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Part 4: Service manual, class 743-221

1. General

This service manual describes the adjustment of the **743-221** model sewing machine in an expedient sequence.

IMPORTANT !

Various adjustments are mutually interdependent.
The adjustment process must therefore be carried out in the order given.

IMPORTANT !

The activities described in this Service manual may only be carried out by specialists or by persons with appropriate training.

Danger of breakage

Before the sewing machine is re-started following dismantling the necessary adjustments must be carried out as specified in this service manual.

Avoidance of damage to the material clamps:

The sewing machine must never be operated without material. This also applies to adjustment work and function-testing.

Adjustment work on stitch-forming components

For all adjustments of stitch-forming components a flawless new needle must be fitted.

Caution: danger of injury

Before all repair, conversion and maintenance work:

- turn off the main switch
- isolate the sewing machine from the pneumatic supply.

Exception:
Adjustment work which is carried out with testing, adjustment or sewing programs of the control device.

Adjustment work and function-testing with the sewing machine running

- When carrying out adjustment work and function-testing with the machine running, comply with all safety measures and take the utmost care.

Pedal

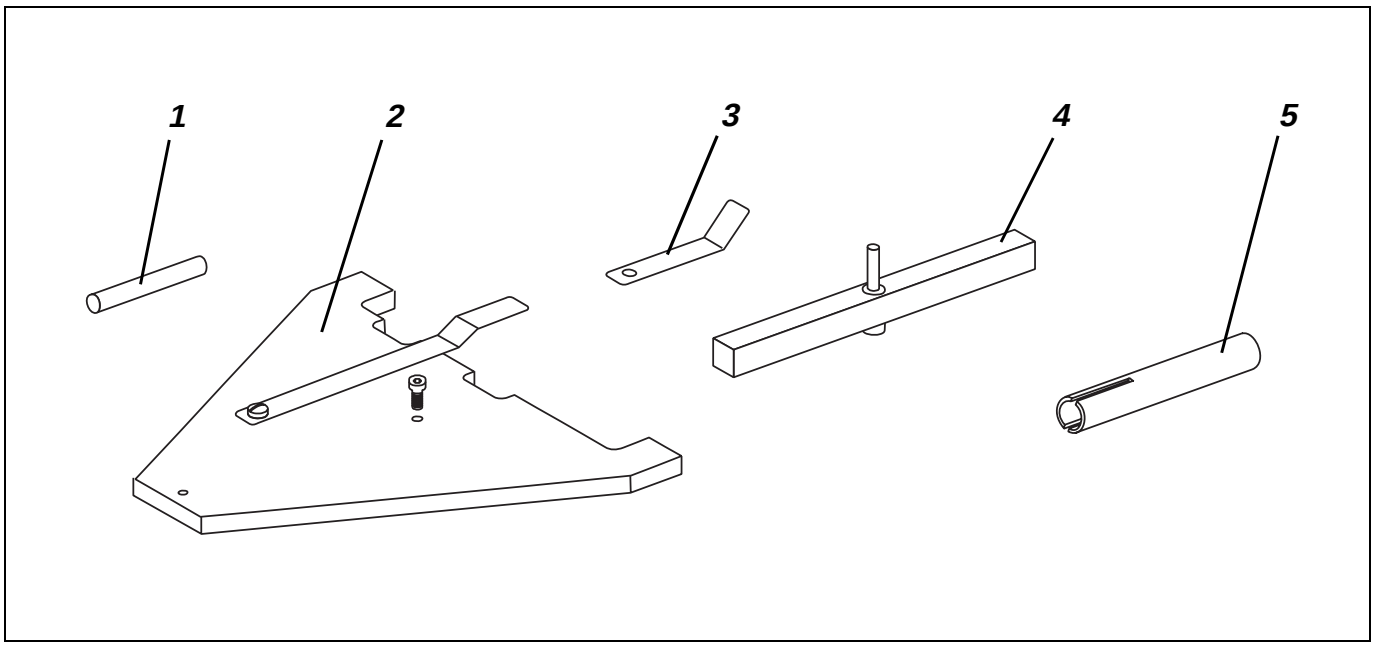
- In the sewing programs the sewing machine can be started by inadvertently depressing the pedal.

IMPORTANT !

All colour-marked components are factory-set. These settings should only be altered by specialists.

2. Adjusting the upper part of the machine

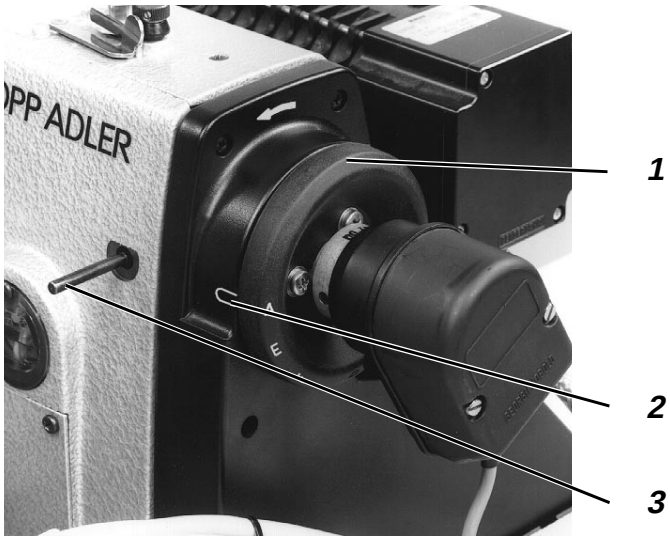
2.1 Gauges

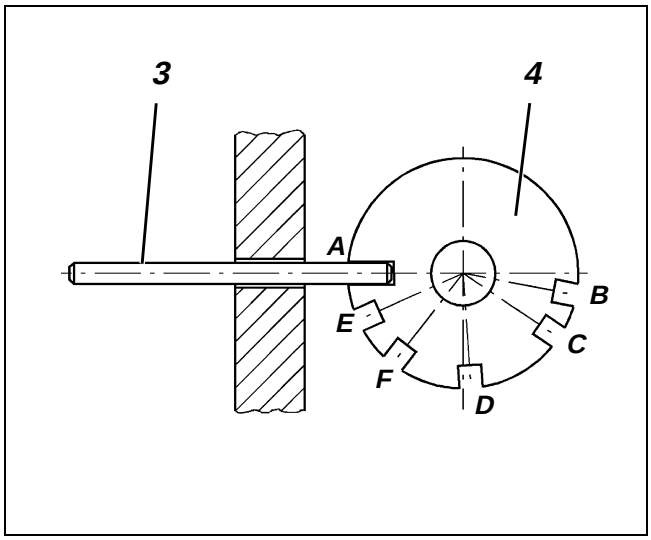


With the adjustment gauges listed below the sewing machine can be precisely adjusted and tested.

item	adjustment gauge	order no.	use
1	adjusting pin	9301 022608	lock sewing machine in positions **A** - **F**
2	gauge	0935 107077	align transport carriage, check reference point, guide roller and needle centre
3	feeler gauge	0933 080200	check and adjust guide roller
4	gauge	0935 107071	align needle-bar height and shuttle-drive housing
5	sleeve	0935 107090	align residual-thread monitor

2.2 Description and adjustment of integral adjusting disc





The sewing machine can be locked in all adjustment positions with locking pin 3 and the integral adjusting disc 4 on the cogged-belt pulley of the arm shaft.

The adjusting disc has 6 notches which are marked on the handwheel 1 by the letters **A**, **B**, **C**, **D**, **E** and **F**. In conjunction with marking 2 the letters indicate the position of the notches in which the machine can be locked with pin 3.

Notch **A** (loop-lift position) is deeper than the other notches.

The following adjustments can be carried out in the various positions:

A adjusting disc with respect to the groove in the arm-shaft crank, belt wheel, loop lift, distance of shuttle beak from needle

B - no function -

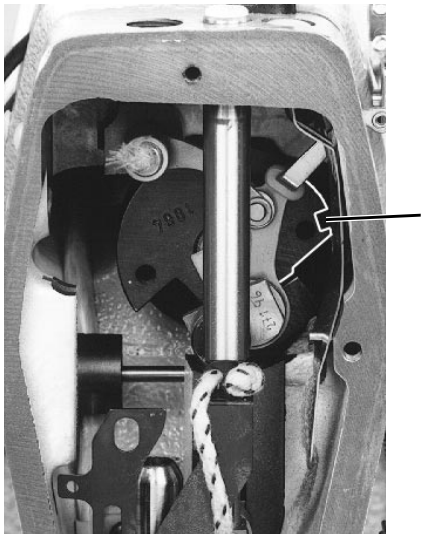
C 2nd needle position (raised thread-lever position)

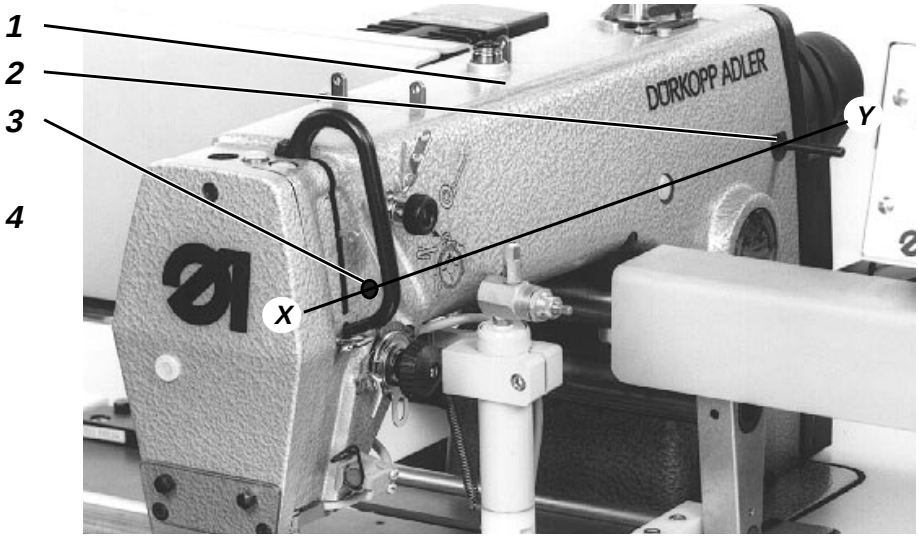
D - no function -

E needle-bar height

F - no function -

2.3 Arm-shaft crank





Regulation and inspection

The groove 4 and notch **A** of the adjusting disc on the cogged-belt pulley must coincide on the **X - Y** line.

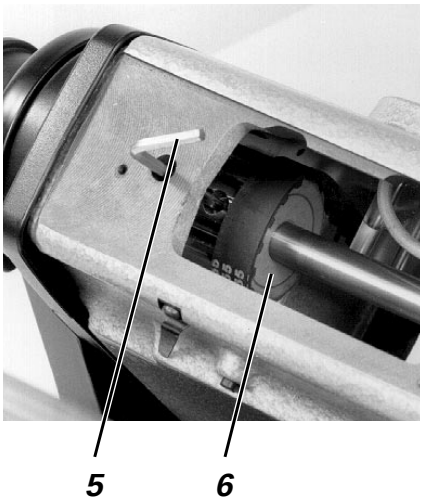
- Lock the arm shaft with a locking pin or a 5 mm Ø pin in the arm-shaft groove 4 (through hole 3).
- It must be possible to pass the locking pin through the hole 2 in position **A** into the integral adjusting disc.

IMPORTANT !

Adjustments carried out with the adjusting disc will only be correct if the disc itself has been adjusted as described below.
If the arm shaft is moved, all subsequent settings must be checked and adjusted if necessary.

Caution: danger of injury

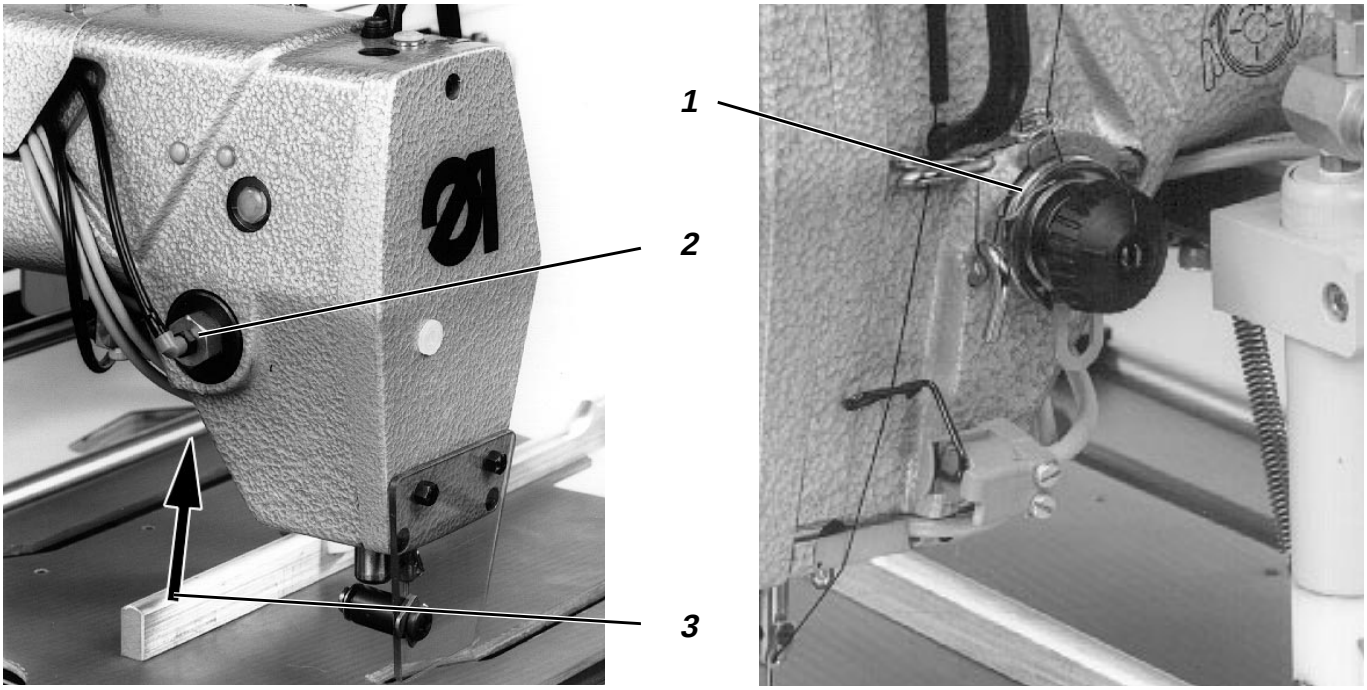
Turn off the main switch.
The position of the arm shaft may only be adjusted with the sewing machine switched off.



