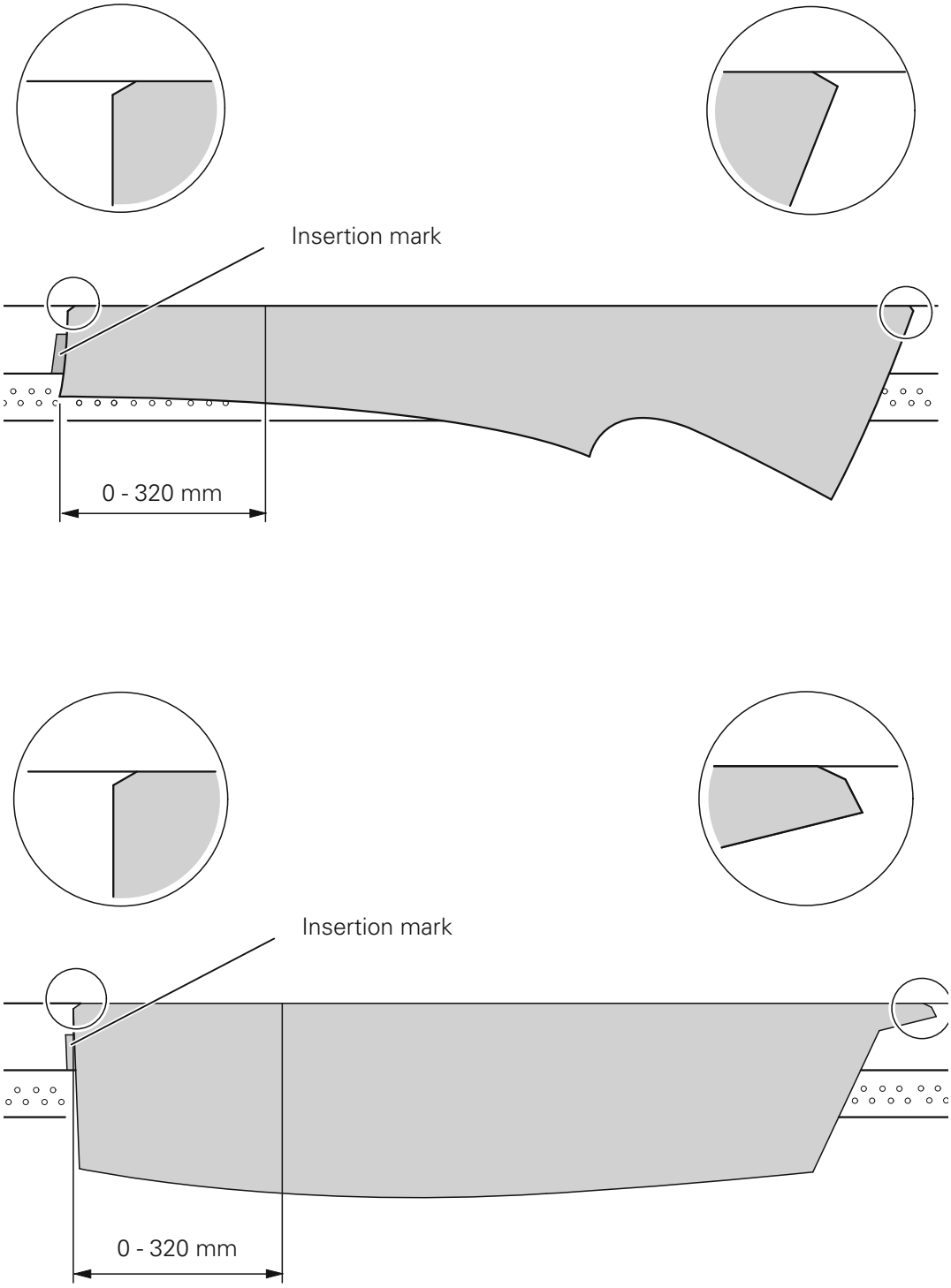
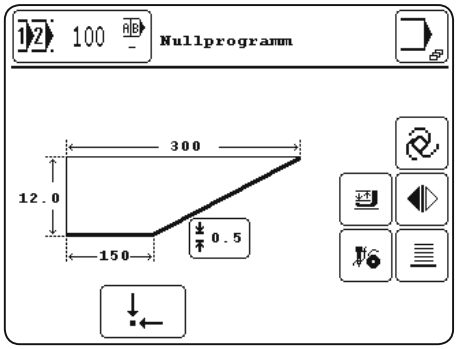


Fig. 10 - 03

10.02 Sewing in automatic mode

Automatic sewing mode is always called up first after switching on the machine.

- Switch the machine on.



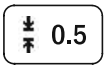
- Switch on the suction of the positioning tube or infeed table, see chapter 7.06 Pedal.
- Insert the workpiece, see chapter 10.01 Inserting the workpiece.
- Press the start keys to start the sewing process, see chapter 7.07 Start keys.

Description of the functions on the display

Menu to input the program number
This functions opens the menu for inputting the program number, see chapter 9.07 Selecting a program number.

Input menu
This function is used to call up input mode, see chapter 11 Input.

Program selection
These functions are used to select a program from the associated program group, see also chapter 9.08 Selecting / compiling program groups.



Material thickness
This function opens a menu to change the material thickness.

Automatic mode
This function displays the current operating mode and switches between automatic and manual mode.

Presser foot up/down
This function is used to raise or lower the presser foot.

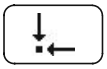
Right/left part
This function is used to turn the automatic switching between the right and left part on or off. The part currently being processed is displayed.

Threading aid function
This function activates the threading aid function, for example, see chapter 9.01 Inserting the needle.

Stacker up/down
This function is used to move the stacker up or down.

Stop
(The function appears only during the sewing process.)
This function is used to stop the sewing process.

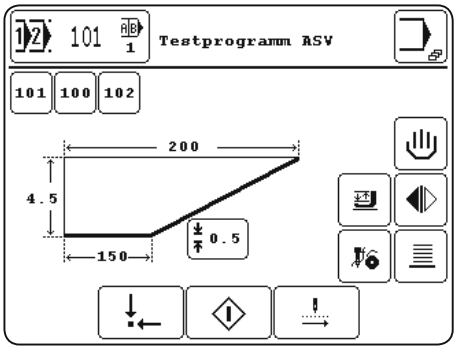
Start
(The function appears only when the sewing process has been stopped.)
This function is used to start the sewing sequence.



Home position
This function is used to move the machine to home position.

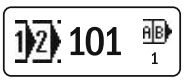
10.03 Sewing in manual mode

- Switch on the machine, see chapter 8.03 Switching the machine on / off.
- Call up manual sewing.



- Switch on the suction of the positioning tube or infeed table, see chapter 7.06 Pedal.
- Insert the workpiece, see chapter 10.01 Inserting the workpiece.

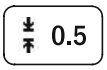
Description of the functions on the display



Menu to input the program number
This functions opens the menu for inputting the program number, see chapter 9.07 Selecting a program number.

Input menu
This function is used to call up input mode, see chapter 11 Input.

Program selection
These functions are used to select a program from the associated group, see also **chapter 9.08 Selecting / compiling program groups**.



Material thickness
This function opens a menu to change the material thickness.

Manual mode
This function displays the current operating mode and switches between manual and automatic mode.

Presser foot up/down
This function is used to raise or lower the presser foot.

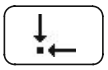
Right/left part
This function is used to turn the automatic switching between the right and left part on or off. The part currently being processed is displayed.

Threading aid function
This function activates the threading aid, for example, see **chapter 9.01 Inserting the needle**.

Stacker up/down
This function is used to move the stacker up or down.

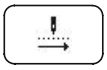
Stop
(The function appears only during the sewing process.)
This function is used to stop the sewing process.

Start
This function is used to start the sewing sequence.

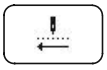


Home position
This function is used to move the machine to home position.

Move through the feed cycle
This function is used to move through the material feed cycle step by step.



Move the cycle forwards
This function is used to move forward through the sewing process step by step.



Move the cycle backwards
This function is used to move backwards through the sewing process step by step.

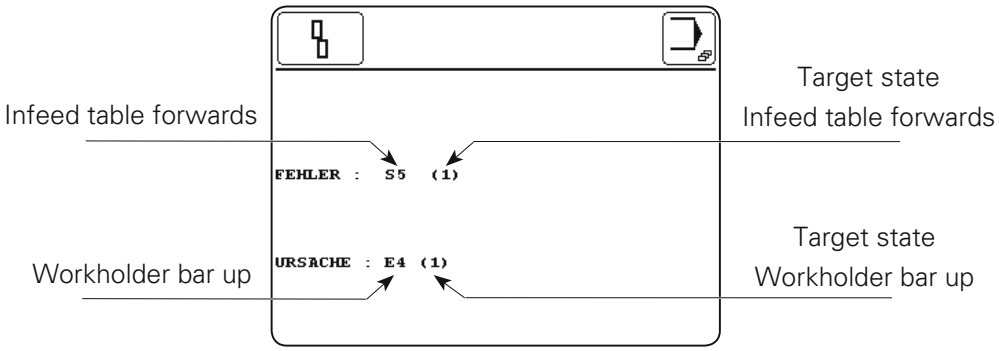
10.04 Error messages

General

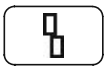
The display will show a error code if a malfunction occurs. An error message is generated by incorrect handling, malfunctions on the machine or by overload conditions. (For an explanation of the error codes, see **chapter 14.02 Explanation of the error messages**.)

Error when switching outputs

If an error occurs when switching an output, the relevant output is displayed with the desired switching state (**0**) or (**I**).
(**0**) means that the output should be switched off and (**I**) means that the output should be switched on.
The cause of the error is displayed on the next line.
The target state is shown in brackets to achieve an error-free process.
The output **S5** should be activated in the following example.
Condition: **E4** must be set to (**1**).



- Check **E4** and correct the error.



- Acknowledge the elimination of the error.

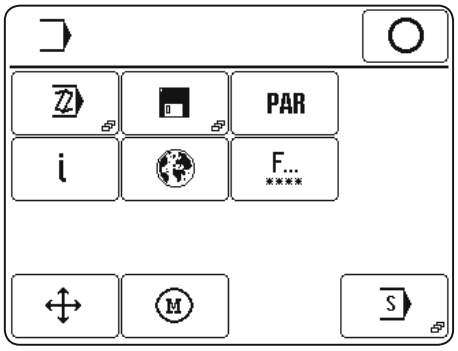
11 Input

Input mode contains the functions for displaying information, program management, machine adjustment and configuration (incl. the choice of country and access rights), as well as for supporting service and adjustment work in addition to the functions for inputting or altering seam programs.
Any start-up of the machine is disabled in input mode to avoid the unintentional start-up of the machine.

11.01 Overview of the functions in input mode

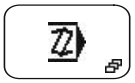
- Switch the machine on.

- Call up input mode.



Description of the functions

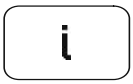
Conclude input
This function is used to conclude the input and the machine switches to sewing mode.



Seam program input
This function is used to call up the menu for inputting or altering seam programs, see **chapter 11.02 Creating/altering seam programs**.

Program management
This function is used to manage the data from the machine memory and SD card, see **chapter 11.03 Program management**.

Parameter settings
This function is used to call up the menu for changing parameter settings, see **chapter 13.25 Parameter settings**.



Info

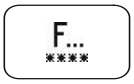
This function opens a menu to display the following information:

- Current software status of the machine
- Current firmware status of the machine
- Current firmware status of the control panel
- Daily piece counter
- Bobbin thread monitor stitch counter
- Operating hours counter
- Production hours counter

The daily piece counter and bobbin thread monitor counter can be reset using the "Clear" function.

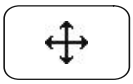
Country settings

This functions opens a menu to select the language displayed on the control panel.



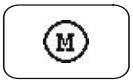
Rights of access

This function opens a menu to define the rights of access, see **chapter 11.04 Rights of access**.



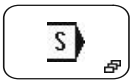
Stepping motors

This function opens a menu to move the stepping motors.



Sewing motor

This function opens a menu to test and adjust the sewing motor, see **chapter 13.24 Sewing motor menu**.



Service menu

This function is used to call up the menu for selecting various service functions, see **chapter 13.23 Service menu**.

11.02 Creating / altering seam programs

A distinction is made between three different seam types when creating or altering the seam programs:

- Single-point darts
  L3 = L4; program numbers 0 - 199
- Double-point darts
  L3 < 4.5 mm; is not cut, program numbers 200 - 299
- Tapered darts
  L3 < L4; program numbers 300 - 399

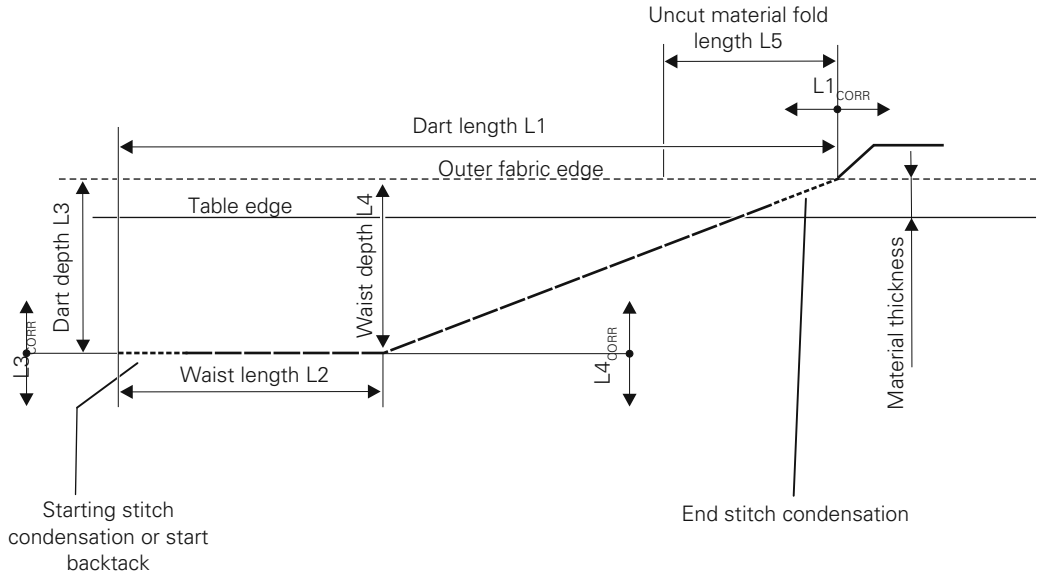
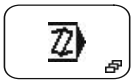


Fig. 11 - 01

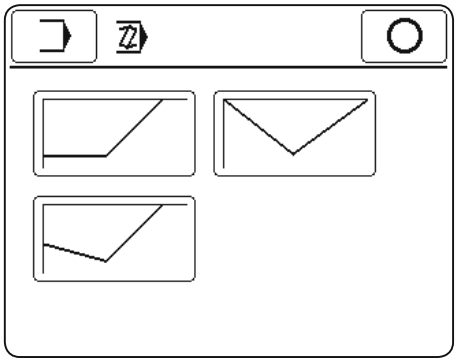
The seam program input is accessed by selecting the desired seam type.

- Switch the machine on.

- Call up input mode.

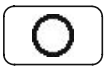


- Call up seam program input.

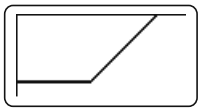


Description of the functions

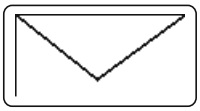
Input mode
This function is used to change the initial status of input mode.



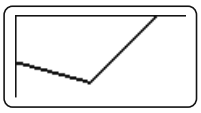
Conclude input
This function is used to conclude the input and the machine switches to sewing mode.



Single-point darts
This function is used to call up the entry of single-point darts, see chapter 11.02.01 Creating / altering single-point darts .



Double-point darts
This function is used to call up the entry of double-point darts, see chapter 11.02.02 Creating / altering double-point darts.

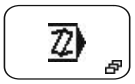


Tapered darts
This function is used to call up the entry of tapered darts, see chapter 11.02.03 Creating / altering tapered darts.

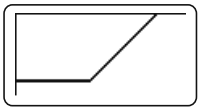
11.02.01 Creating / altering single-point darts

- Switch the machine on.

- Call up input mode.

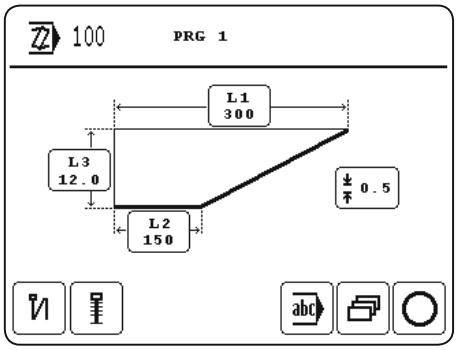


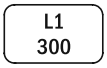
- Call up seam program input.

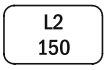


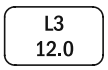
- Call up the entry for single-point darts.

- Select the program number, see **chapter 9.07 Selecting a program number**.

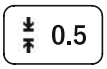








- Enter or alter the values for dart length **L1**, waist length **L2** and dart depth **L3.**



- Enter or change the material thickness.

Description of further functions

Start backtack
This function is used to switch the start backtack on or off.

Starting stitch condensation
This function is used to switch the starting stitch condensation on or off.

Comment
This function opens a menu for entering a comment about the current program, see **chapter 11.02.04 Entering a comment**.

Correction values
This function opens a menu for entering the correction values and the uncut material fold length, see **chapter 11.02.05 Entering correction values**.

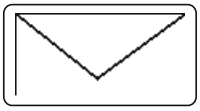
Conclude programming
This function concludes seam programming, see **chapter 11.02.06 Concluding seam programming**.

11.02.02 Creating / altering double-point darts

- Switch the machine on.

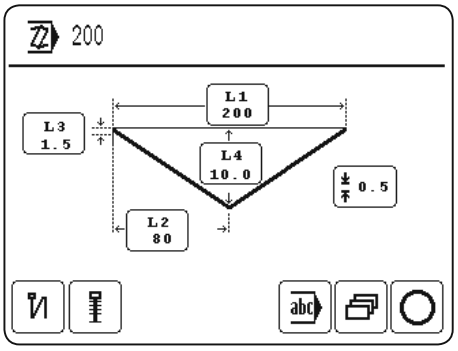
- Call up input mode.

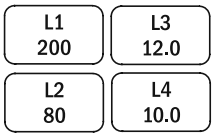
- Call up seam program input.



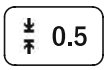
- Call up the entry for double-point darts.

- Select the program number, see **chapter 9.07 Selecting a program number**.





- Enter or alter the values for dart length **L1**, waist length **L2,** dart depth **L3** and waist depth **L4.**



- Enter or change the material thickness.

Description of further functions

Start backtack
This function is used to switch the start backtack on or off.

Starting stitch condensation
This function is used to switch the starting stitch condensation on or off.

Comment
This function opens a menu for entering a comment about the current program, see **chapter 11.02.04 Entering a comment**.

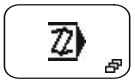
Correction values
This function opens a menu for entering the correction values and the uncut material fold length, see **chapter 11.02.05 Entering correction values**.

Conclude programming
This function concludes programming, see **chapter 11.02.06 Concluding seam programming**.

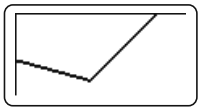
11.02.03 Creating / altering tapered darts

- Switch the machine on.

- Call up input mode.

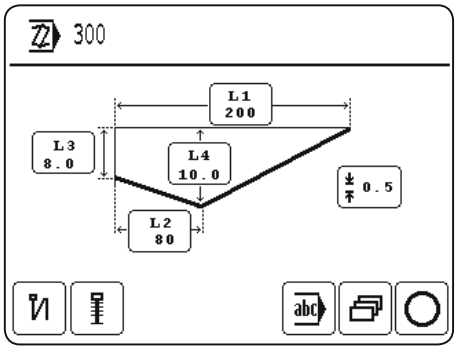


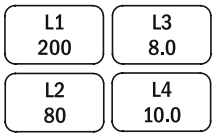
- Call up seam program input.



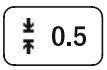
- Call up the entry for tapered darts.

- Select the program number, see chapter 9.07 Selecting a program number.





- Enter or alter the values for dart length L1, waist length L2, dart depth L3 and waist depth L4.



- Enter or change the material thickness.

Description of further functions

Start backtack
This function is used to switch the start backtack on or off.

Starting stitch condensation
This function is used to switch the starting stitch condensation on or off.

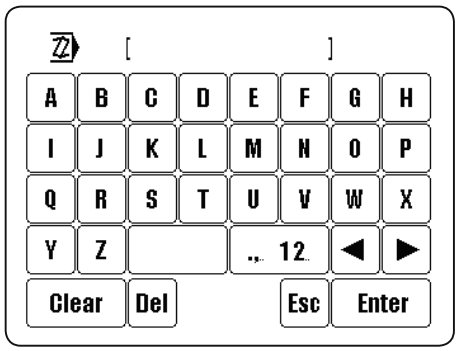
Comment
This function opens a menu for entering a comment about the current program, see chapter 11.02.04 Entering a comment.

Correction values
This function opens a menu for entering the correction values and the uncut material fold length, see chapter 11.02.05 Entering correction values.

Conclude programming
This function concludes programming, see chapter 11.02.06 Concluding seam programming.

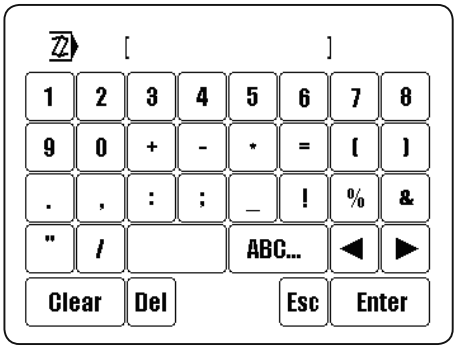
11.02.04 Entering a comment

A comment can be added to the seam program after calling up the appropriate function within seam programming. The comment is displayed as information about the appropriate seam program in the program selection and program management functions.



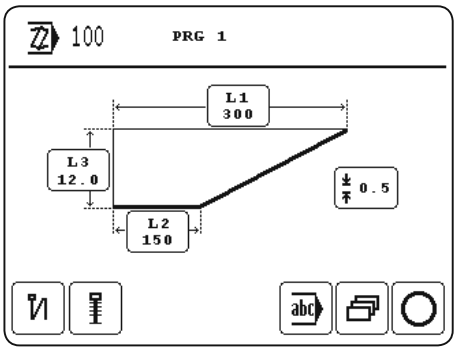
P R G
- Enter the desired text, e.g. "PRG".

.,- 12
- Change to number input.



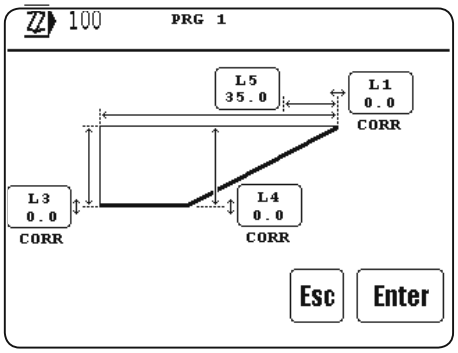
1
- Enter the desired numbers, e.g. "1".

Enter
- Conclude the comment input.



11.02.05 Entering correction values

You can enter correction values for the current seam program after calling up the appropriate function within seam programming. The value for the uncut material fold length can also be specified for single-point and tapered darts.



L1 0.0
L3 0.0
L4 0.0

- Enter or alter the correction values for dart length **L1**, dart depth **L3** and waist depth **L4.**

L5 35.0

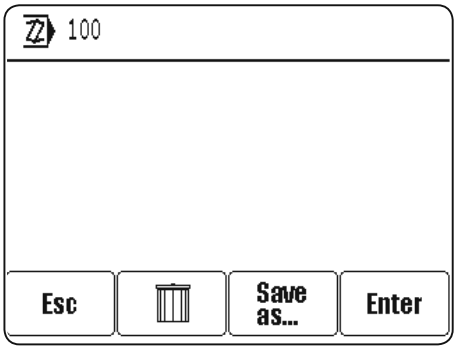
- Enter or change the value for the uncut material fold length.

Enter

- Conclude the input of the correction values.

11.02.06 Concluding seam programming

The seam programming can be concluded by pressing the appropriate function once all the details for the programming have been entered.



Description of the functions

Esc

Esc
The input is interrupted and the machine moves back to the initial status of the programming function.

Discard alterations
All program alterations are cancelled.

Save as...

Save as...
The number block opens to enter any program number if this function is pressed.

Enter

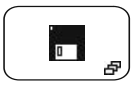
Enter
All program alterations are stored under the current program number.

11.03 Program management

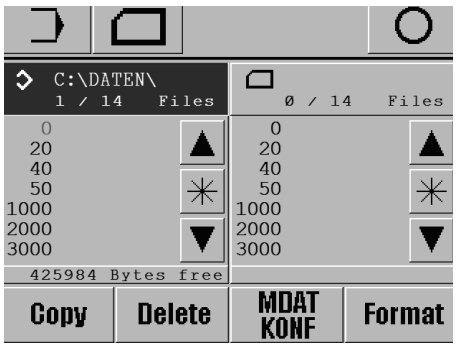
The program management function is used to manage seam programs as well as configuration and machine data. Files can be selected, copied and deleted from the machine memory or from an SD card.

- Switch the machine on.

- Call up input mode.



- Call up program management.



Both data carriers with the corresponding files appear on the display:
- Machine memory ("C:\DATA") is currently selected
- SD card ( ) is currently inserted

The data carrier is selected by touching the appropriate box. The content of the appropriate data carrier is also updated. The selected data carrier is shown inversely and the selected files are shown in red:

The seam programs are stored at a different level to the storage of the configuration and machine data to avoid the accidental processing of the configuration and machine data.

Description of the functions

Input mode
This function is used to change the initial status of input mode.

Update drives
This function is used to update (reimport) the drives.

Conclude input
This function is used to conclude the input and the machine switches to sewing mode.

Data selection
These functions are used to mark the desired files in the current drive. Individual files are selected with the arrow keys. Several files can be selected at one time with the arrow keys in combination with the lock key (✳).

Copy
This function is used to copy the files selected from the current data carrier to the second data carrier.

Delete
This function is used to delete the selected files.

MDAT/CONF
This function is used to call up the level for the configuration and machine data.
The current settings and the machine configuration are stored in the files "MDAT3519" and "CONF3519**.** In this way, the machine data can be copied onto an SD card as a backup or several machines with the same designation can be configured quickly by reading the machine data.

Format
This function is used to format the inserted SD card.

All data on the SD card is deleted in the course of the formatting process!

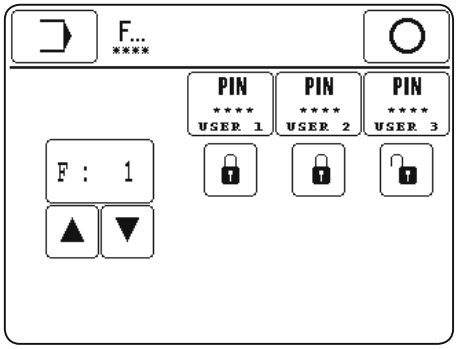
11.04 Rights of access

The functions that can be called up with the control panel are classified by code numbers and can be protected from unauthorised access. To this end, the control unit differentiates between three user groups (user 1, 2 and 3), all of which can be assigned a corresponding PIN. If a function is selected for which the user does not have authorisation, the user is requested to input a PIN. The selected function is carried out after the appropriate PIN has been entered. In addition to the 3 user groups, the control unit also recognises the so-called "super user" who has a key switch to access all functions and who is authorised to stipulate the rights of access.

- Enter the key switch and switch on the machine.

- Call up input mode.

- Call up the menu for inputting the rights of access.

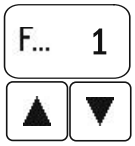


Description of the functions

Input mode
This function is used to change the initial status of input mode.

Conclude input
This function is used to conclude the input and the machine switches to sewing mode.

PIN input
These functions can be used to stipulate an individual PIN for each user.



Function selection
These functions are used to select the code number for the function to be locked or released.

Lock/release functions
These functions are used to lock or release the selected function for the appropriate users.

Allocation of the code numbers

Function	Symbol	Code number	Standard setting		
			User 1	User 2	User 3
Program number selection		0			
Correct program	-	1			
Input		2			
Create program		3			
Program management		4			
Parameter settings	PAR	5			
Parameter group 100 General settings	-	6			
Parameter group 200 Seam parameters	-	7			
Parameter group 300 Sewing motor positions	-	8			
Parameter group 400 Times	-	9			
Parameter group 500 Counters	-	10			
Parameter group 600	-	11			
Parameter group 700 Sewing motor	-	12			
Parameter group 800	-	13			
Parameter group 900 Sewing motor	-	14			
Info	i	15			
Reset daily piece counter	000↑	16			
Reset bobbin thread stitch counter	000↓	17			
Delete operating hours counter	1	18			
Delete production hours counter	2	19			
Country settings		20			
Rights of access	F... ****	21			

Function	Symbol	Code num-ber	Standard setting		
			User 1	User 2	User 3
Service		22			
Run cold start		23			
Configure machine		24			
Load software		25			
Set control panel contrast		26			
Thread trimmer sequence		27			
Needle position	POS	28			

12 Maintenance and Care

12.01 Maintenance intervals

Clean the whole machine	weekly
Clean the needle area	several times a day
Clean the hook area	several times a day
Clean the blower air filter	as required
Clean the maintenance unit air filter (air filter)	as required
Check the air pressure	daily, before start-up
Check the oil level	daily, before start-up
Lubricate the trimmer	daily, before start-up
Lubricate the stacker drive	twice a year

These maintenance intervals are based on an average running time of a single shift operation. Shorter maintenance intervals are recommended for increased running times.

12.02 Cleaning the entire machine

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

- Single or multi-shift operation
- Dust formation caused by the workpieces

Optimal cleaning instructions can therefore only be defined on a case-by-case basis.

Disconnect the machine from the electricity mains by shutting off the main switch or removing the mains plug!
Risk of injury due to accidental machine start-up!

- Clean the whole machine at least once a week.

12.03 Cleaning the needle area and hook area

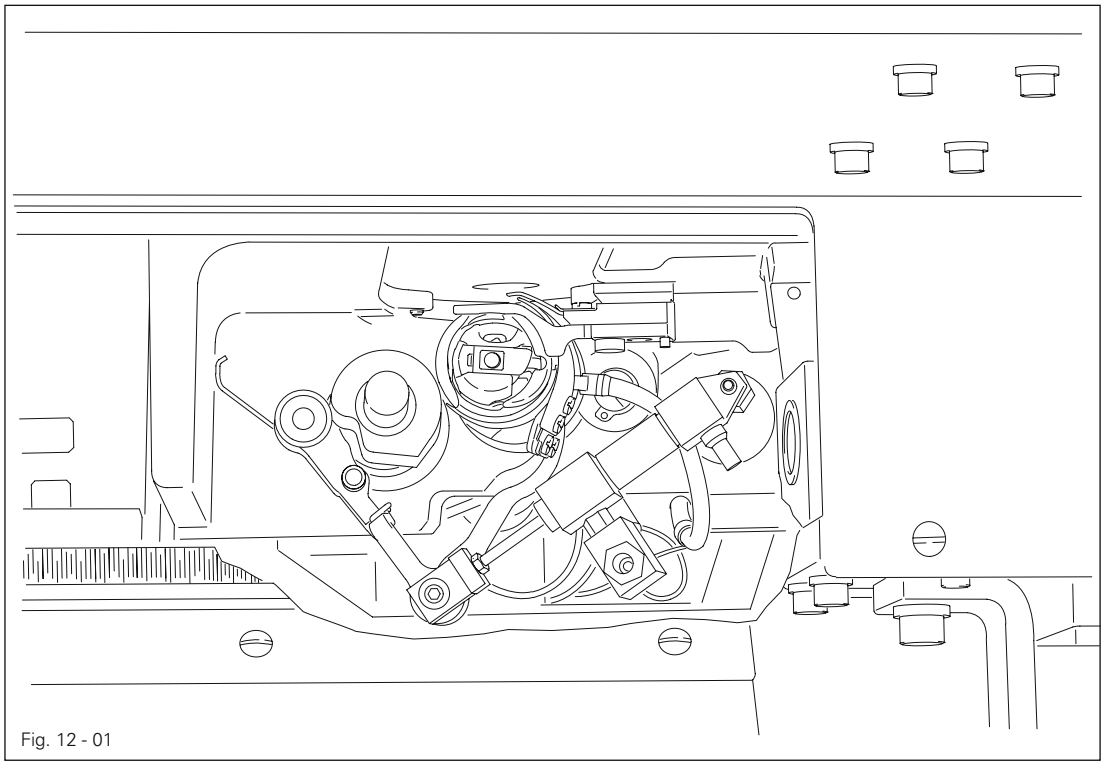


Fig. 12 - 01

- Switch the machine on.
- Call up the threading aid function.
  The transport rail moves out of the needle area, the presser foot is lowered and the sewing start is disengaged.
- Press both start keys at the same time, see chapter 7.07 Start keys.
  The infeed table moves forward and the hook area of the sewing head becomes accessible.
- Clean the hook and hook area several times a day.
- Move the machine to the last position prior to the cleaning

or

- Move the machine to home position.

12.04 Cleaning the blower air filter

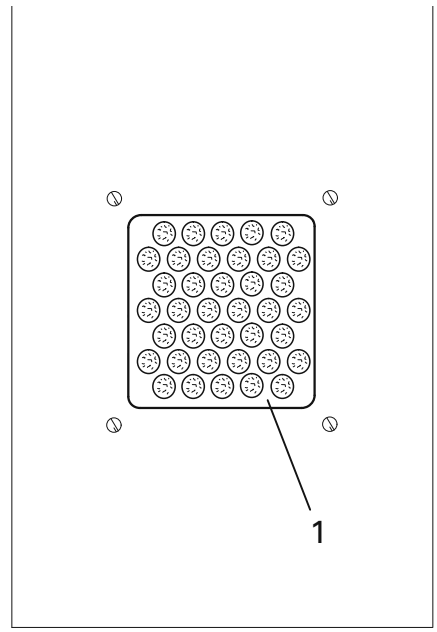


Fig. 12 - 02

As required:

- Remove the cover **1.**
- Remove the filter element and blow it out with compressed air.
- Insert the cleaned filter element and replace the cover **1.**

12.05 Cleaning the maintenance unit air filter

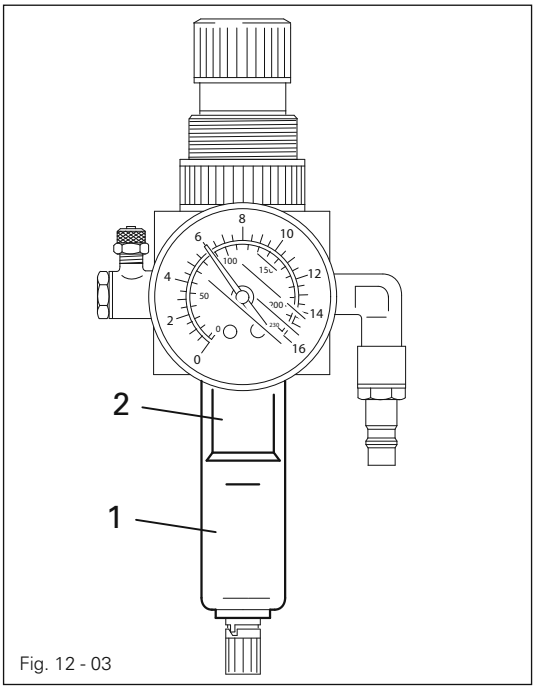


Fig. 12 - 03

Switch off the machine!
Push the slide closure on the maintenance unit downwards, see **chapter 8.02 Initial start-up**.

Emptying the water tank:

- The water tank **1** empties itself automatically after the compressed air tube for the maintenance unit has been removed.

Cleaning the filter:

- Unscrew the water tank **1** and take out the filter **2.**
- Clean the filter **2** with compressed air or isopropyl alcohol
  (order no. 95-665 735-91).
- Screw in the filter **2** and screw on the water tank **1.**

12.06 Checking / setting the air pressure

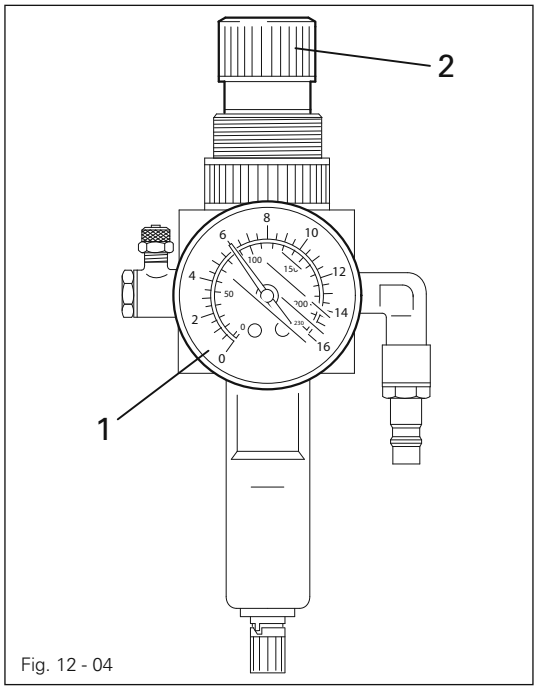


Fig. 12 - 04

- Check the air pressure on the manometer **1** before every start-up.
- The manometer **1** must show a pressure of **6 bar**.
- Adjust this value if needed.
- To do this, pull up the button **2** and turn it so that the manometer **1** shows a pressure of **6 bar**.

12.07 Checking the oil level

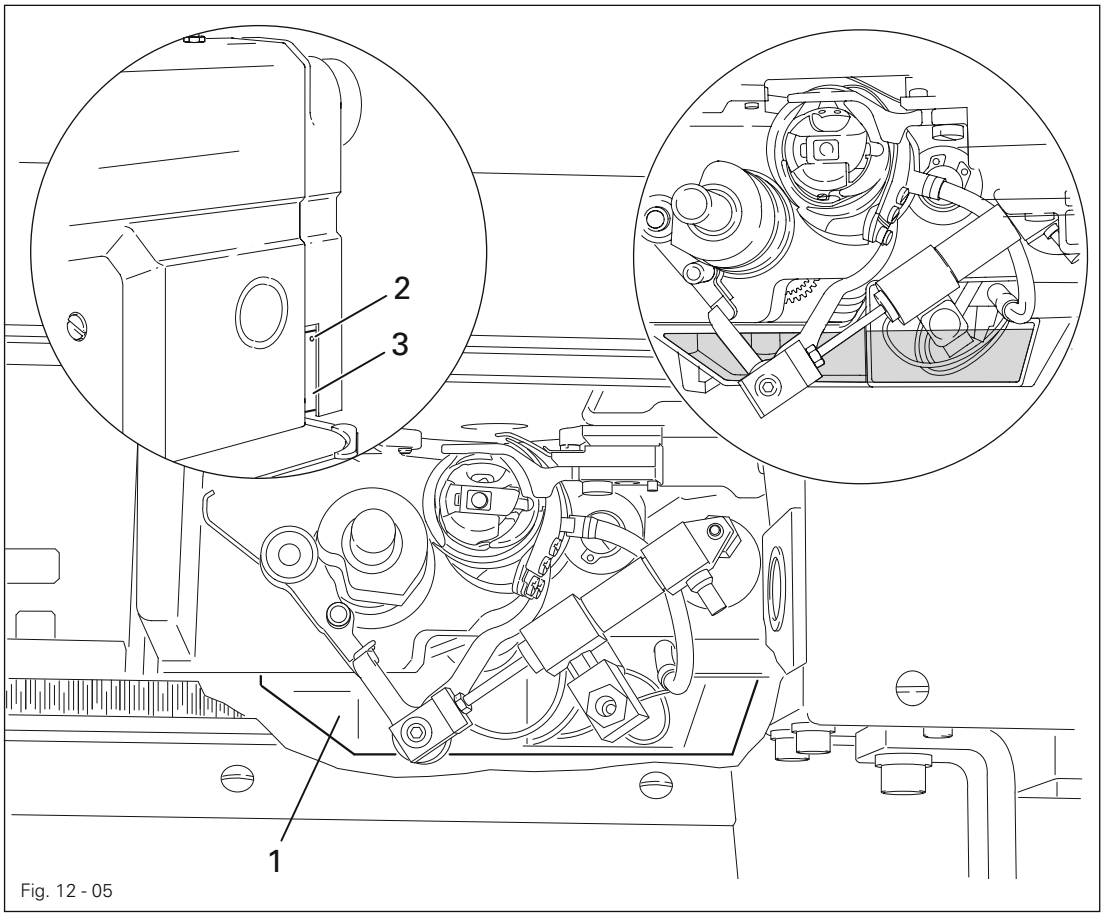


Fig. 12 - 05

Switch off the machine!
Risk of injury due to accidental machine start-up!

The oil reservoir **1** must always have oil in it!
Danger of machine damage!

- Check the oil level daily, add oil through the hole **2** as needed up to the line as a maximum.

The oil tank **3** serves solely for topping up the oil reservoir **1** and not for displaying the oil level.

Only use oil with a centre viscosity of **22.0 mm²/s** at **40 °C** and a density of **0.865 g/cm³** at **15 °C.**

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

12.08 Lubricating the trimmer

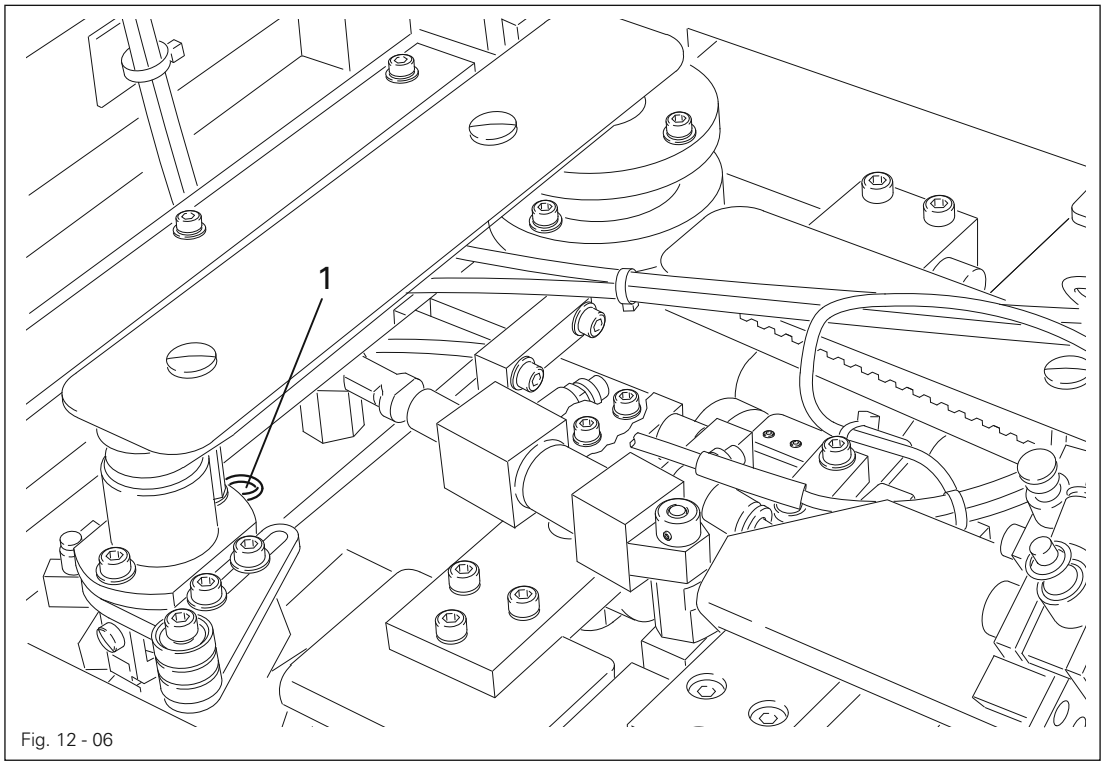


Fig. 12 - 06

Switch off the machine!
Risk of injury due to accidental machine start-up!

