

Service manual

7000- serien

Directions for use

These service instructions are intended to be used by service workshop personnel, or by salesmen who carry out servicing in their own districts. They assume a thorough knowledge of the handling of precision appliances and accessibility to service tools.

The manual is divided into three sections and covers all service operations and checks which should be carried out when making a complete overhaul of a sewing machine.

The first section covers the control of the adequate functioning of integral details.

The second section deals with the various settings which must be maintained to ensure that the machine functions satisfactorily.

The third section covers dismantling and mounting instructions.

The diagrams only give an indication as to where the detail or mechanism mentioned is located in the machine. For more detailed information regarding the construction, etc., refer to the diagrams in the spare parts list.

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The following details should be visually checked:

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The stitch plate

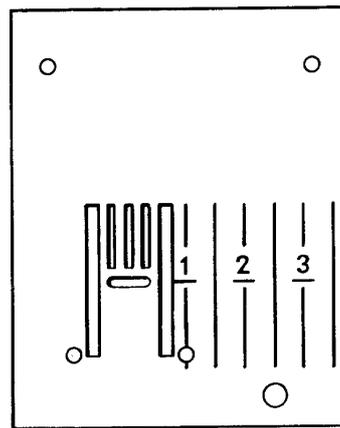
Requirements

The stitch plate must not be damaged in any way. Particular attention should be paid to possible damage or unevenness around the needle hole.

Action

Exchange the damaged stitch plate.

For removal, refer to Operating Manual. Care of the machine.



The presser foot

Requirements

There should be no scratches on the underneath of the presser foot.

Action

Exchange the presser foot if there are scratches on the underneath.

Comments

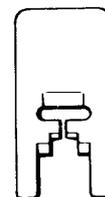
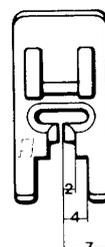
How the fabric is held between the presser foot and the stitch plate plays an important role in the stitch formation.

Refer to all presser feet.

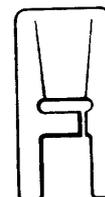
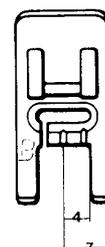
See Operating Manual.

Top side

Underneath



Presser foot A 411 73 86-01



Presser foot B 411 73 88-01

The feed dog

Requirements

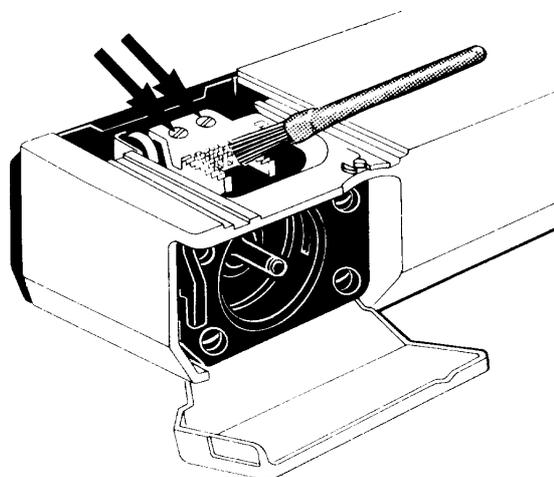
The top side of the feed dog must not be damaged in any way, e.g. broken teeth, etc., and should be free from fluff and pieces of thread. Compare with the Operating Manual. Care of the machine.

Action

The faulty dog should be exchanged.

Remove the stitch plate. Undo the screws and replace the feed dog.

As regards the setting of the feed dog, see pages 28-29.



The bobbin case

Requirements

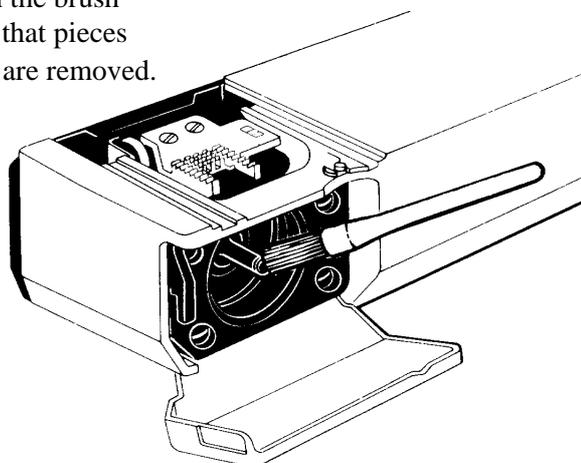
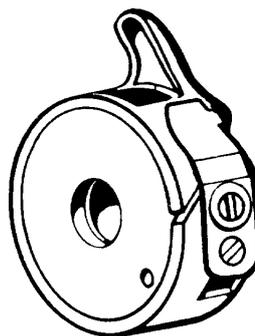
The thread tension spring, in its whole width, must be parallel to and press against the side of the bobbin case.

Action

Remove any fabric dressing which may have fastened under the thread tension spring. If the thread tension spring is deformed, exchange the bobbin case.

Comments

Deposits from the fabric or thread can fasten on the spindle of the hook. This should be carefully cleaned with the brush in the accessory box. At the same time make sure that pieces which may have become wound round the spindle are removed.



