DÜRKOPP ADLER

610-10,630-10

Service Instructions

IMPORTANT
READ CAREFULLY BEFORE USE
KEEP FOR FUTURE REFERENCE

1 About these instructions

These instructions have been prepared with utmost care. They contain information and notes intended to ensure long-term and reliable operation.

Should you notice any discrepancies or if you have improvement requests, then we would be glad to receive your feedback through **Customer Service** (📖 *p. 123*).

Consider the instructions part of the product and store them in a place where they are readily available.

1.1 For whom are these instructions intended?

These instructions are intended for:

- Specialists:
  This group has the appropriate technical training for performing maintenance or repairing malfunctions.

Operating Instructions are supplied separately.

With regard to minimum qualification and other requirements to be met by personnel, please also follow the chapter **Safety** (📖 *p. 9*).

1.2 Representation conventions – symbols and characters

Various information in these instructions is represented or highlighted by the following characters in order to facilitate easy and quick understanding:

Proper setting

Specifies proper setting.

Disturbances

Specifies the disturbances that can occur from an incorrect setting.

Cover

Specifies which covers must be disassembled 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 service, maintenance, and installation

Steps to be performed via the software control panel

The individual steps are numbered:

1. First step
2. Second step
3. … The steps must always be followed in the specified order.

- Lists are marked 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 options.

Order

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

References

📖 Reference to another section in these instructions.

Safety Important warnings for the user of the machine are specifically marked. Since safety is of particular importance, hazard symbols, levels of danger and their signal words are described separately in the chapter **Safety** (📖 *p. 9*).

Location information If no other clear location information is used in a figure, indications of **right** or **left** are always from the user's point of view.

1.3 Other documents

The machine includes components from other manufacturers. Each manufacturer has performed a hazard assessment for these purchased parts and confirmed their design compliance with applicable European and national regulations. The proper use of the built-in components is described in the corresponding manufacturer's instructions.

1.4 Liability

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

Dürkopp Adler cannot be held liable for any damage resulting from:

- Breakage and damage during transport
- Failure to observe these instructions
- Improper use
- Unauthorized modifications to the machine
- Use of untrained personnel
- Use of unapproved parts

Transport

Dürkopp Adler cannot be held liable for breakage and transport damages. Inspect the delivery immediately upon receiving it. Report any damage to the last transport manager. This also applies if the packaging is not damaged.

Leave machines, equipment and packaging material in the condition in which they were found when the damage was discovered. This will ensure any claims against the transport company.

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

2 Safety

This chapter contains basic information 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 so can result in serious injury and property damage.

2.1 Basic safety instructions

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

These 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 DIN VDE 0105.

For the following work, switch off the machine at the main switch or disconnect the power plug:

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

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

Transport

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

Setup

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

Obligations of the operator

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

All the warnings and safety signs on the machine must always be in legible condition. Do not remove!
Missing or damaged warnings and safety signs must be replaced immediately.

Requirements to be met by the personnel

Only qualified specialists may:

- set up the machine
- perform maintenance work and repairs
- perform work on electrical equipment

Only authorized persons may work on the machine and must first have understood these instructions.

Operation

Inspect the machine while in use for any externally visible damage. Stop working if you notice any changes to the machine. Report any changes to your supervisor. Do not use a damaged machine any further.

Safety equipment

Safety equipment should not be removed or deactivated. If it is essential to remove or deactivate safety equipment for a repair operation, it must be assembled and put back into operation immediately afterward.

2.2 Signal words and symbols used in warnings

Warnings in the text are distinguished by color bars. The color scheme based on the severity of the danger. Signal words indicate the severity of the danger.

Signal words

Signal words and the hazard they describe:

Signal word	Meaning
DANGER	(with hazard symbol) If ignored, fatal or serious injury will result
WARNING	(with hazard symbol) If ignored, fatal or serious injury can result
CAUTION	(with hazard symbol) If ignored, moderate or minor injury can result
CAUTION	(with hazard symbol) If ignored, environmental damage can result
NOTICE	(without hazard symbol) If ignored, property damage can result

Symbols

The following symbols indicate the type of danger to personnel:

Symbol	Type of danger
	General
	Electric shock

Symbol	Type of danger
	Puncture
	Crushing
	Environmental damage

Examples Examples of the layout of warnings in the text:

DANGER

Type and source of danger!

Consequences of non-compliance.

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 ignored.

WARNING

Type and source of danger!

Consequences of non-compliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that could result in serious or even fatal injury if ignored.

CAUTION

Type and source of danger!

Consequences of non-compliance.

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 ignored.

CAUTION

Type and source of danger!

Consequences of non-compliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that could result in environmental damage if ignored.

NOTICE

Type and source of danger!

Consequences of non-compliance.

Measures for avoiding the danger.

↳ This is what a warning looks like for a hazard that could result in property damage if ignored.

3 Working basis

3.1 Laying the cables

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

NOTICE

Property damage and malfunctions can be caused by laying the cables incorrectly!

Excess cables can impair the functioning of moving machine parts. This affects the sewing process and can result in damage to the machine.

Lay excess cable as described.

To lay the cables:

1. Lay any cable that is too long neatly in proper cable snakes.
2. Bind together the cable loops with cable ties.
   If possible, bind the snakes to fixed parts.

Important

The cables must be fixed in place!

3. Cut off any overlapping cable ties.

3.2 Disassembling the covers

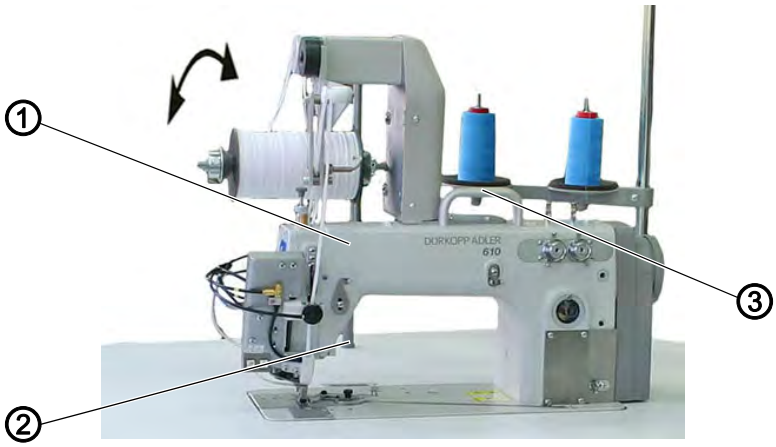
For many types of setting work, you will have to disassemble the machine covers first in order to access the components.

This chapter describes how to disassemble and then assemble the individual covers. The text for the relevant setting operations then only mentions which of the covers must be disassembled.

3.2.1 Tilting and re-erecting the machine head

To access the components on the underside of the machine, swivel up the machine head.

Fig. 1: Tilting and re-erecting the machine head



(1) - Machine head
(2) - Support
(3) - Handle

Tilting the machine head

To tilt the machine head:

1. Use the handle (3) to tilt the machine head (1) up to the support (2).

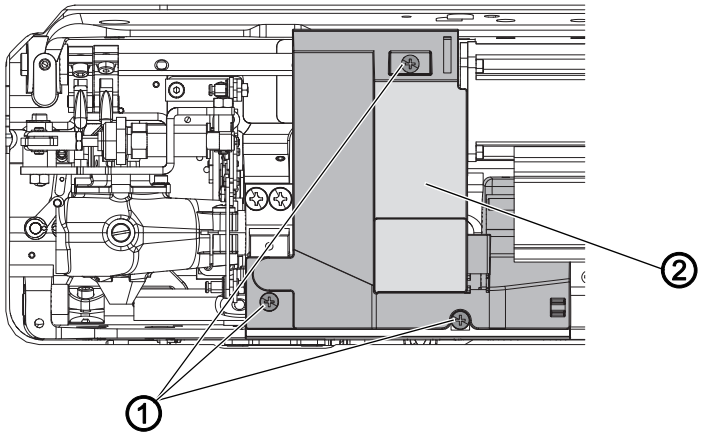
Erecting the machine head

To erect the machine head:

1. Carefully erect the machine head (1) using the handle (3).

3.2.2 Disassembling and assembling the oil pan

Fig. 2: Disassembling and assembling the oil pan



(1) - Screws *(2) - Oil pan*

Disassembling the oil pan

To disassemble the oil pan:

1. Loosen all 3 screws (1).
2. Remove the oil pan (2) downwards.

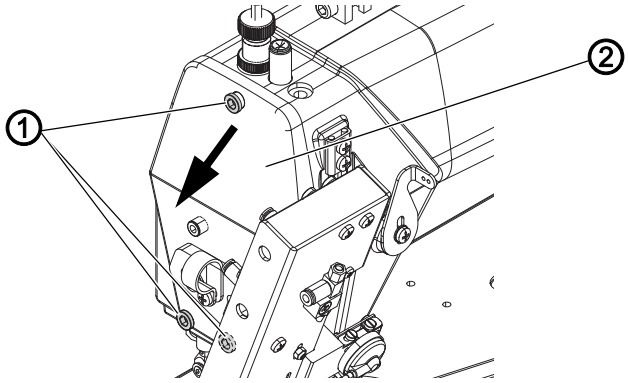
Assembling the oil pan

To assemble the oil pan:

1. Place the oil pan (2).
2. Secure the oil pan by tightening all 3 screws (1).

3.2.3 Disassembling and assembling the head cover

Fig. 3: Disassembling and assembling the head cover



(1) - Screws *(2) - Head cover*

Disassembling the head cover

To disassemble the head cover:

1. Loosen both screws (1).
2. Remove the head cover (2)

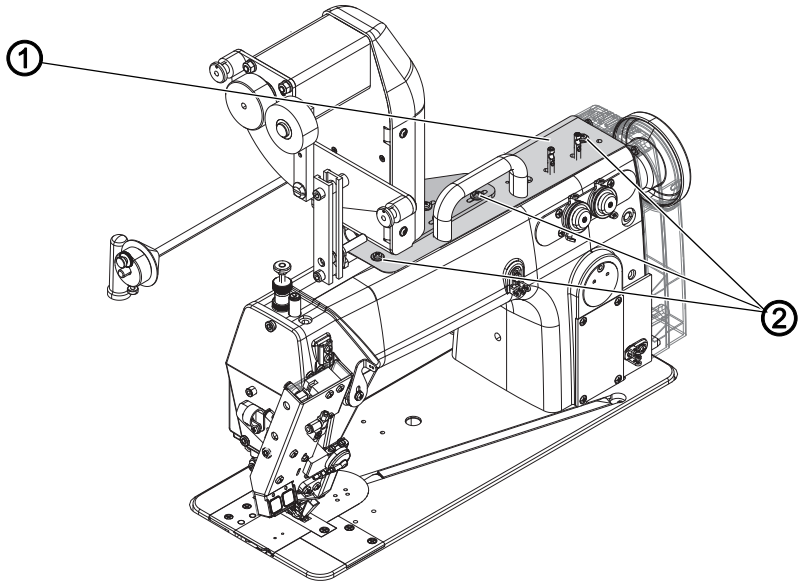
Assemble the head cover

To assemble the head cover:

1. Place the head cover (2).
2. Tighten both screws (1).

3.2.4 Disassembling and assembling the arm cover

Fig. 4: Disassembling and assembling the arm cover



(1) - Arm cover

(2) - Screws

Disassembling the arm cover

To disassemble the arm cover:

1. Loosen all 3 screws (1) on the arm cover.
2. Remove the arm cover (2).

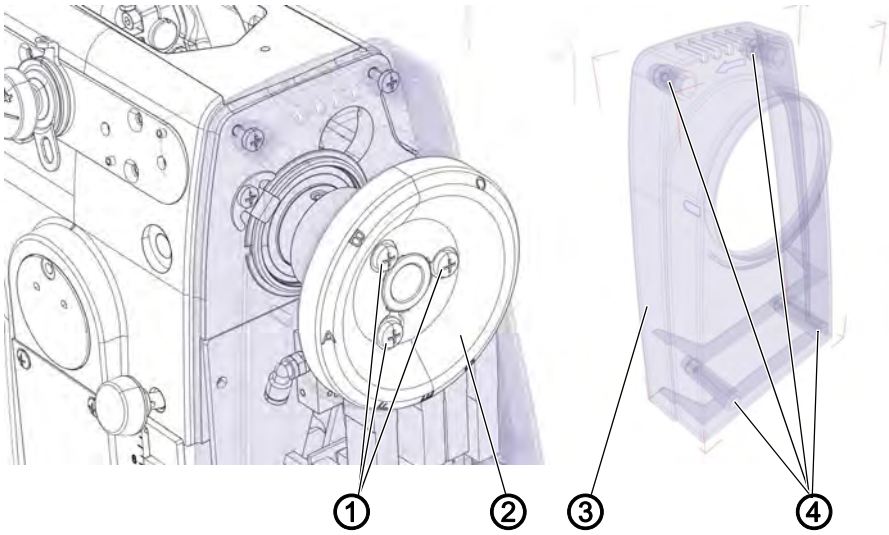
Assembling the arm cover

To assemble the arm cover:

1. Place the arm cover (2).
2. Tighten all 3 screws (1) on the arm cover.

3.2.5 Disassembling and assembling the upper belt guard

Fig. 5: Disassembling and assembling the upper belt guard



(1) - Screws
(2) - Handwheel
(3) - Belt guard
(4) - Screws

Order

1. Disassembling the handwheel
2. Disassembling the belt guard
3. Assembling the belt guard
4. Assembling the handwheel

Disassembling the handwheel

To disassemble the handwheel:

1. Loosen all 3 screws (1).
2. Remove the handwheel (2).

Disassembling the belt guard

To disassemble the belt guard:

1. Loosen all 4 screws (4) on the belt guard.
2. Remove the belt guard (3).

Assembling the belt guard

To assemble the belt guard:

1. Place the belt guard (3).
2. Tighten the belt guard with all 4 screws (4).

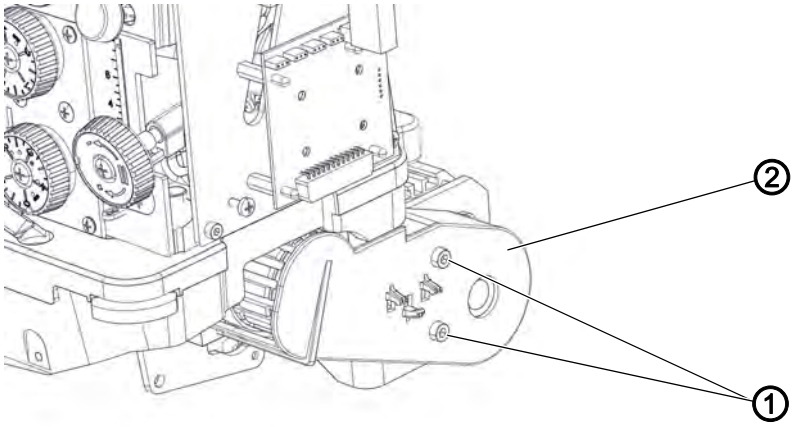
Assembling the handwheel

To assemble the handwheel:

1. Place the handwheel (2).
2. Tighten the handwheel with all 3 screws (1).

3.2.6 Disassembling and assembling the lower belt guard

Fig. 6: Disassembling and assembling the lower belt guard



(1) - Screws *(2) - Belt guard*

Disassembling the belt guard

To disassemble the belt guard:

1. Loosen both screws (1).
2. Remove the belt guard (2) to the right.

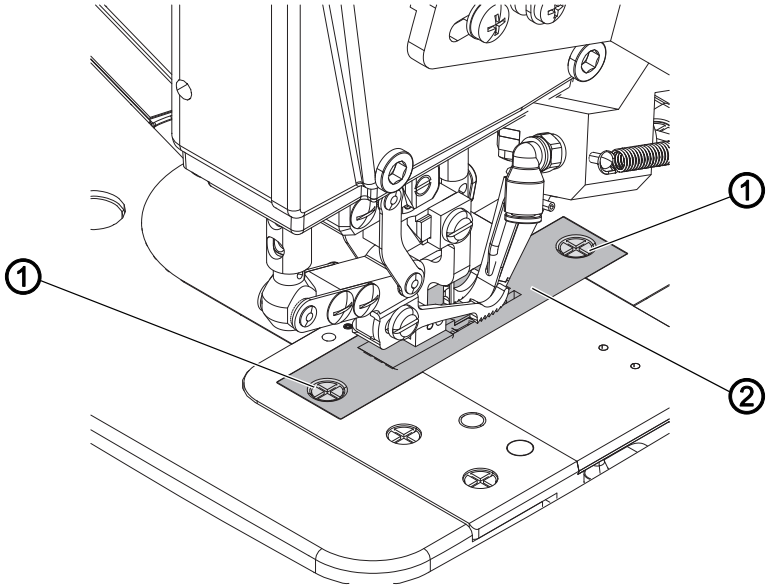
Assembling the belt guard

To assemble the belt guard:

1. Carefully place the belt guard (2). Ensure that you do not crush the cables while doing so.
2. Tighten the belt guard with both screws (1).

3.2.7 Disassembling and assembling the throat plate

Fig. 7: Disassembling and assembling the throat plate



(1) - Screws *(2) - Throat plate*

Disassembling the throat plate

To disassemble the throat plate:

1. Lift and lock the sewing foot.
2. Loosen both screws (1).
3. Remove the throat plate (2) upwards.

Assembling the throat plate

To assemble the throat plate:

1. Lift and lock the sewing foot.
2. Insert the throat plate (2) from above.
3. Tighten both screws (1).

3.3 Removing disruptive components

WARNING

Risk of injury from moving parts!

There is a risk of crushing when disruptive components are removed.

Switch off the machine.

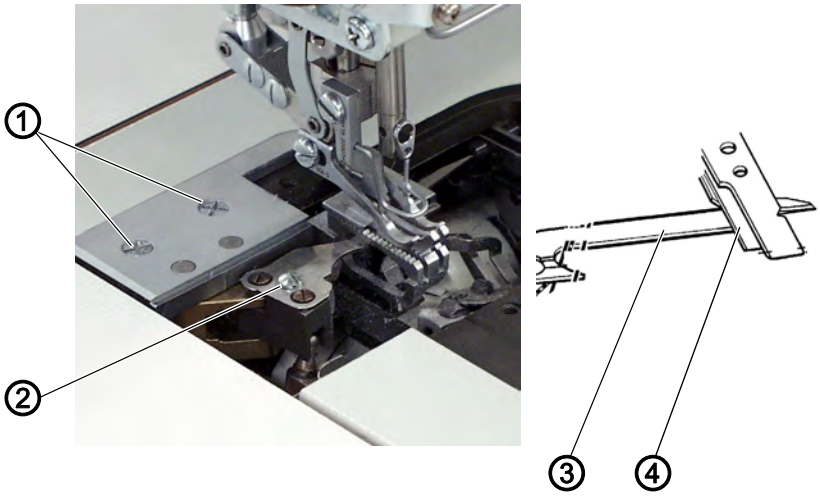
Some settings require that you remove other components first before you can access the components you need to set.

This description explains how to disassemble and assemble the thread cutter, the needle guard, the looper and looper mounting, the top feed foot and sewing foot, and the feed dogs.

3.3.1 Disassembling and assembling the thread cutter

Disassembling and assembling the thread cutter

Fig. 8: Disassembling and assembling the thread cutter



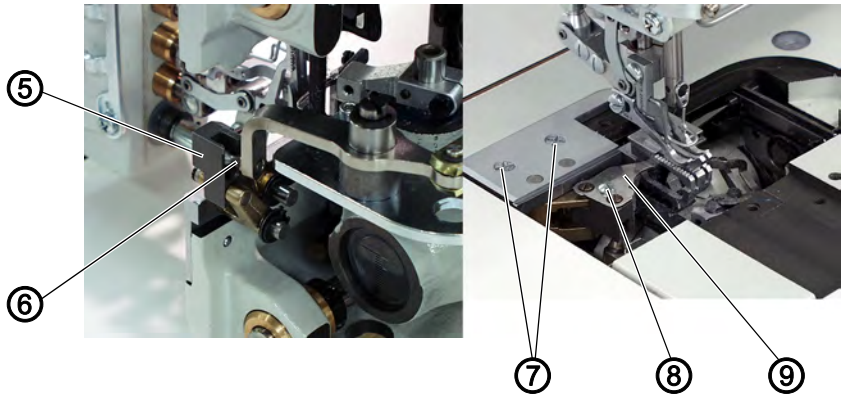
(1) - Screws
(2) - Screw
(3) - Movable blade
(4) - Counter blade

To disassemble the thread cutter:

1. Loosen the screw (2).
2. Pull the movable blade (3) to the left out of the counter blade (4).
3. Loosen the screws (1).
4. Remove the thread cutter upwards.

Assembling the thread cutter

Fig. 9: Assembling the thread cutter



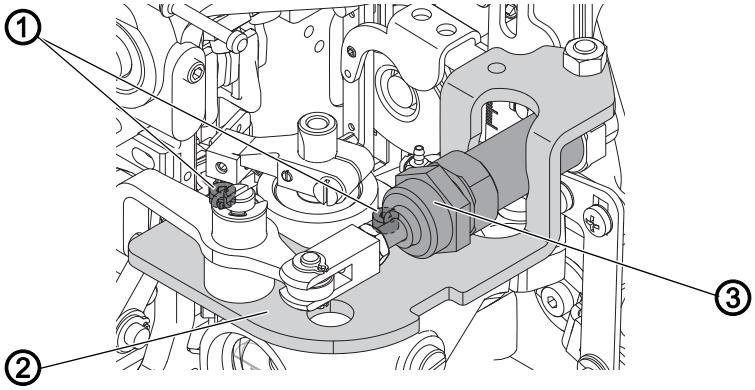
(5) - Ball lever
(6) - Blade carrier
(7) - Screws
(8) - Screw
(9) - Blade

To assemble the thread cutter:

1. Position the thread cutter such that the blade carrier (6) fits over the ball lever (5).
2. Insert both screws (7) and tighten.
3. Push the movable blade (9) to the right between the counter blade and the spring plate.
4. Tighten the blade to the blade carrier (6) with the screw (8).

Disassembling the carrier plate

Fig. 10: Disassembling and assembling the carrier plate



(1) - Screws
(2) - Carrier plate
(3) - cylinder

To disassemble the carrier plate:

1. Remove both screws (1).
2. Carefully remove the carrier plate (2) with mechanics and cylinder (3).

To assemble the carrier plate:

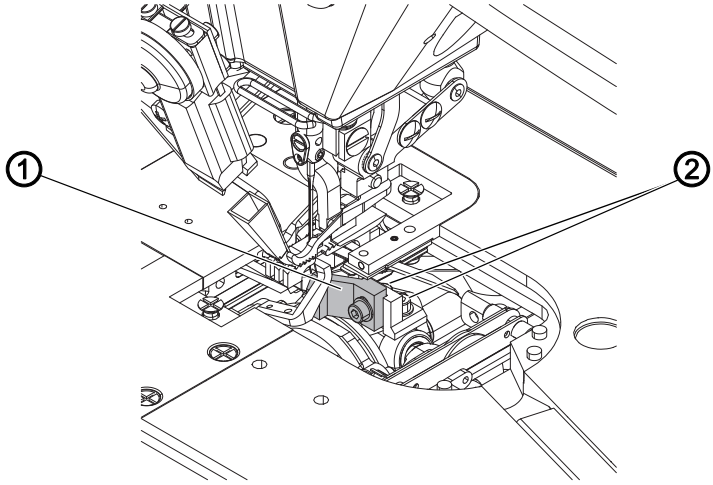
1. Carefully place the carrier plate (2) with mechanics and cylinder (3).
2. Tighten the carrier plate (2) with both screws (1).

3.3.2 Disassembling and assembling the needle guard

Order

1. Disassembling the needle guard
2. Assembling the needle guard
3. Setting the needle guard (📖 *p. 62*)

Fig. 11: Disassembling and assembling the needle guard



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

Disassembling the needle guard

To disassemble the needle guard:

1. Loosen both screws (2).
2. Carefully remove the needle guard (1) with mounting.

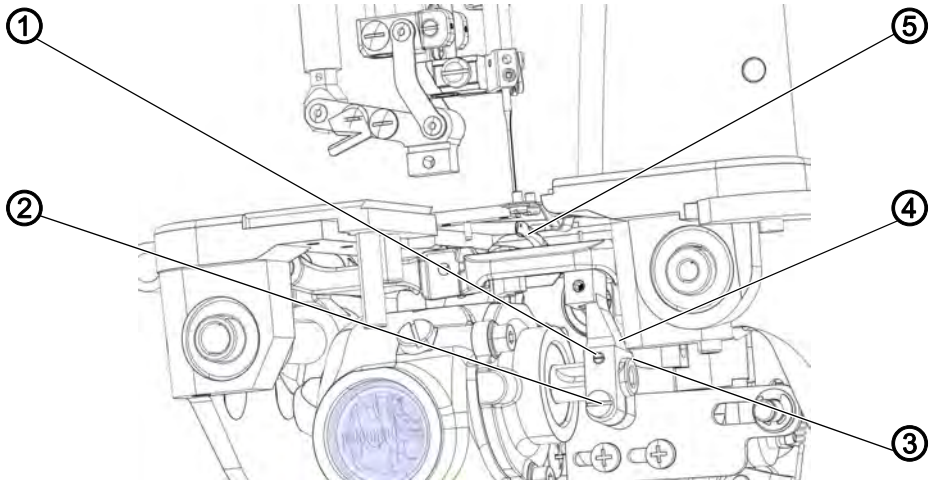
Assembling the needle guard

To assemble the needle guard:

1. Carefully place the needle guard (1) with mounting.
2. Secure the needle guard by tightening both screws (2).

3.3.3 Disassembling and assembling the looper and looper mounting

Fig. 12: Disassembling and assembling the looper and looper mounting



(1) - Screw
(2) - Screw
(3) - Screw (covered)
(4) - Looper mounting
(5) - Looper

Disassembling the looper mounting and looper

To disassemble the looper mounting and looper:

1. Slightly loosen screws (1) and (3).
2. Loosen the screw (2).
3. Remove the looper mounting (4) with looper (5) from the shaft.

Assembling the looper mounting and looper

To assemble the looper mounting and looper:

1. Push the looper mounting (4) with looper (5) onto the shaft.
2. Tighten both screws (1) and (3) a little.
3. Tighten the screw (2) on the looper mounting (4).

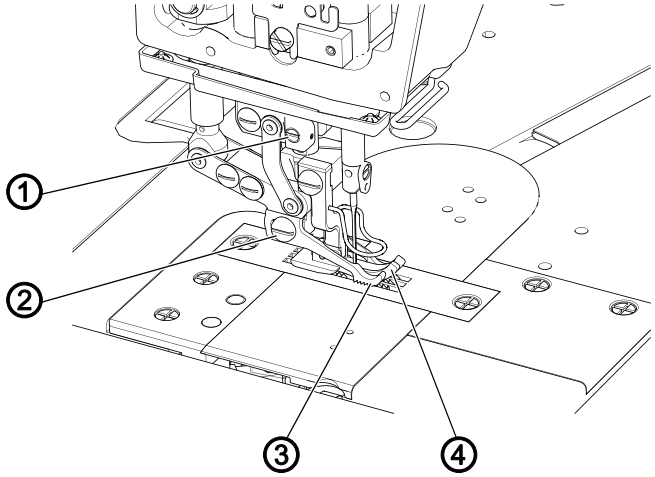
Order

After assembling the looper and the looper mounting, perform the following settings:

1. Loop stroke and looper clearance (📖 *p. 54*)
2. Needle guard (📖 *p. 62*)

3.3.4 Disassembling and assembling top feed foot and sewing foot

Fig. 13: Disassembling and assembling top feed foot and sewing foot



(1) - Screw
(2) - Screw
(3) - Top feed foot
(4) - Sewing foot

Disassembling the top feed foot

To disassemble the top feed foot:

1. Lift and lock the sewing foot (4).
2. Loosen the screw (2).
3. Remove the top feed foot (3).

Disassembling the sewing foot

To disassemble the sewing foot:

1. Lift and lock the sewing foot (4).
2. Loosen the screw (1).
3. Remove the sewing foot (4).

Assembling the sewing foot

To assemble the sewing foot:

1. Insert the sewing foot (4)
2. Assemble the sewing foot with screw (1).

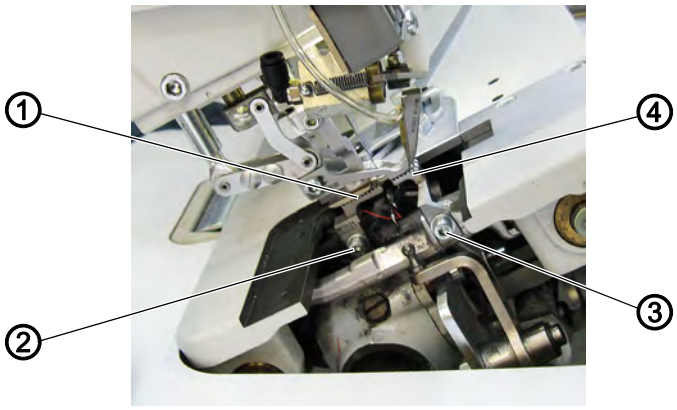
Assembling the top feed foot

To assemble the top feed foot:

1. Insert the top feed foot (3).
2. Assemble the top feed foot with screw (2).

3.3.5 Disassembling and assembling the feed dogs

Fig. 14: Disassembling and assembling the feed dogs



(1) - Main feed
(2) - Screw
(3) - Screw
(4) - Differential feed

Disassembling the feed dogs

To disassemble the feed dogs:

1. Loosen the screws (2) and (3).
2. Remove the main feed (1).
3. Remove the differential feed (4).

Assembling the feed dogs

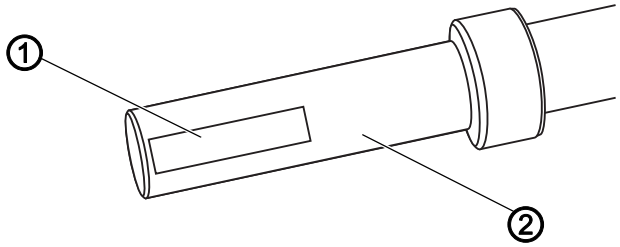
To assemble the feed dogs:

1. Insert the main feed (1).
2. Tighten the screw (2).
3. Insert the differential feed (4).
4. Tighten the screw (3).

3.4 Flats on shafts

Flats on shafts look like this:

Fig. 15: Flats on shafts



(1) - Flat
(2) - Shaft

Some shafts have flat surfaces at the points where the components are screwed on. This stabilizes the connection and makes setting easier.

Important

Always ensure that the screws are completely flush with the surface (1).