- Add a drop of silicone oil through the hole **1** into the trimmer before every start-up.

Only use oil with a density of **0.810 g/cm³** at **21 °C.**

We recommend PFAFF sewing machine oil part no. **280-1-120 217.**

12.09 Lubricating the stacker drive

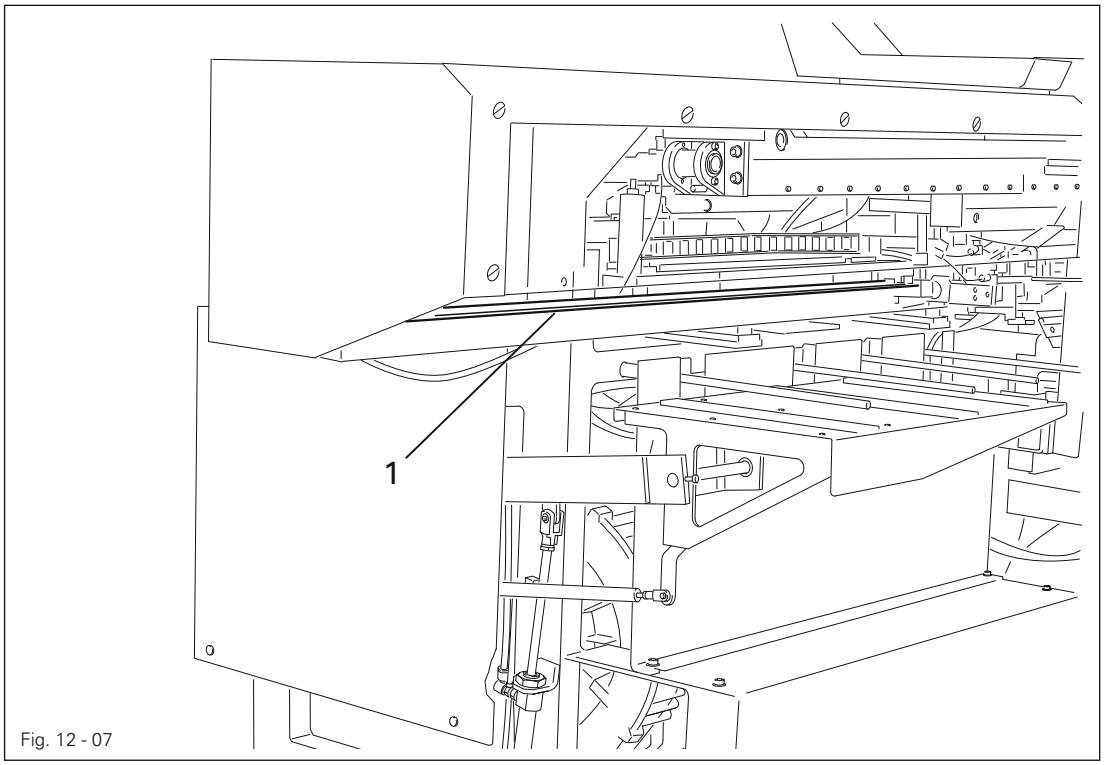


Fig. 12 - 07

Switch off the machine!
Risk of injury due to accidental machine start-up!

- Clean and then lubricate the track **1** twice a year.

Only use Isoflex Topas L32 high-performance grease, order no. **280-1-120 210**.

13 Adjustment

No screw clamp may be fastened to the needle bar with the **PFAFF 3519-4/01!**
This may damage the special needle bar coating.

13.01 Notes on adjustment

All adjustments in this manual are based on a fully assembled machine and may only be carried out by technical 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 that have to be completely adjusted. Both the preceding and following chapters must be observed if only specific individual work steps are carried out.
The screws and nuts indicated in brackets ( ) are fastenings for machine parts, which must be loosened before any adjustment and tightened again afterwards.

Unless otherwise stated, the machine must be disconnected from the electric and pneumatic supplies for all adjustment work!
Risk of injury due to accidental machine start-up!

13.02 Tools, gauges and other accessories

- 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 Allen keys from 1.5 to 6 mm
- 1 open-ended wrench with 22 mm wrench size
- 1 metal ruler, order no. 08-880 218-00
- 1 adjustment gauge, (order no. 95-752 474-05)
- 1 setting gauge for the hook drive belt tension, order no. 61-111 639-76
- 1 setting gauge for the infeed table needles, (order no. 95-743 776-15)
- Thread and testing material

13.03 Abbreviations

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

13.04 Sewing head service position

The sewing head can be pulled out of the machine stand for maintenance and adjustment work.

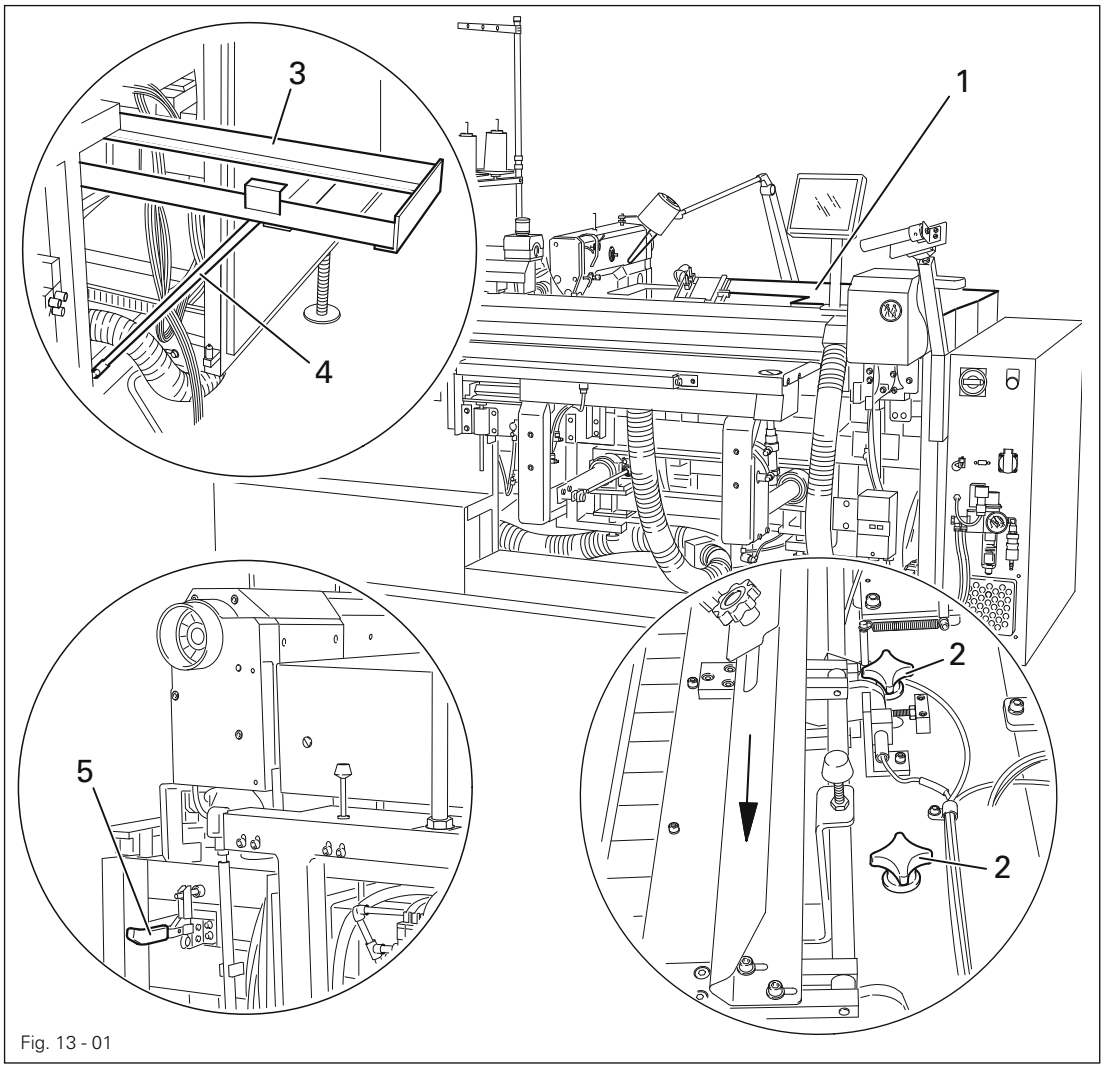


Fig. 13 - 01

Switch off the machine!
Risk of injury due to accidental machine start-up!

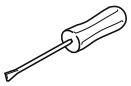
Move the sewing head into home position.

- Open the cover **1** and the tensioning lever on the loading clamp.
- Loosen the screws **2** and push the loading clamp in the **direction of the arrow** until it stops.
- Raise the frame **3** and hook in the support **4.**
- Open the tensioning lever **5.**
- Pull the sewing back until it stops and tilt if necessary.

Tilt the sewing head with both hands!
Risk of crushing between the sewing head and the machine stand!

Move the sewing head to the operating position.

Move the sewing head to its upright position using both hands!
Risk of crushing between the sewing head and the machine stand!



- Move the sewing head to its upright position and push into the machine stand until it stop.
- Close the tensioning lever 5.
- Fold down the support 4 and pivot the frame 3 downwards.
- Push back the loading clamp until it stops.
- Close the tensioning lever on the loading clamp.
- Tighten the screws 2 and close the cover 1.

13.05 Adjusting the sewing head

13.05.01 Adjustment aid

The adjustment gauge **1** (order no. 95-752 474-05) can be used to fix the needle bar in the needle rise position (needle bar is positioned 1.8 mm after b.d.c.).

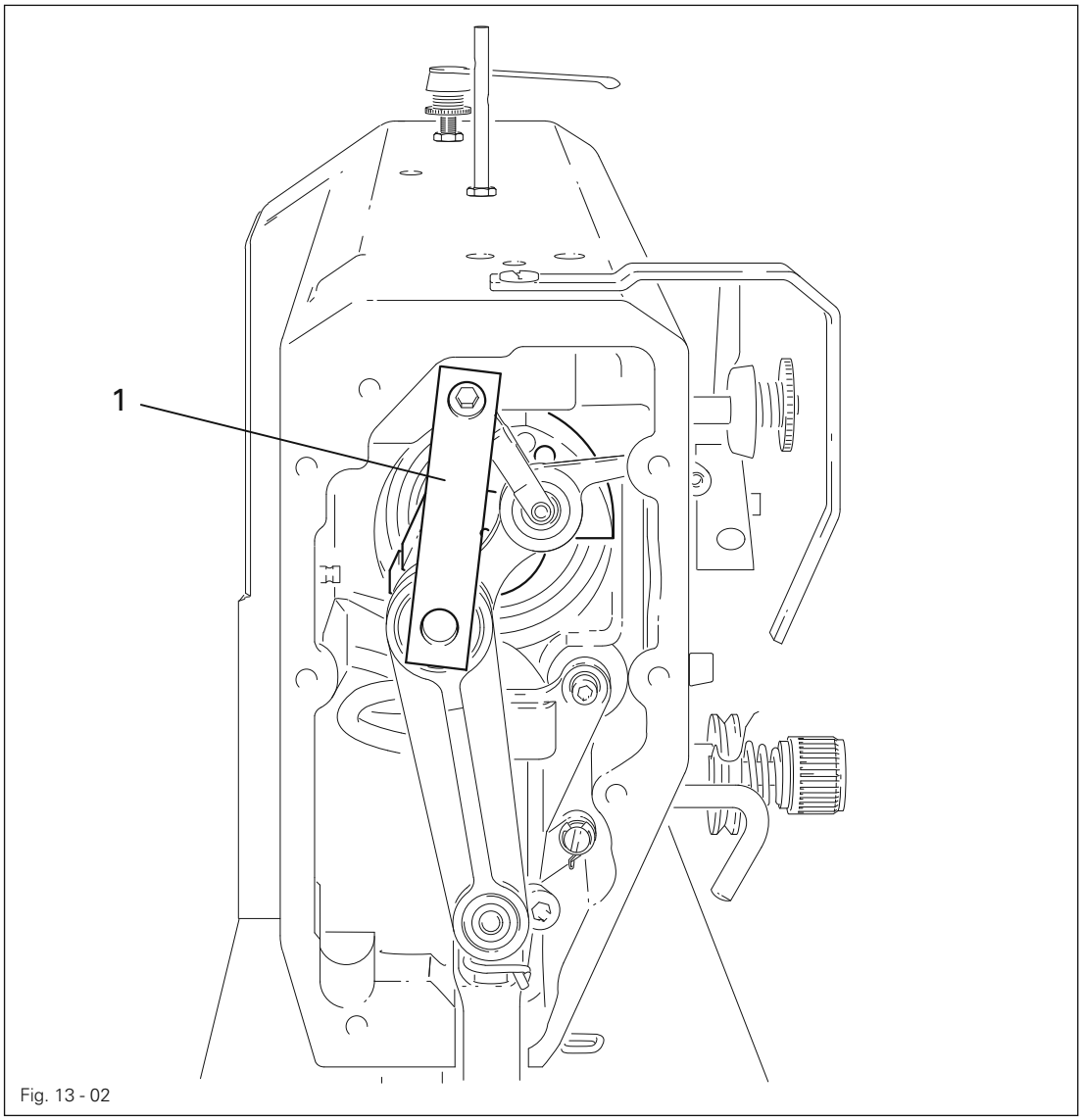


Fig. 13 - 02

- Turn the handwheel until the needle bar is approximately in the required position.
- Fit the adjustment gauge **1** as shown in Fig. **13-02;** move the handwheel gently back and forwards if necessary until the adjustment gauge **1** fits properly.

13.05.02 Machine drive home position

This setting is only made if the toothed belt **2** has been dismantled.

Rule
The markings 3 and 4 should be aligned if the needle bar is positioned 1.8 mm after b.d.c.

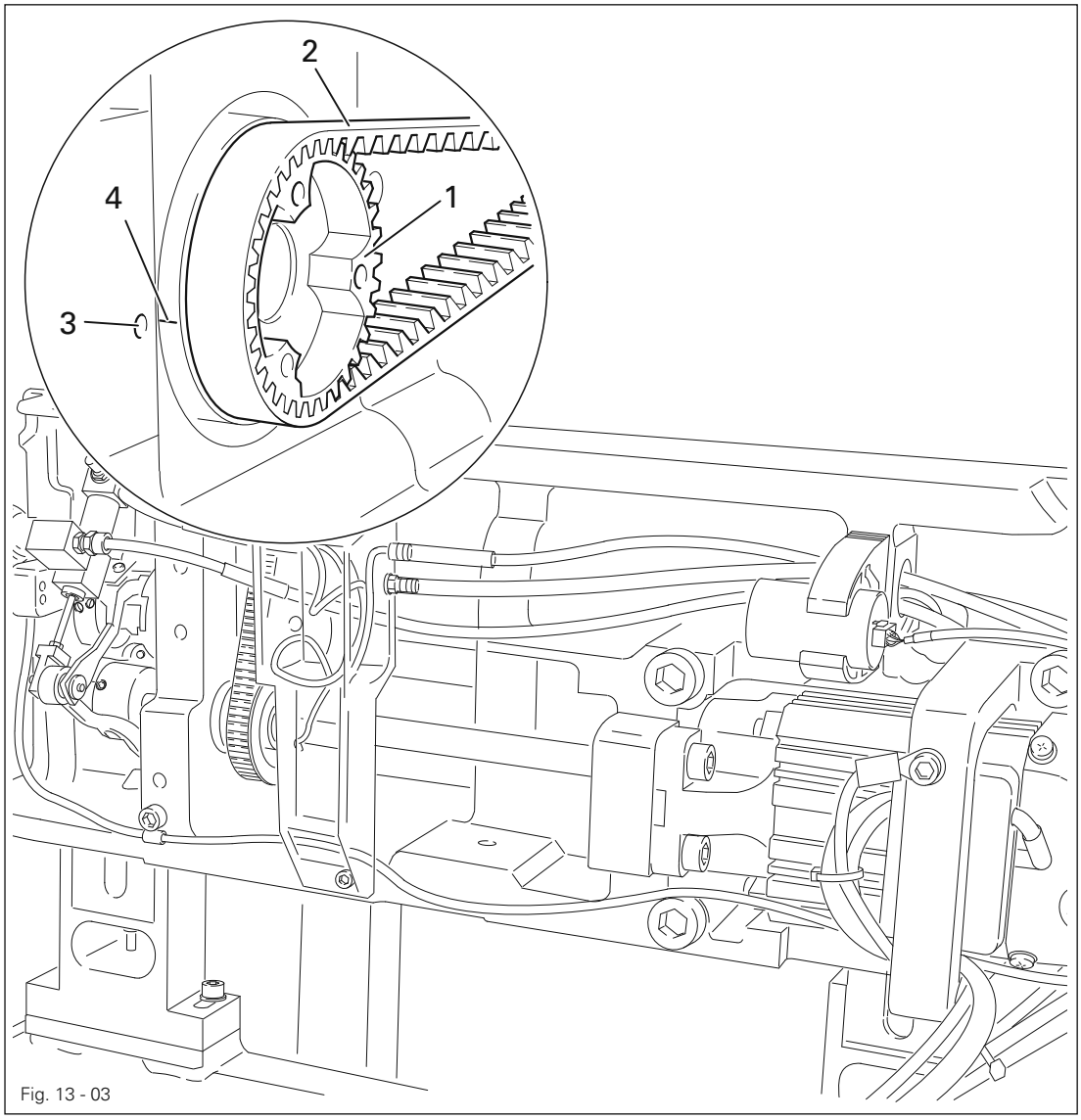


Fig. 13 - 03

- Move the needle bar to a position **1.8** mm after b.d.c., see chapter **13.05.01** Adjustment aid.
- Turn the toothed belt wheel **1** according to the **rule** and slide on the toothed belt **2.**

Make sure that the shaft flange, shock absorber and motor flange are in the right position when installing the motor!

13.05.03 Needle in needle hole centre

Rule
The needle should pierce the centre of the needle hole exactly.

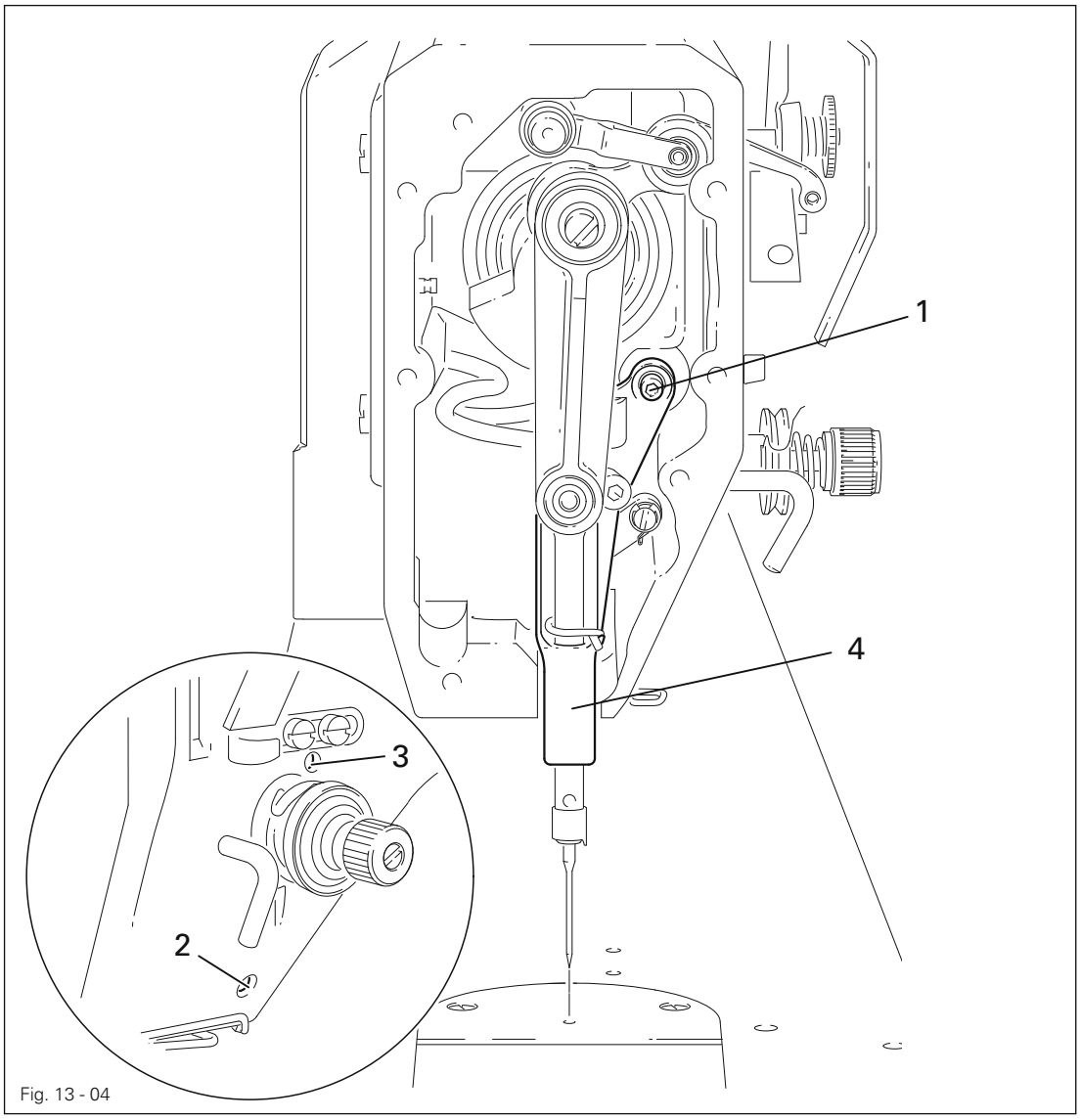


Fig. 13 - 04

- Move the needle directly over the needle hole.
- Loosen the screws **1, 2** and **3.**
- Adjust the needle bar frame **4** according to the **rule**.
- Tighten the screw **2** and gently tighten the screw **3.**
- Use the screw **1** to pull the internal guide pin up to the eye of the needle bar frame **4** and tighten it.
- Turn the handwheel a few turns so that the needle bar frame **4** is not under tension.
- Tighten the screw **3.**

13.05.04 Hook shaft bearing and spur gear clearance

Rule

1. The front edge of the hook shaft **5** should be **14.5 mm** away from the needle midpoint, the groove in the hook shaft bearing **1** (see arrow) should be parallel to the bed plate and point away from the sewing direction.
2. There should be minimal yet noticeable play between the plastic pinion **3** and the steel wheel **4**. This play should be approximately the same for a **360°** turn.
3. The steel wheel 4 should align with the plastic pinion **3**.

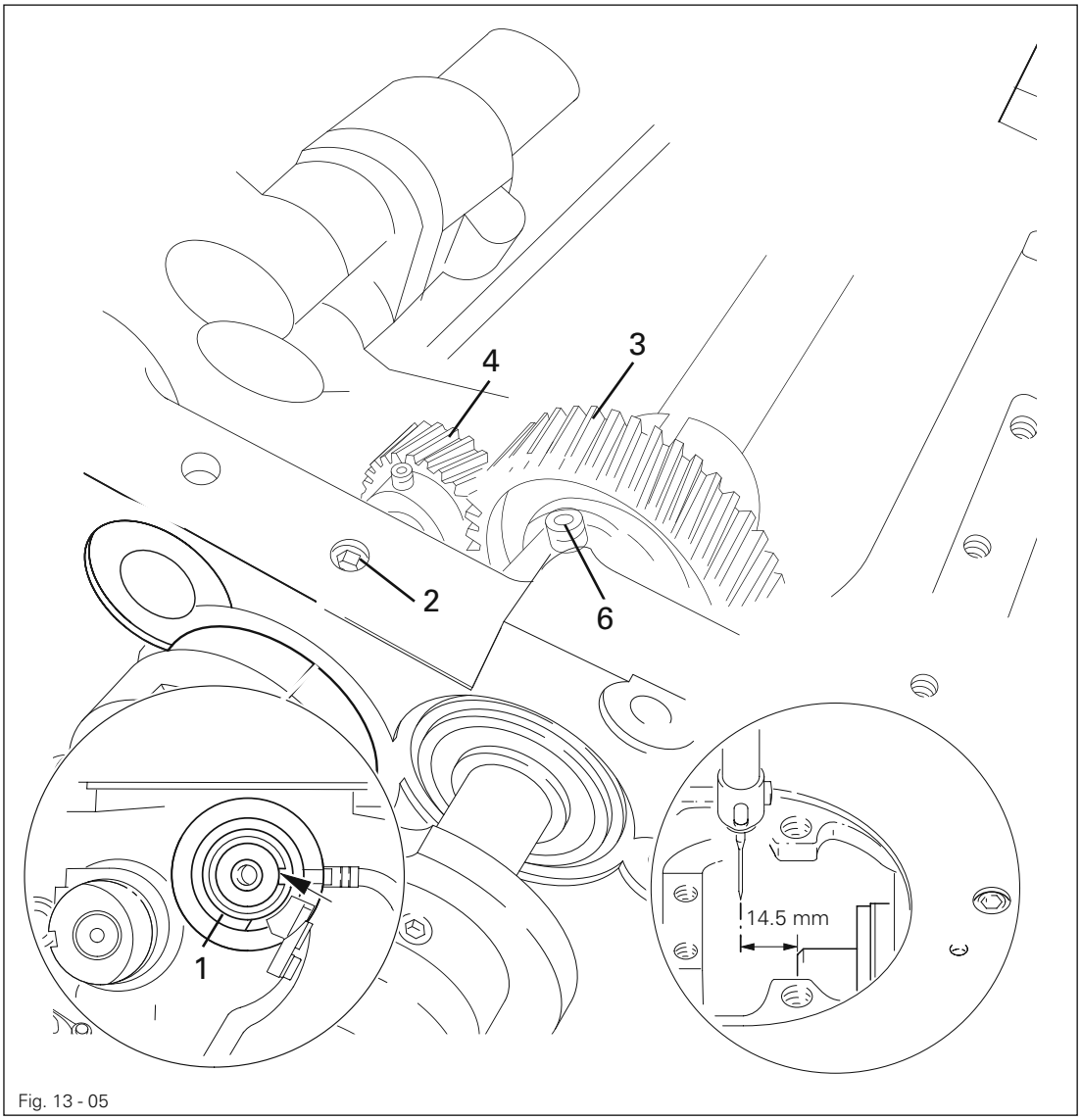
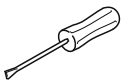


Fig. 13 - 05



- Align the hook shaft bearing **1** (screw **2**) according to **rule 1.**
- Set the steel wheel **4** with the eccentric bush of the hook shaft bearing **1** according to rule **2** and tighten the screw **2.**
- Adjust the plastic pinion **3** (screws **6**) according to **rule 3** and tighten the screws **6.**

13.05.05 Hook lubrication

Rule

1. The centrifugal disc **1** should be **1.5 mm** in front of the oil distributor ring **3.**
2. A light oil strip should appear on a paper strip held over the needle plate cutout after approximately **10 seconds** when the machine is running at full speed.

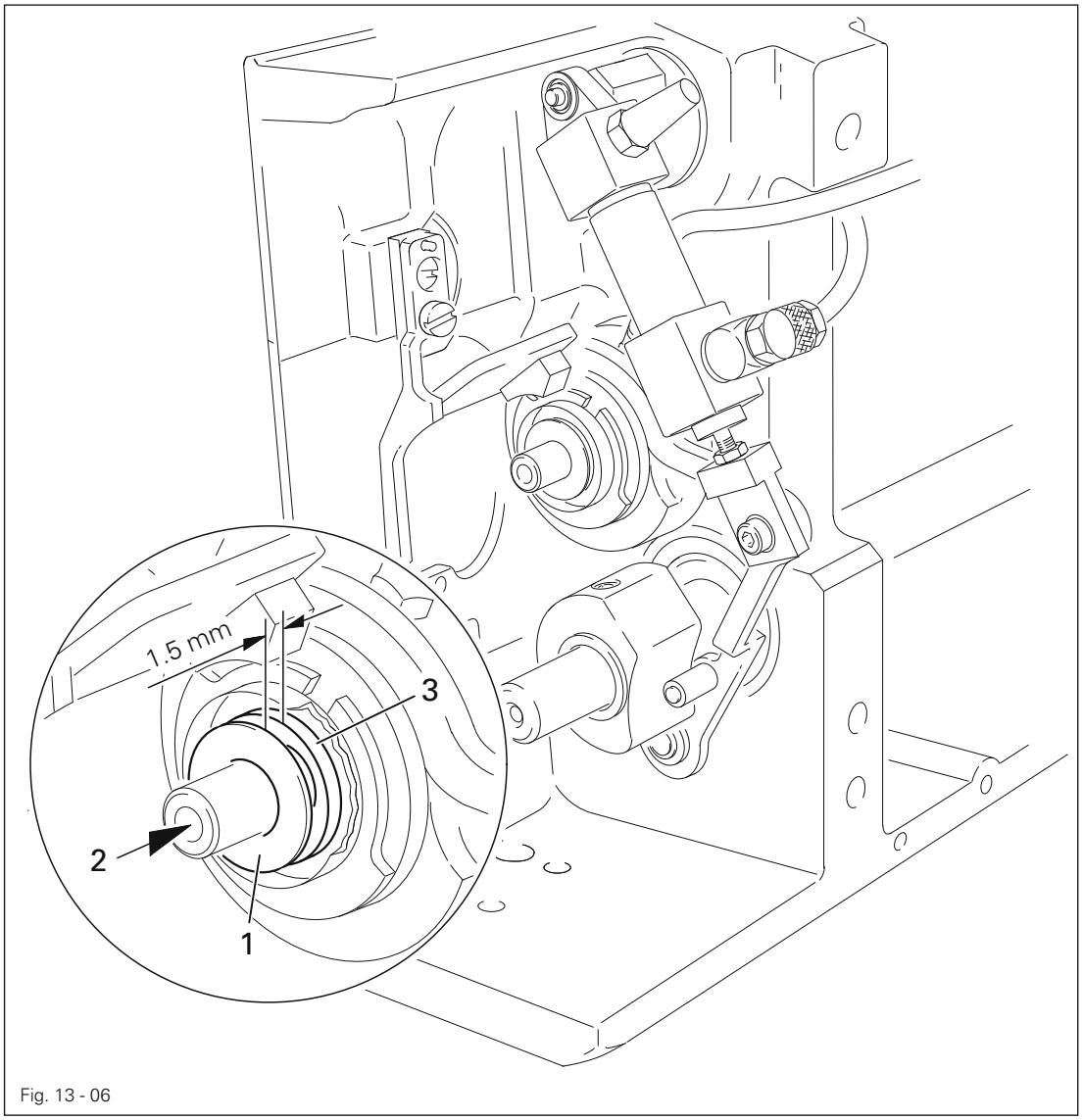


Fig. 13 - 06

The setting is only required if the wick is replaced.

Make sure that the new wick is impregnated with oil when replacing the wick.

- Adjust the centrifugal disc **1** (screw **2**) according to **rule 1.**
- Check **rule 2** and adjust the centrifugal disc **1** if necessary.

13.05.06 Needle bar rise, hook-to-needle clearance, needle height and bobbin case position finger

Rule

With the needle bar positioned **1.8 mm** after b.d.c.

1. The tip of the hook **6** should be at the needle midpoint and be a distance of **0.05 mm - 0.1 mm** from the scarf of the needle and
2. the upper edge of the eye of the needle should be **0.8 mm** under the tip of the hook.
3. There should be a clearance of **0.5 mm** between the lug of the bobbin case position finger **4** and the base of the stop groove.

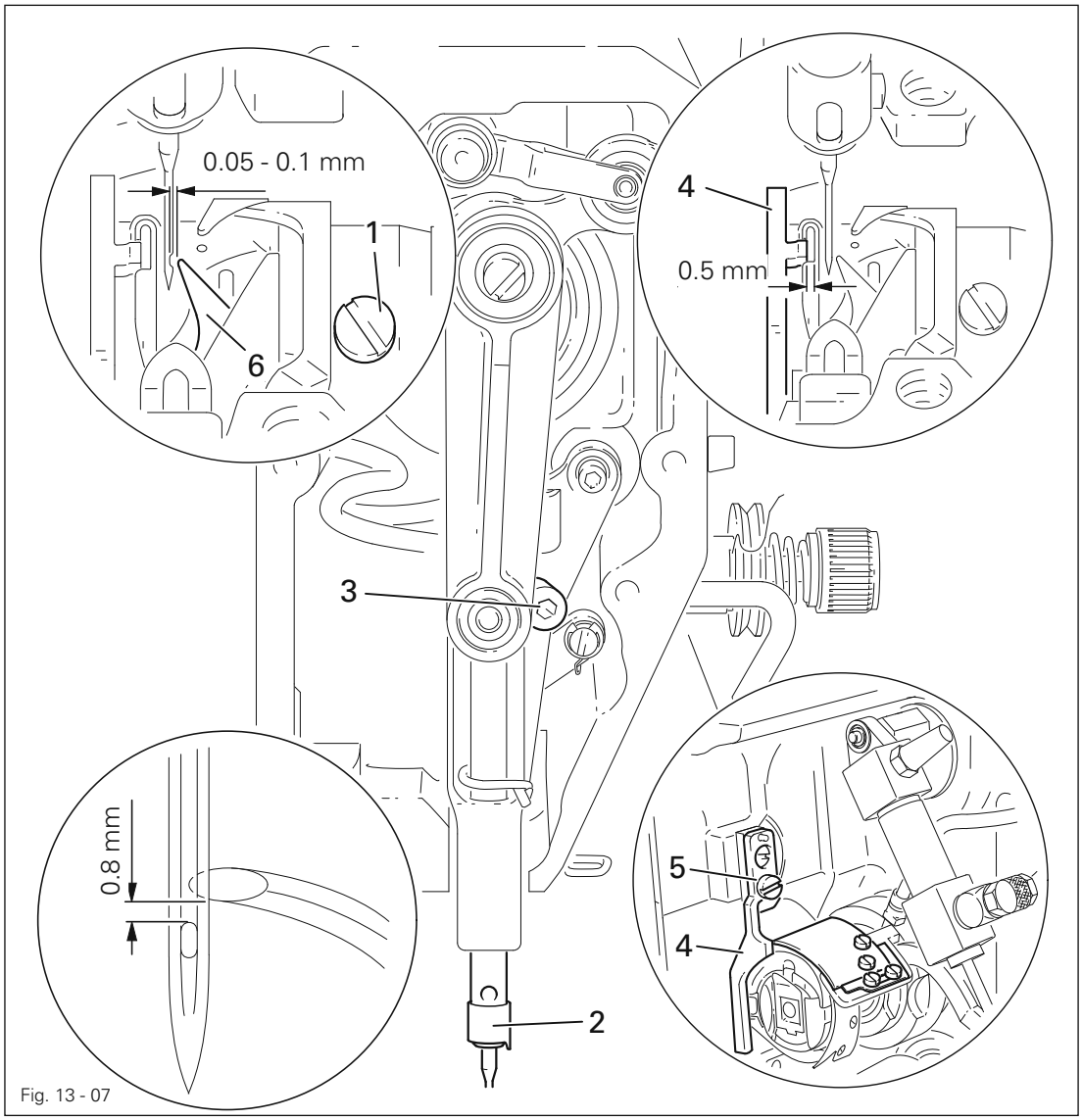
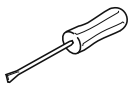


Fig. 13 - 07



- Move the needle bar to a position **1.8 mm** after b.d.c., see **chapter 13.05.01 Adjustment aid**.
- Adjust the hook according to **rule 1.**
- Tighten the screws **1.**
- Adjust the needle bar **2** (screw **3**) without twisting according to **rule 2.**
- Align the bobbin case position finger **4** (screw **5**) according to **rule3.**

13.05.07 Thread check spring and slack thread regulator

Rule

1. The movement of the thread check spring should be finished when the needle point punctures the material (spring deflection: approx. **7 mm**).
2. The thread check spring should have moved approx. **1 mm** when forming the maximum thread loop while passing the thread around the hook.

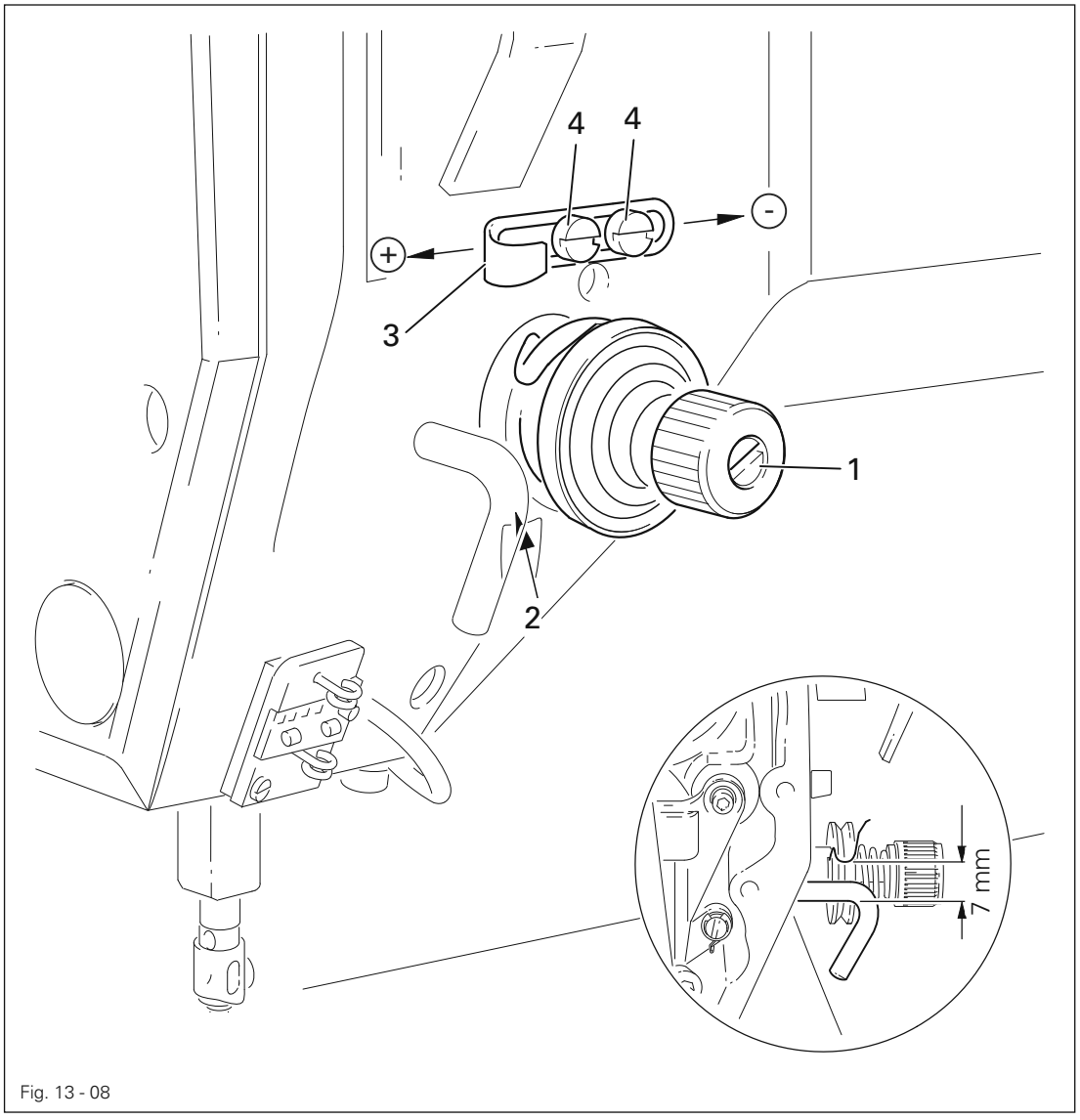
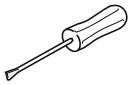


Fig. 13 - 08



- Turn the thread tension **1** (screw **2**) according to **rule 1.**
- Adjust the slack thread regulator **3** (screws **4**) according to **rule 2.**

It may be necessary to deviate from the specified spring deflection for reasons relating to the sewing technology.

Adjust the slack thread regulator **3** (screw **4**) by "+" (= more thread) o "-" (= less thread).

13.05.08 Bobbin winder

Rule

1. When the bobbin winder is switched on, the drive wheel 1 should be moved easily.
2. When the bobbin winder is switched off, the friction wheel **5** must not touch the drive wheel **1.**
3. The bobbin winder should switch off automatically if the fill amount of the bobbin is approx. **1 mm** away from the edge of the bobbin.

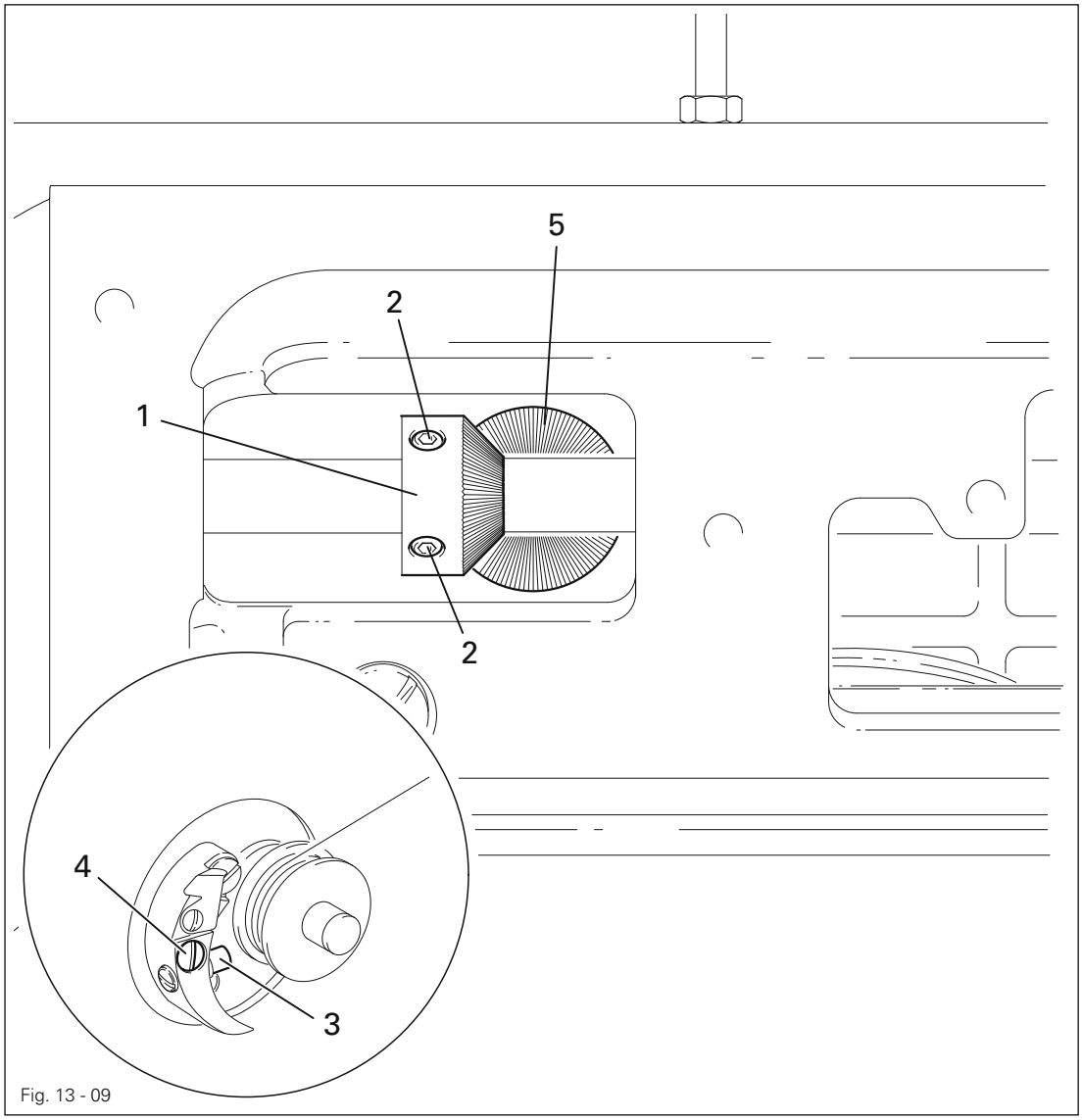
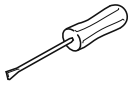


Fig. 13 - 09



- Adjust the drive wheel **1** (screws **2**) according to **rules 1** and **2.**
- Adjust the bolt **3** (screw **4**) according to **rule 3.**

13.06 Adjusting the thread trimmer

13.06.01 Pre-adjusting the control cam

Rule
When the needle bar is at t.d.c. the surface **1** of the control cam should be parallel to the bed plate.