The hook cover

Requirements

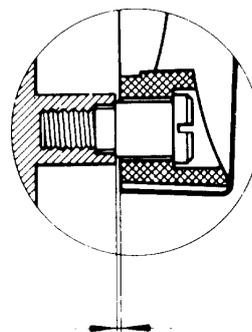
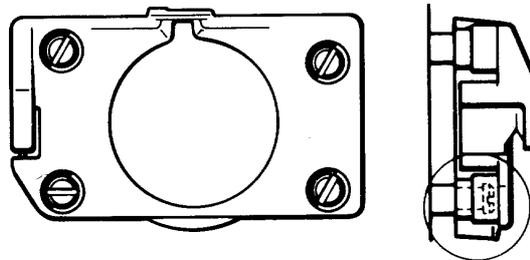
The inside of the hook cover must not be damaged. Both axial and radial movement should be possible.

Action

If the inside of the hook cover is damaged, it must be exchanged. Check that the holes in the hook cover are not blocked and that the shoulder screws and the holders are not damaged. Regarding "The gap between the hook cover and the driver", see page 18.

Comments

The inside of the hook cover forms a support for the hook and the bridge above the finger of the bobbin case supports the thread, so that the thread loop is formed on the right side of the needle. The possibility of movement in the hook cover is a prerequisite to avoid unnecessary noise.



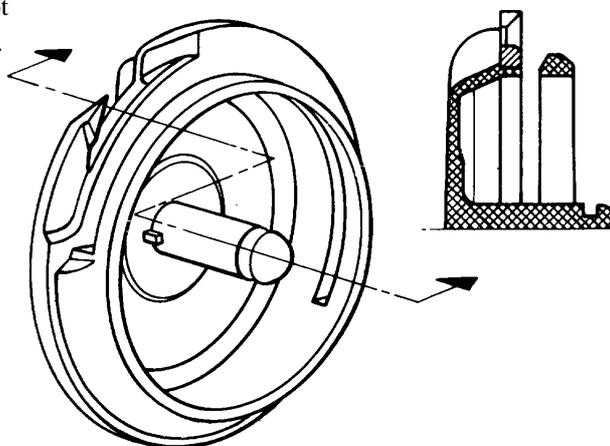
The hook

Requirements

The hook must not be damaged. Particular attention should be given to the tip, to ensure that it is not damaged or worn, causing burrs or unevenness.

Action

Exchange the damaged hook.



The driver

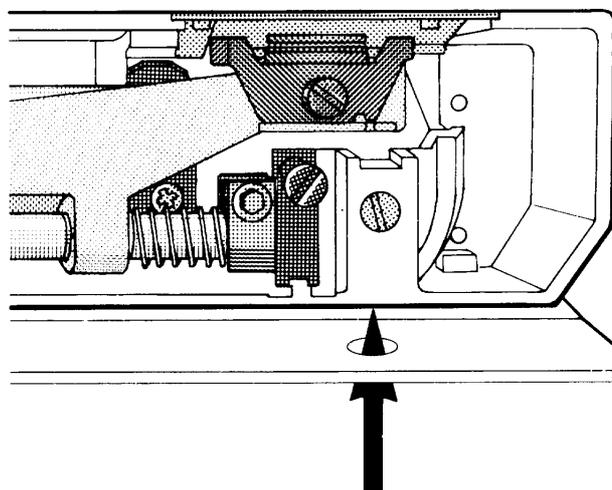
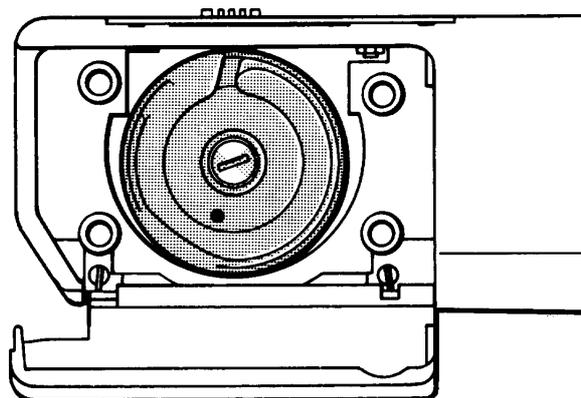
Requirements

The surface of the driver against the hook must not be damaged, worn or uneven in any way which might hinder the passage of the thread.

Action

The damaged driver unit should be exchanged. Turn the handwheel until the needle stops at the highest position. The slot in the driver is now in the middle, underneath the feed dog. Undo the four screws which hold the hook cover and hook. Undo the screw from underneath and exchange the driver unit. Note the position of the slot in the driver.

Thereafter "The play in the suttle gear" should be set according to page 16. "The gap between the hook cover and the driver" according to page 18. "The gap between the hook and the needle" according to page 19 and "Setting the timing of the hook in relation to the needle" according to page 20.



The foot control

Requirements

The speed should be continuously controllable from the lowest r/min to full speed.

The connecting plugs to both the wall socket and the terminal board must not be damaged or deformed.