3.5 Locking the machine in place

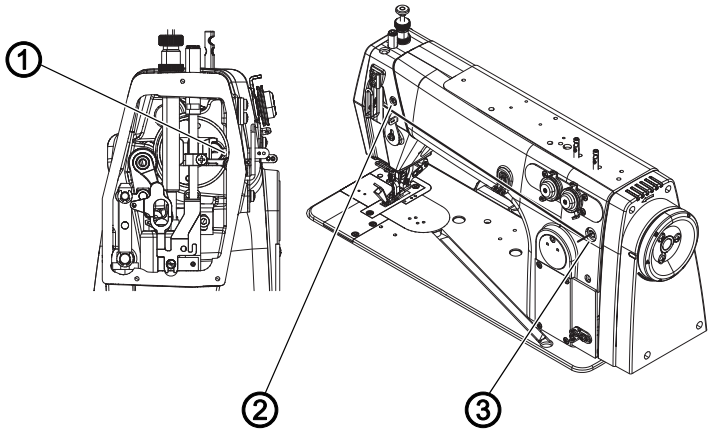
For some settings, the machine must be locked in place.

Order

1. Align the adjusting disk on the arm shaft crank.
2. Set the locking positions.

3.5.1 Aligning the adjusting disk on the arm shaft crank

Fig. 16: Aligning the adjusting disk on the arm shaft crank (1)



(1) - Slot of arm shaft crank
(2) - Hole for arresting pin
(3) - Hole for arresting pin

Proper setting

The largest slot A of the adjusting disk should be in a line with the slot (1) of the arm shaft crank.

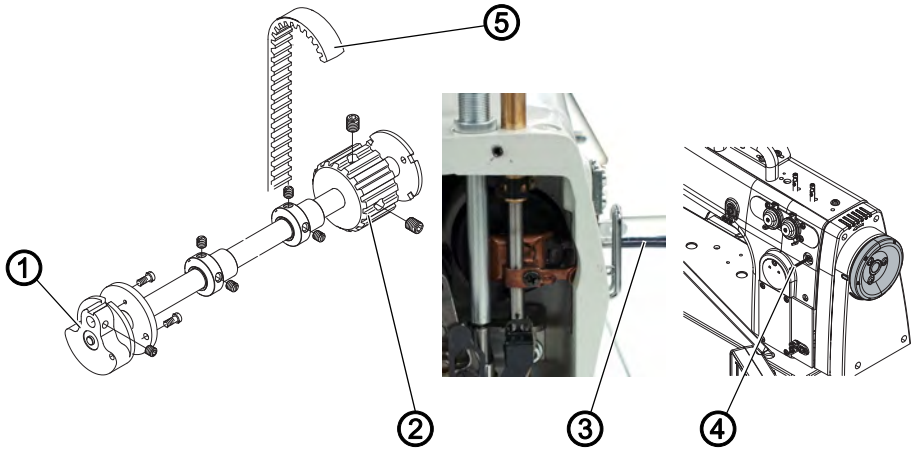
Disturbance

All function sequences are disturbed

Cover

- Disassembling the head cover (📖 *p. 16*)
- Disassembling the arm cover (📖 *p. 17*)

Fig. 17: Aligning the adjusting disk on the arm shaft crank (2)



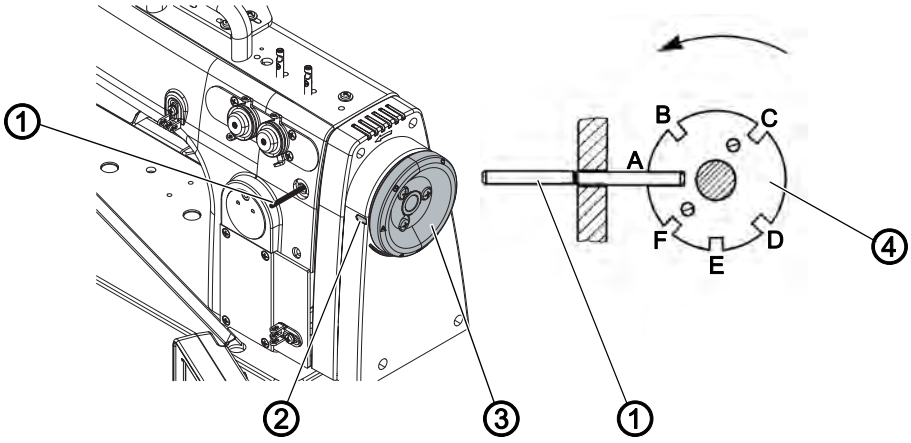
(1) - Slot of arm shaft crank
(2) - Upper toothed belt wheel
(3) - Arresting pin
(4) - Arresting pin
(5) - Toothed belt

To align the adjusting disk on the arm shaft crank:

1. Remove the toothed belt (5).
2. Loosen the screws on the upper toothed belt wheel (2).
3. Insert the arresting pin (3) into the slot (1) of the arm shaft crank.
4. Turn the handwheel until the arresting pin (4) can be inserted into the largest slot A of the adjusting disk (📖 *p. 29*).
5. Tighten the screws on the upper toothed belt wheel (2).
6. Position the toothed belt (5).
7. Remove arresting pins (3) and (4).

3.5.2 Setting the locking positions

Fig. 18: Setting the locking positions (1)



(1) - Arresting pin
(2) - Marking
(3) - Hand wheel
(4) - Adjusting disk with slots

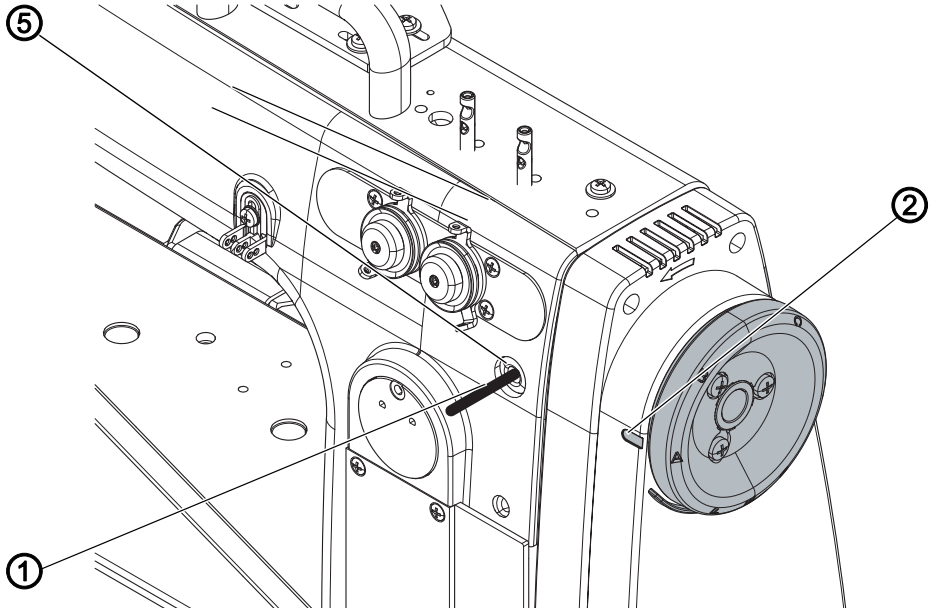
There are letters on the handwheel (3) for orientation. If you turn the handwheel such that one of the letters is next to the marking (2), this means that the corresponding slot on the adjusting disk (4) is below the hole for the arresting pin (1).

There are 6 locking positions for the following settings:

- **Position A**
  - Adjusting disk on the upper toothed belt wheel with its largest slot in the arm shaft crank
- **Position B**
  - Symmetry of the looper motion, i.e. when turning against the machine's direction of rotation, the needle tip must be in line with the center of the needle
- **Position C**
  - Lower toothed belt wheel
  - Symmetry of the looper motion
  - Loop stroke
  - Needle bar height
- **Position D**
  - Thrust movement of the feed dogs
  - Thrust movement of the top feed foot
- **Position E**
  - Thread take-up disk
  - Reference position top dead center

- **Position F**
  - 1. Screw of the top feed stroke eccentric congruent with the slot of the pull rod in the direction of rotation
  - Stroke movement of the top feed foot

Fig. 19: Setting the locking positions (2)



(1) - Arresting pin
(2) - Marking
(5) - Hole

Locking the machine in place

To lock the machine in place:

1. Remove the plug from the hole (1).
2. Turn the handwheel until the letter for the desired position is next to the marking (3).
3. Insert the arresting pin (2) through the hole (1) and into the slot of the adjusting disk.

Important

The letters on the handwheel are intended to provide general orientation! If necessary, you may still have to turn the handwheel slightly in order to meet the slot exactly.

Removing the lock

To remove the lock:

1. Remove the arresting pin (2).
2. Insert the plug (1) into the hole (2).

4 Individual settings

Always adhere to the specified order for the individual steps.

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

NOTICE

Property damage from incorrect order!

Failure to observe can result in damage to the machine.

It is essential to follow the working order specified in these instructions.

WARNING

Risk of injury from moving, cutting and sharp parts!

Crushing, cutting and punctures are possible.

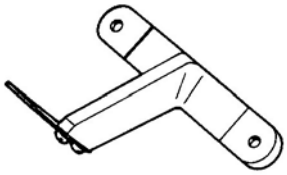
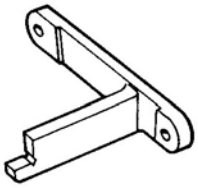
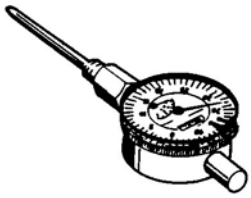
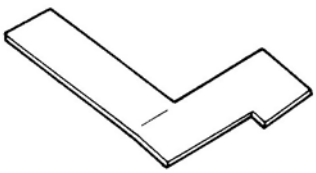
If possible, only change settings when the machine is switched off.

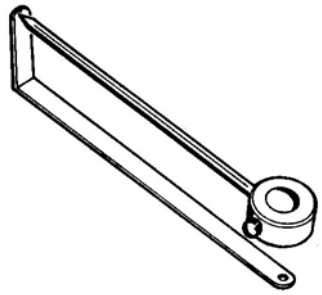
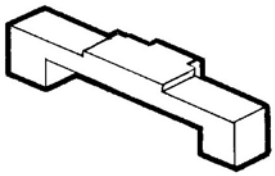
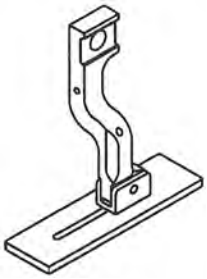
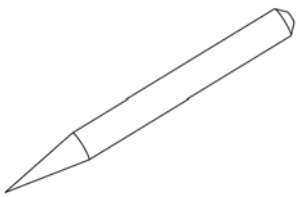
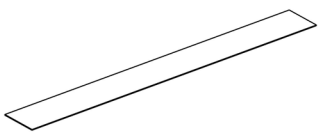
4.1 Set of gages and wrenches

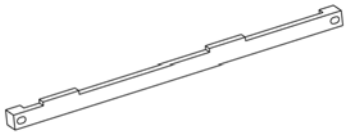
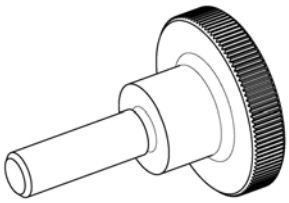
The gages listed below allow you to precisely set and check the machine.

The arresting pin listed is included in the accessory pack that comes with every machine. It can be used to lock the handwheel in place at positions A – F in order to make adjust the necessary machine settings.

Set of gages and wrenches

Gage	Part number	Setting
	0933 000735	Position of the rocker bolt in the looper drive housing
	0933 000739 K	Position of the looper drive housing
	9301 022608	Arresting pin 5H8x60 (included in the accessory pack) For locking the handwheel in one of the setting positions A – F
	0171 000981	To measure the needle evasive movement (ellipsis width) of the looper drive. If you have your own dial gage, only the clamping sleeve 171 984 and measuring pin 933 748 are required.
	0171 290010	Slant of the looper of 89° 30’

Gage	Part number	Setting
	0933 080192	Even looper movement for symmetry
	0933 000740	Height of the thread take-up disk
	0271 000767	Height of the feed dog
	0178 800024	Calibrating foot
	0558 006060	Adjusting needle: Synchronizing the feed dogs
	0178 800033	PTFE strips: Synchronizing the feed dogs

Gage	Part number	Setting
	0178 800010	Gage bottom feed: Synchronizing the feed dogs
	0238 010353	Cylinder pin 6H8x70
	9210 013397	Knurled screw M5x16

4.2 Positioning the needle

NOTICE

Property damage from incorrect setting!

There is a risk of the machine becoming damaged and malfunctioning.

When turning the ring, make sure that the ring does not shift in axial direction on the arm shaft.
Ensure that there is enough clearance on either side in the slot of the forked light barrier.

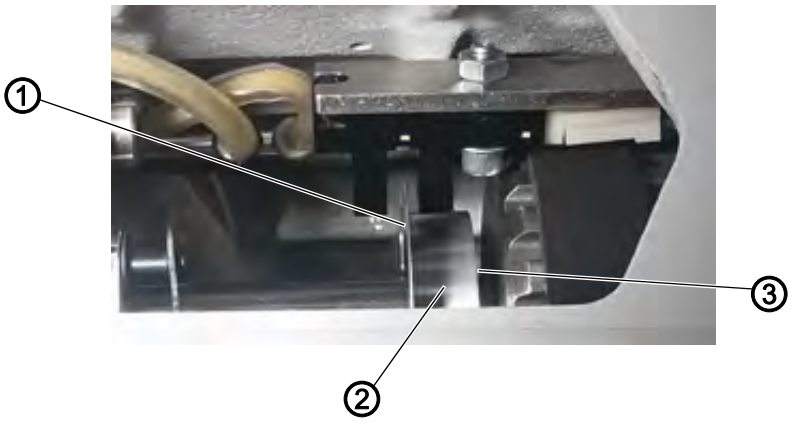
Proper setting

After the machine is switched on, the needle is situated at the reference position top dead center. This position corresponds to slot E of the adjusting disk.

Cover

- Disassembling the arm cover (🕮 *p. 17*)

Fig. 20: Positioning the needle



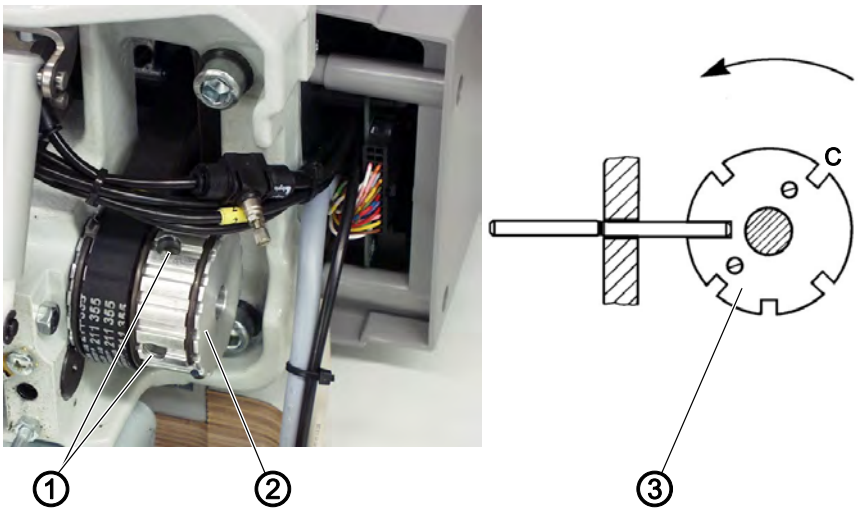
(1) - Edge of the thread take-up disk
(2) - Ring
(3) - Threaded pin

To position the needle:

1. Lock the machine in place at position E (📖 *p. 27*).
2. Loosen the threaded pin (3) of the ring (2) and turn the ring (2) accordingly.
3. Tighten the threaded pin (3).
4. Remove the lock (📖 *p. 27*).

4.3 Setting the lower toothed belt wheel

Fig. 21: Setting the lower toothed belt wheel



(1) - Screws
(2) - Lower toothed belt wheel
(3) - Arm shaft crank with slots

Proper setting

When positioning the toothed belt on the lower toothed belt wheel (2), make sure that both screws (1) in slot C assume the position shown, i.e. they must be freely accessible for an Allen key.

Disturbance

Adjusting the machine settings is becoming harder.

To set the lower toothed belt wheel:

1. Turn the toothed belt wheel (2) to the position shown.
2. Lock the machine in place at position C (📖 *p. 27*).
3. Place the toothed belt onto the upper toothed belt wheel.

Order

Change the following settings after completely placing the toothed belt between the upper and lower shaft:

- Symmetry of the looper motion (📖 *p. 49*)
- Loop stroke (📖 *p. 54*)
- Needle bar height (📖 *p. 55*)
- Stroke setting of the top feed foot (📖 *p. 69*)
- Thrust setting of the top feed foot (📖 *p. 72*)

4.4 Setting the sewing foot

4.4.1 Setting the lift stroke

When the pedal is pressed to position -1, the sewing feet can be raised during sewing, e. g. to move the sewing material (📖 *Operating Instructions*).

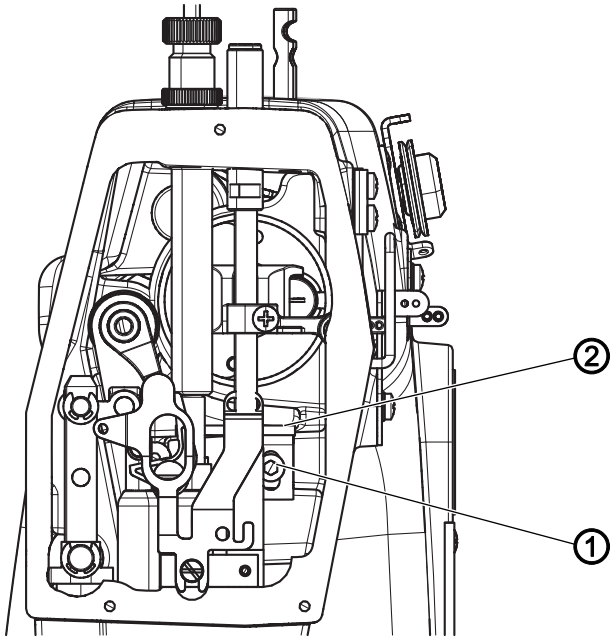
Proper setting

The distance between the raised sewing feet and the throat plate is preset to 9 mm on delivery.

Cover

- Disassembling the head cover (📖 *p. 16*)

Fig. 22: Setting the lift stroke



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

To set the lifting height of the sewing foot:

1. Loosen the screw (1).
2. Adjust the height of the stop (2).
3. Tighten the screw (1).

4.4.2 Setting the speed of the sewing foot lift

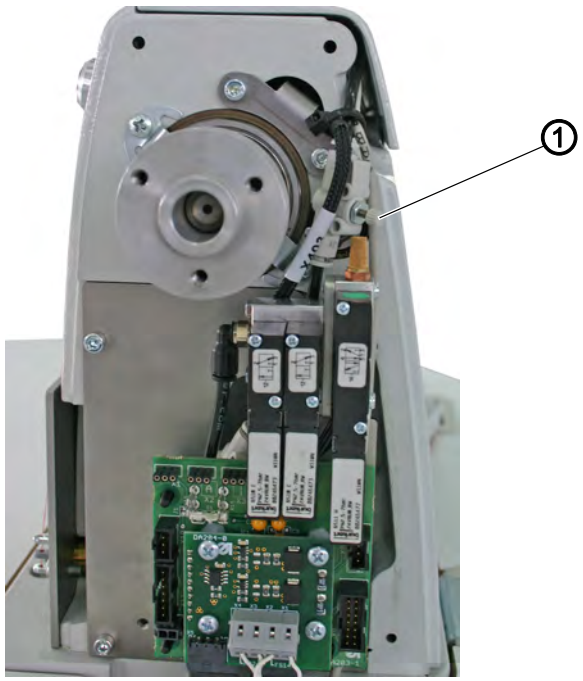
NOTICE

Property damage from incorrect setting!

If lowered too quickly, the tulle foot may become damaged or destroyed.

Set the speed of the lowering process to an appropriate rate.

Fig. 23: Setting the speed of the sewing foot lift



(1) - Throttle valve

Proper setting

If previously closed, the throttle valve (1) must be opened by rotating it 3 complete turns in counterclockwise direction.

Cover

- Disassembling the upper belt guard (📖 *p. 18*)

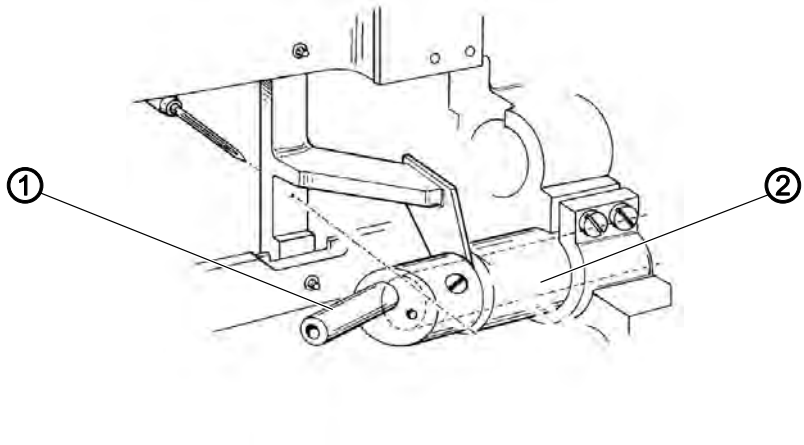
To set the speed of the sewing foot lift:

1. Turn the throttle valve (1):
   - Lower the sewing foot more quickly = turn throttle valve (1) counter-clockwise
   - Lower the sewing foot more slowly = turn throttle valve (1) clockwise

4.5 Setting the looper

4.5.1 Setting the rocker bolt and the left lower shaft bearing

Fig. 24: Setting the rocker bolt and the left lower shaft bearing



(1) - Rocker bolt

(2) - Left lower shaft bearing

Cover

- Disassembling the covers on the base plate (📖 *p. 13*)

Order

1. Removing the needle
2. Removing the throat plate (📖 *p. 20*).
3. Disassembling the oil pan (📖 *p. 15*).
4. Removing the thread cutter (📖 *p. 21*).
5. Draining the oil from the looper drive housing (📖 *p. 40*).
6. Disassembling the needle guard (📖 *p. 23*).
7. Removing the looper mounting (📖 *p. 24*).
8. Removing the looper drive housing (📖 *p. 41*).
9. Setting left lower shaft bearing and rocker bolt (📖 *p. 39*).

4.5.2 Draining and filling the oil in the looper drive housing

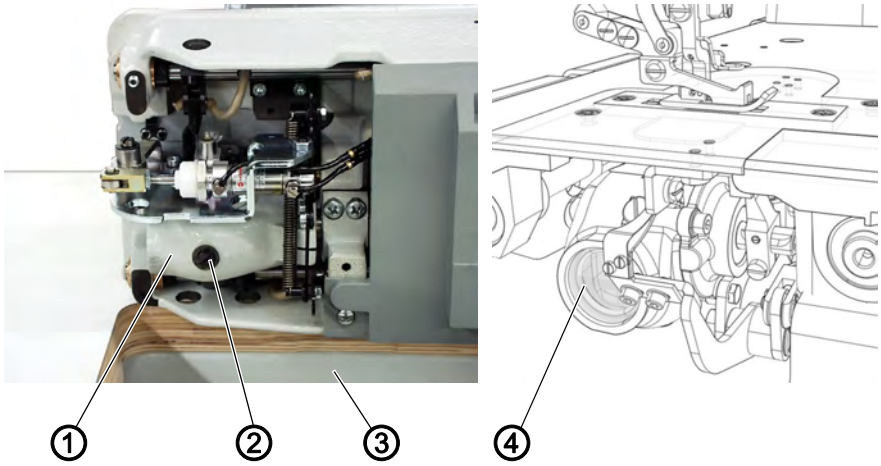
CAUTION

Risk of environmental damage from oil!

Oil is a pollutant and must not enter the sewage system or the soil.

Carefully collect up used oil.
Dispose of used oil and oily machine parts in accordance with national regulations.

Fig. 25: Draining and filling the oil in the looper drive housing



(1) - Looper drive housing
(2) - Drain screw
(3) - Oil pan
(4) - Upper mark

Cover

Tilt the machine head (📖 *p. 14*).

Draining the oil

To drain the oil:

1. Loosen the drain screw (2).
2. Place an appropriate collection tray in the oil pan (3).
3. Allow the oil to drain completely with the machine tilted up.

Topping off the oil

To top off the oil:

1. Top off the looper drive housing (1) with **DA 10** lubricating oil until reaching the upper mark (4) on the inspection glass.
2. Tighten the drain screw (2).

4.5.3 Removing and placing the looper drive housing

Fig. 26: Removing and placing the looper drive housing

(1) - Looper drive housing
(2) - Clamping screw
(3) - Lower shaft

Cover

- Tilt the machine head (📖 *p. 14*)

Removing the looper drive housing

To remove the looper drive housing:

1. Loosen the clamping screw (2).
2. Pull the looper drive housing (1) carefully off to the left.
   While doing so, slowly turn the lower shaft (3).

Placing the looper drive housing

To place the looper drive housing:

1. Push the looper drive housing (1) carefully on to the right.
   While doing so, slowly turn the lower shaft (3) until the rocker bolt is engaged in its mounting.
2. Tighten the clamping screw (2).

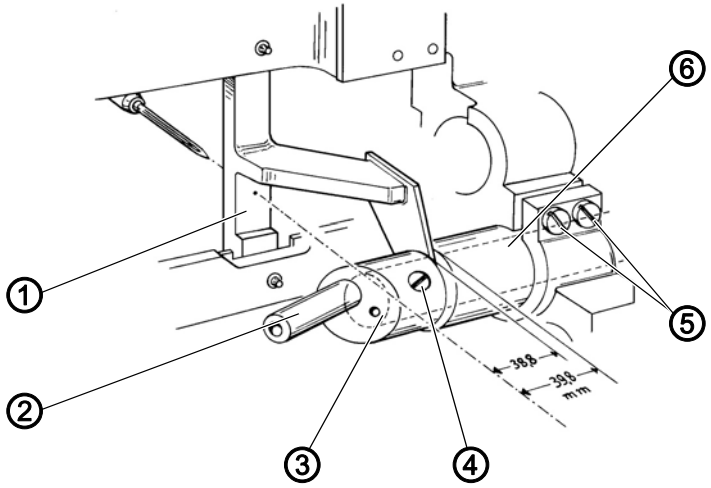
Order

After placing a completely new looper drive housing, perform the following settings:

- Setting the looper drive housing (📖 *p. 45*)
- Setting the needle evasive movement (📖 *p. 46*)
- Setting the symmetry of the looper motion (📖 *p. 49*)
- Setting the looper in the looper mounting (📖 *p. 51*)
- Setting the looper and needle bar height (📖 *p. 52*)

4.5.4 Setting the left lower shaft bearing

Fig. 27: Setting the lower shaft bearing



(1) - Gage
(2) - Rocker bolt
(3) - Face of the lower shaft
(4) - Screw
(5) - Screws
(6) - Lower shaft bearing

Proper setting

The distance from the center of the needle to the start of the left lower shaft bearing (6) and from the center of the needle to the end of the rocker bolt (2) should be 39.8 mm and 38.8 mm, respectively.

To set the left lower shaft bearing:

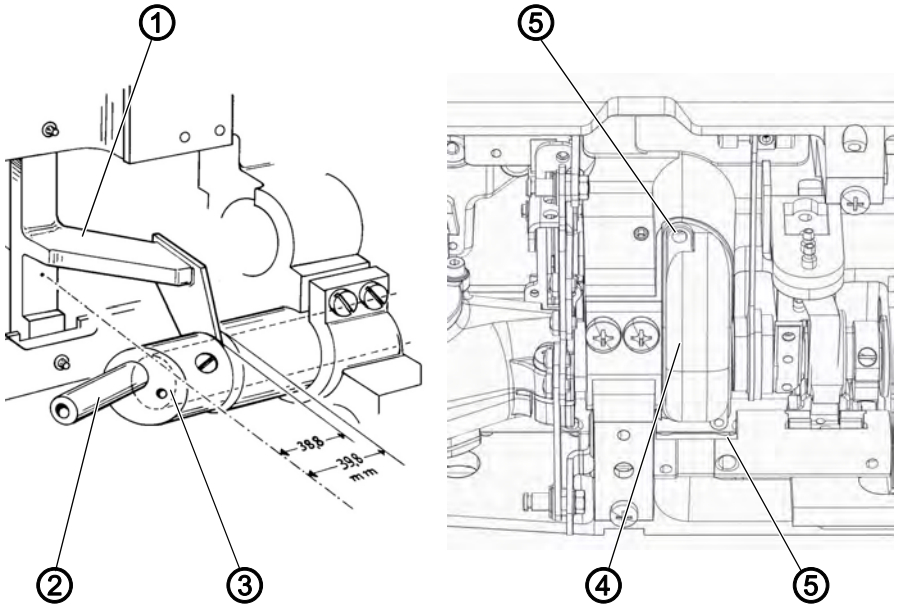
1. Tighten the gage (1) for the rocker bolt on the throat plate support.
2. Loosen both screws (5).
3. Move the lower shaft bearing (6) up to the gage (1).
4. Tighten both screws (5).

Disturbance

- Damage to the looper
- Damage to the needle
- Damage to the thread cutter blade
- Missing stitches
- Thread breakage

4.5.5 Setting the rocker bolt

Fig. 28: Setting the rocker bolt (1)



(1) - Gage
(2) - Rocker bolt
(3) - Face of the lower shaft
(4) - Grease cap
(5) - Screws

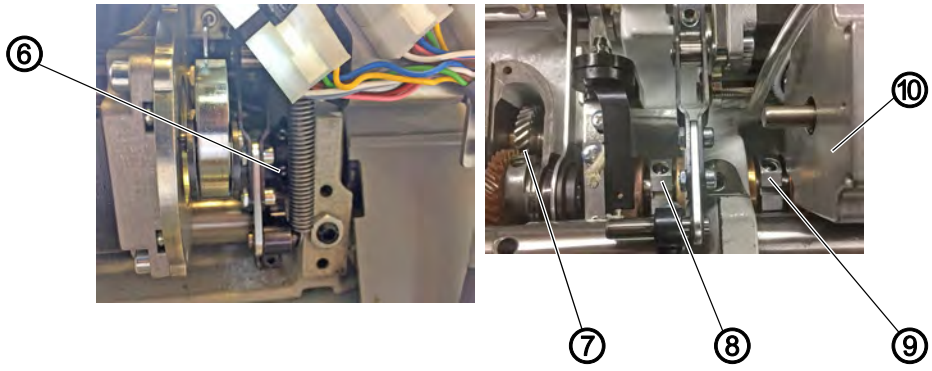
Proper setting

The rocker bolt (2) must be pushed up against the face (3) of the lower shaft.

To set the rocker bolt:

1. Remove the grease cap (4).
   The 2nd screw (5) is accessible from the upper side of the base plate.
2. Tighten the gage (1) for the rocker bolt on the throat plate support.

Fig. 29: Setting the rocker bolt (2)



(6) - Screw
(7) - Gear wheel
(8) - Eccentric
(9) - Eccentric
(10) - Lower shaft

3. Loosen eccentics (8) and (9), gear wheel (7), and screw (6).
4. Slide the lower shaft (10) such that there is a distance of 1 mm between lower shaft bearing (4) and rocker bolt (2) or the rocker bolt abuts on the gage (1).
5. Tighten the eccentrics (8) and (9), tighten the screw (6), and align the gear wheel (7).
6. Tighten the screws.
7. Check the movement of the toothed belt on the lower toothed belt wheel.
   If required, align the lower toothed belt wheel.
8. Assemble the looper drive housing (📖 *p. 41*) and fill it with **DA 10** lubricating oil (📖 *p. 40*).