Adjustment

- Remove bobbin-winder cover 1.
- Undo the first screw of the cogged-belt pulley 6 from above with the Allen key 5 through the hole.
- Lock cogged-belt pulley in position **A** with the locking pin.
- Undo second screw of cogged-belt pulley 6.
- Insert a 5 mm-thick pin into the rig hole 3 and allow it to engage in the arm-shaft groove 4 by turning the handwheel.
- Retighten the screws on the cogged-belt pulley 6.
  The cogged-belt pulley must not be axially shifted.

2.4 Upper-thread tensioner release



Regulation and inspection

The cylinder 2 must open the tension discs 1 by about 1 mm.

When closed, the tension discs 1 must keep the upper thread securely under tension.

- Turn the **"program"** switch to **64**.
- Press "STOP" button.
  The program is activated.
- Turn **"program"** switch to **24**.
  Switch on solenoid valve s24 by pressing the **"Σ"** button.
  The upper-thread tensioner opens.
- Check distance between tension discs 1.

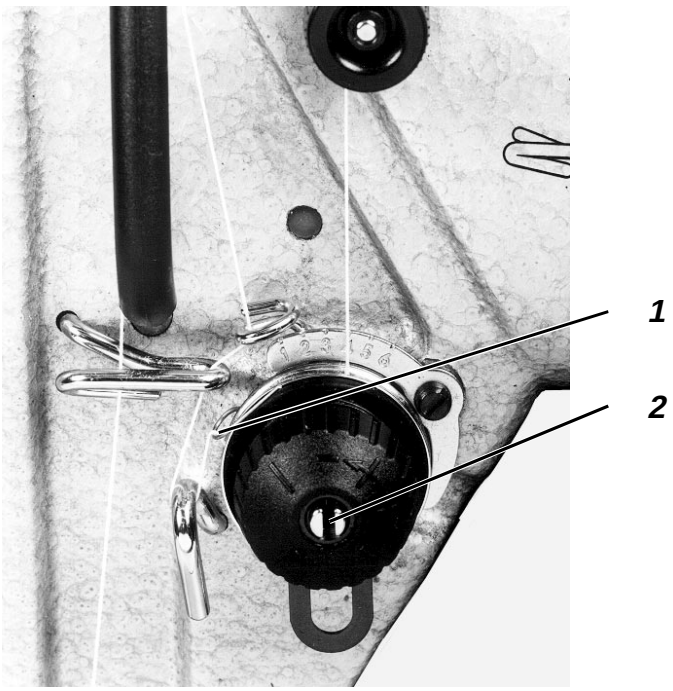
Caution: danger of injury

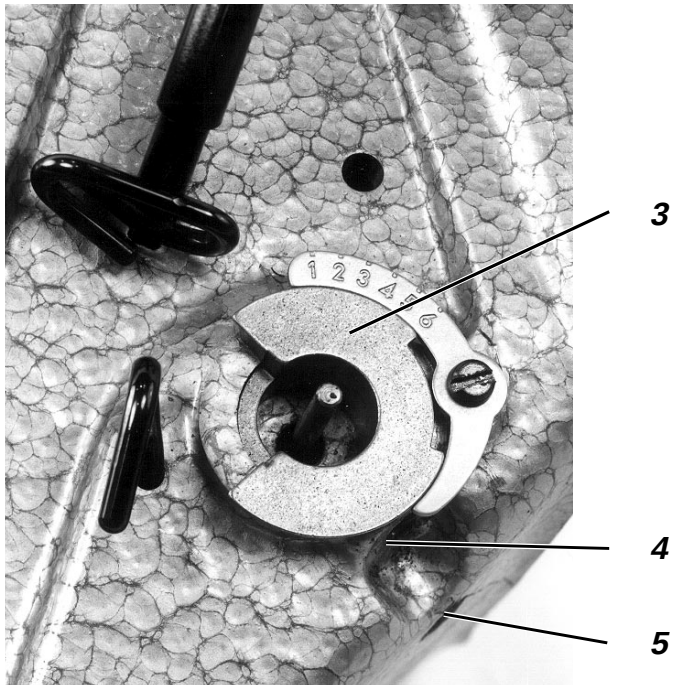
Turn off the main switch.
The upper-thread tensioner release may only be adjusted with the motor-protection switch turned off.

Adjustment

- Slightly undo screw 3.
- Move cylinder 2.
  With the upper-thread tensioner open there should be a distance of 1 mm between the tension discs 1.
  The distance can be checked with a gauge (see section 2.1 no. 3).
- Retighten screw 3.

2.5 Thread take-up spring



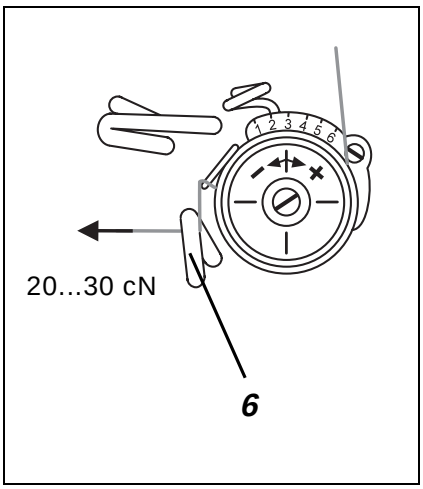


Regulation and inspection

The thread take-up spring 1 must keep the upper thread under tension at least until the tip of the needle has penetrated the material.

Caution: danger of injury

Turn off the main switch.
The thread take-up spring may only be adjusted with the sewing machine switched off.



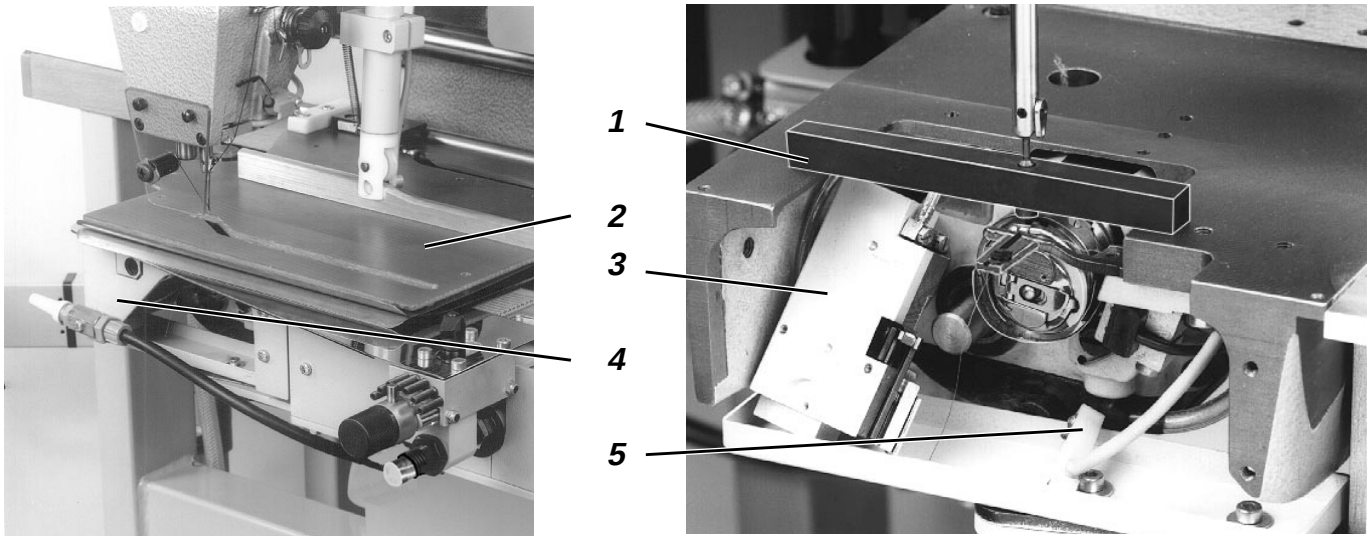
Adjusting the spring travel

- Undo screw 4.
- Rotate bush 3.
  The spring 1 must pre-tension the upper thread at least until the tip of the needle penetrates the material.
- Retighten screw 4.

Adjusting the spring tension

- Undo screw 5.
- Adjust the tension by rotating tension bolt 2.
  Depending on the material and thread the tension of the thread take-up spring must be between 20 and 30 cN (1 cN = 1 g).
  The tension is measured at thread guide 6.
  The thread is drawn parallel to the arm shaft.
- Retighten screw 5.

2.6 Needle-bar height



Regulation and inspection

Adjustment and inspection are carried out with gauge 1.

Caution: danger of injury

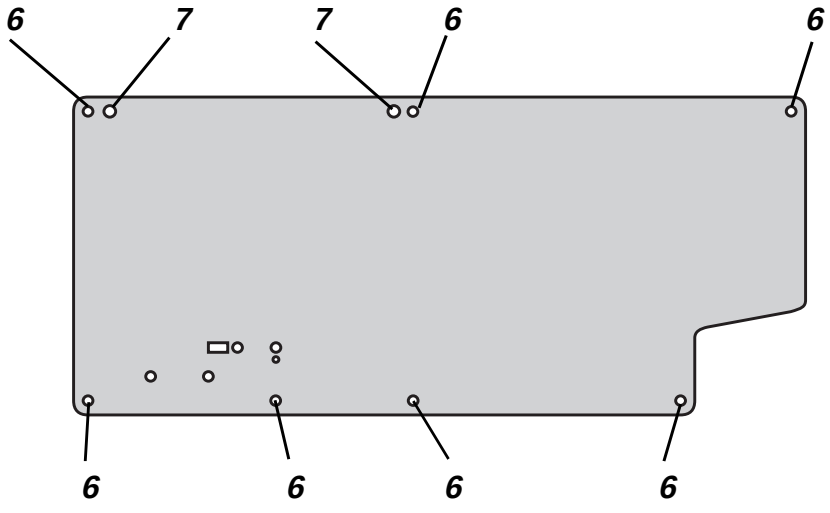
Turn off the main switch.
The needle-bar height may only be adjusted with the sewing machine switched off.

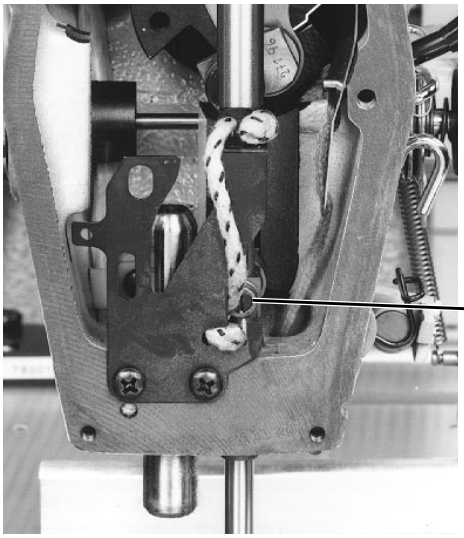
Adjustment

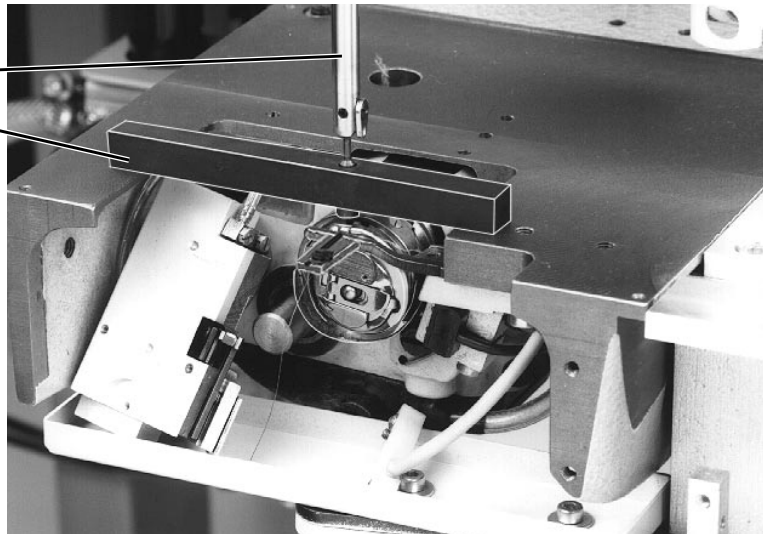
- Remove shaping module 2.
- Remove casing 4.
- Undo light barrier 5 and thread clipper 3 and lay them on the oil reservoir.
- Undo screws 6 on the slide plate and remove the slide plate.

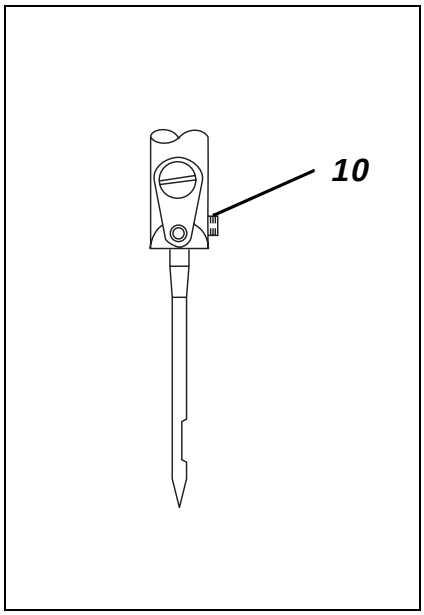
IMPORTANT !
The centring screws 7 must not be rotated.
These are used to align the slide plate to the needle.

There are 2 shims between the slide plate and thread clipper.