Action

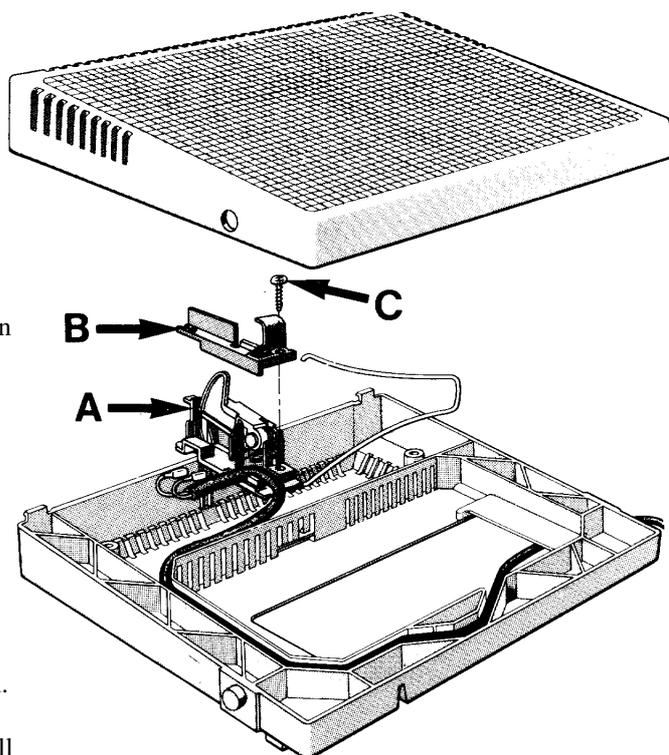
Test the foot control on a machine which is known to operate properly.

If a satisfactory result is not obtained exchange the faulty foot control. If the cable or plug are damaged, exchange the damaged part.

Dismantling

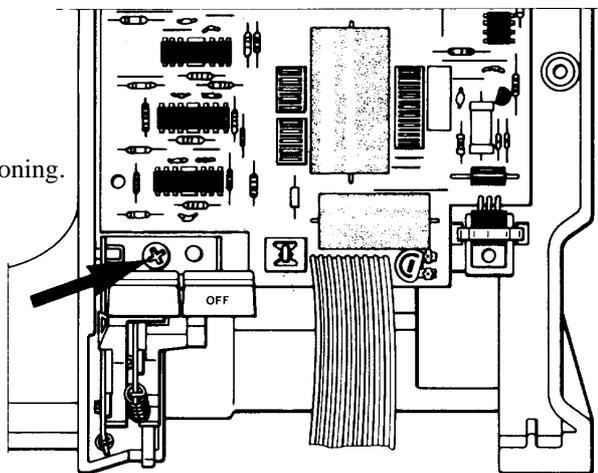
Turn the foot control upside down and insert a screwdriver between the sections. Bend the upper part outward until the pin is inside the wall. The bottom section can be removed from the top section. If the cord device is to be exchanged, pull the sleeves loose from the peg in the potentiometer A.

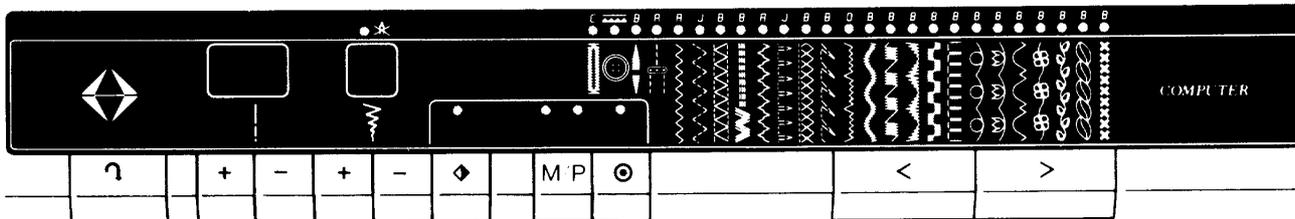
The potentiometer (A) and clamp (B) can be dismantled after undoing the screw (C).



The main switch and feed dip button

If the switch or the feed dip button does not function satisfactorily, remove the rear cover and front panel. See page 33-35. Then loosen the screw which holds the changeover switches in place and check the functioning. The push-button on the transformer unit shall connect the circuit when it is unloaded.





The use of electronics for service purposes

There is information stored in the circuit board which can be used as follows.

Before turning on the main switch, press buttons 1 and 3 (reverse feeding and minus for stitch length) and keep them depressed whilst the main switch is turned on. Run the machine one turn (calibration) and stop when the thread take-up lever is in the highest position. Check all the lights beneath the stitch symbols by pressing one of the pushbuttons bearing an arrow. Keep the pushbutton depressed and the lights will go on one after the other. If, however, you make pause in between, the indication will stop at one of the last lights. The lights for the other functions will then go on (e.g. mirroring, memory, etc.).

On some machines (e.g. 940, 950, 960) all elements in the numeric displays light up (8.8 and 8); on others the elements can be checked by setting 0 and 2.

On model 940, press the buttons one after another. The indication will then stop at button No. 16 when this or subsequent buttons are pressed.

