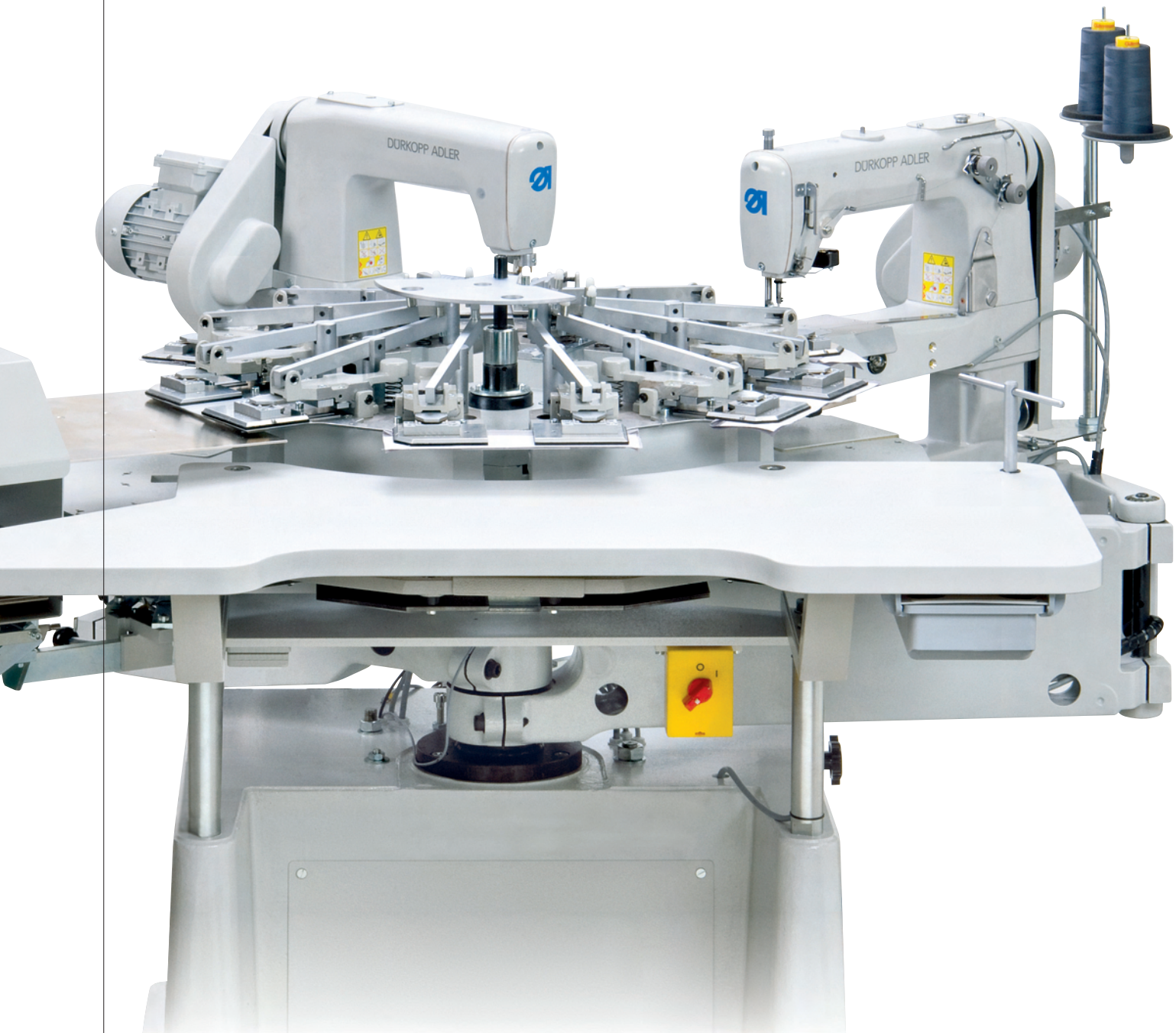
DÜRKOPP ADLER

971-01

Service Instructions



IMPORTANT
READ CAREFULLY BEFORE USE
KEEP FOR FUTURE REFERENCE

1 About these operating instructions

1.1 Scope of application of the instructions

These instructions describe setting and maintenance work on the sewing machine 971. They apply to all subclasses.

The 🕮 *Operating Instructions* describe the intended use and set-up.

1.2 For whom are these operating instructions intended?

The operating instructions are intended for:

- Specialized staff:
  This group of employees has the appropriate technical training allowing them to perform maintenance or to repair faults.

With regard to minimum qualification and other requirements to be met by the personnel, please also refer to 🕮 *2 Safety*, pg. 7.

1.3 Representational conventions – Symbols and characters

Various items of information are depicted or highlighted in these operating instructions by the following characters to make them easier to understand:

Correct setting

Indicates the correct setting.

Faults

Indicates faults that can occur due to an incorrect setting.

Cover

Indicates which covers must be removed in order to access the components to be set.

Steps to be performed when operating the machine (sewing and equipping)

Steps to be performed for servicing, maintenance and installation

Steps to be performed via the software control panel

The individual steps are numbered:

1. 1. First step
2. 2. Second step

The sequence of the steps must always be followed.

- Lists are identified by bullet points.

Result of performing an operation

Change to the machine or on the display/control panel

Important

Special attention must be paid to this point when performing a step.

Information

Additional information, e.g. on alternative operating possibilities.

Sequence

Specifies the work to be performed before or after a setting.

References

A reference is provided to another place in the text.

Safety

Important warnings for the user of the machine are specifically marked. Since safety constitutes an area of major importance, hazard symbols, levels of risk, and their signal words are described separately in *2 Safety*, pg. 7.

Location information

Information on where something is positioned using the terms *right* or *left* must always be regarded from the operator's viewpoint if the figure gives no other obvious indication for determining the location.

1.4 Other documents

The machine contains built-in components from other manufacturers. The respective manufacturers have carried out hazard assessments for these purchased parts and confirmed compliance of the design with the applicable European and national regulations. The intended use of the built-in components is described in the corresponding manuals of the manufacturers.

1.5 Liability

All information and notes in these instructions have been compiled in accordance with the latest technology and the applicable standards and regulations.

The manufacturer cannot be held liable for any damage due to:

- Damage during transport
- Failure to observe these instructions
- Improper use
- Unauthorized modifications to the machine
- The deployment of untrained personnel
- Using unapproved spare parts

1.5.1 Transportation

Dürkopp Adler cannot be held liable for any damage during transport. Check the delivered product immediately after receiving it. Report any damage to the last transport carrier. This also applies if the packaging is not damaged.

Keep the machines, devices and packaging material in the condition they were in at the time when the damage was identified. This secures any claims against the transport company.

Report all other complaints to Dürkopp Adler immediately after receiving the product.

1.5.2 Intended use

The Dürkopp Adler 971-01 is for sewing very light to moderately heavy material.

The machine is only intended for processing dry material. The material must not contain any hard objects.

The stitching is generally created with sewing threads made of textile fibers of sizes 80/2 Nm (synthetic) or 140/3 Nm (core spun thread). If other threads are to be used, the resultant risks must be assessed beforehand and corresponding safety measures taken.

The machine is intended for industrial use.

The machine may only be set up and operated in dry conditions on well-maintained premises. If the machine is operated on premises that are not dry and well-maintained, then further measures may be required which must be compatible with EN 60204-31.

Only authorized persons may work on the machine.

The manufacturer will not be held liable for damage resulting from improper use.

WARNING

Danger due to high voltage, crushing and sharp objects!

Improper use can result in injuries.

Please follow all instructions provided.

NOTE

Improper use could result in material damage.

Please follow all instructions provided.

2 Safety

This section contains basic instructions for your safety. Read the instructions carefully before setting up or operating the machine. Make sure to follow the information included in the safety instructions. Failure to do this can result in serious injury and damage to the machine.

2.1 Basic safety instructions

The machine may only be used as described in these operating instructions.

The operating instructions must be available at the machine's location at all times.

Work on live components and equipment is prohibited. Exceptions are defined in the specifications in DIN VDE 0105.

For the following work, the machine must be disconnected from the power supply using the main switch or by disconnecting the power plug:

- Replacing the needle or other sewing tools
- Leaving the workplace
- Performing maintenance work and repairs
- Threading

Missing or faulty spare parts could impair safety and damage the machine. Therefore only use original spare parts from the manufacturer.

Transportation

Use a lifting carriage or forklift to transport the machine. Raise the machine max. 20 mm and secure it against slipping.

Set-up

The connecting cable must have a power plug approved in the relevant country. The power plug may only be connected to the power cable by a qualified specialist.

Operator's obligations

Observe the country-specific safety and accident prevention regulations and the legal regulations concerning industrial safety and the protection of the environment.

All warnings and safety signs on the machine must always be in legible condition and may not be removed. Missing or damaged labels must be replaced immediately.

Requirements to be met by the personnel

The machine may only be set up by qualified specialists.

Maintenance work and repairs may only be carried out by qualified specialists.

Work on electrical equipment may only be carried out by qualified specialists.

Only authorized persons may work on the machine. Every person who works on the machine must first have understood the operating instructions.

Operation

Inspect the machine while in use for any externally visible damage. Interrupt your work if you notice any changes to the machine. Report any changes to your supervisor. A damaged machine must not be used any further.

Safety equipment

Safety equipment may not be removed or put out of service. If this cannot be avoided for a repair operation, the safety equipment must be refitted and put back into service immediately afterward.

2.2 Signal words and icons used in warnings

Warnings in the text are distinguished by color bars. The color scheme is oriented towards the severity of the danger. Signal words specify the severity of a danger.

Signal words

Signal words and the hazard they describe:

Signal word	Meaning
DANGER	(with hazard symbol) Non-compliance will result in death or serious injury
WARNING	(with hazard symbol) Non-compliance can result in death or serious injury
CAUTION	(with hazard symbol) Non-compliance can result in moderate or minor injury
NOTE	(without hazard symbol) Non-compliance can result in material damage

Symbols

In the case of danger to personnel, the following symbols indicate the type of hazard:

Symbol	Type of danger
	General information
	Electric shock

Symbol	Type of danger
	Sharp objects
	Crushing
	Environmental damage

Examples Examples of the layout of the warnings in the text:

DANGER

Type and source of the danger!

Consequences in the event of noncompliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that will result in serious injury or even death if the warning is not complied with.

WARNING

Type and source of the danger!

Consequences in the event of noncompliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that could result in serious injury or even death if the warning is not complied with.

CAUTION

Type and source of the danger!

Consequences in the event of noncompliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that could result in moderate or minor injury if the warning is not complied with.

ATTENTION

Type and source of the danger!

Consequences in the event of noncompliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that could result in environmental damage if the warning is not complied with.

NOTE

Type and source of the danger!

Consequences in the event of noncompliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that could result in material damage if the warning is not complied with.

3 Work fundamentals

3.1 Sequence of settings

Comply with the sequence

Always comply with the sequence of individual setting steps as specified.

It is absolutely essential that you comply with all notices regarding prerequisites and subsequent settings that are marked with in the margin.

NOTE

Machine damage possible due to the incorrect sequence.

It is essential that you comply with the sequence of work steps specified in these instructions.

3.2 Cable guidance

Joining cables

Ensure that all cables are laid in the machine such that the function of moving parts is not hampered.

1. Lay cables that are too long in tidy loops.
2. Bind together the cable loops with cable ties.

   Tie loops wherever possible to fixed parts.
   The cables must be secured firmly.

3. Cut off the extending ends of cable ties.

NOTE

Machine damage and function disruptions are possible due to incorrectly laid cables.

Excess cables can impair the functioning of moving machine parts. This impairs the sewing function and can result in damage.

Excess cable should therefore be laid as described above.

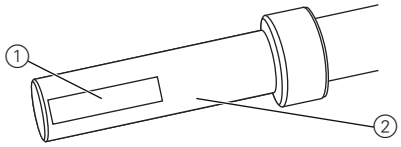
3.3 Screws in safety covers

Screws in safety covers need not be removed from the screw hole. As soon as the screws are loosened such that the cover can be detached, you can remove the cover. The screws remain either in the housing or in the cover. In the text, such screws are marked with the addition *(safety cover)*.

3.4 Flat surfaces on shafts

Screwing onto flat surfaces

Fig. 1: Flat surfaces on shafts

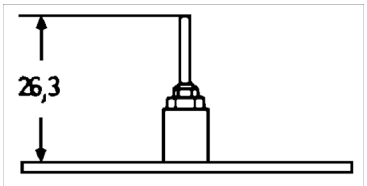
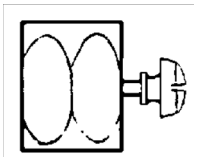


(1) - Flat surface *(2) - Shaft*

Some shafts have flat surfaces at places where components are to be attached. These make the connection more stable and setting easier.

Always ensure that the screws are completely flush with the flat surface.

3.5 Gauge set

Gauge	Order number	Setting
	K981 120012	Height of the needle bar of the sewing head
	K981 150002	Setting block for the time of looper movement and the radial position of the needle bar
	K981 150015	Feeler gauge

4 Sewing head

4.1 Setting the toothed belt

WARNING

Risk of injury!

Switch off the main switch before checking and setting the toothed belt.

NOTE

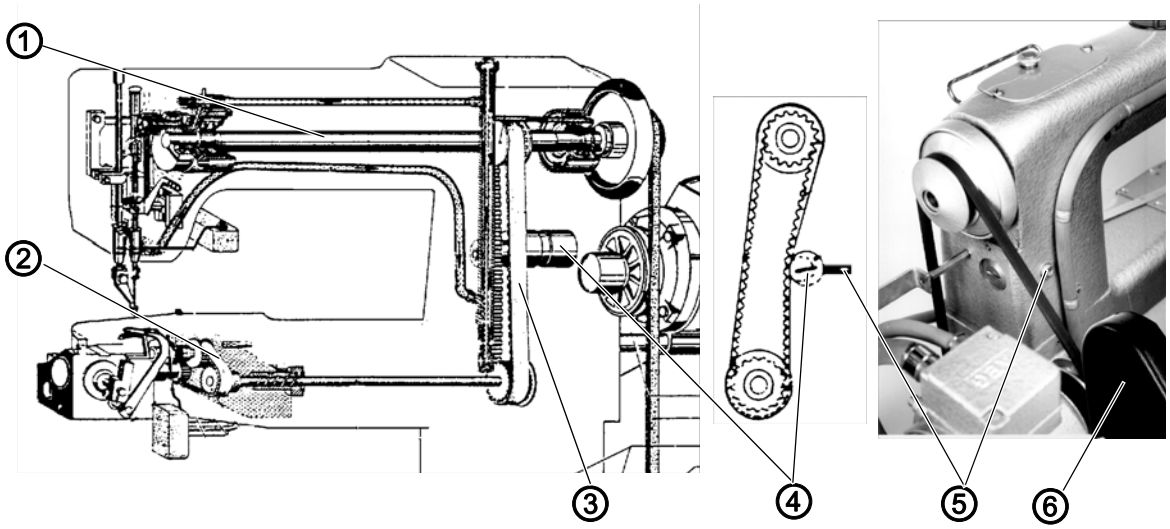
Having the belt tension too tight leads to increased wear to the belt and bearings.