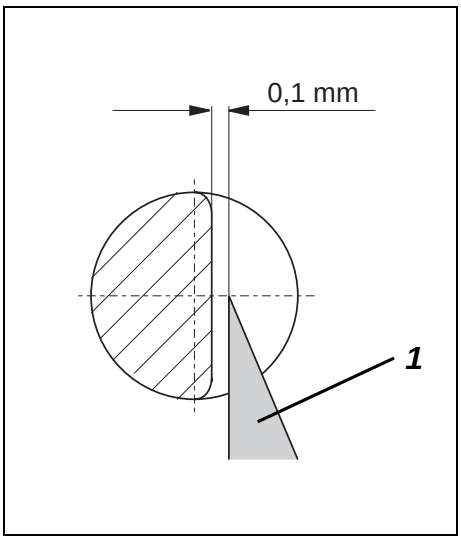


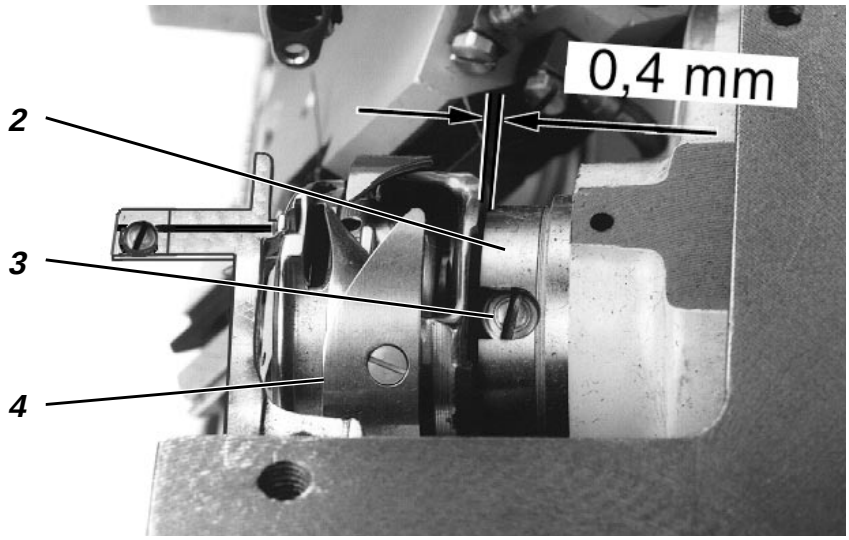
- Place gauge 1 on the base plate.
- Unscrew safety shutter and head cover.
- Undo clamping screw 9.
- Lock the sewing machine in position **E**.
- Lower the needle bar 8 onto the gauge 1.
  The pin of gauge 1 must fully penetrate the needle bar.
- Tighten needle-bar attachment screw 10.
  The needle-attachment screw 10 must be aligned in parallel to the arm shaft and point to the rear (towards the handwheel).
- Replace all the parts which have been removed.

IMPORTANT !
When fitting the thread clipper place both shims between the thread clipper and slide plate.

2.7 Shuttle settings

2.7.1 Loop lift and distance between shuttle beak and needle





Regulation and inspection

The loop lift is the travel of the needle bar from bottom dead centre to the point at which the shuttle beak is at the centre of the needle.
The loop lift is 1.8 mm.

– Lock the machine in position **A**.
  The shuttle beak 1 must be at the centre of the needle.
  The distance between the shuttle beak 1 and the needle must be 0.1 mm.

Caution: danger of injury

Turn off the main switch.
The loop lift and the distance between the shuttle beak and needle may only be adjusted with the sewing machine switched off.

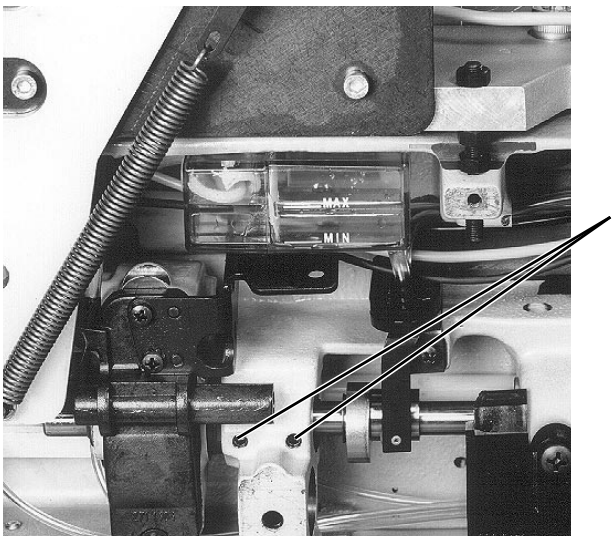
Adjustment

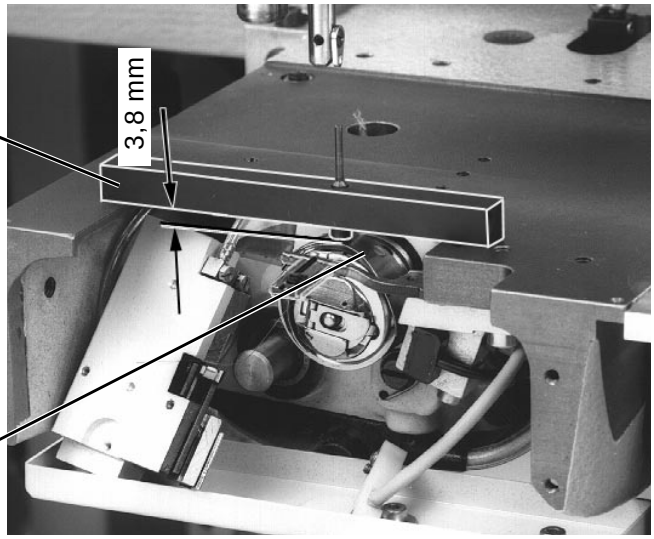
– Remove shaping module and slide plate (see section 2.6).
  Fit new needle.
– Undo first attachment screw 3 of shuttle 4.
– Lock sewing machine in position **A**.
– Undo second attachment screw 3 of shuttle 4.
– Place shuttle beak 1 at centre of needle.
  The distance between the shuttle beak 1 and the furrow of the needle must be 0.1 mm.
  In this position there is a distance of about 0.4 mm between the shuttle 4 and the bush 2.

  If the distance of 0.4 mm is not achieved, the shuttle-drive housing should be adjusted accordingly (see section 7.2).

– Retighten 2 attachment screws 3 of the shuttle 4.
– Replace all the parts which have been removed.

2.7.2 Shuttle-drive housing





Regulation and inspection

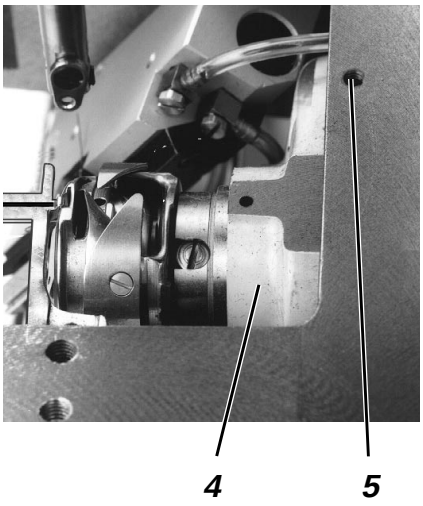
The shuttle-drive housing 4 is factory-aligned.
It may only be altered in exceptional circumstances.

With the shuttle-drive housing correctly aligned there must be a distance of 0.4 mm between the shuttle and the adjusting ring (see section 2.7.1).

The distance between the slide-plate surface and the thread-drawing plate 3 is 3.8 mm.

Caution: danger of injury

Turn off the main switch.
The shuttle-drive housing 4 may only be adjusted with the sewing machine switched off.

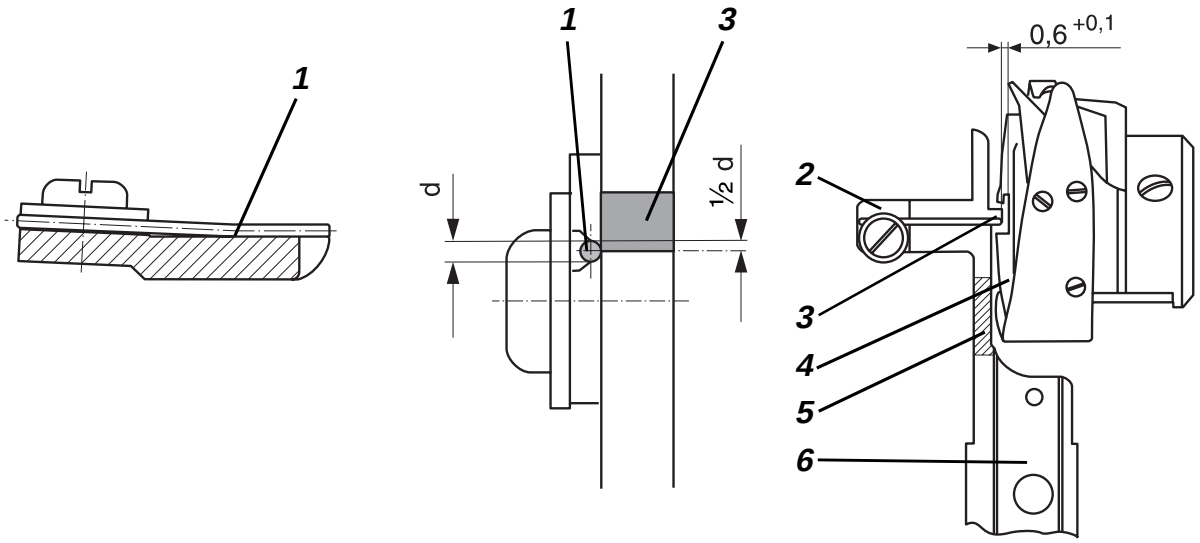


Adjustment

- Remove the shaping module and slide plate (see section 2.6).
- Unscrew locking screw 5.
  Beneath the locking screw there is a stop screw.
- Adjust stop screw.
  The distance between the slide-plate surface and the thread-drawing plate 3 is 3.8 mm

  The distance is checked with gauge 1.
- Retighten locking screw 5.
- Undo screws 2 of the shuttle-drive housing.
- Move shuttle-drive housing 4.
  There must be a distance of 0.4 mm between the shuttle and the adjusting ring (see section 2.7.1).
- Retighten screws 2 of the shuttle-drive housing.
- Check the distance of the shuttle beak to the needle and adjust if necessary (see section 2.7.1).

2.8 Bobbin-housing holder



Regulation and inspection

The bobbin-housing holder is factory-aligned.

After the holder has been replaced it may be necessary to re-align the new one.

The spring wire 1 must be in close contact with the bobbin-housing holder with no gaps.

Half the width of the spring wire 1 must be over the retaining tab 3.

Caution: danger of injury

Turn off the main switch.
The bobbin-housing holder may only be adjusted with the sewing machine switched off.

IMPORTANT !

Alignment may only be carried out in the cross-hatched area 5 (see sketch).
The extreme hardness in the region of the retaining tab 3 means that there is a danger of breakage there.

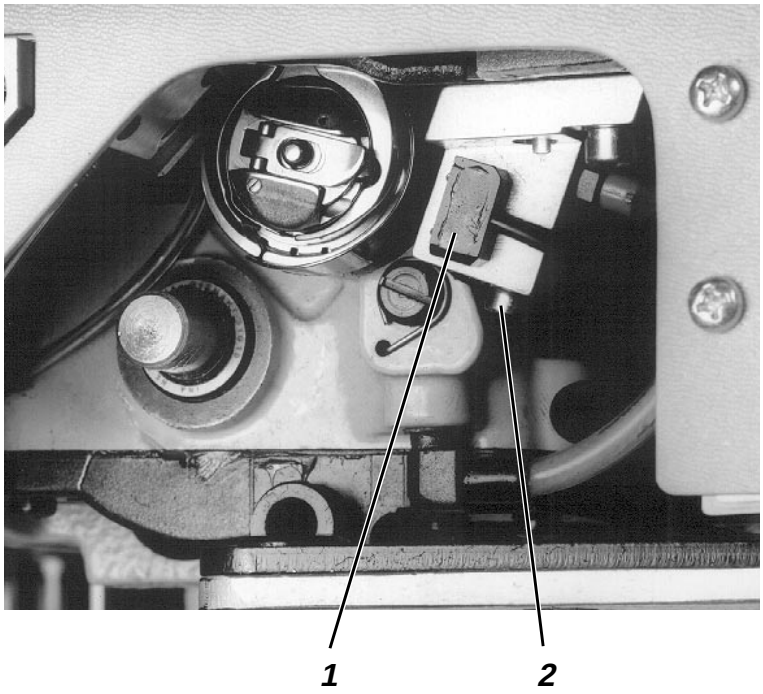
Adjustment

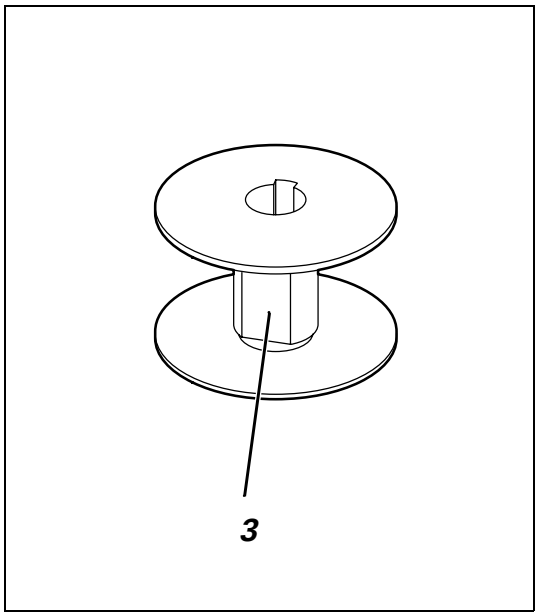
- Align the bobbin-housing holder 6.
  The distance between the retaining tab 3 of the bobbin-housing holder 5 and the lower part of the bobbin housing 4 must be 0.6 $^{+0.1}$ mm.
- Undo screw 2.
- Move the wire so that it is in close contact with the retaining tab or is 0.1 mm away from it.
- Tighten screw 2.

Note

If the holding wire 1 is worn it can be reversed and the other end used.

2.9 Light barrier of residual-thread monitor





Regulation and inspection

If the light barrier is properly aligned a reflection occurs when an empty bobbin is rotated.

The alignment of the light barrier is carried out in program 42.

Caution: danger of injury

Turn off the motor safety switch.
The reflex light barrier may only be aligned with the motor safety switch turned off.