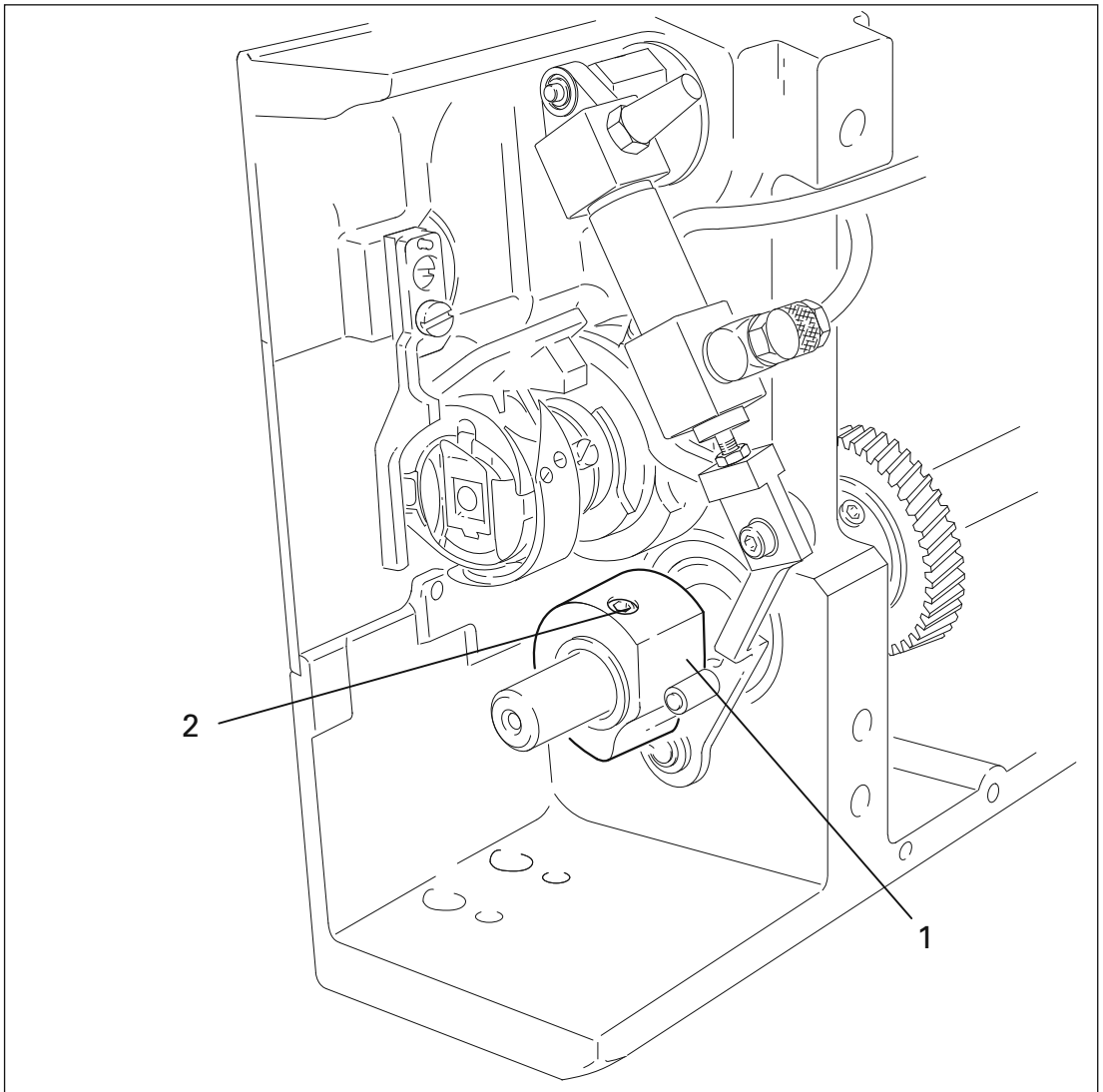
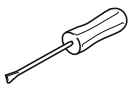


Fig. 13 - 10



- Turn the control cam (screws **2**) according to the **rule**.

13.06.02 Roller lever setting

Rule

1. When the cylinder **3** is fully extended, the roller of the roller lever **4** should be a distance of **0.1 mm** from the highest point of the control cam **5.**
2. The cylinder **3** should be parallel to the front edge of the bed plate.

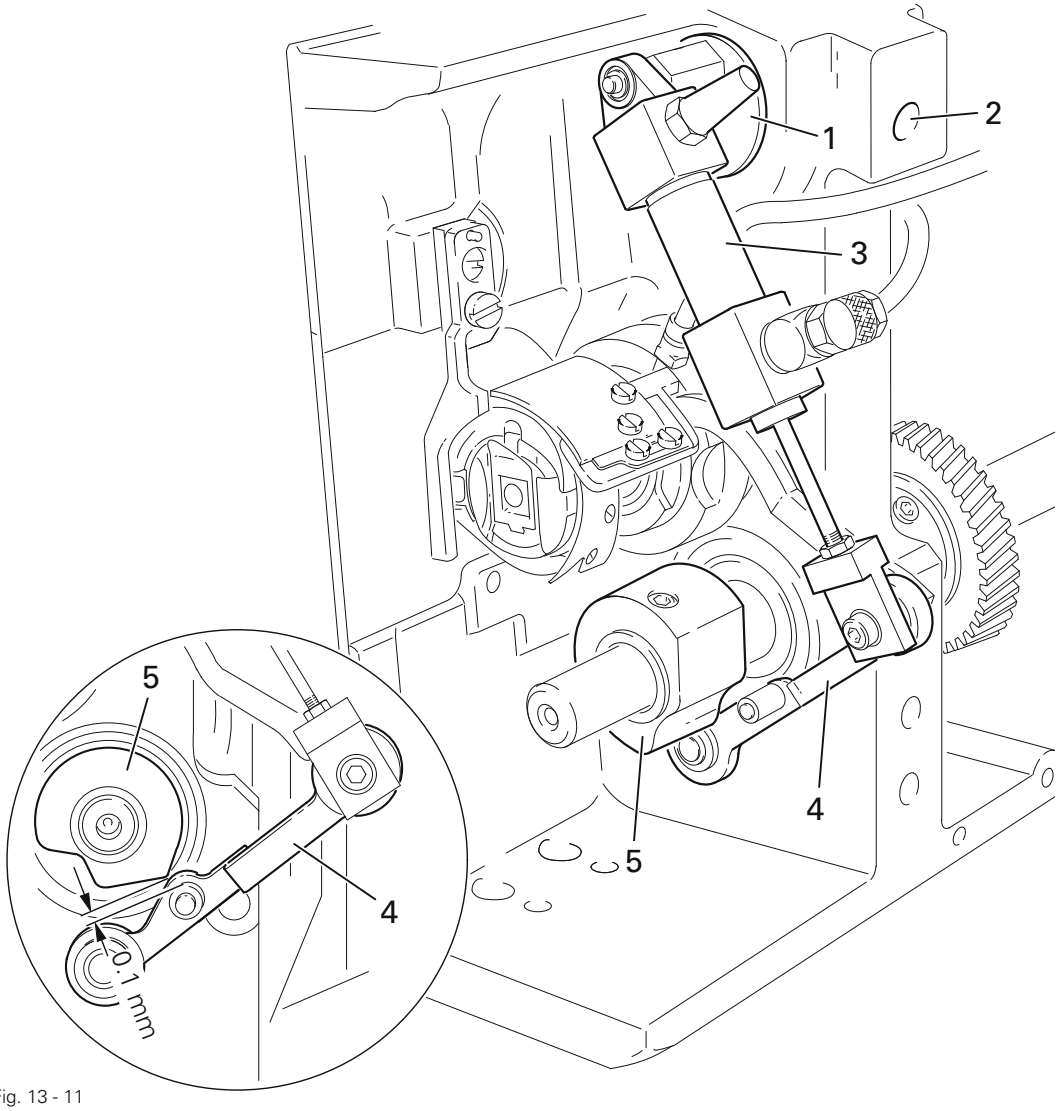
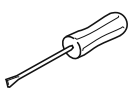


Fig. 13 - 11



- Turn or adjust the eccentric **1** (screw **2**) according to the **rules**.

13.06.03 Aligning the thread trimmer laterally

Rule

1. The tip of the thread catcher **5** should point exactly at the needle midpoint.
2. The thread catcher **5** should be horizontal and not touch at any position as it moves.

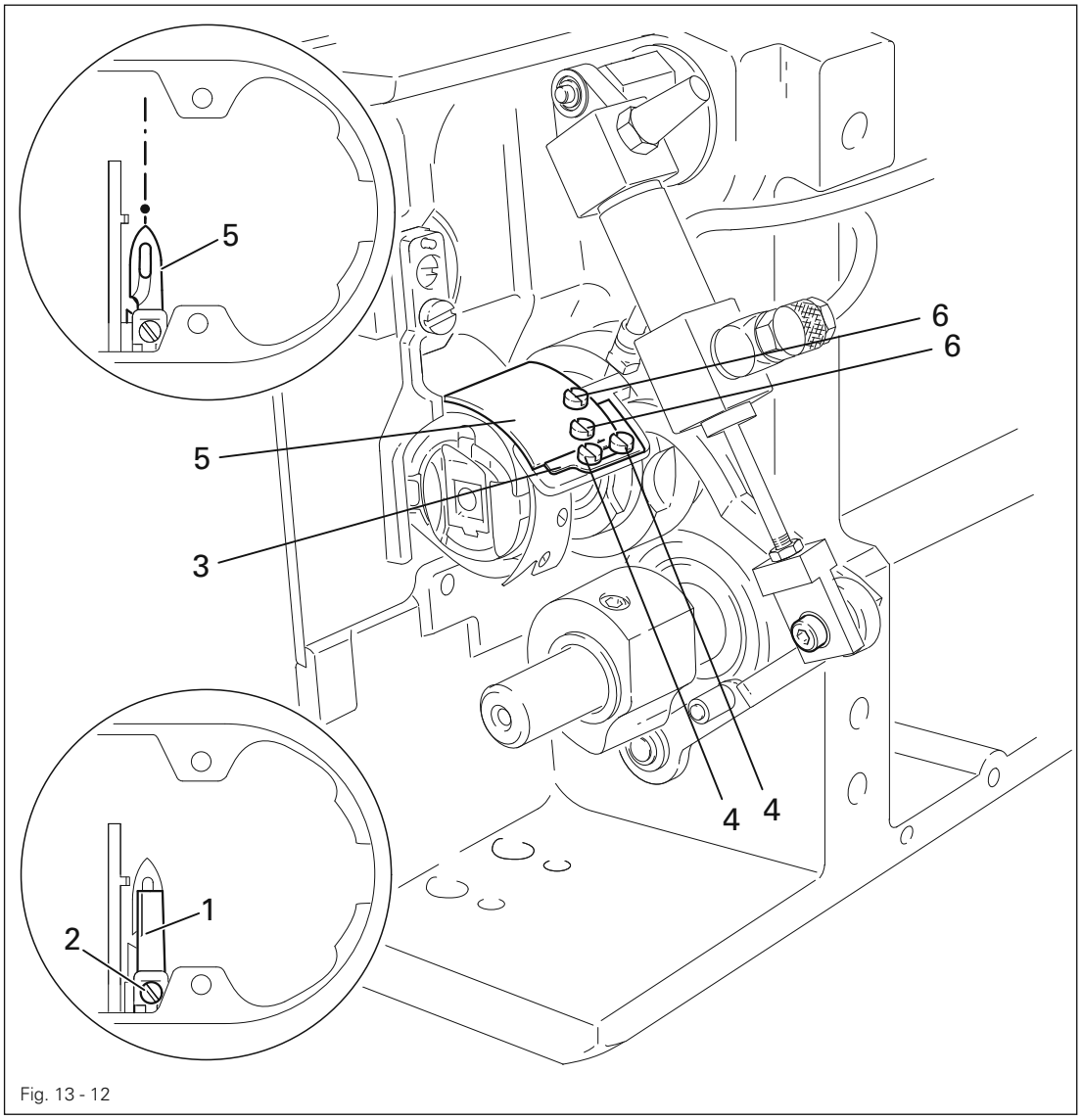
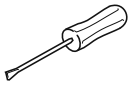


Fig. 13 - 12



- Remove the knife **1** (screw **2**).
- Move the needle bar to b.d.c.
- Loosen the stop **3** (screws **4**).
- Manually position the thread catcher **5** (screws **6**) in front of the needle and align according to the **rules**.

13.06.04 Knife position

Rule

1. There should be a clearance of **4 mm** between the knife edge and the needle.
2. The right edge of the knife **1** should not protrude beyond the right edge of the thread catcher (see arrow).

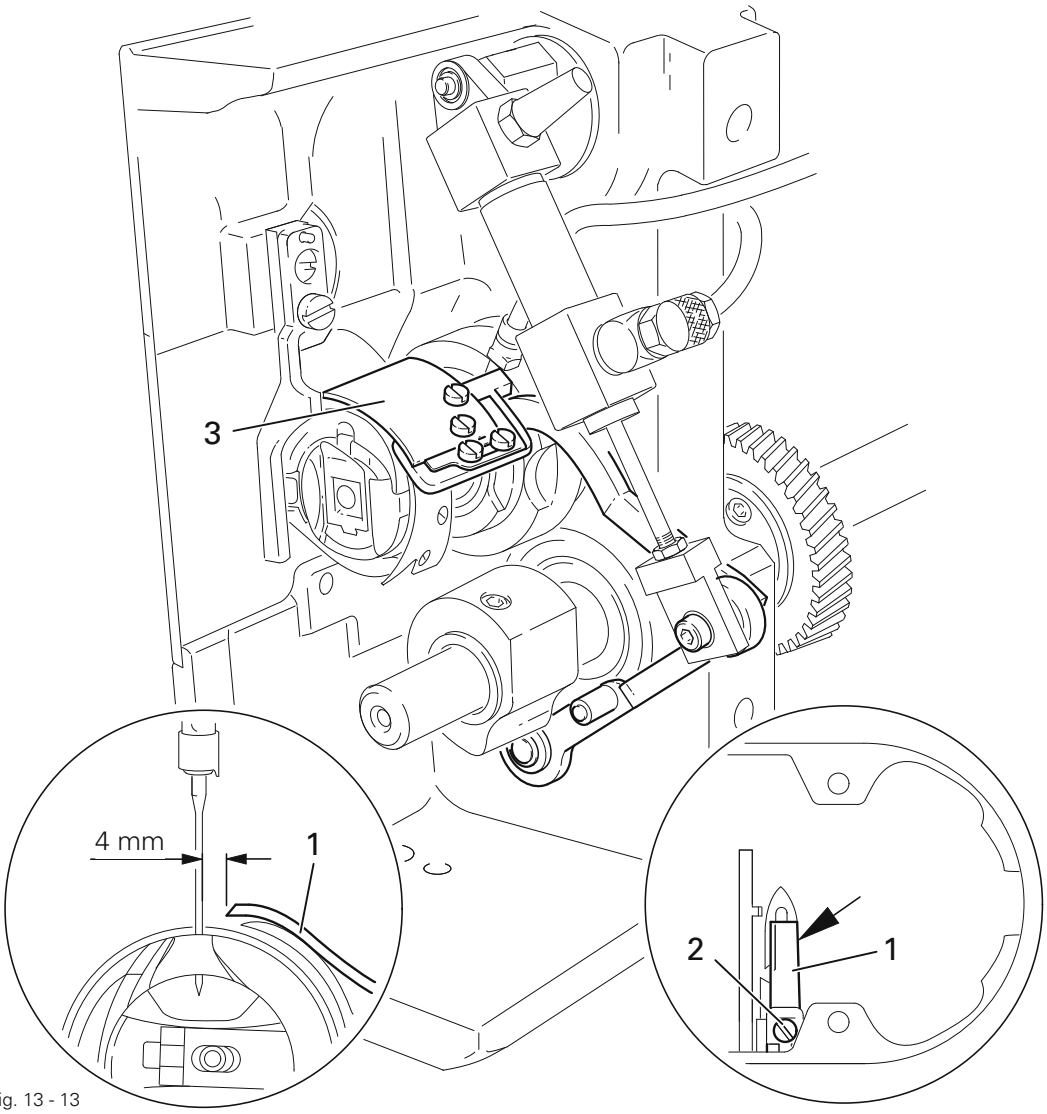
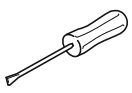


Fig. 13 - 13



- Move the needle bar to b.d.c.
- Slide the knife **1** under the locking tab and align according to **rule 1.**
- Gently tighten the screw **2** .
- Manually adjust the thread catcher carrier **3** until the cutting tip in the thread catcher is positioned just in front of the knife edge.
- Align the knife **1** according to **rule 2** and tighten the screw **2** .

13.06.05 Front turning point of the thread catcher

Rule
When the thread catcher **5** is in the front turning point, the rear edge of the thread catcher cutout should be **1 mm** in front of the bobbin case position finger **6.**

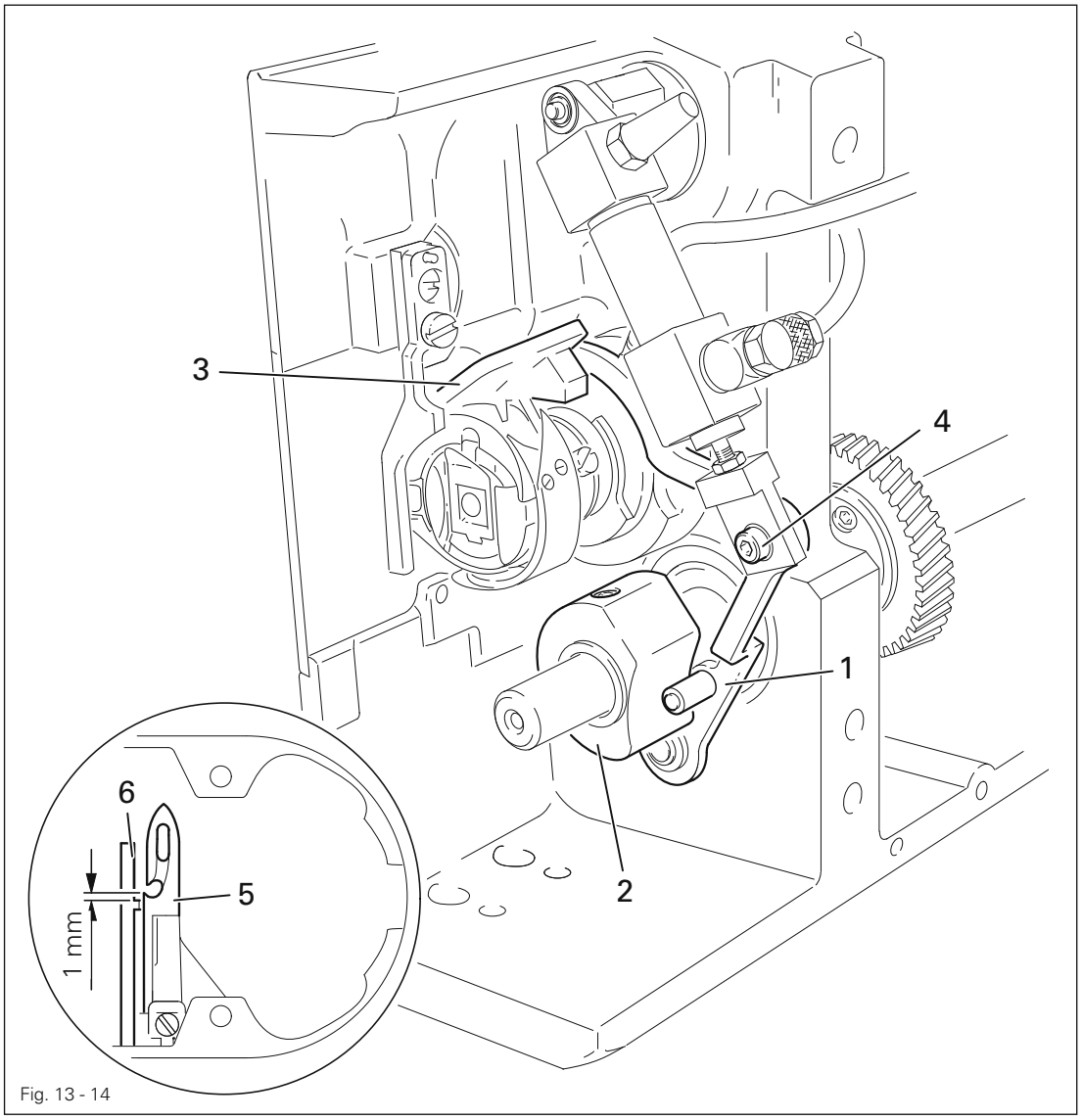


Fig. 13 - 14

- Swivel the roller lever **1** to the lowest point of the control cam **2.**
- Adjust the thread catcher carrier **3** (screw **4**) according to the **rule**.

13.06.06 Manual cutting control

Rule
Two threads must be cut cleanly on both the left and right in the thread catcher cutout **1.**

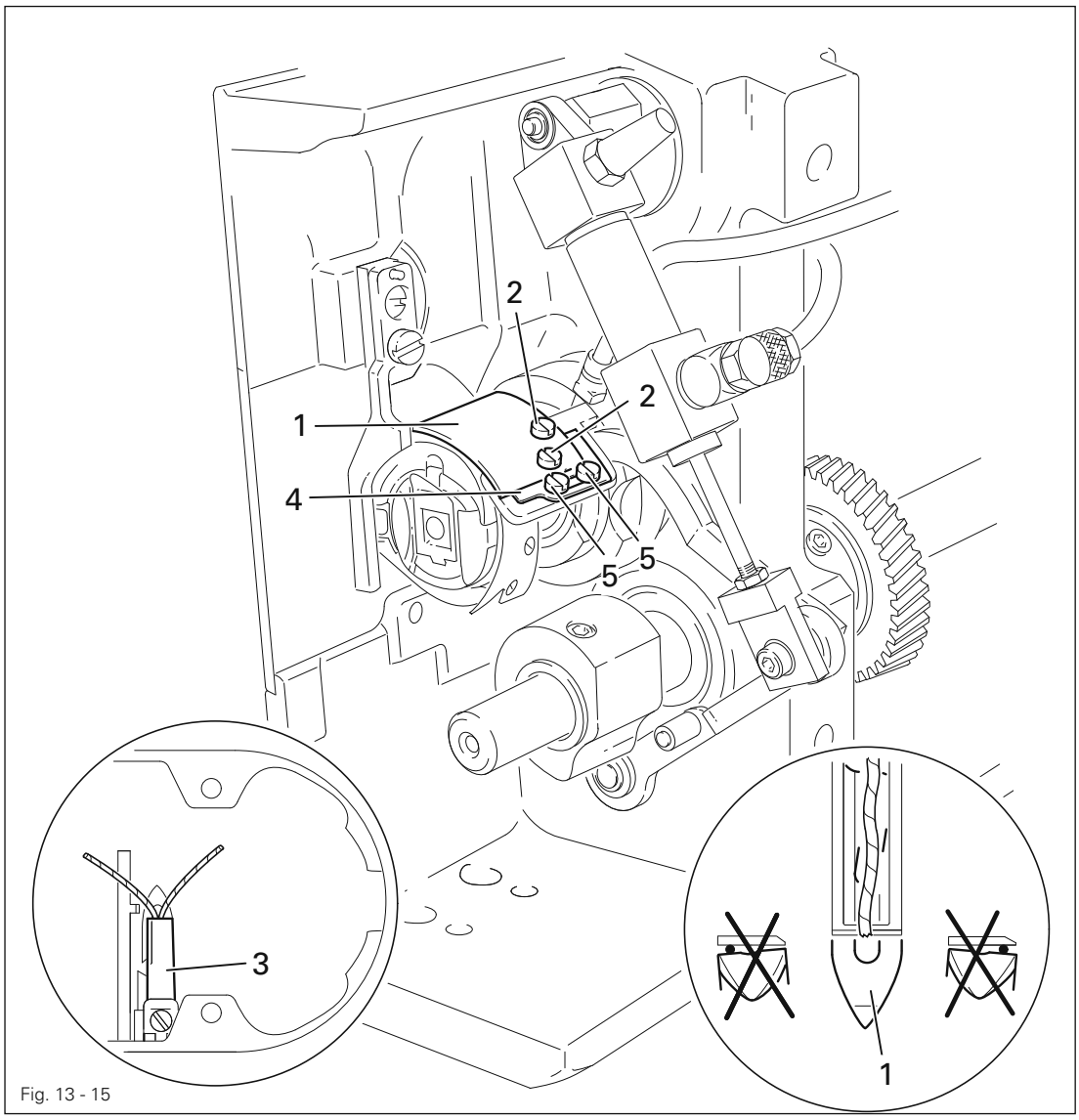


Fig. 13 - 15

- Fit the needle plate.
- Manually move the thread catcher **1** to its front turning point.
- Pull a double-up length of thread and hook it in the thread catcher cutout.
- Carry out the cutting operation manually.
- If the threads are not cut according to the **rule**, align the thread catcher **1** (screws **2**) to the knife **3** accordingly.
- Move the stop **4** until it abuts the thread catcher **1** and tighten the screws **5.**
- **Chapter 13.06.03 Checking and if necessary adjusting the lateral alignment of the thread catcher**.

13.08.07 Control cam (recalibrating)

Rule
If the end of the thread guard **3** is positioned **2 mm** behind the centre of the lug on the bobbin case position finger **4,** there should also be a clearance of **2 mm** between the tip of the thread catcher **6** and the centre of the lug.

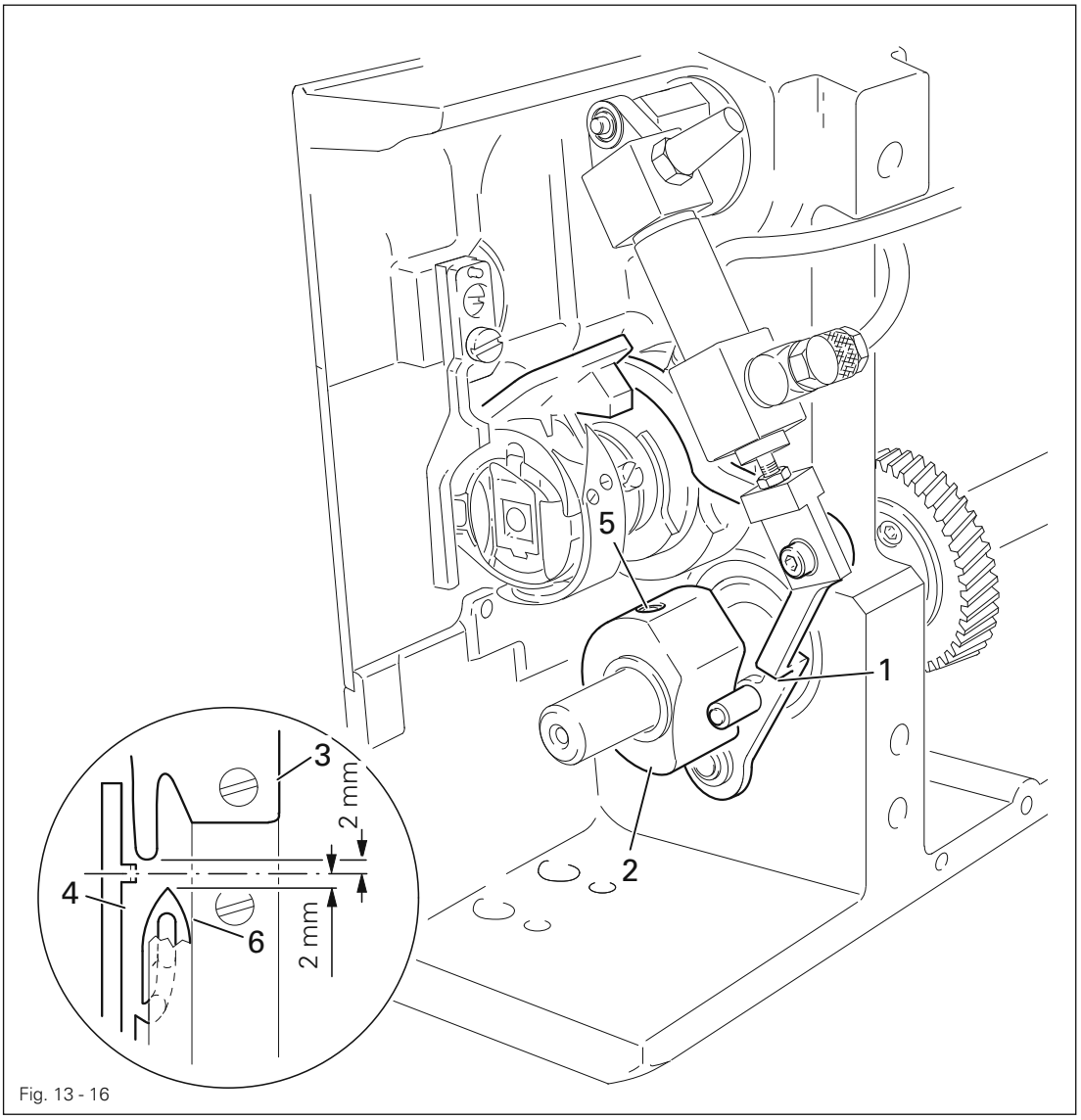


Fig. 13 - 16

- Move the needle bar to b.d.c.
- Manually press the roller lever **1** onto the control cam **2** and turn the handwheel until there is a clearance of **2 mm** between the end of the thread guard **3** and the middle of the lug on the bobbin case position finger **4.**
- If required, turn the control cam **2** (screws **5**) according to the **rule**.

13.07 Adjusting the loading plate

13.07.01 Basic setting of the loading plate height

Rule
The loading plate 3 should be centred between the strips 4 and 5 and be parallel to the bars 4 and 5.

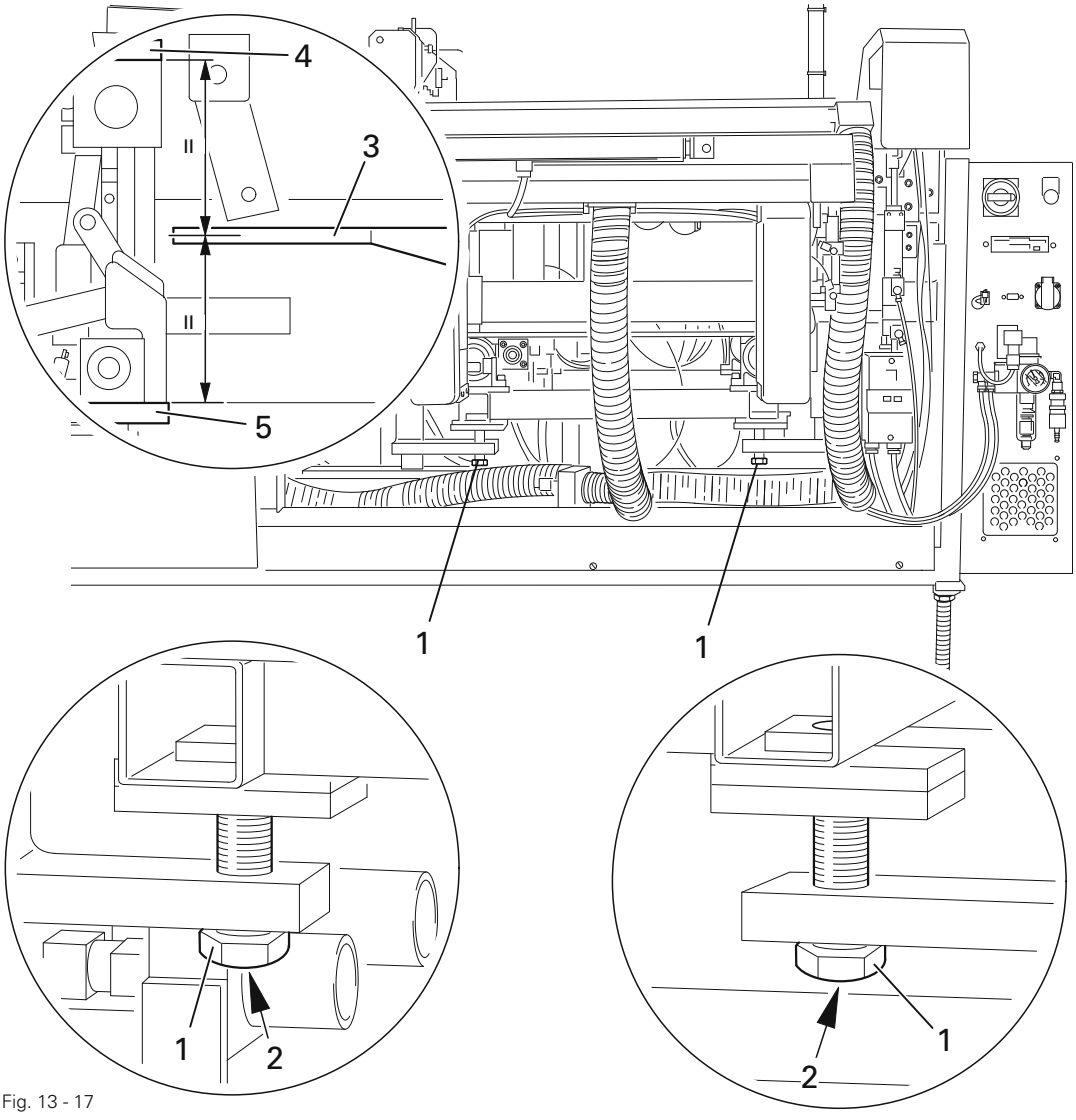
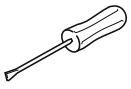


Fig. 13 - 17



- Turn the screws **1** (screws **2**) according to the **rule**.

13.07.02 Loading plate position

Rule
The loading plate **1** should be parallel to the rail **3**.

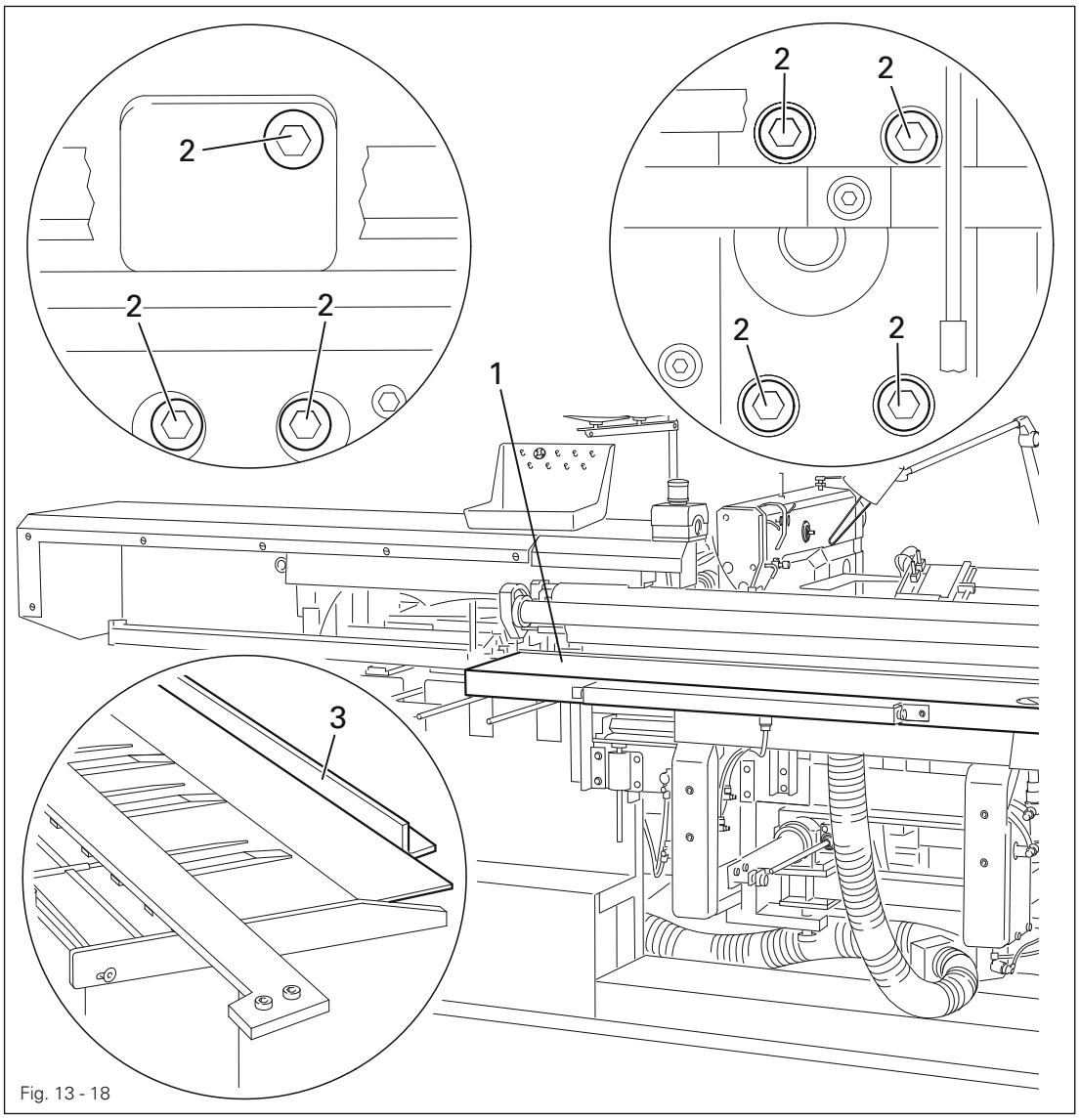


Fig. 13 - 18

- Remove the cover plate of the loading plate **1.**
- Retract the loading plate **1** manually.
- Adjust the loading plate **1** (screws **2**) according to the **rule**.
- Fit the cover plate.

13.07.03 Insertion depth of the loading plate

Rule

1. There should be a clearance of **12 mm** between the front edge of the plate and the needle hole centre when the loading plate is retracted.
2. The screws **1** should rest on the stops when the loading plate is extended.

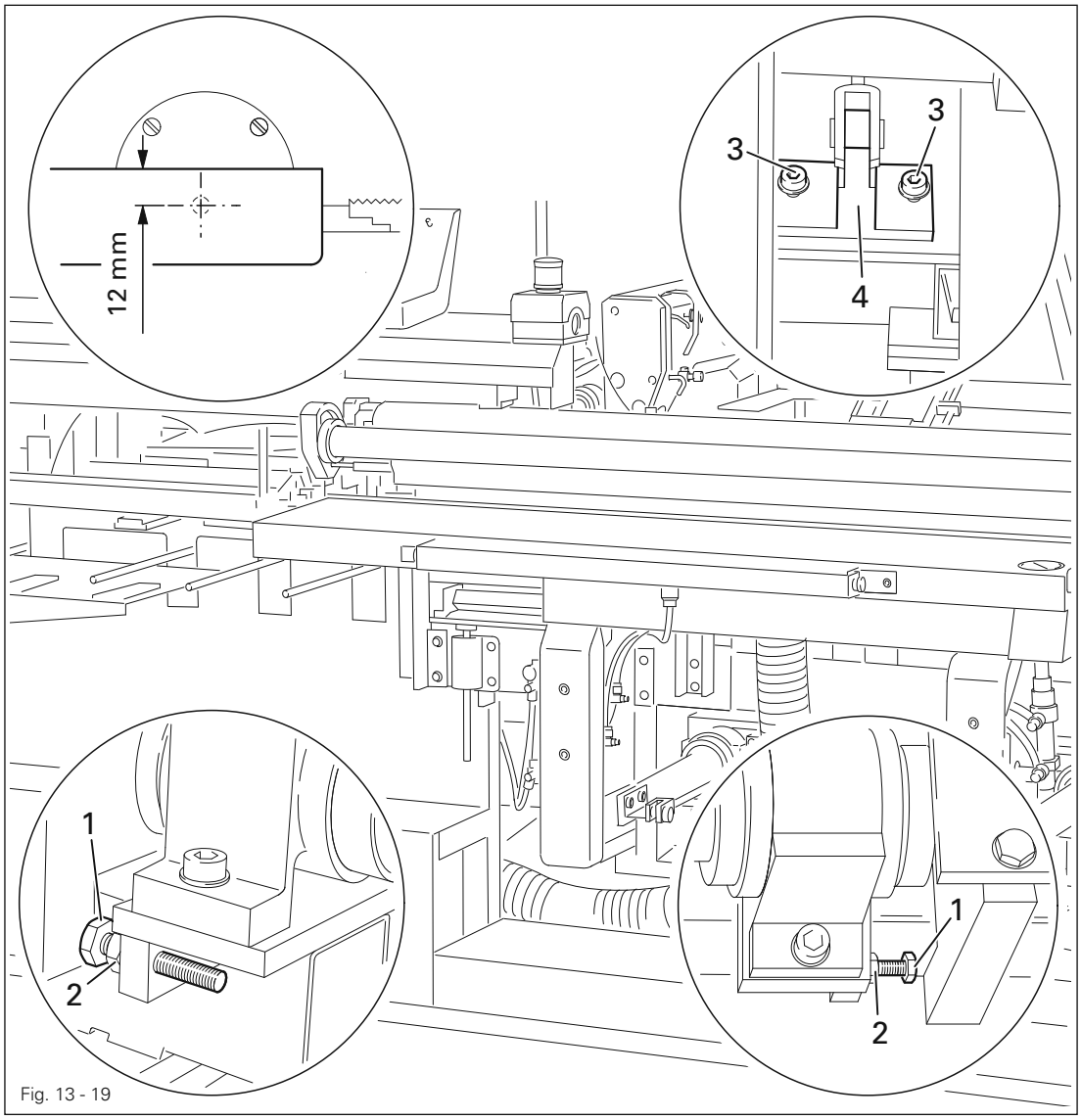


Fig. 13 - 19

- Screw in the screws **1** (nuts **2**) until they no longer touch the stops.
- Adjust the cylinder (screws **3** on the cylinder bracket **4**) according to **rule 1.**
- Turn the screws **1** (nuts **2**) according to **rule 2.**

13.08 Aligning the sewing head

13.08.01 Sewing head height

Rule
The upper edge of the sewing machine bed plate should have a clearance of **0.5 mm** to the surface plate **5**.