Checking the top speed of the machine

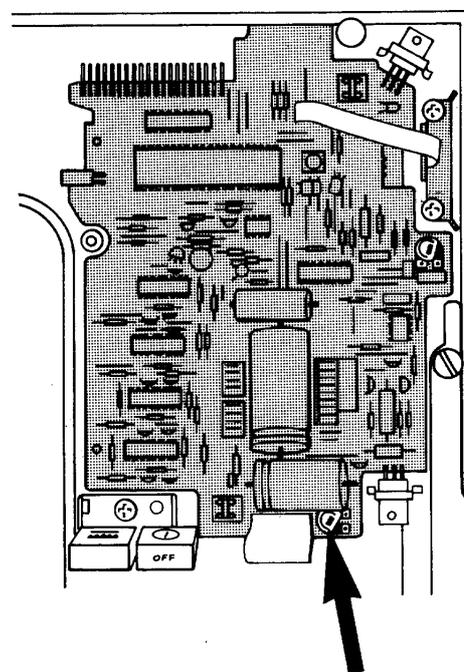
If the step motors shall reach their positions in time the machine must not run faster than a certain speed. This is adjustable and can be measured by engaging the service information, i.e. when the machine has run one turn after switching on and the indication has stopped at one of the last numbers. Depress the foot control and after 1 minute's running a light, according to the following table, shall go on:

Model	Light No.
940	7-9
950	4-8
960	7-9
975,980	without repeatable buttonhole 7 - 9
990	with repeatable buttonhole 4 - 8

Adjustment

Remove the rear cover plate and front panel, see page 33-35.

There is a potentiometer on the circuit board, close to the cable to the transformer. Turn the potentiometer until the correct indication is obtained after 1 minute's running with the foot control completely depressed.



The homing speed of the machine (lowest speed)

It is necessary that the homing speed (lowest speed) of the machine is correctly adjusted to ensure good start conditions and to enable the needle to always stop at its highest position and to be able to move it to the lowest position by means of the foot control. The homing speed is adjustable and can be measured as follows:

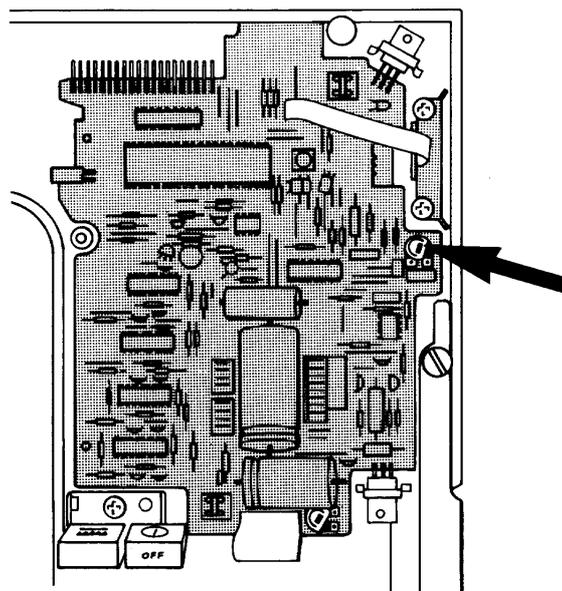
Engage the service information, i.e. press buttons 1 and 3 (reverse feeding and minus stitch length) and keep them depressed whilst the mainswitch is turned on. Repeat press until the stitch indication reaches one of the last lights with out letting the machine run (without calibration of the step motors). Then depress the foot control completely and let the machine run for 1 minute. Count the number of stitches during 15 seconds.

Requirements

The machine shall have a homing speed of 23-30 turns/15 seconds (90-120 turns/min).

Adjustment

Remove the rear cover plate and front panel (on model 960, the set of pushbuttons). See pages 33-35. There is a potentiometer on the circuit board under the cable to the light at the handwheel. Turn the potentiometer until the correct speed is obtained.



Setting instructions

The best results will be obtained if you make the settings in the following order when servicing.

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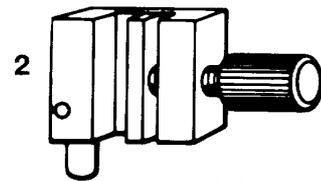
Setting ratings

A reasonable requirement in a domestic sewing machine is that it should be able to sew all types of fabrics used in the home. The settings made when assembling and sewing-in the machines are those most suited to give the best results in the majority of fabrics and fabric combinations. In doing so, consideration has been given to the requirements of different markets. This does, however, mean that when sewing extreme fabrics, better results may be obtained in certain cases by altering the settings. It must be pointed out that these altered settings can cause poorer results on more normal fabrics. How the different standard ratings are set can be seen from the description under each setting instruction. The following list of setting gauges and service tools is chiefly intended as an indication as to how service men or service workshops should be equipped.

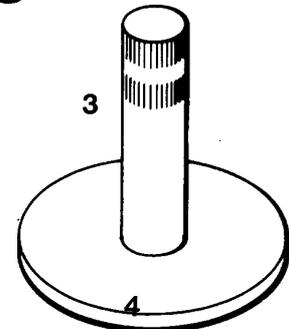
Setting gauges

1. The needle is often used as a setting gauge. The setting ratings are adapted to needle size 90 and when setting in the feeding direction, the needle should be set in the middle of the needle hole. Compare page 23. Be sure to use an undamaged needle.

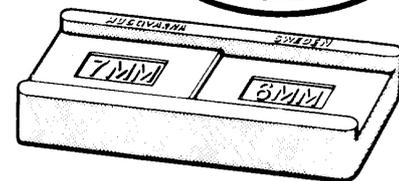
2. Gauge for the hook.
Ordering No 411 17 52-01.
Setting the timing of the hook in relation to the needle, see page 20.