If the tension is too low, it is impossible to achieve precise movement coordination between the needle bar, the looper and the thread take-up disk.

Correct setting

The arm shaft (1) drives the shaft of the looper housing and the shaft of the thread take-up disk via toothed belts (2, 3) and the lower shaft. The toothed belts can be pushed through a little by hand (~ 6 N).

Fig. 2: Setting the upper toothed belt

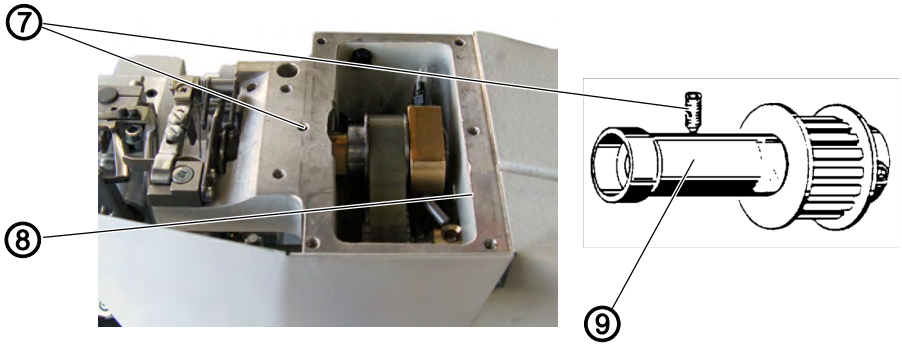


(1) - Arm shaft
(2) - Toothed belt
(3) - Toothed belt
(4) - Tensioning roller
(5) - Screw
(6) - Belt guard

Setting steps for the upper toothed belt

1. Unscrew the belt guard (6).
2. Loosen the screw (5).
3. Turn the tensioning roller (4) against the toothed belt (3) using gentle pressure.
4. Tighten the screw (5).
5. Fit the belt guard (6).

Fig. 3: Setting the lower toothed belt



(7) - Grub screw
(8) - Housing cover
(9) - Eccentric bushing

Setting steps for the lower toothed belt

1. Unscrew the housing cover (8).
2. Loosen grub screw (7).
3. Turn the eccentric bushing (9) accordingly.
4. Tighten the grub screw (7).
5. Fasten the housing cover (8).

4.2 Setting the sewing foot

WARNING

Risk of injury!

Switch off the main switch before setting the sewing foot.

4.2.1 Setting the sewing foot pressure

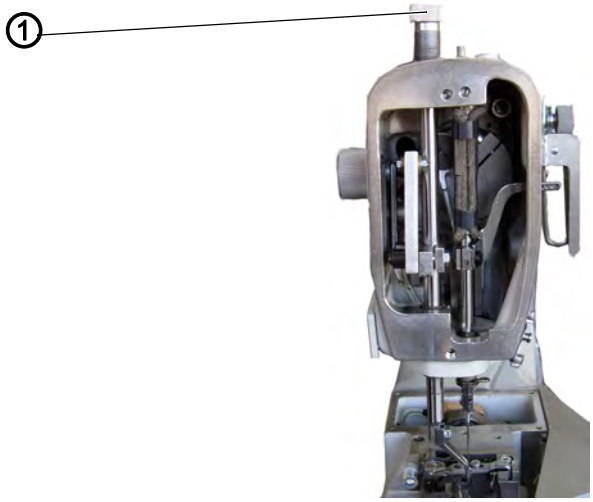
Correct setting

The sewing foot follows the actuating mechanism in its downward motion.

Faults

- Missed stitches

Fig. 4: Setting the sewing foot pressure



(1) - Knurled screw

Setting steps

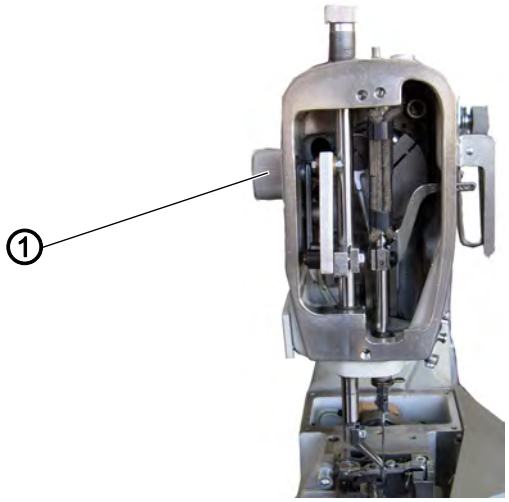
1. Turn knurled screw (1).

4.2.2 Setting the stroke position

Correct setting

- At its bottom dead center, the sewing foot lightly touches the sewing material.

Fig. 5: Setting the stroke position



(1) - Adjusting wheel

Setting steps

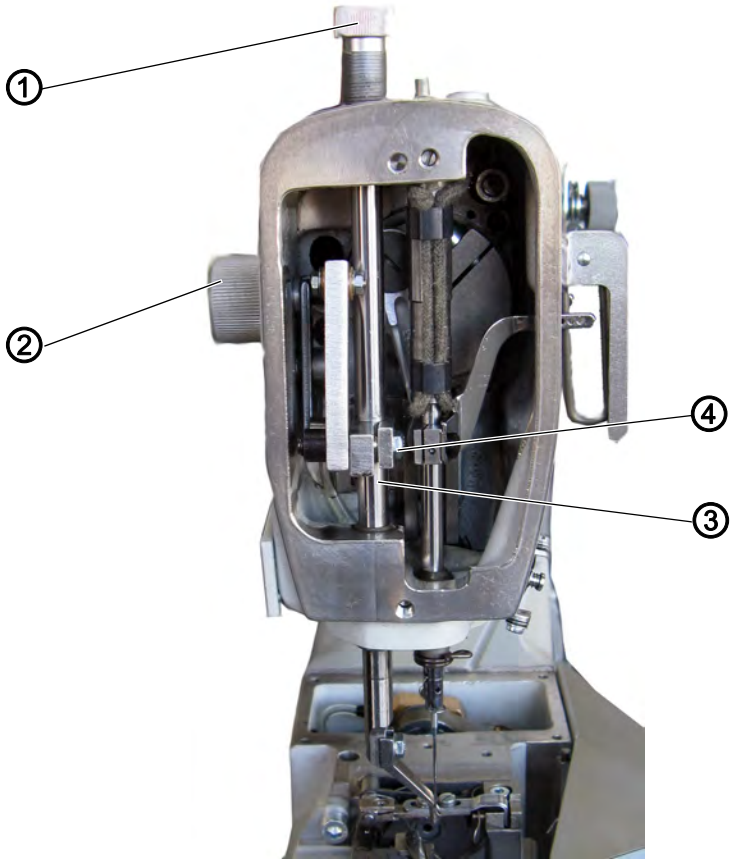
1. Turn the hand wheel in the direction of rotation, until the sewing foot reaches its lowest position.
2. Turn the adjusting wheel (1) such that the sewing foot is lightly touching the sewing material.

4.2.3 Setting the height

Correct setting

- When the lowest stroke position is set, the distance between the sewing foot, when at bottom dead center, and the hole in the throat plate is 0.5 mm.

Fig. 6: Setting the height



(1) - Knurled screw
(2) - Adjusting wheel
(3) - Cloth pressure bar
(4) - Screw

Setting steps

1. Using the adjusting wheel (2), set the lowest stroke position.
2. Using the hand wheel, bring the sewing foot into the lowest position.
3. Loosen the knurled screw (1).
4. Loosen the screw (4) and adjust the height of the cloth pressure bar (3).
5. Tighten the screw (4).
6. Reset the foot pressure using the knurled screw (1).

4.2.4 Setting the timing

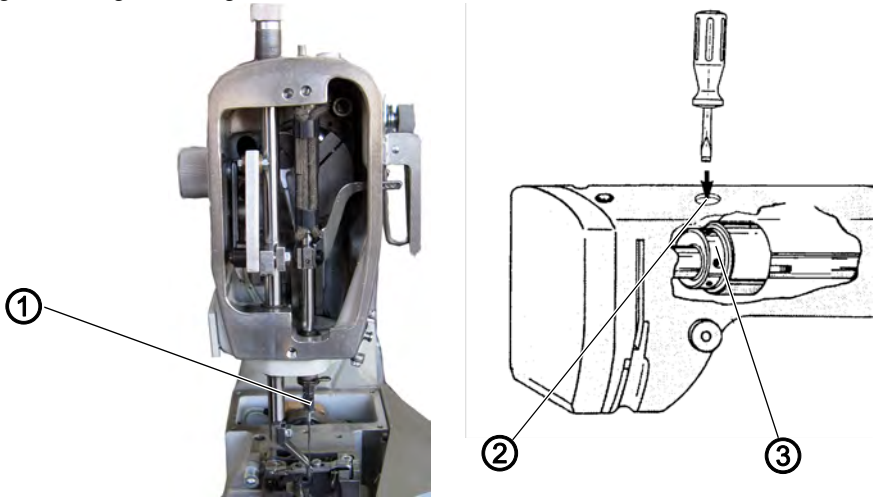
Correct setting

The sewing foot does not start its upward motion until after 2 mm of looping stroke.

Faults

- Missed stitches

Fig. 7: Setting the timing



(1) - Needle bar

(2) - Plug
(3) - Stroke cam

Setting steps

1. Remove the plug (2).
2. Loosen the screws on the stroke cam (3).
3. Turn the needle bar (1) to bottom dead center.
4. Change the position of the stroke cam (3) on the shaft, but do not change the axial position in the process.
5. Tighten the screws on the stroke cam (3).
6. Insert the plug (2).

4.3 Setting the thread lever

WARNING

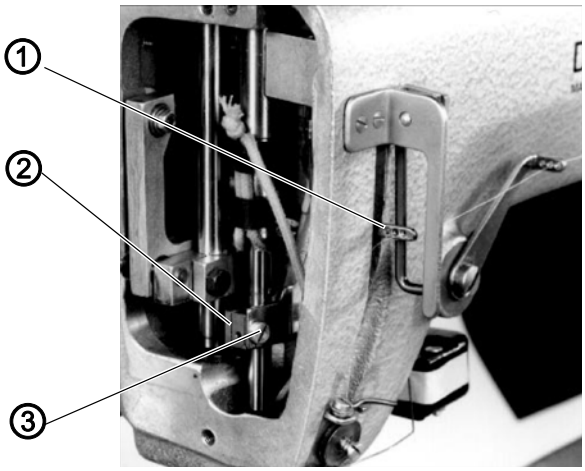
Risk of injury!

Switch off the main switch before adjusting the thread lever.

Correct setting

The thread lever is positioned centrally in the slot on the housing.

Fig. 8: Setting the thread lever



(1) - Thread lever
(2) - Clamping block
(3) - Screw

Setting steps

1. Remove the head cover.
2. Loosen the screw (3) on the clamping block (2).
3. Set the position of the thread lever in the vertical and horizontal direction.
4. Tighten the screw (3) on the clamping block (2).
5. Assemble the head cover.

4.4 Looper, spreader, needle bar and needle guide

WARNING

Risk of injury!

Switch off the main switch before making settings.

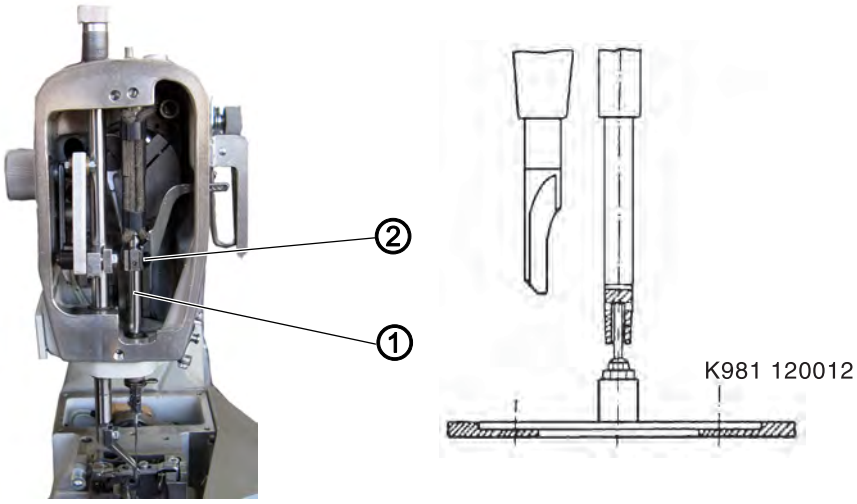
4.4.1 Setting the needle bar height

The needle bar height is set using the gauge K981 120012.

Correct setting

The pin of the gauge must be completely inserted in the needle bar hole when the needle bar is at bottom dead center.

Fig. 9: Setting the needle bar height



(1) - Needle bar *(2) - Screw*

Setting steps

1. Remove the head cover and throat plate.
2. Remove the needle and sewing foot.
3. Using the hand wheel, bring the needle bar (1) to top dead center.
4. Set the gauge K981 120012 on the base plate.
5. Loosen the screw (2) on the clamping block.
6. Using the hand wheel, bring the drive mechanism of the needle bar to bottom dead center.
7. Pull the needle bar down completely onto the pin of the gauge. Do not turn the needle bar while doing this.
8. Tighten the screw (2).