IMPORTANT !

The residual-thread monitor is only operational if the value for the shuttle-thread counter in program 41 has been set to **0000**.

Checking the alignment

- Place an empty bobbin on the sleeve (gauge 5, section 2.1) and insert it in the bobbin housing.
- Move the shuttle by turning the handwheel until the infra-red radiation of the light barrier 1 can fall on the bobbin hub through the light aperture in the bobbin housing (shuttle beak down).
- Set "**program**" switch to **42**.
- Press "**STOP**" button.
  The program is activated.
- Rotate empty bobbin with the sleeve (gauge 5).
  If the infrared radiation from light barrier 1 falls on the reflective surface 3 of the bobbin hub, this must appear in the display:

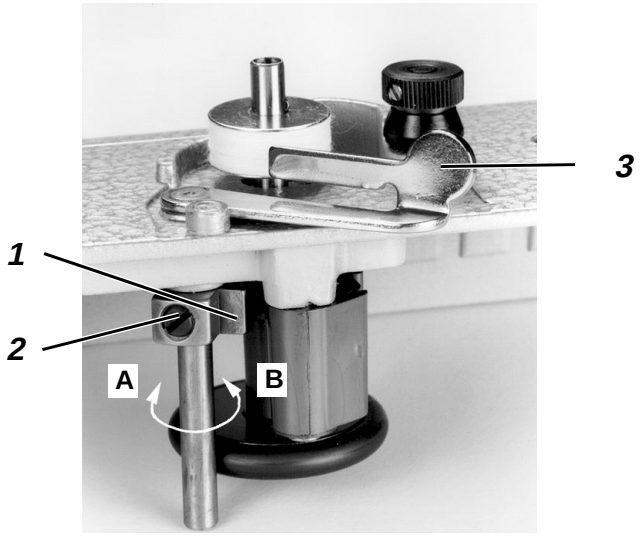
  display with reflection: 

  display with no reflection: 

Adjusting the alignment

- Clean the lenses of the light barrier 1 and the reflection surface 3 of the bobbin hub with a soft cloth.
- Undo clamping screw 2.
- Press the light barrier 1 into the light-barrier holders as far as it will go.
- Gently tighten clamping screw 2.
- Align light barrier.
  Rotate light barrier 1 until appears in the display.
- Re-tighten clamping screw 2.
- Check alignment after clamping and re-adjust if necessary.

2.10 Bobbin winder



Regulation and inspection

The bobbin winder should automatically turn off when the bobbin is fully wound to a point about 0.5 mm under the rim.

Caution: danger of injury

Turn off the main switch.
The bobbin winder may only be adjusted with the sewing machine switched off.

Adjustment

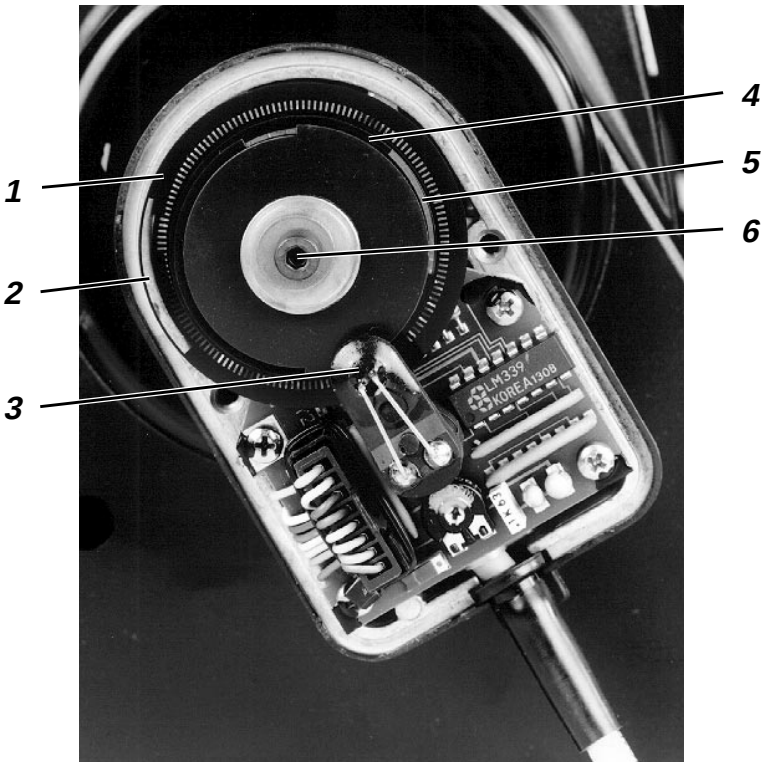
1. Minor adjustments to the wind-on quantity

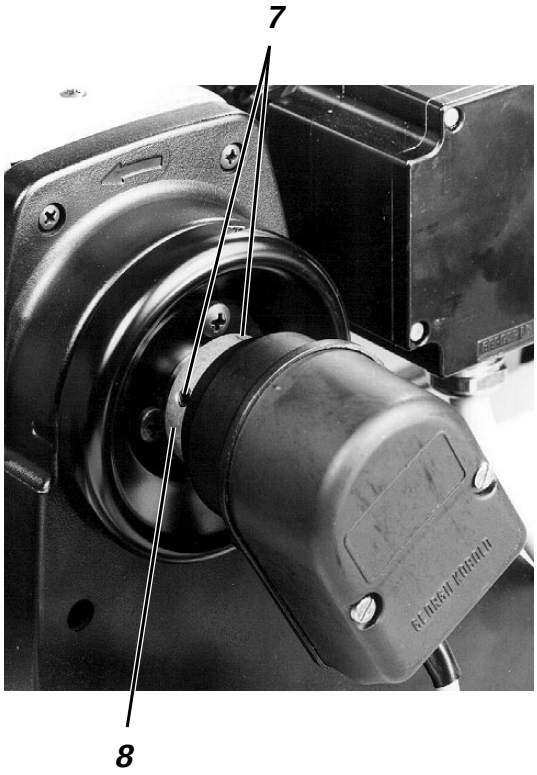
- Bend bobbin-winder flap 3.

2. Major adjustments to the wind-on quantity

- Remove bobbin-winder cover.
- Undo screw 2.
- Rotate trip cam 1:
  in the direction of arrow **A**: to reduce the wind-on quantity
  in the direction of arrow **B**: to increase the wind-on quantity.
- Retighten screw 2.
- Replace bobbin-winder cover.

2.11 Position sensor





Regulation and inspection

After sewing the upper part of the machine must move to position **C** of the adjusting disc.

Caution: danger of injury

Turn off the main switch.
The light apertures may only be adjusted with the main switch turned off.

- Partly undo clamping screw 6.
- Rotate light apertures 1 and 4 so that their light slits 2 and 5 are opposite each other (offset by 180°).
  The position of light aperture 4 also determines the moment at which the thread clipper switches on.
- Tighten clamping screw 6.

IMPORTANT !

The light apertures 1 and 4 must not be rotated when tightening the clamping screw 6.

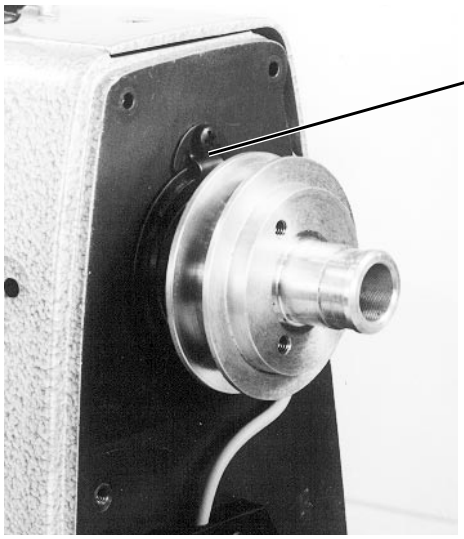
- Turn on the main switch.
- Set the "**program**" switch on the front plate of the control device to a sewing program (**" 10...29 ")**.
- Press the " **P** " button for 3 seconds.
  Set the motor-speed parameter to maximum.
- Place the material in position and start the sewing process.
  IMPORTANT !
  Never start up with no material in place: this may damage the material clamps.
- After the thread is cut the upper part of the machine moves to the second needle position (position **C**).

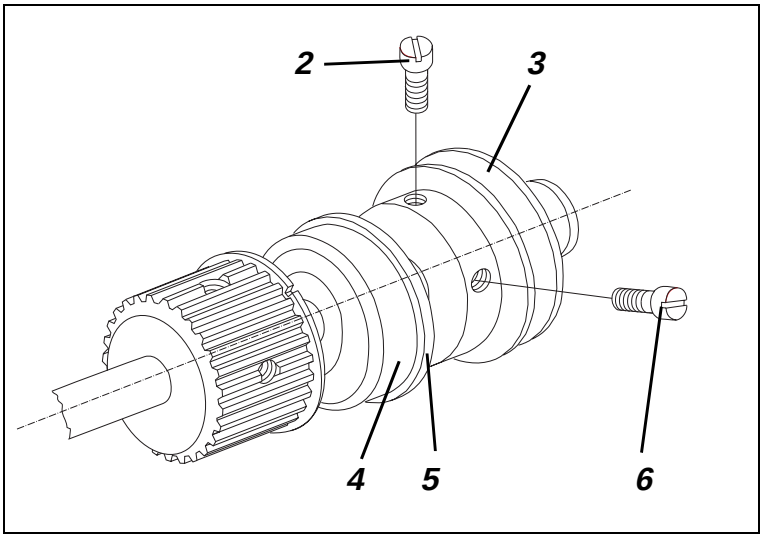
– Check the exact second needle position **C** with the locking pin.
– If the locking pin will not go into notch **C** of the adjusting disc, correct the second needle position.

Adjustment

– Undo both clamping screws 7 on the position-sensor ring 8.
– Hold position-sensor ring 8 steady and rotate handwheel.
– Fully tighten clamping screws 7.
– Carry out sewing process.
– Check the second needle position with the locking pin.
– If necessary, correct the position of the position-sensor ring 8 again.

2.12 Replacing the right-hand arm-shaft bearing





Regulation and inspection

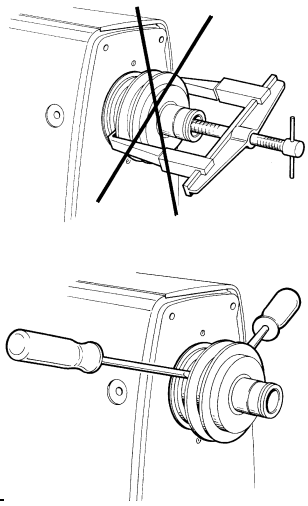
The right-hand arm-shaft bearing must be replaced if the arm shaft does not run smoothly.

Caution: danger of injury

Turn off the main switch.
The arm-shaft bearing may only be replaced with the sewing machine switched off.

IMPORTANT !

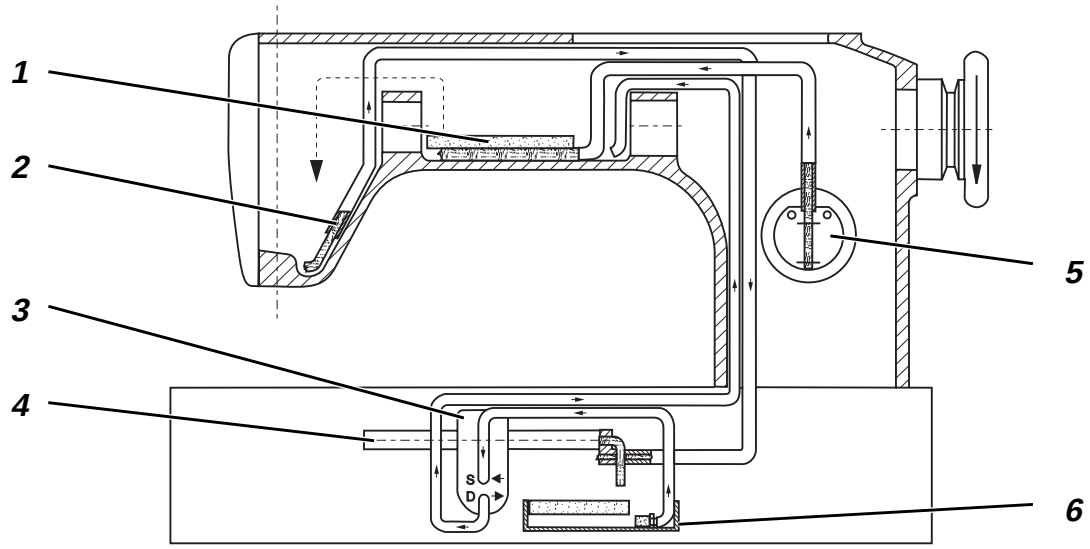
Do not use an extractor tool.
When the right-hand arm-shaft bearing is removed and replaced no axial pressure must be exerted on the arm shaft. Axial pressure in the direction of the head cover will damage the thread lever.



Replacing the arm-shaft bearing

- Remove position sensor, handwheel, arm and head covers.
- Unfasten the belt protector and remove it together with the belt.
- Remove the 2 retaining springs 1.
- Undo screws 2 and 6.
- Carefully prise off the V-belt pulley with 2 screwdrivers or similar.
- Remove the ball-race 4 with the extractor tool and remove circlip 5.
- Fit the circlip to the new ball-race (order no.: 0211 000361) and carefully press the complete unit onto the V-belt pulley.
- Gently tap the V-belt pulley into place with a synthetic hammer.
- Replace in reverse order the parts which have been removed.

2.13 Lubrication



The oil passes from the oil reservoir 5 to the sump 1, from where the lubrications points in the arm and sewing-head regions are supplied with oil.

The oil thrown off by the crank mechanism passes along the wick 2 to the central distributor pipe 4 for the lubrication points located under the base plate. Excess oil drips into the oil-collection tray 6 and is returned to the sump 1 by the pump 3.

This provides effective lubrication with minimum oil consumption.

Caution: danger of injury

Turn off the main switch.
Work on the oil-circulation system may only be carried out with the sewing machine switched off.

IMPORTANT !

After work is completed it is essential to ensure that the hoses are correctly reconnected to the pump.