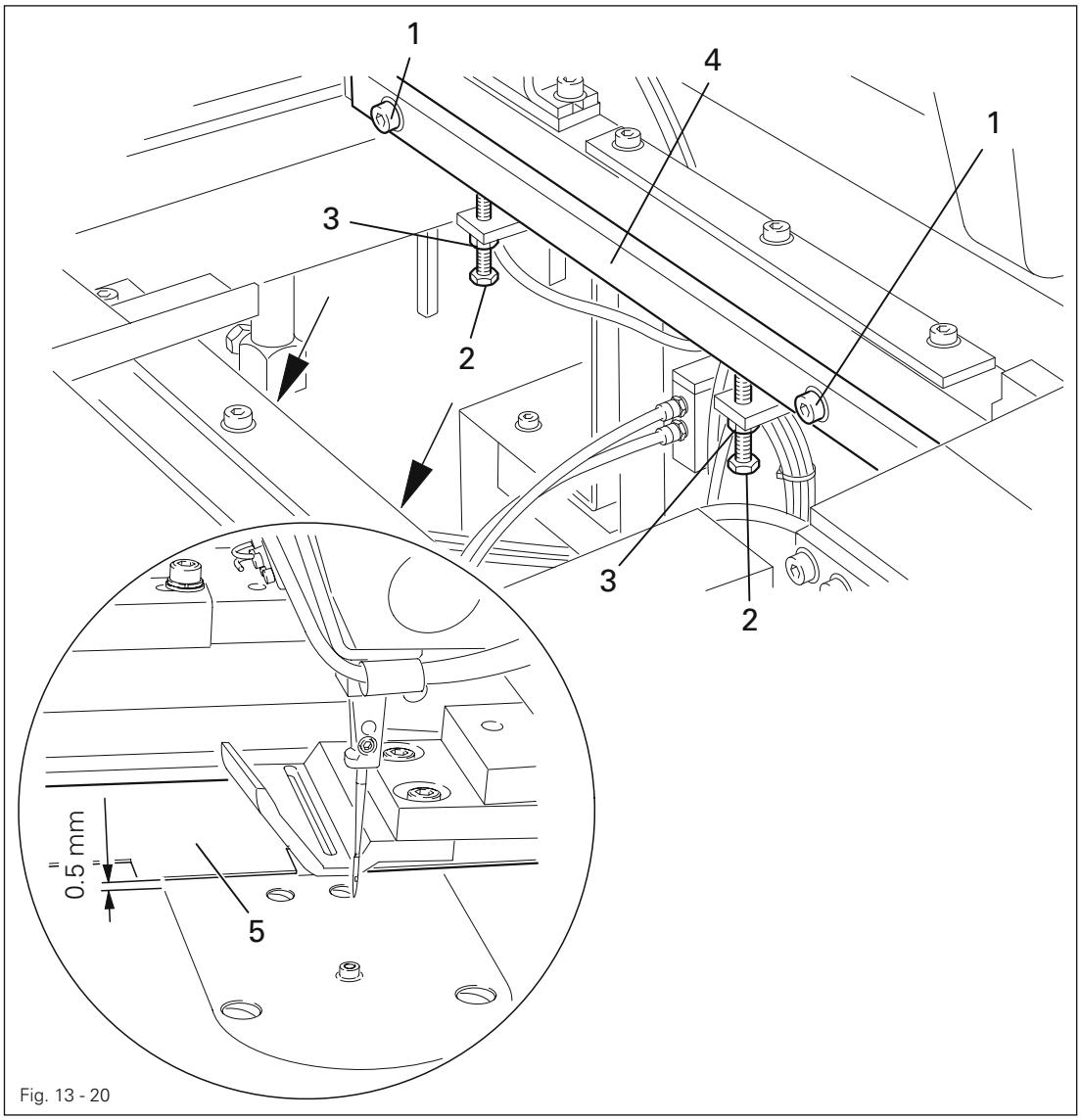


Fig. 13 - 20

- Move the sewing head to the service position, see **chapter 13.04 Sewing head service position**.
- Loosen the screws **1.**
- Turn the screws **2** (nuts **3**) according to the **rule** making sure that the bars **4** are horizontal.
- Tighten the screws **1.**
- Move the sewing head back to the operating position.

13.08.02 Aligning the sewing head laterally

Rule

1. There should be a clearance of **50 mm** between the front edge of the spreader **5** and the needle hole centre.
2. The sewing head should be at a right angle to the loading plate.

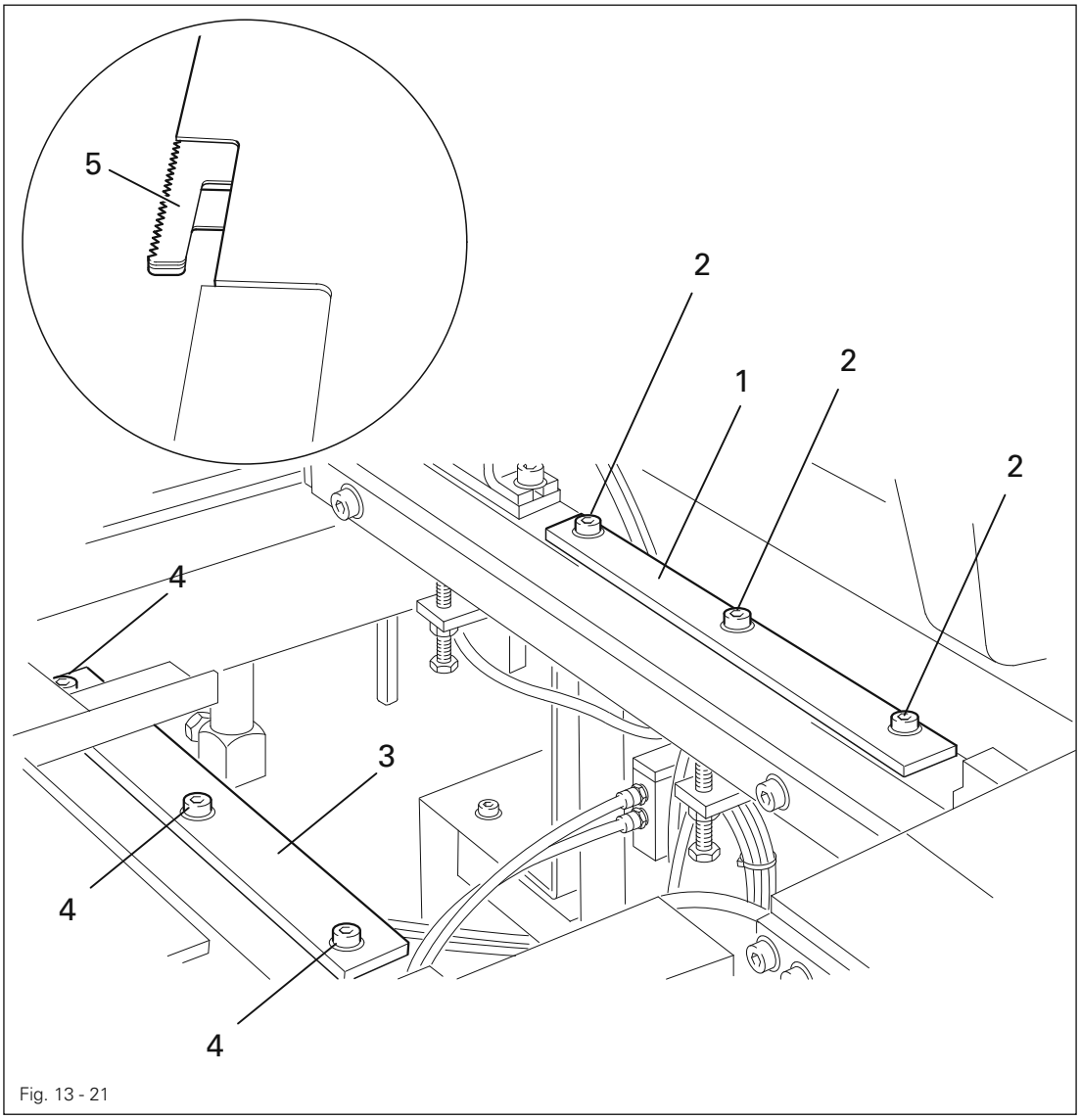
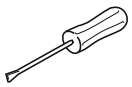


Fig. 13 - 21



- Adjust the rail **1** (screws **2**) according to the **rules**.
- Place the rail **3** (screws **4**) parallel on the sewing head so that there is no play.

13.09 Aligning the surface plate

Rule

1. The surface plate 1 should be parallel to the front edge of the loading plate.
2. There should be a clearance of **1 mm** between the needle plate insert and the surface plate **1.**

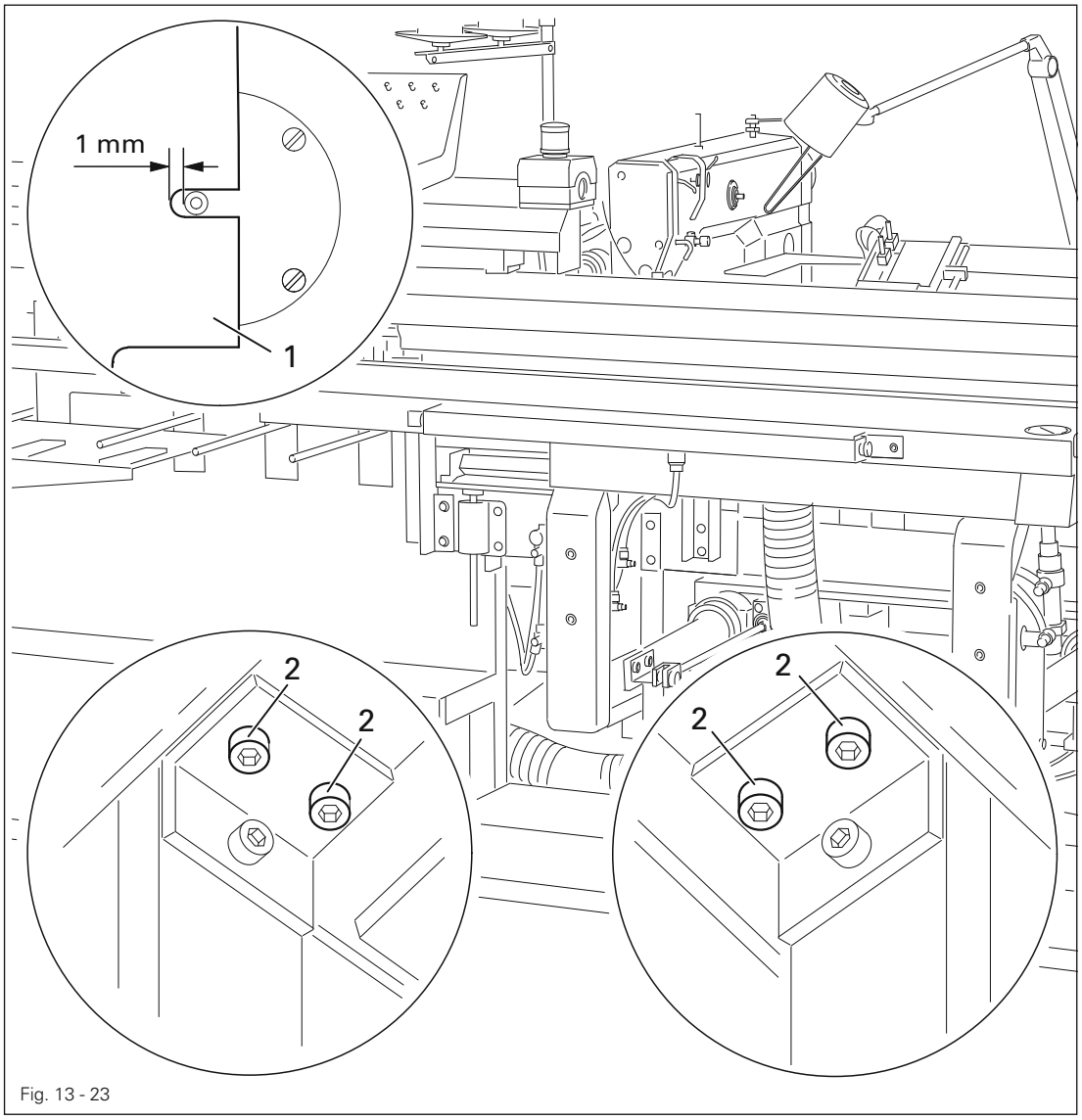


Fig. 13 - 23

- Adjust the surface plate **1** (screws **2**, under the surface plate) according to the **rules**.

13.10 Adjusting the positioning tube

13.10.01 Presetting the positioning tube

Rule
The bracket 1 should be parallel to the bracket **3** when the positioning tube is in the upper position.

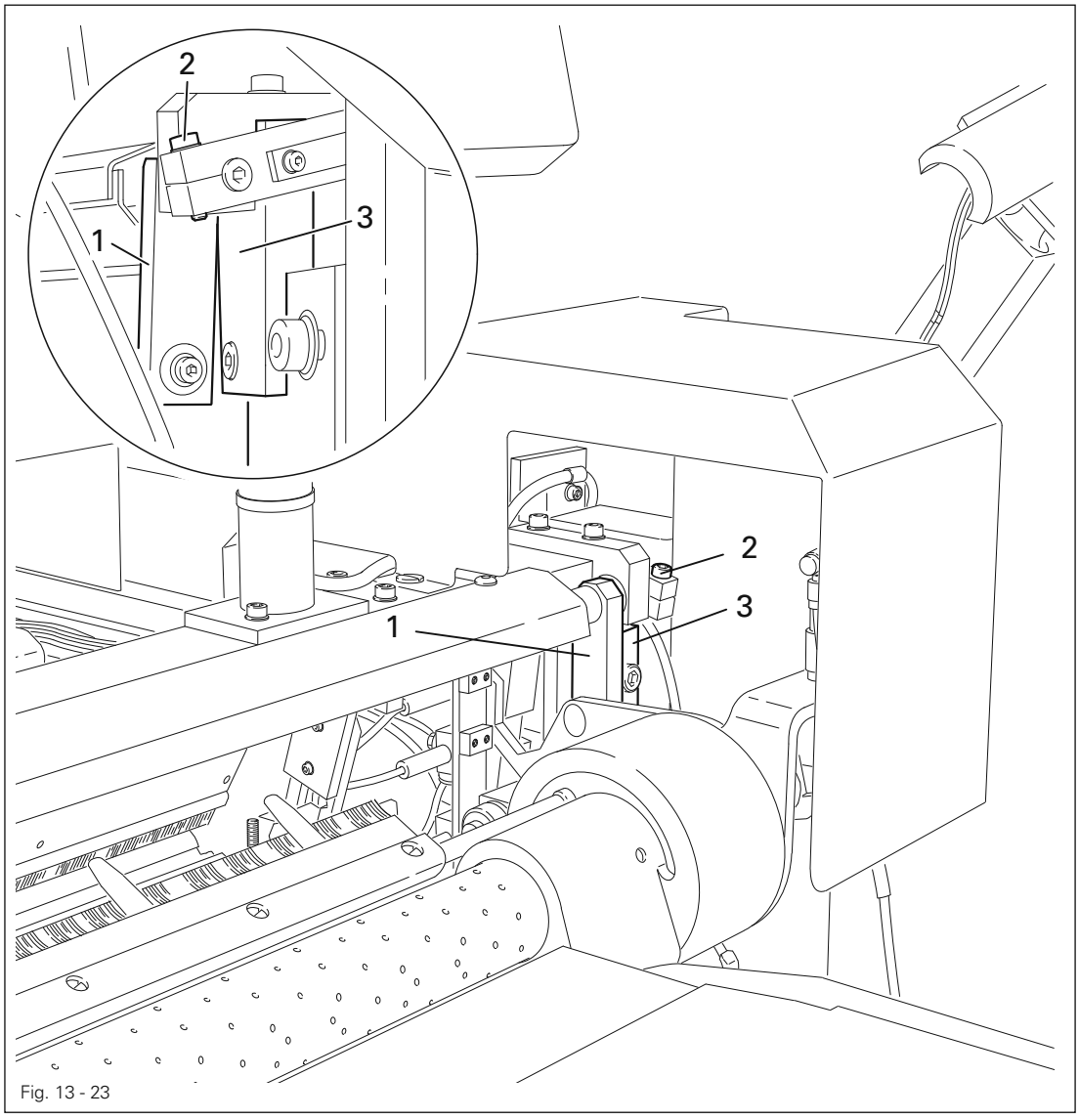


Fig. 13 - 23

- Adjust the bracket **1** (screw **2**) according to the **rule**.

13.10.02 Front final position of the positioning tube

Rule
The positioning tube 1 should rest parallel on the loading plate in its front final position.

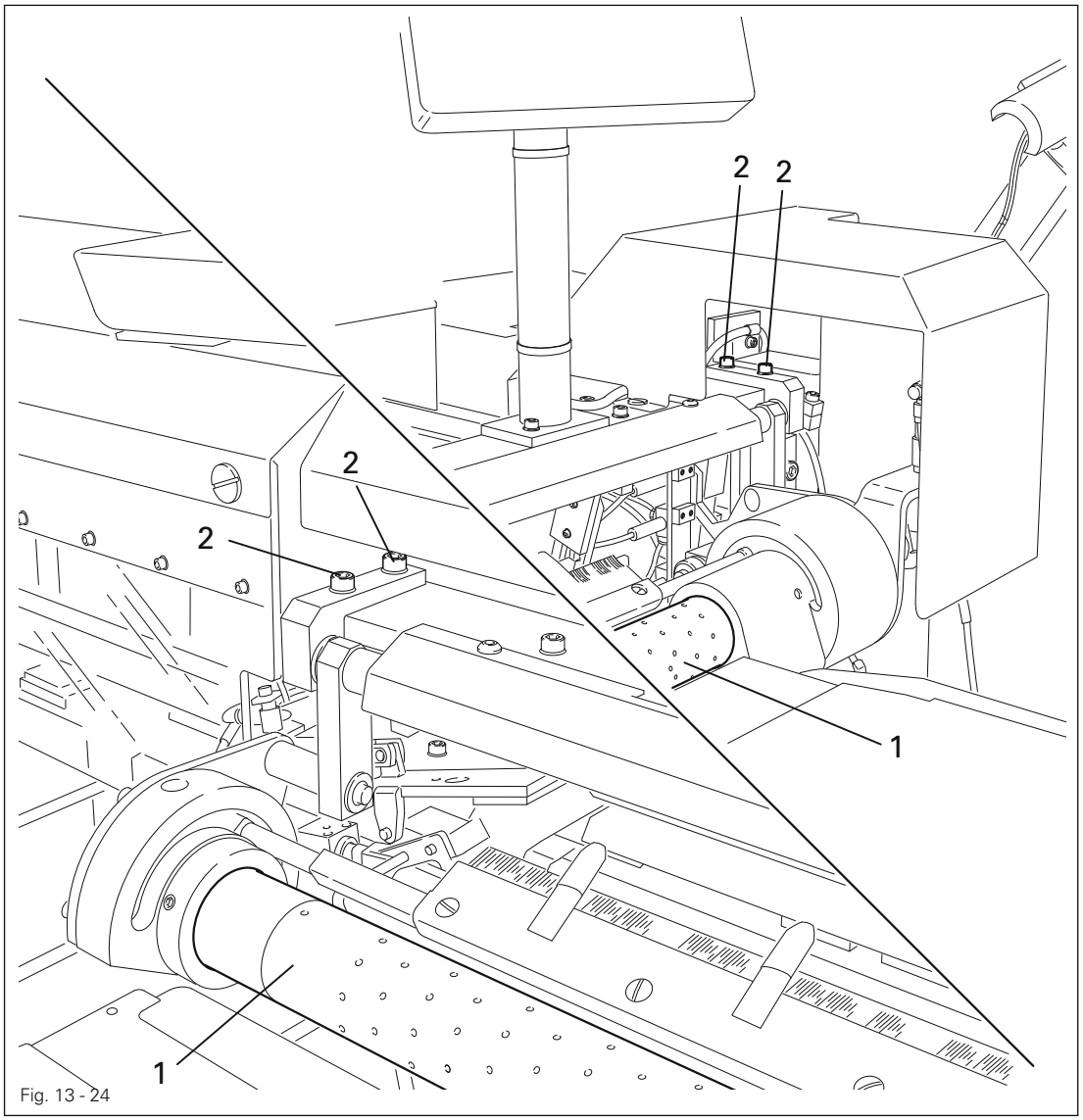


Fig. 13 - 24

- Adjust the positioning tube **1** (screws **2**) according to the **rule**.

13.10.03 Height and alignment of the positioning tube

Rule

When the positioning tube **3** is in the front final position

1. its top edge should maintain a distance of **18.9 mm** to the upper edge of the loading plate and
2. the corresponding holes on the marking should be centred in relation to the loading plate needles.

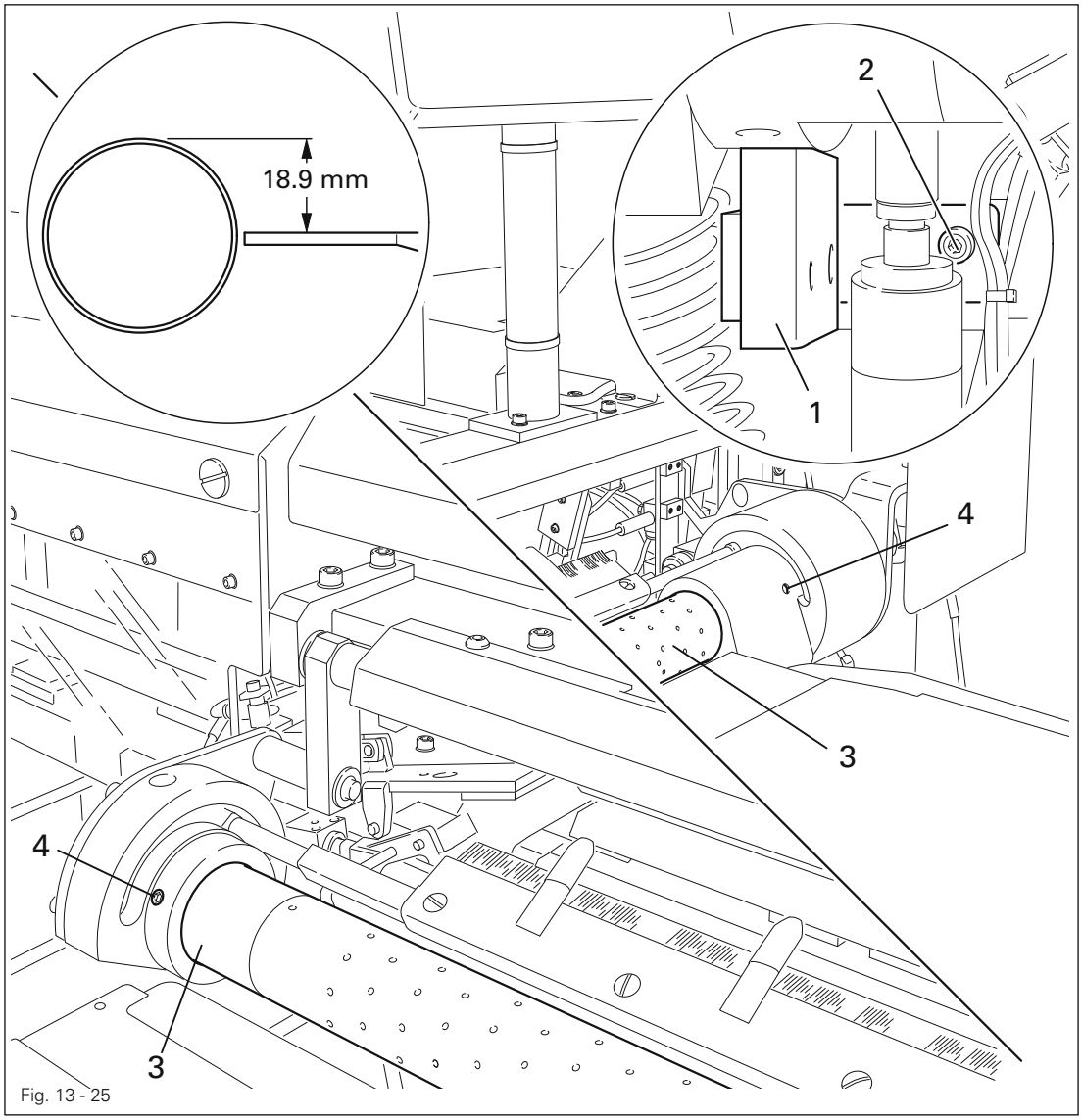
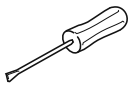


Fig. 13 - 25



- Adjust the stop **1** (screw **2**) according to **rule 1.**
- Turn or adjust the positioning tube **3** (two screws **4** respectively) according to **rule 2.**

13.11 Height of the needles

Rule
There should be a clearance of **4 mm** between the needle points and the front edge of the loading plate **1** when the needles are extended.

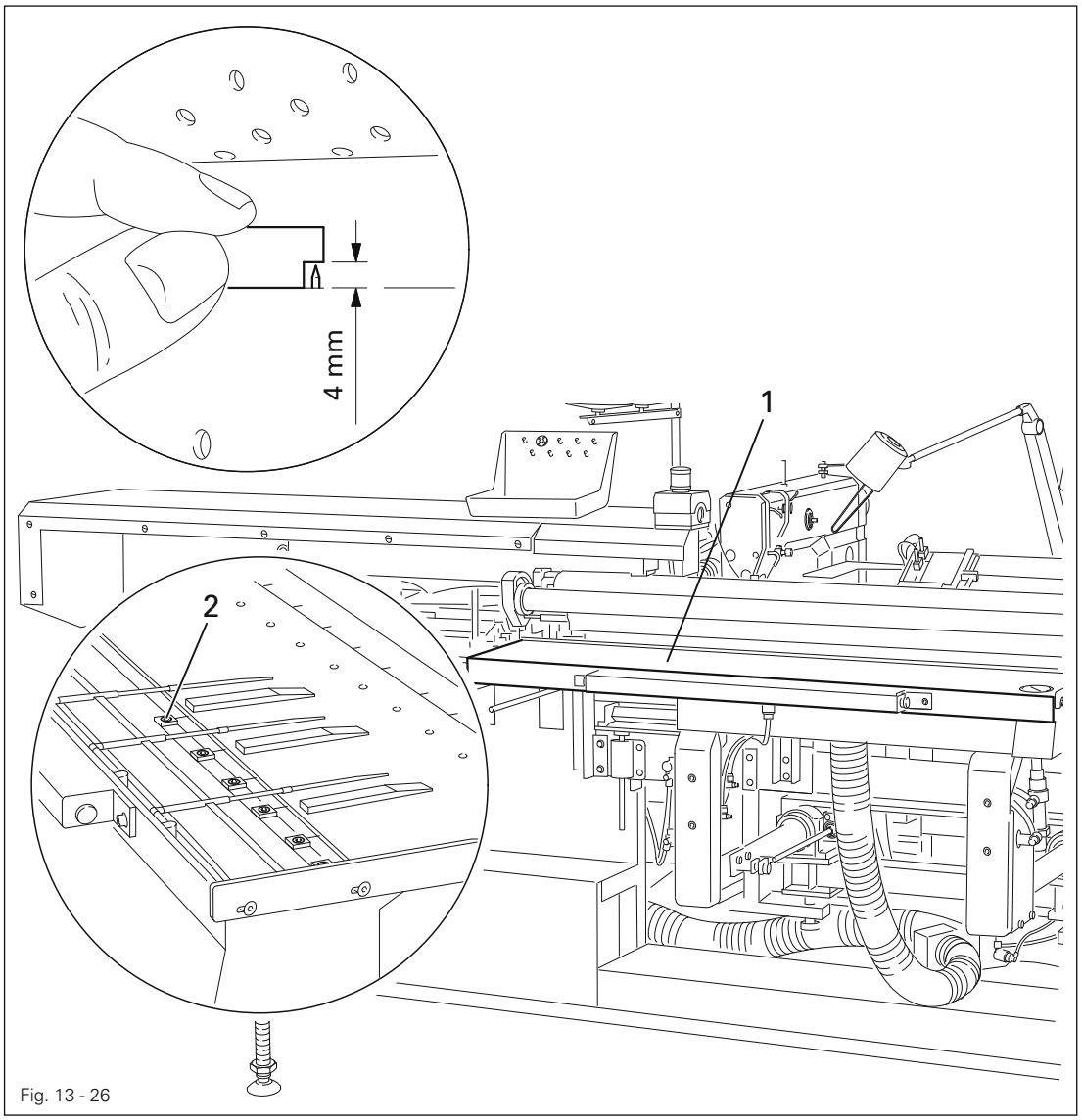


Fig. 13 - 26

- Remove the cover plate of the loading plate **1.**
- Extend the needles.
- Adjust the needles (screws **2**) according to the **rule**.

The cover plate remains dismantled for additional settings.

13.12 Adjusting the spreader

Rule

1. When retracted, the spreader 1 should be flush with the front edge of the loading plate
2. When extended, the spreader **1** should be recessed by **3 mm**.

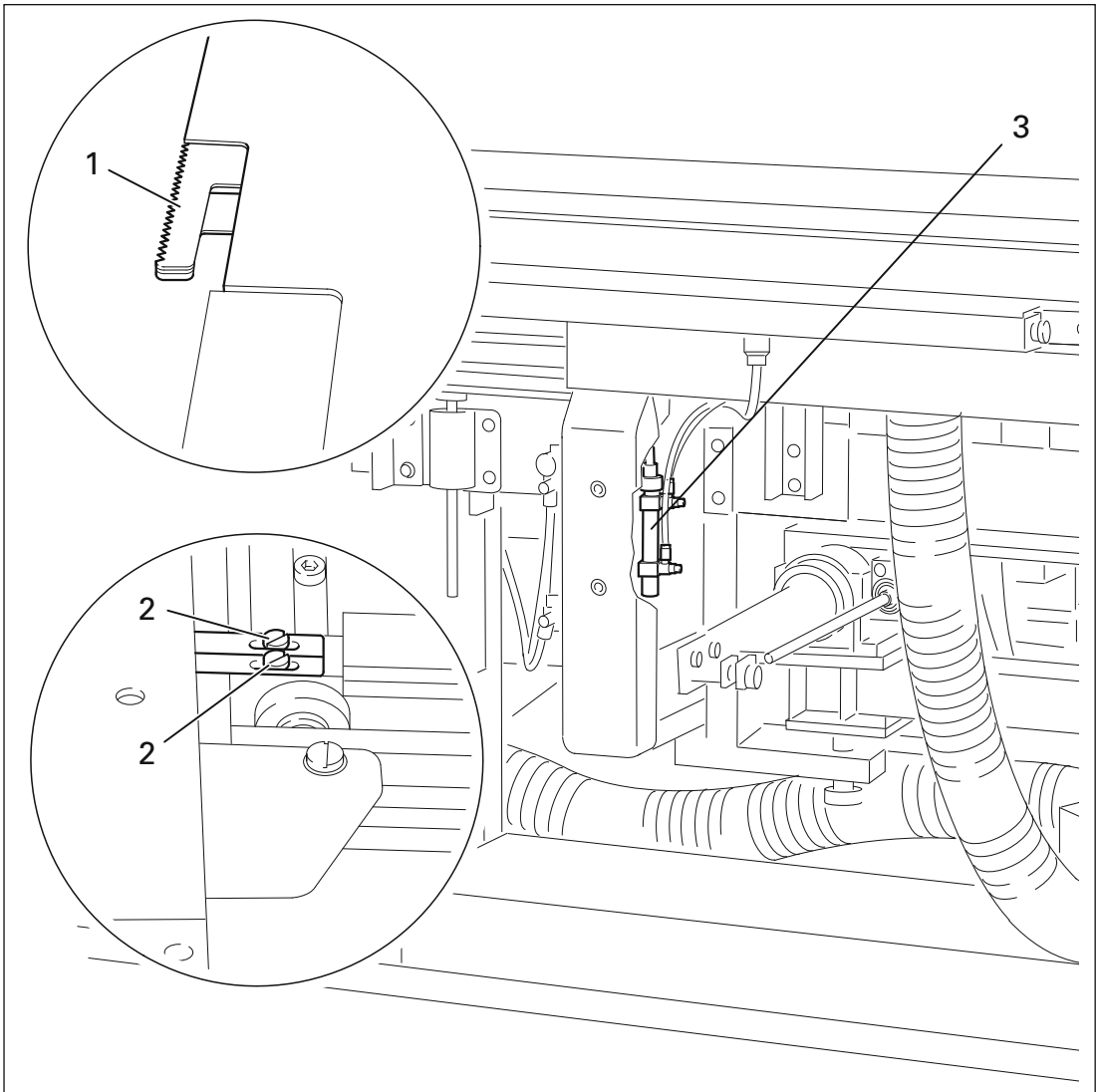
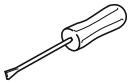


Fig. 13 - 27



- Adjust the spreader **1** (screws **2**) according to **rule 1.**
- Turn the yoke head (nut) of the cylinder **3** according to **rule 2.**

13.13 Adjusting the table extension

Rule
When extended, the front edge of the table extension 1 should be flush with the front edge of the loading plate.

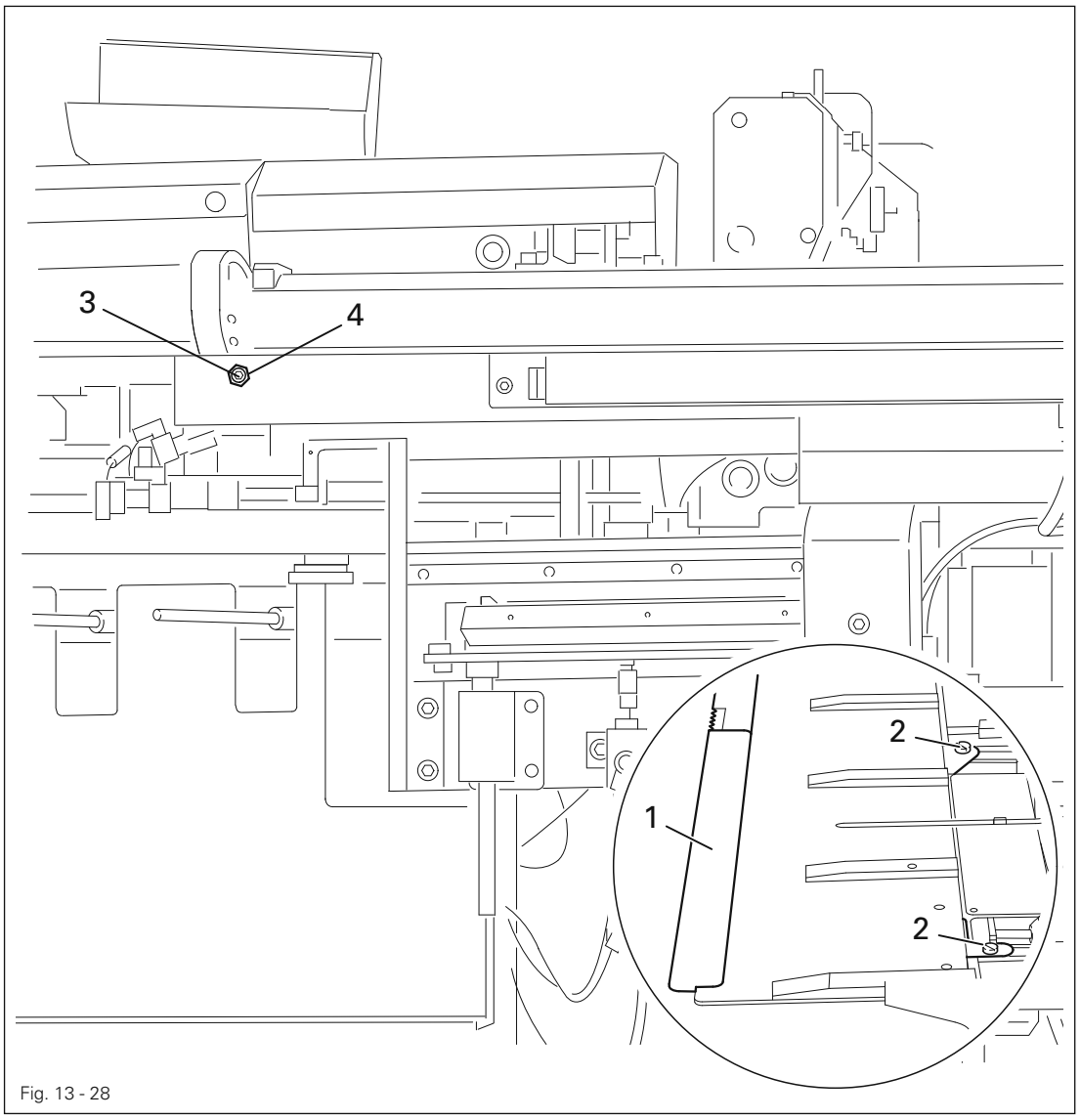


Fig. 13 - 28

- Adjust the table extension **1** (screws **2**) according to the **rule**.

If necessary, the clearance between the retracted table extension **1** and the loading plate can be changed according to the incision depth on the screw **3** (**nut 4**).

13.14 Adjusting the loading clamp

13.14.01 Loading clamp height

Rule

1. The claws of the loading clamp should touch the retracted loading plate simultaneously from the top and bottom.
2. The claws should be parallel to the loading plate.

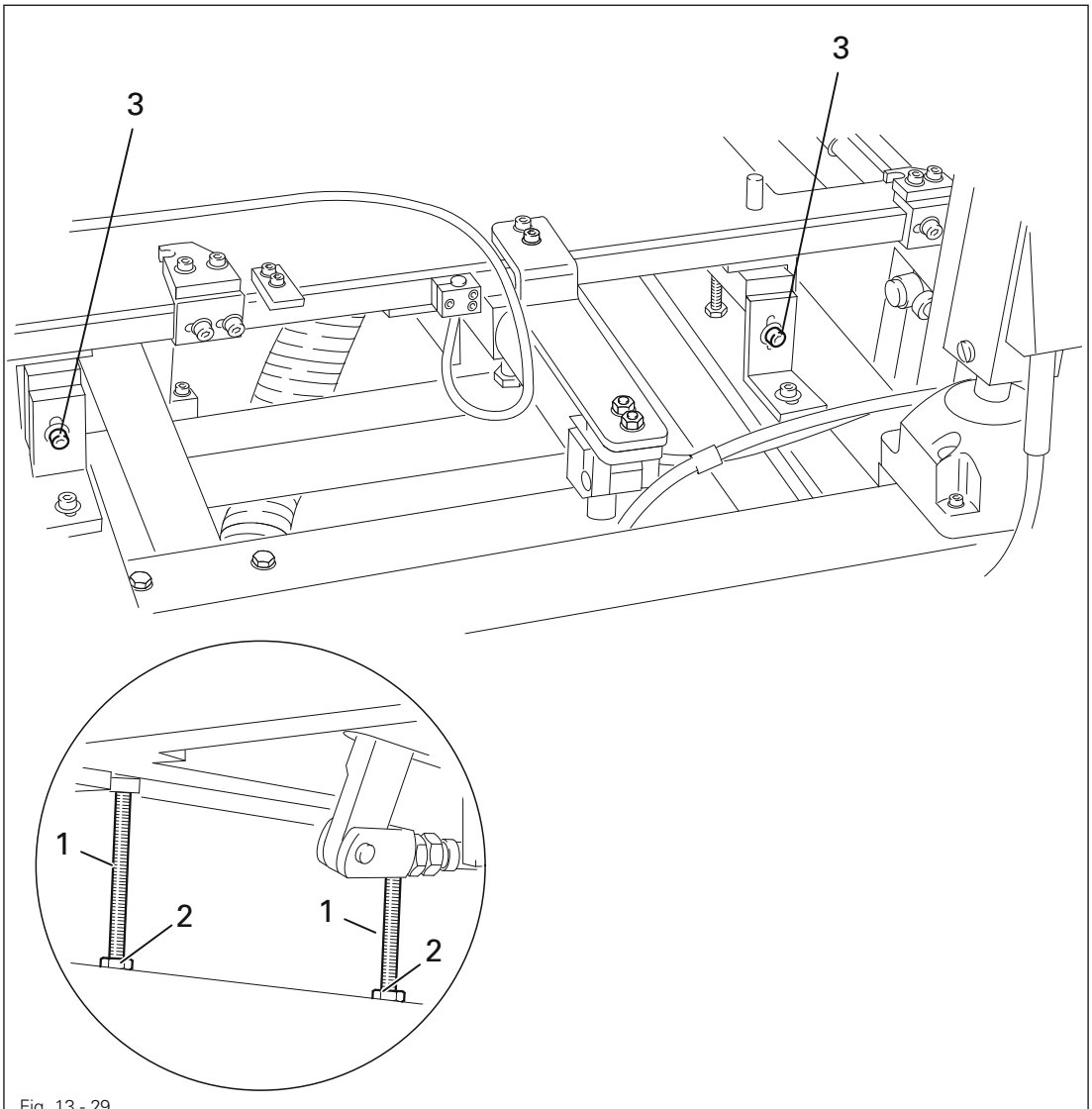
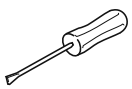


Fig. 13 - 29



- Turn the feed regular post **1** (nuts **2** and screws **3**) according to the **rules**.

13.14.02 Position of the loading clamp

Rule

1. The inner claws of the loading clamp should touch the retracted loading plate **6 - 7 mm** behind the front edge.
2. The clearance between the left claw edge of the loading clamp and the needle hole centre should be **50 mm**.

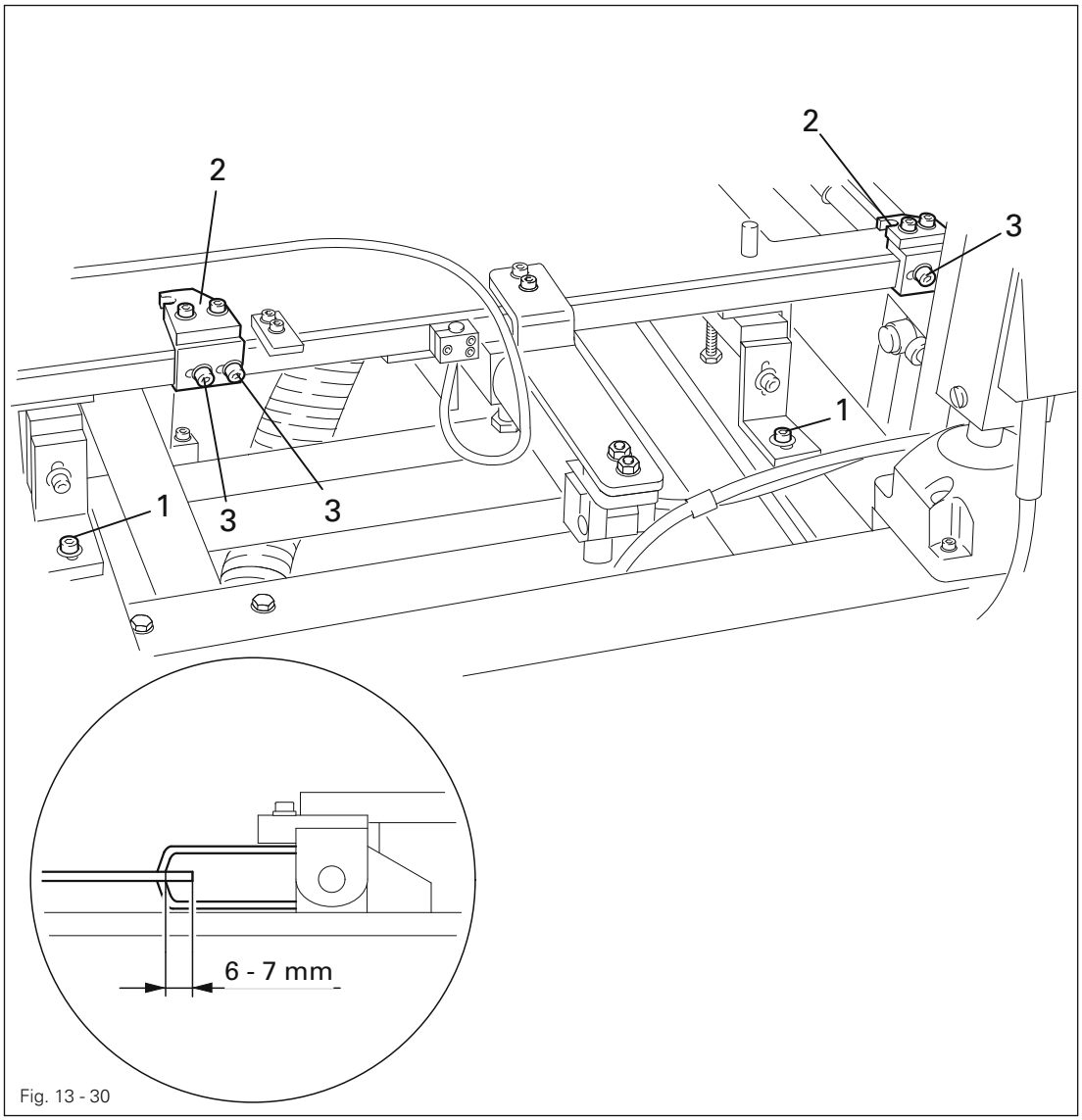


Fig. 13 - 30

- Adjust the loading clamp (screws **1**) according to **rule 1.**
- Adjust the bracket **2** (screws **3**) according to **rule 2.**

13.15 Adjusting the brushes

13.15.01 Adjusting the long brushes

Rule

1. The closed brushes **1** should rest parallel on the loading plate and close far enough that the material ail so that the material is smoothed out properly; in doing so, the loading plate should retract directly in the middle between the brushes **1**.
2. The open brushes **1** should have a clearance of approx. **10 mm** from each other.