Disturbance

- Damage to the looper
- Damage to the needle
- Damage to the thread cutter blade
- Missing stitches
- Thread breakage

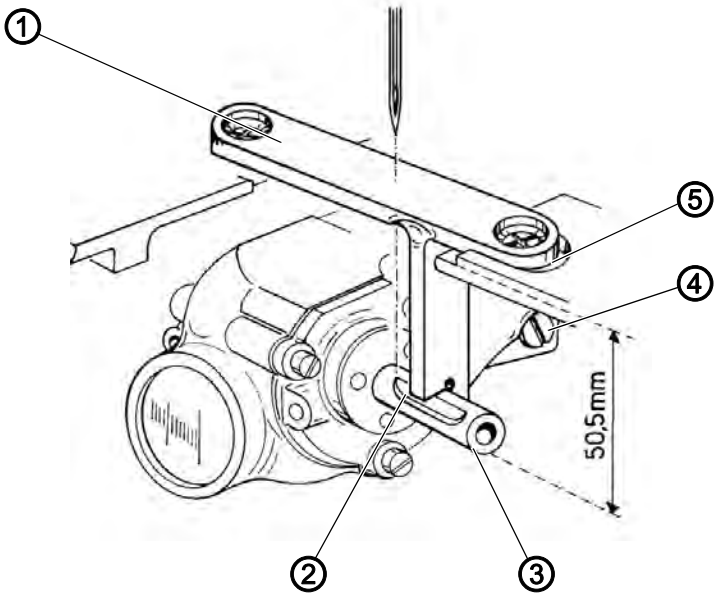
Order

After setting the rocker bolt and the left lower shaft bearing, perform the following settings:

- Assemble all parts
- Symmetry of the looper motion (📖 *p. 49*)
- Loop stroke and looper clearance to the needle (📖 *p. 54*)
- Needle bar height (📖 *p. 55*)

4.5.6 Setting the looper drive housing

Fig. 30: Setting the looper drive housing (1)



(1) - Gage
(2) - Looper shaft
(3) - Looper shaft lower edge
(4) - Clamping screw
(5) - Throat plate support

Proper setting

The needle tip should point to the center of the looper shaft (2), and the looper shaft lower edge should be parallel to the underside of the throat plate.

This corresponds to a distance of 50.5 mm between the lower edge of the looper shaft (3) and the throat plate support (5).

Disturbance

- Damage to the looper
- Damage to the needle
- Damage to the thread cutter blade
- Missing stitches
- Thread breakage

Order

- Removing the needle
- Removing the throat plate (📖 *p. 20*)
- Disassembling the oil pan (📖 *p. 15*)
- Disassembling the thread cutter (📖 *p. 21*)
- Disassembling the needle guard (📖 *p. 23*)
- Removing the looper mounting (📖 *p. 24*)

To set the looper drive housing:

1. Tighten the gage (1) on the throat plate support.
2. Loosen the clamping screw (4).
3. Align the looper drive housing such that the looper shaft (2) abuts in the cutout of the gage (1).
4. Tighten the clamping screw (4).

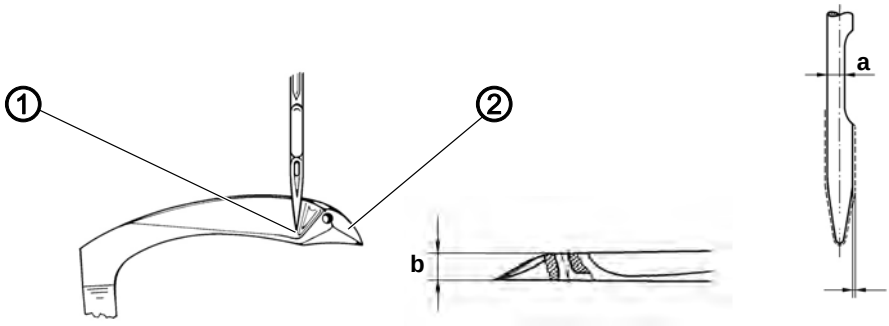
Order

After setting the looper drive housing, perform the following settings:

1. Symmetry of the looper motion (📖 *p. 49*)
2. Loop stroke and looper clearance to the needle (📖 *p. 54*)
3. Needle bar height (📖 *p. 55*)

4.6 Setting the needle evasive movement (ellipsis width)

Fig. 31: Setting the needle evasive movement



(1) - Tip of the needle
(2) - Looper
a *- Needle thickness*
b *- Looper thickness*

Proper setting

The needle evasive movement is set properly if - during the looper movement from right to left - the distance to the needle is 0.1 mm. While the looper is moving from left to right, the tip (1) of the descending needle is at the back of the looper (2); see position shown in the figure above.

The precise dimension of the needle evasive movement depends on the needle system and the needle thickness.

It must, therefore, be calculated using the following formula:

$$E = a + b + 0.1 + X$$

Example using a 934 SIN/Nm 110 needle

Needle thickness at a = 0.7 mm

Looper thickness at b = 1.4 mm

Distance from looper tip to the needle = 0.1 mm

For larger needle thickness 110 Nm X *= 0.1 mm

Ellipsis width E = 2.3 mm

*X = larger dimension a for larger needle thicknesses

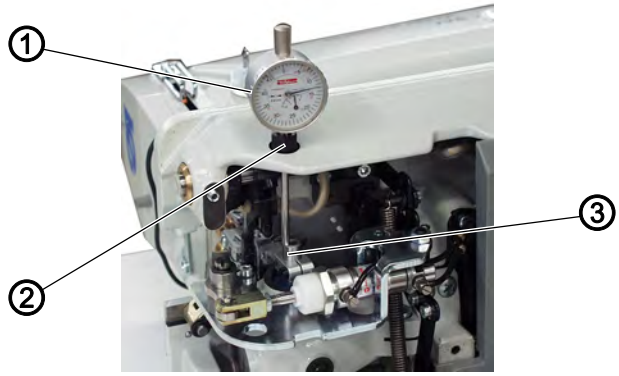
X for Nm 100	= 0 mm
X for Nm 110 and 120	= 0.1 mm
X for Nm 130	= 0.2 mm

To perform the setting, move the lower shaft axially:

To the right	= ellipsis width is smaller
To the left	= ellipsis width is larger

4.6.1 Setting the needle evasive movement

Fig. 32: Setting the needle evasive movement (1)

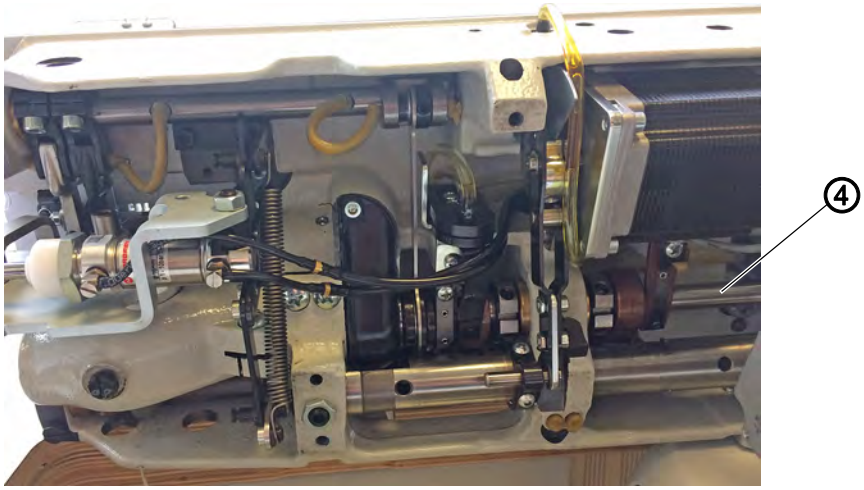


(1) - Dial gage
(2) - Clamping sleeve
(3) - Looper gage

To set the needle evasive movement:

1. Tighten the clamping sleeve (2) and insert the dial gage (1).
2. Turn the handwheel to position the looper shaft (3) at its lowest point.
3. Set the measured value 0 on the dial gage (1).
4. Turn the handwheel to position the looper shaft (3) at its highest point.
5. Read the difference off the dial gage.

Fig. 33: Setting the needle evasive movement (2)



(4) - Lower shaft

Important

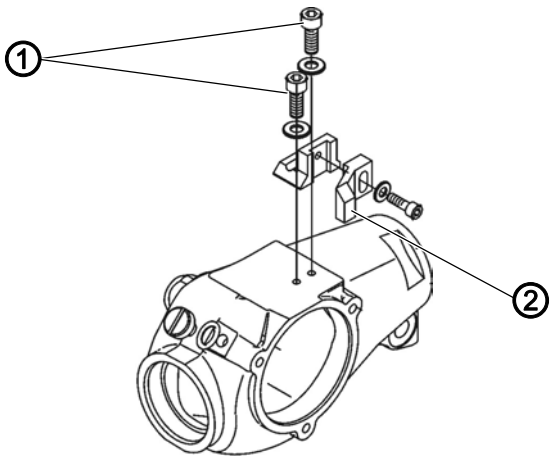
If the dimension does not match the calculated dimension for the needle evasive movement, the lower shaft (4) must be loosened and adjusted. An adjustment in the axial direction changes the ellipsis width at a ratio of 1:2, i.e., when the lower shaft is moved, e.g. by 0.2 mm, the ellipsis width changes by 0.1 mm.

Disturbance

- Damage to the looper
- Damage to the needle
- Missing stitches
- Thread breakage

4.6.2 Swiveling down the needle guard

Fig. 34: Swiveling down the needle guard



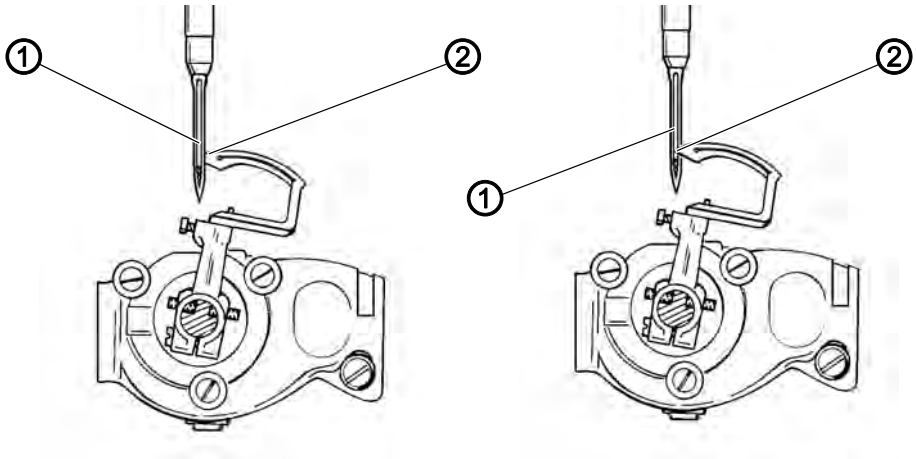
(1) - Screw *(2) - Needle guard*

To swivel down the needle guard:

1. Loosen the screws (1) and swivel down the needle guard (2).

4.7 Setting the symmetry of the looper motion

Fig. 35: Setting the symmetry of the looper motion (1)



Position C **Position B**

(1) - Center of the needle *(2) - Looper tip*

Proper setting

Setting the symmetry means that the looper tip (2) is in line with the center of the needle (1) when the machine is locked in place at both position C and position B.
The looper tip should be behind and in front of the needle when the machine is locked in place at position C and B, respectively.

Disturbance

- Damage to the looper
- Damage to the needle
- Missing stitches
- Thread breakage

Order

Remove the following component before performing the setting:

- Thread cutter (📖 *p. 21*)

Fig. 36: Setting the symmetry of the looper motion (2)

(3) - Pointer
(4) - Gage
(5) - Lower toothed belt wheel

To set the symmetry of the looper motion:

1. To ensure precise adjustments, assemble the gage (4) for the looper movement on the looper drive housing and the pointer (3) on the looper shaft.
2. Loosen the screws on the lower toothed belt wheel (5).
3. Turn the lower shaft such that the pointer (3) is above the marking on the gage (4) both at position C and B.
4. When you turn the lower shaft, the pointer (3) must swing out to the left.
5. Tighten the screws on the toothed belt wheel (5).

Information

If you do not have a gage available, perform the adjustment as shown in the previous figures.

4.8 Setting the looper in the looper mounting

Proper setting

The front of the looper should be positioned at an angle of 89° to the edge of the machine plate.

If the machine is fitted with 2 loopers, the rear one must be aligned and assembled first, followed by the looper on the front.

The setting is performed using the gage for the looper.

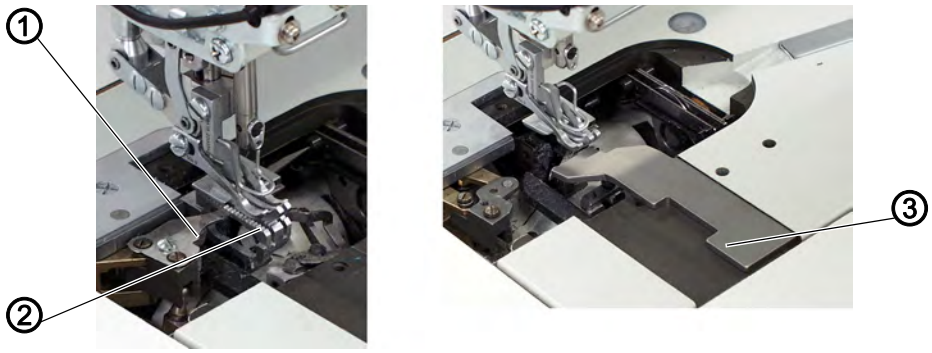
Disturbance

- Damage to the looper
- Damage to the needle
- Missing stitches
- Thread breakage

Cover

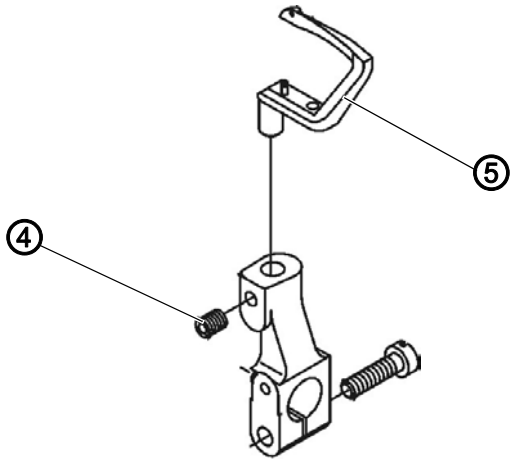
- Disassembling the covers on the base plate (📖 *p. 13*)
- Removing the throat plate (📖 *p. 20*)
- Removing the feed dog (2) (📖 *p. 26*)
- Removing the thread cutter blade (1) (📖 *p. 21*)

Fig. 37: Setting the looper in the looper mounting (1)



(1) - Blade
(2) - Feed dog
(3) - Gage

Fig. 38: Setting the looper in the looper mounting (2)



(4) - Screw *(5) - Looper*

To set the looper in the looper mounting:

1. Loosen the screw (4).
2. Position the gage (3) for the looper on the right side of the base plate cutout.
3. Move the looper (5) up to the gage and tighten the screw (4).

4.9 Setting looper and needle bar

The following 3 settings must be coordinated with each other:

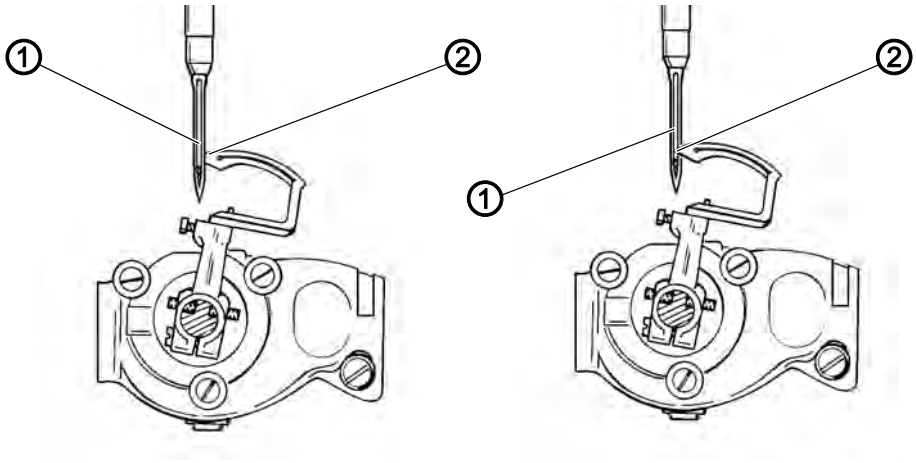
- Loop stroke position and loop stroke
- Looper clearance to needle
- Needle bar height

Information

The **loop stroke position** is the position of the looper in which the looper tip points precisely at the center line of the needle.

The **loop stroke** is the path length from the bottom dead center of the needle bar up to the height where the looper is in the loop stroke position. The loop stroke is 3.5 mm.

Fig. 39: Setting the looper and needle bar (1)



Position C **Position B**

(1) - Center of the needle *(2) - Looper tip*

Proper setting

When the needle has risen by 3.5 mm from its bottom dead center as a result of turning the handwheel in the direction of rotation, the looper tip (2) must be exactly at the center of the needle (1) - slot C of the adjusting disk.

This setting must also be present in the opposite direction of rotation - slot B of the adjusting disk.
For more information, see also chapter **Setting the symmetry of the looper motion** (📖 *p. 49*).

Disturbance

- Damage to the looper
- Damage to the needle
- Missing stitches
- Thread breakage

Order

Prerequisite:

A straight and undamaged needle has to be inserted (📖 *Operating Instructions*).

4.9.1 Setting loop stroke position and looper clearance

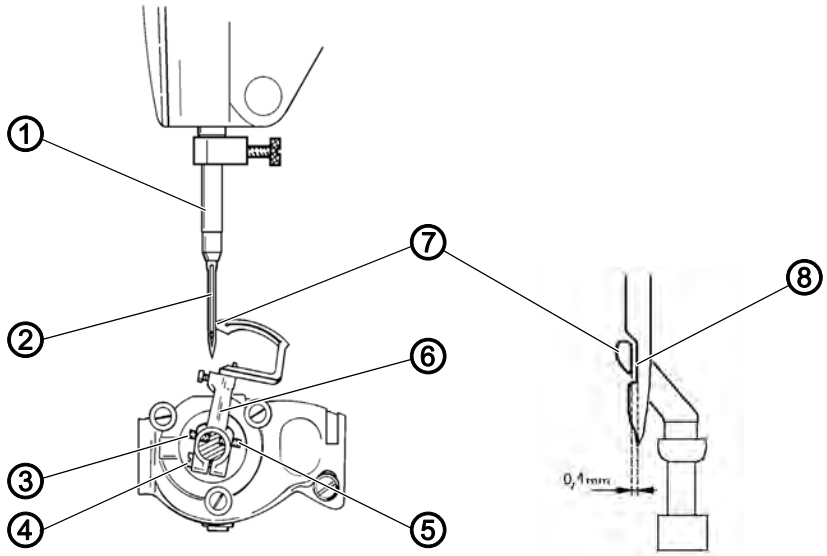
Proper setting

Looper clearance:
The distance between the looper tip and the groove of the needle should be 0.1 mm.

Cover

- Disassembling the covers on the base plate (📖 *p. 13*)
- Removing the throat plate (📖 *p. 20*)

Fig. 40: Setting the loop stroke position and looper clearance



(1) - Needle bar
(2) - Needle
(3) - Adjusting screw
(4) - Screw
(5) - Adjusting screw
(6) - Looper mounting
(7) - Looper tip
(8) - Needle groove

To set the loop stroke position and the looper clearance:

1. Turn the needle bar (1) to the loop stroke position.
2. Lock the machine in place at position C (📖 *p. 27*).
3. Loosen the screw (4).
4. Setting the loop stroke position:
   Turn the looper mounting (6) such that the looper tip (7) behind the needle (2) points to the center line of the needle.
   To do so, turn the adjusting screws (3) and (5) accordingly.
5. Setting the looper clearance:
   Move the looper mounting (6) sideways such that the distance between the looper tip (7) and the groove of the needle (8) is correct.
6. Tighten the screw (4).

Order

After setting loop stroke position and looper clearance, check the following settings:

- Symmetry of the looper motion (position B and C) (📖 *p. 49*)
- Needle bar height (📖 *p. 55*)

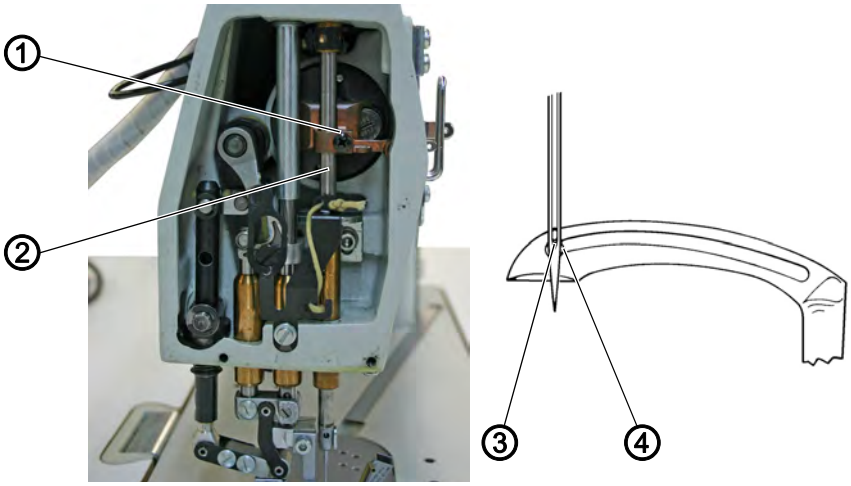
7. Remove the lock (📖 *p. 27*).

4.9.2 Setting the needle bar height

Cover

- Head cover (📖 *p. 16*)

Fig. 41: Setting the needle bar height



(1) - Screw
(2) - Needle bar
(3) - Lower edge of the needle eye
(4) - Looper eye

Proper setting

When the looper eye (4) is in line with the middle of the needle, the lower edge of the needle eye (3) and the upper edge of the looper eye should be at the same level.

Disturbance

- Missing stitches
- Thread breakage

Order

A straight and undamaged needle has to be inserted (📖 *Operating Instructions)*.

To set the needle bar height:

1. Loosen the screw (2).
2. Set the needle bar height such that the lower edge of the needle eye (3) and the upper edge of the looper eye (4) are at the same level.

Important

When doing this, take care not to twist the needle bar to one side!

3. Tighten the screw (2).

Order

After setting the needle bar height, perform the following setting:

Loop stroke position and looper clearance (📖 *p. 54*).

4.10 Setting the retention spring on the looper

Proper setting

When the looper moves from **right to left** the needle thread loop (4) must slide beyond the holding point (1) between the retention spring (2) and the looper (3).

When the looper moves from **left to right** the needle thread loop should be held at the holding point (1) until the descending needle has plunged into the so-called thread triangle on the left in front of the needle thread loop (4).

As the needle moves to its upper position and the looper moves to the left position, the needle tip should pass the retention spring (2) at a distance of approx. 0.5 mm.

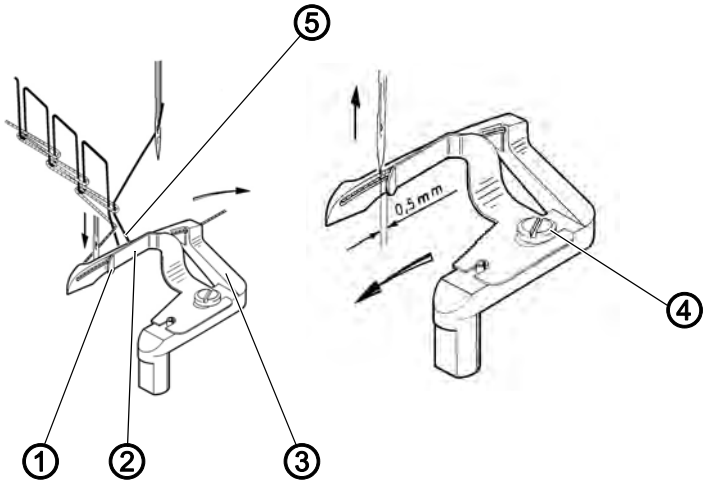
Disturbance

- Missing stitches
- Thread breakage

Cover

- Disassembling the covers on the base plate (📖 *p. 13*)
- Removing the throat plate (📖 *p. 20*)

Fig. 42: Setting the retention spring on the looper



(1) - Holding point
(2) - Retention spring
(3) - Looper
(4) - Screw
(5) - Needle thread loop

To set the retention spring on the looper:

1. Loosen the screw (4).
2. Set the distance to 0.5 mm by sliding the retention spring (2).
3. Align the retention spring (2) such that it abuts on the looper (3). Make sure that the pressure is greatest in front at the holding point (1).
4. Tighten the screw (4).
5. Tilt the machine head and turn on the handwheel.

Important

The force of the pressure exerted by the spring against the looper must be checked when the machine is completed and threaded.

6. Check the described stitch formation during the right-to-left and left-to-right looper motion.
   If required, reduce or increase the pressure of the retention spring by bending it:
   - if the needle thread loop (5) is not pushed beyond the holding point (1) = reduce
   - if the needle thread loop is not held at the holding point (1) until the needle plunges into the thread triangle on the left in front of the needle thread loop (5) = increase
7. Carry out the sewing process.
8. Check the stitch pattern.

4.11 Adjusting the needle thread quantity

WARNING

Risk of injury from moving parts!

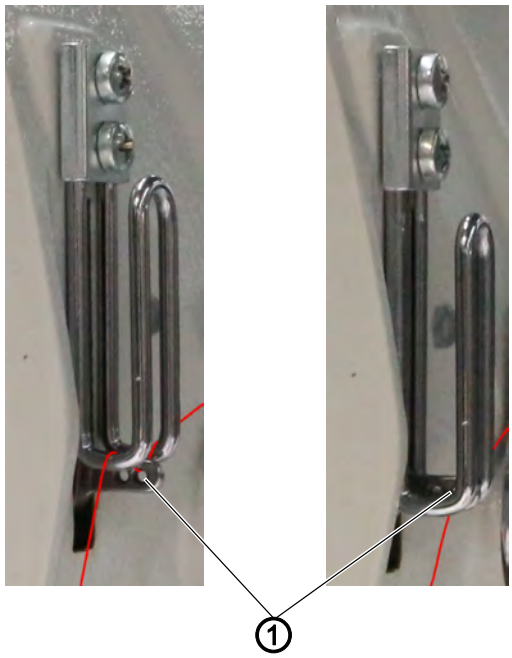
Crushing possible.

Switch off the machine before setting the needle thread regulator.

The needle thread quantity released for stitch formation is determined by the position of the needle thread regulator. The required needle thread quantity depends on the thickness of the sewing material, the thread strength, and the seam type.

In addition, the threading procedure varies with the threads and the types of seams used.

Fig. 43: Setting the needle thread quantity (1)

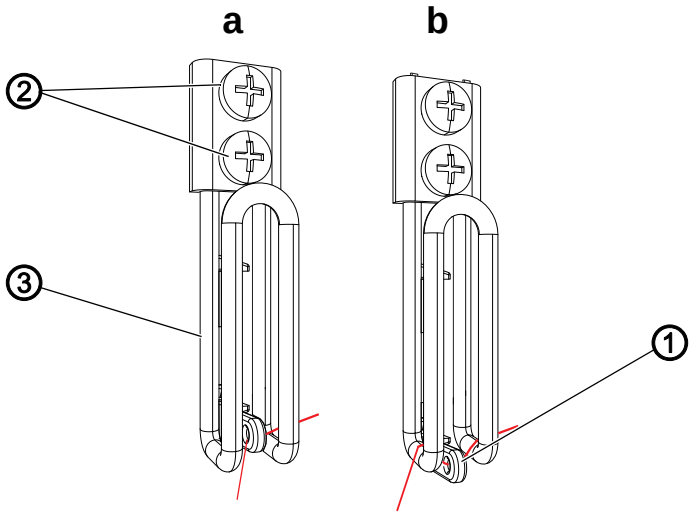


(1) - Hole of the thread lever

Proper setting

- **Less elastic threads:**
  The hole of the thread lever (1) is visible at the thread lever's bottom dead center just above the lower bar of the needle thread regulator
- **Very elastic threads:**
  The hole of the thread lever (1) is visible at the thread lever's bottom dead center just below the lower bar of the needle thread regulator

Fig. 44: Setting the needle thread quantity (2)



(1) - Hole of the thread lever
(2) - Screws
(3) - Needle thread regulator

To set the needle thread quantity:

1. Turn the handwheel until the thread lever reaches its lower end position.
2. Loosen the screws (2) of the needle thread regulator (3).
3. Move the needle thread regulator (3) to the correct position.
   - **For tight and normal seams (detail image (a)):**
     Feed the thread through the hole of the thread lever (1) and then directly downwards.
   - **For elastic seams (detail image (b)):**
     Feed the thread through hole of the thread lever (1) and then via the left bar of the needle thread regulator (3).
4. Tighten the screws (2) for the needle thread regulator (3).

4.12 Setting the looper thread quantity

The released looper thread quantity is determined by the position of the looper thread take-up. The looper thread take-up adjusts the looper thread quantity to the relevant set stitch length so that the stitch pull is optimal for every length and also for stitch condensing.

The looper thread take-up can be adjusted continuously on a scale from 0 to 5. The larger the value, the greater the released thread quantity and the more elastic the seam.

Proper setting

The proper setting is dependent on the stitch length and the seam type.