S = suction

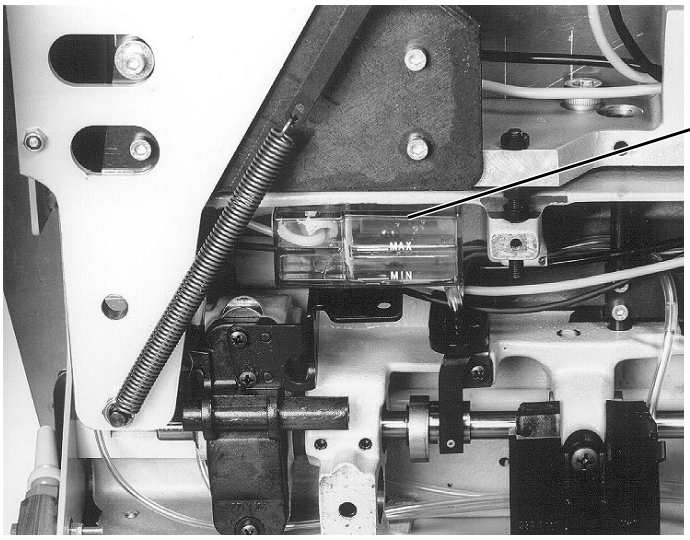
D = pressure

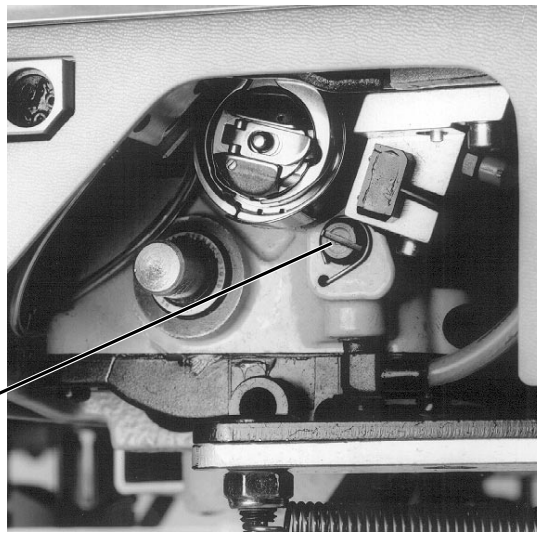
Regulation and inspection

The oil level must be checked every week.

– Check the oil level at the oil reservoir 5.
  The oil level must be between the MIN and MAX marks.
  If necessary top up the oil to the MAX mark.

2.13.1 Shuttle lubrication





Caution: danger of injury

If shuttle lubrication is checked with the sewing machine switched on, the utmost care must be taken.
Oil can cause skin rashes.
Avoid protracted contact with the skin.
In the event of contact, thoroughly wash the affected area.

Turn off the main switch.
Shuttle lubrication may only be adjusted with the sewing machine switched off.

IMPORTANT !

The handling and disposal of mineral oils is subject to legal regulations.
Used oil must be delivered to an authorised acceptance point.
Protect the environment.
Take care that no oil is spilled.

Regulation and inspection

The oil quantity required for shuttle lubrication varies with the sewing yarns and material to be processed.

A piece of paper - ideally blotting paper - held beneath the shuttle should be lightly sprayed with oil when 8-10 stitches are sewn.

Adjustment

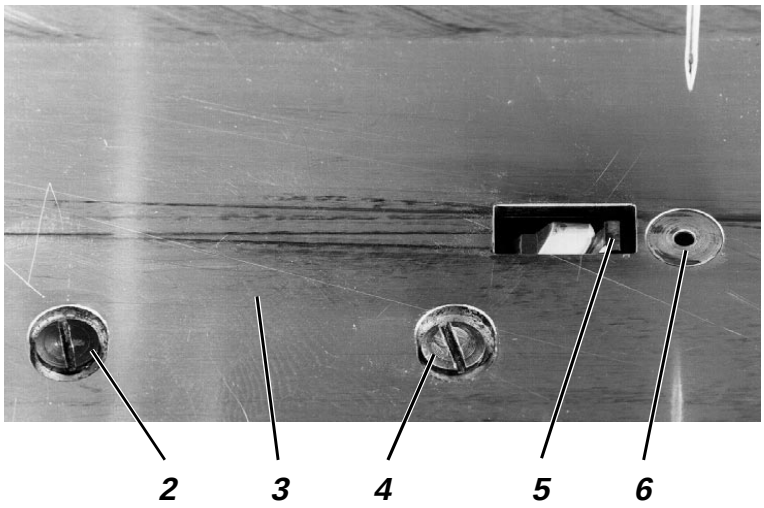
– Adjust screw 2:

anti-clockwise = more oil
clockwise = less oil

1 = shuttle-lubrication oil reservoir

3. Adjusting the sewing machine

3.1 Thread clipper

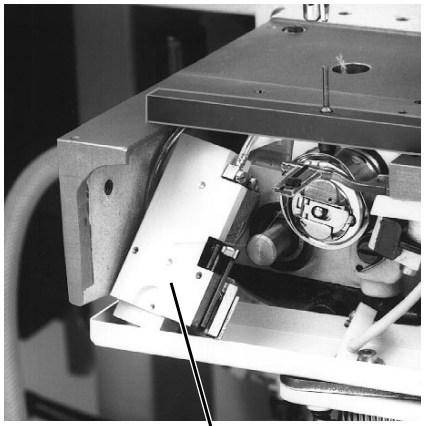


Regulation and inspection

When the thread is being cut the moving blade must be able to move freely in the slit of the shaping module.

Caution: danger of injury

Turn off the main switch.
The thread clipper may only be removed with the sewing machine switched off.



Removing the thread clipper

- Remove shaping module and casing 1.
- Remove screws 2 and 4.
  IMPORTANT !
  Between the slide plate and thread clipper there are 2 shims.
- Mark 3 hoses on the thread clipper 7 and then unscrew them.
- Remove the thread clipper 7.

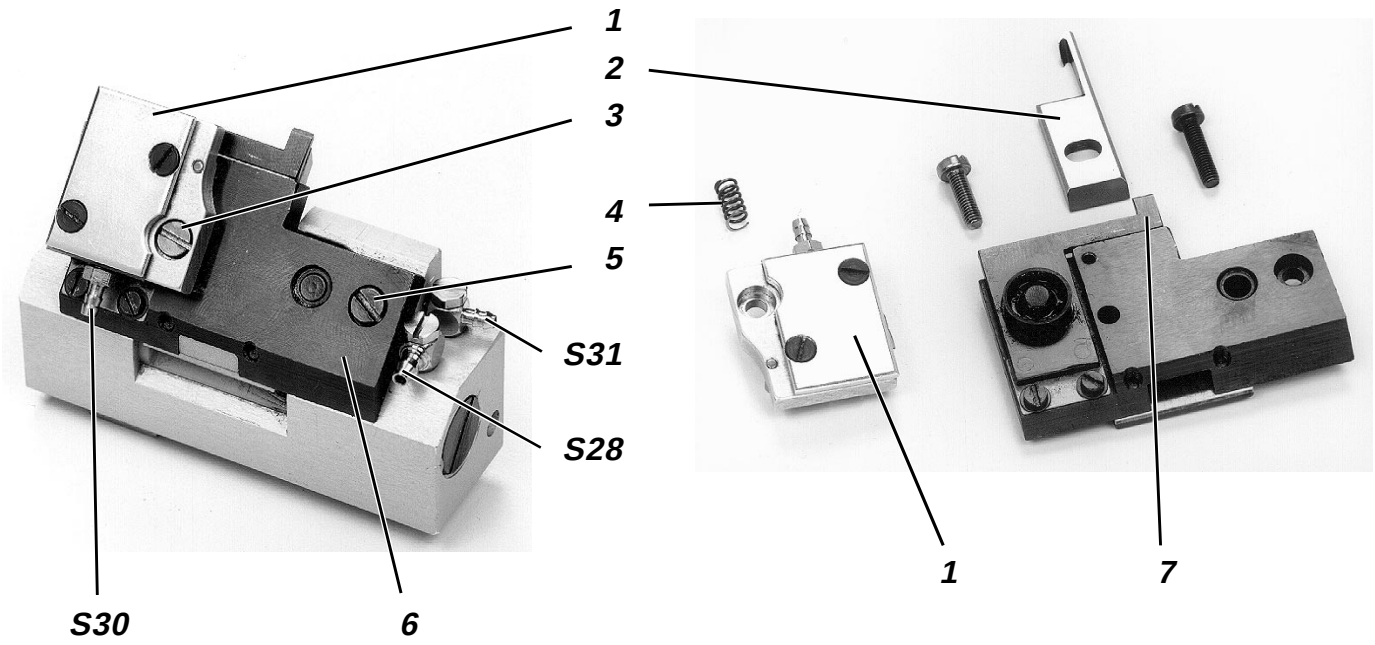
Fitting the thread clipper

- Connect the hoses to the correct connections.
- Attach the thread clipper 7 under the slide plate 3.
  Make sure the hoses cannot be fouled by moving parts.
- Attach screws 2 and 4.
  When the thread is being cut the moving blade must be able to move freely in the slit of the shaping module.
  IMPORTANT !
  When fitting the thread clipper place the shims between the slide plate and thread clipper.
- Replace casing 1 and shaping module.

Function-testing the thread clipper

- The function of the thread clipper 7 can be checked with program 64 (see brief description of Microcontrol).

3.1.1 Fitting and removing the blades



The blades must be replaced and adjusted with the thread clipper removed. The thread must be reliably severed with the minimum possible pressure.

Regulation and inspection

The distance from the edge of the fixed blade 12 to the surface of the body of the clipper is 1.5 mm.

The edge of the moving blade is just beneath that of the fixed blade. This is the case if the distance from the edge of the blade to the surface of the body of the clipper is 2 mm.

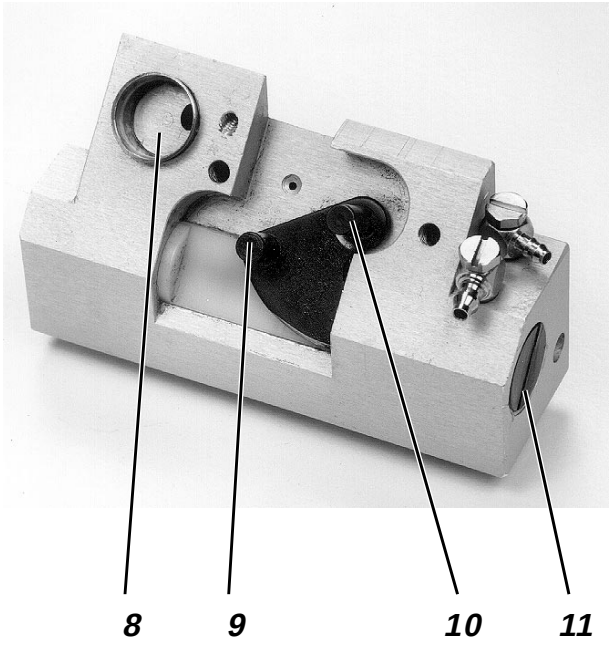
Caution: danger of injury

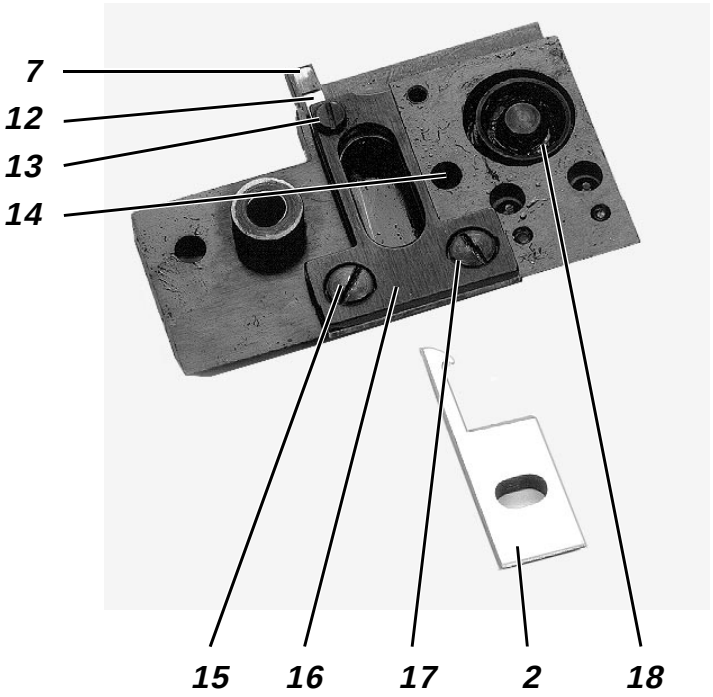
Turn off the main switch.
The thread clipper may only be removed with the sewing machine switched off.
Blades may only be fitted and removed when the thread clipper has been removed.

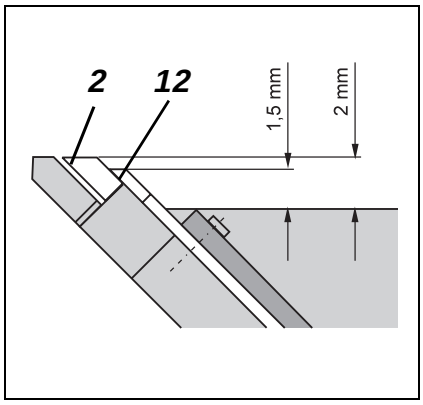
Removing the blades

- Remove thread clipper (see section 3.1).
- Remove screws 3 and 5.
  Remove cover plate 1 and blade-guide plate 6.
  IMPORTANT !
  Do not lose the pressure spring 4.
- Remove moving blade 2 **downwards** from the blade-guide plate 6.
  This is necessary to ensure that the blade is not damaged.
- Undo screws 15 and 17.
  Remove the pressure plate 16.
- Remove blade 12 (fixed blade).

Position markings **S28**, **S30** and **S31** (compressed-air connections) denote the respective solenoid valves.