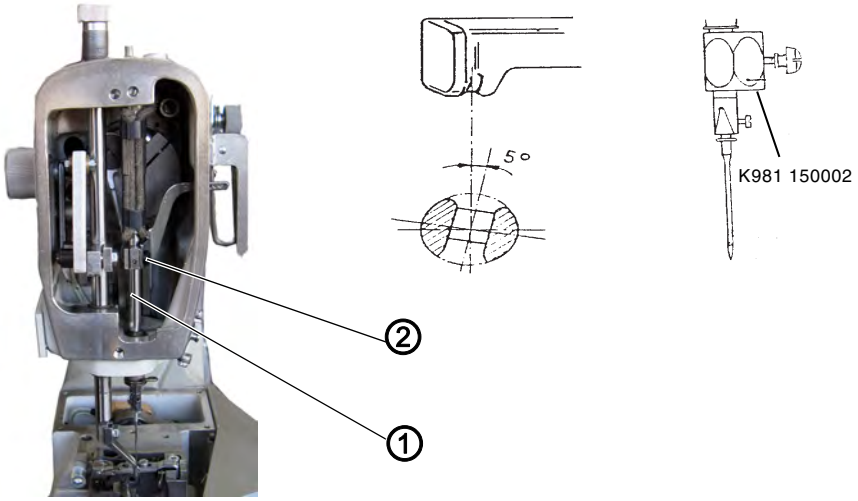
4.4.2 Setting the radial position of the needle bar

The radial position of the needle bar is set using the gauge K981 150002.

Correct setting

The screw sits on the flat surface of the needle bar and determines the correct position of the needle relative to the looper. The needle groove is at a 5 -10° angle to the looper.

Fig. 10: Setting the radial position of the needle bar



(1) - Needle bar *(2) - Screw*

Setting steps

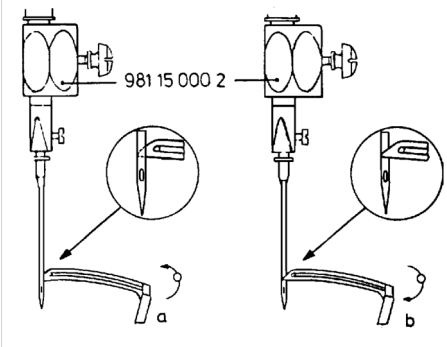
1. Remove the head cover.
2. Position the needle bar at top dead center.
3. Secure the setting block K981 150002 to the needle bar to fix the needle bar height.
4. Loosen the screw (2).
5. Turn the needle bar (1) and in doing so press upwards against the end stop.
6. Tighten the screw (2).

4.4.3 Setting the looper motion timing

Correct setting

When the needle is at bottom dead center, the looper should be in its right-hand turning point.

Fig. 11: Setting the looper motion timing

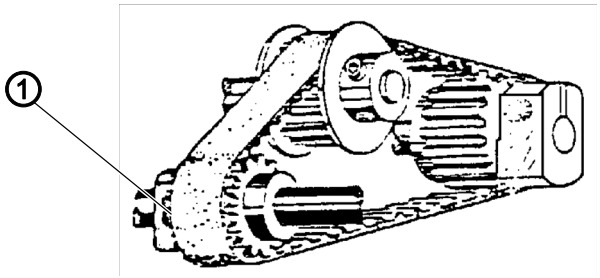


Setting steps

1. Turn the hand wheel until the tip of the looper is behind the needle and is flush with the left side of the needle (a).
2. Set the setting block K981 150002 on the needle bar, press against the needle bar guide bushing and fix with the screw.
3. Turn the hand wheel against the running direction (toward the user), until the block is lying against the bushing again.

↳ In this position (b) the tip of the looper must be in front of the needle and be flush with the left side of the needle.

Fig. 12: Setting the looper motion timing



(1) - Screw

Setting steps

1. Loosen the screw (1).
2. Hold the looper mounting firmly and turn the hand wheel.
3. Tighten the screw (1).

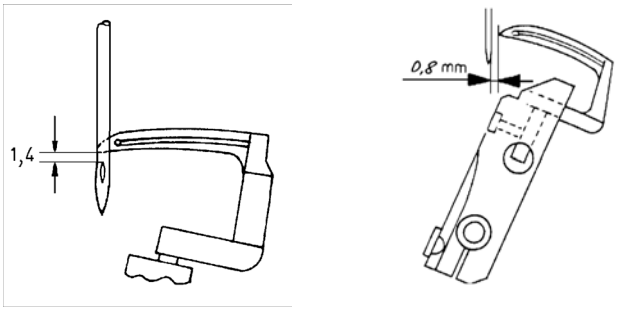
Sequence

- Check the thread take-up disk
- Set the spreader time

4.4.4 Setting the position of the looper relative to the needle

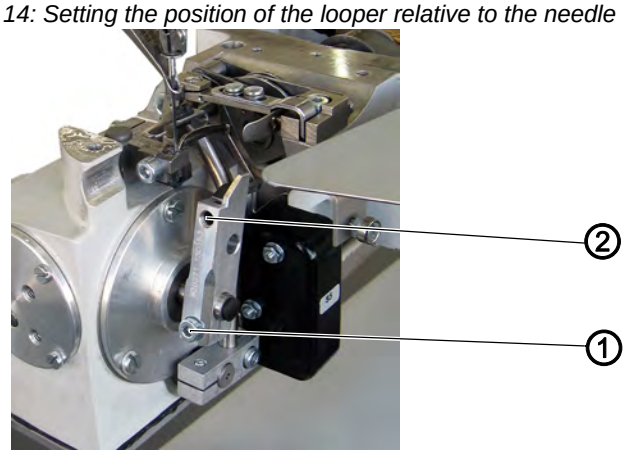
Correct setting

Fig. 13: Position of the looper relative to the needle



When it is flush with the left side of the needle, the tip of the looper is 1.4 mm away from the needle eye. In the right-hand turning point, the distance between the looper and the needle is 0.8 mm. The looper moves past the needle groove at a distance of 0.1 mm.

Fig. 14: Setting the position of the looper relative to the needle



(1) - Screw *(2) - Screw*

Setting steps 1st setting

1. Put the looper in the right-hand turning point.
2. Loosen the screw (1).
3. Set the distance between the looper tip and the needle to 0.8 mm.
4. Tighten the screw (1).

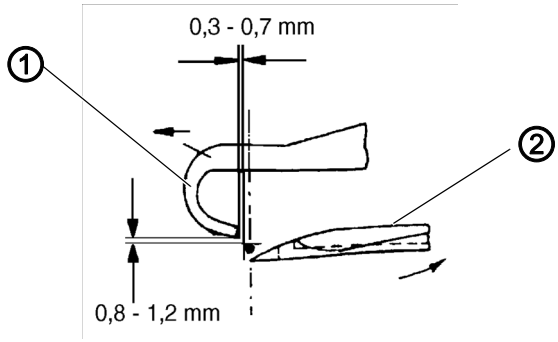
Setting steps 2nd setting

1. Place the looper tip on the left side of the needle.
2. Check whether the distance to the needle eye is 1.4 mm.
3. Loosen the screw (2).
4. Draw in or pull out the looper. Turn the looper in the looper mounting so that there is a distance of 1.4 mm to the groove of the needle.
5. Check that the distance of 0.8 mm in the right-hand turning point is maintained.
6. Tighten the screw (2).

4.4.5 Setting the position of the spreader

Correct setting

Fig. 15: Position of the spreader



(1) - Spreader *(2) - Looper tip*

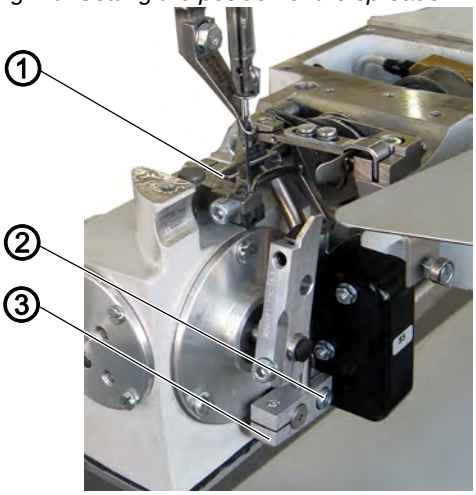
If the looper is in front of the needle and the tip of the looper is at the center of the needle, the spreader is in the position shown.

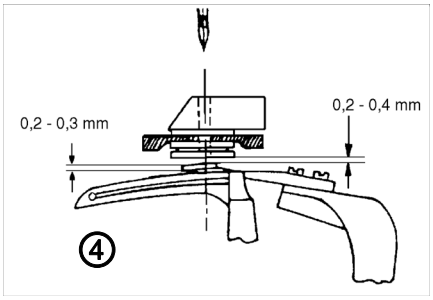
Faults

Missed stitches

Setting steps

Fig. 16: Setting the position of the spreader





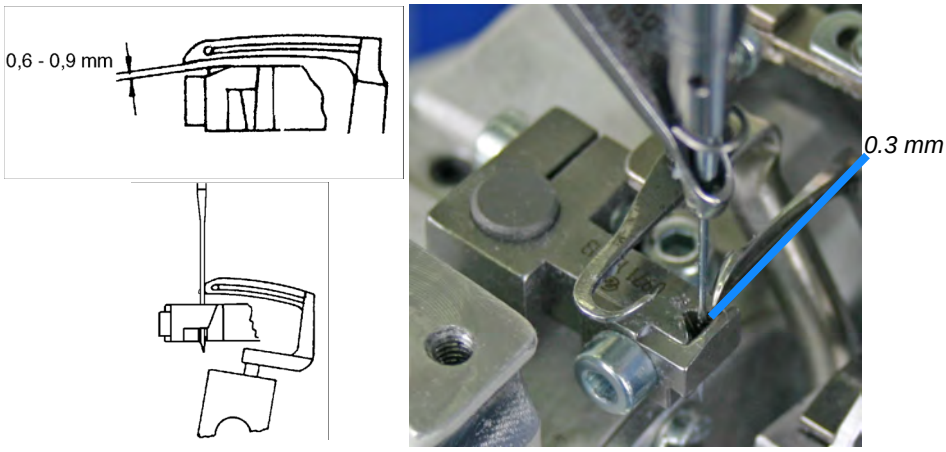
(1) - Spreader
(2) - Screw
(3) - Screw
(4) - Position of the left-hand turning point

1. Turn the hand wheel until the looper is in front of the needle and the tip of the looper is at the middle of the needle.
2. Loosen the screw (3) and adjust the position of the spreader.
3. Tighten the screw (3).
4. Put the looper in the left turning point (4).
5. Loosen the screw (2) and set the spreader height.
6. Tighten the screw (2).

4.4.6 Setting the needle guard

Correct setting

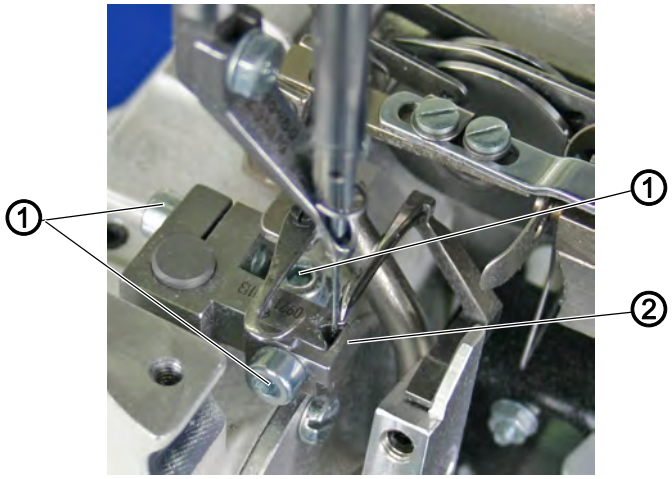
Fig. 17: Needle guard position



Through the continuous feeding of the sewing head, the needle is pushed away underneath the level of the sewing material. The needle must be guided when the tip of the looper moves past the groove of the needle.

The looper moves over the needle guard at a distance of 0.6 – 0.9 mm. The needle tip lies against the needle guard without being forced, when the looper tip is behind the needle and is flush with the left side of the needle. When the needle is at bottom dead center, the distance between the front part of the needle guard and the needle is 0.3 mm.

Fig. 18: Setting the needle guard



(1) - Screw *(2) - Needle guard*

Setting steps

1. Loosen the screws (1).
2. Set the position of the needle guard (2).
3. Tighten the screws (1).

4.5 Thread take-up disk and thread guides

WARNING

Risk of injury!

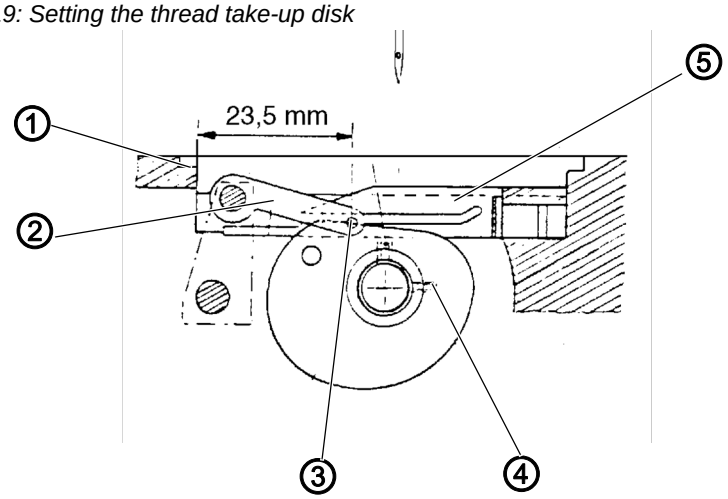
Switch off the main switch before making settings.

4.5.1 Setting the thread take-up disk

Correct setting

The thread take-up disk tightens the looper thread in accordance with the looper movement or releases it. When the needle's upward movement starts, the thread take-up disk starts to pull away the looper thread.