You need to ensure, especially when applying extreme settings, that the needle reliably plunges into the thread triangle:

- Elastic seam with a very short stitch length = scale 5
- Tighter seam with a significantly increased stitch length = scale 0

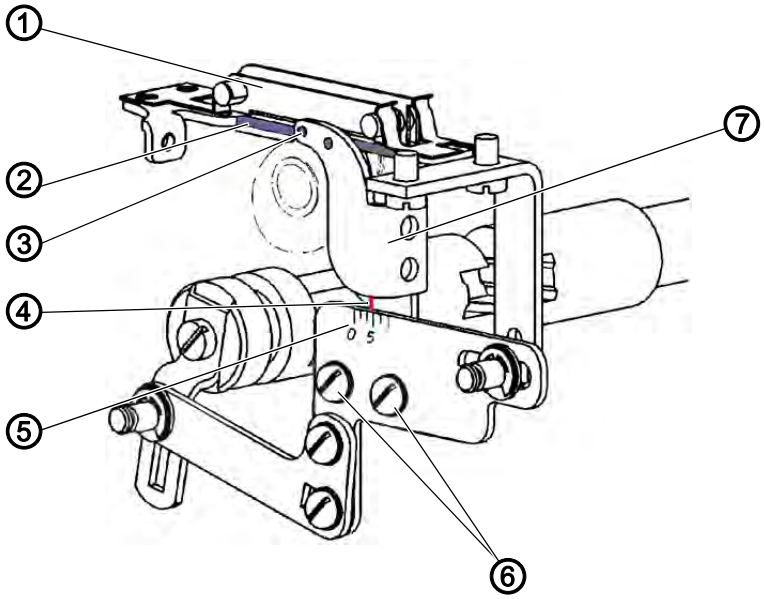
Disturbance due to excessively large looper thread quantity

- Missing stitches
- Looper thread jumps off the thread take-up disk

Cover

- Tilt the machine head (📖 *p. 14*)

Fig. 45: Setting the looper thread quantity (1)



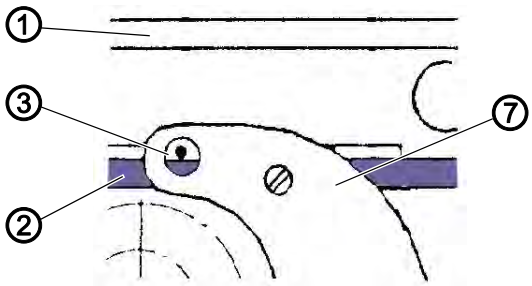
(1) - Thread bobbin case retainer
(2) - Thread bobbin case retainer: Lower bar
(3) - Looper thread take-up: Hole for thread guide
(4) - Front edge
(5) - Scale
(6) - Screws
(7) - Looper thread take-up

To set the looper thread take-up:

1. Loosen the screws (6).
2. Move the looper thread take-up (7):
   - tighter seam = move the front edge (4) towards the 0 on the scale (5)
   - more elastic seam = move the front edge (4) towards the 5 on the scale (5)

Important

Fig. 46: Setting the looper thread quantity (2)



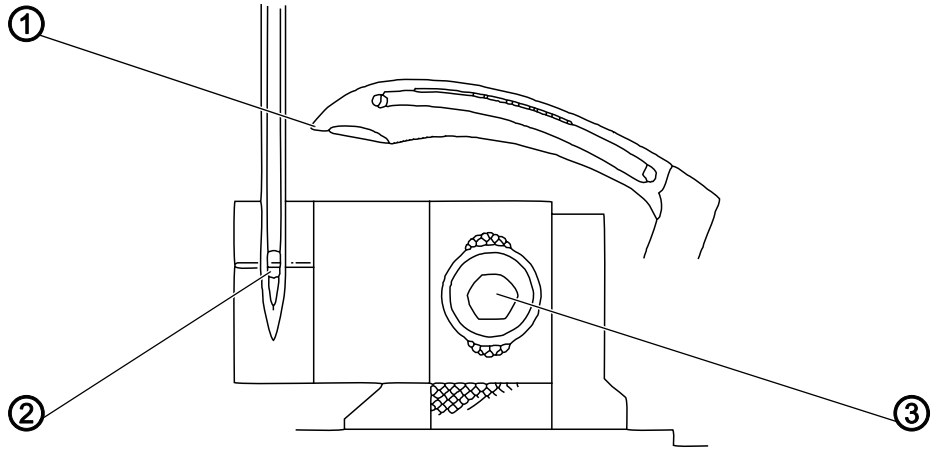
(1) - Thread bobbin case retainer
(2) - Thread bobbin case retainer: Lower bar
(3) - Looper thread take-up: Hole for thread guide
(7) - Looper thread take-up

Ensure that the height of the looper thread take-up (7) is not changed! The hole (3) must always remain above the bar (2) of the thread bobbin case retainer (1).

3. Tighten the screws (6).

4.13 Setting the needle guard

Fig. 47: Setting the needle guard (1)



(1) - Looper tip
(2) - Needle eye
(3) - Screw

Proper setting

When the looper tip (1) moves to the left and reaches the needle, the needle tip should abut on the needle guard.
It must not be possible at this point to push the needle into the path of the looper tip.
In the lowest needle position, half of the needle eye (2) must remain clear.

Disturbance

- Damage to the looper
- Damage to the needle
- Missing stitches
- Thread breakage

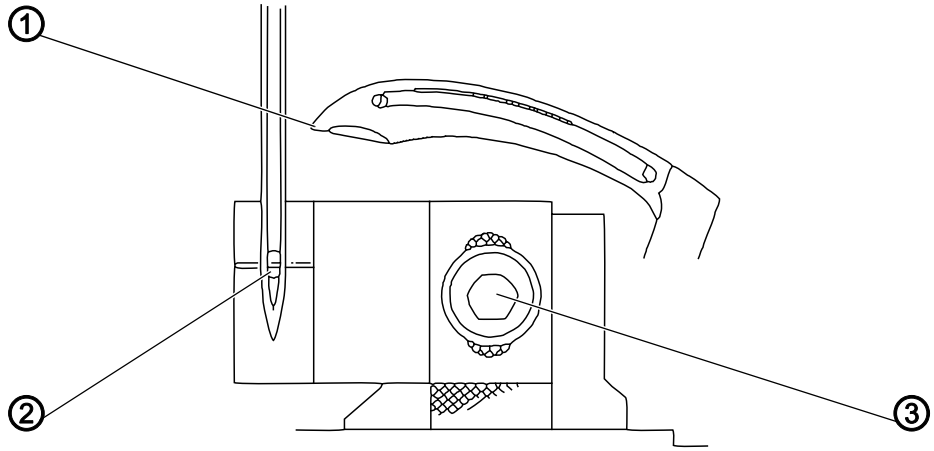
Order

Prerequisite:
A straight and undamaged needle has to be inserted
(📖 *Operating Instructions*).

Cover

- Disassembling the covers on the base plate (📖 *p. 13*)
- Removing the throat plate (📖 *p. 20*)

Fig. 48: Setting the needle guard (2)

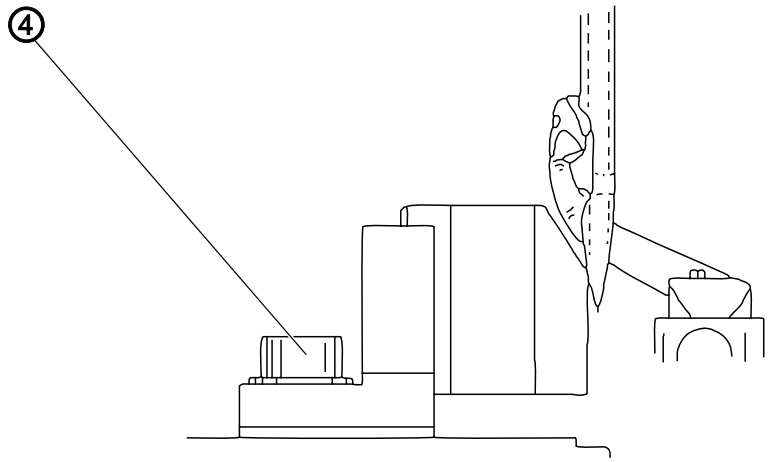


(1) - Looper tip
(2) - Needle eye
(3) - Screw

To set the needle guard:

1. Loosen the screw (3).
2. Adjust the height of the needle guard accordingly.
3. Tighten the screw (3).
4. Loosen the screws (4).

Fig. 49: Setting the needle guard (3)



(4) - Screws

5. Move the needle guard up to the needle tip.
6. Tighten the screws (4).

Important

The needle must not be pushed aside any more than is required!

4.14 Differential top and bottom feed

4.14.1 Setting the stroke movement of the feed dogs

Proper setting

When the needle eye of the descending needle reaches the throat plate, the descending tooth points of the feed dogs should be level with the throat plate surface.

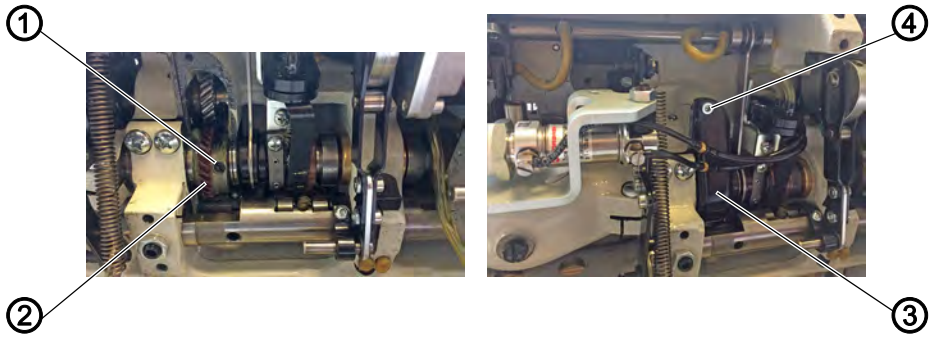
Disturbance

- Damage to the looper
- Damage to the needle
- Missing stitches
- Thread breakage

Cover

- Tilt the machine head (📖 *p. 14*)
- Disassembling the oil pan (📖 *p. 15*)

Fig. 50: Setting the stroke movement of the feed dogs



(1) - Screw
(2) - Stroke eccentric
(3) - Grease cap
(4) - Screws

To set the stroke movement of the feed dogs:

1. Loosen both screws (4) and remove the grease cap (3).
   The 2nd screw (3) is accessible from the upper side of the base plate.
2. Loosen the screw (1) of the stroke eccentric (2).
3. Adjust the stroke eccentric:
   - earlier stroke = turn clockwise
   - later stroke = turn counterclockwise
4. Place the grease cap (3) and assemble it with both screws (4).

4.14.2 Setting the thrust movement of the feed dogs

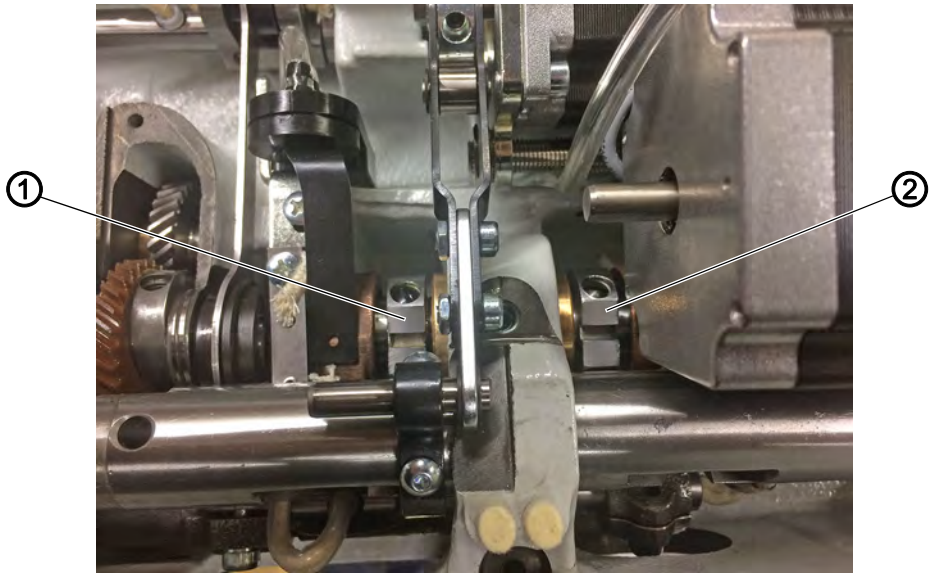
Proper setting

The feed dog performs another minor thrust motion after passing the top dead center of the needle bar. Each of the slots on the two eccentrics fitted on the lower shaft point forward.

Cover

- Tilt the machine head (📖 *p. 14*)
- Disassembling the oil pan (📖 *p. 15*)

Fig. 51: Setting the thrust movement of the feed dogs



(1) - Stroke eccentric (main transport)

(2) - Pusher eccentric (differential transport)

To set the thrust movement of the feed dogs:

1. Lock the machine in place at position D (📖 *p. 27*).
2. Loosen both screws on the stroke eccentric (1).
3. Align the slot towards the front (3 o'clock).
4. Tighten both screws on the stroke eccentric (1).
5. Loosen both screws on the pusher eccentric (2).
6. Align the slot towards the front (3 o'clock).
7. Tighten both screws on the pusher eccentric (2).
8. Remove the lock (📖 *p. 27*).

4.14.3 Setting the height of the feed dogs

Proper setting

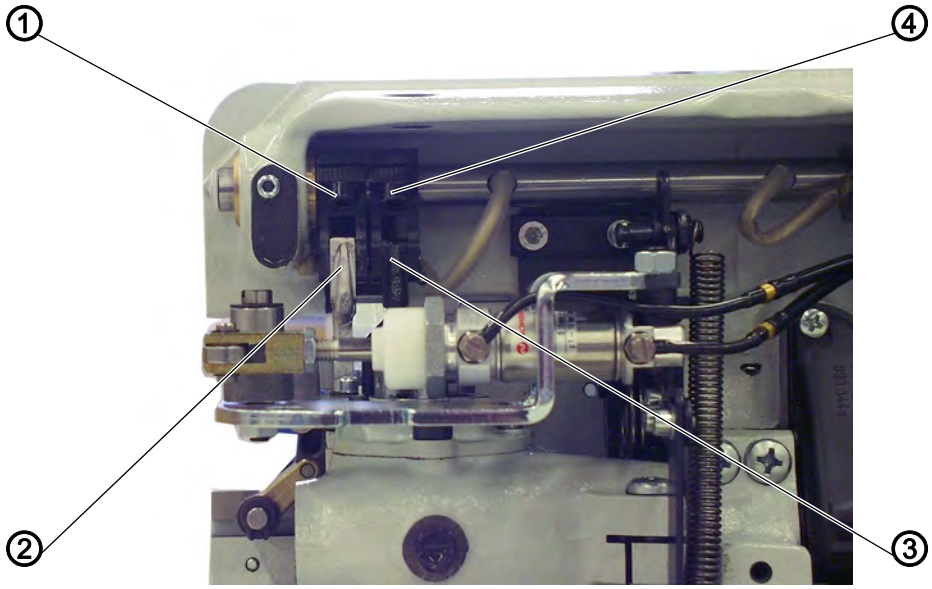
When at its highest position, the main feed (right feed dog carrier) is parallel to the surface of the throat plate at a distance of 1.1 mm.

When at its highest position, the differential feed (left feed dog carrier) is parallel to the surface of the throat plate at a distance of 1.5 mm.

Disturbance

- Damage to the looper
- Damage to the needle

Fig. 52: Setting the height of the feed dogs



(1) - Screw
(2) - Feed dog carrier - differential feed
(3) - Feed dog carrier - main feed
(4) - Screw

To set the height of the feed dogs:

1. Loosen screws (1) and (4).
2. Set the height of the feed dogs:
   - Main feed (3): 1.1 mm
   - Differential feed (2): 1.5 mm
3. Tighten screws (1) and (4).

4.14.4 Performing the basic setting of the bottom feed linkages

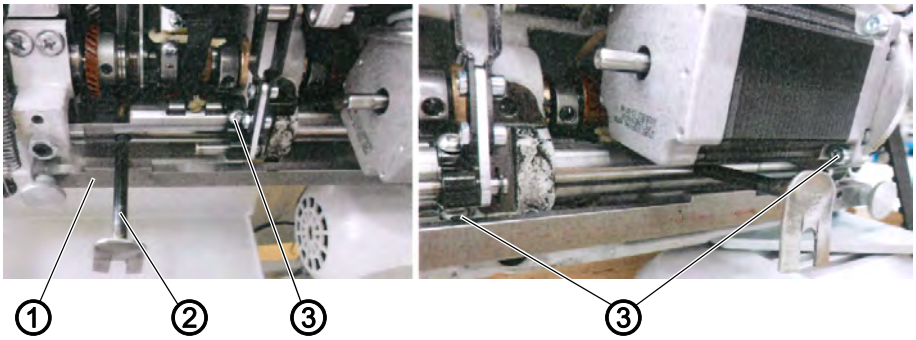
Disturbance

- Damage to the throat plate
- Damage to the feed dogs
- Noise

Cover

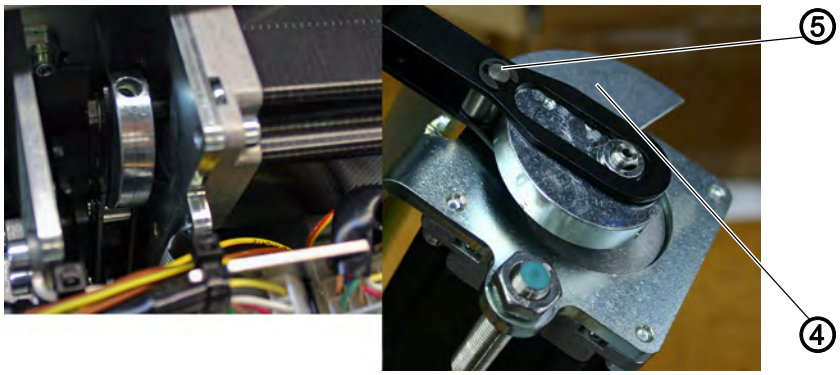
- Disassembling the arm cover (📖 *p. 17*)
- Tilt the machine head (📖 *p. 14*)

Fig. 53: Performing the basic setting of the bottom feed linkage (1)



(1) - Gage bottom feed
(2) - 6mm pin (0238 0103553)
(3) - Screw

Fig. 54: Performing the basic setting of the bottom feed linkage (2)



(4) - Switching flag
(5) - Roller

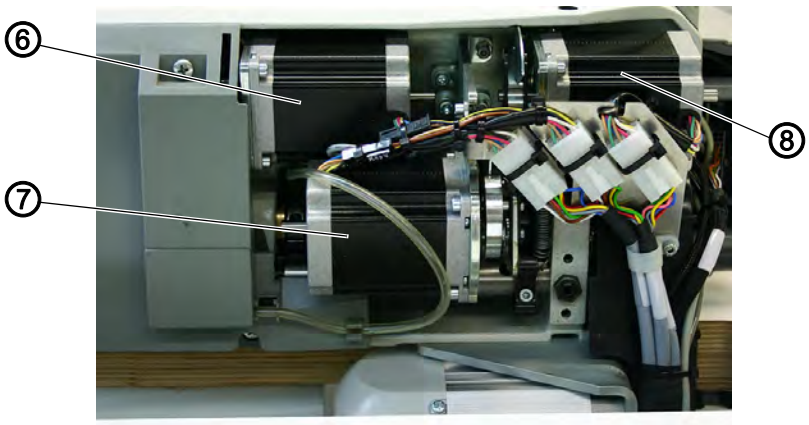
To perform the basic setting of the bottom feed linkages:

1. Assemble the bottom feed gage (1) using 2 M5x16 screws or a knurled screw (📖 *p. 32*).
2. Turn the two switching flags (4) of the stepper motors used for the main feed (6) and the differential bottom feed (8) such that the rollers (5) are situated at the largest diameter of the switching flags.

   ↳ The edge of the switching flag abuts on the roller.
3. Loosen the screws (3) for both linkages.

4. Insert the 6 mm pin (2) into the left hole and turn the linkage such that the 6 mm pin (2) abuts on the gage (1).
5. Insert the 6 mm pin into the right hole of the other linkage and turn until the 6 mm pin (2) abuts on the gage (1).
6. Tighten the screws (3) for both linkages.
7. Dismantle the bottom feed gage (1).

Fig. 55: Performing the basic setting of the bottom feed linkage (3)



(6) - Stepper motor for main feed
(7) - Stepper motor for differential top feed
(8) - Stepper motor for differential bottom feed

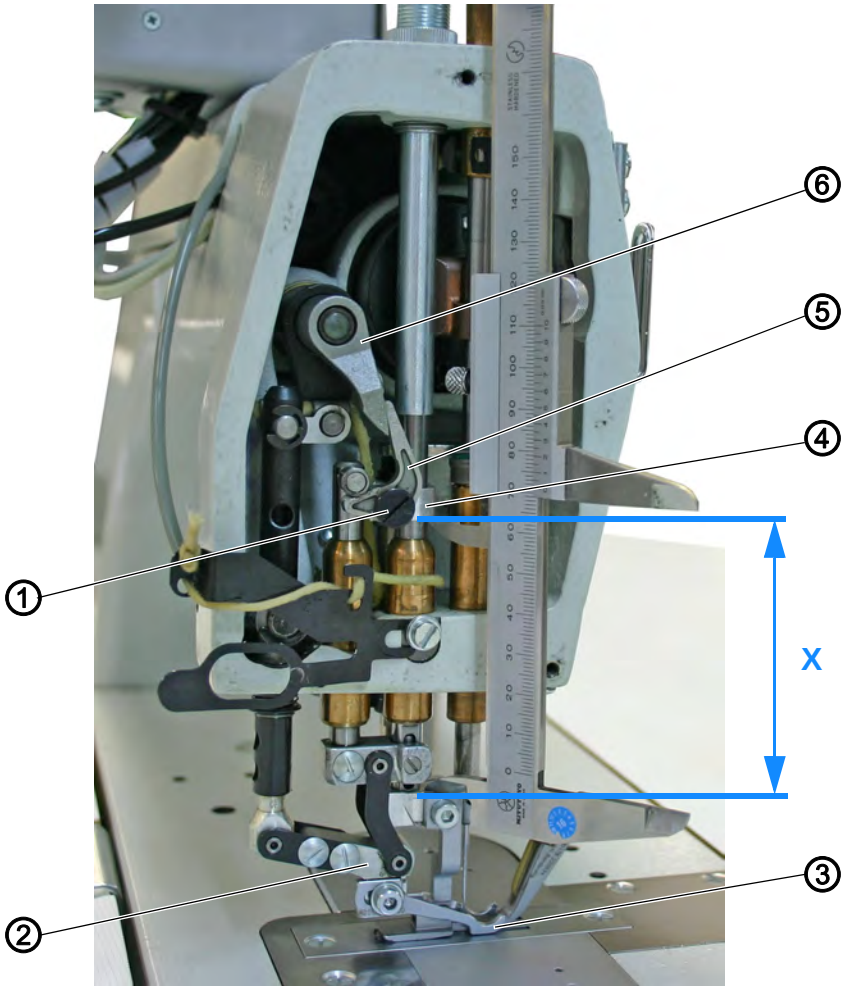
4.15 Top feed foot

Proper setting

Top and bottom feed operate in sync.
There is a light stroke, i.e. the center foot pressure is reduced during the transport phase. The center foot pressure and the top feed foot pressure can be set separately.

4.15.1 Setting the stroke height of the top feed

Fig. 56: Setting the stroke height of the top feed (1)



(1) - Screw
(2) - Foot fastening block
(3) - Top feed foot
(4) - Bearing block
(5) - Rocker lever
(6) - Stroke shaft

Proper setting

The top feed foot (2) has a maximum stroke of 2 mm relative to the throat plate.
The distance **X** between the foot fastening block (1) and the bearing block (3) is 71.5 mm.

Disturbance

- Poor feed behavior

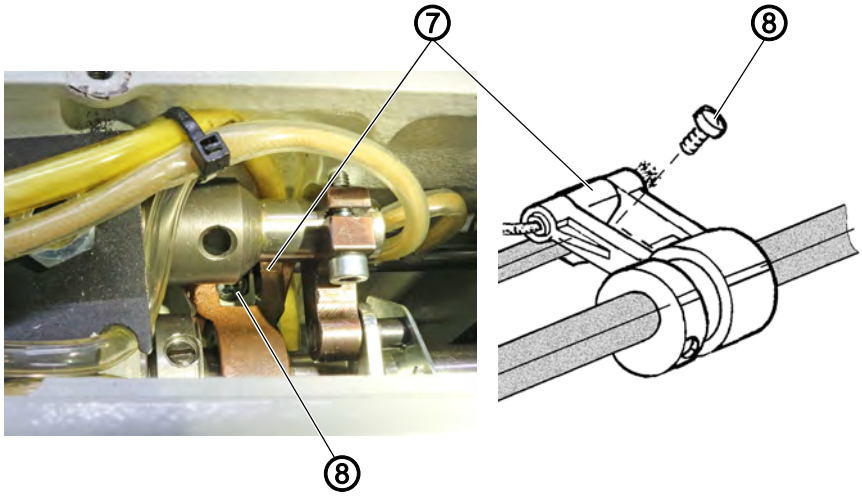
Cover

- Disassembling the arm cover (📖 *p. 17*)
- Disassembling the head cover (📖 *p. 16*)

To set the stroke height of the top feed:

1. Loosen the screw (1).
2. Move the bearing block (4) and set dimension **X** (71.5 mm).
3. Tighten the screw (1).
4. Relieve the rocker lever (5) by swinging it to the left.

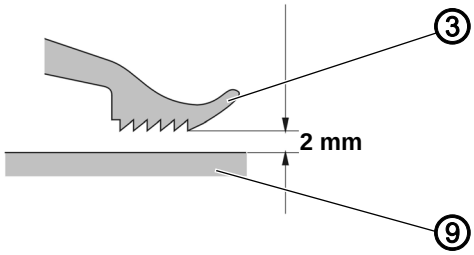
Fig. 57: Setting the stroke height of the top feed (2)



(7) - Clamping hub *(8) - Screw*

5. Loosen the screw (8) of the clamping hub (7).

Fig. 58: Hubhöhe des Obertransports einstellen (3)



(3) - Top feed foot *(9) - Throat plate*

6. Rotate the stroke shaft (6).
   The top feed foot (3) should have a maximum stroke of 2 mm relative to the throat plate (9).
   Turn the stroke shaft (6) until the top feed has reached the required stroke.

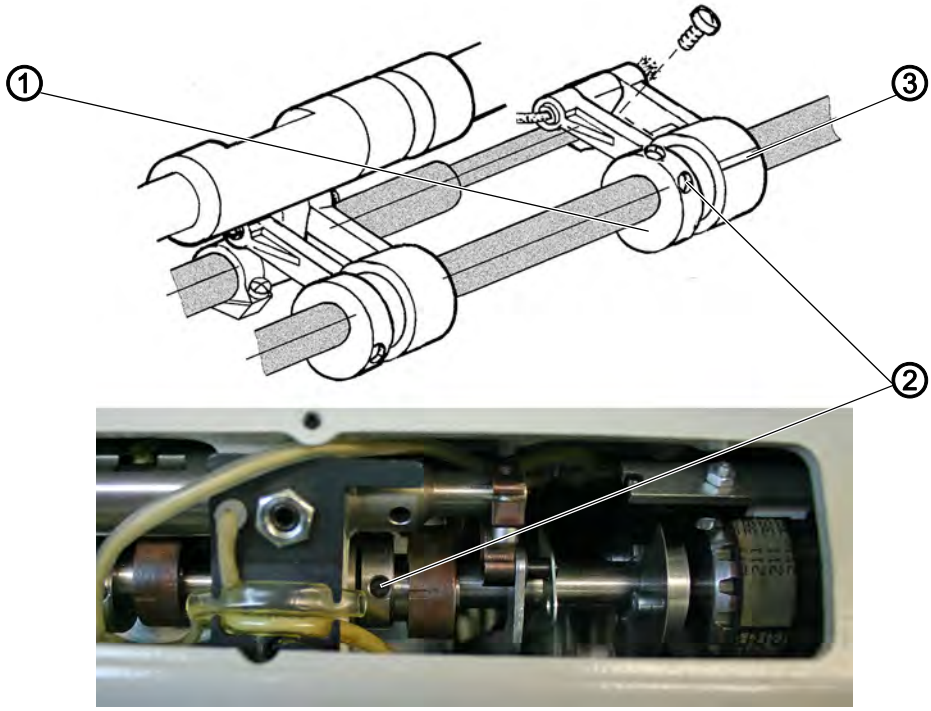
Important

Do not set the stroke higher than necessary! The higher the stroke the shorter the movement of the top feed on the feed dog.

7. Tighten the screw (8).

4.15.2 Setting the stroke movement timing

Fig. 59: Setting the stroke movement timing



(1) - Stroke eccentic
(2) - Screw
(3) - Slot

Proper setting

At handwheel position **F**, the 1st screw (2) in the stroke eccentric's (1) direction of rotation is aligned with the slot (3) of the push rod.

Disturbance

- Increased wear of mechanical parts
- Feed behavior not optimal, possibly loud machine noises

Cover

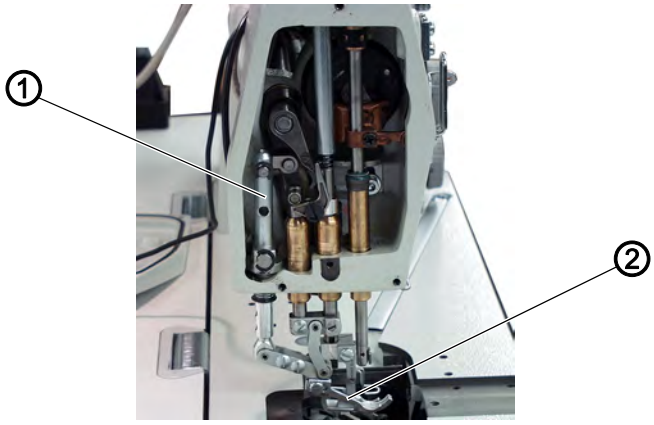
- Disassembling the arm cover (📖 *p. 17*)

To time the stroke movement:

1. Lock the machine in place at position **F** (📖 *p. 27*).
2. Loosen both screws of the stroke eccentric (1).
3. Turn the stroke eccentric (1) until the 1st screw in the direction of rotation is aligned with the slot (3) of the push rod.
4. Tighten both screws of the stroke eccentric (1).
5. Remove the lock (📖 *p. 27*).

4.15.3 Setting the thrust movement timing

Fig. 60: Setting the thurst movement timing (1)



(1) - Advance lever *(2) - Top feed foot*

Proper setting

When the machine is set to position D, the advance lever (1) should be vertical.

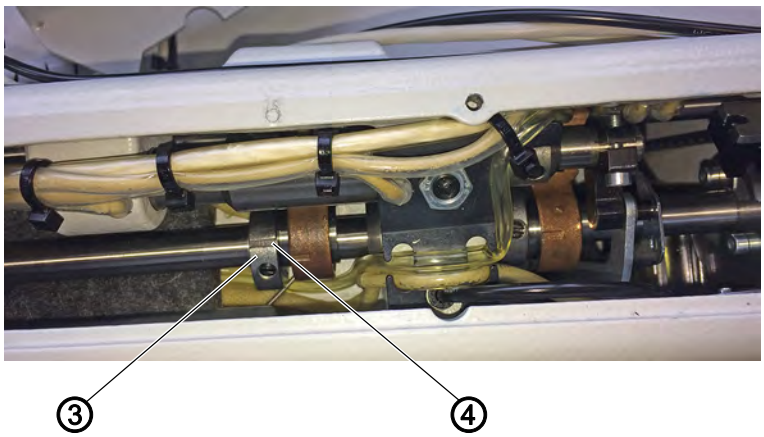
Disturbance

- Synchronization of top feed and bottom feed is poor
- Ruffing behavior is poor

Cover

- Disassembling the head cover (📖 *p. 16*)
- Disassembling the arm cover (📖 *p. 17*)

Fig. 61: Setting the thrust movement timing (2)



(3) - Pusher eccentric *(4) - Slot*

To time the thrust movement:

1. Lock the machine in position **F**.

2. Loosen both screws of the pusher eccentric (3).
3. Turn the pusher eccentric (3) so that the center of the slot (4) is pointing up vertically in position **F** (12 o'clock).
4. Tighten both screws of the pusher eccentric (3).