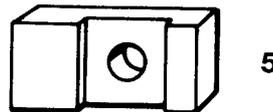
3. Gauge for the gap between the hook cover and driver. See page 18.
Ordering No. 411 16 49-01.
Gives the same values as gauge 41116 35-01 which has been discontinued.



4. Gauge for the presser bar. See page 22. Ordering No. 411 49 92-01.



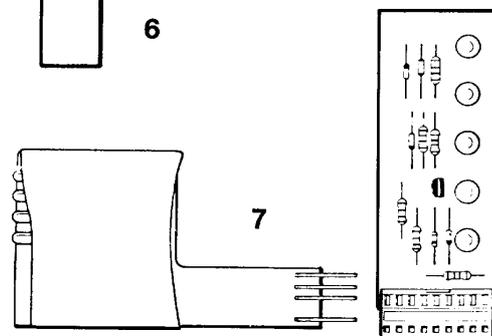
5. Gauge for the feed lift. See page 28.
Ordering No. 411 49 93-01.



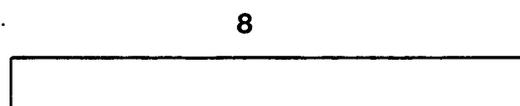
6. Weight for setting the lower thread tension. See page 26.
OrderingNo.4120084-01 24g
OrderingNo.4120083-01 22g



7. Electronic unit for testing the function of the transformer and step motors. See separate instructions enclosed.
Ordering No. 412 02 56-01.

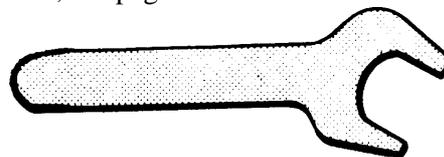


8. Feeler for setting the calibration gap of the step motors.
Ordering No. 412 15 92-01



Service tools

1. Adjustment key for the feed dog Ordering No: 411 86 63-01, see page 29.

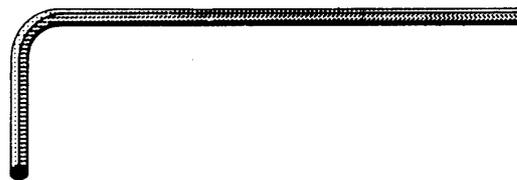


2. Adam key for:

- the needle clamp and step motor, 1.5 mm
Ordering No: 411 66 89-01

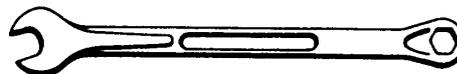
- the hook shaft, belt wheel and presser bar, 2.5 mm
Ordering No: 411 86 01

- for the feed lift and length, 3.0 mm
Ordering No: 411 86 93-01, see page 28.

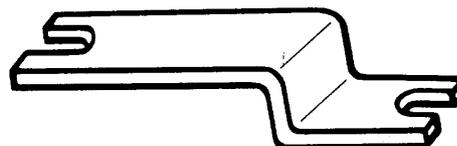


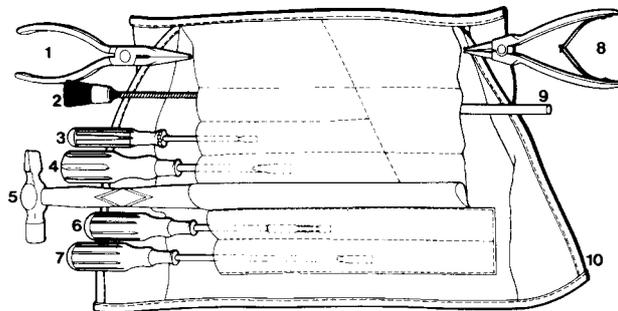
3. Fixed spanner for the stitch plate, 5 mm
Ordering No: 411 85 98-01, see page 23.

4. Fixed spanner for the belt tensioner, 10 mm
Ordering No: 411 85 99-01, see page 17.

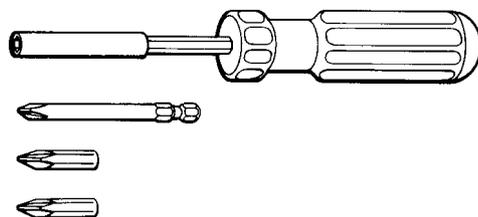


5. Special key for the needle bar frame
Ordering No: 411 67 32-01, see page 22.





These tools are not available any more from Husqvarna .