Fig. 19: Setting the thread take-up disk



(1) - Cast edge
(2) - Thread guide
(3) - Hole
(4) - Screw
(5) - Thread guide

Setting steps

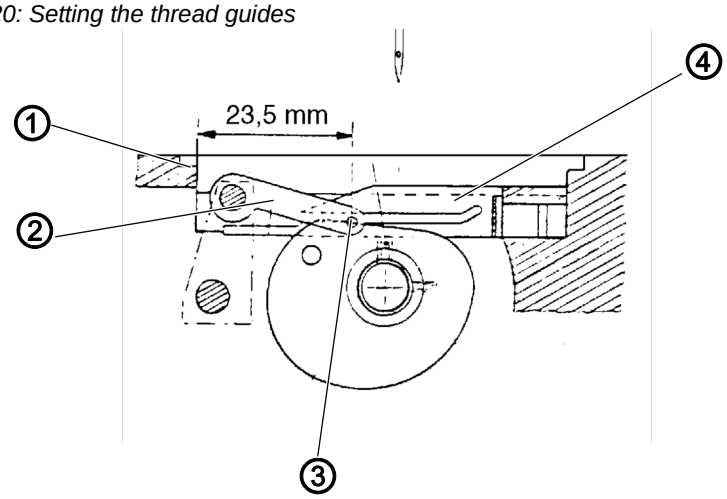
1. Loosen the screws (4) of the thread take-up disk.
2. Move the needle bar from top dead center downwards.
3. Adjust the thread take-up disk such that it starts pulling the looper thread. The thread take-up disk should be positioned centrally to the thread guide (5).
4. Tighten the screws (4).

4.5.2 Setting the thread guides

Correct setting

The distance between the hole (3) of the thread guide (2) and the cast edge (1) is 23.5 mm and the hole is flush with the slot of the thread guide (4).
The thread guide is positioned centrally to the thread take-up disk.

Fig. 20: Setting the thread guides



(1) - Cast edge
(2) - Thread guide
(3) - Hole
(4) - Thread guide

4.6 Setting the thread regulator and needle thread guide

WARNING

Risk of injury!

Switch off the main switch before making settings.

Correct setting

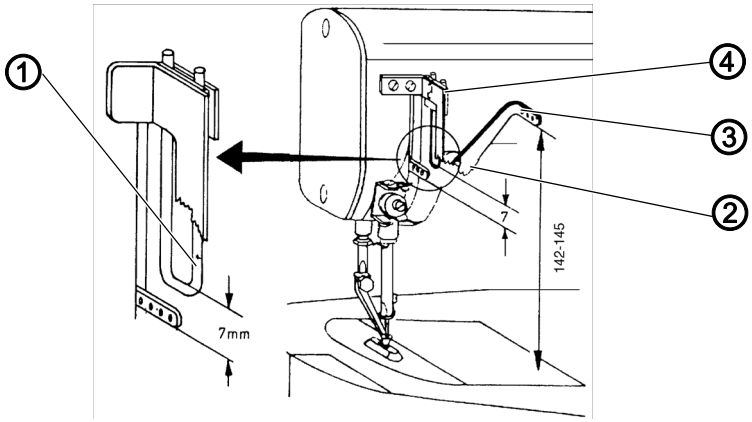
There is a distance between the thread regulator (1) and the thread lever of 7 mm, if the latter is at bottom dead center.

The position of the thread lever influences the:

- Tension of the needle thread loop shortly before the looper jumps off
- Needle thread loop tension
- Loop size

The height of the thread guide (3) is, depending on the material and the sewing threads, 142 – 145 mm from the base plate.

Fig. 21: Setting the thread regulator and needle thread guide



(1) - Thread regulator
(2) - Screw
(3) - Thread guide
(4) - Screw

Setting steps

1. Loosen the screws (2, 4).
2. Set the thread regulator (1) or thread guide (3).
3. Tighten the screws (2, 4).

4.7 Setting the thread monitor

WARNING

Risk of injury!

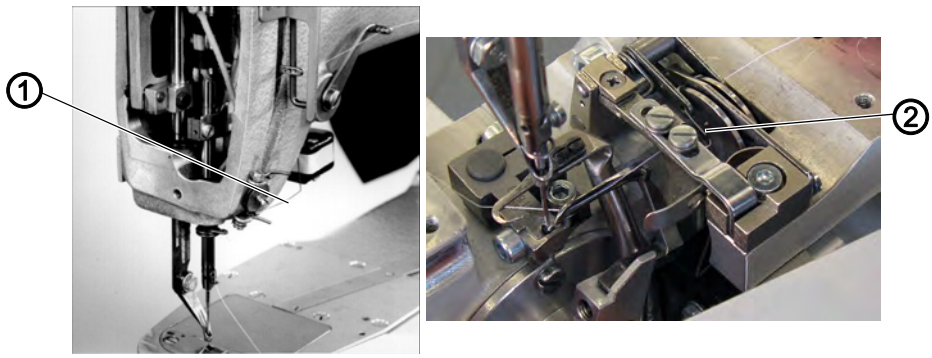
Switch off the main switch before making settings.

Correct setting

In the event of a thread break, the switching flag of the corresponding thread monitor is released.

- The automatic sequence is stopped.
- The thread breakage is not reported until the switching flag has covered at least 2/3 of its possible path.

Fig. 22: Setting the thread monitor



(1) - Switching flag of the needle thread monitor

(2) - Switching flag of the remaining thread monitor

Setting steps

1. Bend the switching flag (1).
2. Bend the switching flag (2).

4.8 Setting the throat plate insert

WARNING

Risk of injury!

Switch off the main switch before making settings.

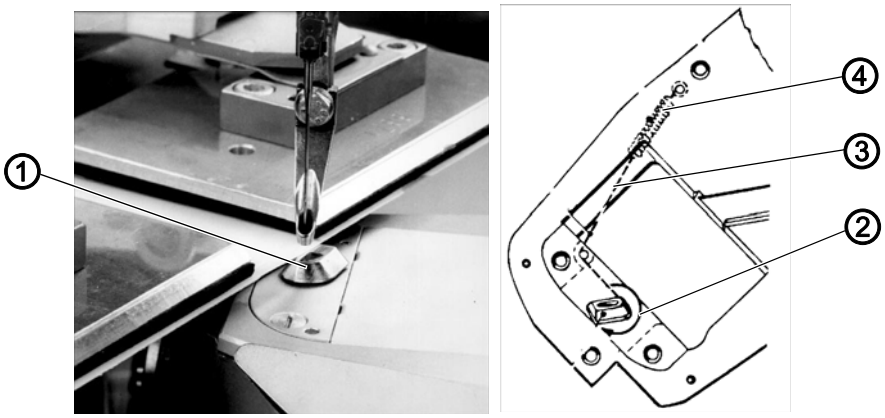
Correct setting

In every sewing phase, the throat plate insert (1) lies on the fabric support surface with the appropriate pressure. This is the case when the line (3) is a little loose when the sewing head is swiveled out.
If the sewing head is swiveled in, the spring (4) must pull the throat plate insert (1) into the sector (2). If this is not the case, shorten the line (3) a little.

Important

Check the position of the throat plate insert in the swiveled in and swiveled out positions.

Fig. 23: Setting the throat plate insert



(1) - Throat plate insert
(2) - Sector
(3) - Line
(4) - Spring

Setting steps

1. Loosen the housing plate screws.
2. Remove the housing plate.
3. Lengthen or shorten the line (3).
4. Fit the housing plate.
5. Tighten the housing plate screws.

4.9 Setting the height of the sewing head

WARNING

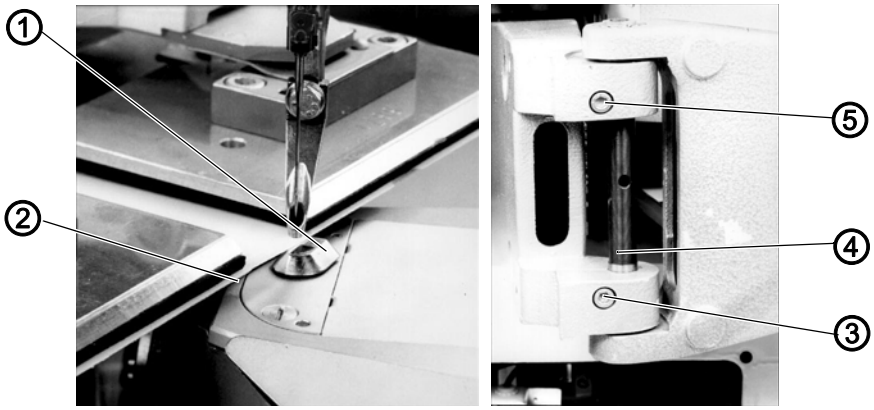
Risk of injury!

Switch off the main switch before making settings.

Correct setting

There is a vertical distance of 0.2 – 0.3 mm underneath the Delrin between the throat plate insert and the material holder.

Fig. 24: Setting the height of the sewing head



(1) - Throat plate insert
(2) - Delrin
(3) - Clamping screw
(4) - Axle
(5) - Clamping screw

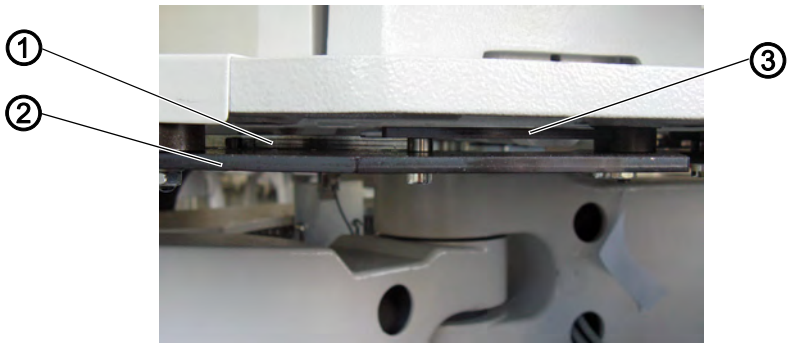
Setting steps

1. Guide the sewing head within the swivel range along the sewing material template and check the distance.
2. Loosen the clamping screws (3, 5) on the swivel arm and turn the axle (4).
3. Tighten the clamping screws (3, 5).

4.10 Setting the height of the transport roller

Correct setting

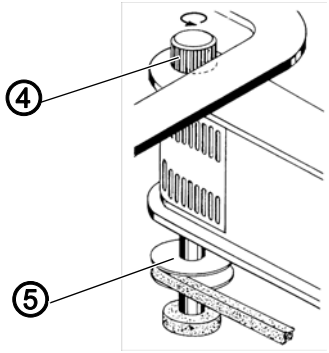
Fig. 25: Height of the transport roller



(1) - Bridge
(2) - Template
(3) - Cutting head template

The transport roller rolls off the entire surface of the template (2). With adjustable material holders, it also rolls off on the higher-positioned bridge (2) between the templates.
There will be no contact, under any circumstances between the templates (3) in the level above that, used for tighter cutting in specific areas, and the transport roller.

Fig. 26: Setting the height of the transport roller



(4) - Transport roller
(5) - Belt pulley

Setting steps

1. Loosen the screw on the belt pulley (5).
2. Set the height of the transport roller (4).
3. Tighten the screw on the belt pulley (5).

4.11 Setting the position of the swivel arm

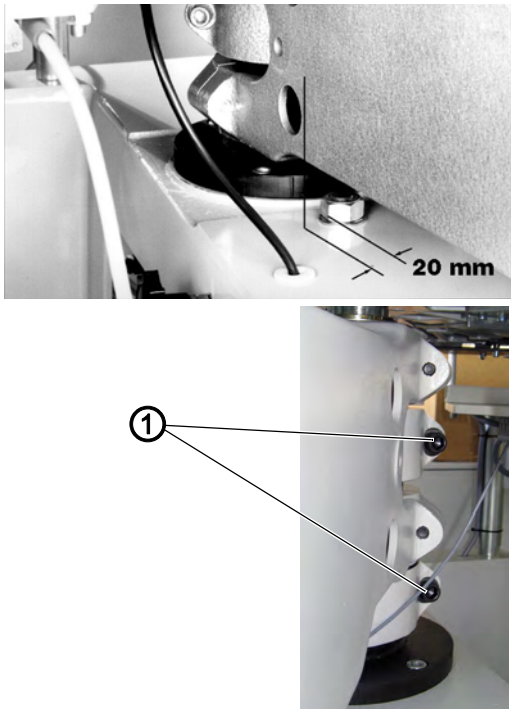
WARNING

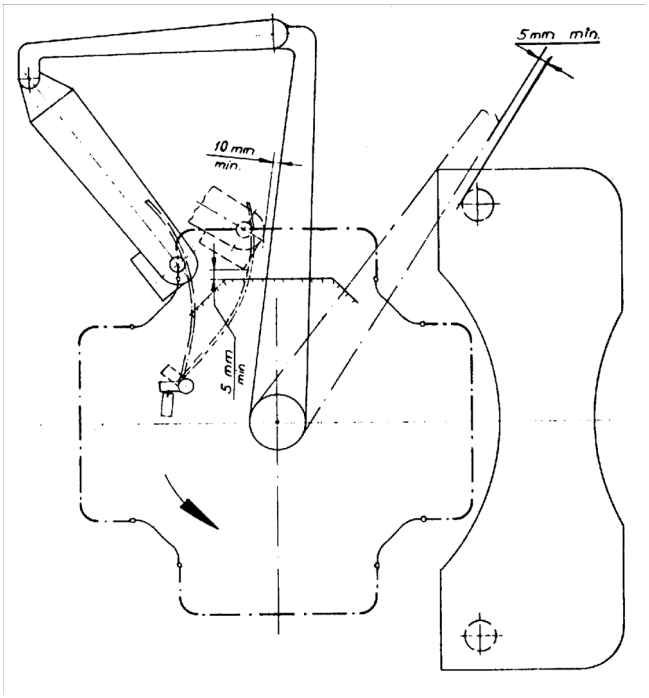
Risk of injury!

Switch off the main switch before making settings.

The position of the swivel arm bearing is specified in the factory. The position is dependent on the type of material holder.
When using a new material holder, it may be necessary to change the position of the swivel arm bearing. When determining the correct position, you can start from that shown:

Fig. 27: Setting the position of the swivel arm





(1) - Screws

Setting steps

1. Loosen both screws (1).
2. Change the position of the swivel arm bearing.

   Do not change the height of the swivel arm bearing in the process.
3. Tighten both screws (1).
4. Check the position of the swivel arm.