4.15.4 Setting the position of the top feed foot

Proper setting

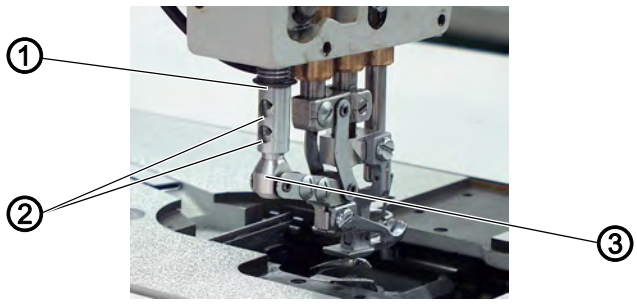
The top feed foot has been set at the factory in such a way that parallel support on the feed dog is guaranteed for light to medium-weight sewing material.

The support surface (inclination) can be adjusted to suit the sewing material.

Disturbance

Property damage

Fig. 62: Setting the position of the top feed foot



(1) - Sliding shaft
(2) - Threaded pins
(3) - Pin

To set the position of the top feed foot:

1. Loosen the threaded pins (2).
2. Push/pull the pin (3) into or out of the sliding shaft (1).
   This adjusts the inclination of the top feed foot.
3. Tighten the threaded pins (2).

Order

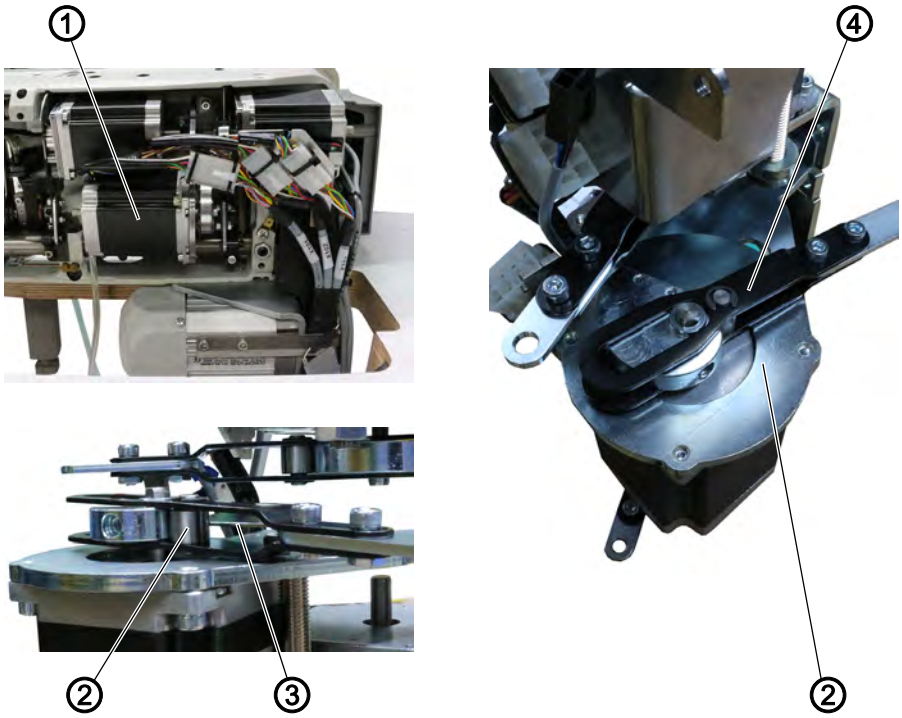
After adjusting the inclination of the top feed, check and, if necessary, correct the stroke height.

4.15.5 Performing the basic setting of the top feed linkage

Cover

- Disassembling the arm cover (📖 *p. 17*)
- Tilt the machine head (📖 *p. 14*)

Fig. 63: Performing the basic setting of the top feed linkage (1)



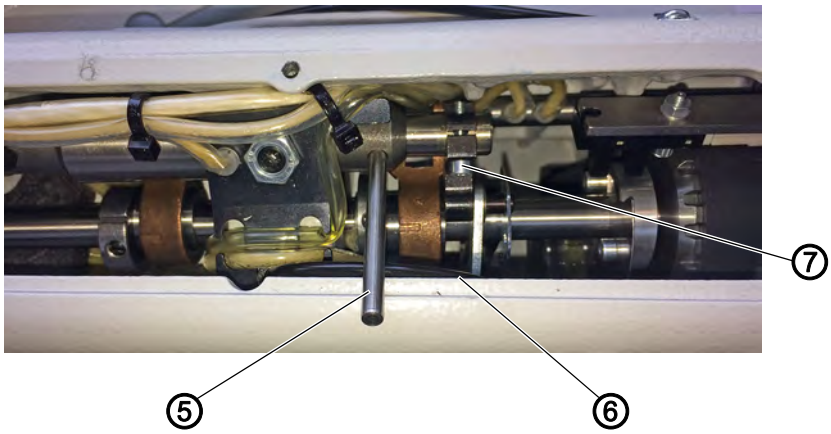
(1) - Central stepper motor
(2) - Roller
(3) - Edge of the switching flag
(4) - Switching flag

To perform the basic setting of the linkage:

1. Turn the switching flag (4) of the central stepper motor (1) such that the roller (2) is situated at the smallest diameter of the switching flag (4).

↳ The edge of the switching flag (3) abuts on the roller.

Fig. 64: Performing the basic setting of the top feed linkage (2)

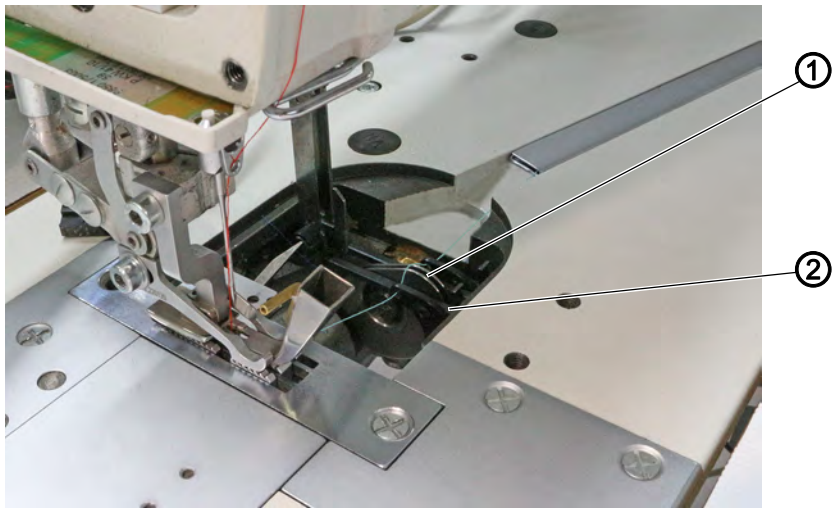


(5) - 5 mm pin
(6) - Edge
(7) - Screw

2. Loosen the screw (7).
3. Use a 5 mm pin (5) to align the linkage on the edge (6) of the machine arm.
4. Tighten the screw used for the linkage (7).

4.16 Setting the thread take-up disk

Fig. 65: Setting the thread take-up disk (1)



(1) - Thread take-up disk *(2) - Carrier plate*

Proper setting

When the machine is locked in place at position E, the thread take-up disk (1) should be 5 mm above the carrier plate (2).

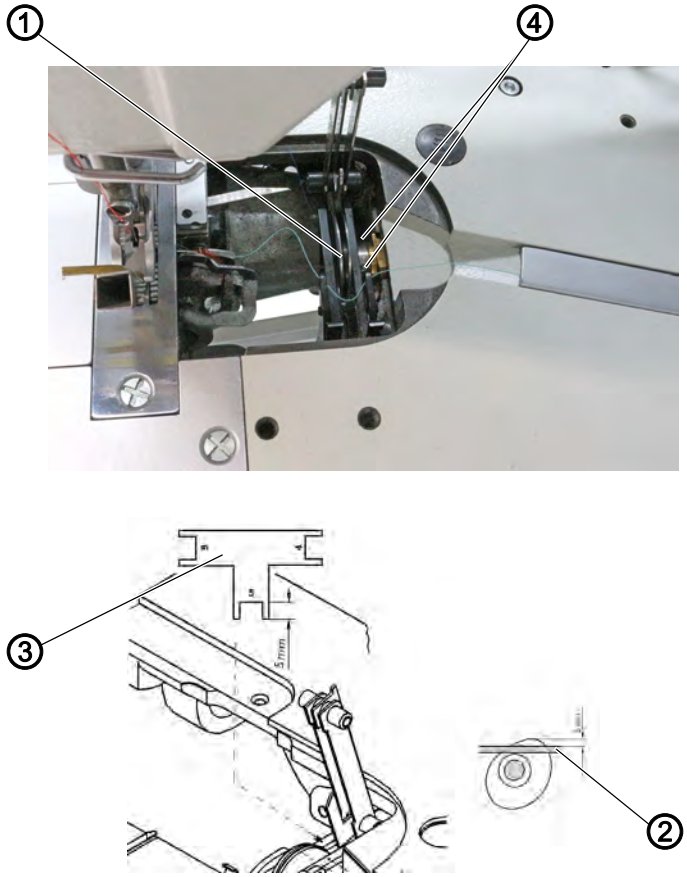
Disturbance

- Missing stitches
- Thread breakage

Cover

Disassembling the covers on the base plate (📖 *p. 13*)

Fig. 66: Setting the thread take-up disk (2)



(1) - Thread take-up disk
(2) - Carrier plate
(3) - Gage
(4) - Screws

To set the thread take-up disk:

1. Loosen the screws (4).
2. Lock the machine in place at position E.
3. Turn the thread take-up disk (1) accordingly.
   The measurement can be performed using the gage (3).
4. Tighten the screws (4).
5. Remove the lock (📖 *p. 27*).

4.17 Setting the thread cutter

Proper setting

The looper thread that is behind the looper and the rear thread of the needle thread loop must be caught by the point of the movable blade during the cutting process.

Disturbance

Threads are not cut or not cut cleanly

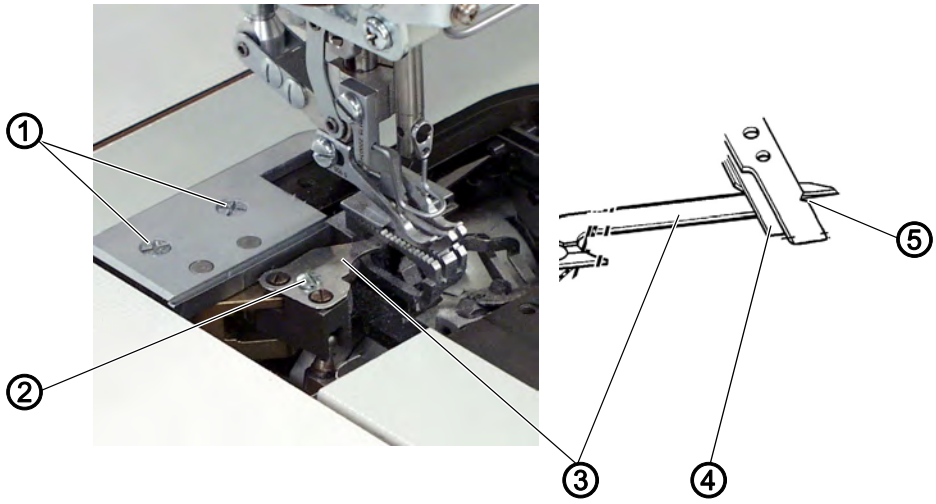
Setting steps

1) Disassembling the thread cutter

See 🕮 *p. 21*.

2) Manual cutting test

Fig. 67: Manual cutting test (1)

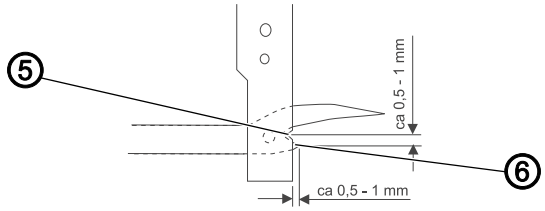


(1) - Screws
(2) - Screw
(3) - Movable blade
(4) - Counter blade
(5) - Notch

To perform a manual cutting test:

1. Start by loosely assembling the movable blade (3) with the screw (2).

Fig. 68: Manual cutting test (2)



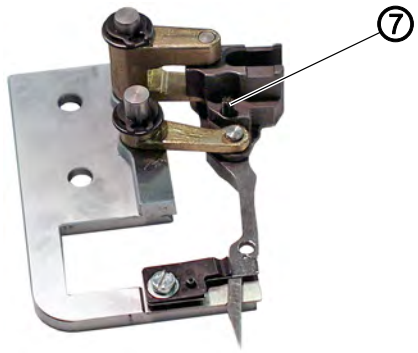
(5) - Notch
(6) - Point

2. Align the point (6) of the movable blade with the notch (5) of the counter blade.
   The point (6) should be approx. 0.5 – 1 mm below the notch (5)!
3. Tighten the screw (2).
4. Perform a cutting test with thread.

Important

If the cut is not clean, check the blades for sharpness or use new blades.

Fig. 69: Manual cutting test (3)



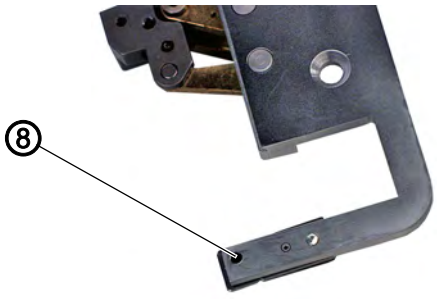
(7) - Screw

5. Align the movable blade (2) by lightly turning in the screw (7).

Important

A smooth blade movement must be guaranteed.

Fig. 70: Manual cutting test (4)

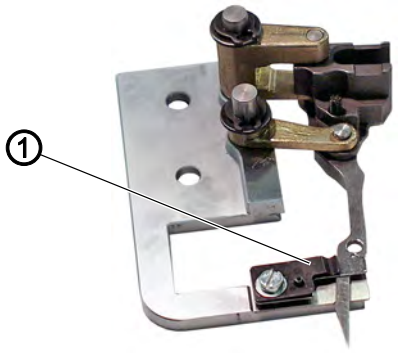


(8) - Screw

6. If required, align the counter blade (4) with the movable blade (3) using the screw (8).

3) Thread clamping plate

Fig. 71: Thread clamping plate



(1) - Thrad clamping plate

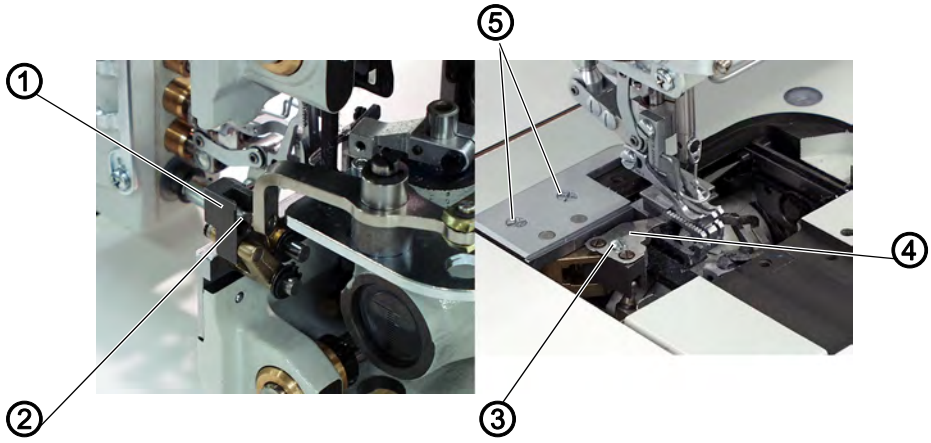
The thread clamping plate (1) should hold the cut thread end gently in place to ensure a secure seam beginning.

Important

If set too tight, the clamping plate may cause ruffing at the seam beginning.

4) Changing the thread cutter blade

Fig. 72: Changing the thread cutter blade



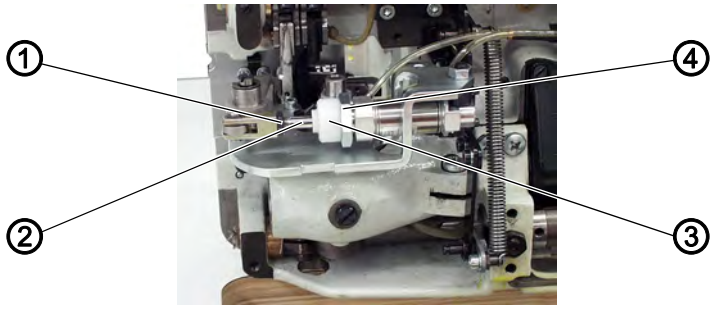
(1) - Blade carrier
(2) - Ball lever
(3) - Screw
(4) - Blade
(5) - Screws

To change the thread cutter blade:

1. Loosen the screw (3).
2. Remove the blade (4).
3. Insert the blade (4).
4. Tighten the screw (3).

5) End position of the thread cutter

Fig. 73: End position of the thread cutter (1)

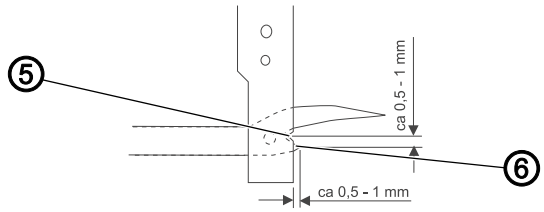


(1) - Nut
(2) - Piston rod
(3) - Stop
(4) - Nut

To set the end position of the thread cutter:

1. Disconnect the machine from the compressed air supply.
2. Tilt the machine head (📖 *p. 14*).
3. Slide the piston rod (2) to the left end position.
4. Loosen the counternut (1) and turn the piston rod (2) until the position depicted below has been reached.

Fig. 74: End position of the thread cutter (2)

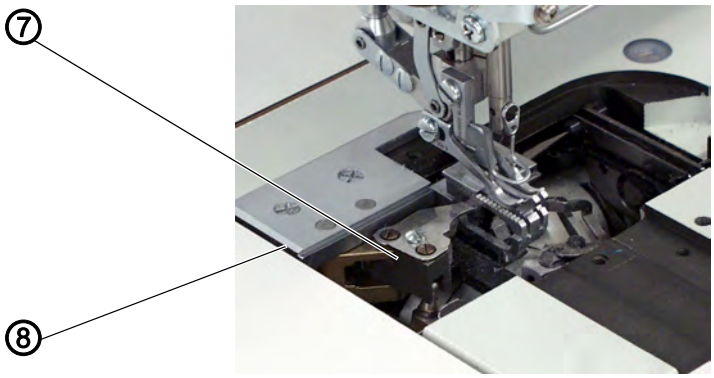


(5) - Notch
(6) - Point

Important

The point (6) of the movable blade should be approx. 0.5 - 1 mm below the notch (5) of the counter blade.
The point (6) of the movable blade should be approx. 0.5 - 1 mm behind the notch (7) of the counter blade.

Fig. 75: End position of the thread cutter (3)



(7) - Edge *(8) - Edge*

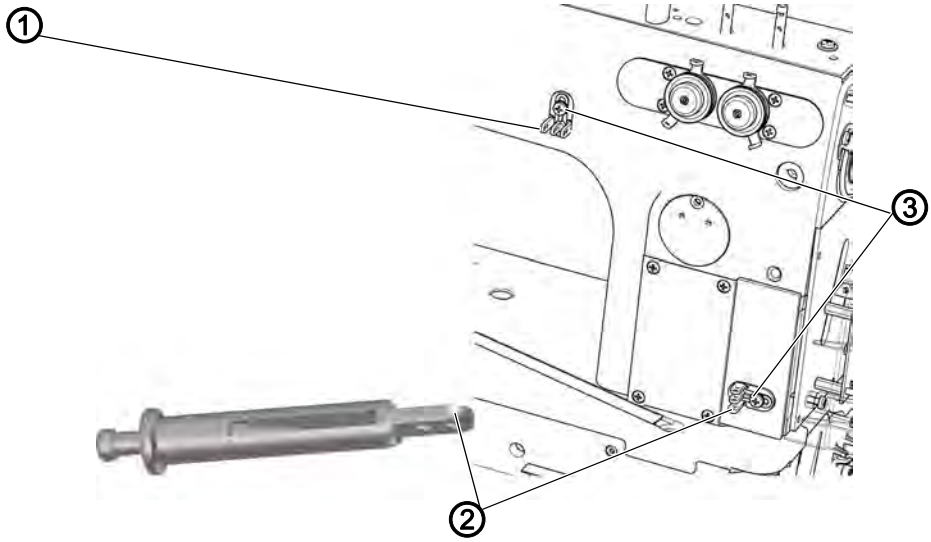
5. If you move the piston rod (2) to its right end position, the edge (7) of the blade carrier and the edge (8) of the tabletop should be flush with one another.
6. Loosen the nut (4) and set the end position of the cylinder accordingly using the stop (3).
7. Tighten the nut (4).
8. Erect the machine head (📖 *p. 14*).

Order

Perform a cutting test while sewing for both the smallest and the largest stitch length.

6) Thread advancing device for looper and needle thread

Fig. 76: Thread advancing device for looper and needle thread



(1) - Needle thread advancing device *(3) - Stop*
(2) - Looper thread advancing device

While cutting the thread, the thread tensions are opened, and the thread advancing device is activated for the looper thread (2) and for the needle thread (1).

The advanced, tension-free thread serves to ensure proper stitch formation at the next seam beginning.

No more thread than is required should be advanced as this determines the length of the thread end remaining at the seam beginning.

The thread advancing device is stepped. The thread quantity can be increased or reduced by adjusting the stop (3).

4.18 Adjusting the thread guide on the machine arm

Proper setting

When the looper is at its left end position (thread lever at top dead center), the thread forms a horizontal line between the thread guide (2) and the thread lever (1).

Fig. 77: Adjusting the thread guide on the machine arm

(1) - Thrad lever
(2) - Thread guide
(3) - Screw

To set the thread guide on the machine arm:

1. Loosen the screw (3).
2. Set the thread guide (2).
3. Tighten the screw (3).

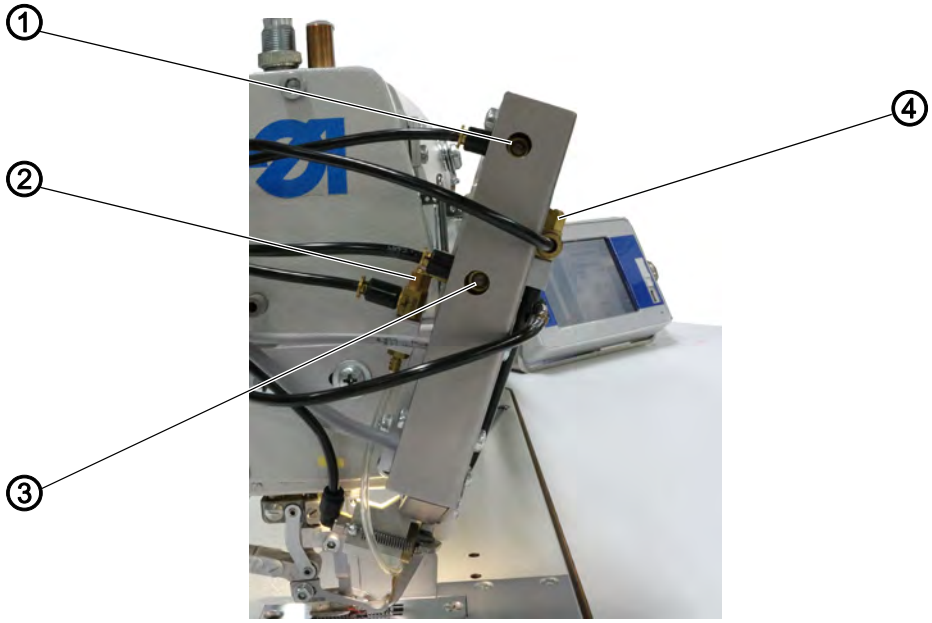
4.19 Setting the tape feed (610-10 only)

Order

- Threading the reinforcement tape (📖 *Operating Instructions*)
- Performing the basic setting of the throttle valves
- Setting the feed into the tulle foot
- Setting the tape feeding speed

4.19.1 Basic setting of the throttle valves

Fig. 78: Basic setting of the throttle valves



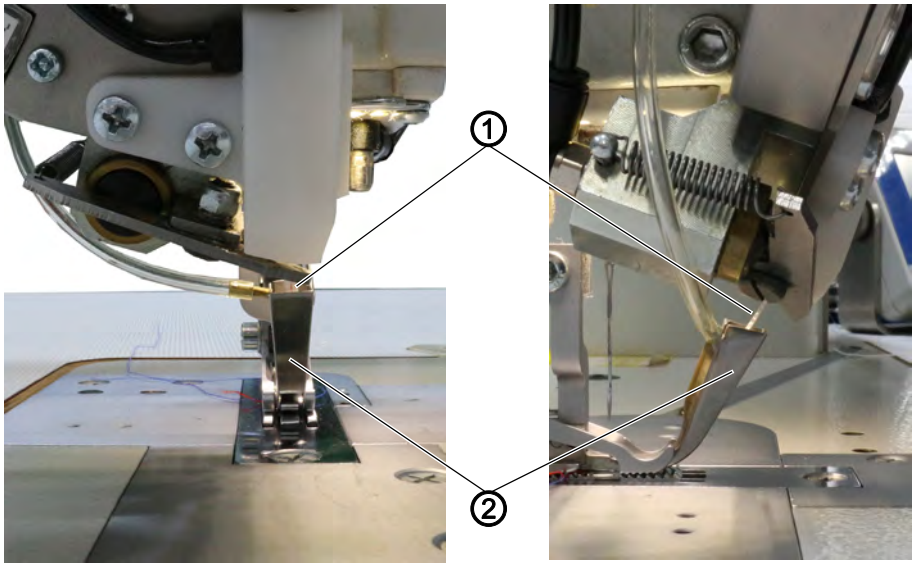
(1) - Throttle valve reverse motion
(2) - Throttle valve tulle foot
(3) - Throttle valve feeding motion
(4) - Throttle valve tape clamp

To set the throttle valves:

1. Close the throttle valves.
2. Open the throttle valves.
   - **Tulle foot** (2): 4 turns
   - **Tape clamp** (4): 3 turns
   - **Reverse motion** (1): 1.5 turns
   - **Feeding motion** (3): 1.5 turns

4.19.2 Setting the reinforcement tape feed into the tulle foot

Fig. 79: Setting the reinforcement tape feed into the tulle foot (1)



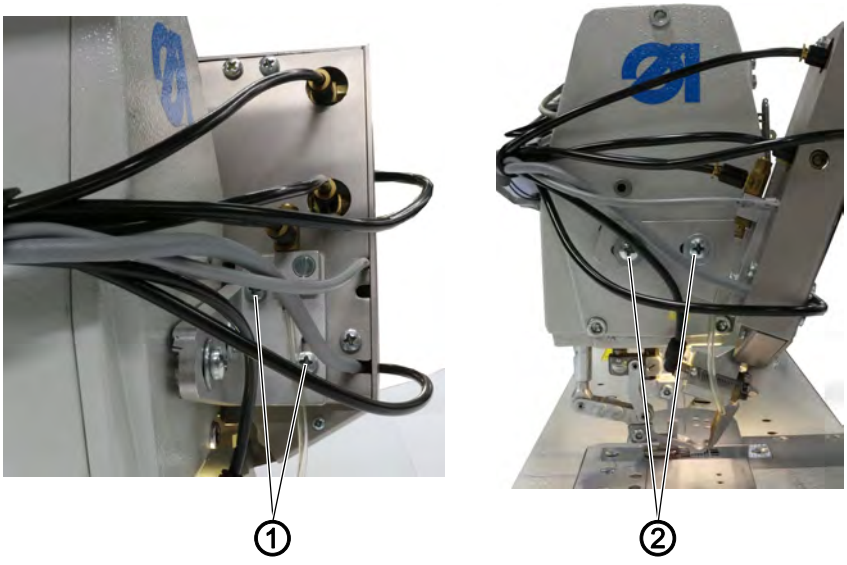
(1) - Reinforcement tape

(2) - Tulle foot

Proper Setting

The position of the reinforcement tape (1) is guided by the tulle foot (2). The reinforcement tape (1) should be fed centrally into the tulle foot (2).

Fig. 80: Setting the reinforcement tape feed into the tulle foot (2)



(1) - Screws

(2) - Screws

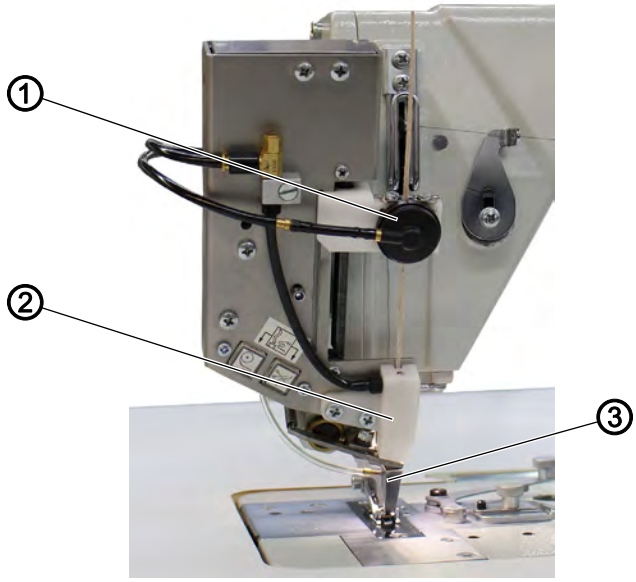
To set the reinforcement tape feed into the tulle foot:

1. Loosen the screws (1) and move the tulle foot sideways.
2. Tighten the screws (1).

3. Loosen the screws (2) and move the tulle foot forwards or backwards.
4. Tighten the screws (2).

4.19.3 Setting the tape feeding speed

Fig. 81: Setting the tape feeding speed (1)



(1) - Tape clamp
(2) - Guide piece
(3) - Tulle foot

Proper setting

The air streams and the speed of the tape feed are coordinated with one another:

- The speed of the feeding motion is not too fast
- The air stream of the tape feed (2) transports the tape faster than the tape clamp (1) transports the tape
- The reverse motion of the tape clamp (1) is not too fast.
  The tape does not sag between tape feed (2) and tape clamp (1)
- The air stream is not too strong. The tape is not fluttering before entering into the tulle foot (3). The tape is not fed past the tulle foot (3)

Checking the tape feeding speed

To check the tape feeding speed:

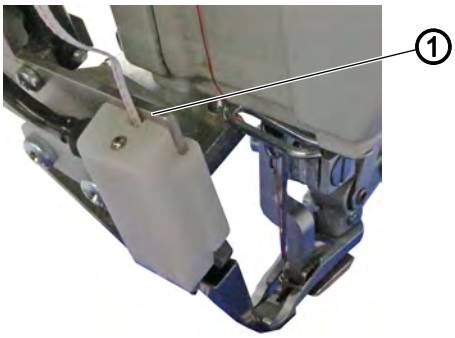
1. Press the  button.

↳ The air stream of the tape feed is switched on.