Fitting the blade

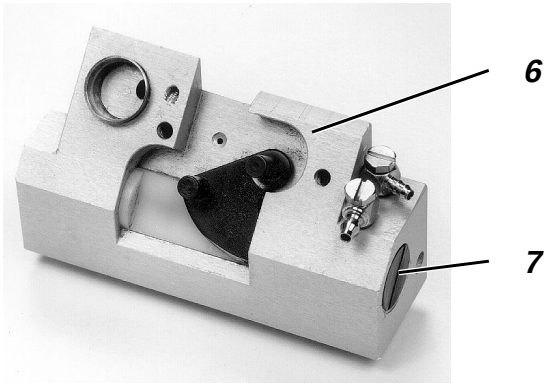
- Screw the blade 12 onto the pressure plate 16.
  The distance from the edge of the blade to the surface of the body of the clipper is 1.5 mm.
- Tighten screws 15 and 17.
- Undo pressure screw 13.
- Fit the moving blade 2 **from below** into the blade-guide plate 6.
  Check that the blade moves freely.
- Tighten the pressure screw 13 and adjust for Cutting pressure.
  The sewing threads must be reliably severed with the minimum possible pressure.
  Carry out a cutting test (see also section on function testing).
  The lower end of screw 13 is split. It may be slightly expanded for a secure fit.
- Fit blade-guide plate 6.
  The collar 18 must engage with the cylinder 8.
  Pin 10 must engage with the hole 14.
  Pin 9 must engage with the slot of the moving blade 2.
- Fit the cover plate 1 with pressure spring 4 onto the blade-guide plate 6.
- Fully tighten screws 3 and 5.

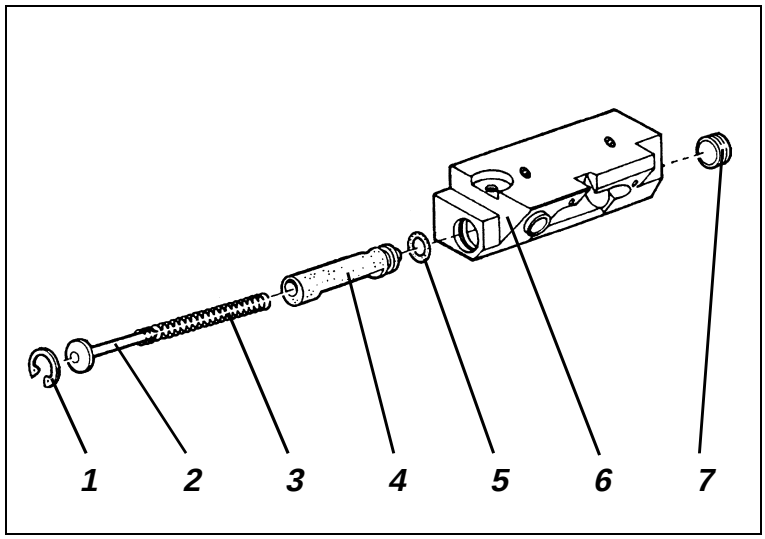
Adjusting the height of the moving blade 2

- The height of the moving blade 2 is adjusted with screw 11.
  If this screw 11 has been unscrewed it must be replaced in the hole together with PTFE tape and screwed in to its previous position.

  The setting of the moving blade 2 must be such that its edge is just beneath the edge of the fixed blade 12. This is the case if the distance from the edge of the blade to the surface of the body of the clipper is 2 mm.

3.1.2 Replacing the piston





The moving blade is raised pneumatically.
The piston 4, which operates the blade, is located in the body of the clipper.

Regulation and inspection

When the piston is replaced it must be adjusted so that the edge of the moving blade is just beneath the edge of the fixed blade 12.

Caution: danger of injury

Turn off the main switch.
The thread clipper may only be removed with the sewing machine switched off.
The piston may only be replaced when the thread clipper has been removed.

IMPORTANT !

The surface of the hole is anodised.
When replacing the piston take care not to damage the anodised layer.

Adjustment

- Remove thread clipper (see section 3.1).
- Remove retaining ring 1.

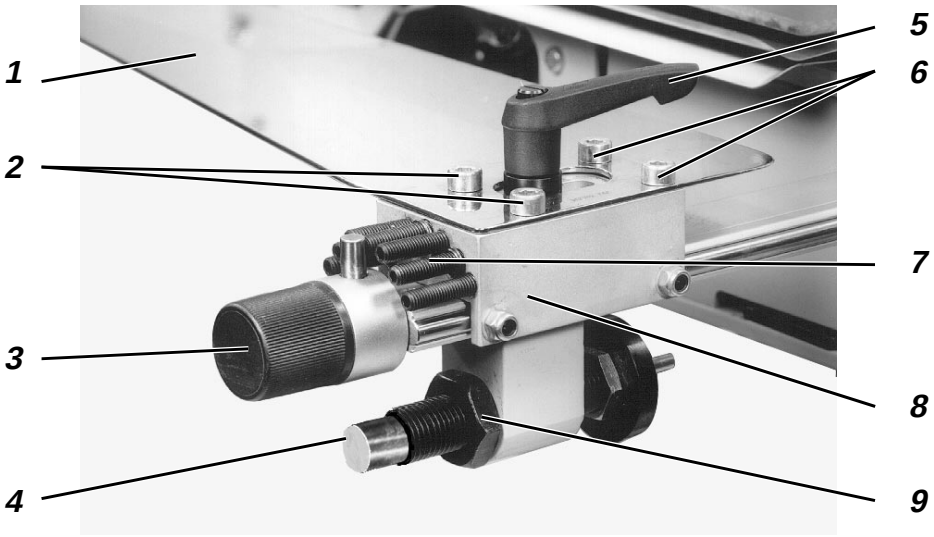
  IMPORTANT !
  Washer 2 is under spring pressure.

- Remove washer 2, pressure spring 3 and piston 4 with O-ring 5.
- Grease the surface of the hole with **ESSO S420** grease.
  (Order no.: 0791 000304)
- Re-assemble the piston in the reverse order.

  If this screw 11 has been unscrewed it must be replaced in the hole together with PTFE tape (see section 3.1.1).

- Fit the thread clipper.
- Carry out a cutting test with sewing threads (test program).

3.2 Folding table



Regulation and inspection

Depending on the thickness of the material the folding plate 1 should be in parallel with the slide plate at a height of between 1 and 1.5 mm above it. The height is determined by the thickness of the material.

In the 0 position the leading edge of the folding plate 1 runs parallel to that of the slide plate.

The insertion depth is determined by the material. The first penetration of the needle into the material should be as close as possible to the fold-over edge.

Caution: danger of injury

Turn off the main switch.
The folding table may only be adjusted with the sewing machine switched off.

Adjustment

1. Adjusting the height

- Unscrew screws 2 and 6.
- Adjust the height of the folding plate 1 by inserting or removing separators (contained in the accessory kit) between the block 8 and the folding plate 1.
- Tighten screws 2 and 6.

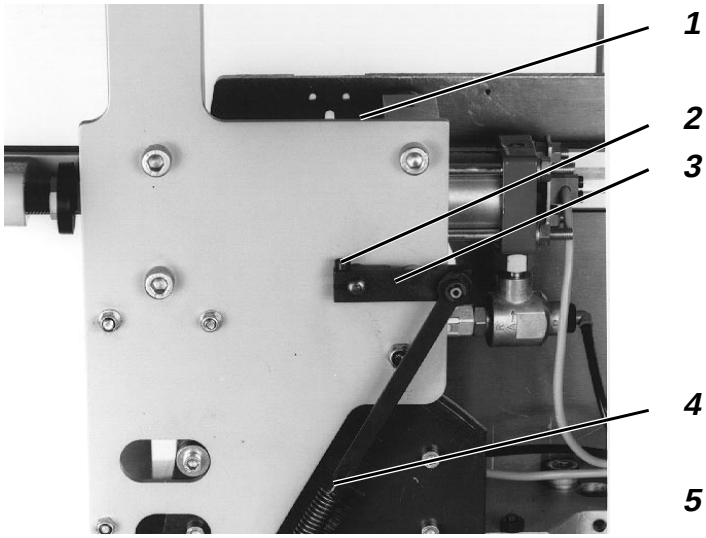
2. Adjusting the position

- Move the swivel arm to the 0° position.
- Undo screws 2 and 6 and the clamping lever 5.
- Align the folding plate 1 in parallel with the slide plate.
  The leading edge of the folding plate should be above the centre of the needle hole and the 0° edge of the scale.
  The depth setting must be adjusted if necessary.
- Retighten screws 2 and 6 and clamping lever 5.

3. Adjusting the insertion depth

- Undo locknut 9.
- Adjust the depth setting 4.
  With medium-heavy material the first penetration of the needle into the material should be as close as possible to the fold-over edge.
- Retighten locknut 9.

3.2.1 Retraction of folding table



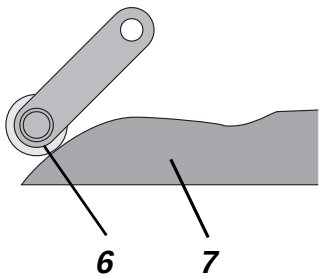
The folding table is extended by a pneumatic cylinder and retracted by a tension spring.

Regulation and inspection

The tension in the spring must be such that with the folding table retracted the lever lies parallel to the edge of the base plate.
The extension movement of the folding table must be rapid, but not instantaneous.

Caution: danger of injury

Turn off the main switch.
The retraction of the folding table may only be adjusted with the sewing machine switched off.
Adjustment work and function testing with the sewing machine running must be carried out with the utmost care.



Adjustment

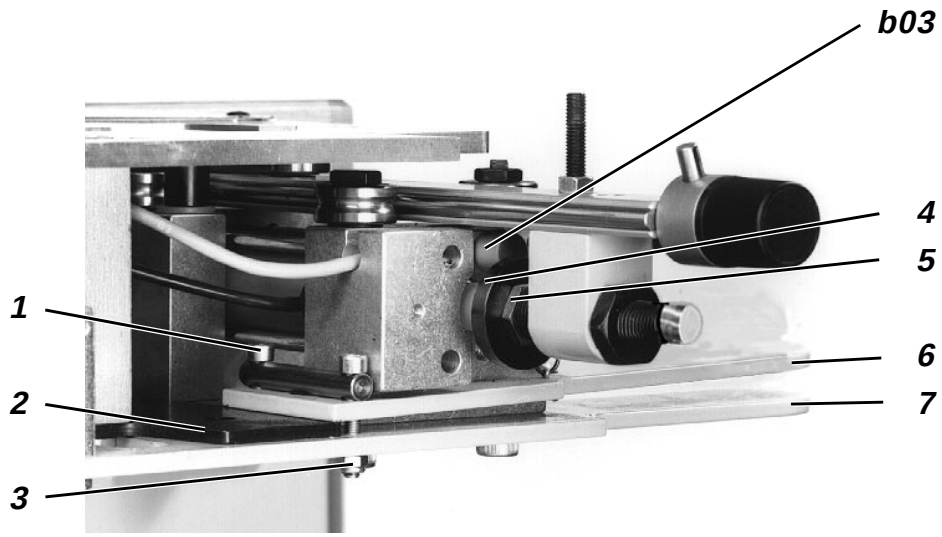
1. Adjusting the retraction of folding table

- Push the folding table in.
- Remove the right-hand casing and detach the tension spring 4.
- Undo screw 2.
- Press the pressure roller 6 onto the control cam 7, at the same time aligning the lever 3 in parallel with the edge 1 of the base plate and tighten screw 2.
  The axial play in the shaft must not exceed 0.5 mm.
- Re-attach the tension spring 4.

2. Adjusting the extension speed

- Adjust the extension speed of the folding table at the throttle valve.
  The movement should be rapid, but not instantaneous.
  The throttle valve can be reached through hole 5.

3.2.2 Angle adjustment, switch point b03



The angle is adjusted manually. The manual grip is compressed and the angle adjusted in accordance with the scale.

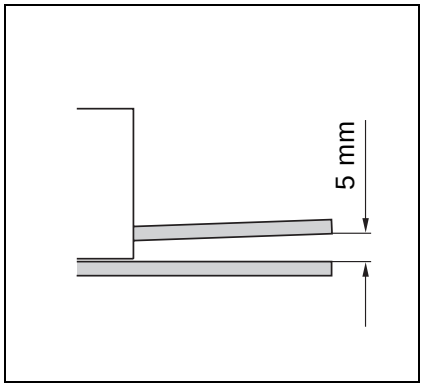
Regulation and inspection

The angle set must be kept constant with the brake.

When the table is in the forward position the proximity switch **b03** must operate.

Caution: danger of injury

Turn off the main switch.
The angle adjustment may only be adjusted with the sewing machine switched off.
Adjustment work and function testing with the sewing machine running must be carried out with the utmost care.



Adjustment

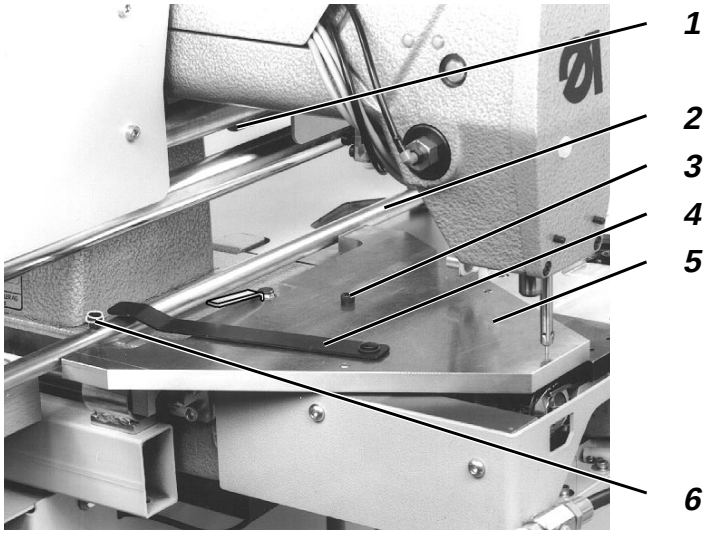
1. Angle adjustment

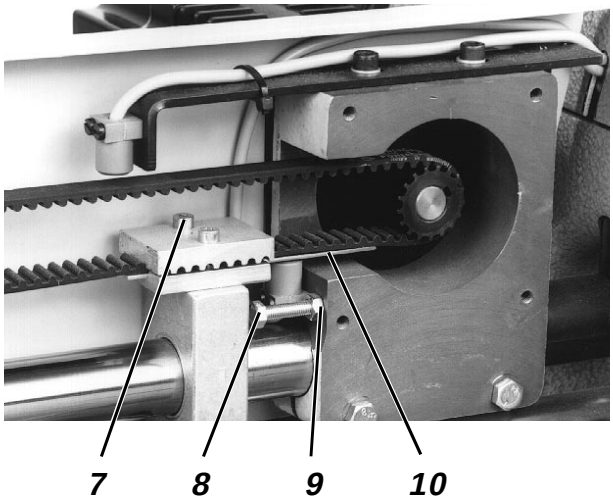
– Tighten 2 screws 1.
  The manual grip 6 must press uniformly on the pressure plate 2.
  The distance of the manual grip 6 to the base plate 7 is about 5 mm on the outer edge.
– Tighten locknuts 3.