Sequence

Check the movement range of the sewing head (📖 pg. 34)

4.12 Setting the movement range of the sewing head

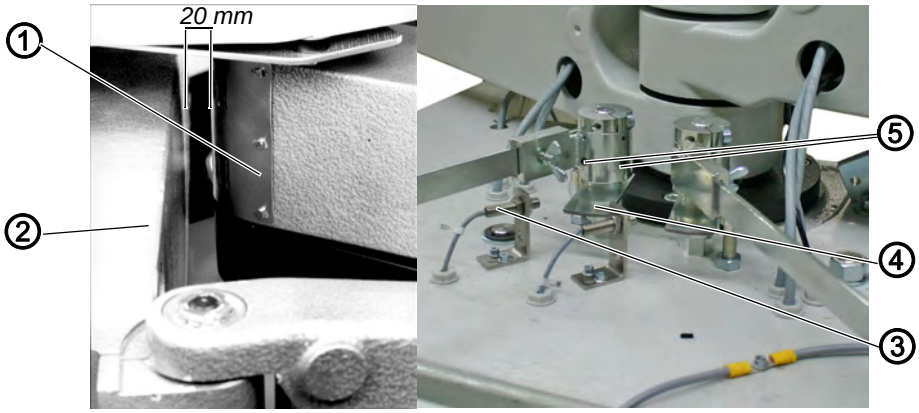
WARNING

Risk of injury!

Switch off the main switch before making settings.

The sewing head has reached the end of the movement range when the switching flag (4) is actuated via the proximity switch (3), thereby activating a new cycle.

Fig. 28: Setting the movement range of the sewing head



(1) - Sewing unit
(2) - Swivel arm bearing
(3) - Proximity switch
(4) - Switching flag
(5) - Screws

Correct setting

The turntable is activated when the sewing unit (1) approaches within 20 mm of the swivel arm bearing (2).

Setting steps

1. Loosen both screws (5).
2. Set the position of the switching flag (4).
3. Tighten the screw (5).

Important

Deviations from this rule are necessary if the chain is sewn in the area between the material holders. In this case, either activate the turntable earlier or change the position of the swivel arm bearing.

4.13 Oil lubrication

WARNING

Risk of injury!

Skin rashes from lubricant

Oil can cause a rash if it comes into contact with the skin.
Avoid any prolonged skin contact with the oil.
Wash the affected area thoroughly after contact.

ATTENTION

Risk of environmental damage from grease!

Lubricant is a pollutant and must not enter the sewage system or the soil.
Collect waste lubricant carefully and dispose of it and greasy machine parts in accordance with the applicable statutory regulations.

Please observe all safety and environmental protection instructions issued by the lubricant manufacturer.

4.13.1 Checking the oil level and oil supply

Fig. 29: Checking the oil level and oil supply

(1) - Inspection glass

(2) - Inspection glass
(3) - Oil rise tube

Correct setting

Check the oil level in the oil sump of machines that have been switched off, at the inspection glass on a weekly basis (1). If the oil can be seen at the lower edge, the oil level is correct. If no oil is seen, top up oil.

If the oil supply is correct, there should be no bubbles visible at the inspection glass (2) of the rise tube while the machine is running. Check the oil supply weekly.

1. Twist out the oil rise tube (3).
2. Pour oil through the filling neck into the oil sump.

4.13.2 Regulating the sewing head lubrication

The oil quantity supplied can be significantly greater than that actually required. In order to avoid having too much oil in the sewing head, the flow rate can be regulated.

Check whether all relevant parts in the sewing head are coated in a film of oil.

Fig. 30: Regulating the sewing head lubrication

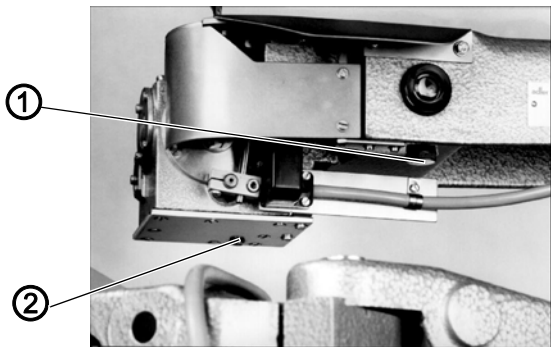
(1) - Screw

1. Remove the head cover.
2. Screw the screw (1) in completely.
3. Turn the screw (1) back approx. 1/2 a turn.
4. Install the head cover.

4.13.3 Changing the oil

Change the oil after the first 6 months, at the latest after 1,000 operating hours. No further oil change is required after that.

Fig. 31: Changing the oil



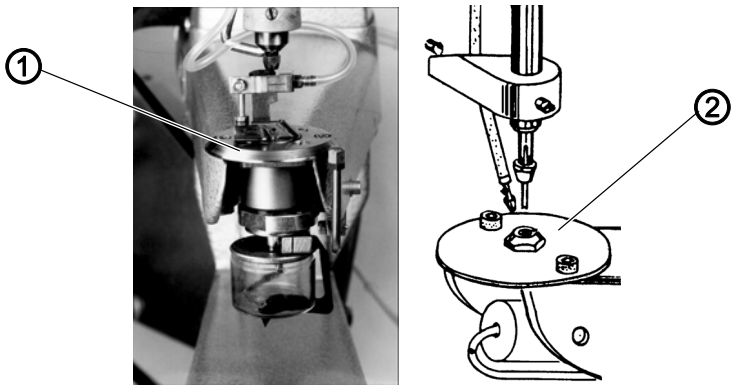
(1) - Drain screw *(2) - Drain screw*

Setting steps

1. Loosen the drain screws (1, 2).
2. Remove the housing plate cover.
3. Clean the gripper box and oil reservoir.
4. Fit a new seal to the housing plate cover (silicon Loctite oil-resistant) and re-fit the housing plate cover.
5. Tighten all drain screws (1, 2).
6. Remove the oil rise tube.
7. Pour DA10 via the filling neck until the oil level has reached the middle of the inspection glass.
   When doing so, be aware that the oil from the oil sump can only reach the gripper box through a relatively small hole. You should therefore wait for a few minutes and check the oil level again.

5 Cutting head

Fig. 32: Cutting head, Version 1 and 2



The cutter (1) is equipped with a top and bottom blade. It enables the cutting of outside radii and larger inner radii. It is designated as Version 1.

The cutter (2) is equipped with a punch and a die. It enables the cutting of small inner radii, for example for gloves. It is designated as Version 2.

5.1 Blade/punch overlap

WARNING

Risk of injury!

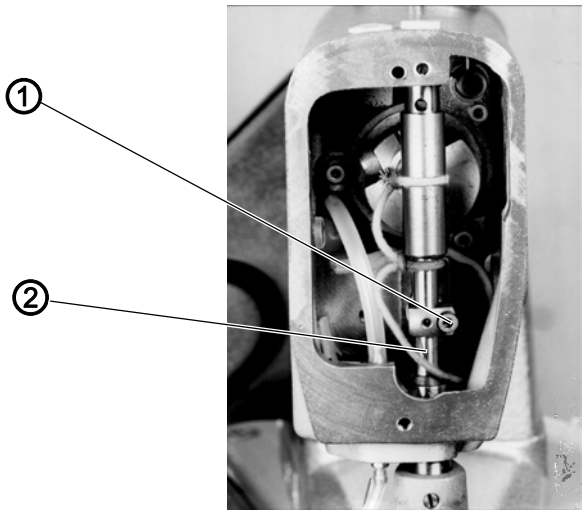
Switch off the main switch before making settings.

5.1.1 Setting the blade overlap (Version 1)

Correct setting

The edges of the top and bottom blades are precisely overlapped when the top blade is at bottom dead center.

Fig. 33: Setting the blade overlap



(1) - Screw *(2) - Pull rod*

Setting steps

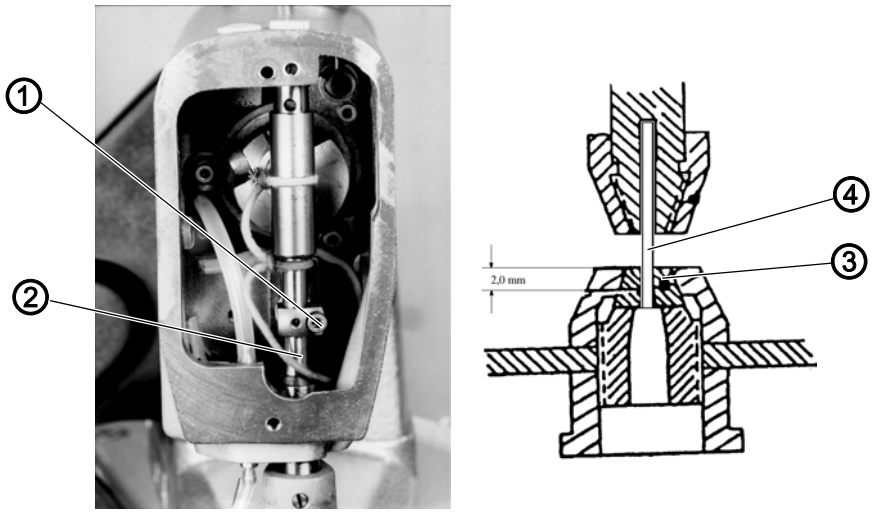
1. Remove the head cover.
2. Turn the hand wheel in the direction of rotation, until the top blade is at bottom dead center.
3. Loosen the screw (1) and adjust the pull rod (2) such that the top and bottom blades are overlapping.
4. Tighten the screw (1).
5. Install the head cover.

5.1.2 Setting the punch overlap (Version 2)

Correct setting

The punch is pushed completely into the locating bore of the punch bar up to the end stop. In its lowest position, it protrudes 2 mm into the die.

Fig. 34: Setting the punch overlap



(1) - Screw
(2) - Punch bar
(3) - Die
(4) - Punch

Setting steps

1. Unscrew the head cover.
2. Turn the hand wheel in the direction of rotation, until the punch (4) is at bottom dead center.
3. Loosen the screw (1) and adjust the punch bar (2) such that the punch (4) is plunged 2 mm into the die (3).
4. Tighten the screw (1).

5.2 Setting the position of the guide piece (Version 1)

Correct setting

When cutting straight sections, the blade edges are parallel to the sewing material clamp.

Fig. 35: Setting the position of the guide piece

(1) - Nut *(2) - Guide piece*

Setting steps

1. Position the cutter on a straight section.
2. Loosen the nut (1).
3. Set the position of the guide piece (2).
4. Tighten the nut (1).

5.3 Setting the position of the shearing head or the die

Correct setting, Version 1

The shearing head can turn easily in any position.

Correct setting, Version 2

The punch plunges into the die without deflection.

Fig. 36: Setting the position of the shearing head or the die to the drive rod

(1) - Screws

Setting steps

1. Loosen both screws (1).
2. Set the position of the die or the mobility of the shearing head.
3. Tighten both screws (1).

5.4 Setting the blade cutting pressure (Version 1)

WARNING

Risk of injury!

Switch off the main switch before making settings.

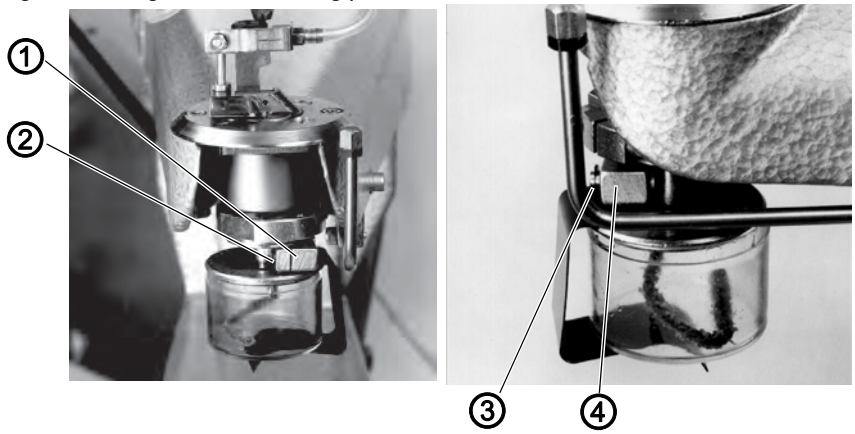
Correct setting

The blades cut reliably with the lowest possible pressure. The distance between the locking ring (3) and the clamping block (4) is 0.2 – 0.3 mm.

Important

Pressure that is too high leads to increased blade wear.

Fig. 37: Setting the blade cutting pressure



(1) - Clamping block
(2) - Screw
(3) - Locking ring
(4) - Clamping block

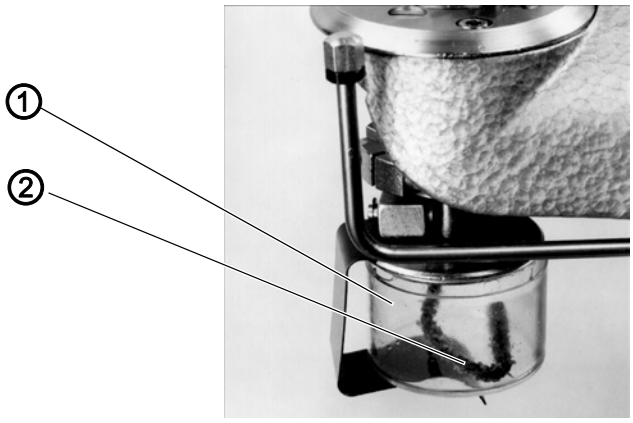
Setting steps

1. Loosen the screw (2).
2. Set the position of the clamping block (1). For this purpose, ensure that the bottom blade holder has no axial play.
3. Tighten the screw (2).

5.5 Lubrication of rotating parts and top blade (Version 1)

Lubrication is via the wick inside the oil reservoir.

Fig. 38: Lubrication of rotating parts and top blade



(1) - Oil reservoir *(2) - Wick*

Correct setting

There is always oil in the reservoir.