2. Press the tape clamp manually (1) and check the tape feed.
3. If the speed is too fast or too slow, adjust the speed using the throttle valves (📖 *p. 84*).

Information

Fig. 82: Setting the tape feeding speed (2)

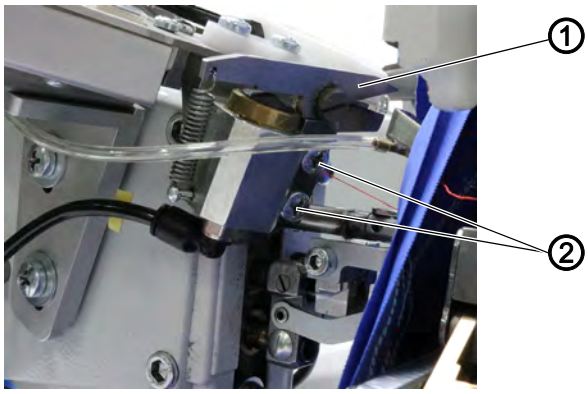


(1) - Edge

If rough or kinked, the reinforcement tape may become jammed or form loops at the edge (1) of the tape feed. If this happens, the edge (1) can be rounded and polished or smoothed so as to achieve the best possible tape feed.

4.19.4 Setting the tape cutter position

Fig. 83: Setting the tape cutter position



(1) - Tape cutter *(2) - Screws*

If coming into contact with the stationary part of the tape cutter (1) after being cut, the reinforcement tape may split. If this happens, the position of the tape cutter (1) can be adjusted.

1. Tilt the machine head (📖 *p. 14*).
2. Loosen the screws (2).
3. Adjust the position of the tape cutter (1).
4. Tighten the screws (2).
5. Erect the machine head.

5 Programming

This chapter describes service settings:

- Presettings for sewing programs and functions
- Basic machine settings
- Advanced machine settings
- Test functions for individual elements in the machine
- Calibration functions
- Resetting the machine

Changes to stitch length, thread tension,curve support, etc. and the calling up and compiling of sewing programs is described in the 🕮 *Operating Instructions*.

5.1 Calling up the Technician level

All settings in the service menu must be carried out at the Technician level.

Important

For safety reasons, the pedal at the Technician level is not active! While you can test the pedal input in the `Multitest` menu item, the sewing motor is not activated by the pedal.

To select the Technician level:

1. Tap the **SERVICE** button.

↳ The input mask for the code appears on the display:

Fig. 84: Calling up the Technician level, input mask

2. Enter the code 25483 using the keypad.

↳ Each time a number is entered, the input cursor will automatically jump to the next position. The numbers are not shown for safety reasons. A 0 appears at the relevant entry point; asterisks are in the other positions.

3. Tap the **OK** button.

After the code is entered, the display shows the menu items at the Technician level:

Fig. 85: Display in service menu

5.2 Menu items at the Technician level

The following table provides an overview of the structure of the service menu.

Service menu structure OP7000

Menu items					
Menu item	**Numerical**	**Function**	**Subitem**	**Subitem**	**Reference**
Default Program Parameters	1.0	Define presettings which are applicable to all sewing programs			📖 *p. 94*
	1.1		Stitch Length		
	1.2		TT at Needle		
	1.3		TT at Hook		
	1.4		Thread Tension		
	1.5		Fullness Top/Bottom		
	1.6		Fullness		
	1.7		Adjust Bottom Fullness in %		
	1.8		Stitch Condensing At Start		
	1.9		Stitch Condensing At End		
	1.10		Thread Trimmer		
	1.11		Size		
	1.12		Seam Graphic		
	1.13		Grading Factor		
	1.14		Teach Side (L=1/R=2)		

Menu items					
Menu item	**Numerical**	**Function**	**Subitem**	**Subitem**	**Reference**
Machine Configuration	2.0	Define basic machine settings which are applicable to all sewing programs			📖 *p. 97*
	2.1		Stitch Condensing At Start		
	2.1.1			Number Stitches Condensing	
	2.1.2			Stitch Condensing Factor	
	2.1.3			Speed	
	2.2		Stitch Condensing At End		
	2.2.1			Number Stitches Condensing	
	2.2.2			Stitch Condensing Factor	
	2.2.3			Speed	
	2.3		Thread Trimmer		
	2.3.1			Speed	
	2.3.2			Thread Tension At Needle	
	2.3.3			Thread Tension At Hook Turn/Back/After/ Trimming	
	2.4		Speed		
	2.4.1			Maximum Speed	
	2.4.2			Positioning Speed	
	2.4.3			Softstart Speed	
	2.4.4			Number Stitches Softstart	

Menu items					
Menu item	**Numerical**	**Function**	**Subitem**	**Subitem**	**Reference**
	2.5		Stop Positions		
	2.5.1			Stop Position After Sewing	
	2.5.2			Stop Position Needle Up	
	2.5.3			Stop Position Needle Down	
	2.6		Foot		
	2.6.1			Foot Lift In Between Seam	
	2.6.2			Foot Lift At Seam End	
	2.6.3				
	2.7		Duration Thread Tension After Seam End		
	2.8		Other Devices		
User Configuration	3.0	Define advanced machine settings			🕮 *p. 100*
	3.1		Signal Sound At Segment Change		
	3.2		Side Switch At Seam End		
	3.3		Abort Program At Pedal -2		
USB Operations	4.0	Transfer data with a USB key			🕮 *p. 101*
	4.1		Write Active Sewing Program To USB		
	4.2		Read Sewing Program From USB		
	4.3		Write Global Data Of Control Unit To USB		
	4.4		Overwrite Global Data Of Control Unit With USB Data		
Calibration	5.0	Calibration			🕮 *p. 102*
	5.1		Motor Calibration		
	5.2		Thread Tension Calibration		

Menu items					
Menu item	**Numerical**	**Function**	**Subitem**	**Subitem**	**Reference**
Reset Operations	6.0	Reset data			🕮 *p. 107*
	6.1		Reset All		
	6.2		Reset Sewing Programs		
Input / Output Test	7.0	Quickly check the input and output elements			🕮 *p. 108*

For all subitems except for *Size*, an editor will open to set the parameters.

5.3 Menu item *Default Program Parameters*

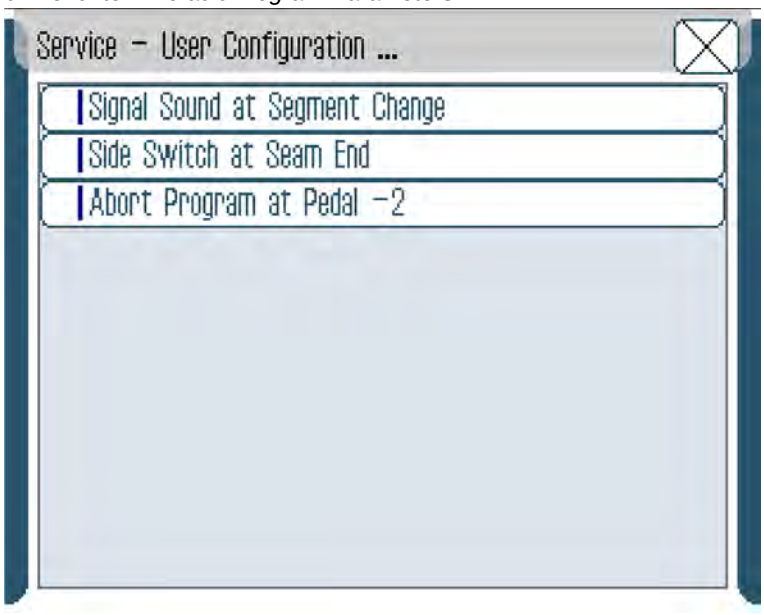
You use the menu item *Default Program Parameters* to define the values that will be preset when a new sewing program is created.

Define the preset values as follows:

1. Select *Default Program Parameters* in the service menu.

↳ The following appears on the display:

Fig. 86: Menu item Default Program Parameters



2. Tap the desired parameter.
3. Enter values that reflect your sewing requirements and can be retained in as many sewing programs as possible in order to make the process of creating new sewing program simple.

Parameters in the menu item *Default Program Parameters*

Icon	Entry	Meaning	Possible value range	Preset value
	**Stitch Length**	Stitch length	1.0 – 4.0	2.5
	**Thread Tension At Needle**	Needle thread tension	1 – 99	30
	**Thread Tension At Hook**	Looper thread tension	1 – 99	5
	Fullness Top/ Bottom	Fullness Top/Bottom	1 – 3 1 = top 2 = bottom 3 = top and bottom	3
	Fullness	Fullness	0 – 16	0
	**Adjust Bottom Fullness in %**	Fullness correction parameter bottom	-50 - 50	0
	**Stitch Condensing At Start**	Stitch condensation at seam beginning	0 – 1	0
	**Stitch Condensing At End**	Stitch condensation at seam end	0 – 1	0
	**Thread Trimmer**	Thread cutter	0 = off 1 = on	1

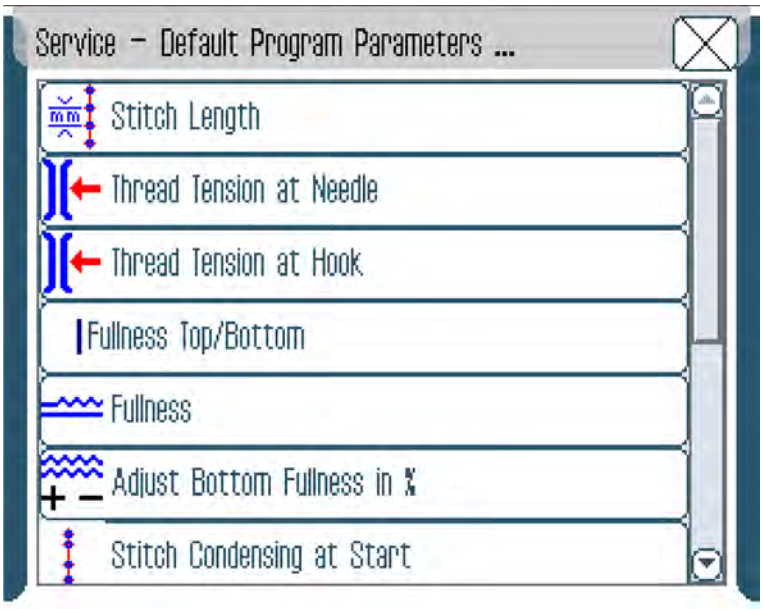
Icon	Entry	Meaning	Possible value range	Preset value
	**Size**	Sewing material size	• Italy Men • GB/USA Men • Japan Men • Universal • Germany Women • France Women • Italy Women • GB/USA Women • Japan Women • Germany Children • Free • W Children	Germany/ France Men
	**Seam Graphic**	Seam pattern for work process: 1 = Pre-ruffle sleeve 2 = Tape front 3 = Tape back	0 – 3	1
	**Grading Factor**	Grading factor (%), increase from size to size	0.0 – 6.0	2.5
	**Teach Side (L=1/R=2)**	Sleeve side which is programmed first	2 = R (start with right sleeve) 1 = L (start with left sleeve)	2

5.4 Menu item *Machine Configuration*

The menu item *Machine Configuration* allows you to determine the basic settings for the machine which apply to all programs.

Machine Configuration has the following subitems:

Fig. 87: Menu item Machine Configuration



The subitems have further subitems (📖 *p. 91*).

5.4.1 *Stitch Condensing At Start/End*

In the *Stitch Condensing At Start* and *Stitch Condensing At End* subitems, you can define how stitch condensing is supposed to be applied.

Parameters in *Stitch Condensing At Start/End* subitem

Entry	Meaning	Possible value range	Preset value
Number Stitches Condensing	Number of stitches during stitch condensing	1 – 50	3
Stitch Condensing Factor	Stitch condensing factor: Stitch length of stitch condensing in relation to the set stitch length	25 – 100	40
Speed	Speed during stitch condensing	50 – 2000	1000

5.4.2 *Thread Trimmer*

In the *Thread Trimmer* subitem, you can define the settings for cutting the thread.

Parameters in the *Thread Trimmer* subitem

Entry	Meaning	Possible value range	Preset value
Speed	Speed when thread is cut in min^{-1}	50 – 250	180
Thread Tension At Needle	Needle thread tension when cutting the thread in %	0 – 50	5
Thread Tension At Hook	Looper thread tension when cutting the thread in %	1 – 5	2
Turn Back		0 - 1	1

5.4.3 *Speed*

In the *Speed* subitem, you can define the speed in certain situations.

Parameters in the *Speed* subitem

Entry	Meaning	Possible value range	Preset value
Maximum Speed	Maximum speed when fully pressing the pedal in min^{-1}	500 – 4000	4000
Positioning Speed	Speed when positioning in min^{-1}	10 – 700	400
Softstart Speed	Speed on soft start in min^{-1}	10 – 1000	500
Number Stitches Softstart	Number of stitches on soft start	0 – 10	1

5.4.4 *Stop Positions*

In the *Stop Positions* subitem, you can determine the position of the needle when sewing stops.

Parameters in the *Stop Positions* subitem

Entry	Meaning	Possible value range	Preset value
Stop Position After Sewing	Handwheel position after sewing (needle raised) in °	0 – 359	0
Stop Position Needle Up	Handwheel position in the needle's upper idle position when sewing stops in °	0 – 359	0
Stop Position Needle Down	Handwheel position in the needle's lower idle position when sewing stops in °	0 – 359	130

5.4.5 *Foot*

Parameters in the *Foot* subitem

Entry	Meaning	Possible value range	Preset value
Foot Lift In Between Seam	Sewing foot lifting in the seam	0 = off 1 = on	0
Foot Lift At Seam End	Sewing foot lifting at the end of the seam (after cutting the thread)	0 = off 1 = on	0

5.4.6 *Duration Thread Tension After Seam End*

Entry	Meaning	Possible value range	Preset value
Duration Thread Tension After Seam End	Duration of needle thread tension closed at seam end	0.1 – 7.0	5.0

5.4.7 *Other Devices*

Parameters in *Other Devices* subitem

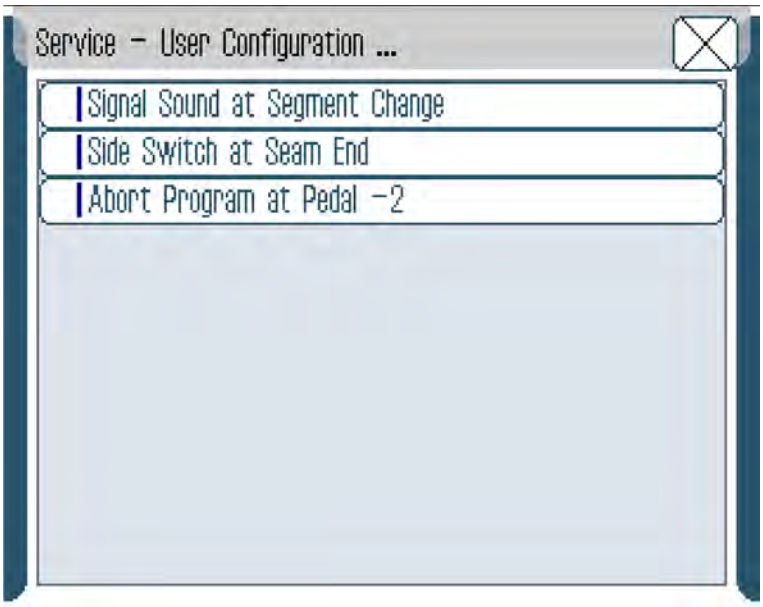
Entry	Meaning	Possible value range	Preset value
Tape Feeder Exists	Tape unwinder	0 = not present 1 = present	
Tape Length Cutter to Needle	Tape length after cutting	0 – 100	40

5.5 Menu item *User configuration*

The menu item *User Configuration* allows you to define additional machine settings.

User Configuration has the following subitems:

Fig. 88: Menu item User Configuration



Parameters in the menu item *User Configuration*

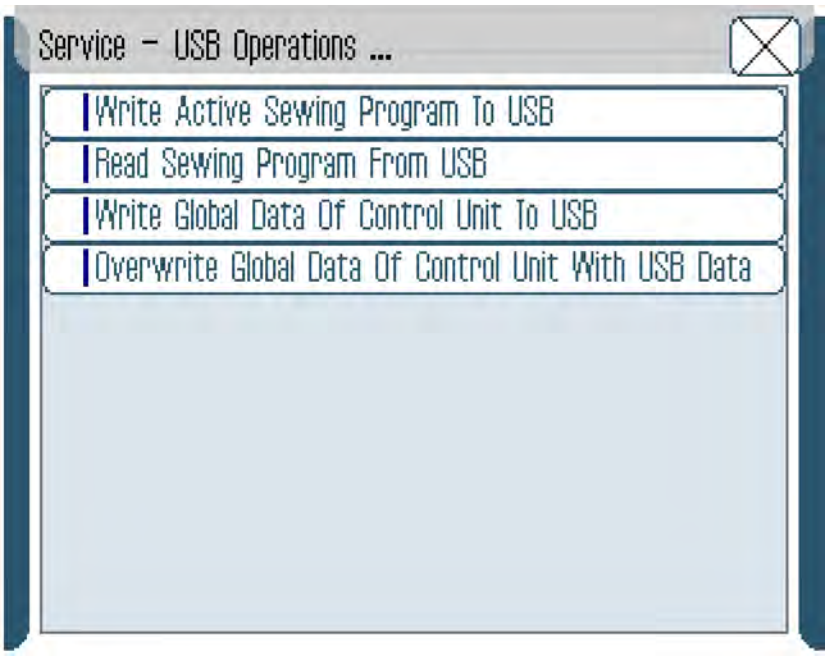
Entry	Meaning	Possible value range	Preset value
Signal Sound At Segment Change	Signal tone when transitioning between program steps	0 = off 1 = on	1
Side Switch At Seam End	Automatic change of side between right/left at seam end	0 = off 1 = on	1
Abort Program At Pedal -2	Program termination with main pedal at pos. -2	0 = off 1 = on	1

5.6 Menu item *USB Operations*

The menu item *USB Operations* allows you to save or load sewing data to or from a USB key.

USB Operations has the following subitems:

Fig. 89: Menu item USB Operations



Parameters in the menu item *USB operations*

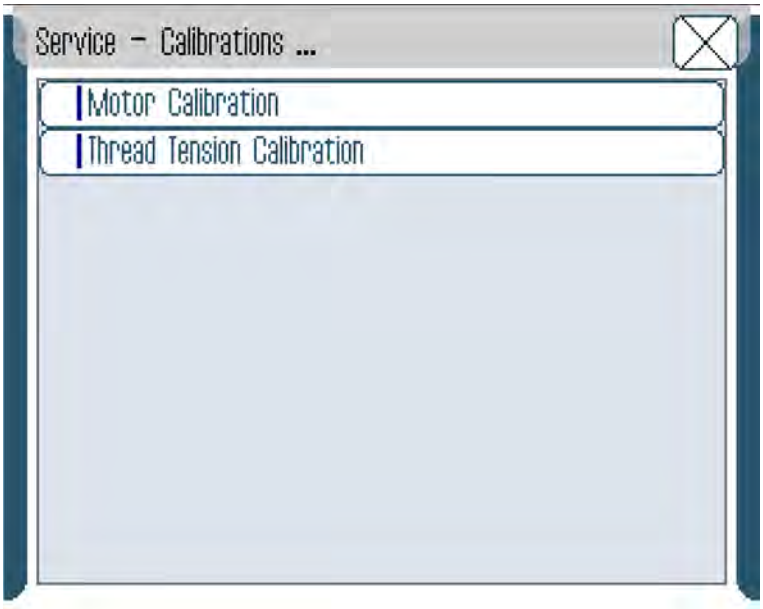
Entry	Meaning
Write Active Sewing Program To USB	Save active sewing program on the USB key
Read Sewing Program From USB	Load sewing program from USB key
Write Global Data Of Control Unit To USB	Transfers all files to a USB key
Overwrite Global Data Of Control Unit With USB Data	Transfer all data from USB key

5.7 Menu item *Calibration*

In the *Calibration* menu item, you can calibrate the machine.

Calibration has the following subitems:

Fig. 90: Menu item Calibration



5.7.1 *Motor Calibration*

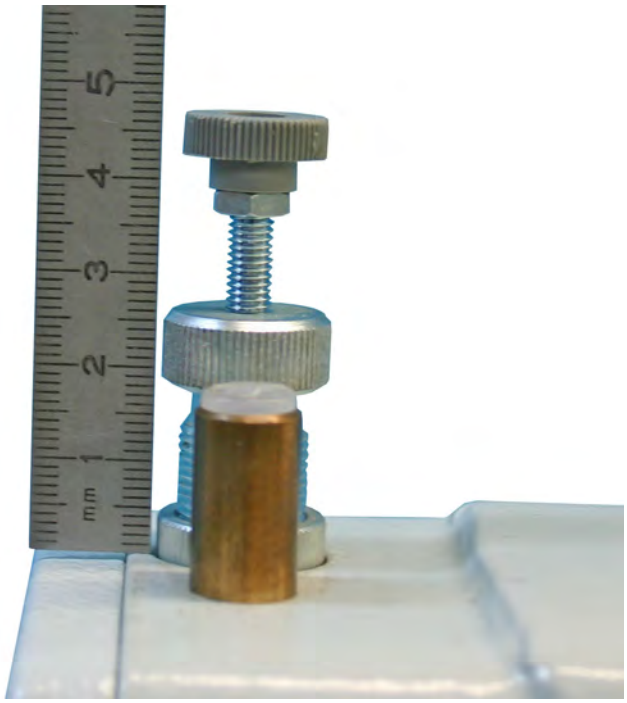
The *Motor Calibration* subitem is used to synchronize the feed dogs.

Calibrating the main feed

To calibrate the main feed:

1. Ensure that the mechanical basic setting is performed completely.
2. Set the sewing foot pressure to the base value (26/47 mm).

Fig. 91: Calibrating the main feed



3. Disassemble the top feed foot and the center foot.
4. Assemble the calibrating foot.
5. Lower the differential feed at the bottom.
6. Use the adjusting needle such that it creates a stitch on a cardboard strip.
7. Switch on the machine.
8. Select the menu *Service* > *Calibrations* > *Motor Calibration* > *Motor Main 2mm*.
9. Lift the sewing feet and insert the strip of cardboard.
10. Press the pedal forwards.

    ↳ 11 stitches are sewn. The distance between the first and the last stitch should be precisely 20 mm.

11. If required, change the distance with +/-1 or +/-10. If the distance is to be reduced, a smaller minus figure must be entered. If the distance is to be increased, a higher minus figure must be entered.

12. Repeat the sewing process until the distance is precisely 20 mm.
13. Repeat steps 8 to 11 for the setting *Motor Main 3mm* (30 mm) and *Motor Main 4mm* (40 mm).

Calibrating the differential bottom feed

To calibrate the differential bottom feed:

1. Lower the main feed such that it remains precisely below the throat plate.

Important

Check manually, that no parts can collide during the movement.

2. Set the differential bottom feed to a height of 1.5 mm.
3. Select the menu *Service* > *Calibrations* > *Motor Calibration* > *Motor Bottom Diff 2mm*.
4. Lift the sewing feet and insert the strip of cardboard.
5. Press the pedal forwards.

↳ 11 stitches are sewn. The distance between the first and the last stitch should be precisely 20 mm. If required, change the distance with +/-1 or +/-10.
If the distance is to be reduced, enter a smaller minus figure.
If the distance is to be increased, enter a higher minus figure.

6. Repeat the sewing process until the distance is precisely 20 mm.
7. Repeat steps 3 to 6 for:
   - *Motor Bottom Diff 3mm* (30 mm)
   - *Motor Bottom Diff 4mm* (40 mm)
   - *Motor Bottom Diff 6mm* (60 mm)

Calibrating the differential top feed foot

To calibrate the differential top feed foot:

1. Disassemble the calibrating foot.
2. Disassemble the adjusting needle.
3. Assemble the top feed foot and the center foot. The main feed remains lowered. The differential bottom feed and the differential top feed are in mesh.
4. Change to manual mode *MAN*.
5. Set fullness = 0 and stitch length = 2.
6. Allow 2 PTFE strips to run through with the fabric side outwards. The strips should be fed without offset.

7. Select the menu *Service* > *Calibrations* > *Motor Calibration* > *Motor Top Diff 2mm* and change the value, if required, using +/-1 or +/-10.
8. Repeat the sewing process in manual mode until both PTFE strips are fed through perfectly aligned.
9. Repeat steps 4 to 8 for:
   - *Motor Main 3mm* (30 mm)
   - *Motor Main 4mm* (40 mm)
10. Change to manual mode *MAN*.
11. Set fullness to 16.
12. Repeat steps 6 to 8 for:
    - *Motor Main 6mm* (60 mm)
13. Set the main feed to a height of 1.1 mm.

5.7.2 *Thread Tension Calibration*

In the *Thread Tension Calibration* subitem, you can calibrate the needle thread tension.

Important

Calibrate the needle thread tension only once! Even after a complete reset (📖 *p. 107*) and after software updates (📖 *p. 108*), the values remain the same.

The needle thread tension only needs to be recalibrated after changing the control.

Prerequisite: An external thread tension measurement device is available, and the calibration is performed with a thread with a thickness of 120.

Order

Set the following 3 calibration positions one after the other for the needle thread:

- **Position 3** – maximum tension (300 g)
- **Position 2** – medium tension (150 g)
- **Position 1** – minimum tension (5 g)

Calibration steps

To set calibration position 3:

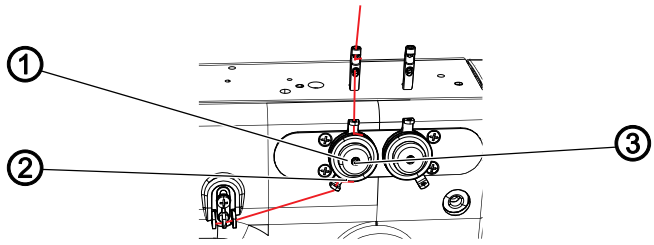
1. Insert the thread and guide it up to the thread lever (📖 *Operating Instructions, Threading needle thread*).
2. After the thread lever, feed the thread into the thread tension measurement device.
3. Select *Tension Top 300g*.

4. Press `On/Off`.

↳ The tension element is closed.

5. Measure the tension value. It must be at 300 g.

Fig. 92: Calibrating the needle thread tension



(1) - Adjusting nut
(2) - Tension disks
(3) - Threaded pin

If it is not at 300 g, correct as follows:

6. Loosen the threaded pin (3).
7. Press `On/Off`.

↳ The tension element opens.

8. Very gently turn the adjusting nut (1):
   - Decrease value = turn clockwise
   - Increase value = turn counterclockwise
9. Select `Tension Top 300g` again.
10. Press `On/Off` and measure the tension value.
11. At the point at which the thread tension measurement device displays a value of 300 g:
    Tighten the threaded pin (3) without changing the position of the adjusting nut (1).
12. Press `On/Off`.

↳ The tension element opens.

To set calibration position 2:

1. Select `Tension Top 150g`.
2. Change the thread tension with +/-1 or +/-10, until the thread tension measurement device displays 150 g.
3. Exit the menu item.

To set calibration position 1:

1. Select `Tension Top 5g`.
2. Change the thread tension with +/-1 or +/-10, until the thread tension measurement device displays a value.
3. Exit the menu item.

5.8 Menu item *Reset Operations*

The menu item *Reset Operations* allows you to reset sewing programs and parameters to the delivery state. To do this, re-entering the code is requested (for reasons of security).

To select the menu item:

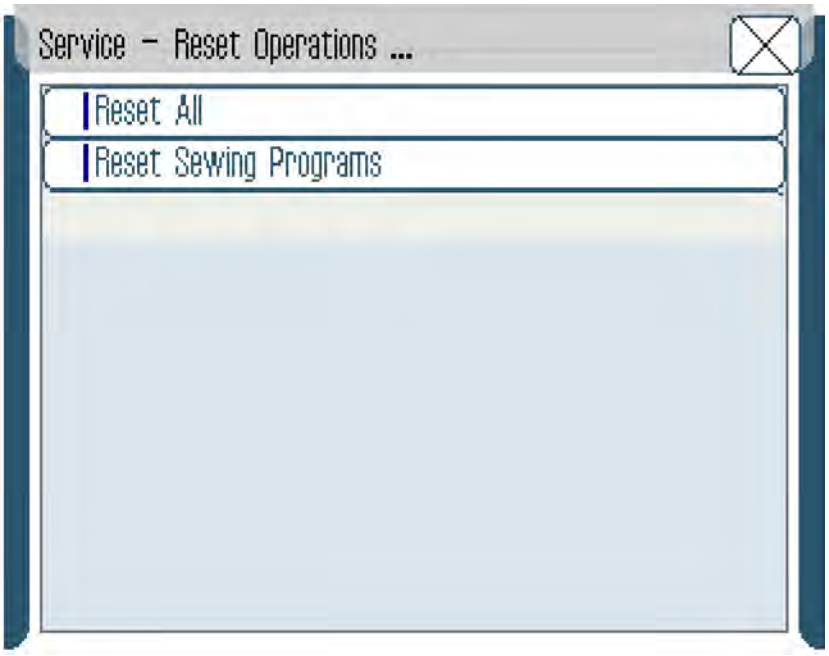
1. Select *Reset? Operations* in the service menu.

↳ The input mask for the code appears on the display.

2. Enter the code 25483 using the keypad.

↳ *Reset Operations* has the following subitems:

Fig. 93: Menu item Reset Operations



Parameters in the menu item *Reset*

Entry	Meaning
Reset All	Resetting to factory defaults
Reset Sewing Programs	Reset sewing programs

5.8.1 *Reset All*

In the *Reset All* subitem, you can reset all sewing programs and parameters to the delivery state.

Only the calibration values for the thread tension and sewing feet are retained.

To reset all sewing programs and parameters:

1. Press *Reset All*.

↳ All sewing programs and parameters - except for the calibration values for the thread tension and sewing feet - will be reset to their delivery state.

5.8.2 *Reset Sewing Programs*

In the *Reset Sewing Programs* subitem, you can delete all the sewing programs you have created yourself.
Only the standard programs are retained and are returned to their delivery state.

To delete all the sewing programs you have created yourself:

1. Press *Reset Sewing Programs*.

↳ All the sewing programs you have created yourself will be deleted. The standard programs will be returned to their delivery state.

5.9 *Test Input / Output*

In the menu item *Test Input / Output*, you can test whether certain elements are functioning.

WARNING

Risk of injury from moving, cutting and sharp parts!

Crushing, cutting and punctures are possible.

Exercise the utmost caution when performing tests when the machine is running.

5.10 Perform software update

When a new software version is available, you can download it from the *website of Dürkopp Adler* and load it using a USB key. All settings on the machine are retained.

The 🕮 *Additional Instructions* describe how to perform a software update.

6 Maintenance

This chapter describes maintenance work that needs to be carried out on a regular basis to extend the service life of the machine and achieve the desired seam quality.

WARNING

Risk of injury from sharp parts!

During maintenance work, the machine may start up unintentionally. Punctures and cutting possible.

Switch the machine off prior to any maintenance work.