The arm shaft, axial play

Requirements

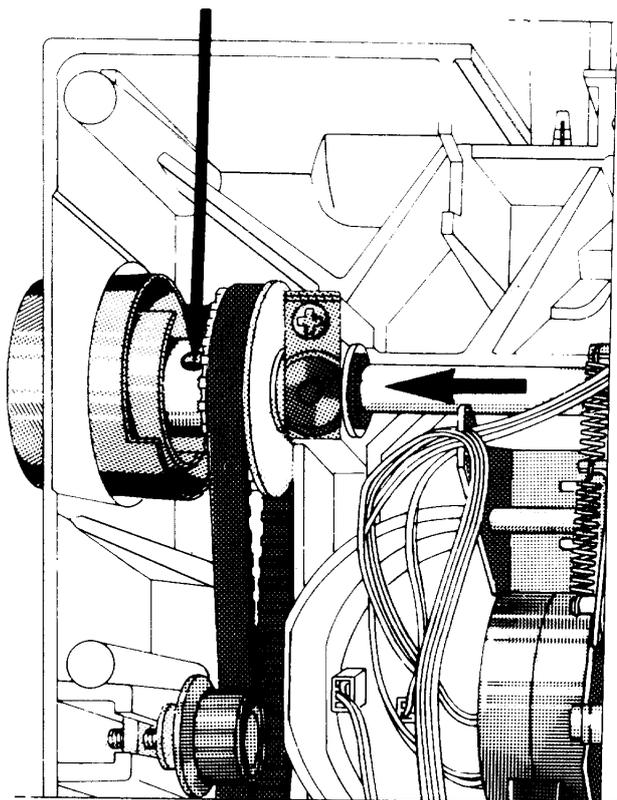
The axial journalling should enable the shaft to run freely during the whole turn and there should not be any axial play.

Adjustment

Remove the rear cover. The adjustment takes place at the rear bearing. Push the shaft with one hand in the direction of the arrow without turning it and push the belt wheel in the opposite direction. Then tighten to two screws. Check that the arm shaft runs freely during the whole turn and that there is no axial play. Finally, insert the tipped screw into a hole where it has not previously been inserted and let it make a new mark in the shaft with it. Replace the rear cover.

Comments

If the arm shaft is turned in relation to the belt wheel, the timing of the needle in relation to the hook will be affected. Check according to page 20.



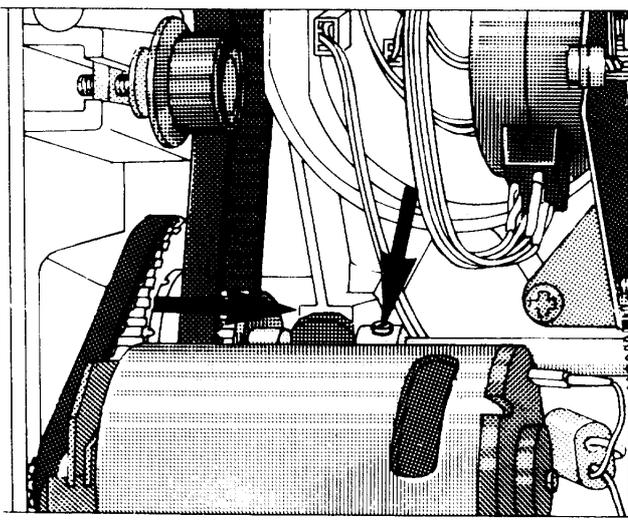
The lower shaft, axial play

Requirements

The axial journalling should enable the shaft to run freely during the whole turn and there should not be any axial play.

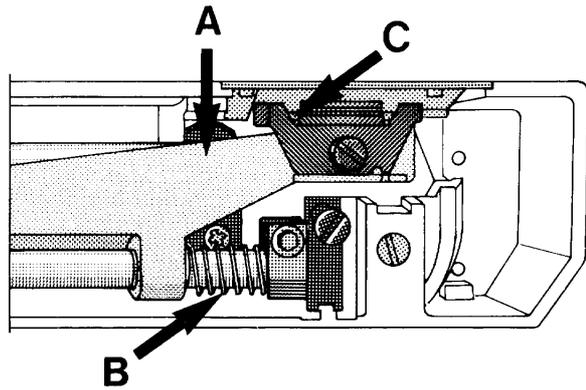
Adjustment

Remove the rear cover. The adjustment takes place at the rear bearing. Loosen the stop screws in the stop ring. Thereafter push the cog belt wheel in the direction of the arrow and the stop ring in the opposite direction. Then tighten the stop screws. Check that the lower shaft runs freely during the whole turn and that there is no axial play. Replace the rear cover.



Feed length arm

The feed dog supporting arm (A) is pressed against the rear bearing of the feed dog shaft by a spring (B). If the spring is unable to prevent the axial play exchange the spring.



The shaft for the feed dog

The position of the feed dog shaft (C) is determined by the adjusting plate. If there is axial play in the shaft, exchange the adjusting plate.

Comments

If there is axial play, the feed dog will move in the stitch plate perpendicularly to the feeding direction and may result in crooked feeding.

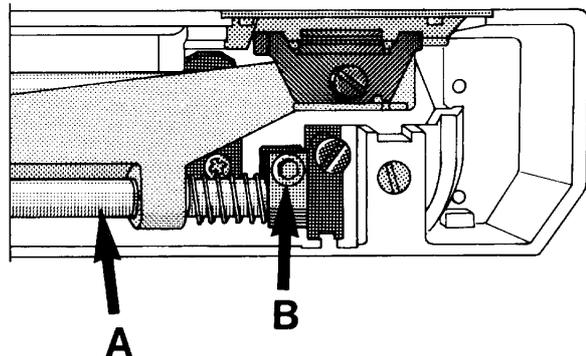
The shaft, the feed lift

Requirement

There shall be no play in the shaft of the feed movement (A).

Adjustment

The axial journalling occurs on both sides of the front bearing. Loosen the screw (B) and shift the crank on the shaft until there is no play. Tighten the screw.