1. Check the oil level weekly and top up as required.

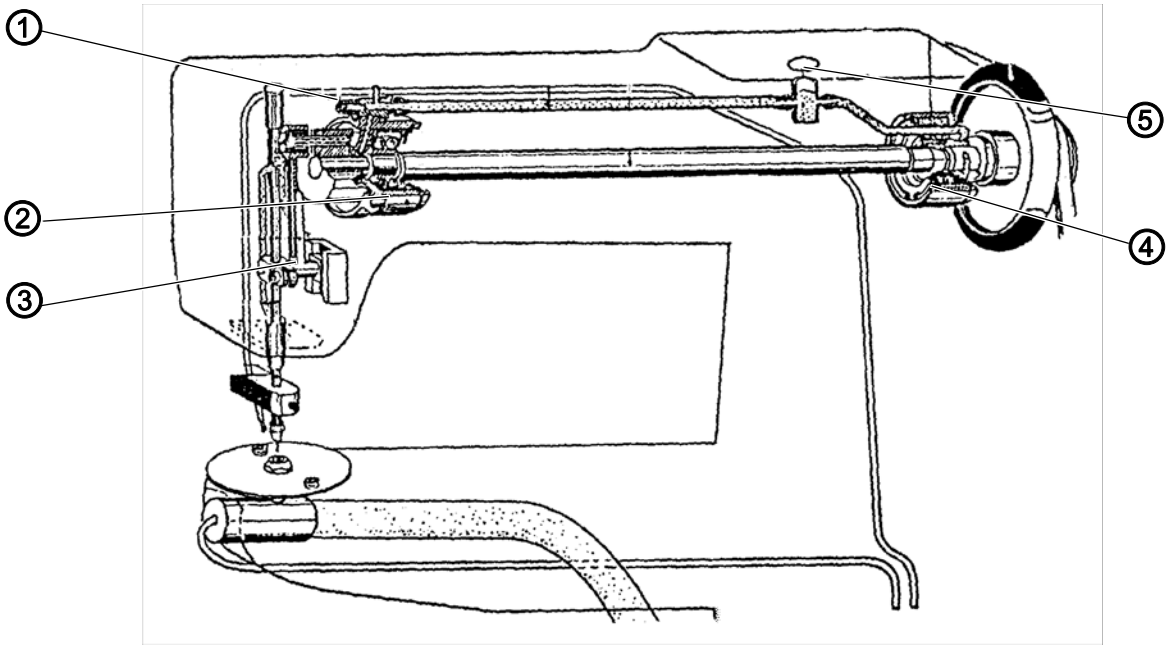
5.6 Lubrication of punch bar and arm shaft bearing

WARNING

Risk of injury!

Switch off the main switch before making settings.

Fig. 39: Lubrication of punch bar and arm shaft bearing



(1) - Screw
(2) - Arm shaft bearing, left
(3) - Guide
(4) - Arm shaft bearing, right
(5) - Reservoir

The oil in the reservoir (5) travels to both arm shaft bearings (2, 4) via the wick and from there into the head. The separated oil is collected and guided via the felt to the guide (3) and via the wick to the punch bar.

Correct setting

The punch and guide rod are sufficiently lubricated with the smallest possible quantity. There is always oil in the reservoir (5). Top up daily.

Setting steps

1. Remove the head cover.
2. Check whether all parts are coated in a film of oil.
3. Turn the adjusting screw (1):
   - Screw clockwise = reduces the oil quantity
   - Screw counter-clockwise = increases the oil quantity
4. Install the head cover.

5.7 Changing the blade and/or punch and dies

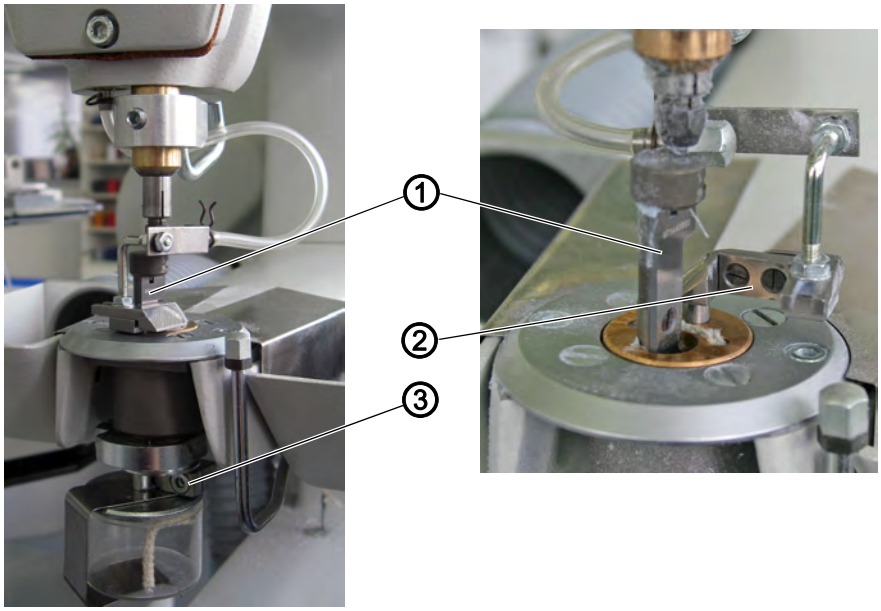
WARNING

Risk of injury!

Switch off the main switch before making settings.

5.7.1 Changing the top and bottom blade (Version 1)

Fig. 40: Changing the top and bottom blades



(1) - Top blade
(2) - Bottom blade
(3) - Clamping block

Setting steps

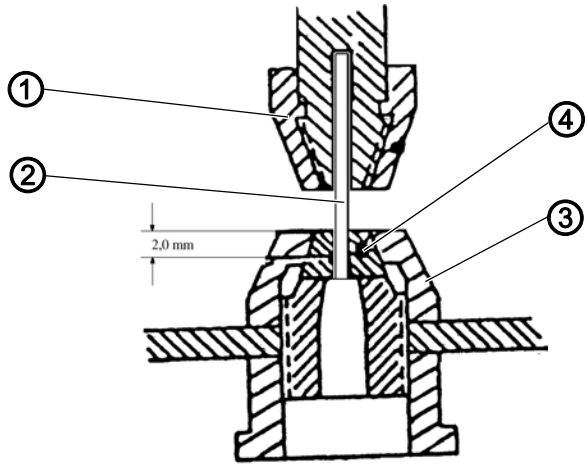
1. Loosen the screw on the clamping block (3).
2. Swivel the blade (2) to the side.
3. Change the top blade (1).
4. Change the bottom blade (2) or turn the blade so that the 2nd edge is effective.
5. Tighten the screw on the clamping block (3).

Sequence

Setting the blade pressure (📖 pg. 43)

5.7.2 Changing the punch and die (Version 2)

Fig. 41: Changing the punch and die



(1) - Union nut
(2) - Die
(3) - Clamping nut
(4) - Punch

Setting steps

1. Loosen the union nut (1).
2. Change the die (2).
3. Tighten the union nut (1).
4. Loosen the clamping nut (3) slightly.
5. Remove the blunt punch (4).
6. Push the new punch (4) completely up into the locating bore of the punch bar.
7. Tighten the clamping nut (3).

5.8 Setting the height of the cutter

WARNING

Risk of injury!

Switch off the main switch before making settings.

Correct setting

The distance between the guide piece or die and the Delrin of the fabric support surface is 0.3 – 0.5 mm.

Fig. 42: Setting the height of the cutter

(1) - Guide piece
(2) - Delrin
(3) - Clamping screw
(4) - Axle
(5) - Clamping screw

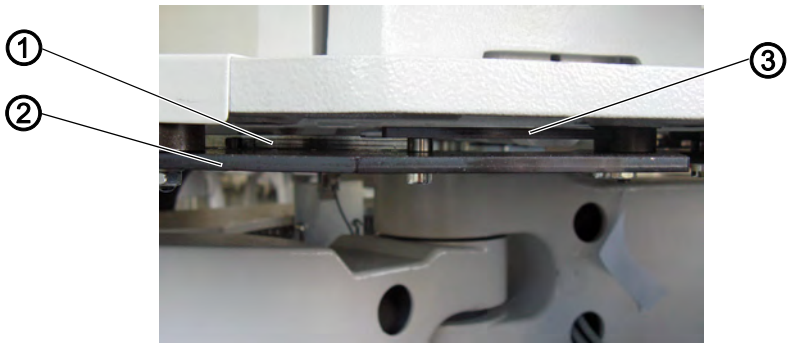
Setting steps

1. Guide the cutter within its swivel range along the template and check the distance.
2. Loosen the clamping screws (3, 5).
3. Set axle (4).
4. Tighten the clamping screws (3, 5).

5.9 Setting the height of the transport roller

Correct setting

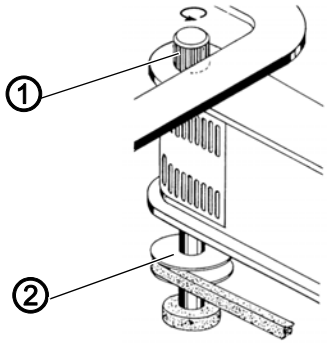
Fig. 43: Height of the transport roller



(1) - Bridge
(2) - Template
(3) - Cutting head template

The transport roller rolls along the entire surface of the template (2). With adjustable material holders, it also rolls on the higher-positioned bridge (2) between the material holders.
If there are further templates in the second level above the template (3), in order e.g. to be able to cut the material closer to the course of the seam in the radii, the magnetic roller also rolls on this template.

Fig. 44: Setting the height of the transport roller



(1) - Transport roller
(2) - Belt pulley

Setting steps

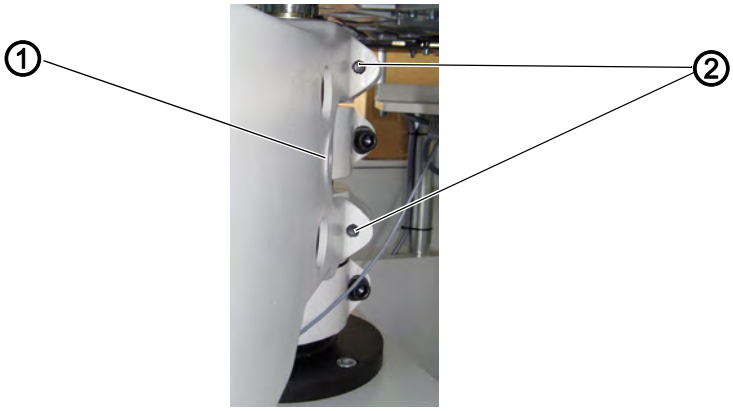
1. Loosen the screw on the belt pulley (2).
2. Set the height of the transport roller (1).
3. Tighten the screw on the belt pulley (2).

5.10 Setting the position of the swivel arm bearing

Correct setting

The swivel arm bearing (1) is located in the center between the two screws (2).

Fig. 45: Setting the position of the swivel arm bearing



(1) - Swivel arm bearing *(2) - Screws*

Setting steps

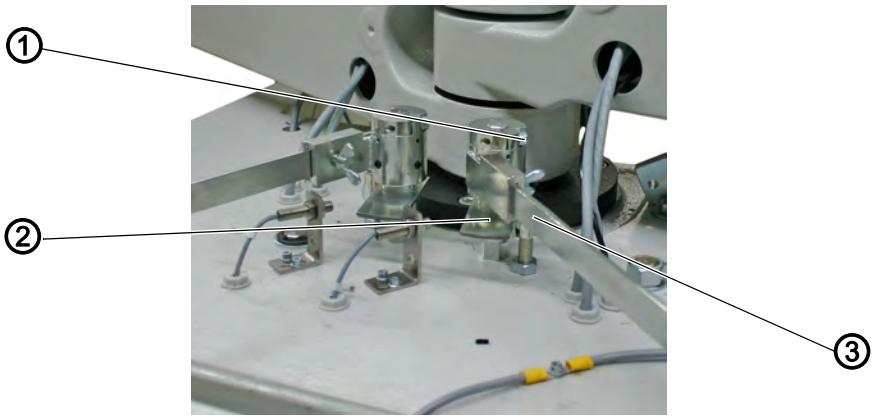
1. Loosen the screw (2).
2. Set the position of the swivel arm bearing (1).
3. Tighten the screw (2).

5.11 Setting the movement range of the cutting head

Correct setting

During the automatic sequence, the cutting head maintains a reliable distance to the sewing head. The possibility of a collision is excluded.

Fig. 46: Setting the movement range of the cutting head



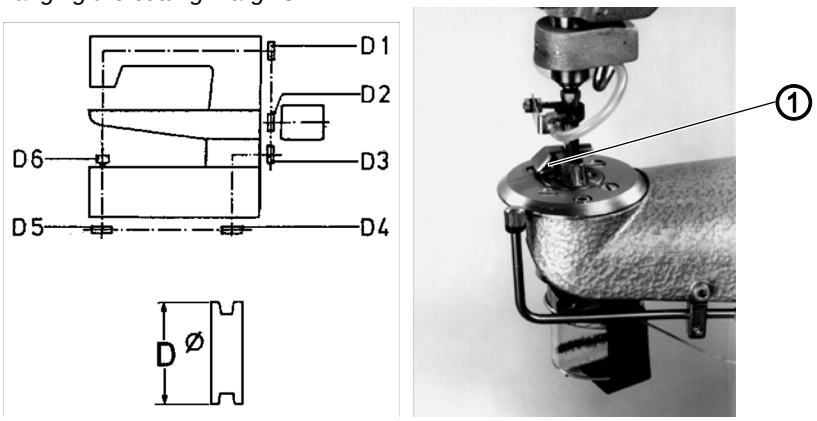
(1) - Screw
(2) - Switch plate
(3) - Switching flag

Setting steps

1. Activate the automatic sequence and determine the minimum distance between the cutting head and the sewing head.
2. Loosen the screw (1).
3. Change the position of the switching flag (3) relative to the switch plate (2).
4. Tighten the screw (1).

5.12 Changing the cutting margins

Fig. 47: Changing the cutting margins



(1) - Guide piece

The cutting margins are determined by the diameter of the transport roller D6. Changing the cutting margin not only requires a change of transport roller, but in some cases also a change of belt pulleys D4 and D5 and/or D3.

Cutting margin	Transport roller D6		Belt pulley D5		Belt pulley D4		Belt pulley D3	
	Ø	Part no.	Ø	Part no.	Ø	Part no.	Ø	Part no.
3.5	18	K970 430120	72	K971 440453	54	K971 440443	54	K970 402253
4.5	16	K970 440020	72	K971 440453	54	K971 440443	48	K971 440063
5.5	14	K970 440010	66	K971 440883	62	K971 440893	54	K970 402253
6.5	12	K971 770850	66	K971 440883	62	K971 440893	48	K971 440063

Sequence

After changing the transport roller and the belt pulleys, adjust the position of the guide piece to the changed cutting margin.