2. Adjusting the switch point for b03

– Adjust switch with program 63.
– Undo locknut 5.
– Rotate the index ring 4 until the proximity switch **b03** operates securely (see display).
– Tighten locknut 5.

3.3 Transport carriage





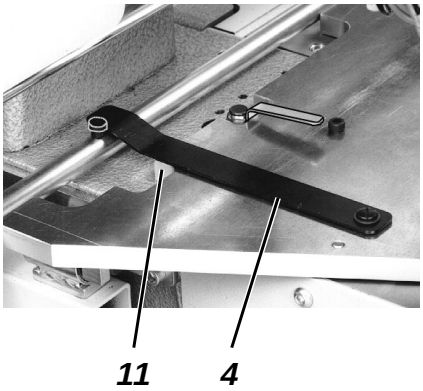
The transport carriage holds the shaping module and moves it in accordance with the seam pattern.

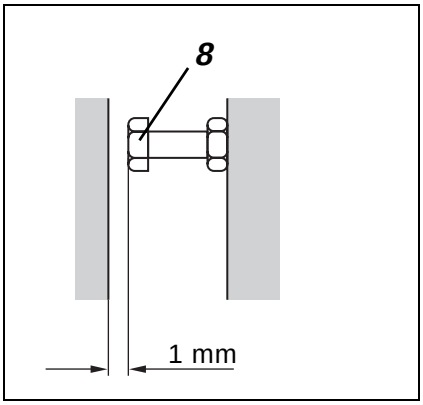
Regulation and inspection

The transport carriage must be at an angle of 90° to the arm shaft.
The reference point must be adjusted with the gauge.

Caution: danger of injury

Turn off the main switch.
The transport carriage may only be adjusted with the sewing machine switched off.
Adjustment work and function testing with the sewing machine running must be carried out with the utmost care.

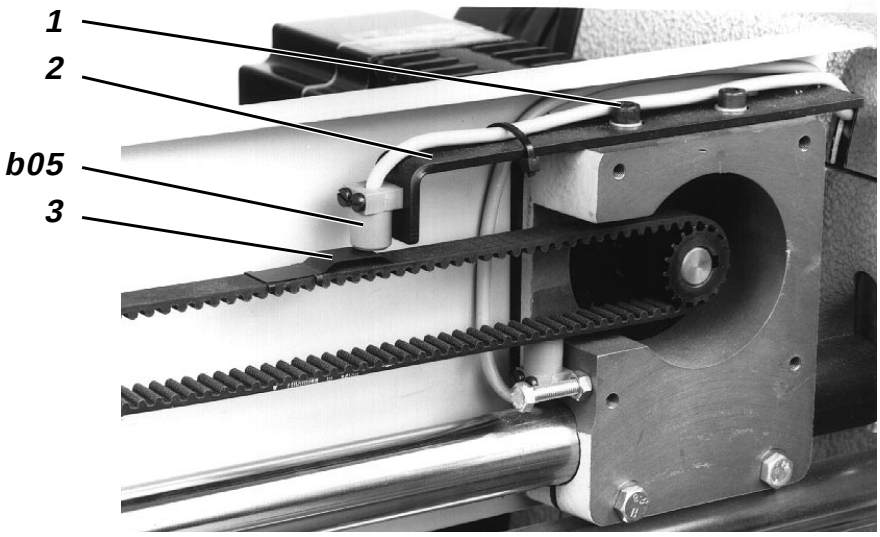




Adjustment

- Remove the shaping module and slide plate (see section 2.5).
- Place the gauge 5 (order no. 0935 107077) on the base plate of the sewing machine and attach it with screw 3.
- Undo 2 screws 1.
- Align the transport carriage with the gauge.
  The shaft 2 must be in contact with the gauge.
- Tighten 2 screws 1.
- Align the stop plate 4 at about 5° (anti-clockwise) to the surface 11 of the gauge 5.
- Move the transport carriage about 100 mm to the left.
- Select program 01 (sewing program) and turn on the main switch.
  When the display **" <--- REF ---> "** or **" REF ---> "** appears press the **" Σ "** button.
  The transport carriage moves to the reference position.
  The position of the stop plate 4 is altered by the pin 6. In this position the stop plate 4 must be in close contact with the edge 11 of the gauge.
- If it is not, undo screws 7 and adjust the switch plate 10.
- Check positioning again.
- Adjust stop screw 8 and secure with locknut 9.
  The distance between the support and the screw head is about 1 mm.

3.3.1 Overrun protection



Regulation and inspection

Overrun protection on the left of the transport carriage is provided by proximity switch **b05**.

Caution: danger of injury

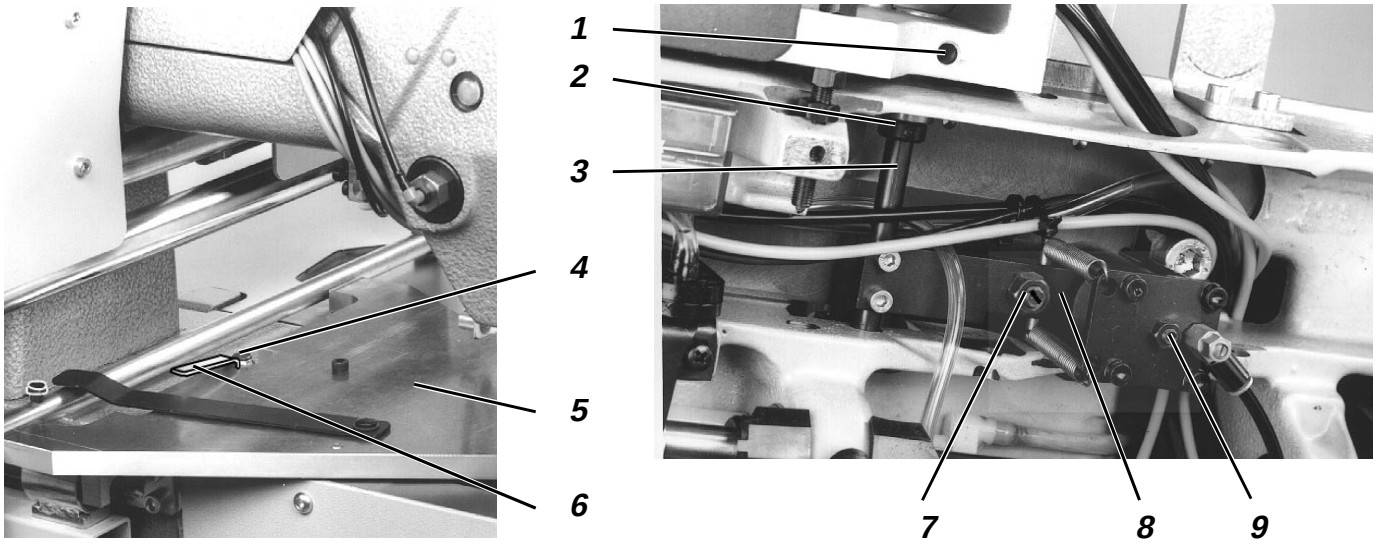
Turn off the main switch.
Overrun protection may only be adjusted with the sewing machine switched off.
Adjustment work and function testing with the sewing machine running must be carried out with the utmost care.

Adjustment

- Adjust the height of proximity switch **b05** so that the switch plate 3 can pass through without a gap.
  If this is not the case, bend the tab 2.
- Push the transport carriage manually to its left-hand end position.
- Select program **62** and turn on the main switch.
  Press **"STOP"** button.
  Set the **"program"** switch to **05**.
- Push the switch plate 3 towards the proximity switch until this operates securely.
  Bend the lugs of the plate into the nearest tooth gaps.
- Undo 2 screws 1.
- Move tab 2.
  This carries out the fine adjustment of the switch point.
- Retighten 2 screws 1.
- Check the switch function.

3.4 Shaping module

3.4.1 Shaping-module guide roller



Regulation and inspection

The position of the guide roller 4 is adjusted with gauges 5 and 6.

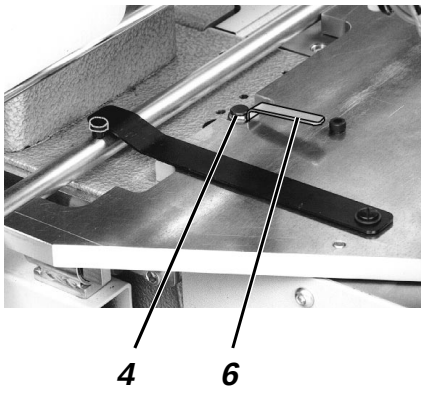
The pneumatic cylinder 8 is only needed for seams with a small radius of curvature.

Caution: danger of injury

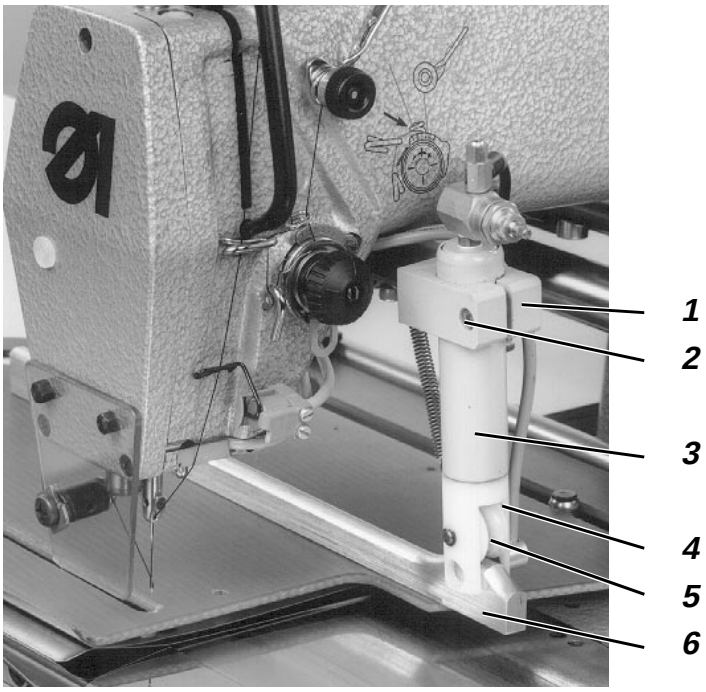
Turn off the main switch.
The guide roller may only be adjusted with the sewing machine switched off.

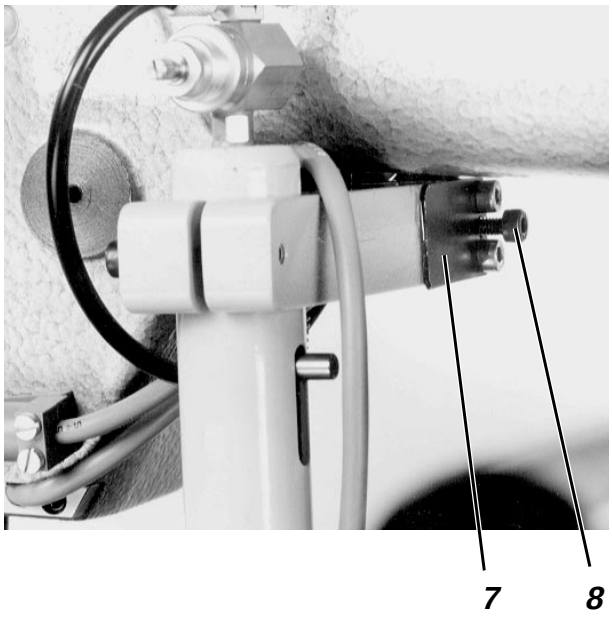
Adjustment

- Remove the shaping module and slide plate (see section 2.6).
- Place gauge 5 (order no. 0935 107077) on the base plate of the sewing machine and attach it with screw 3.
- Pivot the upper part of the machine to the left.
- Undo adjusting rings 1 and 3.
  Move the shaft 2 until the guide roller 4 is at a distance of 1 mm from the first surface of the gauge 5.
  Check the distance with gauge 6 (order no. 0933 080200).
- Re-attach adjusting rings 1 and 3.
- Undo the locknut and unscrew screw 7 a few turns.
- Screw 9 presses on the piston rod.
  Turn screw 9 until the guide roller 4 is at a distance of 1 mm from the second surface of the gauge 5.
  Check the distance with gauge 6.
- Tighten locknut onto screw 9.
- Screw in screw 7 as far as it will go and lock it.
- Use gauge 6 to check that the guide roller is at a distance of 1 mm from both surfaces of the gauge 5.
  If it is not, repeat the process.



3.4.2 Shaping-module pressure cylinder





Regulation and inspection

The pressure cylinder 3 closes the shaping module.
The clamping frame 1 is supported on a shaft. The pressure cylinder 3 is free to swing. The return movement is carried out by the spring plate 7. When the shaping module is fitted the roller bracket is opposite the control cam 6.

Caution: danger of injury

Turn off the main switch.
The pressure cylinder may only be adjusted with the sewing machine switched off.

Adjustment

1. Adjusting the height.

- Turn the handwheel until the needle is at top dead centre.
- Move the shaping module. The guide roller 5 of the pressure cylinder 3 must press on the curve of control cam 6.
- Undo screw 2 and move the pressure cylinder 3 in the clamping frame 1.
  The distance between the tip of the needle and the upper side of the shaping module is 2.5 mm. The inner surfaces 4 of the roller bracket must be parallel to the control cam 6.
- Retighten screw 2.