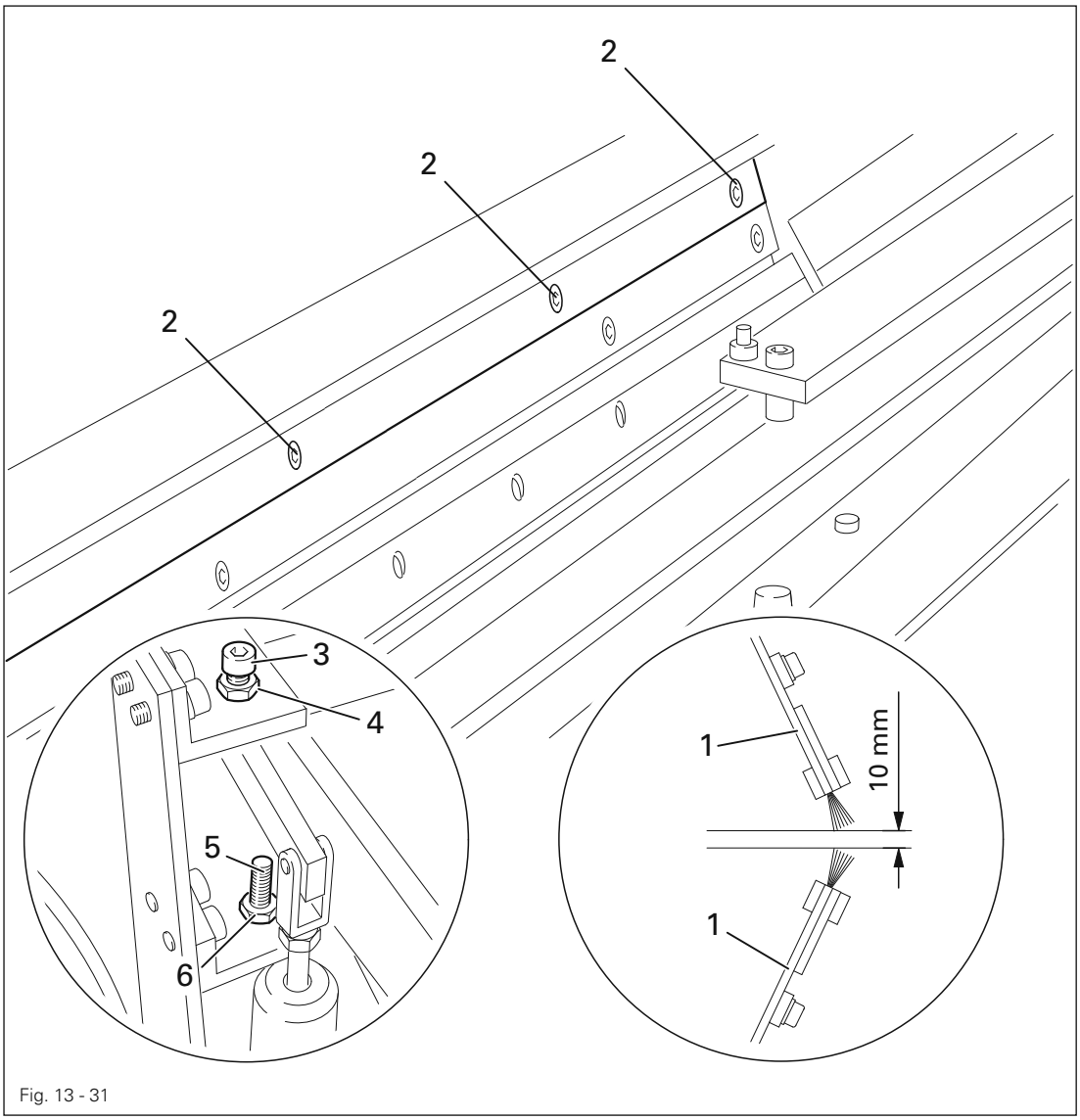
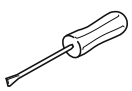


Fig. 13 - 31



- Adjust the brushes **1** (screws **2**), the screw **3** (nut **4**) and the screw **5** (nut **6**) according to the **rules**.

The closing of the brushes **1** is dependent on the material and must be adjusted according to the sewing result.

13.15.02 Adjusting the short brushes

Rule

1. The upper and lower brush should rest directly on or against the loading plate when the brushes are closed.
2. The upper and lower brush should each have a clearance of approx. **4 mm** to the loading plate when the brushes are open.

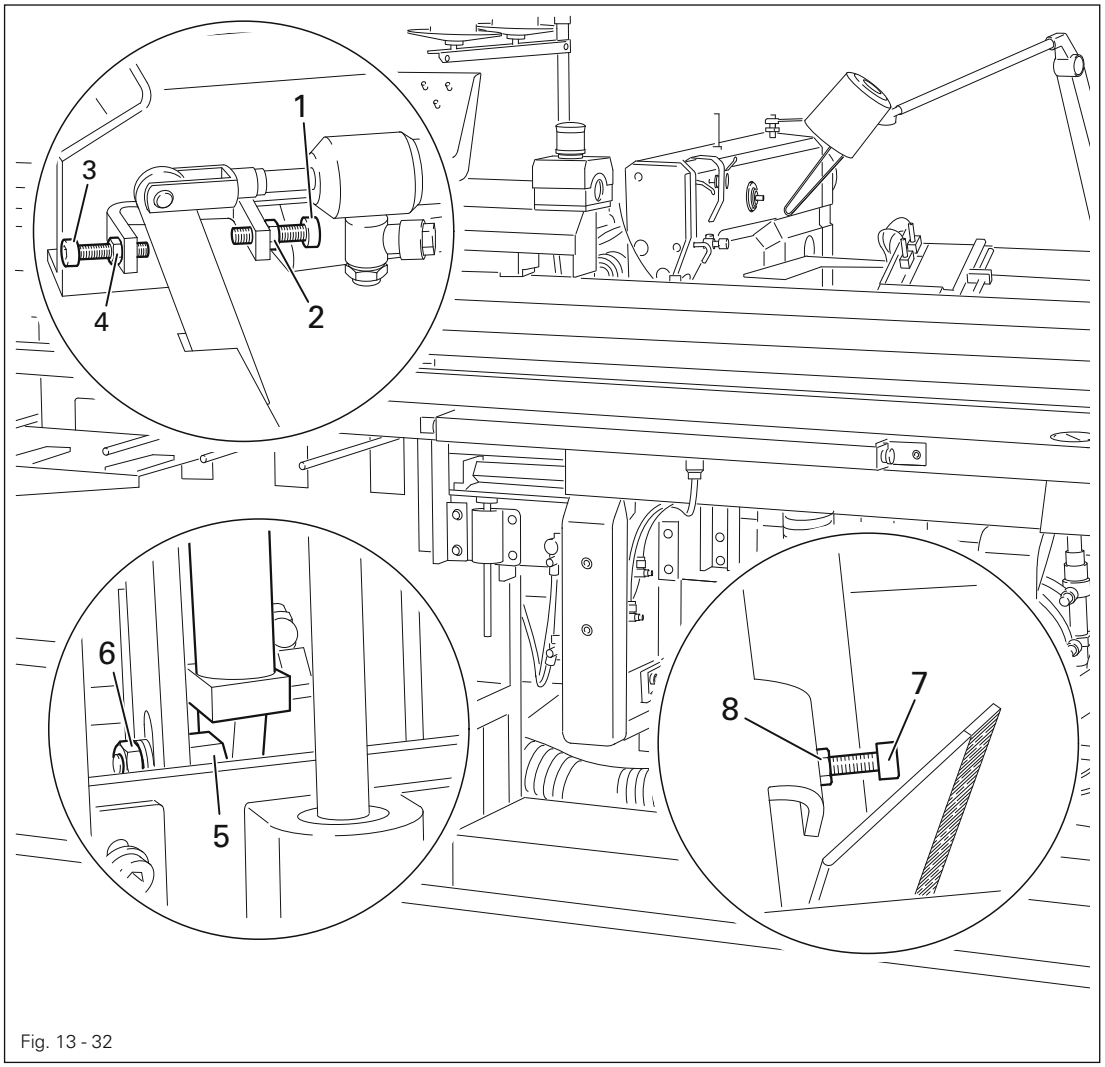


Fig. 13 - 32

Adjusting the upper brush:

- Turn the screw **1** (nut **2**) according to **rule 1.**
- Turn the screw **3** (nut **4**) according to **rule 2.**

Adjusting the lower brush:

- Adjust the cylinder bracket **5** (nut **6**) according to **rule 1.**
- Turn the screw **7** (nut **8**) according to **rule 2.**

The closing of the brushes is dependent on the material and must be adjusted according to the sewing result.

13.16 Adjusting the knife unit

13.16.01 Presetting the knife unit

Rule

1. The rear edge of the retracted thread catcher should tilt forward approx. 2°.
   (The centre of the screw **6** is almost flush with the outer edge of the screw **7**.)
2. Rest the thread catcher on the fold of the material (with an average material thickness).
3. The highest points of the knife should rest on the material when the thread catcher is retracted.

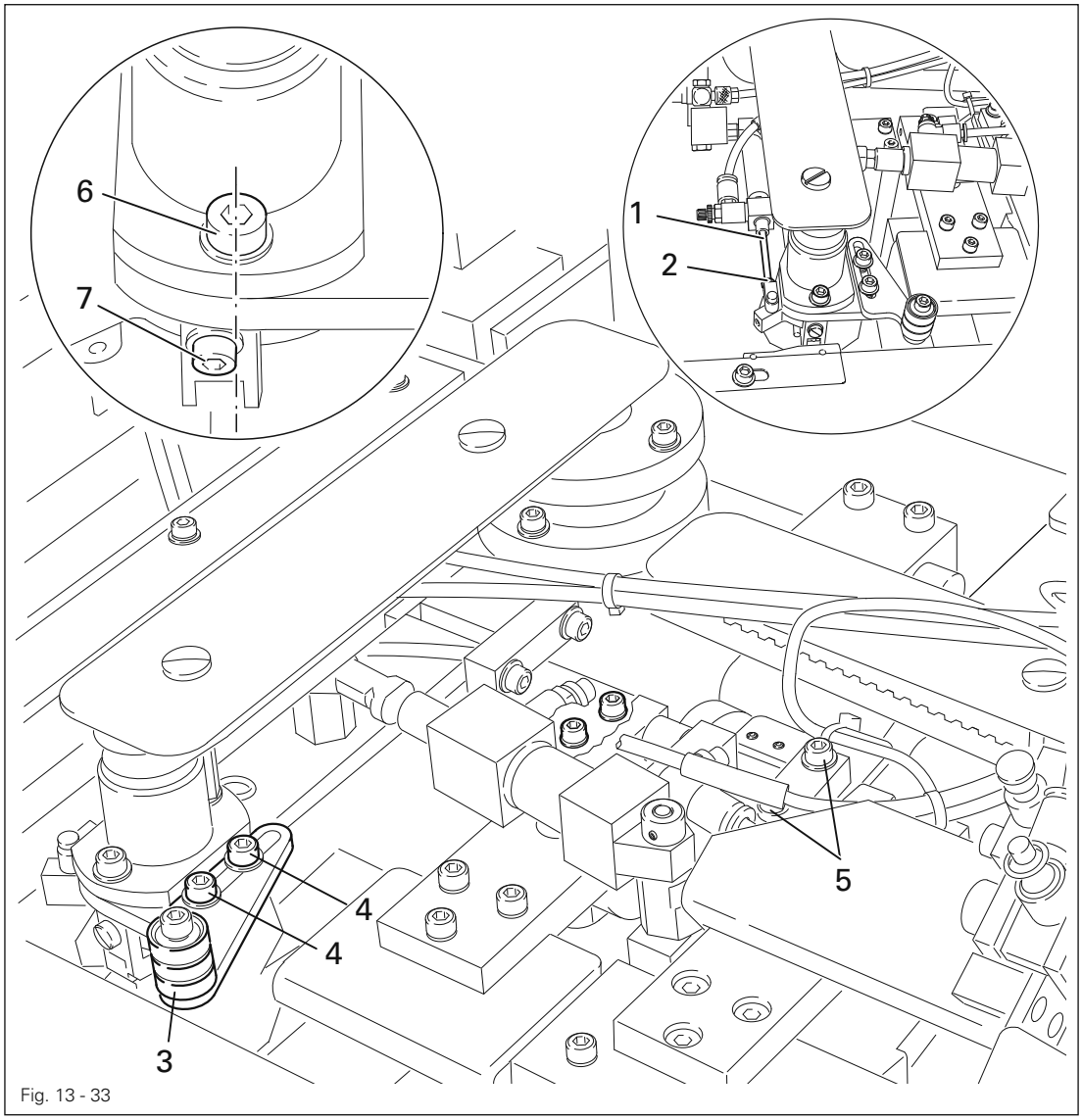
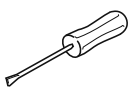


Fig. 13 - 33



- Turn the piston rod **1** (nut **2**) according to **rule 1.**
- Adjust the stop **3** (screws **4**) according to **rule 2.**
- Adjust the knife unit (screws **5**) according to **rule 3.**

13.16.02 Knife unit height

Rule
The thread catcher should retract in the centre of the open spreader.

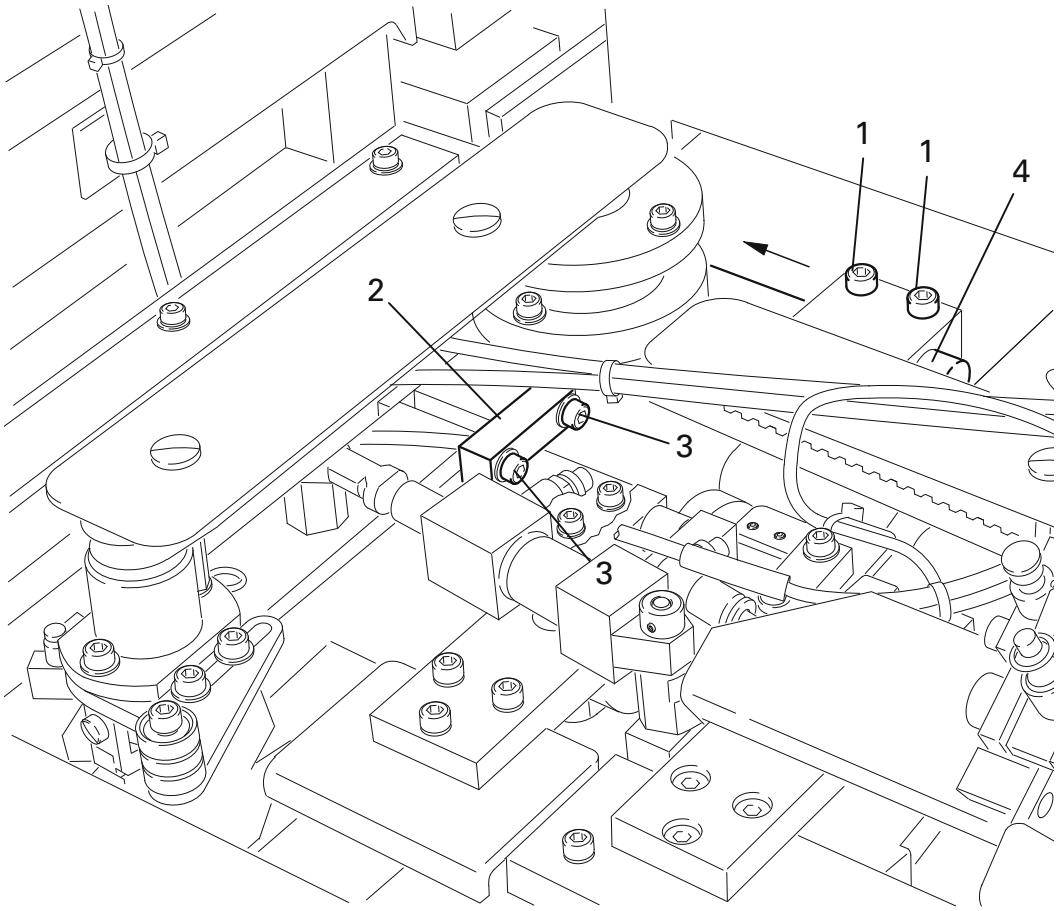


Fig. 13 - 34

- Loosen the screws **1.**
- Adjust the plate **2** (screw **3**) according to the **rule**.
- Press against the bar **4** in the direction of the arrow and tighten the screws **1.**

13.16.03 Changing the knife

Rule
The knife must be replaced when the cutting performance deteriorates.

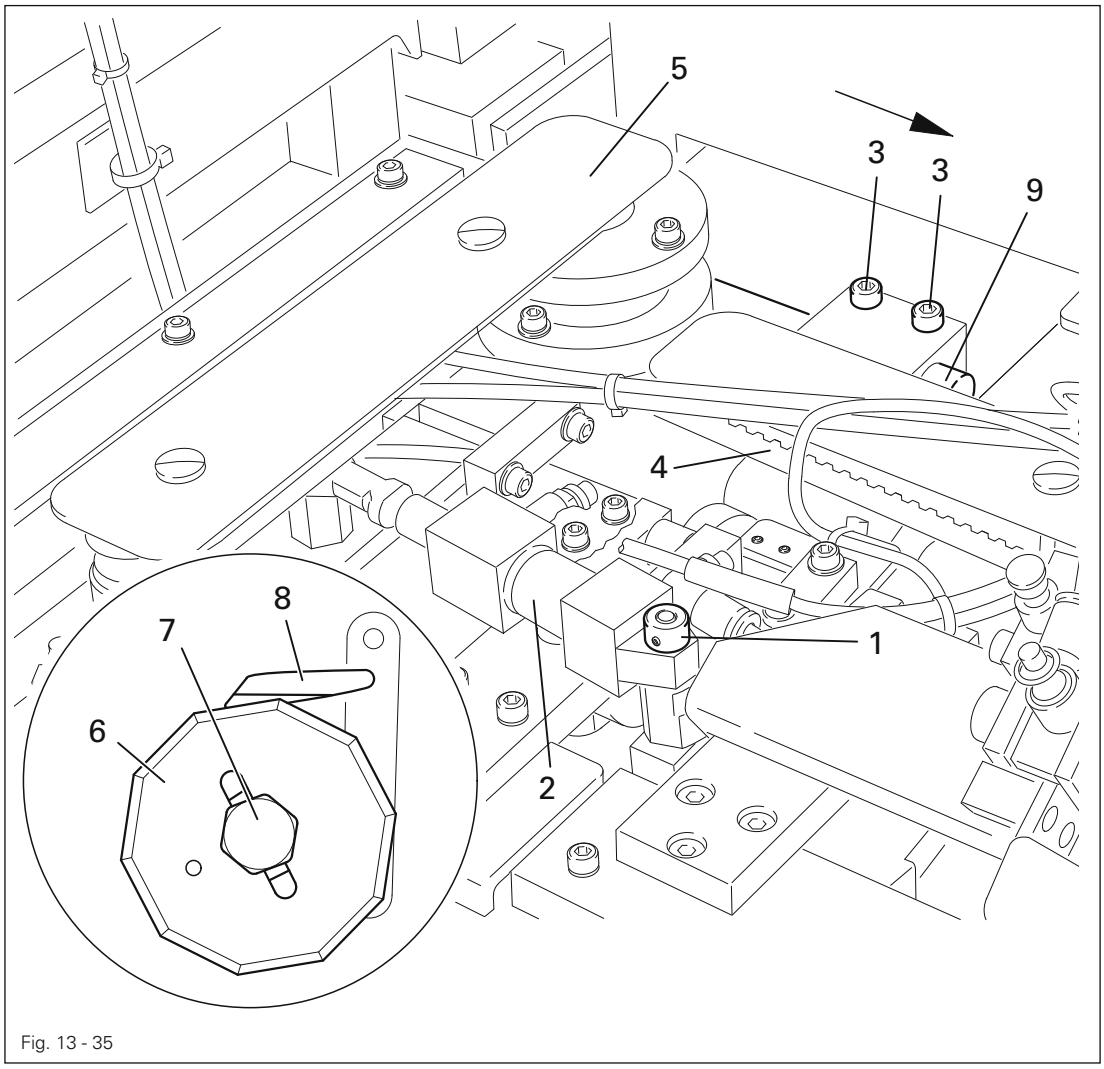


Fig. 13 - 35

- Open the tensioning lever on the loading clamp.
- Loosen the star knob screws and push the loading clamp in the direction of the arrow.
- Disassemble the retaining collar **1** and remove the cylinder **2.**
- Loosen the screws **3** and remove the toothed belt **4.**
- Pivot the knife unit **5** upwards.
- Replace the knife **6** (screw **7**) making sure that the largest diameter of the knife **6** does not touch the thread catcher **8.**
- If necessary, remove the thread catcher **8** and insert the support plate.
- Fit the toothed belt **4,** press against the bar **9** and tighten the screws **3.**
- Mount the cylinder **2** and fit the retaining collar **1.**
- Push the loading clamp back until it stops, close the tensioning lever and tighten the star knob screws.

13.17 Aligning the workholder bar

13.17.01 Zero point of the workholder bar

Rule

1. A gap of **5 mm** should be maintained between the front edge of the workholder bar and the needle midpoint.
2. A gap of approx. **0.5 mm** should be maintained between the rear edge of the workholder bar and the front edge of the presser foot.

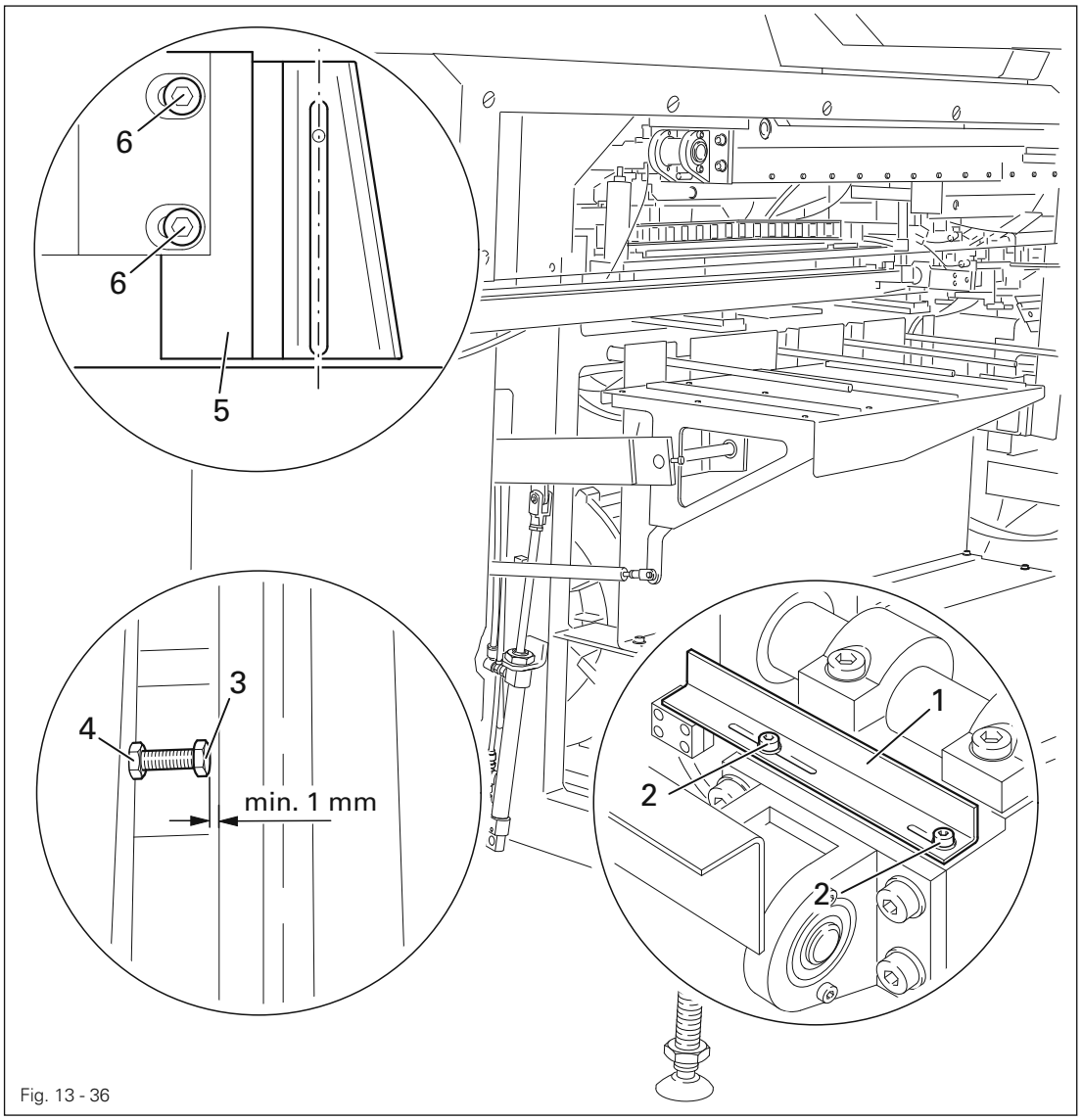


Fig. 13 - 36

- Adjust the angle bracket **1** (screws **2**) according to **rule 1.**
- Position the screw **3** (nut **4**) with a clearance of **1 mm** to the stop.
- Adjust the presser foot **5** (screws **6**) according to **rule 2** making sure that the needle punctures in the centre of the cutout.

13.17.02 Workholder bar stop

Rule
The lowered workholder bar must rest evenly over its entire length.

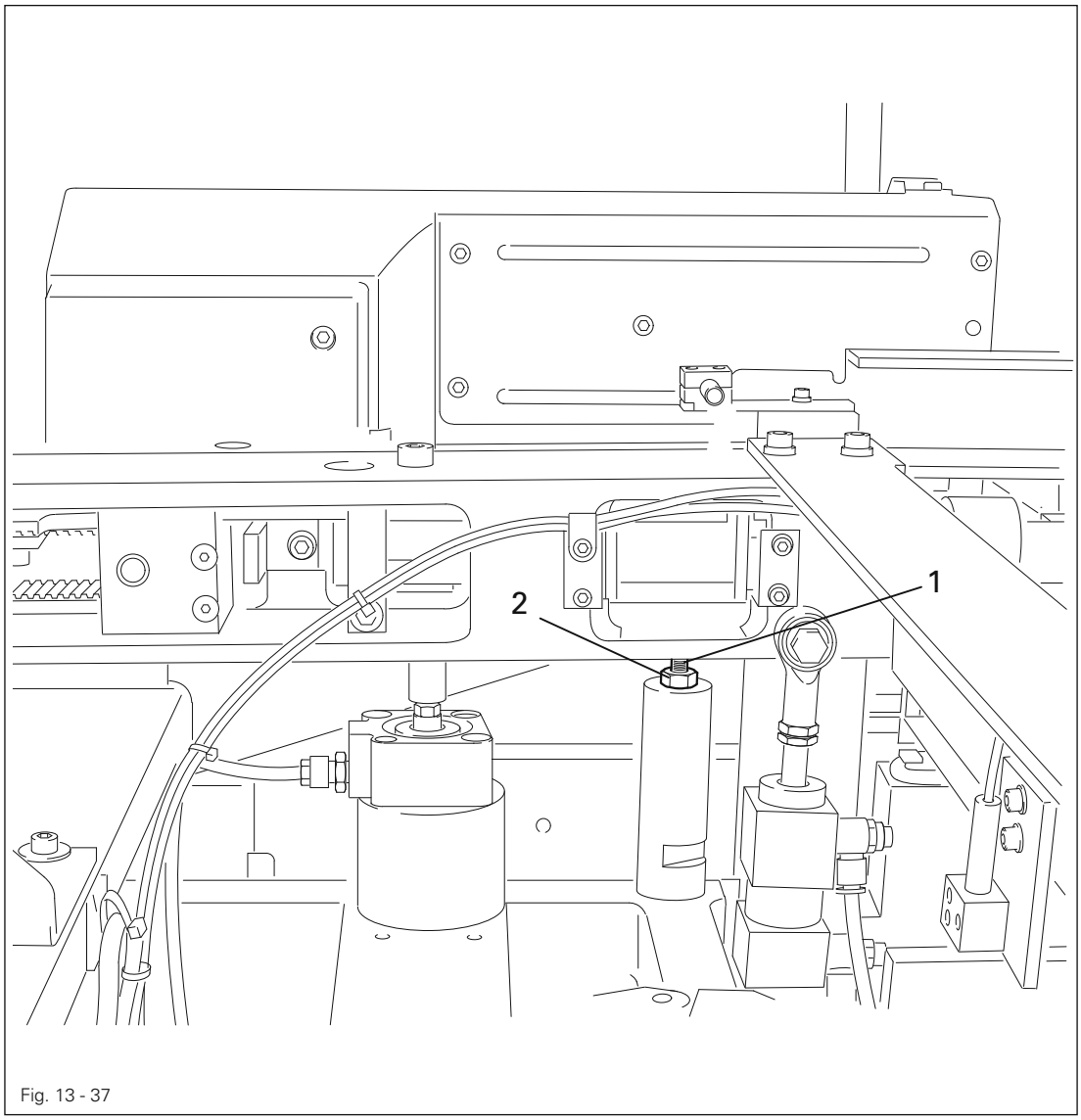
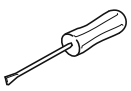


Fig. 13 - 37



- Turn screws **1** (nuts **2**) on **both sides** according to the **rule**.

13.18 Setting the pneumatic table pressure

Rule
The material should not move when the infeed table is extended.

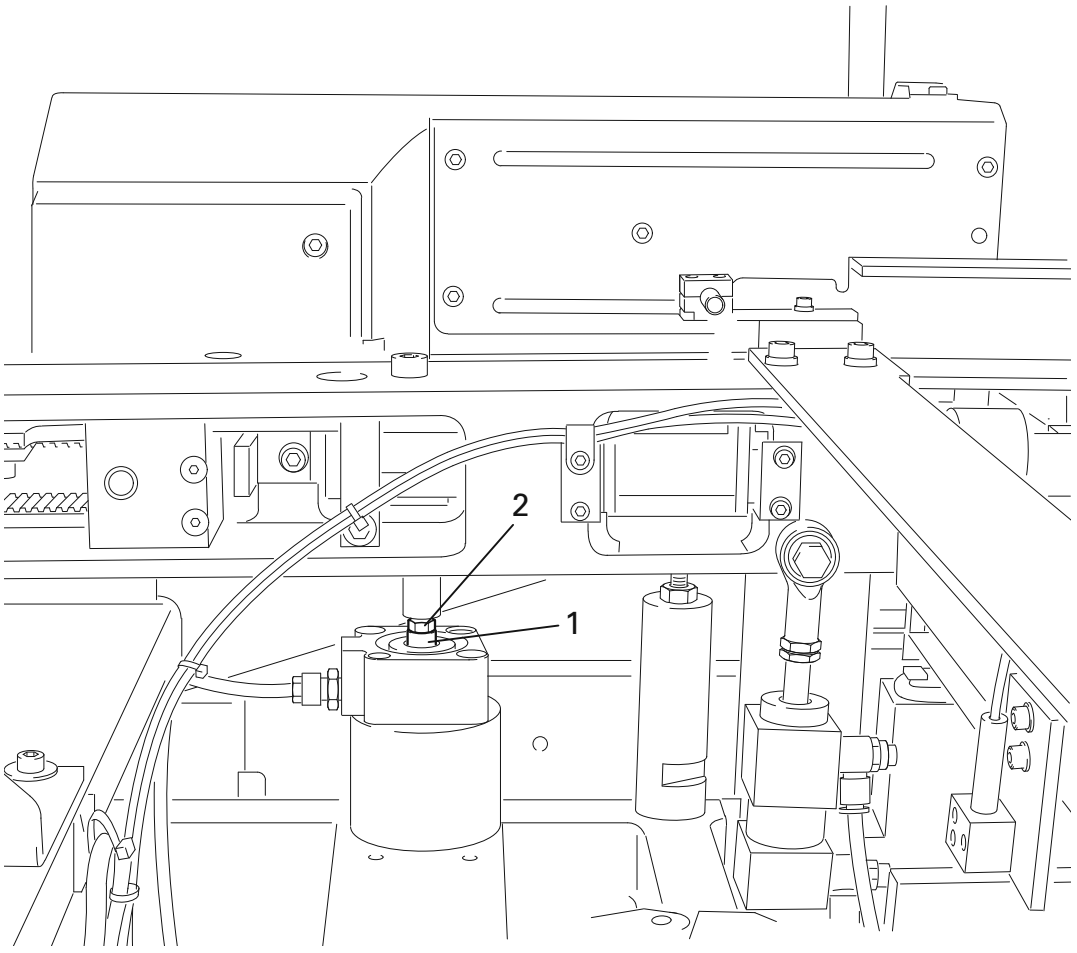


Fig. 13 - 38

- Turn the piston rod **1** (nut **2**) according to the **rule**.

13.19 Adjusting the pressure controller

Rule
The pressure controller should switch off the machine at a pressure of 4.5 bar.

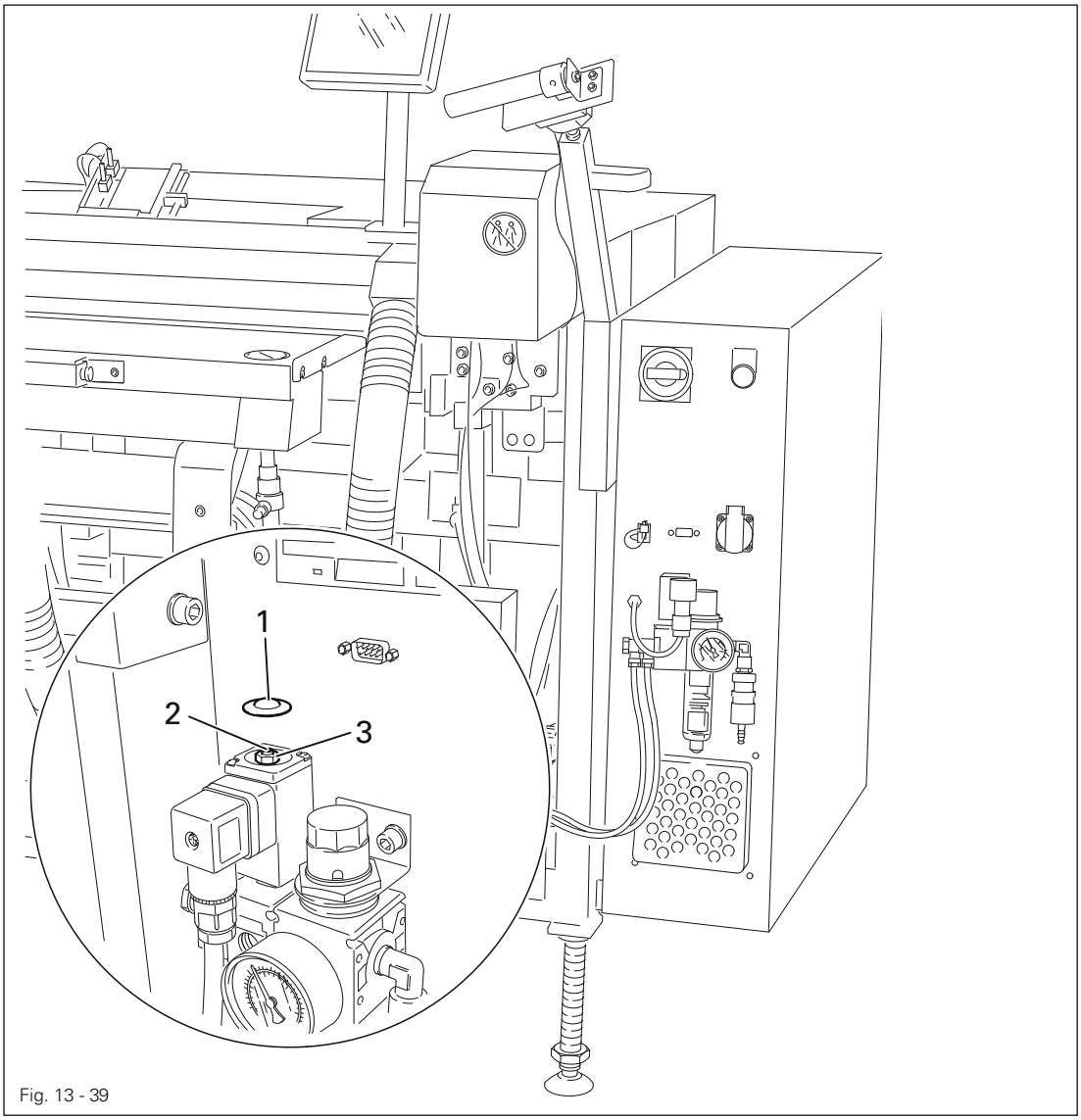
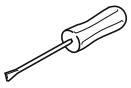


Fig. 13 - 39



- Remove the cover **1.**
- Turn the screw **2** (nut **3**) according to the **rule**.
- Fit the cover **1.**

13.20 Adjusting the stacker

Rule

1. The stacker support should move safely to its rear final position.
2. The stacker should move evenly and safely to its top position when loaded.

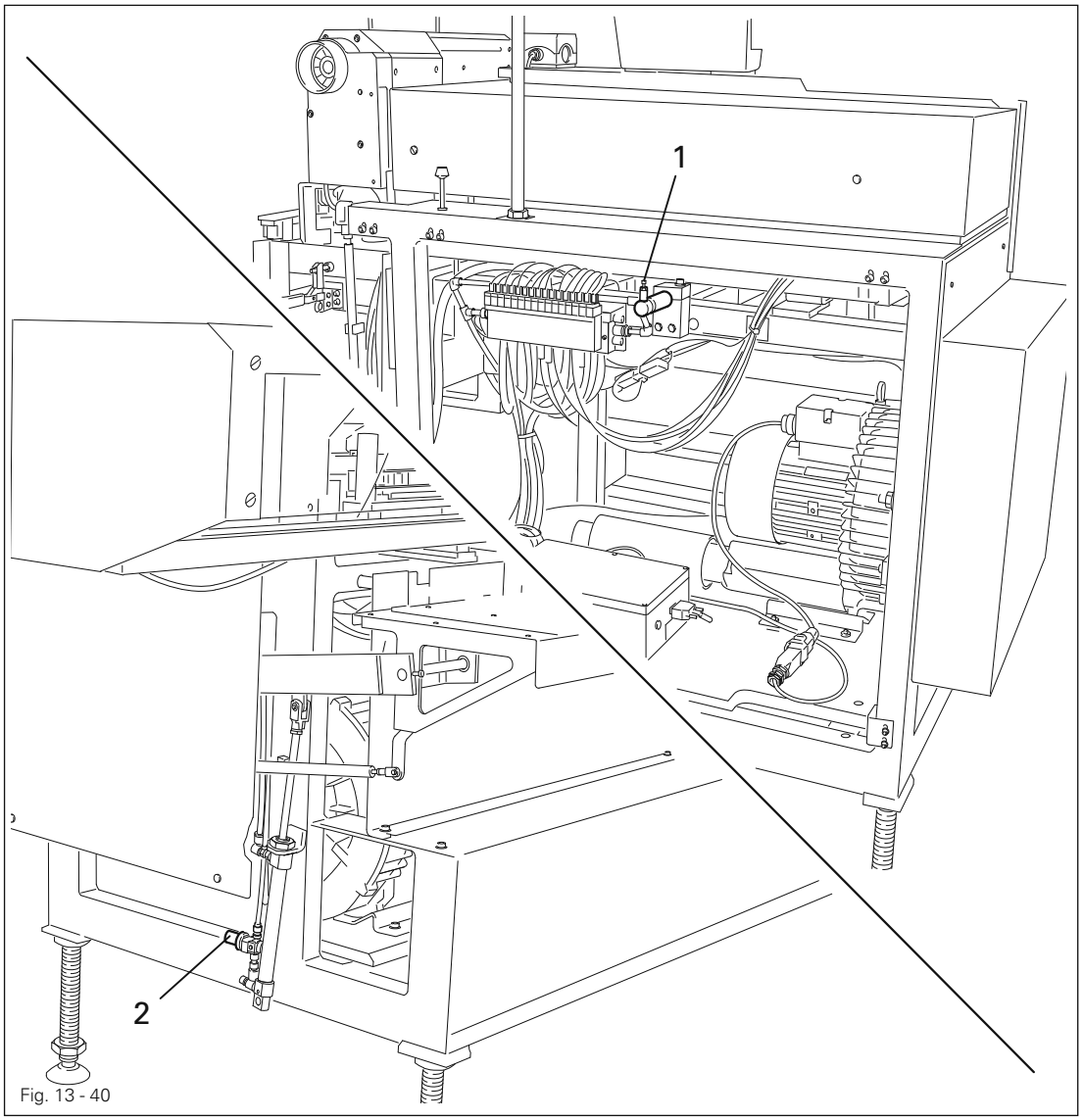
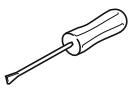


Fig. 13 - 40



- Adjust the throttle **1** according to **rule 1.**
- Adjust the pressure reducer **2** according to **rule 2.**

13.21 Adjusting the small parts stacker

Rule

1. The stacker should be adjusted so that the material is placed cleanly on the depositing table 1.

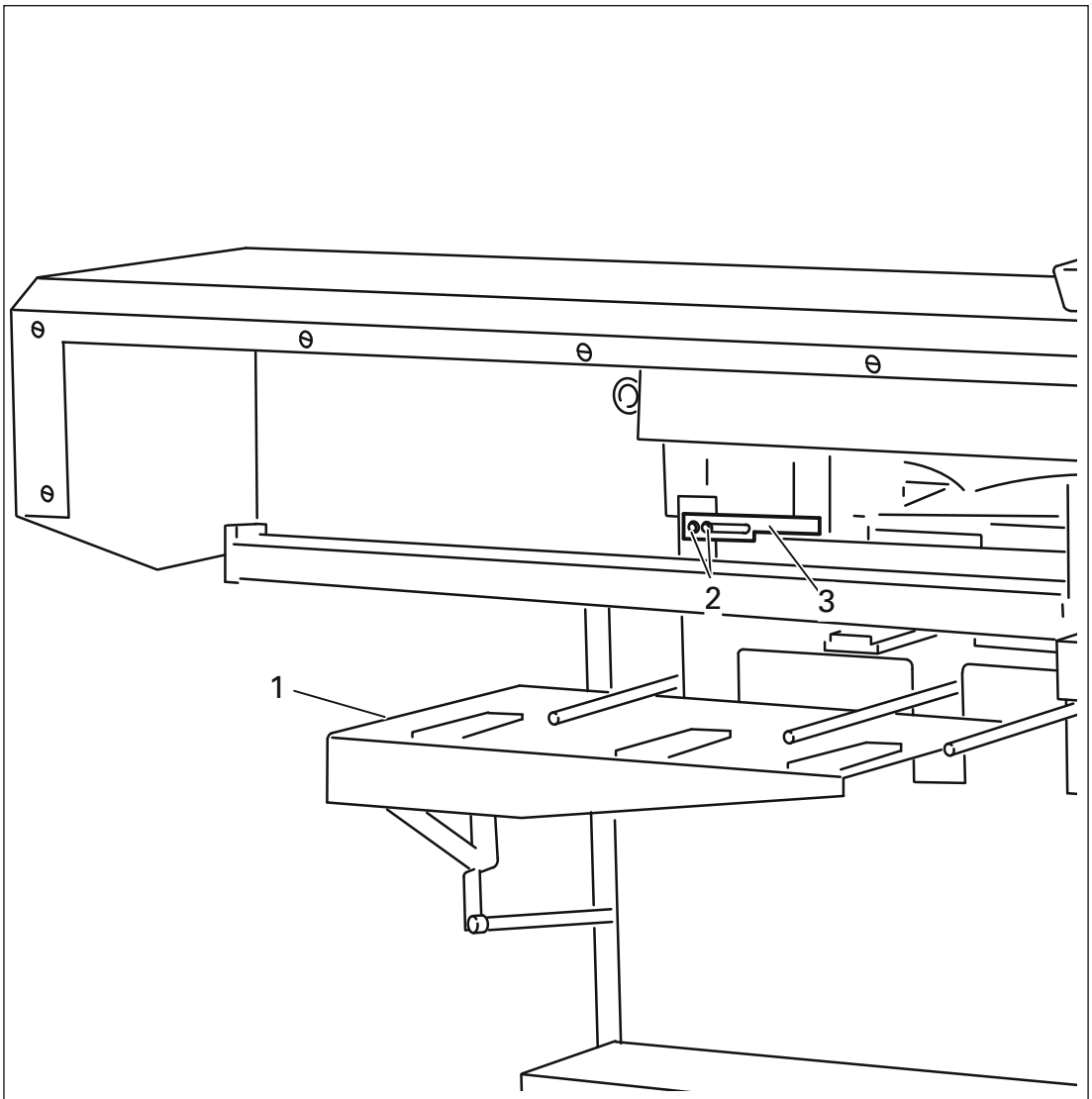
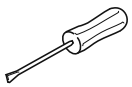


Fig. 13 - 41



- Open the screws **2.**
- Adjust the stop **3** according to the **rule**.
- Tighten the screws **2.**

13.22 Boot key

Fatal danger from electric voltage!