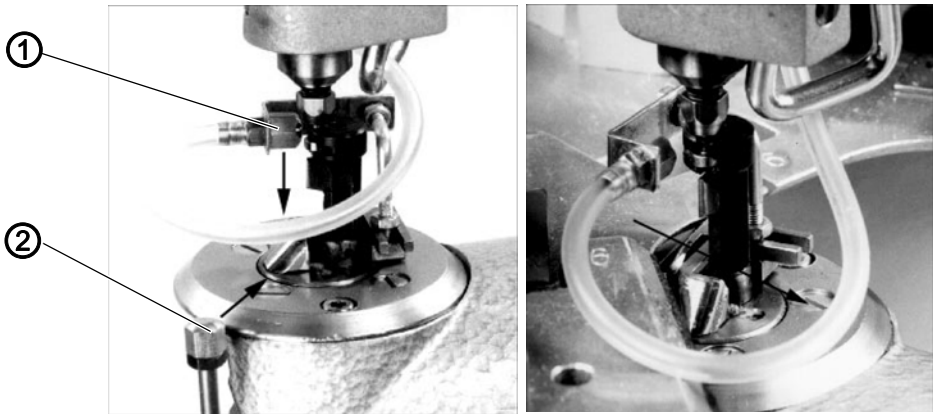
6 Blowing equipment

6.1 Setting the *sewing material* and *cutting position* blow pipes

Correct setting

Blow pipe (1) holds the sewing material down during the cutting process. Blow pipe (2) blows the chain thread, which was separated on the previously cut sewing part, into the cutting position.

Fig. 48: Blow pipes for holding down fabric and blowing chain into the cutting position



(1) - Blow pipe, fabric

(2) - Blow pipe, cutting position

Setting steps

1. Start the automatic sequence.
2. Interrupt sequence shortly before separating the chain that is hanging down.
3. Set blow pipe (1) such that the air flows as in the image on the left.
4. Set blow pipe (2) such that it is approx. 1 mm under the material holder and the air flows approximately as in the image on the right.
5. Regulate the strength of the air flow with the throttles (see Pneumatic plan).

6.2 Setting the *material residues* blow pipe

Correct setting

The blow pipe is active for as long as the cutting head is switched on. It blows all the cut-off material residues away from the turntable.

Fig. 49: Blow pipe for blowing away material residues

(1) - Blow pipe, material residues *(2) - Screws*

Setting steps

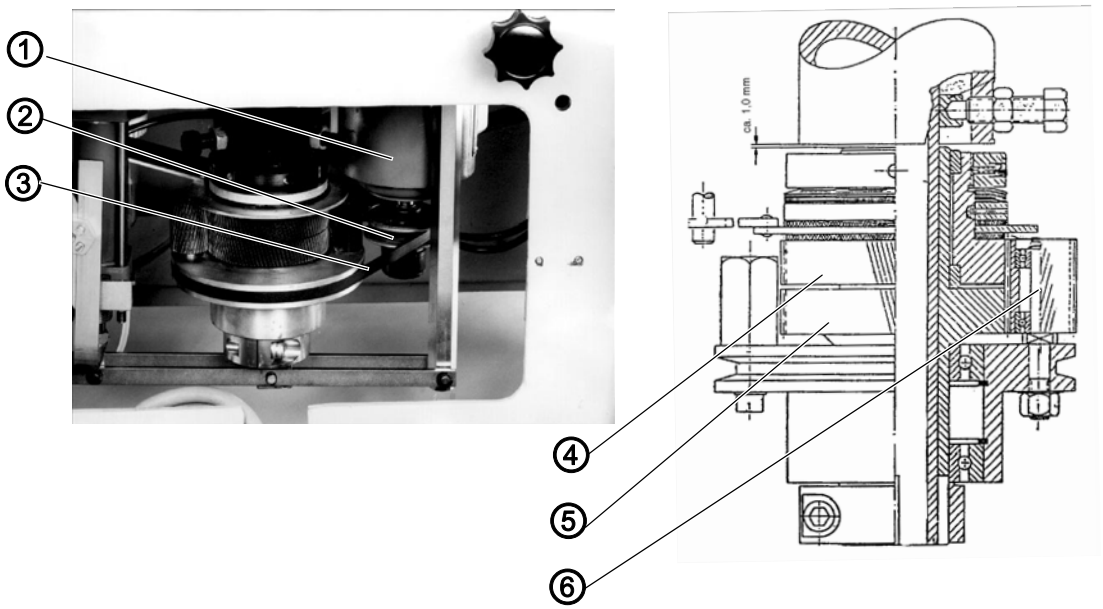
1. Loosen both screws (2).
2. Turn the blow pipe (1).
3. Tighten both screws (2).

7 Turntable

The turntable supports the material holder and turns this in accordance with the number of the holder (4, 6 or 8) by 45°, 60° or 90° as appropriate during the automatic sequence.
A counterweight acts against the planet wheel to balance the forces.
All toothed wheels are lubricated with a Molykote/oil mixture.

7.1 Operating principle

Fig. 50: Operating principle



(1) - Motor
(2) - Simplabelt pulley
(3) - Belts
(4) - Top toothed wheel
(5) - Bottom toothed wheel
(6) - Planet toothed wheel

The motor (1) drives the turntable via the Simplabelt pulley (2), the belt (3) and the planetary gear. The Simplabelt pulley (2) comprises 2 halves, the distances between which can be altered. In this way, the position of the belt (3) relative to the shaft can be changed in order to change the speed of the turntable.

The upper toothed wheel (4) has 99 teeth and can only be turned if the friction forces of the friction clutch are overcome. This is the case temporarily when starting up and braking during the automatic sequence and when the table is turned by hand.

The bottom toothed wheel (5) has 98 teeth and is firmly connected to the drive shaft of the turntable.

The different number of teeth means that the bottom toothed wheel is transported counter-clockwise around one tooth for each complete orbit of the planet toothed wheel (6). For a 360° revolution, 98 orbits of the planet toothed wheel are required.

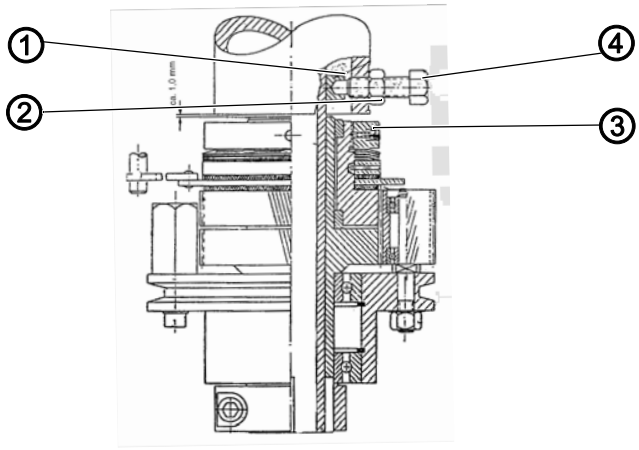
7.2 Setting the position of the drive shaft

The drive shaft is set in the factory using a dial gauge such that the turntable is horizontal.

Correct setting

Within the movement range of the sewing head, check the distance between the throat plate insert and the Delrin of the material holder. The position of the shaft is correct when the distances are the same in all areas of the material holder.

Fig. 51: Setting the position of the drive shaft



(1) - Plastic caps
(2) - Counternut
(3) - Ring
(4) - Screw

Setting steps

1. Loosen the counternuts (2) on the screws (3).
2. Loosen the ring (3) until the friction effect of the friction clutch is canceled.
3. Adjust the screws (4). When doing so, comply with the following:
   - Do not turn the screws out too far as otherwise the plastic caps (1) will be stripped off.
   - Do not tighten the screws too tightly as this will hinder the rotation of the table.
4. Tighten all loosened elements.

Sequence

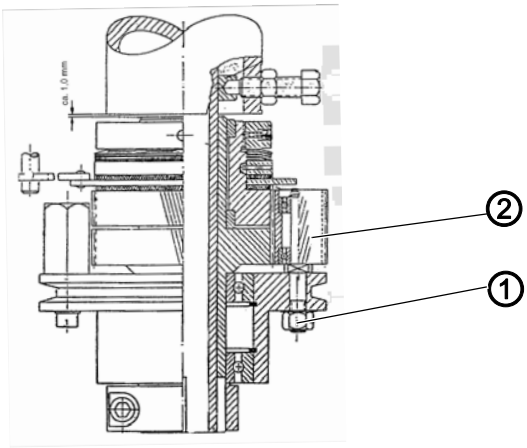
Set the friction clutch (📖 pg. 57)

7.3 Setting the play of the toothed wheels

Correct setting

The planet toothed wheel has the minimum play possible with respect to the other two toothed wheels.

Fig. 52: Setting the play of the toothed wheels



(1) - Nut *(2) - Planet toothed wheel*

Setting steps

1. Loosen the nut (1).
2. Set the position of the planet toothed wheel (2).
3. Tighten the nut (1).

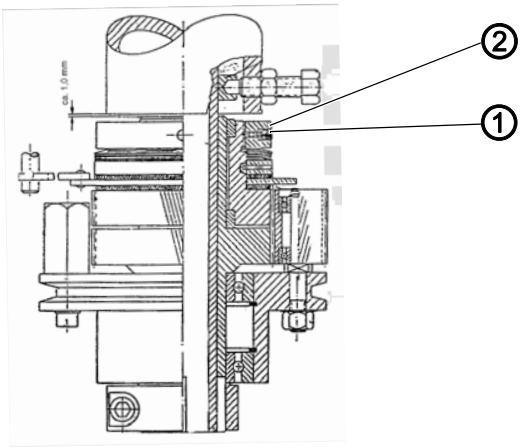
7.4 Setting the friction clutch

The friction clutch prevents the further movement of the turntable, if a user is within the movement range of the table. In addition, it enables a soft start-up and braking of the table.

Correct setting

The turntable can be turned and stopped by hand without any great effort being required. The surfaces are free of oil and grease, as otherwise there would be no braking effect.

Fig. 53: Setting the friction clutch



(1) - Screw *(2) - Ring*

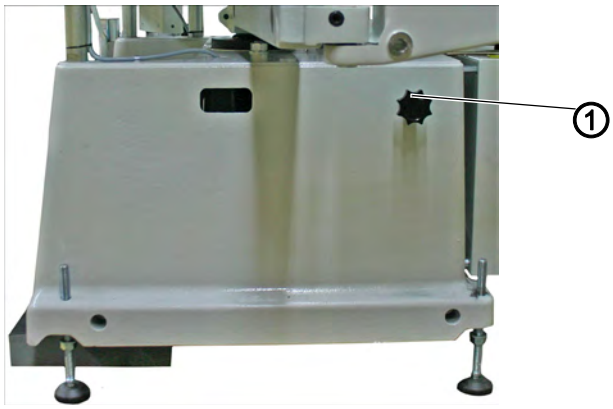
Setting steps

1. Loosen the screw (1).
2. Turn the ring (2):
   - Turn clockwise = braking effect is higher
   - Counter-clockwise = braking effect is lower
3. Tighten the screw (1).

7.5 Setting the speed of the turntable

The higher the speed the more time is available to position the sewing material.

Fig. 54: Setting the speed of the turntable



(1) - Adjusting wheel

Setting steps

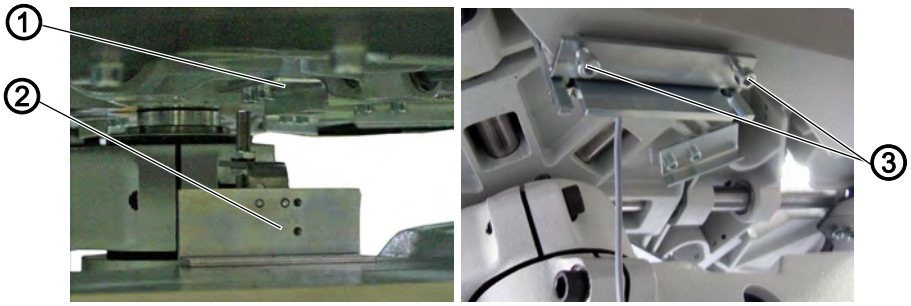
1. Use the adjusting wheel (1) to change the position of the motor and thereby the position of the belt in the Simplabelt pulley.

7.6 Setting the *table drive* actuating time

Correct setting

If the turntable is in the loading position, the switching flag (2) of the switch S1 (1) moves approx. 20 mm to the right over the actual switching point. The prerequisite is a correctly functioning friction clutch.

Fig. 55: Setting the actuating time for the Switch off table drive switch



(1) - Switch S1
(2) - Switching flag
(3) - Clamping screws

Setting steps

1. Start the automatic sequence.
2. Determine the holding point of the turntable.
3. Loosen the clamping screws (3) of the switch (1).
4. Change the position of the switch S1 (1).
5. Tighten the clamping screws (3).

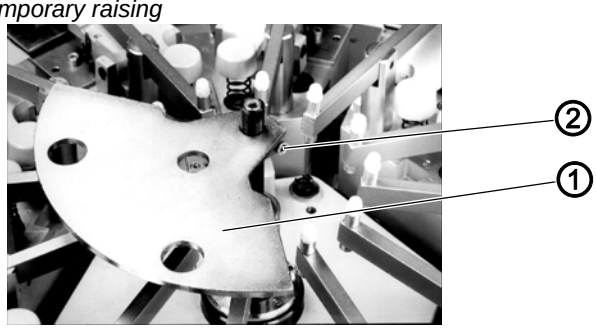
8 Sewing material clamp

8.1 Setting temporary raising

Correct setting

When the left foot pedal is actuated, the piston rod of the cylinder is extended in order to open the clamp for temporary raising.
The clamp is only lifted so far that the sewing material can be aligned unhindered.
Brackets for neckties are lifted so far that the lining holder plate is lying on the fabric support surface.

Fig. 56: Setting temporary raising



(1) - Lift plate *(2) - Screw*

Setting steps

1. Loosen the screw (2).
2. Align the lift plate (1) such that both the clamps in the loading position and the clamps in the stacking area are raised.
3. Tighten the screw (2).
4. Using the left foot pedal, test whether the setting is correct and adjust if required.

8.2 Setting complete raising

Correct setting

The gripping arm of the stacker fits under the opened clamp, without damaging the foam rubber.

Setting steps

The height of the completely raised clamp is determined by the temporary raising setting via the piston rod path of the cylinder.