Comments

If the crank is turned on the shaft the lift movement of the feed dog will be affected.

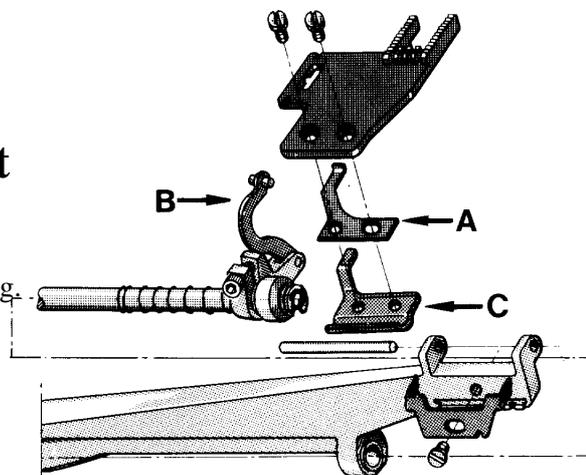
Leverarm, feed lift movement

Requirements

The spring (A) shall be strong enough to press the lever arm against the underneath of the feed dog.

Adjustment

Exchange the faulty spring. Insert a screwdriver under the clamp (C) to keep it in place and loosen the screws. The feed dog can now be removed and the spring exchanged.



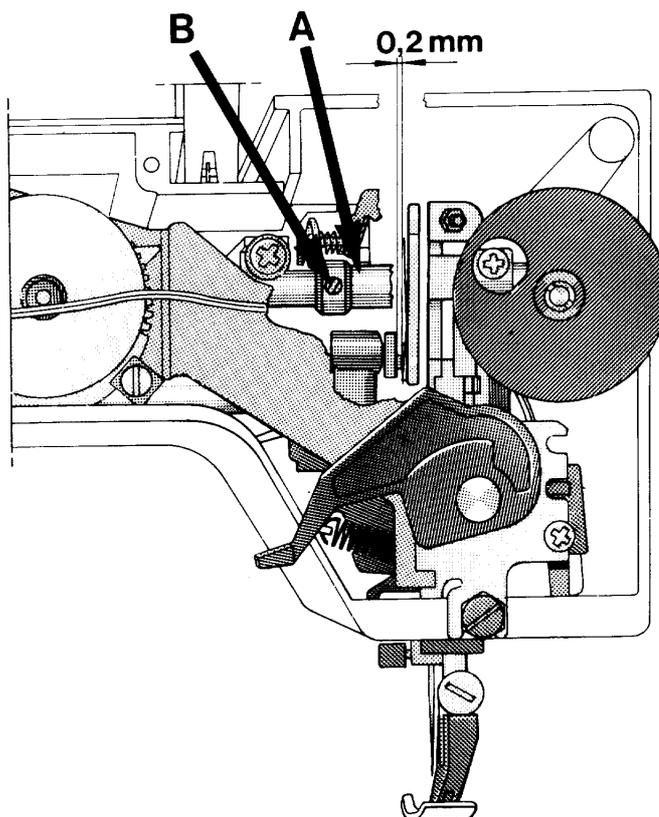
The journalling of the thread take-up lever, the crank stud

Requirements

The journalling of the guide arm (A) shall be in such a position as to allow a maximum play of 0.2 mm at the journalling of the thread take-up lever in the crank stud.

Adjustment

Loosen the screw (B) and shift the stop ring on the shaft until the required play is obtained. Check that the thread take-up lever runs in the middle of the slot at the front of the machine. Tighten the screw in the stop ring.



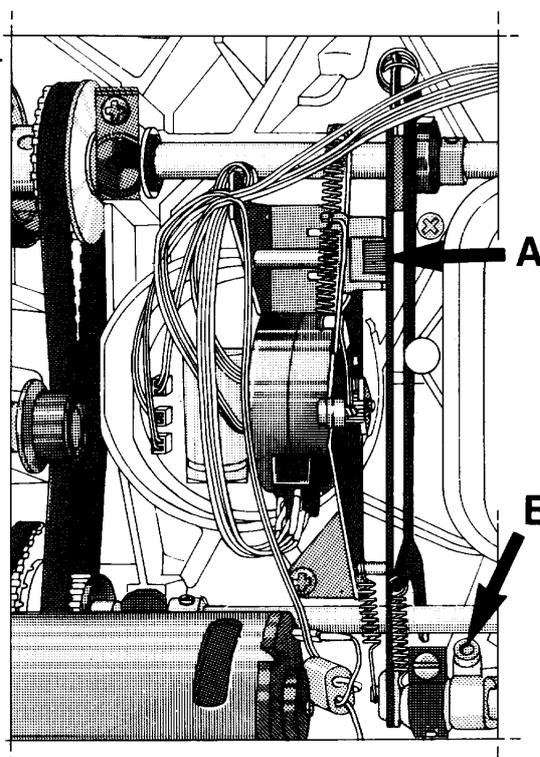
The guide and block, feed dog movement.

Requirements

The block (A) shall run freely in the guide journalling. The block is pressed against the bottom of the guide by a spring washer. The stitch regulating fork shall be parallel with the adjusting plate of the step motor and the crank shaft for the feed lift.

Adjustment

Loosen the screw (B) to the right above the rear bearing of the feed dog supporting arm by means of a 3 mm adam key and shift the fork sideways to the required position.