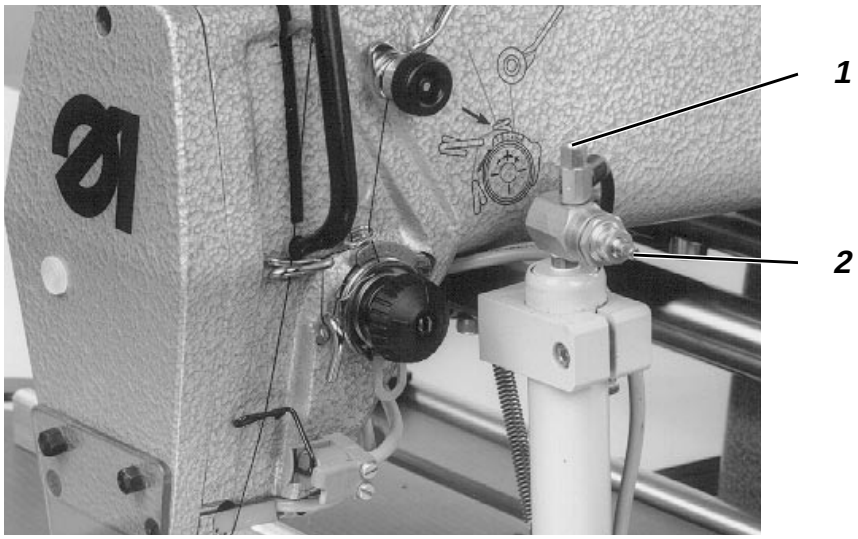
2. Adjusting the spring plate 5.

- Undo clamping screw 8.
- Move the spring plate 7 along the shaft.
  5 mm of the spring plate must be in contact with the clamping frame.
  The guide roller 5 is above the centre of the control cam.
- Retighten clamping screw 8.

IMPORTANT !

The slide surface of the spring plate 7 must always be kept greased.

3.4.3 Shaping-module closing movement



Regulation and inspection

The closing movement for the shaping module is determined by the throttle and the closing force by the pressure regulator.
The closing movement of the pressure cylinder must be rapid, but not instantaneous.
The material must be properly transferred with the minimum possible pressure.

Caution: danger of injury

Adjustment work and function testing with the sewing machine running must be carried out with the utmost care.

Adjustment

1. Adjusting the closing movement

– Adjust the throttle 1.

2. Adjusting the closing force

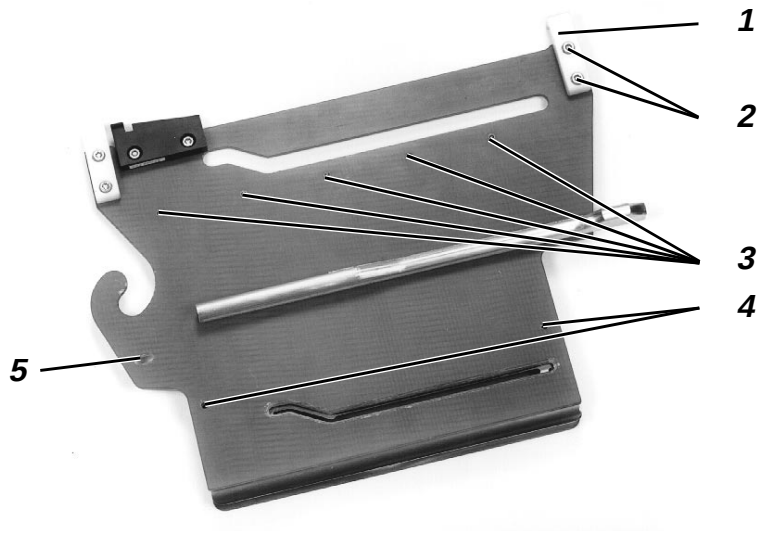
– Activate program 64 (select output elements).
  Press **"STOP"** button and set **"program"** switch to **32**.
– Check that the material is properly transferred.
  Place the thinnest material in position and push in the folding table. Press the **"Σ"** button. The cylinder is operated.
  Check that the material is securely held.
– Adjust the pressure regulator:

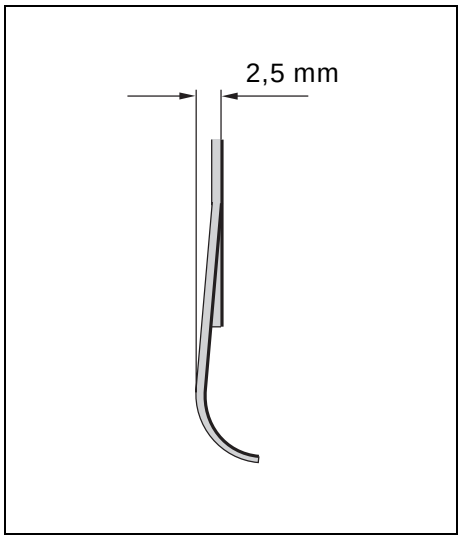
  to increase pressure: screw in tap screw 2
  to decrease pressure: unscrew tap screw 2

  The material must be properly transferred with the minimum possible pressure.

IMPORTANT !
If the pressure is insufficient the pressure cylinder is not vented.

3.4.4 Adjusting the shaping module





The sewing machine can be fitted with various shaping modules for different seam patterns.
See section 2.12 of the Operating manual.

Regulation and inspection

The shaping module must be mounted on the support shaft with no play.
The material clamps must be fitted so that the adjusting pins (gauge 1, section 2.1) can be inserted through holes 4.
The pressure of the folding rims (pre-tension of the material clamps) is determined by the curvature of the shaping module.

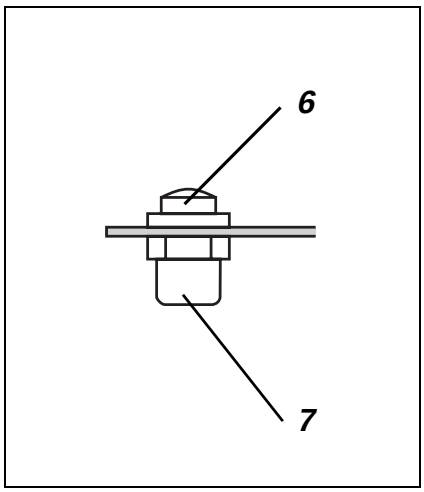
Caution: danger of injury

Turn off the main switch.
Remove the shaping module from the sewing machine and adjust it.

Adjustment

1. Adjusting the holding claws

– Undo the attachment screws 2 of the holding claws 1.
– The shaping module must be mounted on the support shaft with no play.
  Otherwise adjust the position of holding claws 1 and 6.
– Retighten attachment screws 2.



2. Adjusting the position of the material clamps

– Compress the shaping module (to the same dimensions as in the sewing machine).
  It must be possible to pass the adjusting pins through the holes 4.
  If it is not, undo the screws 3 and adjust the plates accordingly.

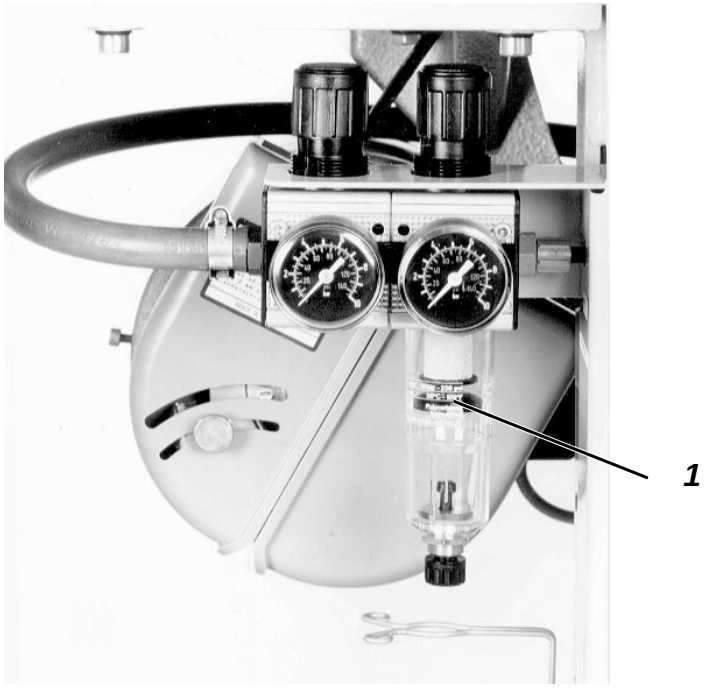
3. Adjusting the pressure of the folding rims

– Bend the material clamps to the correct curvature.
  Standard setting: 2.5 mm.
  The distance must be the same along the entire length of the material clamp. The distance must also be the same for both plates.

4. Using the shaping module on the 743-121 sewing machine

– The shaping modules of the **743-221** do not have stop 7.
  If the shaping module is to be used on the **743-121**, fit stop 7 into slot 5 with nut 6.
  The stop must be adjusted. See the **743-121** service manual.

4. Maintenance unit



The maintenance unit protects the sewing machine from water and particles of dirt in order to avoid blockages and rust formation in the pneumatic system.

Regulation and inspection

The water level in the pressure regulator must not reach the filter.

The filter insert 1 must be cleaned every 160 hours.

Caution: danger of injury

Turn off the main switch.
Isolate the sewing machine from the compressed-air supply.

The filter may only be cleaned when the system has been depressurised.

- Blow the water out of the water separator under pressure.
- Wash the filter holder and filter insert 1 with petroleum ether. Blow the filter insert 1 clean with the compressed-air gun.

Important !

Do not use solvents to wash the filter holder and filter insert.

They destroy the filter holder.

5. Maintenance

Caution: danger of injury

Turn off the main switch.
Maintenance of the sewing machine may only be carried out when it is switched off.

The maintenance work to be carried out daily or weekly by the sewing machine's operating personnel (cleaning and lubrication) is described in part 1: Operating manual. It is given in the following table for the sake of completeness.

Work to be carried out	operating hours			
	8	40	160	500
upper part of machine				
clean up dust, lint and thread fragments in the region of the shuttle and needle plate	X			
clean light barrier	X			
check oil level in reservoir		X		
check oil level in shuttle-lubrication reservoir		X		
check shuttle lubrication			X	
clean lenses of residual-thread monitor	X			
check cogged belt				X
sewing machine				
clean motor-fan screen	X			
check condition and tension of V-belt				X
clean filter for stepping-motor drive	X			
inspect condition and tension of transfer-carriage V-belt				X
lubricate laminated spring on pressure cylinder		X		
pneumatic system				
check water level in pressure regulator	X			
clean filter insert in maintenance unit			X	
check system impermeability			X	

6. Summary of adjustments

IMPORTANT !

Adjustments to the sewing machine must be carried out in the order given.

no.:	subject	section	correct adjustment	correction
arm-shaft crank				
1	position of adjusting disc	2.3	groove and notch **A** in line	rotate cogged-belt pulley
upper-thread tensioner				
2	upper-thread tensioner release	2.4	distance of tension discs: 1mm when closed	move cylinder
3	thread take-up spring	2.5	spring travel: keep upper thread under tension until tip of needle has penetrated material spring tension: about 20 to 30 cN	rotate bush adjust tension bolt
needle-bar height				
4	needle-bar height	2.7	set with gauge	move needle bar
shuttle settings				
5	shuttle-drive housing	2.7.2	distance between shuttle and bush 0.4 mm. distance between slide surface and thread-drawing plate 3.8 mm.	adjust housing laterally adjust stop screw in base plate
6	loop lift	2.7.1	in position **A** shuttle beak at centre of needle and distance from shuttle beak to furrow: 0.1 mm	adjust shuttle
7	bobbin-housing holder	2.8	distance from retaining tab to housing: $0.6^{+0.1}$ mm	bend retaining tab
residual-thread monitor				
8	light barrier	2.9	reflection on turning empty bobbin	align light barrier
bobbin winder				
9	filling level of bobbin	2.10	to 0.5 mm beneath bobbin rim	rotate switch cam
position sensor				
10	positioning	2.11	move to position **C** after sewing process	rotate position-sensor ring
thread clipper				
11	position of the thread clipper	3.1	moving blade must be able to move freely in shaping-module slit while thread is being cut	align thread clipper
12	fixed blade	3.1.1	must protrude 1.5 mm from body of clipper	move blade
13	moving blade	3.1.1	must protrude 2 mm from body of clipper	move blade
14	cutting pressure	3.1.1	cut safely with minimum pressure	adjust pressure screw

no.:	subject	section	correct adjustment	correction
folding table				
15	height	3.2	1 to 1.5 mm parallel to and above slide plate height is determined by thickness of material	add intermediate layers
16	position	3.2	parallel to slide plate - leading edge above centre of needle hole and 0° mark on scale	align folding plate
17	insertion depth	3.2	first penetration as close as possible to folding edge	adjust depth setting
18	retraction of folding table	3.2.1	tension of tension spring such that lever is parallel to base plate	align lever
19	extend folding table	3.2.1	movement rapid but not instantaneous	adjust throttle
20	angle adjustment	3.2.2	distance of manual grips on outer edge about 5 mm	adjust distance
21	switch point b3	3.2	with table in forward position proximity switch must operate safely	rotate index ring
transport carriage				
22	angle	3.3	90° to arm shaft.	adjust with gauge
23	position	3.3	check reference point with gauge	adjust switch plate
24	overrun protection	3.3.1	transport carriage in left-hand end position	adjust switch plate
shaping module				
25	guide roller	3.4.1	align position with gauges: distance to needle position in direction of travel of transport carriage	 adjust position of pistons in pneumatic cylinder move shaft
26	position of pressure cylinder	3.4.2	needle at top dead centre and guide roller on curve of control cam: distance between tip of needle and upper side of shaping module 2.5 mm inner surfaces of roller bracket parallel to control cam	 move cylinder rotate cylinder
27	spring plate on pressure cylinder	3.4.2	5 mm must be in contact with clamping frame	move spring plate
28	closing movement	3.4.3	rapid but not instantaneous	adjust throttle
29	closing force	3.4.3	hold material securely with minimum pressure	adjust pressure regulator
30	holding claws	3.4.4	shaping module must be mounted on support shaft with no play	move holding claws
31	material clamps	3.4.4	adjusting pins must go into inspection holes	adjust plates
32	pressure of folding rims	3.4.4	curvature of material clamps 2.5 mm.	bend material clamps