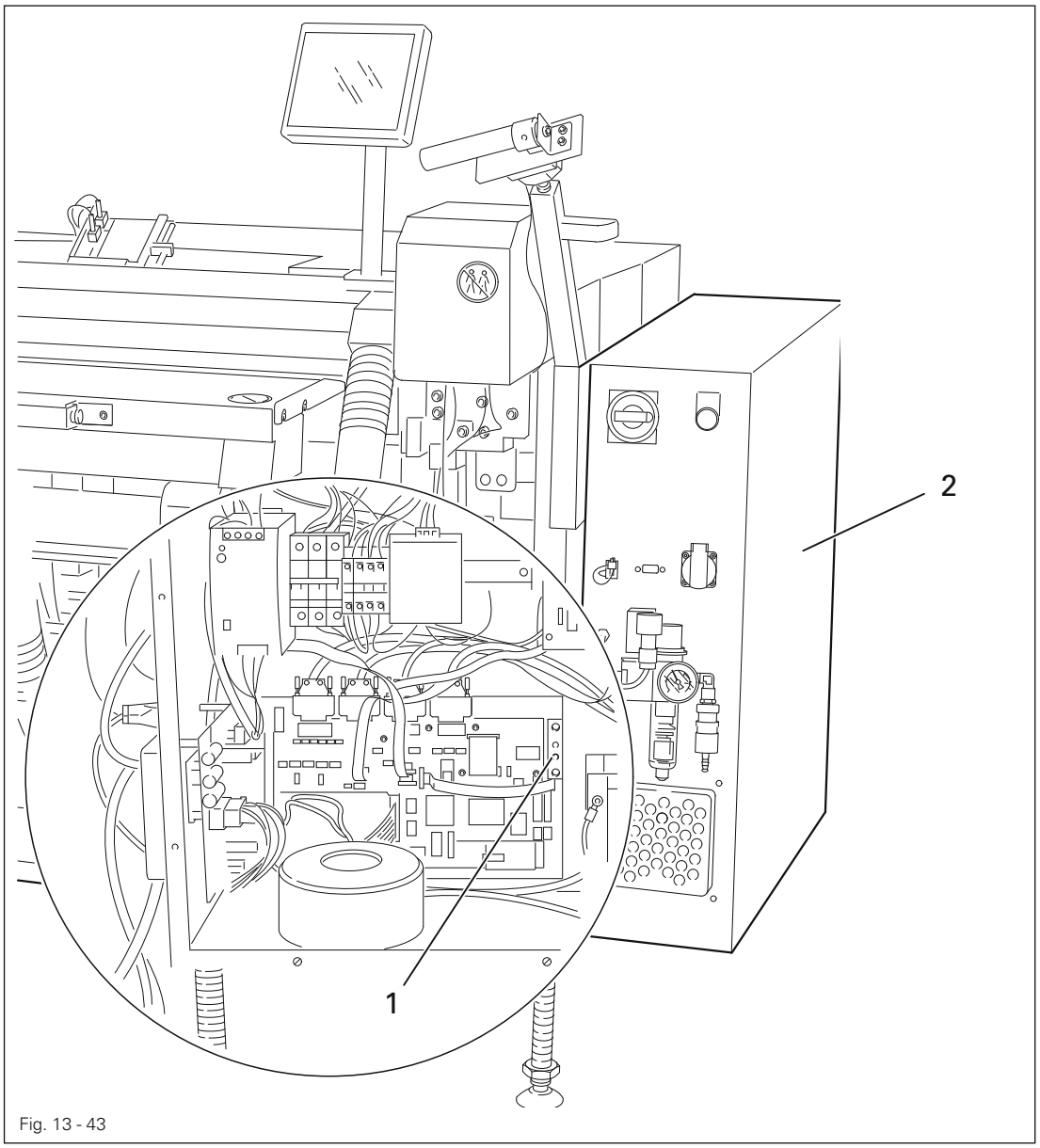


Fig. 13 - 43

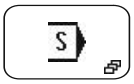
The boot key **1** in the control box **2** is used to boot-up the machine control unit, see **chapter 13.23.03 Loading / updating the operating program**.

13.23 Service menu

The status of the digital and analogue inputs are displayed in the service menu. The outputs can be set or reset manually. In addition, it is also possible to call up functions for carrying out a cold start, for the machine configuration, for loading the operating program and for setting the control panel.

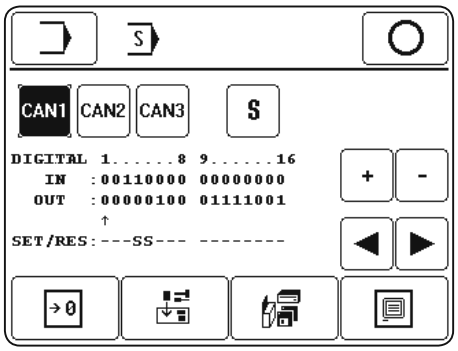
- Switch the machine on.

- Call up input mode.

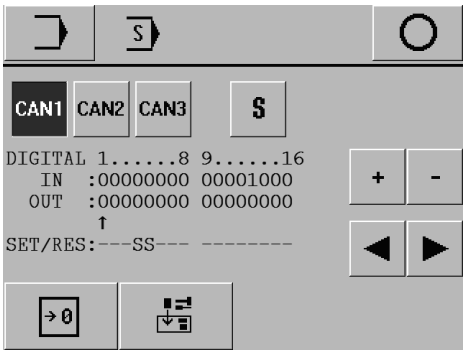


- Call up the service menu.

Control panel BDF T1



Control panel BDF P1



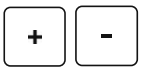
Description of the functions

Input mode
This function is used to change the initial status of input mode.

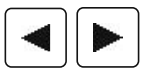
Conclude input
This function is used to conclude the input and the machine switches to sewing mode.

CAN nodes
This function is used to select the desired CAN node; the currently selected CAN node is shown inversely.

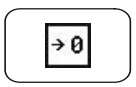
Special outputs
This function can be used to set or reset special outputs.



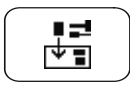
Plus/minus keys
These functions are used to set (+) or reset (-) the selected output.



Arrow keys
These functions are used to select the desired outputs.



Cold start
This function is used to perform a cold start, see **chapter 13.23.01 Cold start**.



Machine configuration
This function calls up a menu for configuring the machine, see **chapter 13.23.02 Machine configuration**.

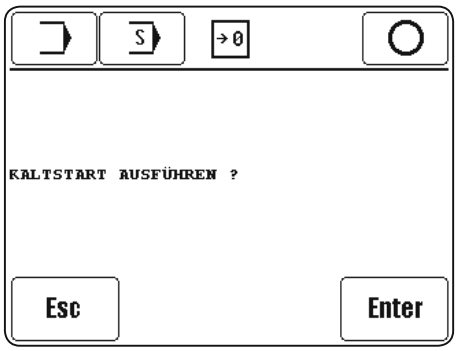
Loading the operating program (only on machines with the control panel BDF T1)
This function is used to load the machine operating program, see **chapter 13.23.03 Loading / updating the operating program**.

Control panel settings (only on machines with the control panel BDF T1)
This function is used to call up a menu for changing the display contrast and for switching the key tone on or off, see **chapter 8.04 Setting the control panel**.

13.23.01 Cold start

All newly created or modified programs as well as all changed parameter settings are deleted when performing a cold start!
The machine memory is deleted or reset to the factory setting.

- Switch on the machine and call up input mode.
- Call up the service menu.
- Call up cold start.



- Confirm “Perform a cold start”.

Description of further functions

Input mode
This function is used to change the initial status of input mode.

Service menu
This function is used to return to the service menu, see **chapter 13.23 Service menu**.

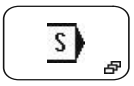
Conclude input
This function is used to conclude the input and the machine switches to sewing mode.

Esc
The input is interrupted.

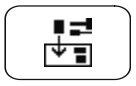
13.23.02 Machine configuration

The machine control unit receives the necessary information about the attached components with the machine configuration. Care must be taken to make the appropriate adjustments in the machine configuration if the machine components are changed.

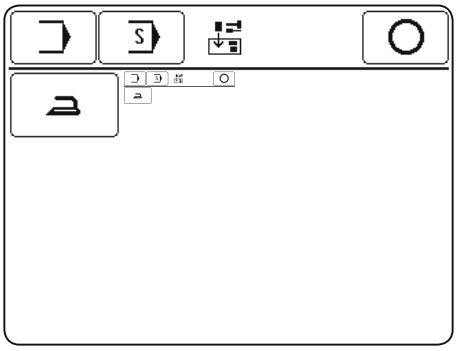
- Switch on the machine and call up input mode.



- Call up the service menu.

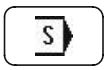


- Call up the menu for entering the machine configuration.



Description of the functions

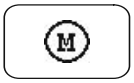
Input mode
This function is used to change the initial status of input mode.



Service menu
This function is used to return to the service menu, see **chapter 13.23 Service menu**.

Conclude input
This function is used to conclude the input and the machine switches to sewing mode.

Ironing compensation strip feeder
This function is used to enter whether the ironing compensation strip feeder option is or is not attached.



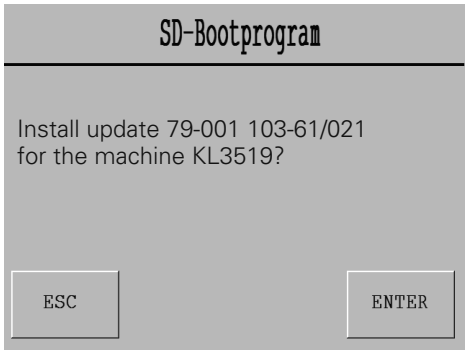
Vacuum motor
This function is used to enter whether the vacuum motor option is or is not attached.

13.23.03 Loading / updating the operating program

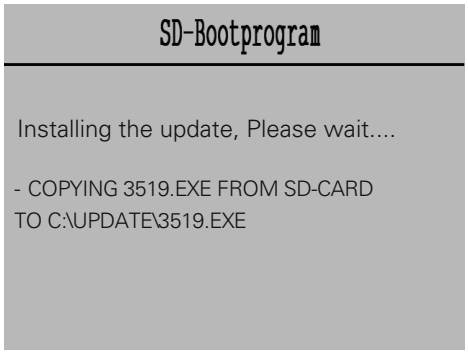
An SD card with the necessary boot files must be inserted in the SD card slot on the control panel when the machine is switched on in order to load the operating program.

All data in the machine memory is deleted when the operating program is loaded!

- Switch on the machine and press the “FORCE UPDATE” key.



- Press the “ENTER” key to start the boot process.



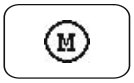
- The software is installed by pressing the “NEXT” key.

13.24 Sewing motor menu

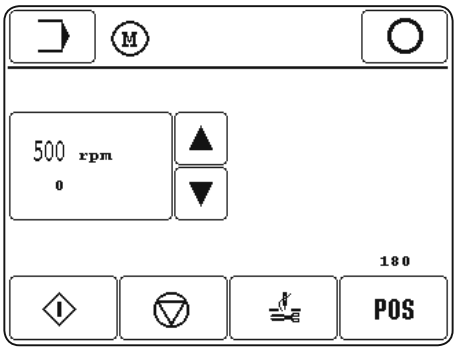
The sewing motor functions are tested and the needle position is set to t.d.c. in this menu.

- Switch the machine on.

- Call up input mode.



- Call up the sewing motor menu.



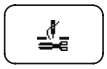
Description of the functions

Input mode
This function is used to change the initial status of input mode.

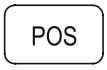
Conclude input
This function is used to conclude the input and the machine switches to sewing mode.

Sewing motor “start”
This function is used to start the sewing motor at the set speed.

Sewing motor "stop"
This function is used to stop the sewing motor again.



Thread trimming
This function is used to perform the thread trimming cycle.



Needle position
The current position of the needle is displayed.
To set the needle bar position to t.d.c., move the needle bar to the corresponding position by turning the handwheel and accept this position by pressing the “POS” key.

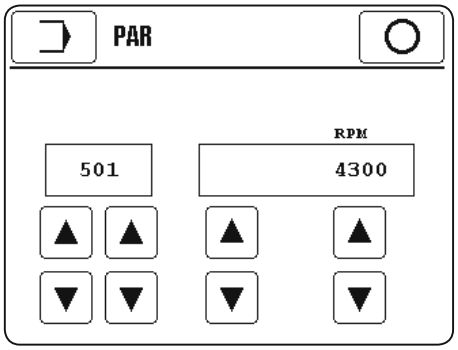
13.25 Parameter settings

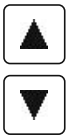
All adjustable parameters are listed in the list of parameters (chapter **13.25.02**). Parameter selection as well as changing the values is described below.

13.25.01 Selecting and changing parameters

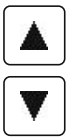
- Switch on the machine and call up input mode.

- Call up parameter input.





- Select parameters subdivided by group (in hundreds) and parameters within the function group.



- Change the value of the selected parameter.

- Exit parameter input.

13.25.02 List of parameters

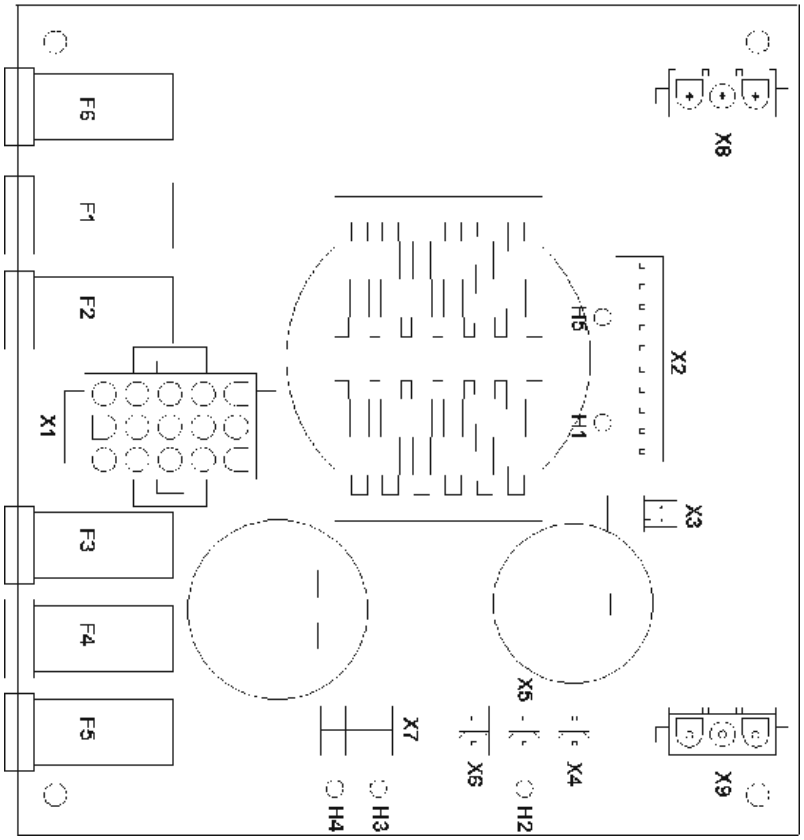
Group	Parameter	Description	Setting range	Set value
1	101	Bobbin thread monitor **0** = off, **1** = counter, **2** = sensor	0 - 2	**1**
	102	Bobbin thread counter	0 - 999	100
	103	Needle thread monitor	0 - 1	**1**
	104	Needle thread monitor hide stitches The number of stitches at which the needle thread monitor is not activated when sewing is changed.	0 - 99	5
	105	Needle thread / bobbin thread monitor reaction time The sensitivity of the needle thread monitor is changed (1= fastest reaction, max. sensitivity).	1 - 9	**1**
	106	Process without positioning tube	0 - 1	**0**
	107	Ironing compensation strip	0 - 1	**0**
	108	Sewing off	0 - 1	**0**
	109	Process without trimming	0 - 1	**0**
	110	Sewing stop in case of a needle thread malfunction	0 - 1	**0**
	111	Remaining piece count after activating the bobbin thread sensor	0 - 500	20
	112	Continuous run / test function	0 - 1	**0**
	113	Wiper 2 off on left part	0 - 1	**0**
	114	Material take-over 2 (switching in cycle)	0 - 1	**0**
	115	Automatic program number changeover when switching to the right / left Right = station key 0, left = station key 1	0 - 1	0
	116	Additional travel in the material clamp [0.1 mm]	100 - 500	100
	117	Switch on the vacuum table later	0 - 1	**0**
	118	Tact marking laser	ON - OFF	**1**
	119	Uniform material thickness for program groups	0 - 1	**0**
	120	Assigning the material thickness to a program group 0 = material thickness group 0 [in 0.1 mm] 1 = material thickness group 1 [in 0.1 mm]...etc.	0 - 30	**0**
	142	Key tone	0 - 1	**1**
2	201	Stitch length for start backtack; (1 = standard stitch length; 2 = 1/2 standard stitch length)	1 - 2	1
	202	Stitch count for start backtack	1 - 9	2

Group	Parameter	Description	Setting range	Set value
2	203	Stitch length for starting stitch condensation [0.1 mm]	10 - 30	12
	204	Stitch count for starting stitch condensation	1 - 9	5
	205	Stitch length for end stitch condensation [0.1 mm]	10 - 30	12
	206	Stitch count for end stitch condensation	1 - 9	4
	207	Angle seam end [°]	0 - 90	30
	208	Stitch count for angle seam end	1 - 9	5
	209	Stitch length [0.1 mm]	10 - 30	20
	210	Trimming stitch count	1 - 5	2
	211	Correction value **1** for starting point of X-coordinates [0.1 mm]	-100 - 800	0
	212	Correction value **2** for starting point of X-coordinates [0.1 mm]	-100 - 800	0
	213	Choice of starting point **0** = starting point **1** (param. **211**) **1** = starting point **2** (param. **212**)	**0 -1**	**0**
	214	Correction for last stitch [0.1 mm]	-10 - +10	0
3	301	NIS (carriage start) [°]	80 - 150	110
	302	Cover thread carrier t.d.c. [°]	80 - 90	82
	303	Thread trimming position [°]	160 - 360	200
	304	Reverse rotation position [°]	0 - Cover-thread carrier t.d.c.	17
	305	Thread tension position [°]	0 - 360	200
4	401	Holdoff time between “Table forwards” and “Table extension off” [0.01 s]	10 - 256	50
	402	Holdoff time "Stacker down" [0.01 s]	10 - 256	56
	403	Time when tacting the laser [0.01 s]	10 - 256	50
5	501	Maximum speed [min^{-1}]	500 - 4300	4300
	502	Backtack speed [min^{-1}]	500 - max. speed	max. speed
	503	Trimming speed [min^{-1}]	100 - 500	200
	504	Speed of the slow starting stitches [min^{-1}]	500 - 2000	1000
	505	Slow starting stitches	0 - 9	2

14 Control

14.01 Home position / diagnostics / pin assignment

14.01.01 Power supply A30



Voltage		Fuse		LED
Mains	230V AC	F6	(6,3 A T)	-
Processor	5V DC	F1	(2 A T)	H1
Control panel	18 V DC	F2	(500 mA T)	H5
I/O	24 V DC	F3	(2,5 A T)	H2
Stepping motor	80 V DC	F4	(6,3 A T)	H3
Stepping motor	24V DC	F5	(500 mA T)	H4

Plug connection

X1 (Secondary transformer)

PIN	Signal	PIN	Signal
3	V1 18 V AC 1	7	V4 57 V AC 1
9	V1 18 V AC M	13	V4 57 V AC M
6	V1 18 V AC 2	10	V4 57 V AC 2
12	V2 18 V AC	11	V5 18 V AC
15	V2 18 V AC	14	V5 18 V AC
2	V3 18 V AC 1	5	
4	V3 18 V AC M	8	
1	V3 18 V AC 2		

X2 (BS3)

PIN	Signal	PIN	Signal
1	GND 5 V	4	5 V
2	GND 5 V	5	5 V
3	GND 5 V	6	5 V
7	18 V AC	8	18 V AC
9	POWERF	10	V1 18 V

X2 (Blower), X4, X5, X6

PIN	Signal	PIN	Signal
1	24 V (I/O)	2	GND 24 V

X7 (SM-end phase)

PIN	Signal	PIN	Signal
1	24 V (SM)	4	GND 24 V (SM)
2	80 V (SM)	5	GND 80 V (SM)
3	80 V (SM)	6	GND 80 V (SM)

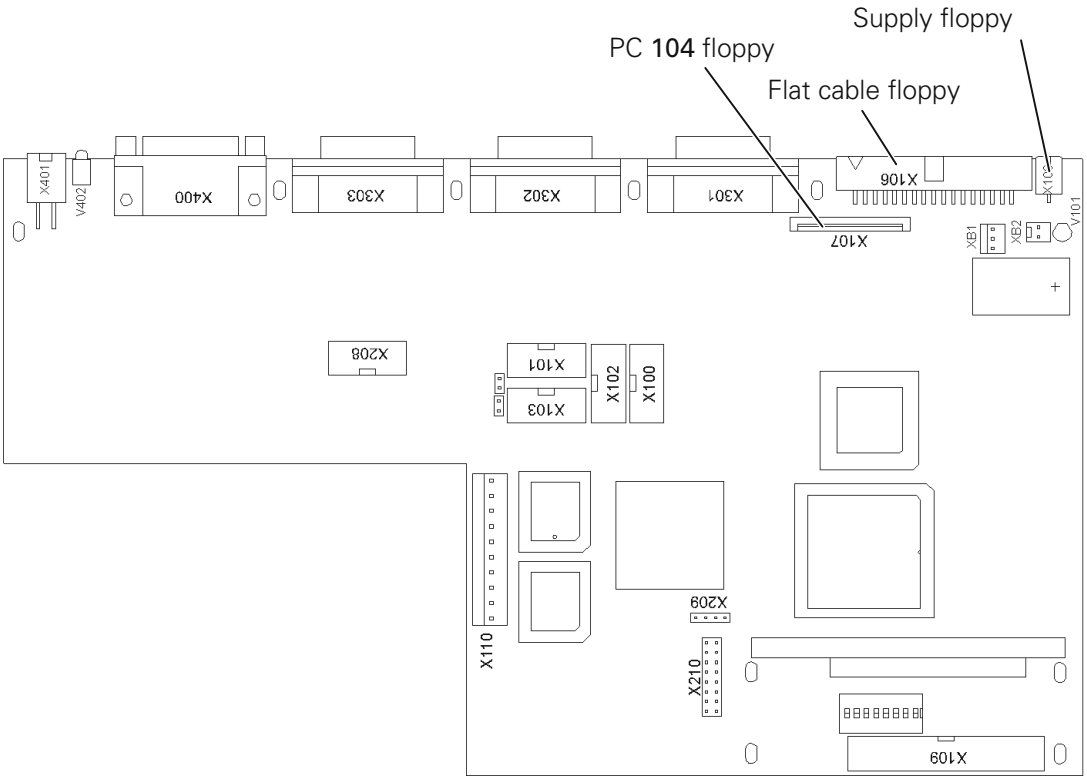
X8 (Mains)

PIN	Signal	PIN	Signal
1	PE	2	N
3	L1		

X9 (Primary transformer)

PIN	Signal	PIN	Signal
1	PE	2	N
3	L1		

14.01.02 Basic control unit A20



Plug connection

X103 (COM1)
X101 (COM2)

PIN	Signal	PIN	Signal
1	Vterm1	6	
2	RxD	7	RTS
3	TxD	8	CTS
4		9	Vterm2
5	GND		

X301 (X-axis / motor 1)
X302 (Y-axis / motor 2))

PIN	Signal	PIN	Signal
1	Pulse +	9	Pulse -
2	Direction +	10	Direction -
3	Gate/enable +	11	Gate/enable -
4	Current control +	12	Current control -
5	Vex +	13	Vex -
6			
7	Inp2 +	14	Inp2 -
8	Inp1 +	15	Inp1 -

X208 (CAN bus)

PIN	Signal	PIN	Signal
1	P8HA +	6	
2	P8HA -	7	
3	DoRi +	8	DoRi -
4	GND	9	GND
5			

X400 (Main drive)

PIN	Signal	PIN	Signal
1	Screening	14	A_A
2	TxD_A	15	A_B
3	RxD_A	16	B_A
4	TxD_B	17	B_B
5	RxD_B	18	I_A
6		19	I_B
7	GND	20	GND
8		21	A_OC
9	R1_A	22	B_OC
10	R1_B	23	I_OC
11	R2_A	24	V2
12	R2_B	25	GND
13	GND	26	Vex

X401 (Thread monitor)

PIN	Signal	PIN	Signal
1	+U_ULN	2	+U_ULN
3	POUT7	4	POUT8

14.01.03 Sewing drive A22

The sewing drive control unit is supplied from the factory with the necessary operating software already installed. This should only be replaced by the appropriate technical staff.

The "Power on" LED indicates that it is ready for operation. Diagnostic functions and fuses are not provided. Please refer to chapter **14.02.04 Sewing drive errors** when error messages appear on the machine display.

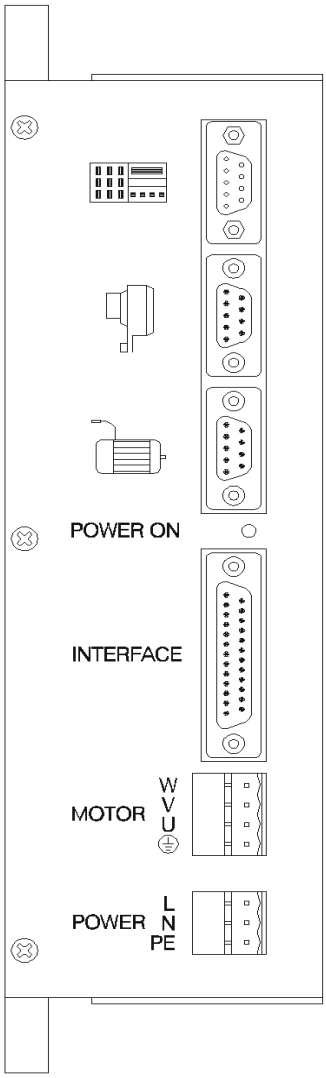
Plug connection

X2 (Position sensor)

PIN	Signal	PIN	Signal
1	KA	6	
2	KB	7	
3	KC	8	
4	ADTC2	9	GND
5	+ 5V		

X3 (Interface)

PIN	Signal	PIN	Signal
1	GND	14	A
2	TxD	15	A\
3	RxD	16	B
4	TxD\	17	B\
5	RxD\	18	Index
6		19	Index\
7	GND	20	
8		21	
9	REF1	22	
10	REF1\	23	
11	REF2	24	
12	REF2\	25	
13	GND	26	



X6 (Mains)

PIN	Signal	PIN	Signal
1	PE	2	N
3	L1		

X14 (Motor)

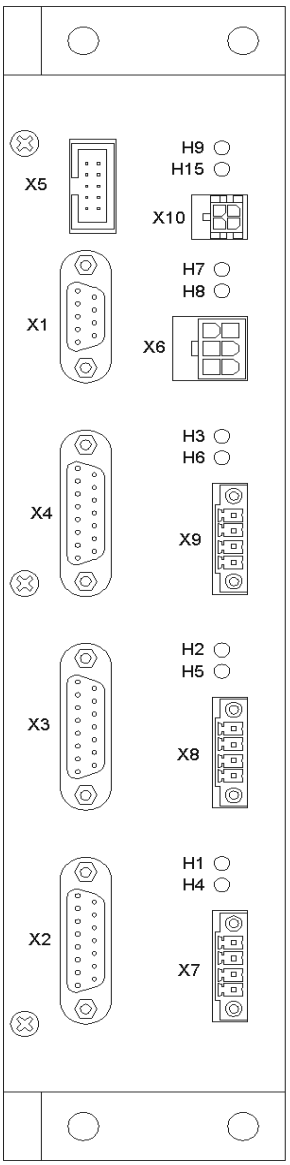
PIN	Signal	PIN	Signal
1	PE	3	V
2	U	4	W

14.01.04 Stepping motor drive

The stepping motor control unit has the following basic setting:
Motor **1:** **6** A, SIN **4**
Motor **2:** **6** A, SIN **4**
Current reduction **30%,** coupling of motor **1** and motor **2**
The settings are loaded. Software number: **79-001 358-91/002**

Please refer to chapter **14.02.05** Stepping motor drive errors for the LED status indicators.

Plug connection



X5 (Bootstrap)

PIN	Signal	PIN	Signal
1	GND	2	BOOTSTRAP
3	RESIN\	4	n.c.
5	TxD	6	RxD
7	12 Vin	8	Vpp processor
9	5 V	10	n.c.

X10 (Carriage monitoring)

PIN	Signal	PIN	Signal
1	12 V	3	GND
2	Switch	4	n.c.

X1 (CAN bus)

PIN	Signal	PIN	Signal
1		6	
2		7	
3	DoRi +	8	DoRi -
4	GND	9	GND
5			

X6 (Supply)

PIN	Signal	PIN	Signal
1	+24 VSM	4	GND 24 VSM
2	+80 VSM	5	GND 80 VSM
3	+80 VSM	6	GND 80 VSM

X2, X3, X4 (Control of motor 1 to 3)

PIN	Signal	PIN	Signal
1	Pulse +	9	Pulse -
2	Direction +	10	Direction -
3	Gate/enable +	11	Gate/enable -
4	Current control +	12	Current control -
5	n.c.	13	n.c.
6	n.c.	14	Output - (free)
7	Output + (free)	15	Ready -
8	Ready +		

X7, X8, X9 (Control of motor 1 to 3)

PIN	Signal
1	Winding 1
2	Winding 1
3	Winding 2
4	Winding 2

14.01.05 CAN nodes A10, A11, A12

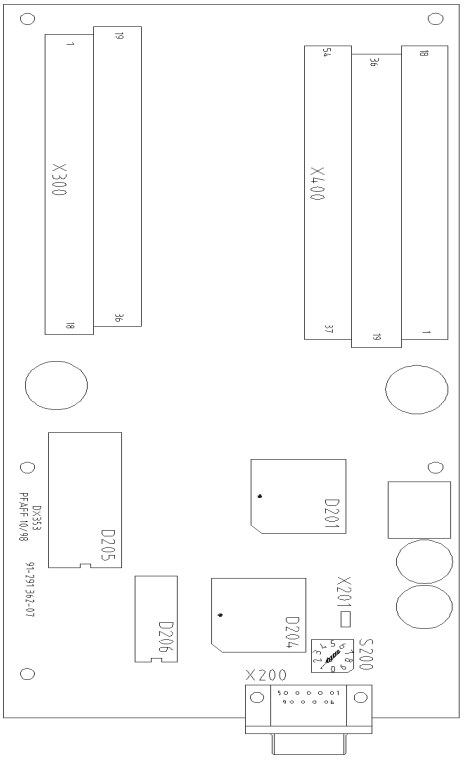
The CAN node has the following basic setting:

Address (**A 10** S200) = **1,** (**A 11** S200) = 2, (**A 12** S200) = 3

Plug connection

X300 (Outputs)

PIN	Signal	PIN	Signal
1	OUT2	19	GND
2	OUT1	20	GND
3	OUT4	21	GND
4	OUT3	22	GND
5	OUT6	23	GND
6	OUT5	24	GND
7	OUT8	25	GND
8	OUT7	26	GND
9	OUT10	27	GND
10	OUT9	28	GND
11	OUT12	29	GND
12	OUT11	30	GND
13	OUT14	31	GND
14	OUT13	32	GND
15	OUT16	33	GND
16	OUT15	34	GND
17			
18			



X300 (Inputs)

PIN	Signal	PIN	Signal	PIN	Signal
1		19			
2		20			
3	IN1	21	GND	39	24 V
4	IN2	22	GND	40	24 V
5	IN3	23	GND	41	24 V
6	IN4	24	GND	42	24 V
7	IN5	25	GND	43	24 V
8	IN6	26	GND	44	24 V
9	IN7	27	GND	45	24 V
10	IN8	28	GND	46	24 V
11	IN9	29	GND	47	24 V
12	IN10	30	GND	48	24 V
13	IN11	31	GND	49	24 V
14	IN12	32	GND	50	24 V
15	IN13	33	GND	51	24 V
16	IN14	34	GND	52	24 V
17	IN15	35	GND	53	24 V
18	IN16	36	GND	54	24 V

X200 CAN bus)

PIN	Signal	PIN	Signal
1	P8HA +	6	
2	P8HA -	7	
3	D0Ri +	8	DoRi -
4	GND	9	GND
5			

14.02 Explanation of error messages

14.02.01 General errors

Display	Description
ERROR: 3	Error in allocating the EMS memory
ERROR: 4	C167 is not reacting
ERROR: 5	Boot file (c167boot.bin) cannot be opened
ERROR: 6	Error in flash-programming
ERROR: 7	Error when opening a file
ERROR: 8	Battery
ERROR: 9	Firmware version conflict
ERROR: 10	CAN error (reset)
ERROR: 11	CAN error (number of nodes)
ERROR: 12	Main drive communication
ERROR: OPERATING DATA CHECK SUM (COLD START CARRIED OUT)	Operating data check sum
NEW OPERATING SOFT-WARE (COLD START CARRIED OUT)	New operating software
COLD START CARRIED OUT	Cold start
ERROR: 101	C167 error
ERROR: 102 (#Node no.) (status)	CAN error, status = Bit1 – node inactive, Bit 8 – short circuit,
ERROR: 103	End phase SmX
ERROR: 104	End phase SmY
ERROR: 105	Compressed air error
ERROR: 106	Material take-over open error
ERROR: 201 (#Sewing motor error)	Sewing motor error, see **chapter 14.02.04 Sewing motor errors**
ERROR: 202 (Cause)	Move locked
ERROR: 203 (Cause)	Move to zero point locked
ERROR: 204 (Cause)	Sewing locked
ERROR: 205 (Cause)	Level control function locked
ERROR: 210	Command byte of the NM interface was not free, command could not be issued
ERROR: 211	Coordinates outside the sewing area
ERROR: 212	Stitch length too large
ERROR: 213	Zero point not found

Display	Description
ERROR: 214	No carriage start NIS
ERROR: 215	Ramp not completed
ERROR: 216	Material does not reach the clamp
ERROR: 217	Needle thread malfunction
ERROR: 241 (#Sewing motor error)	Sewing motor error, see chapter 14.02.04 Sewing motor errors
ERROR: 242	Remove material
ERROR: 281	Remove material, material not in clamp
ERROR: 282	Stacker full
ERROR: 283	Needle thread malfunction
ERROR: 284	Bobbin thread malfunction
ERROR: 301	Program too large
ERROR: 302	Contradiction between progpar and progload
ERROR: 303	Flash read error or faulty program
ERROR: 304	Memory overrun
ERROR: 305	Invalid configuration
ERROR: 306	Needle zero point invalid
ERROR: 310	File not on source
ERROR: 311	Source read error, file cannot be opened
ERROR: 312	Target write error, file cannot be opened
ERROR: 313	Source read error
ERROR: 314	Target write error
ERROR: 315	File config. cannot be opened
ERROR: 316	Error when opening MDAT-file
ERROR: 317	Write error in MDAT-file
ERROR: 318	Machine data identification incorrect
ERROR: 319	Read error in MDAT-file
ERROR: 320	Program with incorrect machine class
ERROR: 321	Program with incorrect machine variant
ERROR: 322	Program with incorrect data set version
ERROR: 323	Incorrect program number
ERROR: 324	No carriage start, NIS
ERROR: 330 (#Stitch generation error) (#Program number)	Stitch generation error, see chapter 14.02.03 Stitch generation errors
ERROR: 341 (#Sewing motor error)	Sewing motor error, see chapter 14.02.04 Sewing motor errors
PROGRAM XX NOT IN MEMORY	Program XX does not exist

Display	Description
ERROR: 401	Text file cannot be opened
ERROR: 402	Error in read text file
ERROR: 403	Error when assigning memory space for the texts
ERROR: 501	Error when opening the file "pikto.hex" or "vorlagen.hex"
ERROR: 502	No ACK from control panel

14.02.02 CAN errors

Error byte	Description
bit7	End phase error (short circuit)
bit6	-
bit5	-
bit4	Receive status (wait for input object)
bit3	Transmit status (send output object)
bit2	Transmit status
bit1	Node time-out
bit0	Node active

14.02.03 Stitch generation

Display	Description
1	Start backtack too large
2	Start backtack too large
3	Starting stitch condensation too large
4	Incorrect bartack type
5	Bartack length > 6 mm
11	x-coord. > xsewing area_max
12	x-coord. < xsewing area_min
13	y-coord. > ysewing area_max
14	y-coord. < ysewing area_min
15	Bartack starting point is above L2 and ARSZ < 2

14.02.04 Sewing motor errors

Display	Description
1	Transmission error
2	Serial interface time-out
3	Checksum error in received data
4	Tme-out command
30h (48)	Time-out slave expired (command string incomplete)
31h (49)	Incorrect command code
32h (50)	Framing or parity error
33h (51)	Incorrect checksum
34h (52)	Wrong date for queries
35h (53)	No parameter can be programmed (motor running)
36h (54)	Parameter not available
37h (55)	Incorrect parameter value
38h (56)	EEPROM is programmed
39h (57)	Incorrect machine speed
3Ah (58)	Incorrect position
3Bh: (59)	Path for guided positioning too low
3Ch: (60)	No reset of the position counter possible (motor running)
3Dh: (61)	Turning to t.d.c. after power on not permitted
3Eh: (62)	SYMA not detected
3Fh: (63)	Target position < 3 incr. away from the counting position
40h - 4Fh -	
50h: (80)	Mains monitor (failure of 2 mains halfwaves)
51h: (81)	Power electronics malfunction during initialisation
52h: (82)	Short circuit in motor
53h: (83)	Mains voltage off detected
54h: (84)	Power electronics malfunction during operation
55h: (85)	No increments
56h: (86)	Motor blocked
57h: (87)	Commutation transmitter plug missing
58h: (88)	Incremental transmitter plug missing
59h: (89)	Faulty motor operation (nominal speed not attained)
5Ah: (90)	-
5Bh: (91)	Control algorithm locked
5Ch - 69h -	
6Ah: (106)	EEPROM cannot be programmed
6Bh: (107)	EEPROM missing
6Ch: (108)	Master reset performed
6Dh: (109)	-
6Eh: (110)	Residual path for path-controlled, guided delay ramp too short
6Fh: (111)	Slave has received 5 garbled messages in succession
70h: (112)	Deadman expired
71h - FFh -	

14.02.05 Stepping motor drive errors

It is possible to switch the stepping motor control unit to error mode if problems occur with the stepping motor drive during operation.
The error message is indicated by LEDs on the stepping motor control unit.