WARNING

Risk of injury from moving parts!

During maintenance work, the machine may start up unintentionally. Crushing possible.

Switch the machine off prior to any maintenance work.

Maintenance interval

Work to be carried out	Operating hours			
	8	40	160	500
Machine head				
Removing lint and thread remnants	●			
Clean the area under the throat plate	●			
Check oil level at machine head	●			
Check oil level at looper drive housing		●		
Check and clean toothed belt			●	
Pneumatic system				
Check the operating pressure	●			
Check the water level in the pressure controller	●			
Clean the filter element in the compressed air maintenance unit				●
Check the tightness of the system				●

6.1 Cleaning

WARNING

Risk of injury from flying particles!

Flying particles can enter the eyes, causing injury.

Wear safety goggles.
Hold the compressed air gun so that the particles do not fly close to people.
Make sure no particles fly into the oil pan.

NOTICE

Property damage from soiling!

Lint and thread remnants can impair the operation of the machine.

Clean the machine as described.

NOTICE

Property damage from solvent-based cleaners!

Solvent-based cleaners will damage paintwork.

Use only solvent-free substances for cleaning.

You need to clean the following areas as they are particularly susceptible to soiling:

- Needle
- Below the throat plate
- Thread cutter
- Looper

Cover

Disassembling the throat plate (📖 *p. 20*)

Tilt the machine head (📖 *p. 14*)

To clean areas that are particularly susceptible to soiling:

1. Remove any lint and thread remnants from top to bottom using a compressed air gun or a brush.
2. Remove sewing dust and cutting waste from the oil pan.

6.2 Lubricating

CAUTION

Risk of injury from contact with oil!

Oil can cause a rash if it comes into contact with skin.

Avoid skin contact with oil.
If oil has come into contact with your skin, wash the affected areas thoroughly.

NOTICE

Property damage from incorrect oil!

Incorrect oil types can result in damage to the machine.

Only use oil that complies with the data in the instructions.

CAUTION

Risk of environmental damage from oil!

Oil is a pollutant and must not enter the sewage system or the soil.

Carefully collect up used oil.
Dispose of used oil and oily machine parts in accordance with national regulations.

For topping off the oil reservoir, use only lubricating oil **DA 10** or oil of equivalent quality with the following specifications:

- Viscosity at 40 °C: 10 mm²/s
- Flash point: 150 °C

You can order the lubricating oil from our sales offices using the following part numbers:

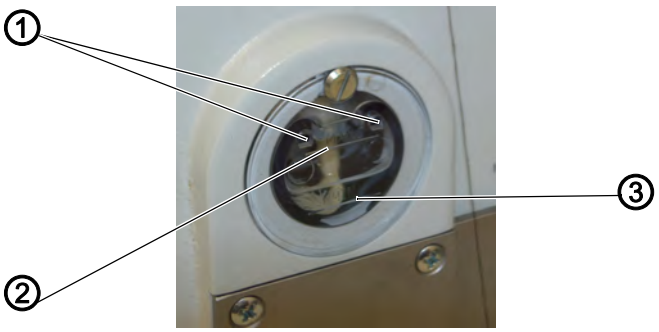
Container	Part no.
250 ml	9047 000011
1 l	9047 000012
2 l	9047 000013
5 l	9047 000014

The machine must be lubricated at regular intervals (📖 *p. 109*). Complete the following steps when lubricating the machine:

- Checking the oil level
- Lubricating the machine head
- Lubricating the looper

6.2.1 Lubrication of the machine head

Fig. 94: Lubrication of the machine head



(1) - Filler openings
(2) - Maximum level mark
(3) - Minimum level mark

Checking the oil level

Proper setting

The oil level must always be between the minimum level mark (3) and the maximum level mark (2).

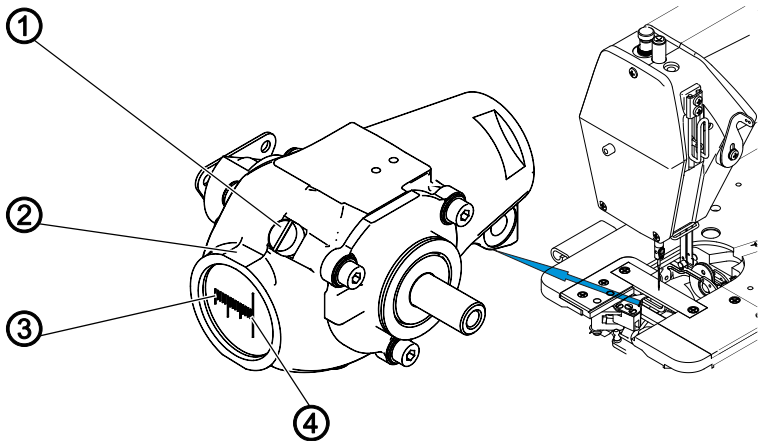
Topping off the oil

To fill oil through the filler openings (1), if necessary:

1. Add oil up to but not past the maximum level mark (2)

6.2.2 Looper lubrication

Fig. 95: Looper lubrication



(1) - Screw plug
(2) - Oil reservoir
(3) - Minimum level mark
(4) - Maximum level mark

Checking the oil level

Cover

- Tilt the machine head (📖 *p. 14*)

Proper setting

The oil level must always be between the minimum level mark (3) and the maximum level mark (4) with the machine head tilted back halfway.

Topping off the oil

To fill oil through the filler openings, if necessary:

1. Loosen the screw plug (1) on the filler opening.
2. Add oil up to but not past the maximum level marking (4).
3. Tighten the screw plug (1).

The approved oil quantity for looper lubrication is a factory specification.

6.3 Servicing the pneumatic system

6.3.1 Setting the operating pressure

NOTICE

Property damage from incorrect setting!

Incorrect operating pressure can result in damage to the machine.

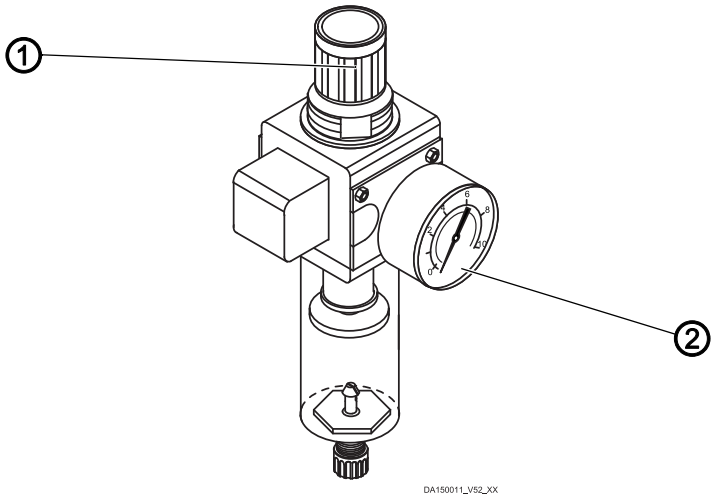
Ensure that the machine is only used when the operating pressure is set correctly.

Proper setting

Refer to the **Technical data** (📖 *p. 139*) chapter for the permissible operating pressure. The operating pressure cannot deviate by more than ± 0.5 bar.

Check the operating pressure on a daily basis.

Fig. 96: Setting the operating pressure



(1) - Pressure controller *(2) - Pressure gage*

To set the operating pressure:

1. Pull the pressure controller (1) up.
2. Turn the pressure controller until the pressure gage (2) indicates the proper setting:
   - Increase pressure = turn clockwise
   - Reduce pressure = turn counterclockwise
3. Push the pressure controller (1) down.

6.3.2 Draining the water condensation

NOTICE

Property damage from excess water condensation!

Too much water condensation can result in damage to the machine.

If necessary, drain the condensation water as described.

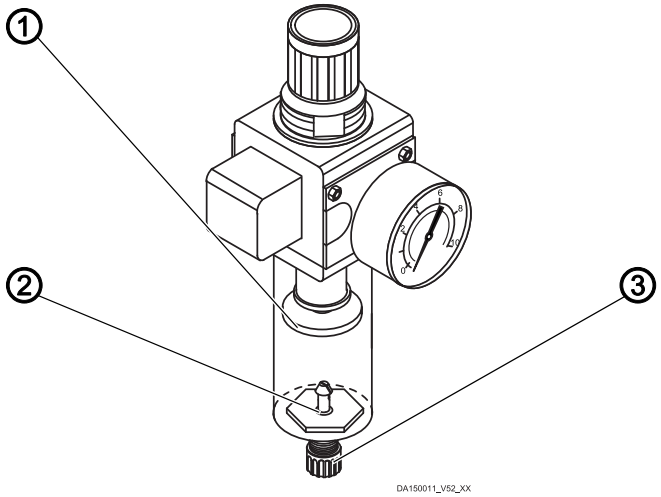
Water condensation will accumulate in the water separator (2) of the compressed air maintenance unit.

Proper setting

Water condensation must not rise up to the level of the filter element (1).

Check the water level in the water separator (2) on a daily basis.

Fig. 97: Draining the water condensation



(1) - Filter element
(2) - Water separator
(3) - Drain screw

To drain water condensation:

1. Disconnect the machine from the compressed air supply.
2. Place the collection tray under the drain screw (3).
3. Loosen the drain screw (3) completely.
4. Allow water to drain into the collection tray.
5. Tighten the drain screw (3).
6. Connect the machine to the compressed air supply.

6.3.3 Cleaning the filter element

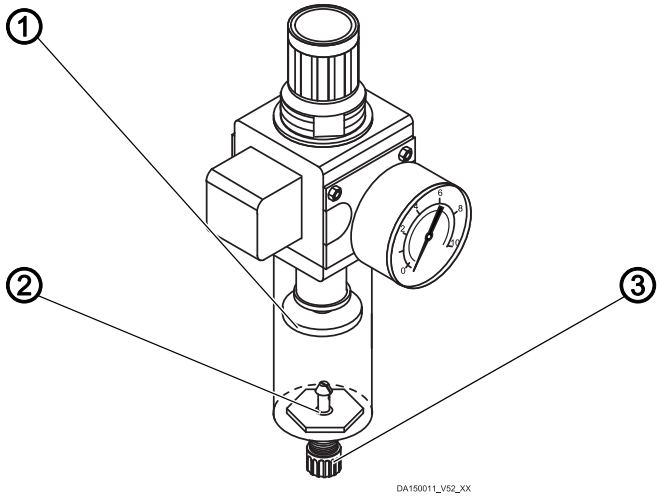
NOTICE

Damage to the paintwork due to solvent-based cleaners!

Solvent-based cleaners damage the filter.

Use only solvent-free substances for washing out the filter tray.

Fig. 98: Cleaning the filter element



(1) - Filter element
(2) - Water separator
(3) - Drain screw

To clean the filter element:

1. Disconnect the machine from the compressed air supply.
2. Drain the water condensation (📖 *p. 115*).
3. Unscrew the water separator (2).
4. Unscrew the filter element (1).
5. Blow out the filter element (1) using a compressed air gun.
6. Wash out the filter tray using benzine.
7. Tighten the filter element (1).
8. Tighten the water separator (2).
9. Tighten the drain screw (3).
10. Connect the machine to the compressed air supply.

6.4 Checking the toothed belt

Check the condition of the toothed belt on a monthly basis.

Replace the toothed belt immediately if damaged!

Proper setting

The toothed belt exhibits no cracks or fragile areas.
When pressed with a finger, the toothed belt must yield no more than 10 mm.

6.5 Parts list

A parts list can be ordered from Dürkopp Adler. Or visit our website for further information at:

www.duerkopp-adler.com

7 Decommissioning

You need to perform a number of activities if the machine is to be shut down for a longer period of time or completely decommissioned.

WARNING

Risk of injury from a lack of care!

Serious injuries may occur.

ONLY clean the machine when it is switched off. Allow ONLY trained personnel to disconnect the machine.

CAUTION

Skin damage from contact with oil!

Oil can cause a rash if it comes into contact with skin.

Avoid skin contact with residual oil.

To decommission the machine:

1. Switch off the machine.
2. Unplug the power plug.
3. If applicable, disconnect the machine from the compressed air supply.
4. Remove residual oil from the oil pan using a cloth.
5. Cover the control panel to protect it from soiling.
6. Cover the control to protect it from soiling.
7. Cover the entire machine if possible to protect it from contamination and damage.

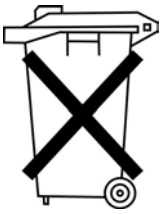
8 Disposal

CAUTION

Risk of environmental damage from improper disposal!

Improper disposal of the machine can result in serious environmental damage.

ALWAYS comply with the national regulations regarding disposal.



The machine must not be disposed of in the normal household waste.

The machine must be disposed of in a suitable manner in accordance with all applicable national regulations.

When disposing of the machine, be aware that it consists of a range of different materials (steel, plastic, electronic components, etc.). Follow the national regulations when disposing these materials.

9 Troubleshooting

9.1 Customer Service

Contact for repairs and issues with the machine:

Dürkopp Adler AG

Potsdamer Str. 190
33719 Bielefeld, Germany

Tel. +49 (0) 180 5 383 756
Fax +49 (0) 521 925 2594
Email: service@duerkopp-adler.com
Internet: www.duerkopp-adler.com

9.2 Messages of the software

Please contact customer service if an error occurs that is not described here. Do not attempt to correct the error yourself.

Table of software messages

Code	Type	Possible causes	Remedial action
1000	Error	Sewing motor error: • Encoder plug (Sub-D, 9-pin) not connected or defective • Encoder defective	• Check the connection of the encoder cable and replace, if necessary
1001	Error	Sewing motor error: • Sewing motor plug not connected or defective	• Check the connection of the sewing motor cable • Test sewing motor phases (R = 2.8Ω, high impedance to PE) • Replace the encoder • Replace the sewing motor • Replace the control
1002	Error	Sewing motor insulation error	• Check motor phase and PE for low-impedance connection • Replace the encoder • Replace the sewing motor

Code	Type	Possible causes	Remedial action
1004	Error	Sewing motor error: • Incorrect direction of rotation	• Replace the encoder • Check plug assignment and change, if necessary • Check wiring in machine distributor and change it, if necessary • Test motor phases and check for correct value
1005	Error	Sewing motor current error: • Sewing motor blocked • Encoder cable not connected or defective • Encoder defective	• Remove the blockage • Check the encoder cable and replace, if necessary • Replace the sewing motor
1006	Error	Sewing motor error: • Max. speed exceeded • Sewing motor cable defective • Sewing motor defective	• Switch off and on the machine • Replace the encoder • Perform reset • Replace the sewing motor • Contact customer service
1007	Error	Error in the reference run	• Replace the encoder • Eliminate stiff movement in the machine
1008	Error	Sewing motor encoder error	• Replace the encoder
1010	Error	Sewing motor synchronization error: • External synchronizer plug (Sub-D, 9-pin) not connected	• Connect plug of external synchronizer to control, use correct connection (Sync) • Replace the reference switch or synchronizer • Only required for machines with transmission!
1011	Error	Sewing motor synchronization error (Z pulse)	• Switch off the control, use handwheel to turn and switch on the control again • If error is not corrected, check encoder
1012	Error	Sewing motor synchronization error	• Replace the synchronizer
1051	Error	Sewing motor timeout: • Cable to sewing motor reference switch defective • Reference switch defective	• Replace the cable • Replace the reference switch
1052	Error	Sewing motor overcurrent: • Sewing motor cable defective • Sewing motor defective • Control defective	• Replace the sewing motor cable • Replace the sewing motor • Replace the control
1053	Error	Sewing motor overvoltage	• Check the mains voltage
1054	Error	Internal short circuit	• Replace the control
1055	Error	Sewing motor overload (I^2T): • Sewing motor not moving freely or blocked • Sewing motor defective • Control defective	• Remove the cause of the stiff movement or blockage • Replace the sewing motor • Replace the control

Code	Type	Possible causes	Remedial action
1056	Error	Sewing motor overtemperature: • Sewing motor not moving freely • Sewing motor defective • Control defective	• Correct the cause of not moving freely • Replace the sewing motor • Replace the control
1058	Error	Sewing motor speed greater than setpoint: • Reference switch defective • Sewing motor defective	• Replace the reference switch • Replace the sewing motor
1060	Error	PowerParts	• Replace the control
1061	Error	Sewing motor disturbance: • Encoder defective • Sewing motor defective	• Switch off and on the machine • Replace the encoder • Replace the sewing motor • Contact customer service
1062	Error	Sewing motor disturbance (IDMA auto increment)	• Switch off and on the machine
1120	Error	Software error: • Parameter not initialized	• Perform software update
1203	Information	Sewing motor: Position not reached	• Switch off and on the machine • Perform software update • Contact Customer Service
1302	Error	Sewing motor current error: • Sewing motor blocked • Encoder cable not connected or defective • Encoder defective	• Remove the blockage • Check the encoder cable and replace, if necessary • Replace the sewing motor
1330	Error	Sewing motor not responding	• Switch off and on the machine • Perform software update • Contact Customer Service
2102	Error	X-axis stepper motor: • Stepper motor not moving freely or blocked • Encoder cable not connected or defective • Stepper motor cable not connected or defective • Encoder defective • Stepper motor defective	• Remove the cause of the stiff movement or blockage • Check the encoder cable and replace, if necessary • Replace the encoder If the stepper motor is not supplied with current: • Check the stepper motor cable and replace, if necessary • Replace the stepper motor
2103	Error	X-axis stepper motor step losses: • Stiff mechanical movement or blockage	• Remove the cause of the stiff mechanical movement or blockage
2121	Error	X-axis stepper motor: • Encoder plug (Sub-D, 9-pin) not connected or defective • Encoder defective	• Check the connection of the encoder cable and replace, if necessary
2122	Information	Magnet wheel search timeout	• Check connection cables • Check stepper motor for stiff movement

Code	Type	Possible causes	Remedial action
2130	Error	X-axis stepper motor not responding	• Perform software update • Replace the control
2152	Error	X-axis stepper motor overcurrent	• Replace the stepper motor
2153	Error	Overvoltage	• Check the mains voltage
2155	Error	X-axis stepper motor overload (I^2T): • Stepper motor not moving freely or blocked • Stepper motor defective • Control defective	• Remove the blockage or the cause of the stiff movement • Replace the stepper motor • Replace the control
2156	Error	X-axis stepper motor: • Stepper motor not moving freely • Stepper motor defective • Control defective	• Correct the cause of not moving freely • Replace the stepper motor • Replace the control
2162	Error	X-axis stepper motor disturbance (IDMA auto increment)	• Switch off and on the machine
2171	Error	Watchdog	• Switch off and on the machine • Perform software update • Contact Customer Service
2172	Error	Stepper motor overvoltage: • Stepper motor card defective	• Replace the control
2173	Error	X-axis stepper motor error	• Check the connection • Test stepper motor phases (R = 2.8 Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control
2174	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2175	Error	Magnet wheel search	• Check the connection • Test stepper motor phases (R = 2.8 Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control
2177	Error	Stepper motor overload (I^2T)	• Remove the cause of the stiff movement or blockage • Replace the stepper motor • Replace the control
2178	Error	Encoder error	• Check the connection of the encoder cable and replace, if necessary • Replace the control
2179	Error	Current sensor: • Stepper motor card defective • Control defective	• Replace the control

Code	Type	Possible causes	Remedial action
2180	Error	Direction of rotation	• Replace the encoder • Check plug assignment and change, if necessary • Check wiring in machine distributor and change it, if necessary • Test stepper motor phases and check for correct value
2181	Error	Error in the reference run	• Replace the reference switch
2182	Error	Stepper motor current error	• Remove the blockage • Check the encoder cable and replace, if necessary • Replace the stepper motor
2183	Error	Stepper motor overcurrent	• Replace the sewing motor cable • Replace the stepper motor • Replace the control
2184	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2185	Error	Stepper motor insulation error	• Check motor phase and PE for low-impedance connection • Replace the encoder • Replace the stepper motor
2186	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2187	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2188	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2202	Error	Y-axis stepper motor: • Stepper motor not moving freely or blocked • Encoder cable not connected or defective • Stepper motor cable not connected or defective • Encoder defective • Stepper motor defective	• Remove the cause of the stiff movement or blockage • Check the encoder cable and replace, if necessary • Replace the encoder If the stepper motor is not supplied with current: • Check the stepper motor cable and replace, if necessary • Replace the stepper motor
2203	Error	Y-axis stepper motor step losses: • Stiff mechanical movement or blockage	• Remove the cause of the stiff mechanical movement or blockage
2221	Error	Y-axis stepper motor: • Encoder plug (Sub-D, 9-pin) not connected or defective • Encoder defective	• Check the connection of the encoder cable and replace, if necessary

Code	Type	Possible causes	Remedial action
2222	Information	Magnet wheel search timeout	• Check connection cables • Check stepper motor for stiff movement
2230	Error	Y-axis stepper motor not responding	• Perform software update • Replace the control
2252	Error	Y-axis stepper motor overcurrent	• Replace the stepper motor
2253	Error	Overvoltage	• Check the mains voltage
2255	Error	Y-axis stepper motor overload (I^2T): • Stepper motor not moving freely or blocked • Stepper motor defective • Control defective	• Remove the blockage or the cause of the stiff movement • Replace the stepper motor • Replace the control
2256	Error	Y-axis stepper motor: • Stepper motor not moving freely • Stepper motor defective • Control defective	• Correct the cause of not moving freely • Replace the stepper motor • Replace the control
2262	Error	Y-axis stepper motor disturbance (IDMA auto increment)	• Switch off and on the machine
2271	Error	Watchdog	• Switch off and on the machine • Perform software update • Contact Customer Service
2272	Error	Stepper motor overvoltage: • Stepper motor card defective	• Replace the control
2273	Error	Y-axis stepper motor error	• Check the connection • Test stepper motor phases (R = 2.8 Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control
2274	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2275	Error	Magnet wheel search	• Check the connection • Test stepper motor phases (R = 2.8 Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control
2277	Error	Stepper motor overload (I^2T)	• Remove the cause of the stiff movement or blockage • Replace the stepper motor • Replace the control
2278	Error	Encoder error	• Check the connection of the encoder cable and replace, if necessary • Replace the control

Code	Type	Possible causes	Remedial action
2279	Error	Current sensor: • Stepper motor card defective • Control defective	• Replace the control
2280	Error	Direction of rotation	• Replace the encoder • Check plug assignment and change, if necessary • Check wiring in machine distributor and change it, if necessary • Test stepper motor phases and check for correct value
2281	Error	Error in the reference run	• Replace the reference switch
2282	Error	Stepper motor current error	• Remove the blockage • Check the encoder cable and replace, if necessary • Replace the stepper motor
2283	Error	Stepper motor overcurrent	• Replace the sewing motor cable • Replace the stepper motor • Replace the control
2284	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2285	Error	Stepper motor insulation error	• Check motor phase and PE for low-impedance connection • Replace the encoder • Replace the stepper motor
2286	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2287	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2288	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2302	Error	Z-axis stepper motor: • Stepper motor not moving freely or blocked • Encoder cable not connected or defective • Stepper motor cable not connected or defective • Encoder defective • Stepper motor defective	• Remove the cause of the stiff movement or blockage • Check the encoder cable and replace, if necessary • Replace the encoder If the stepper motor is not supplied with current: • Check the stepper motor cable and replace, if necessary • Replace the stepper motor
2303	Error	Z-axis stepper motor step losses: • Stiff mechanical movement or blockage	• Remove the cause of the stiff mechanical movement or blockage

Code	Type	Possible causes	Remedial action
2321	Error	Z-axis stepper motor: • Encoder plug (Sub-D, 9-pin) not connected or defective • Encoder defective	• Check the connection of the encoder cable and replace, if necessary
2322	Information	Magnet wheel search timeout	• Check connection cables • Check stepper motor for stiff movement
2330	Error	Z-axis stepper motor not responding	• Perform software update • Replace the control
2352	Error	Z-axis stepper motor overcurrent	• Replace the stepper motor
2353	Error	Overvoltage	• Check the mains voltage
2355	Error	Z-axis stepper motor overload (I^2T): • Stepper motor not moving freely or blocked • Stepper motor defective • Control defective	• Remove the blockage or the cause of the stiff movement • Replace the stepper motor • Replace the control
2356	Error	Z-axis stepper motor: • Stepper motor not moving freely • Stepper motor defective • Control defective	• Correct the cause of not moving freely • Replace the stepper motor • Replace the control
2362	Error	Z-axis stepper motor disturbance (IDMA auto increment)	• Switch off and on the machine
2371	Error	Watchdog	• Switch off and on the machine • Perform software update • Contact Customer Service
2372	Error	Stepper motor overvoltage: • Stepper motor card defective	• Replace the control
2373	Error	Z-axis stepper motor error	• Check the connection • Test stepper motor phases (R = 2.8 Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control
2374	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2375	Error	Magnet wheel search	• Check the connection • Test stepper motor phases (R = 2.8 Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control

Code	Type	Possible causes	Remedial action
2377	Error	Stepper motor overload (I^2T)	• Remove the cause of the stiff movement or blockage • Replace the stepper motor • Replace the control
2378	Error	Encoder error	• Check the connection of the encoder cable and replace, if necessary • Replace the control
2379	Error	Current sensor: • Stepper motor card defective • Control defective	• Replace the control
2380	Error	Direction of rotation	• Replace the encoder • Check plug assignment and change, if necessary • Check wiring in machine distributor and change it, if necessary • Test stepper motor phases and check for correct value
2381	Error	Error in the reference run	• Replace the reference switch
2382	Error	Stepper motor current error	• Remove the blockage • Check the encoder cable and replace, if necessary • Replace the stepper motor
2383	Error	Stepper motor overcurrent	• Replace the sewing motor cable • Replace the stepper motor • Replace the control
2384	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2385	Error	Stepper motor insulation error	• Check motor phase and PE for low-impedance connection • Replace the encoder • Replace the stepper motor
2386	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2387	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2388	Error	Software error	• Perform reset • Perform software update • Contact Customer Service

Code	Type	Possible causes	Remedial action
2402	Error	U-axis stepper motor: • Stepper motor not moving freely or blocked • Encoder cable not connected or defective • Stepper motor cable not connected or defective • Encoder defective • Stepper motor defective	• Remove the cause of the stiff movement or blockage • Check the encoder cable and replace, if necessary • Replace the encoder If the stepper motor is not supplied with current: • Check the stepper motor cable and replace, if necessary • Replace the stepper motor
2403	Error	U-axis stepper motor step losses: • Stiff mechanical movement or blockage	• Remove the cause of the stiff mechanical movement or blockage
2421	Error	U-axis stepper motor: • Encoder plug (Sub-D, 9-pin) not connected or defective • Encoder defective	• Check the connection of the encoder cable and replace, if necessary
2422	Information	Magnet wheel search timeout	• Check connection cables • Check stepper motor for stiff movement
2430	Error	U-axis stepper motor not responding	• Perform software update • Replace the control
2452	Error	U-axis stepper motor over current	• Replace the stepper motor
2453	Error	Overvoltage	• Check the mains voltage
2455	Error	U-axis stepper motor overload (I^2T): • Stepper motor not moving freely or blocked • Stepper motor defective • Control defective	• Remove the blockage or the cause of the stiff movement • Replace the stepper motor • Replace the control
2456	Error	U-axis stepper motor: • Stepper motor not moving freely • Stepper motor defective • Control defective	• Correct the cause of not moving freely • Replace the stepper motor • Replace the control
2462	Error	• U-axis stepper motor disturbance (IDMA auto increment)	• Switch off and on the machine
2471	Error	• Watchdog	• Switch off and on the machine • Perform software update • Contact Customer Service
2472	Error	Stepper motor overvoltage: • Stepper motor card defective	• Replace the control
2473	Error	U-axis stepper motor over current error	• Check the connection • Test stepper motor phases (R = 2.8Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control

Code	Type	Possible causes	Remedial action
2474	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2475	Error	Magnet wheel search	• Check the connection • Test stepper motor phases (R = 2.8 Ω, high impedance to PE) • Replace the encoder • Replace the stepper motor • Replace the control
2477	Error	Stepper motor overload (I^2T)	• Remove the cause of the stiff movement or blockage • Replace the stepper motor • Replace the control
2478	Error	Encoder error	• Check the connection of the encoder cable and replace, if necessary • Replace the control
2479	Error	Current sensor: • Stepper motor card defective • Control defective	• Replace the control
2480	Error	Direction of rotation	• Replace the encoder • Check plug assignment and change, if necessary • Check wiring in machine distributor and change it, if necessary • Test stepper motor phases and check for correct value
2481	Error	Error in the reference run	• Replace the reference switch
2482	Error	Stepper motor current error	• Remove the blockage • Check the encoder cable and replace, if necessary • Replace the stepper motor
2483	Error	Stepper motor overcurrent	• Replace the sewing motor cable • Replace the stepper motor • Replace the control
2484	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2485	Error	Stepper motor insulation error	• Check motor phase and PE for low-impedance connection • Replace the encoder • Replace the stepper motor
2486	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2487	Error	Software error	• Perform reset • Perform software update • Contact Customer Service

Code	Type	Possible causes	Remedial action
2488	Error	Software error	• Perform reset • Perform software update • Contact Customer Service
2901	Error	Referencing timeout	• Switch off and on the machine • Check the clamping of the stepper motor
3010	Error	Control: 100 V voltage error	• Check the connections • Replace the control
3011	Error	Control: 100 V voltage error	• Check the connections • Replace the control
3012	Error	Control: 100 V voltage error (I^2T)	• Switch off and on the machine • Check the connections • Replace the control
3020	Error	Short circuit in 24 V input or output	• Check the connections • Replace the control
3021	Error	Short circuit in 24 V input or output	• Check the connections • Replace the control
3022	Error	Short circuit in 24 V input or output (I^2T)	• Switch off and on the machine • Check the connections • Replace the control
3030	Error	Sewing motor phase error	• Test sewing motor phases (R = 2.8Ω, high impedance to PE) • Replace the encoder • Replace the sewing motor • Replace the control
3104	Warning	• Foot pedal not in rest position • Setpoint device defective	• Do not step on the foot pedal when starting up the machine • Replace the setpoint device
4440 – 4459	Error	OP3000 control panel: Internal error	• Switch off and on the machine • Perform software update • Replace the control panel
6000 – 6299	Error	Internal error	• Switch off and on the machine • Perform software update • Contact Customer Service
6351 – 6354	Error	Control defective (I^2C)	• Replace the control
6360	Warning	Data on machine ID not permissible	• Replace the control
6361	Warning	Machine ID not connected	• Check the connection of the machine ID cable • Replace the machine ID • Replace the control
6362 – 6367	Error	Internal EEprom	• Replace the control

Code	Type	Possible causes	Remedial action
6400 – 6999	Error	Internal error	• Switch off and on the machine • Perform software update • Contact Customer Service
7551 – 7659	Error	• Internal error • Cable disturbance • Cables to the control panel Interface defective	• Switch off and on the machine • Eliminate source of disturbance • Perform software update • Replace the cable • Contact customer service
9310	Error	• CAN connector not connected or faulty • Tape unwinder faulty	• Replace the CAN connector • Replace the tape unwinder • Replace the control
9320	Error	• Tape unwinder dirty • Tape unwinder faulty	• Clean the tape unwinder (📖 *p. 110*) • Open the throttle (📖 *p. 84*) • Replace the tape unwinder
9910	Error	Tilt sensor: • Machine head is tilted over • Tilt sensor not assembled or defective	• Erecting the machine head • Fit or replace tilt sensor