Fig. 57: Setting complete raising

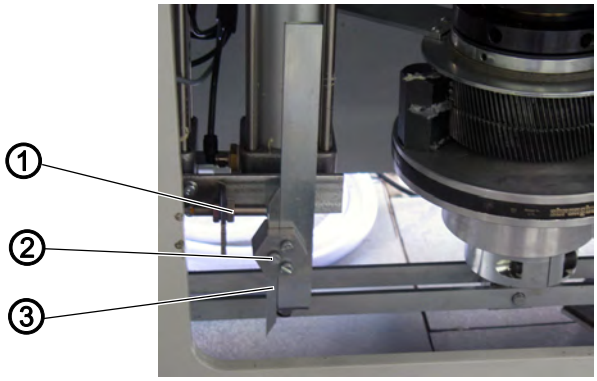
(1) - Cylinder

8.3 Setting the switch actuation timing

Correct setting

The switching flag (3) actuates the proximity switch (1) during the automatic sequence and triggers the actuation of the stacker. The switching process takes place at the start of clamp raising.

Fig. 58: Actuation time of the switch, Clamp opened



(1) - Proximity switch
(2) - Screw
(3) - Switching flag

Setting steps

1. Loosen the screw (2).
2. Set the switching flag (3).
3. Tighten the screws (2).

8.4 Replacing the foam rubber of the material holder

WARNING

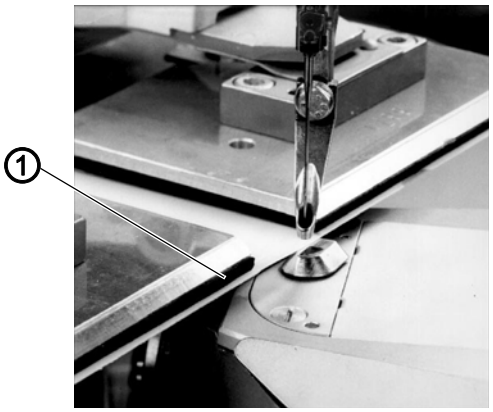
Risk of injury!

Switch off the main switch before making settings.

Correct setting

The foam rubber on the upper clamp halves fixes the sewing material such that it cannot be pulled out of the clamp during the sewing process.

Fig. 59: Replacing the foam rubber of the material holder



(1) - Foam rubber

Setting steps

1. Swing the sewing and cutting heads out.
2. Remove the foam rubber (1).
3. Clean the adhesive surfaces.
4. Cut the foam rubber to fit. The strips should be approx. 10 mm wide.
5. Stick the foam rubber (1) into position. When doing so, apply to the entire edge of the plates and allow the foam rubber to protrude onto the sewing sides by approx. 1 mm.

8.5 Replacing the Delrin of the material holder

WARNING

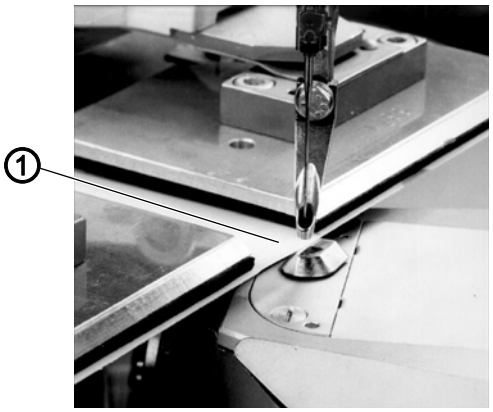
Risk of injury!

Switch off the main switch before making settings.

Correct setting

The Delrin on the fabric support surface is as close as possible to the needle, but does not touch it. The Delrin is not damaged.

Fig. 60: Replacing the Delrin of the material holder



(1) - Delrin

Setting steps

1. Swing the sewing and cutting heads out.
2. Remove the Delrin of the material holder.

Cutting the new Delrin to size

3. Mark the cutting contour on the Delrin.

   For all holder types, be aware of the following:

   - The Delrin should end with the rear edge of the top clamp.
   - On the sewing side, it should project by approx. 5 – 8 mm.

   For adjustable material holders, also note the following:

   - The Delrin of the left material holder half is stuck such that it is flush with the inside edge.
   - The Delrin of the right material holder half should project by 80 mm on the inside.
4. Mark the recesses for the material ends stops on the Delrin.
   In this process, take into consideration the width and the potential position range of the end stop.

5. Cut the Delrin along the markings.
6. Clean the adhesive surfaces.
7. Bond the Delrin to the fabric support surface.

Marking the sewing contour on the Delrin

8. Shorten the needle, sharpen the tip and insert into the needle bar.
9. Swing the sewing and cutting heads back in.
10. Check the height of the needle and correct, as required. The needle may not penetrate too deeply into the Delrin, as it can break.
11. Switch on the sewing unit and start the automatic sequence in order to mark the course of the Delrin.

Trimming and filing the Delrin

12. Trim the Delrin along the perforation.
13. File the Delrin so far that it has the minimum possible distance to the needle, without actually touching it.

Checking the distance between the Delrin and the needle

14. Insert the new needle.
15. Start the sewing cycle and determine the distance. In the event of needle deflections, file the Delrin at the relevant points.

9 Stacker

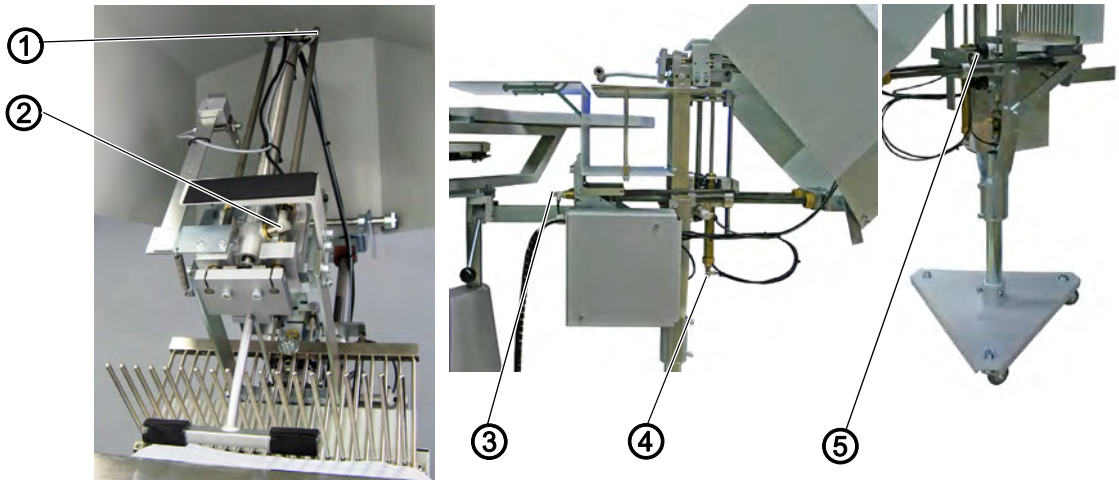
The cycle time of the stacker determines the opening time of the sewing material clamp, provided that the left foot pedal is not actuated for longer than the opening time.

9.1 Setting the speed

Correct setting

Looper and rack move quickly and evenly.
The stacker ends its function within the sewing head cycle time.

Fig. 61: Setting the speed



Setting steps

Set the incoming air/outgoing air of the cylinder with the corresponding throttles, to suit the function.

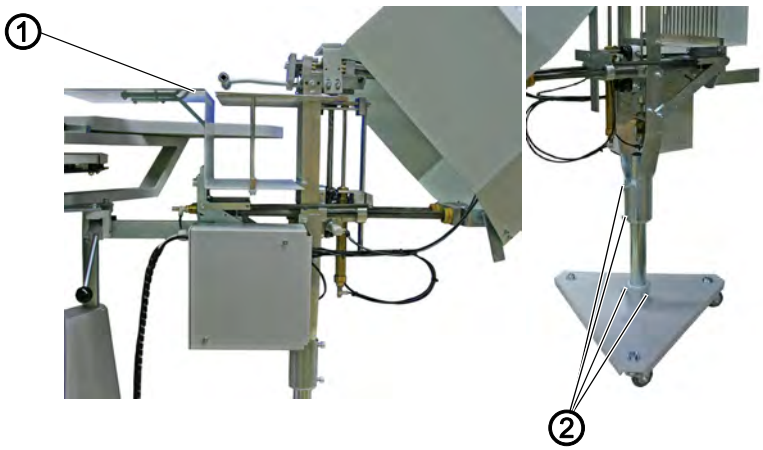
Position	Throttle	Function
1	S18	Gripper forward
2	S21	Gripper backward
3	S19	Rack backward
4	S1	Rack upwards
5	S20	Rack downwards

9.2 Setting the height of the stacker

Correct setting

The support plate maintains a distance of approx. 3 mm to the underside of the material holder.

Fig. 62: Setting the height of the stacker



(1) - Support plate

(2) - Screws

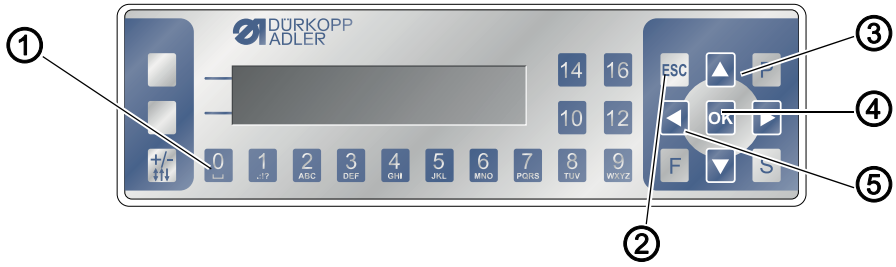
Setting steps

1. Loosen the screws (2).
2. Set the height of the stacker.
3. Tighten the screws (2).

10 Service settings via OP3000

The OP3000 control panel can be connected for service tasks.

Fig. 63: OP3000 display and control panel

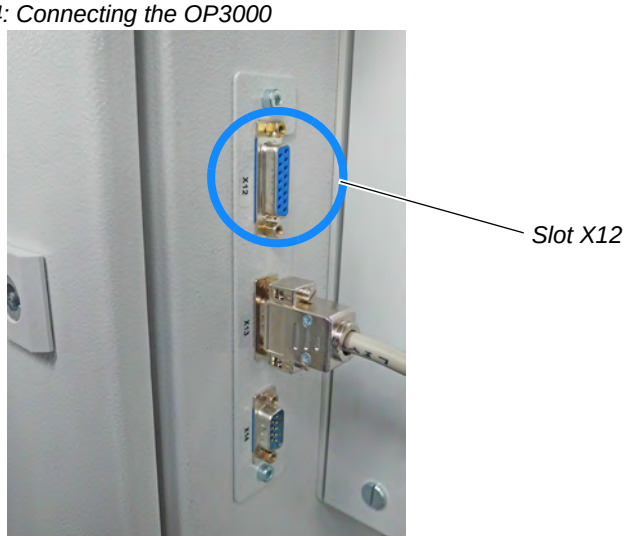


(1) - Numeric keys
(2) - ESC key
(3) - Arrow keys ▲/▼
(4) - OK key
(5) - Arrow keys ◀/▶

10.1 Connecting the OP3000

1. Plug the connector of the OP3000 into slot X12.

Fig. 64: Connecting the OP3000

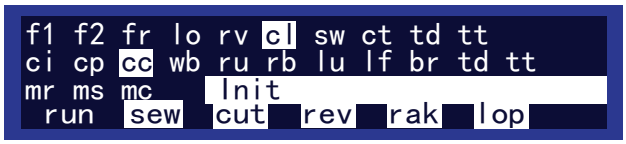


↳ After connecting, the control panel need not be switched on. The start screen will appear on the control panel after a brief loading period.

10.2 Activating/deactivating individual functions

After connecting, the following display appears on the OP3000 after a brief loading period:

Fig. 65: Start screen of the OP3000



1. In order to activate or deactivate an individual function, press the numeric key below it.
   The functions displayed with a white background are active.

Abbreviations for individual functions:

Abbreviation	Meaning
run	Only active in the operating cycle
sew	Sewing head
cut	Cutting head
rev	Turntable
rak	Gripping arm
lop	Stacker

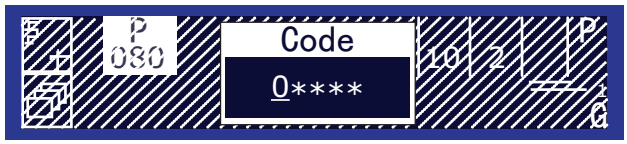
10.3 Selecting the service menu

The service menu is protected with a password. In order to access the service menu, proceed as follows:

1. Press the **P** and **S keys** on the control panel simultaneously.

↳ You are prompted to enter the code.

Fig. 66: Input screen for the technician's code



2. Enter the code **0000**.
3. Press the **0 key** again.

↳ You are now in the service menu.

Fig. 67: Service menu

NOTE

Material damage possible as a result of activating several outputs!

Activating several outputs simultaneously can lead to collisions between machine components.

Only test one output at a time!

10.4 Testing the individual functions

You can select the individual functions and set the value to active or inactive.

NOTE

Material damage possible as a result of activating several outputs!

Activating several outputs simultaneously can lead to collisions between machine components.

Only test one output at a time!

1. Navigate to the service menu.
2. Using the **arrow keys** select the menu item **Service**.
3. Confirm selection with the **OK key**.
4. Using the **arrow keys** select the menu item **Multitest**.
5. Confirm selection with the **OK key**.
6. Using the **arrow keys** select the menu item **Test Output**.
7. Confirm selection with the **OK key**.

↳ The individual functions can be selected and tested.

8. Using the right and left arrow keys, select the desired individual function.
9. Using the up and down arrow keys, change the value from **0 = inactive** to **1 = active**, or vice versa.

↳ The relevant function can be tested.

10.4.1 Individual functions of the sewing unit (pneumatics)

Abbreviation	Function
Y1_ClmOpen	Open clamp
Y2_ClmClose	Close clamp
Y3_ClmIntOpen	Temporary raising active
Y4_ClmIntClose	Temporary raising closed
Y5_Blower	Scrap blower, chain blower, down-holder active

10.4.2 Individual functions of the stacker (pneumatics)

Abbreviation	Function
Y7_LoopFor	Gripping arm forward
Y8_LoopUpw	Gripping arm upward
Y9_RakeBak	Rack backwards
Y10_RakeUpw	Rack upwards
Y11_Brake	Brake on the rack

10.4.3 Individual functions of the motors

Abbreviation	Function
Y13_MotRev	Turntable motor
Y14_MotCat	Cutting head motor
Y15_Brake	Sewing head motor

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