LED	Description
H 9 (red)	Excessive end phase temperature
H 15 (red)	End phase ready
H 7 (red)	80 V supply > 88 V
H 8 (red)	80 V supply < 36 V
H 3 (green)	Motor 3 ready
H 6 (red)	Excess current on motor 3
H 2 (green)	Motor 2 ready
H 5 (red)	Excess current on motor 2
H 1 (green)	Motor 1 ready
H 4 (red)	Excess current on motor 1

14.03 List of inputs and outputs

14.03.01 CAN node 1

Output	Description	Function	Comment
OUT1	Y1	Thread trimming on	Valve
OUT2	Y2	Positioning tube vacuum on	Valve
OUT3	Y3	Table vacuum on	Valve
OUT4	Y4	Workholder bar down	Valve
OUT5	Y5	Workholder bar up	Valve
OUT6	Y6	Work surface forwards	Valve
OUT7	Y7	Top clamp closed	Valve
OUT8	Y8	Disengage bottom clamp	Valve
OUT9	Y9	Clamp coupling on	Valve
OUT10	Y10	Clamp feed unit to the right	Valve
OUT11	Y11	Clamp feed unit to the left	Valve
OUT12	Y12	Stacker table up	Valve
OUT13	Y13	Needle thread tension closed	Valve
OUT14	Y14	Wiper 3 off	Valve
OUT15	Y15	Wiper 3 on (upwards)	Valve
OUT16	Y24	Vacuum reduction on	Valve

Input	Description	Function
IN1	E4	Workholder bar up
IN2	frei	Presser foot up
IN3	E6	Work surface forwards
IN4	E10	Clamp feed unit to the right
IN5	E10A	Clamp feed unit in the middle
IN6	E11	Clamp feed unit to the left
IN7	E12	Stacker table down
IN8	E15	Wiper 3 up
IN9	E50	X-axis home position
IN10	E51	Y-axis home position
IN11	E52	Needle thread malfunction
IN12	E53	Bobbin thread malfunction
IN13	E54	Material in clamp
IN14		
IN15		
IN16		

14.03.02 CAN node 2

Output	Description	Function	Comment
OUT1	K16	Trimmer on	Contactor
OUT2	Y17	Wiper 2 off	Valve
OUT3	Y23	Wiper 1 off	Valve
OUT4	bobres	Reset for bobbin thread monitor (active low)	Dig. signal
OUT5	Y18	Material take-over 1 closed	Valve
OUT6	Y19	Material take-over 2 closed	Valve
OUT7	Y20	Thread catcher back, engage station-ary knife	Valve
OUT8	Y21	Engage thread catcher	Valve
OUT9	Y22	Turn-up limit on	Valve
OUT10	Y40	Cutter down (ironing compensation strip) *** option ***	Valve
OUT11	Y41	Slide back (ironing compensation strip) *** option ***	Valve
OUT12	Y42	Slide up (ironing compensation strip) *** option ***	Valve
OUT13	Y43	Air blast (ironing compensation strip) *** option ***	Valve
OUT14	H13_14	Lamp double start keys	Lamps
OUT15	laser	Marking laser on	Dig. signal
OUT16			

Input	Description	Function
IN1	E18	Material take-over 1 open
IN2	E19	Material take-over 2 open
IN3	E40	Cutter up (ironing compensation strip) *** option ***
IN4	E41U1	Slide back (ironing compensation strip) *** option ***
IN5	E41U2	Slide forward (ironing compensation strip) *** option ***
IN6		
IN7	E55	Material take-over retracted
IN8	E56	Material take-over closed
IN9	E57	Compressed air is okay
IN10	E58	Vacuum foot switch
IN11	E59	Key switch
IN12	E60	Double start key 1
IN13	E61	Double start key 2
IN14		
IN15		
IN16		

14.03.03 CAN node 3

Output	Description	Function	Comment
OUT1	Y27U1	Positioning tube cylinder 1 down (vertical)	Impulse valve
OUT2	Y27U2	Positioning tube cylinder 1 up (vertical)	Impulse valve
OUT3	Y28U1	Positioning tube cylinder 2 down (vertical)	Impulse valve
OUT4	Y28U2	Positioning tube cylinder 2 up (vertical)	Impulse valve
OUT5	Y29U1	Infeed table lift 1 back	Impulse valve
OUT6	Y29U2	Infeed table lift 1 forwards	Impulse valve
OUT7	Y30U1	Infeed table lift 2 end positions	Impulse valve
OUT8	Y30U2	Infeed table lift 2 special position	Impulse valve
OUT9	Y31U1	Positioning tube cylinder 1 back (horizontal)	Impulse valve
OUT10	Y31U2	Positioning tube cylinder 1 forwards (horizontal)	Impulse valve
OUT11	Y32U1	Positioning tube cylinder 2 back (horizontal)	Impulse valve
OUT12	Y32U2	Positioning tube cylinder 2 forwards (horizontal)	Impulse valve
OUT13	Y33	Needles forwards	Valve
OUT14	Y34	Turn-up at back	Valve
OUT15	Y35	Infeed table extension on	Valve
OUT16	Y36	Spreader forwards	Valve

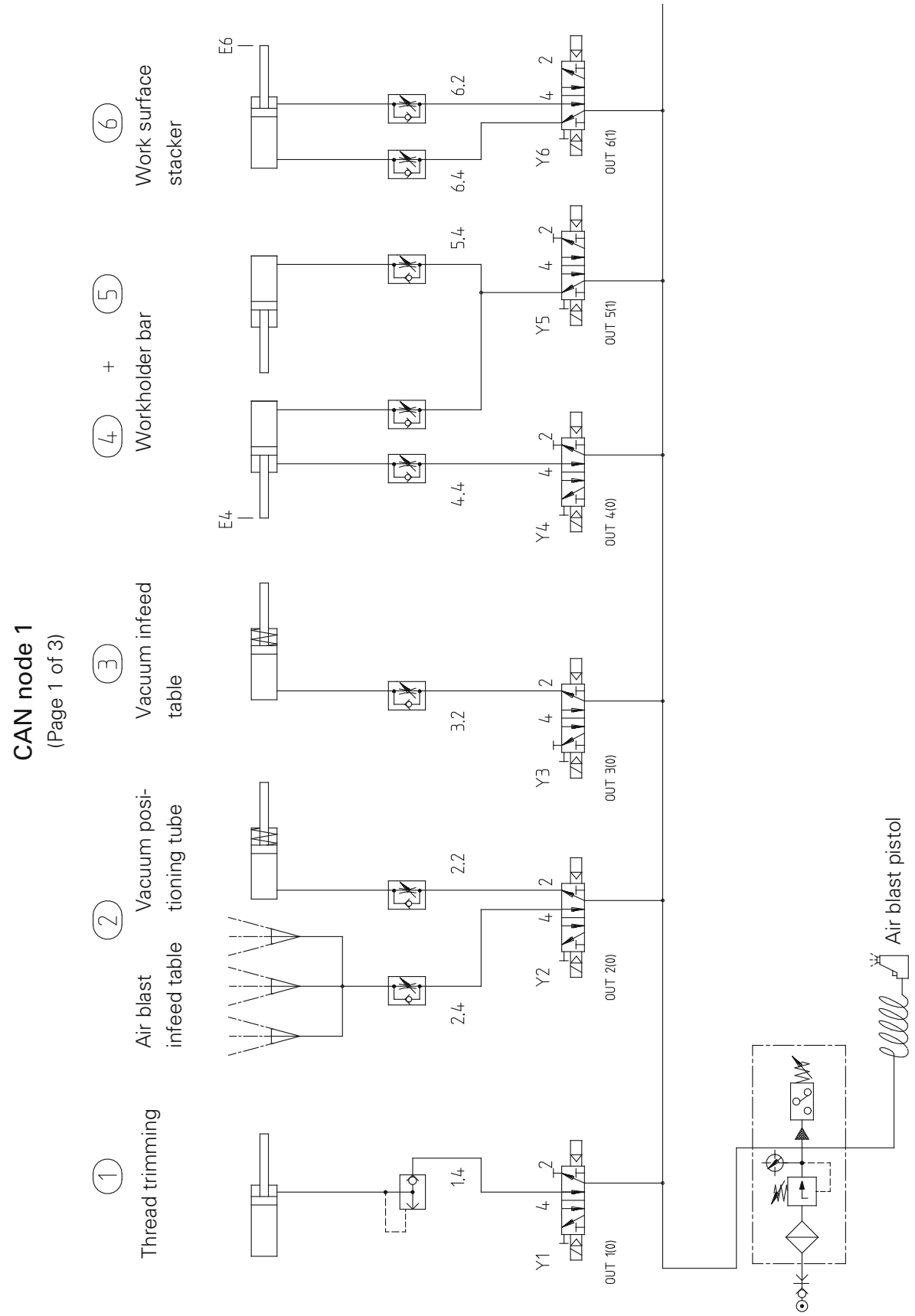
Input	Description	Function
IN1	E27U1	Positioning tube down
IN2	E27U2	Positioning tube up
IN3	E28	Positioning tube in the middle (vertical)
IN4	E29U1	Infeed table lift1 back
IN5	E29U2	Infeed table lift 1 forwards
IN6	E31U1	Positioning tube back
IN7	E31U2	Positioning tube forwards
IN8	E32	Positioning tube in the middle (horizontal)
IN9	E33	Needles back
IN10	E34U1	Turn-up at back
IN11	E34U2	Turn-up at front
IN12	E36	Spreader back
IN13		
IN14	E38	Workholder bar table position
IN15		
IN16		

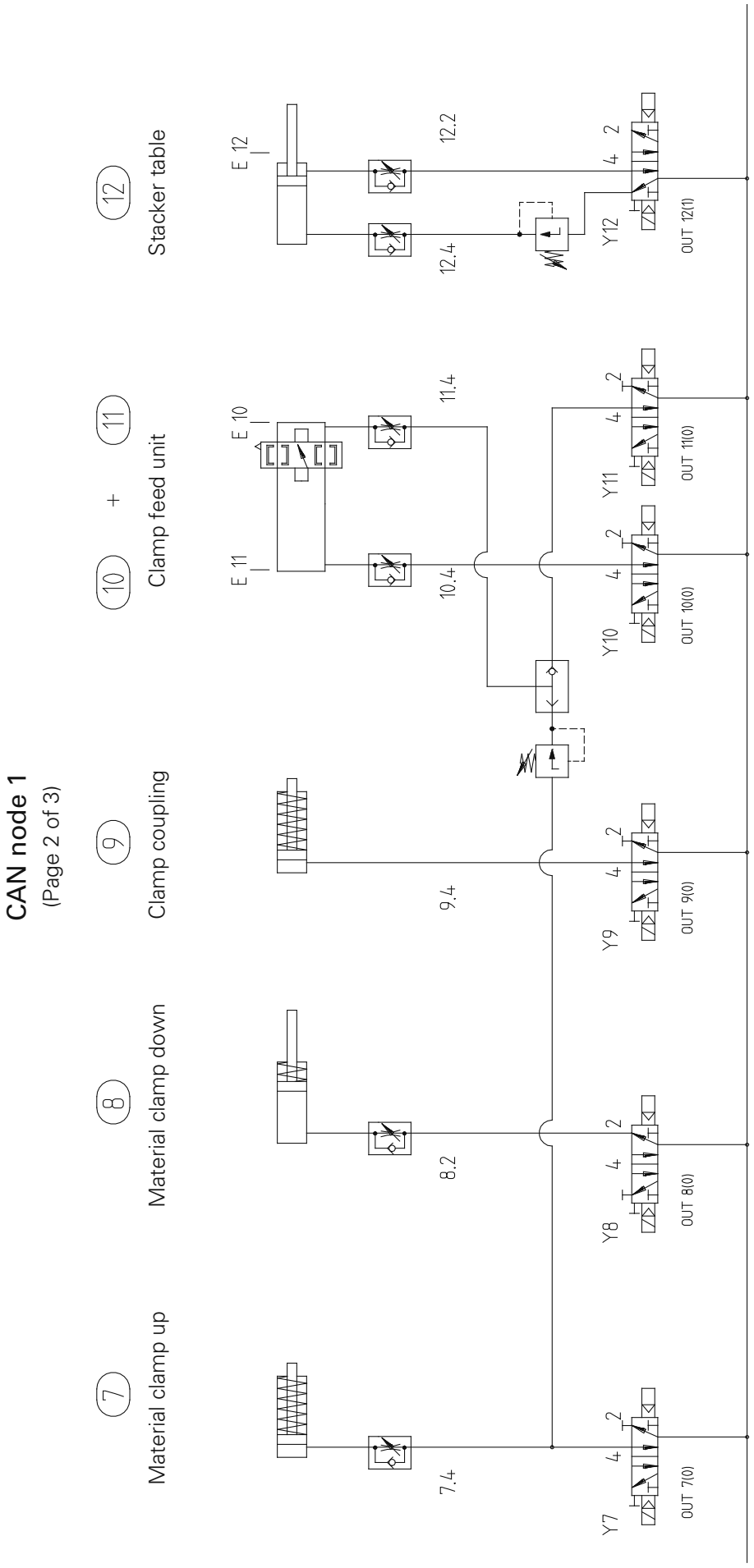
14.03.04 Special outputs

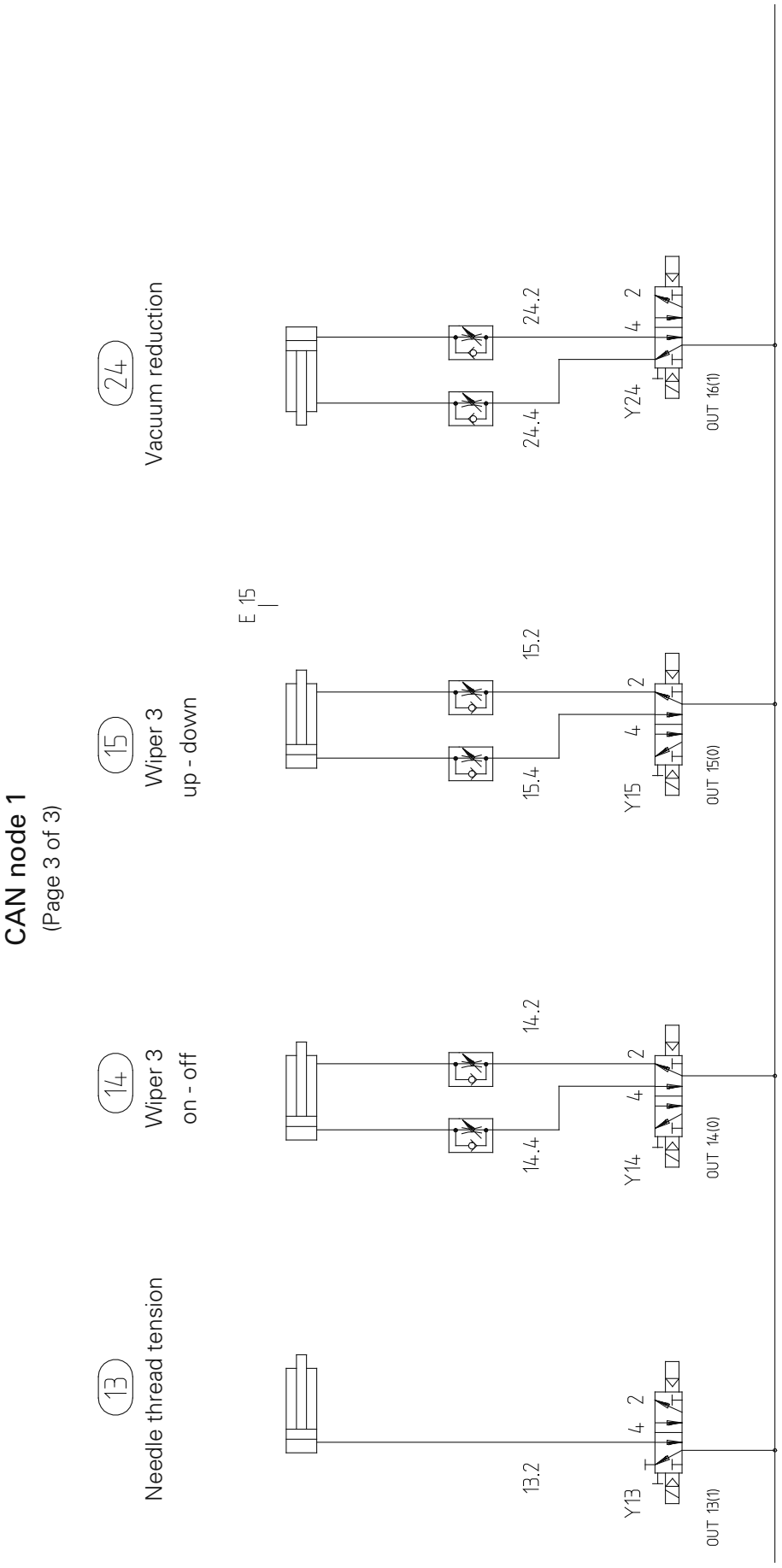
Description	Function	Comment
S1	Positioning tube down	
S2	Positioning tube up	
S3	Positioning tube in the middle, vertical	
S4	Infeed table back	
S5	Infeed table forwards	
S6	Infeed table special position	
S7	Positioning tube back	
S8	Positioning tube forwards	
S9	Positioning tube in the middle, horizontal	
S10	Workholder bar down, depressurised	
S11	Workholder bar down, pressurised	
S12	Workholder bar up	

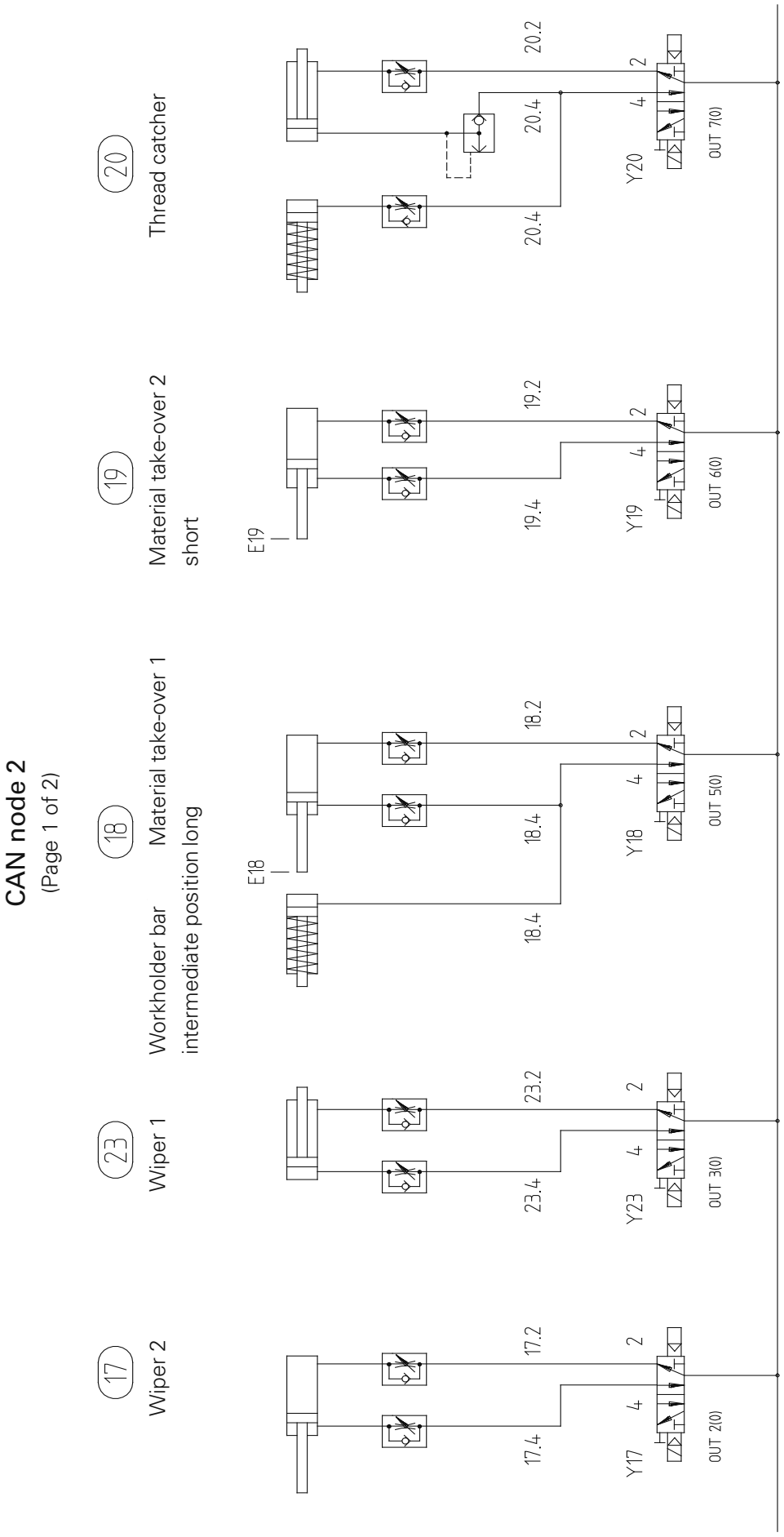
15 Pneumatic Circuit Diagram

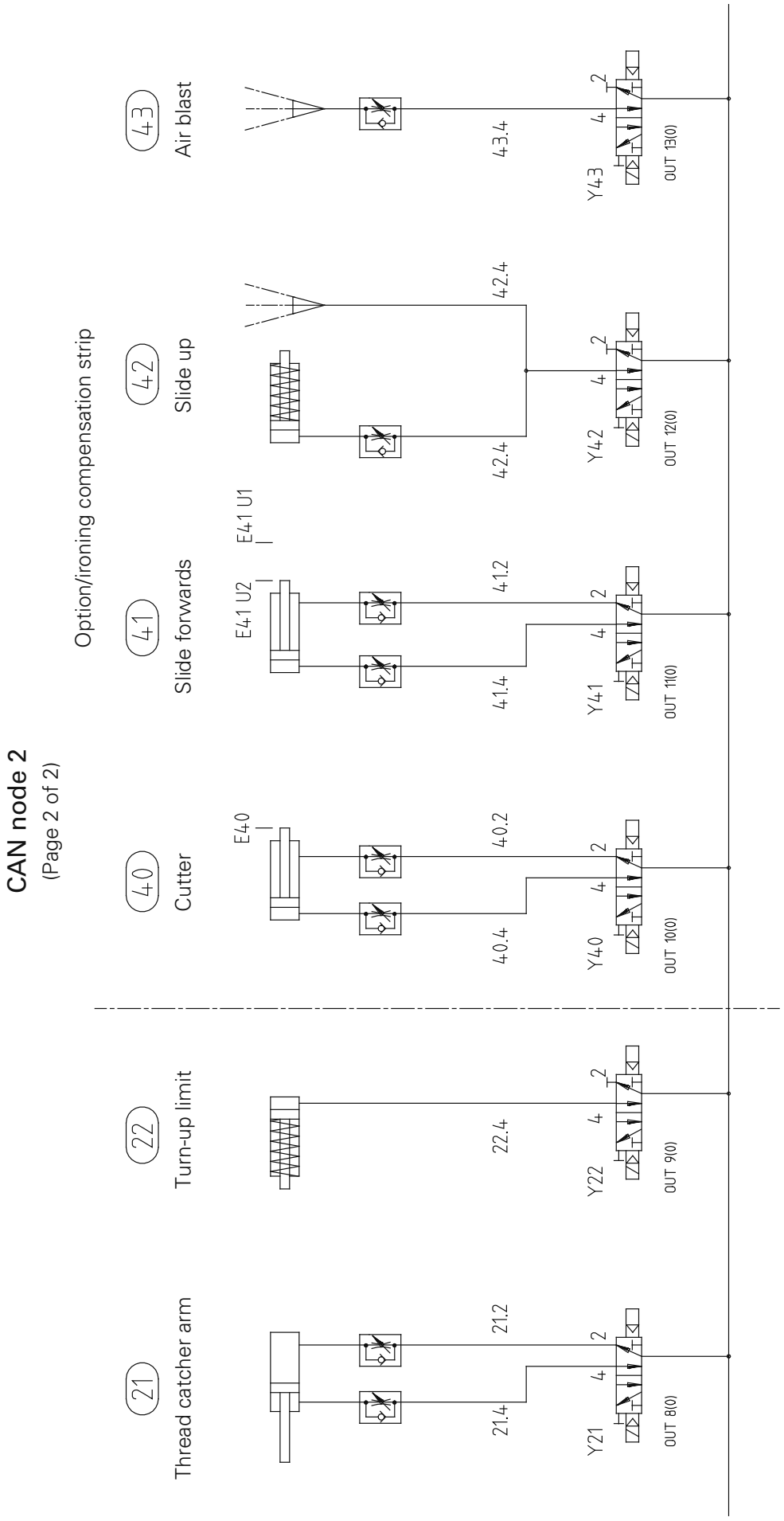
The pneumatic diagram is drawn in the machine's home position. The power (air and electricity) is connected. The components are in a fixed state.

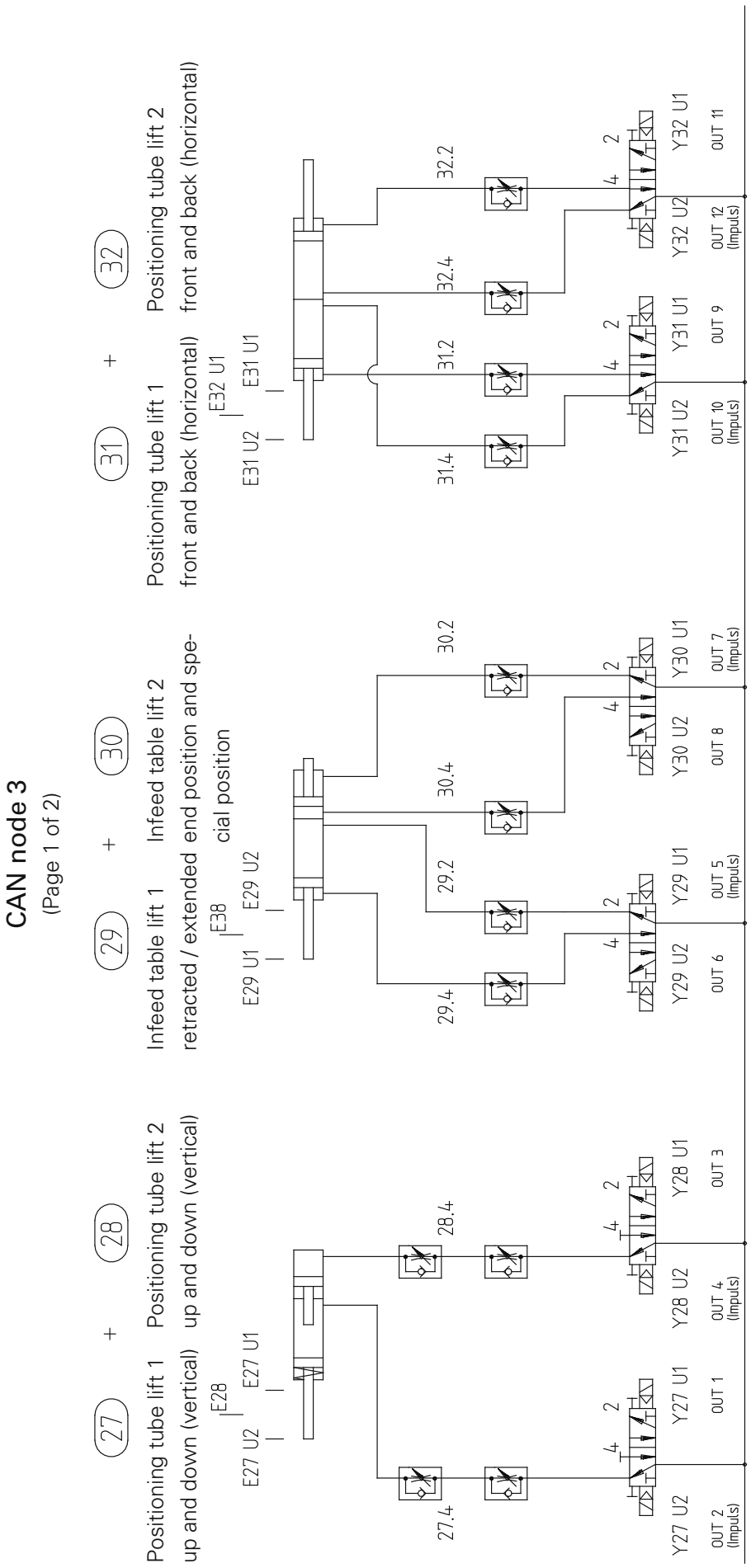


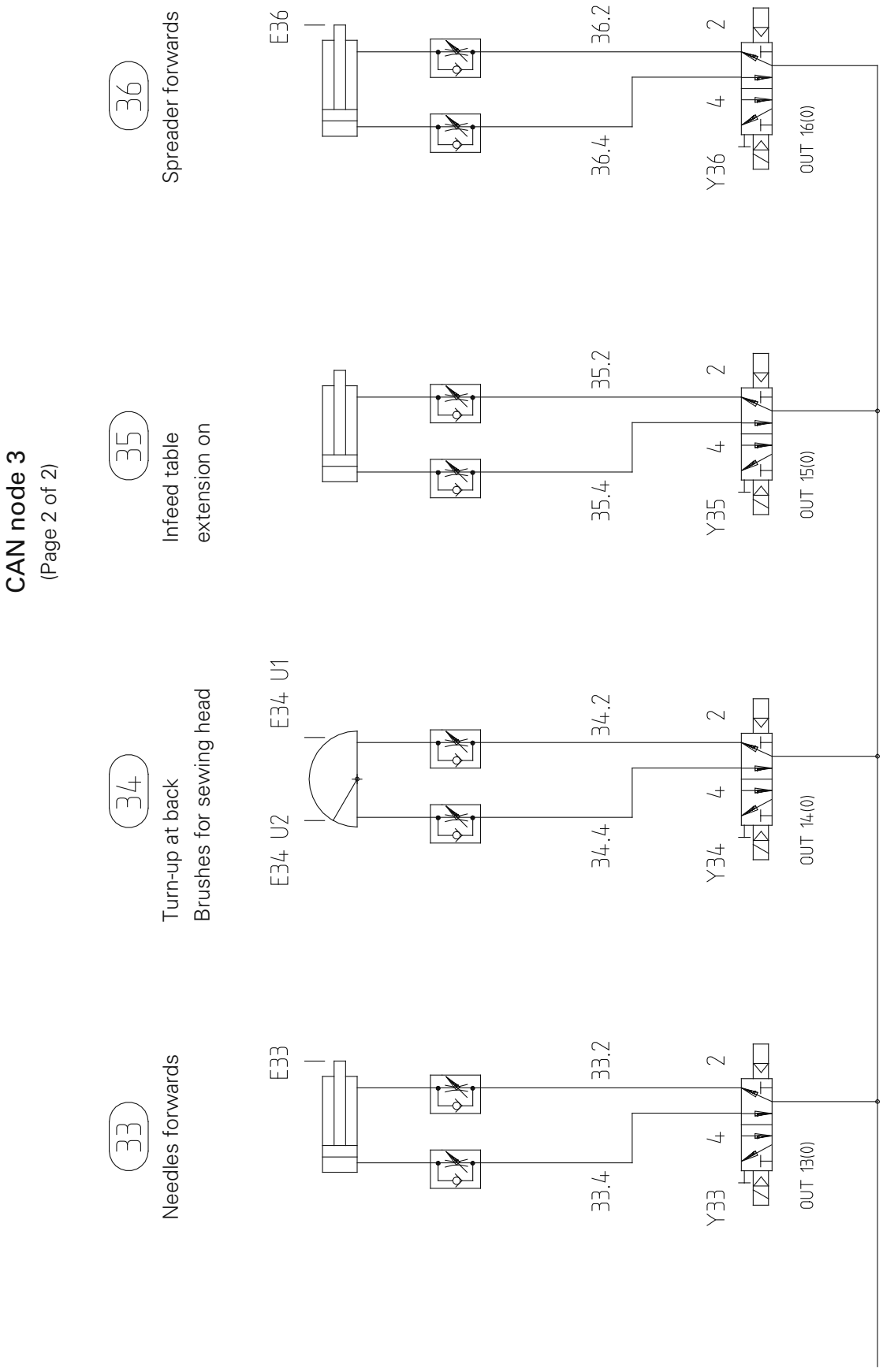

CAN node 1
(Page 2 of 3)
7
Material clamp up
8
Material clamp down
9
Clamp coupling
10
+
11
Clamp feed unit
12
Stacker table
E 12
E 10
E 11
12.2
12.4
11.4
10.4
9.4
8.2
7.4
Y12
Y11
Y10
Y9
Y8
Y7
OUT 12(1)
OUT 11(0)
OUT 10(0)
OUT 9(0)
OUT 8(0)
OUT 7(0)


CAN node 1
(Page 3 of 3)
13
Needle thread tension
14
Wiper 3
on - off
15
Wiper 3
up - down
24
Vacuum reduction
E 15
13.2
14.2
14.4
15.2
15.4
24.2
24.4
Y13
Y14
Y15
Y24
OUT 13(1)
OUT 14(0)
OUT 15(0)
OUT 16(1)


CAN node 2
(Page 1 of 2)
17
Wiper 2
23
Wiper 1
18
Workholder bar intermediate position long
Material take-over 1
19
Material take-over 2 short
20
Thread catcher
E18
E19
Y17
Y23
Y18
Y19
Y20
OUT 2(0)
OUT 3(0)
OUT 5(0)
OUT 6(0)
OUT 7(0)
17.2
17.4
23.2
23.4
18.2
18.4
19.2
19.4
20.2
20.4
2
4


CAN node 2
(Page 2 of 2)
Option/ironing compensation strip
21
Thread catcher arm
22
Turn-up limit
40
Cutter
41
Slide forwards
42
Slide up
43
Air blast
E4.0
E41 U2
E41 U1
21.2
21.4
22.4
40.2
40.4
41.2
41.4
42.4
42.4
43.4
Y21
Y22
Y40
Y41
Y42
Y43
OUT 8(0)
OUT 9(0)
OUT 10(0)
OUT 11(0)
OUT 12(0)
OUT 13(0)


CAN node 3
(Page 1 of 2)
27
+
28
Positioning tube lift 1
up and down (vertical)
Positioning tube lift 2
up and down (vertical)
E28
E27 U2
E27 U1
27.4
28.4
Y27 U2
OUT 2
(Impuls)
Y27 U1
OUT 1
Y28 U2
OUT 4
(Impuls)
Y28 U1
OUT 3
29
+
30
Infeed table lift 1
retracted / extended
Infeed table lift 2
end position and special position
E38
E29 U1
E29 U2
29.4
29.2
30.4
30.2
Y29 U2
OUT 6
Y29 U1
OUT 5
(Impuls)
Y30 U2
OUT 8
Y30 U1
OUT 7
(Impuls)
31
+
32
Positioning tube lift 1
front and back (horizontal)
Positioning tube lift 2
front and back (horizontal)
E32 U1
E31 U2
E31 U1
31.4
31.2
32.4
32.2
Y31 U2
OUT 10
(Impuls)
Y31 U1
OUT 9
Y32 U2
OUT 12
(Impuls)
Y32 U1
OUT 11


CAN node 3
(Page 2 of 2)
33
Needles forwards
34
Turn-up at back
Brushes for sewing head
35
Infeed table
extension on
36
Spreader forwards
E33
E34 U2
E34 U1
E36
33.2
33.4
34.2
34.4
35.2
35.4
36.2
36.4
Y33
Y34
Y35
Y36
2
4
OUT 13(0)
OUT 14(0)
OUT 15(0)
OUT 16(0)

16 Circuit Diagrams

Reference list for the circuit diagrams

A10	CAN 1	S200 =>1
A11	CAN 2	S200 =>2
A12	CAN 3	S200 =>3
A20	Control device BS3	
A22	Sewing motor control MMC **1001**	
A24	Needle thread monitor evaluation	
A25	Needle thread monitor optics	
A26	Control panel BDF-P1	
A27	Laser optics	
A28	Bobbin thread monitor evaluation	
A29	Bobbin thread monitor optics	
A30	Power supply BS3 740 VA	
A31	Pulse power supply 125 VA	
A32	Laser power supply 4 VA 1,1A/3,5V	
A40	Stepping motor end phase	
A41	SSR	

B4	A10 CAN1	E4	Workholder bar up
B6	A10 CAN1	E6	Work surface forwards
B10	A10 CAN1	E10	Clamp feed unit to the right (reed)
B10A	A10 CAN1	E10A	Clamp feed unit in the middle (reed)
B11	A10 CAN1	E11	Clamp feed unit to the left (reed)
B12	A10 CAN1	E12	Stacker table down
B15	A10 CAN1	E15	Wiper 3 up
B50	A10 CAN1	E50	X-axis home position
B51	A10 CAN1	E51	Y-axis home position
B52	A10 CAN1	E52	Needle thread malfunction (optics)
B53	A10 CAN1	E53	Bobbin thread malfunction (optics)
B54	A10 CAN1	E54	Material in clamp (photo cell)

B18	A11 CAN2	E18	Material take-over 1 open
B19	A11 CAN2	E19	Material take-over 2 open
B40	A11 CAN2	E40	Cutter up (option - ironing compensation strip)
B40U1	A11 CAN2	E40U1	Slide back (option - ironing compensation strip)
B40U2	A11 CAN2	E40U2	Slide forwards (option - ironing compensation strip)
B55	A11 CAN2	E55	Material take-over retracted
B56	A11 CAN2	E56	Material take-over closed
B57	A11 CAN2	E57	Compressed air is okay

B27U1	A12 CAN3	E27U1	Positioning tube down
B27U2	A12 CAN3	E27U2	Positioning tube up
B28	A12 CAN3	E28	Positioning tube in the middle (vertical)
B29U1	A12 CAN3	E29U1	Infeed table lift 1 back (reed)
B29U2	A12 CAN3	E29U2	Infeed table lift 1 forwards (reed)
B30U1	A12 CAN3	E30U1	Positioning tube back
B30U2	A12 CAN3	E30U2	Positioning tube forwards
B31	A12 CAN3	E31	Positioning tube in the middle (horizontal)
B33	A12 CAN3	E33	Needles back
B34U1	A12 CAN3	E34U1	Turn-up at back

B34U2	A12 CAN3	E34U2	Turn-up at front
B36	A12 CAN3	E36	Spreader back
B38	A12 CAN3	E38	Workholder bar table position

C1	Capacitor for trimming motor M5

E4	A10 CAN1	Workholder bar up
E6	A10 CAN1	Work surface forwards
E10	A10 CAN1	Clamp feed unit to the right
E10A	A10 CAN1	Clamp feed unit in the middle
E11	A10 CAN1	Clamp feed unit to the left
E12	A10 CAN1	Stacker table down
E15	A10 CAN1	Wiper 3 up
E50	A10 CAN1	X-axis home position
E51	A10 CAN1	Y-axis home position
E52	A10 CAN1	Needle thread malfunction
E53	A10 CAN1	Bobbin thread malfunction
E54	A10 CAN1	Material in clamp

E18	A11 CAN2	Material take-over 1 open
E19	A11 CAN2	Material take-over 2 open
E40	A11 CAN2	Cutter up (option - ironing compensation strip)
E40U1	A11 CAN2	Slide back (option - ironing compensation strip)
E40U2	A11 CAN2	Slide forwards (option - ironing compensation strip)
E55	A11 CAN2	Material take-over retracted
E56	A11 CAN2	Material take-over closed
E57	A11 CAN2	Compressed air is okay
E58	A11 CAN2	Vacuum foot switch
E59	A11 CAN2	Key switch
E61	A11 CAN2	Double start key 1
E62	A11 CAN2	Double start key 2

E27U1	A12 CAN3	Positioning tube down
E27U2	A12 CAN3	Positioning tube up
E28	A12 CAN3	Positioning tube in the middle (vertical)
E29U1	A12 CAN3	Infeed table lift 1 back
E29U2	A12 CAN3	Infeed table lift 1 forwards
E30U1	A12 CAN3	Positioning tube back
E30U2	A12 CAN3	Positioning tube forwards
E31	A12 CAN3	Positioning tube in the middle (horizontal)
E33	A12 CAN3	Needles back
E34U1	A12 CAN3	Turn-up at back
E34U2	A12 CAN3	Turn-up at front
E36	A12 CAN3	Spreader back
E38	A12 CAN3	Workholder bar table position

F0	Circuit breaker 16 A
F7	M5 Trimmer motor fuse 2 A
F8	A30 Power supply fuse 10 A
F9	H11 Sewing lamp fuse 0.5 A
F10	X30 Socket fuse 10 A

H1	A30 LED	=>	F1-2 A
H2	A30 LED	=>	F3-2,5 A

H3	A30 LED	=>	F4-6,3 A
H4	A30 LED	=>	F5-0,5 A
H4	A30 LED	=>	F2-0,5 A
H10	A31 LED	Pulse power supply +24V / 5A / 125 VA	
H1	A40 LED	Axis 1 ready	
H2	A40 LED	Axis 2 ready	
H3	A40 LED	Axis 3 ready	
H4	A40 LED	Axis 1 excess current	
H5	A40 LED	Axis 2 excess current	
H6	A40 LED	Axis 3 excess current	
H7	A40 LED	Overvoltage	
H8	A40 LED	Undervoltage	
H9	A40 LED	Excessive temperature	
H15	A40 LED	Mains on	

H11	Sewing lamp
H12	Machine indicator light on
H13	Indicator light on double start key 1
H14	Indicator light on double start key 2

K1	Vacuum motor contactor on
K16	A41 SSR trimmer on (A11 CAN2)

M1	Sewing motor
M2	Stepping motor X-axis
M3	Stepping motor Y-axis
M4	Stepping motor B-axis (option)
M5	Trimmer motor
M6	Vacuum motor (option)

Q1	Main switch

R1	Pull-up	photo cell B54
R2	Pull-up	photo cell B54
S1	On switch	
S2	EMERGENCY off switch	
S58	A11 CAN2	E58 Vacuum foot switch
S59	A11 CAN2	E59 Key switch
S61	A11 CAN2	E61 Double start key 1
S62	A11 CAN2	E62 Double start key 2

T1	Transformer 740 VA A30 power supply3

A10	X200	CAN bus control (Dip 1 S200)
A10	X300	Outputs OUT 1 – OUT 15
A10	X400	Inputs IN 1 – IN 16

A11	X200	CAN bus control (Dip 2 S200)
A11	X300	Outputs OUT 1 – OUT 15
A11	X400	Inputs IN 1 – IN 16
A12	X200	CAN bus control (Dip 3 S200)
A12	X300	Outputs OUT 1 – OUT 15
A12	X400	Inputs IN 1 – IN 16
A20	X101	COM 2 interface
A20	X103	COM 1 interface

A20	X208	CAN bus
A20	X301	X-axis / motor SM 1 (M2)
A20	X302	Y-axis / motor SM 2 (M3)
A20	X303	B-axis / motor SM 3 (M4) option
A20	X400	Main drive on sewing motor M1
A20	X401	Thread monitor
A22	X2	Position sensor
A22	X3	Interface
A22	X6	Mains 230V AC
A22	X14	Sewing motor M1
A30	X1	Secondary transformer
A30	X2	Power supply BS3 x
A30	X3	Blower power supply
A30	X4	+ 24V and 0V
A30	X5	+ 24V and 0V
A30	X6	+ 24V and 0V
A30	X7	Power supply A40 SM - end phase
A30	X8	Mains 230V AC
A30	X9	Primary transformer 230V AC
A40	X1	CAN bus connection (not used)
A40	X2	Axis 1 control
A40	X3	Axis 2 control
A40	X4	Axis 3 control
A40	X5	Bootstrap
A40	X6	Power supply + 24V and + 80V
A40	X7	Axis 1 motor – SMY M2
40	X8	Axis 2 motor – SMX M3
A40	X9	Axis 3 motor – SMB M4 (option)
A40	X10	Carriage monitoring
XWI	AKZ4 Main terminal strip 400V AC and 230V AC	
XWII	AKZ4 Table terminal strip start	
X30	Power socket 230V AC / 10A	
X31	Pulse power supply 230V AC / 5A / 125VA	
X33	Pulse power supply AXX +24V / 5A / 125VA	
X40	PC connection RS 232 interface	
X41	A26 Control panel BDF-P1	
X42	A26 Control panel BDF-P1 power supply	
X43	A26 Control panel BDF-P1 signal connection	
X44	Rotor position sensor M1 sewing motor	
X51	A50 Floppy signal connection	
X52	A50 Floppy power supply	
X61	Sewing motor M1	
X62	Stepping motor SM X-axis M2	
X63	Stepping motor SM Y-axis M3	
X64	Stepping motor SM B-axis M4 (option)	
X65	Trimmer motor M5	
X66	Vacuum motor M6 (option)	