9.3 Errors in sewing process

Meaning	Possible causes	Remedial action
Thread breakage	• The needle and looper threads are not threaded correctly	• Check threading path (📖 *Operating Instructions, Operation*)
	• Needle is bent or sharp-edged • Needle is not inserted correctly into the needle bar	• Replace the needle • Insert the needle into the needle bar
	• The thread used is unsuitable	• Use recommended thread (📖 *Operating Instructions*)
	• Thread tensions are too tight for the thread used	• Check thread tensions (📖 *Operating Instructions, Operation*)
	• Thread-guiding parts such as thread tube, thread guide or thread-takeup disk are sharp-edged	• Check the thread path
	• Throat plate, looper or spread have been damaged by the needle	• Have parts reworked by qualified specialists
Missing stitches	• The needle and looper threads are not threaded correctly	• Check threading path (📖 *Operating Instructions, Operation*)
	• Needle is blunt or bent • Needle is not inserted correctly into the needle bar	• Replace the needle • Insert the needle into the needle bar
	• The needle thickness used is unsuitable	• Use recommended needle thickness (📖 *p. 100*)
	• The thread reel holder is installed incorrectly	• Check thread reel holder (📖 *Operating Instructions, Setup*)
	• Thread tensions are too tight	• Check thread tensions (📖 *Operating Instructions, Operation*)
	• Sewing material is not held correctly	• Check clamping pressure
	• The loop stroke was not corrected when changing the zigzag stitch width	• Set the loop stroke (📖 *p. 22*)
	• Incorrect parts used for the desired sewing equipment	• Check the parts based on the equipment sheet
	• Throat plate, looper or spread have been damaged by the needle	• Have parts reworked by qualified specialists

Meaning	Possible causes	Remedial action
Loose stitches	• Thread tensions are not adjusted to the sewing material, the sewing material thickness or the thread used	• Check thread tensions
	• The needle and looper threads are not threaded correctly	• Check threading path (📖 *Operating Instructions, Operation*)
Needle breakage	• Needle thickness is unsuitable for the sewing material or the thread	• Use recommended needle
Seam beginning not secure	• Residual tension is too tight for the needle thread	• Adjust residual tension

10 Technical data

Noise emission

Workplace-specific emission value as per DIN EN ISO 10821:

L_{pA} = 78 dB (a) +/- 1.48 dB (A) at

- Stitch length: 3 mm
- Sewing foot stroke: 0 mm
- Speed: 3000 min^{-1}
- Sewing material: 2-layer material G1 DIN 23328

Data and characteristic values

Technical data	Unit	610-10	630-10
Machine type		Engineered workstation	
Stitch type		Double chain stitch 401	
Looper type		Crossline	
Number of needles		1	
Needle system		934 RG	
Needle strength	[Nm]	70 – 130	
Thread strength	[Nm]	bis 70/3	
Stitch length	[mm]	1.0 – 4.0	
Speed maximum	[min^{-1}]	5000	
Speed on delivery	[min^{-1}]	3200	
Feed length maximum for diff. feed dog	[mm]	6	
Feed length maximum for feeding foot	[mm]	8	
Needle bar stroke		32	
Sewing foot stroke		9	
Mains voltage	[V]	230	
Mains frequency	[Hz]	50	
Operating pressure	[bar]	6	
Air consumption [per cycle]	[NL]	0.1	
Length	[mm]	1350	1350
Width	[mm]	900	900
Height	[mm]	1250	1100

Technical data	Unit	610-10	630-10
Weight	[kg]	109	103
Rated power: - StandBy - Operation	[kW]	< 0.05 0.5	
Power input	[kVA]	1.0	

Characteristics

- 32 mm needle bar stroke for light to moderately heavy sewing material
- Stitch length maximum 4 mm, adjustable via the stepper motor
- Differential bottom feed up to a maximum of 6 mm, adjustable via the stepper motor
- Differential top feed up to a maximum of 8 mm, adjustable via the stepper motor.
- Sews forwards only
- Electronically controlled needle and looper thread tension and automatic adjustment of the looper thread quantity to the stitch length for optimal stitch formation, including for loose stitching
- Sewing foot top feed with automatic stroke adjustment for different sewing material thicknesses
- Equipped with drive motor mounted on the machine
- With electropneumatic sewing foot lift and electropneumatic thread cutter for needle and looper thread

11 Appendix

Fig. 99: Wiring diagram (1)

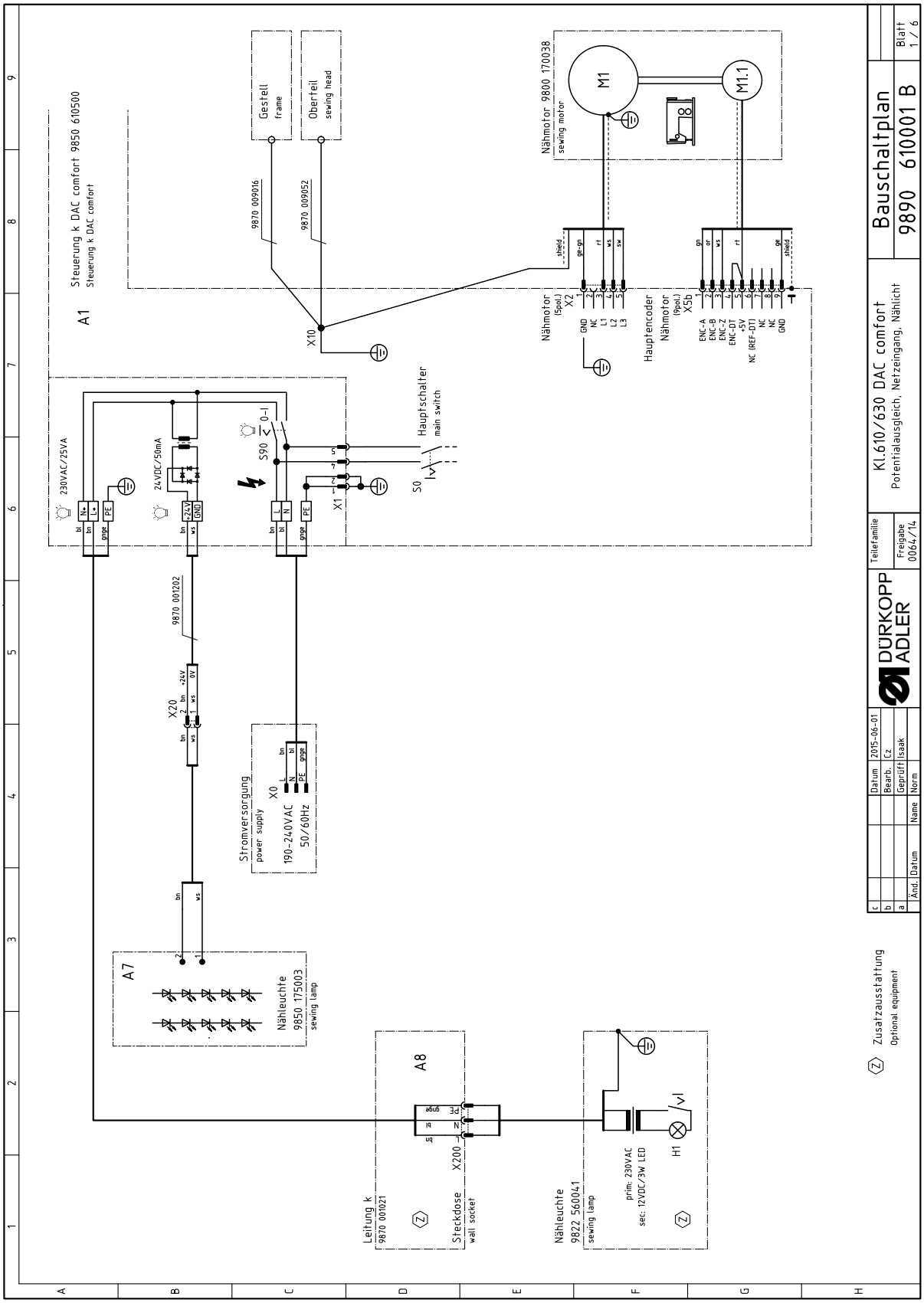


Fig. 100: Wiring diagram (2)

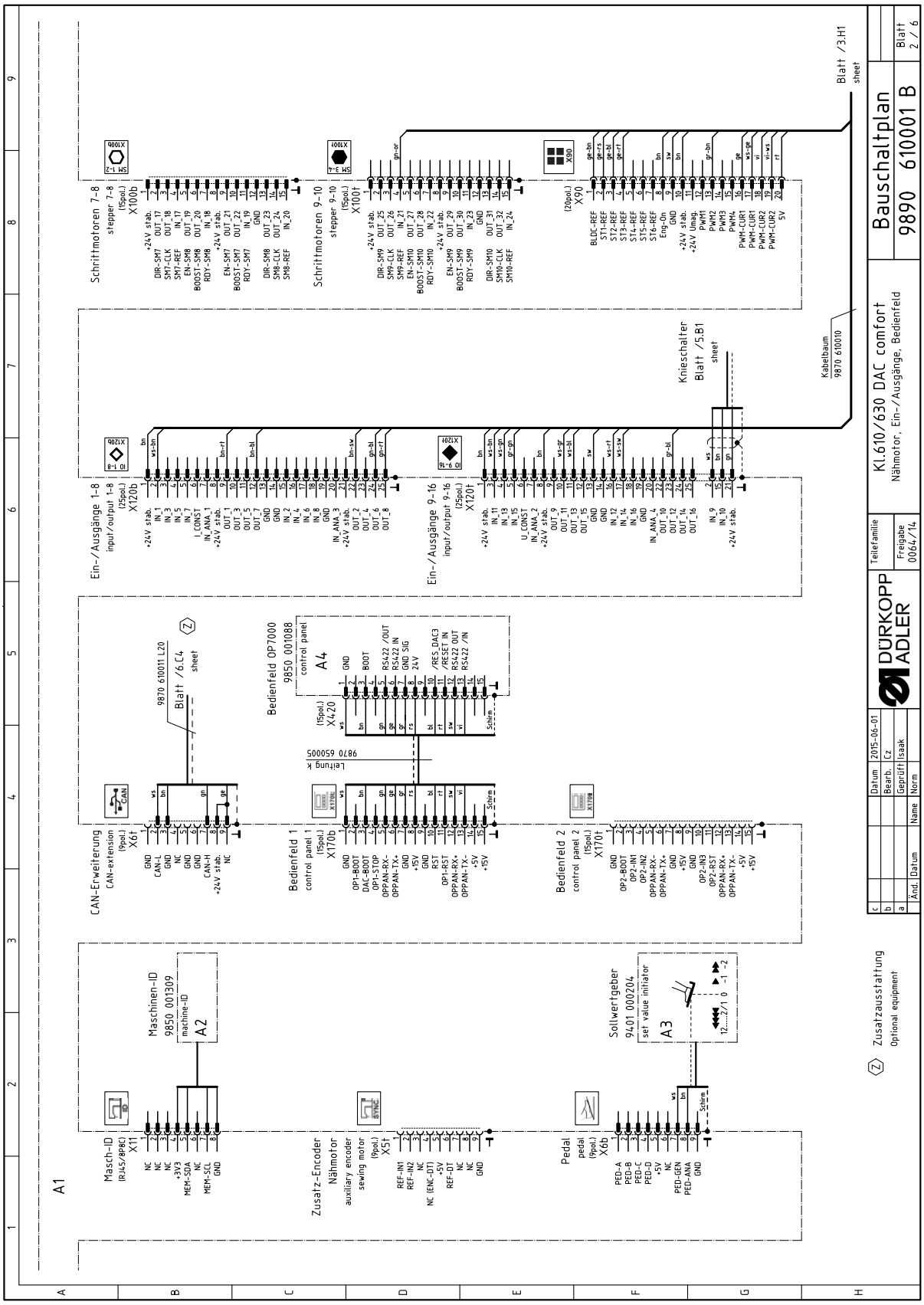


Fig. 101: Wiring diagram (3)

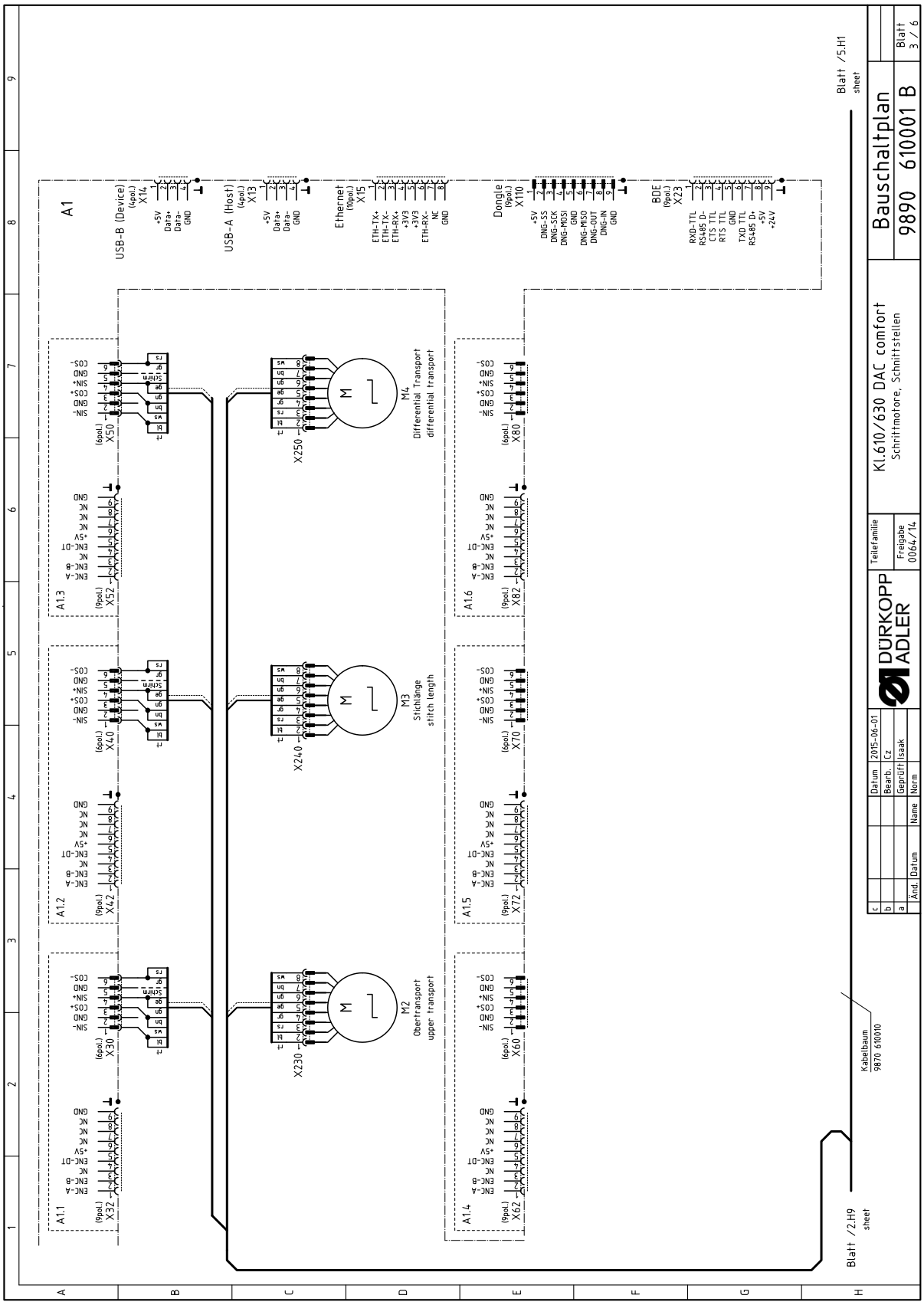


Fig. 102: Wiring diagram (4)

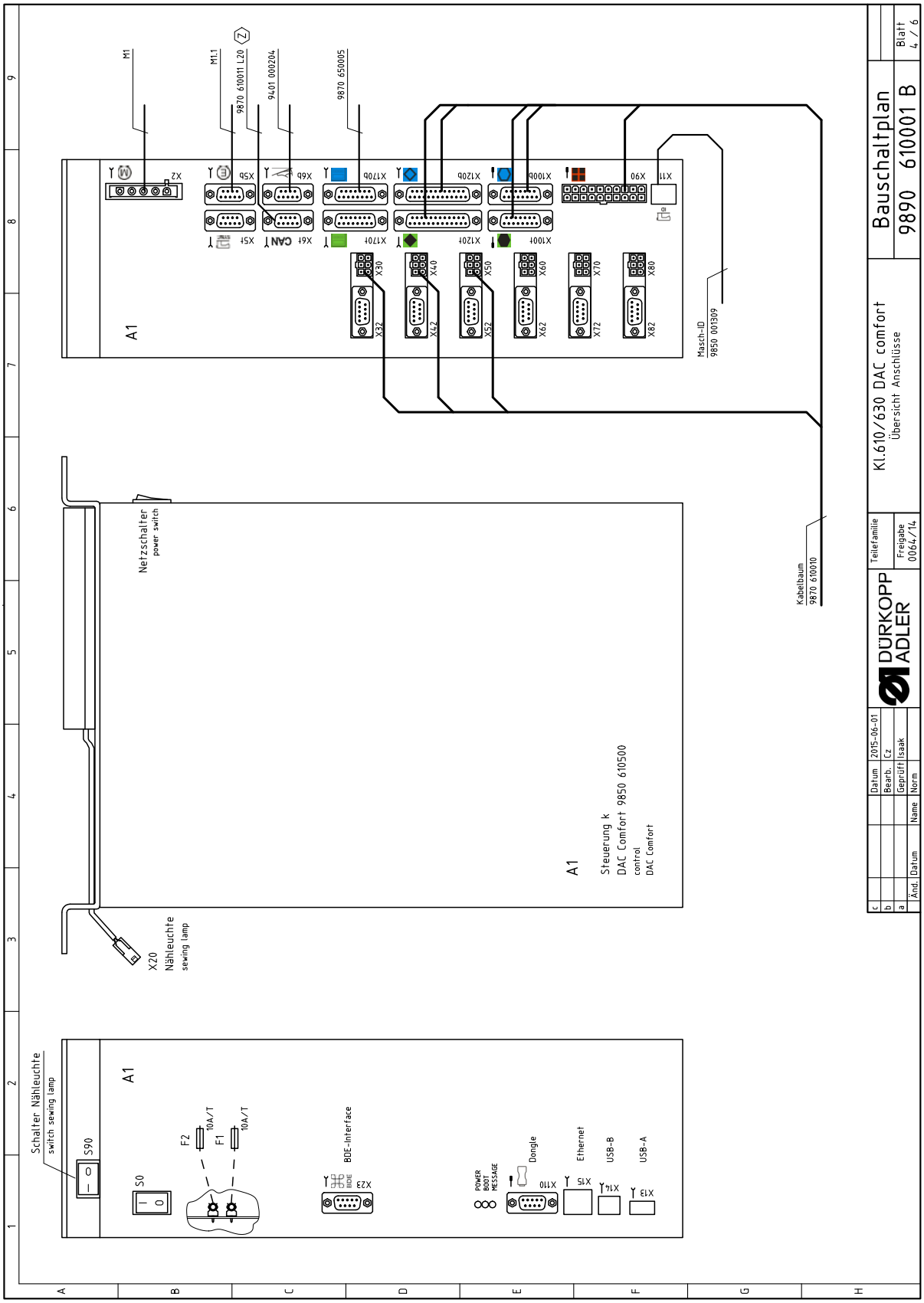


Fig. 103: Wiring diagram (5)

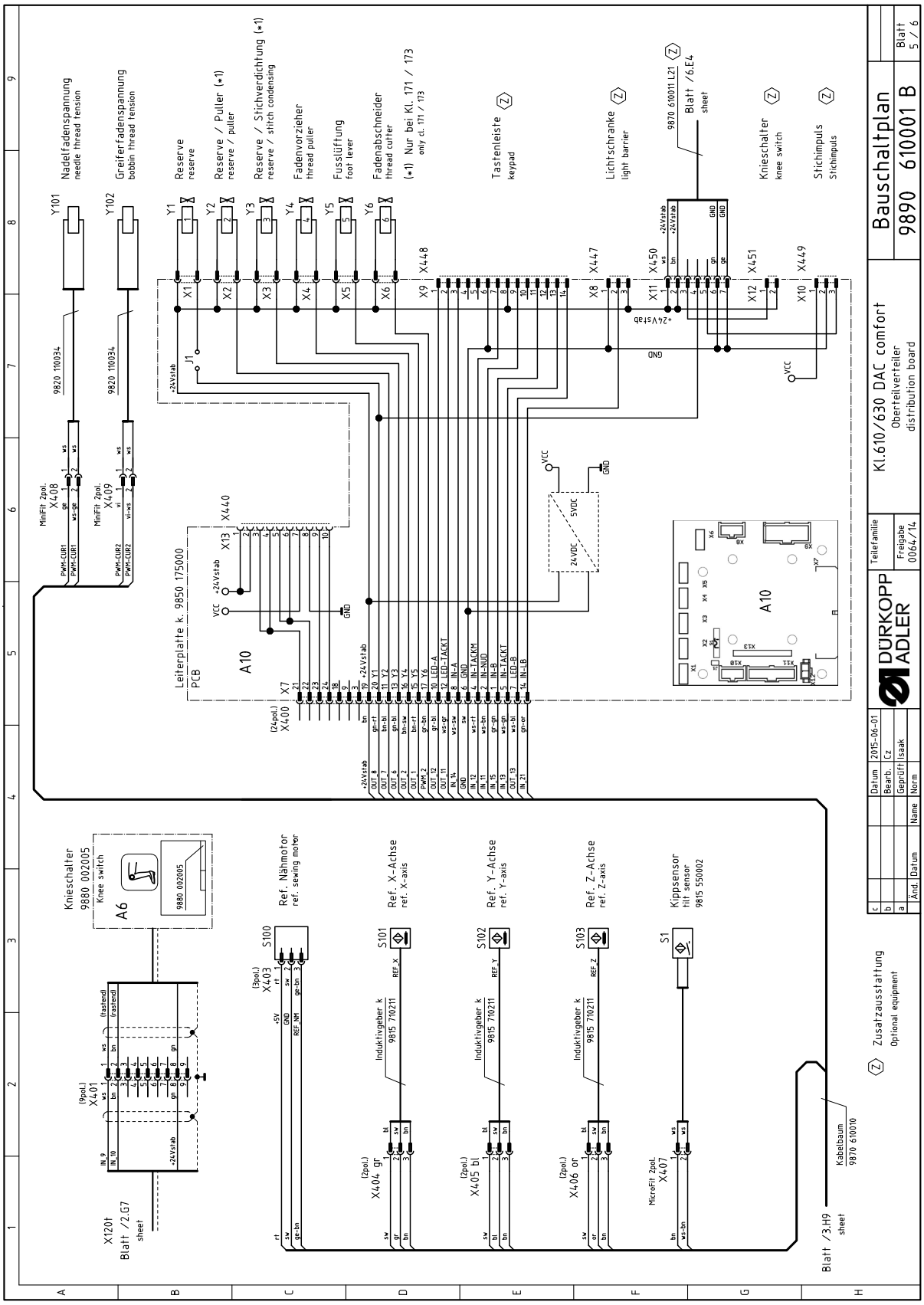


Fig. 104: Wiring diagram (6)

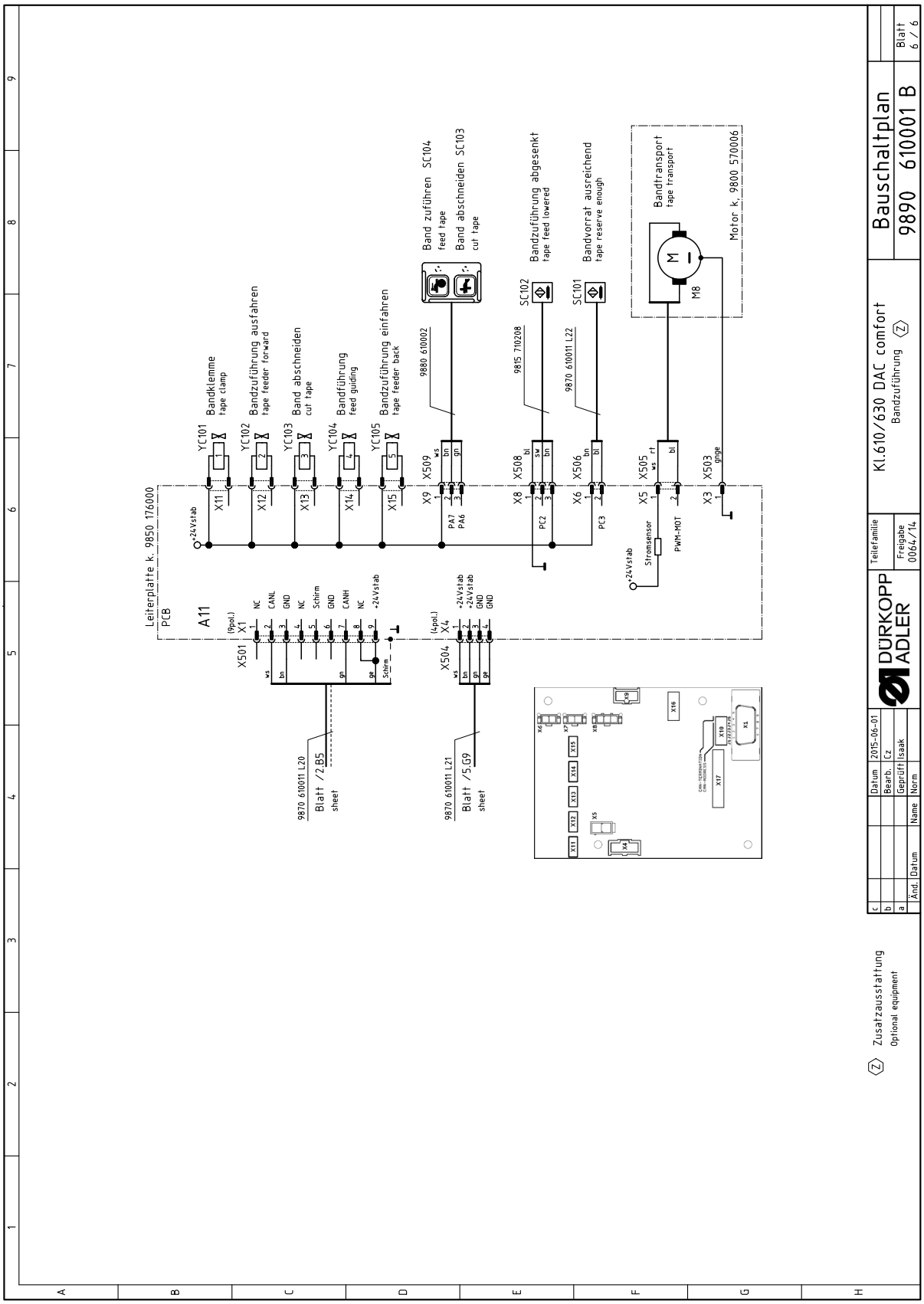
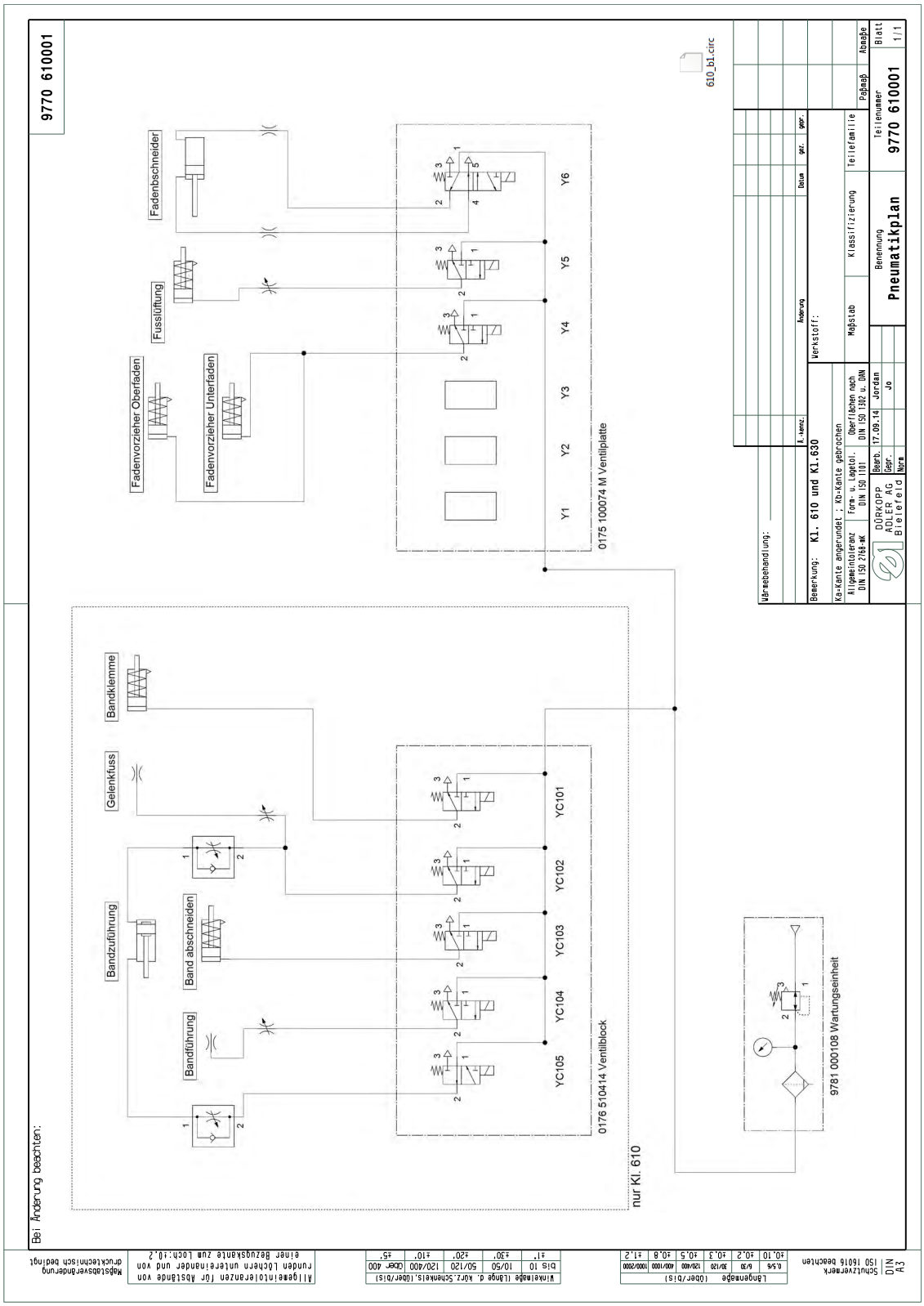


Fig. 105: Pneumatic diagram



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