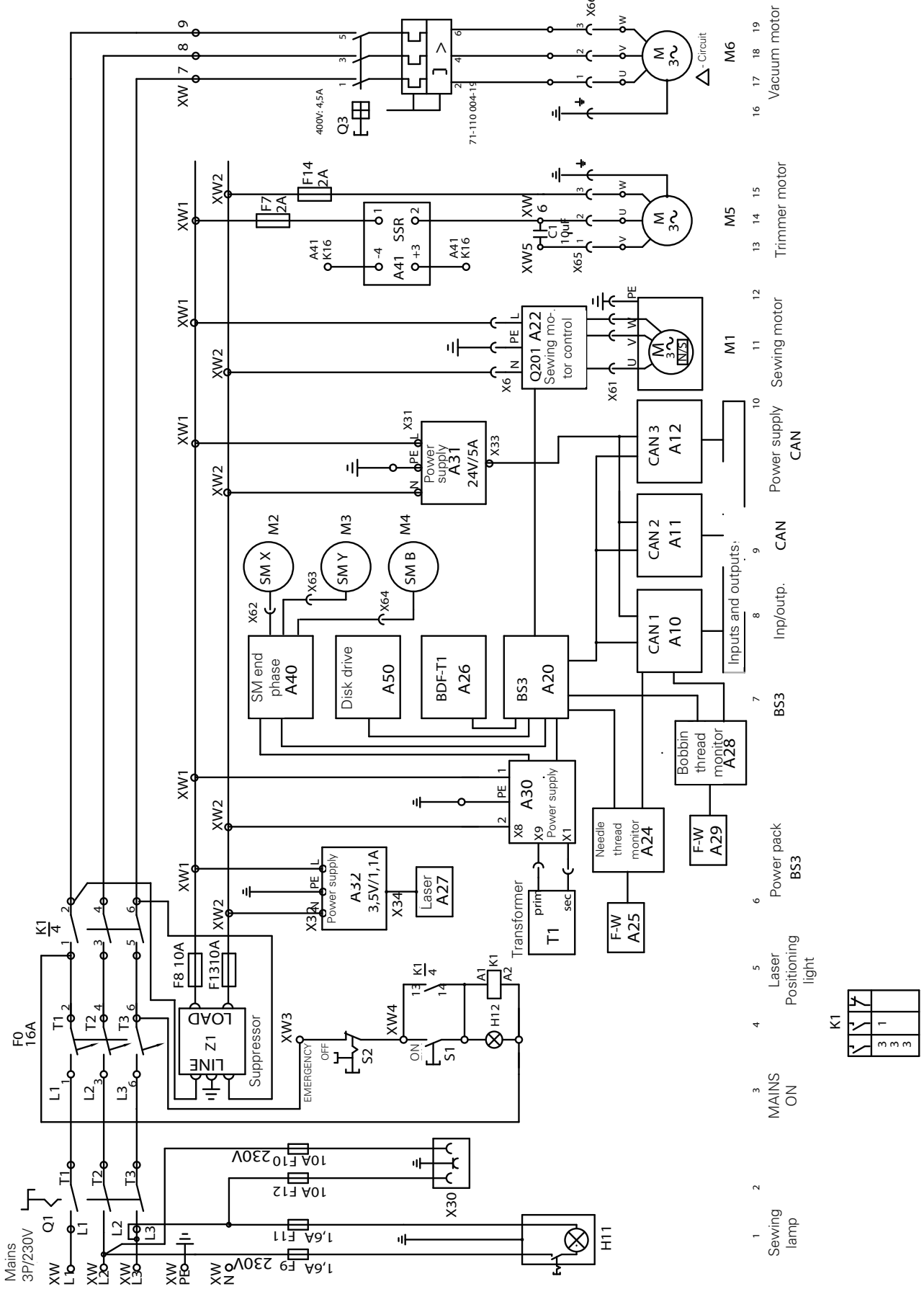
X111	Y1	A10 CAN1	Thread trimming on
X112	Y2	A10 CAN1	Positioning tube vacuum on
X113	Y3	A10 CAN1	Table vacuum on
X114	Y4	A10 CAN1	Workholder bar down
X115	Y5	A10 CAN1	Workholder bar up
X116	Y6	A10 CAN1	Work surface forwards
X117	Y7	A10 CAN1	Top clamp closed
X118	Y8	A10 CAN1	Disengage bottom clamp
X119	Y9	A10 CAN1	Clamp coupling on
X120	Y10	A10 CAN1	Clamp feed unit to the right
X121	Y11	A10 CAN1	Clamp feed unit to the left
X122	Y12	A10 CAN1	Stacker table up
X123	Y13	A10 CAN1	Needle thread tension closed
X124	Y14	A10 CAN1	Wiper 3 off
X125	Y15	A10 CAN1	Wiper 3 on (upwards)
X126	Y24	A10 CAN1	Vacuum reduction on
X132	Y17	A11 CAN2	Wiper 2 off
X135	Y18	A11 CAN2	Material take-over 1 closed
X136	Y19	A11 CAN2	Material take-over 2 closed
X137	Y20	A11 CAN2	Thread catcher back, engage stationary knife
X138	Y21	A11 CAN2	Engage thread catcher
X139	Y22	A11 CAN2	CAN2 (turn-up limit on)
X133	Y23	A11 CAN2	Wiper 1 off
X140	Y40	A11 CAN2	Cutter down (option - ironing compensation strip)
X141	Y41	A11 CAN2	Slide back (option - ironing compensation strip)
X142	Y42	A11 CAN2	Slide up (option - ironing compensation strip)
X143	Y43	A11 CAN2	Air blast (option - ironing compensation strip)

X151	Y27U1	A12 CAN3	Positioning tube cylinder 1 down (vertical)
X152	Y27U2	A12 CAN3	Positioning cylinder 1 up (vertical)
X153	Y28U1	A12 CAN3	Positioning tube cylinder 2 down (vertical)
X154	Y28U2	A12 CAN3	Positioning cylinder 2 up (vertical)
X155	Y29U1	A12 CAN3	Infeed table lift 1 back
X156	Y29U2	A12 CAN3	Infeed table lift 1 forwards
X157	Y30U1	A12 CAN3	Infeed table lift 2 end positions
X158	Y30U2	A12 CAN3	Infeed table lift 2 special position
X159	Y31U1	A12 CAN3	Positioning tube cylinder 1 back (horizontal)
X160	Y31U2	A12 CAN3	Positioning tube cylinder 1 forwards (horizontal)
X161	Y32U1	A12 CAN3	Positioning tube cylinder 2 back (horizontal)
X162	Y32U2	A12 CAN3	Positioning tube cylinder 2 forwards (horizontal)
X163	Y33	A12 CAN3	Needles forwards
X164	Y34	A12 CAN3	Turn-up at back
X165	Y35	A12 CAN3	Infeed table extension on
X166	Y36	A12 CAN3	Spreader forwards

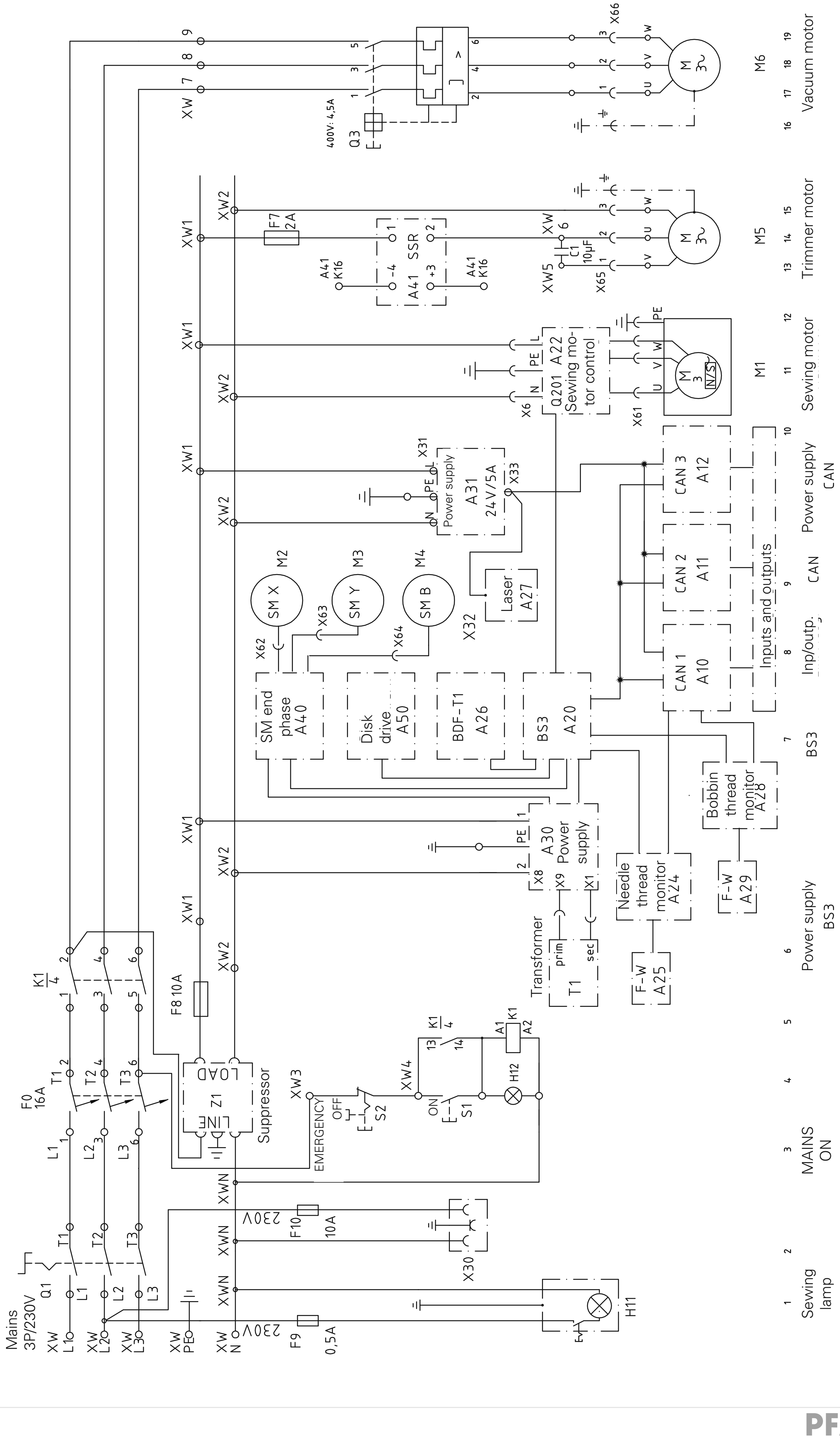
Y1	A10 CAN1	Thread trimming on
Y2	A10 CAN1	Positioning tube vacuum on
Y3	A10 CAN1	Table vacuum on
Y4	A10 CAN1	Workholder bar down
Y5	A10 CAN1	Workholder bar up
Y6	A10 CAN1	Work surface forwards

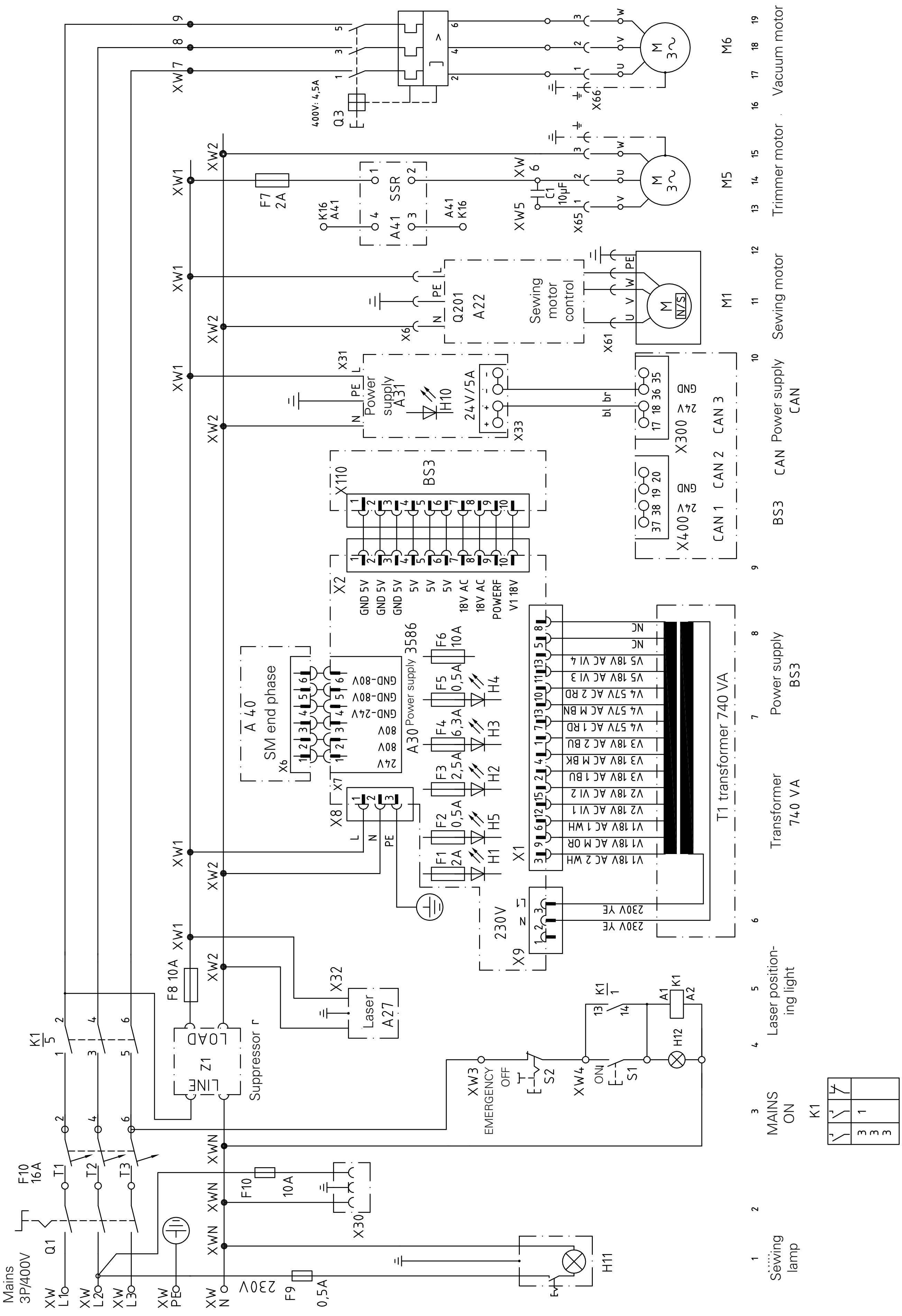
Y7	A10 CAN1	Top clamp closed
Y8	A10 CAN1	Disengage bottom clamp
Y9	A10 CAN1	Clamp coupling on
Y10	A10 CAN1	Clamp feed unit to the right
Y11	A10 CAN1	Clamp feed unit to the left
Y12	A10 CAN1	Stacker table up
Y13	A10 CAN1	Needle thread tension closed
Y14	A10 CAN1	Wiper 3 off
Y15	A10 CAN1	Wiper 3 on (upwards)
Y24	A10 CAN1	Vacuum reduction on
Y17	A11 CAN2	Wiper 2 off
Y18	A11 CAN2	Material take-over 1 closed
Y19	A11 CAN2	Material take-over 2 closed
Y20	A11 CAN2	Thread catcher back, engage stationary knife
Y21	A11 CAN2	Engage thread catcher
Y22	A11 CAN2	CAN2 Turn-up limit on
Y23	A11 CAN2	Wiper 1 off
Y40	A11 CAN2	Cutter down (option - ironing compensation strip)
Y41	A11 CAN2	Slide back (option - ironing compensation strip)
Y42	A11 CAN2	Slide up (option - ironing compensation strip)
Y43	A11 CAN2	Air blast (option - ironing compensation strip)
Y27U1	A12 CAN3	Positioning tube cylinder 1 down (vertical)
Y27U2	A12 CAN3	Positioning tube cylinder 1 up (vertical)
Y28U1	A12 CAN3	Positioning tube cylinder 2 down (vertical)
Y28U2	A12 CAN3	Positioning tube cylinder 2 up (vertical)
Y29U1	A12 CAN3	Infeed table lift 1 back
Y29U2	A12 CAN3	Infeed table lift 1 forwards
Y30U1	A12 CAN3	Infeed table lift 2 end positions
Y30U2	A12 CAN3	Infeed table lift 2 special position
Y31U1	A12 CAN3	Positioning tube cylinder 1 back (horizontal)
Y31U2	A12 CAN3	Positioning tube cylinder 1 forwards (horizontal)
Y32U1	A12 CAN3	Positioning tube cylinder 2 back (horizontal)
Y32U2	A12 CAN3	Positioning tube cylinder 2 forwards (horizontal)
Y33	A12 CAN3	Needles forwards
Y34	A12 CAN3	Turn-up at back
Y35	A12 CAN3	Infeed table extension on
Y36	A12 CAN3	Spreader forwards
Z1	Suppressor (10VSK 1)	

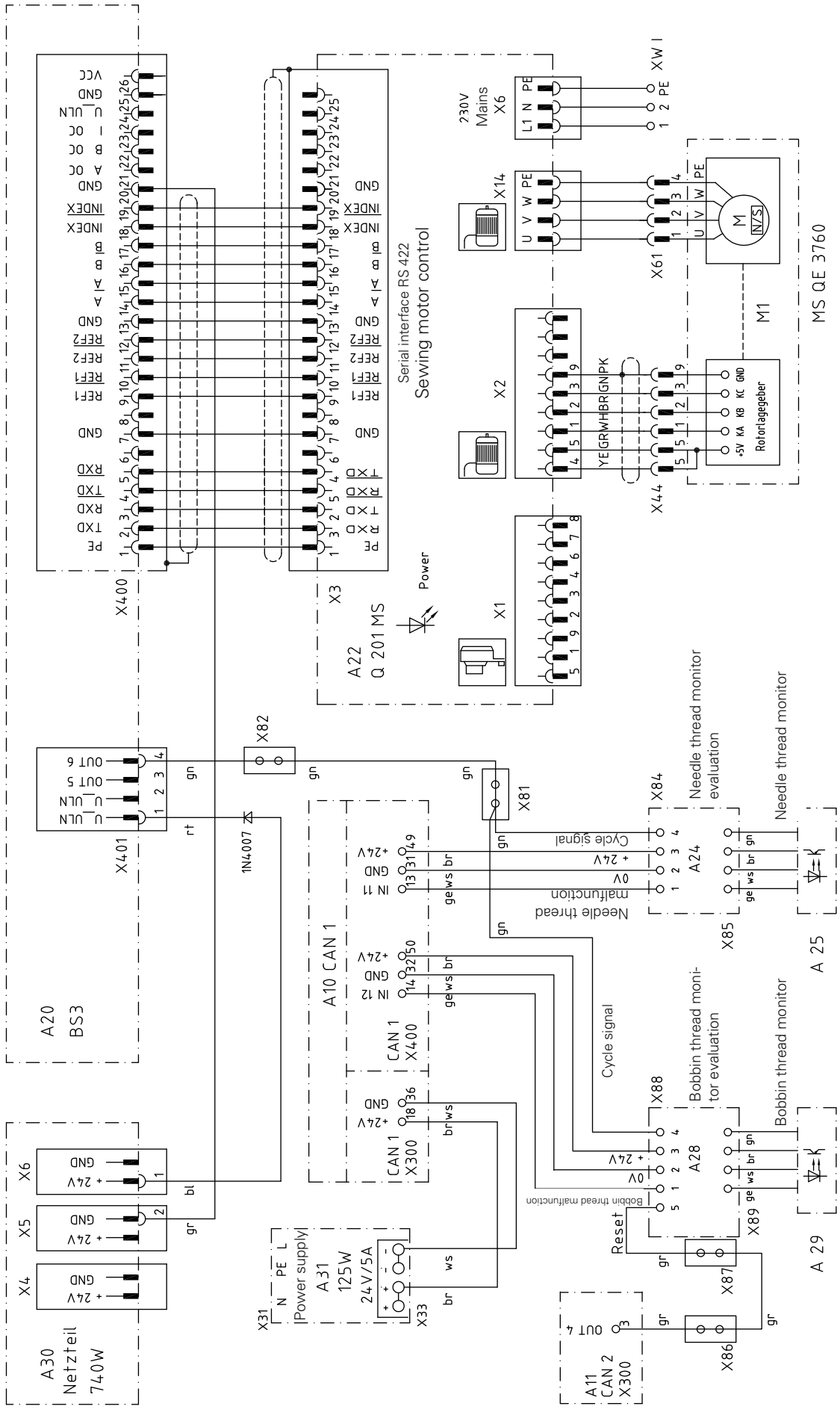
3P / 230V

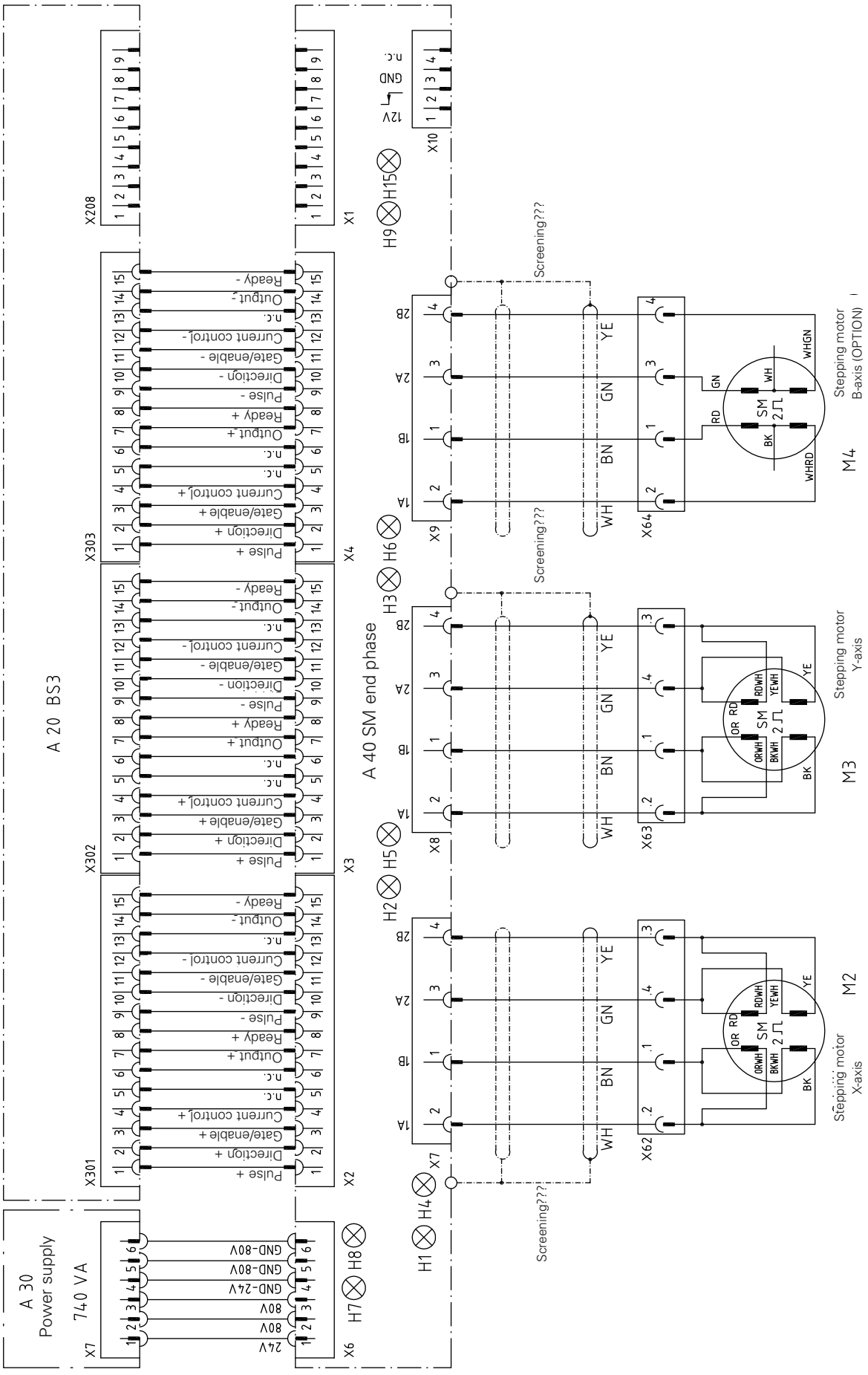

Mains 3P/230V
Q1
F0 16A
K1 4
F8 10A
F1310A
LOAD
LINE
Z1
Suppressor
XW3
EMERGENCY
OFF
S2
ON
S1
XW4
H12
H11
X30
10A F10 230V
10A F12
1,6A F11
1,6A F9 230V
Q3
400V: 4,5A
71-110 004-19
X66
M6
Vacuum motor
F14 2A
F7 2A
A41 K16
A41 SSR
C1 1 µF
X65
M5
Trimmer motor
Q201 A22
Sewing motor control
X6
X61
M1
Sewing motor
X31
Power supply A31 24V/5A
X33
CAN 3 A12
Power supply
CAN
M2
M3
M4
SM X
SM Y
SM B
X62
X63
X64
CAN 2 A11
CAN
Inputs and outputs
CAN 1 A10
Inp/outp.
SM end phase A40
Disk drive A50
BDF-T1 A26
BS3 A20
BS3
Bobbin thread monitor A28
A30 Power supply
X8
X9
X1
Needle thread monitor A24
F-W A29
F-W A25
Power pack
BS3
Power supply A32 3,5V/1,1A
X34
Laser A27
X35
Transformer
prim
sec
T1
Laser Positioning light
MAINS ON
Sewing lamp
K1

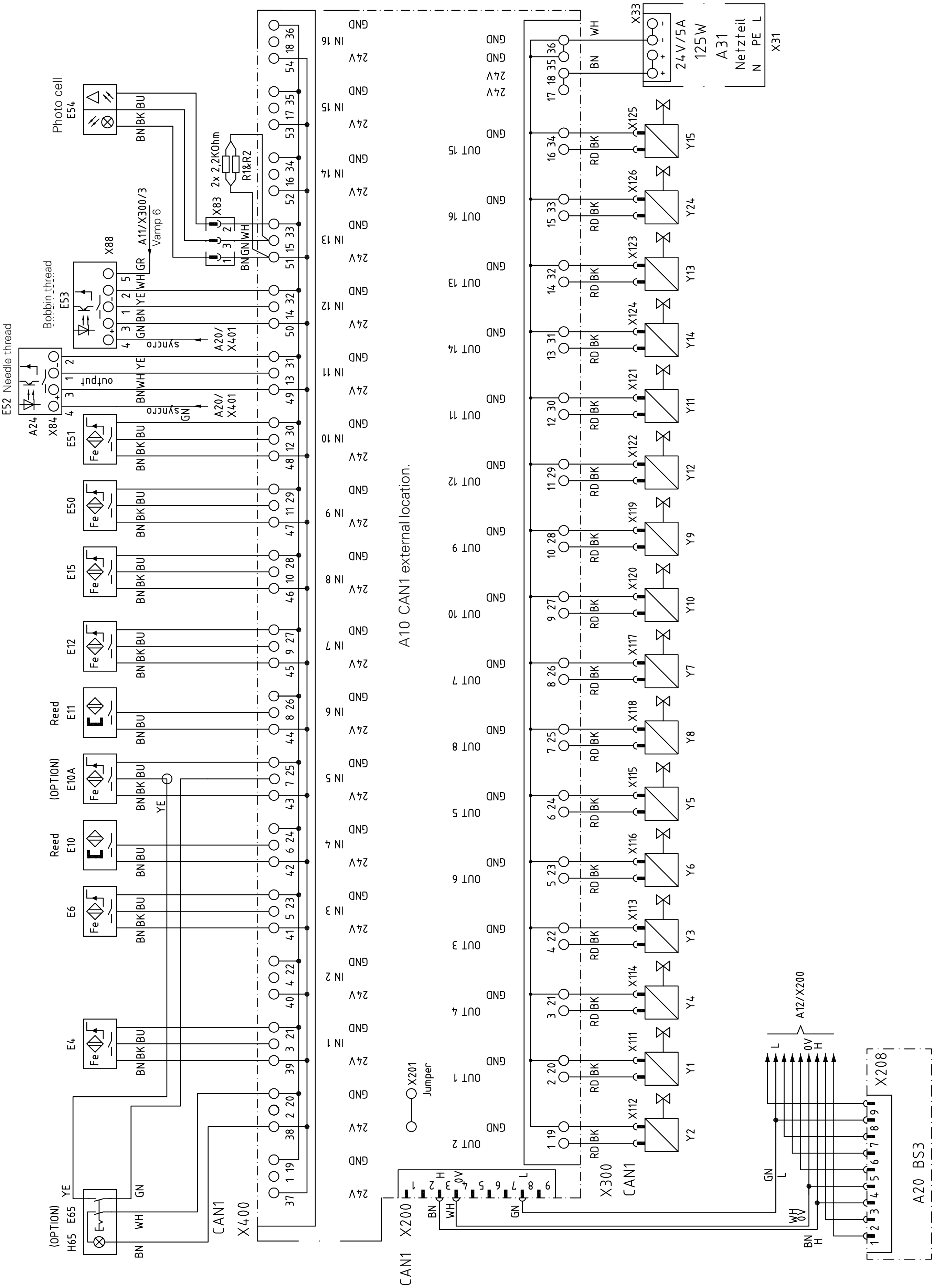
3P / 400V

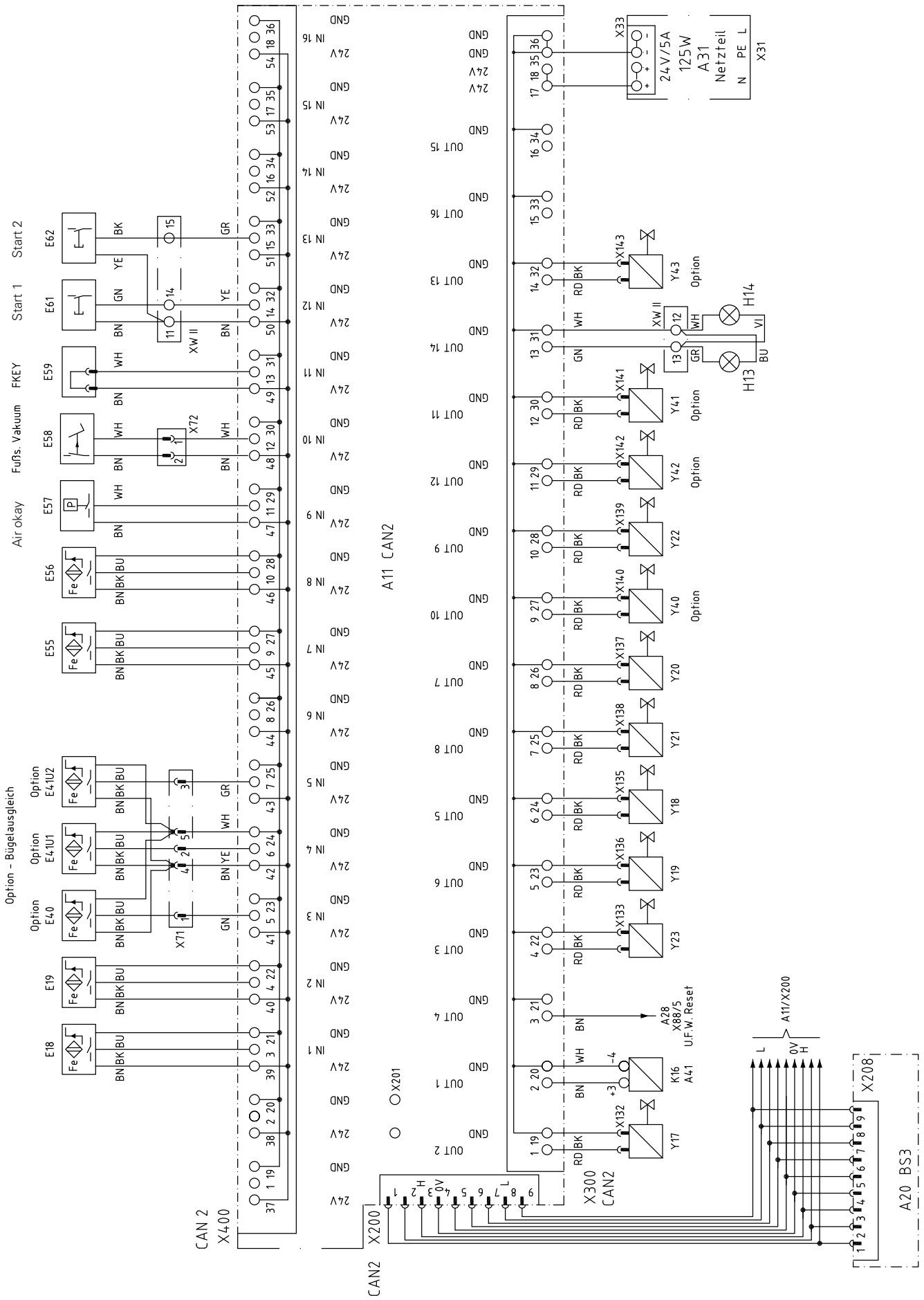

Vacuum motor
M6
Trimmer motor
M5
Sewing motor
M1
Power supply CAN
CAN
Inp/outp.
BS3
Power supply BS3
MAINS ON
Sewing lamp
Q3
400V: 4,5A
SSR
A41
K16
F7 2A
C1 10µF
Q201 A22 Sewing motor control
Power supply A31 24V/5A
CAN 3 A12
CAN 2 A11
CAN 1 A10
Inputs and outputs
Laser A27
SM X
SM Y
SM B
M2
M3
M4
SM end phase A40
Disk drive A50
BDF-T1 A26
BS3 A20
Bobbin thread monitor A28
F-W A29
A30 Power supply
Needle thread monitor A24
F-W A25
Transformer T1
prim
sec
F8 10A
Z1 Suppressor
LOAD
LINE
EMERGENCY OFF
S2
S1
ON
H12
K1
F0 16A
Q1
Mains 3P/230V
F10 10A
230V
X30
F9 0,5A
H11

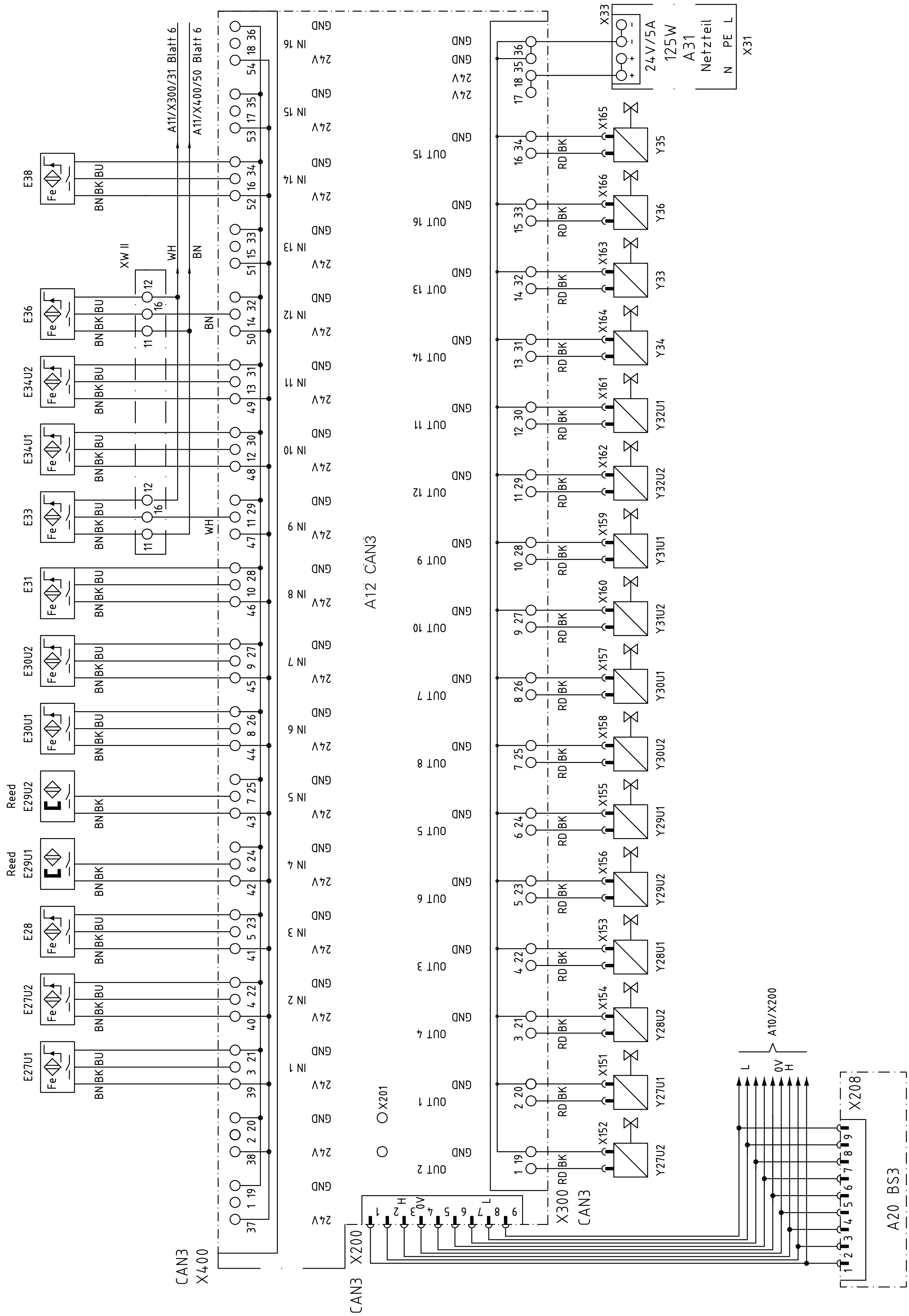

Mains 3P/400V
Q1
F10 16A
K1 5
Suppressor
Z1
LINE
LOAD
F8 10A
Laser A27
X32
F9 0,5A
230V
H11
X30
F10 10A
EMERGENCY OFF
S2
ON
S1
H12
K1
230V
X9
X1
T1 transformer 740 VA
A30 Power supply 3586
A 40 SM end phase
X8
X2
X110
BS3
X400
X300
CAN 1
CAN 2
CAN 3
GND
Power supply A31
H10
24V/5A
X33
Sewing motor control
Q201 A22
M1
X61
SSR
A41
K16
F7 2A
C1 10µF
M5
X65
Q3
400V: 4,5A
M6
X66
Sewing lamp
MAINS ON
Laser position-ing light
Transformer 740 VA
Power supply BS3
CAN Power supply CAN
Sewing motor
Trimmer motor
Vacuum motor

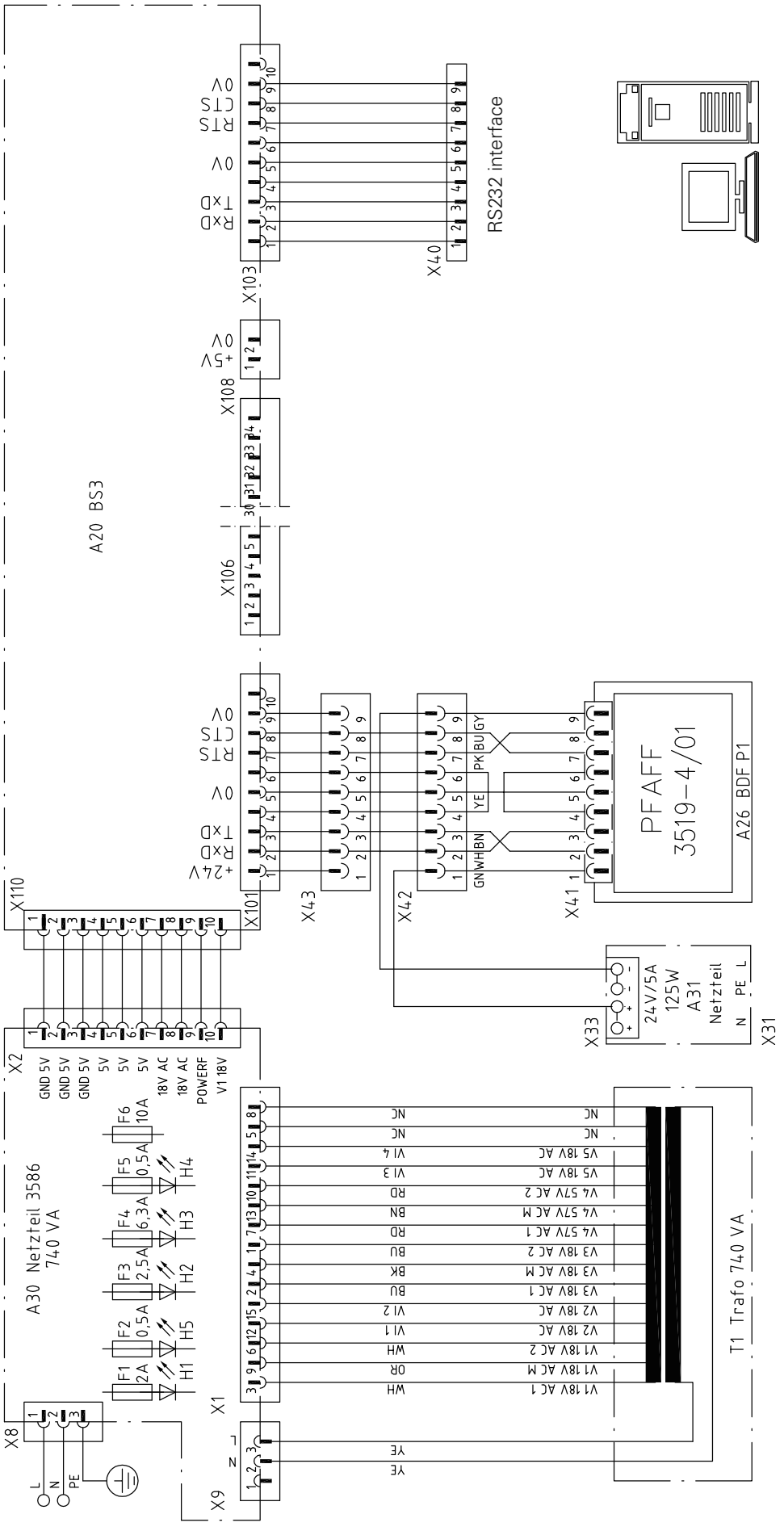

A20
BS3
A30
Netzteil
740W
A31
125W
24V/5A
Power supply
A10 CAN 1
A11
CAN 2
X300
A22
Q 201 MS
Serial interface RS 422
Sewing motor control
MS QE 3760
M1
230V
Mains
Power
Cycle signal
Needle thread malfunction
Needle thread monitor evaluation
Needle thread monitor
A24
A 25
Bobbin thread malfunction
Bobbin thread monitor evaluation
Bobbin thread monitor
A28
A 29
Reset
1N4007
X400
X401
X1
X2
X3
X4
X5
X6
X14
X31
X33
X44
X61
X81
X82
X84
X85
X86
X87
X88
X89
Roforlagegeber


A 30
Power supply
740 VA
A 20 BS3
A 40 SM end phase
X7
X6
X301
X302
X303
X208
X1
X2
X3
X4
X10
X8
X9
X62
X63
X64
H1
H2
H3
H4
H5
H6
H7
H8
H9
H15
24V
80V
GND-80V
GND-24V
Pulse +
Direction +
Gate/enable +
Current control +
n.c.
Output +
Ready +
Pulse -
Direction -
Gate/enable -
Current control -
Output -
Ready -
12V
GND
Screening???
Stepping motor
X-axis
Stepping motor
Y-axis
Stepping motor
B-axis (OPTION)
M2
M3
M4


A10 CAN1 external location.
Photo cell E54
Bobbin thread E53
E52 Needle thread
A24 X84
E51
E50
E15
E12
Reed E11
(OPTION) E10A
Reed E10
E6
E4
(OPTION) H65 E65
A11/X300/3 Vamp 6
X83
X88
2x 2,2KOhm R1&R2
A20/ X401
syncro
output
CAN1 X400
CAN1 X200
X201 Jumper
X300 CAN1
X33
24V/5A 125W A31 Netzteil
N PE L
X31
A12/X200
X208
A20 BS3
IN 1
IN 2
IN 3
IN 4
IN 5
IN 6
IN 7
IN 8
IN 9
IN 10
IN 11
IN 12
IN 13
IN 14
IN 15
IN 16
OUT 1
OUT 2
OUT 3
OUT 4
OUT 5
OUT 6
OUT 7
OUT 8
OUT 9
OUT 10
OUT 11
OUT 12
OUT 13
OUT 14
OUT 15
OUT 16
GND
24V
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
Y10
Y11
Y12
Y13
Y14
Y15
Y24
X111
X112
X113
X114
X115
X116
X117
X118
X119
X120
X121
X122
X123
X124
X125
X126


Air okay
Fuß. Vakuum
FKEY
Start 1
Start 2
E18
E19
E40
E41U1
E41U2
E55
E56
E57
E58
E59
E61
E62
Option – Bügelausgleich
A11 CAN2
X400
CAN 2
X200
CAN2
X300
CAN2
X201
A11/X200
A20 BS3
X208
A28
X88/5
U.F.W. Reset
K16
A41
X33
24V/5A
125W
A31
Netzteil
X31
H13
H14
Y17
Y23
Y19
Y18
Y21
Y20
Y40
Y22
Y42
Y41
Y43
Option


A12 CAN3
CAN3 X400
CAN3 X200
X300 CAN3
A11/X300/31 Blatt 6
A11/X400/50 Blatt 6
XW II
E38
E36
E34U2
E34U1
E33
E31
E30U2
E30U1
Reed E29U2
Reed E29U1
E28
E27U2
E27U1
Y35
Y36
Y33
Y34
Y32U1
Y32U2
Y31U1
Y31U2
Y30U1
Y30U2
Y29U1
Y29U2
Y28U1
Y28U2
Y27U1
Y27U2
X33
24V/5A 125W A31 Netzteil
X31
X201
A10/X200
X208
A20 BS3


A20 BS3
X103
X40
RS232 interface
X108
X106
X101
X43
X42
X41
PFAFF 3519-4/01
A26 BDF P1
X110
X2
X33
24V/5A 125W A31 Netzteil
X31
A30 Netzteil 3586 740 VA
F1 2A
F2 0,5A
F3 2,5A
F4 6,3A
F5 0,5A
F6 10A
H1
H2
H3
H4
H5
X8
X1
X9
T1 Trafo 740 VA

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