The hook gear

1. Tangential play

Requirements

Lock the handwheel and turn the driver forward and back again.

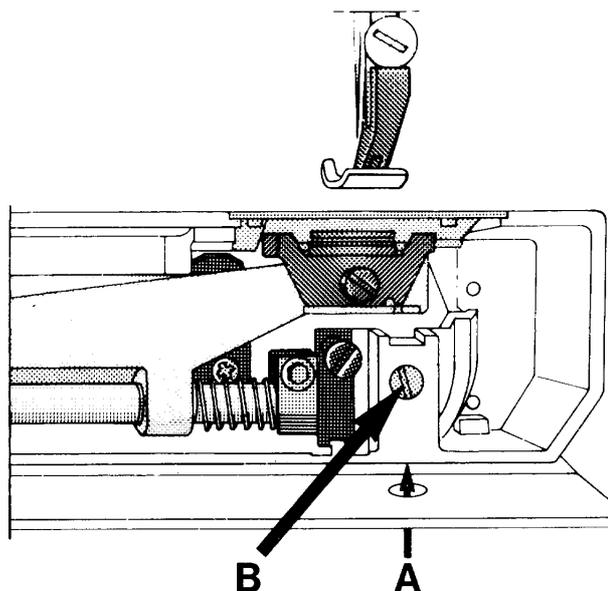
The gear must not be completely tight but the play should be as little as possible.

Adjustment

Remove the rear cover. Loosen the stop screw (A) from underneath and turn the shaft (B) until the required play is obtained.

Comments

The shaft is journalled eccentrically and must always be set so that the screwdriver slot is to the left of the centre of the hole (see illustration). The same play in the hook gear can be obtained by turning the shaft a half turn but the hook will then lay eccentrically in relation to the hook cover. The shaft is also shiftable. Check therefore that the gap between the hook cover and the driver has not been altered when adjusting according to the foregoing. See page 18.



II. Axial play

Requirements

Lift the driver with your finger tips out from the machine. There shall be no axial play in the gear.

Adjustment

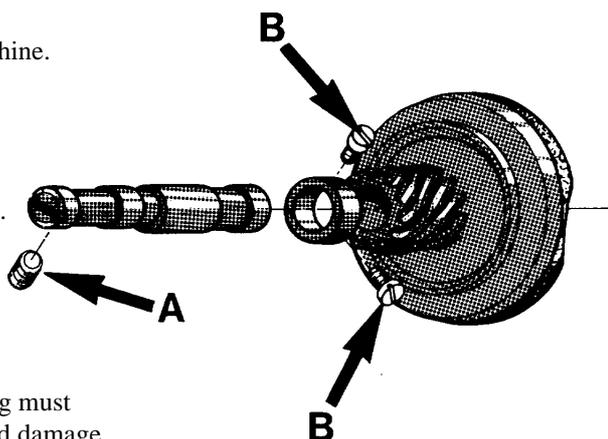
Remove the hook cover and hook. Loosen the stop screw (A) from underneath. Push the hook shaft out. Loosen the two screws (B) on the stop ring and shift it until there is no play. The journalling must not be so tight that sluggishness occurs. Check at the same time that the cog is not damaged.

Mount the shaft. Note that the screws on the stop ring must be turned downward when mounting in order to avoid damage to the worm screw. Set the tangential play according to I above and test run the machine. To set the gap between the hook cover and the driver, see page 18. Set the timing of the hook according to page 20.

Set the gap between the hook and the needle according to page 19.

Comments

It will be easier to set the tangential play if the position of the screwdriver slot in shaft B is noted before dismantling and the shaft is replaced in its original position.



The cog belt, short

Requirements

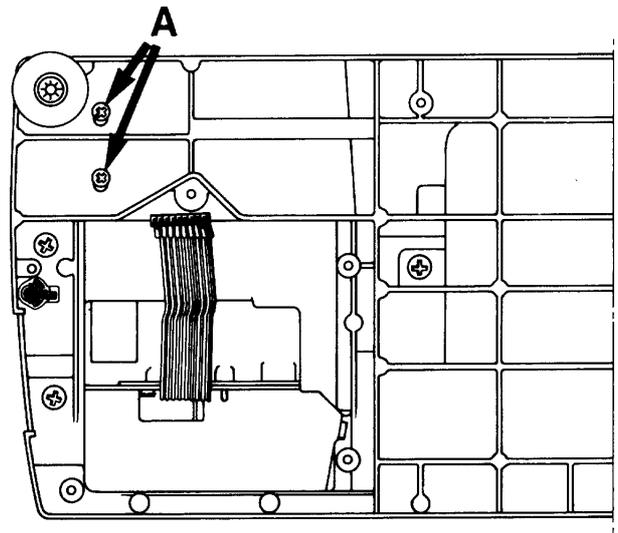
The belt tension should not be so loose that it permits slipping when the machine is locked and the foot control is depressed. A tighter tension makes more noise. The belt should not be damaged.

Adjustment

Undo both screws (A) underneath the base plate and shift the motor until the required tension is obtained. The motor shaft and lower shaft shall be parallel.

Comments

The motor is driven by direct current (DC) 24 V, hereby the demands on insulation clearance are not so stringent.



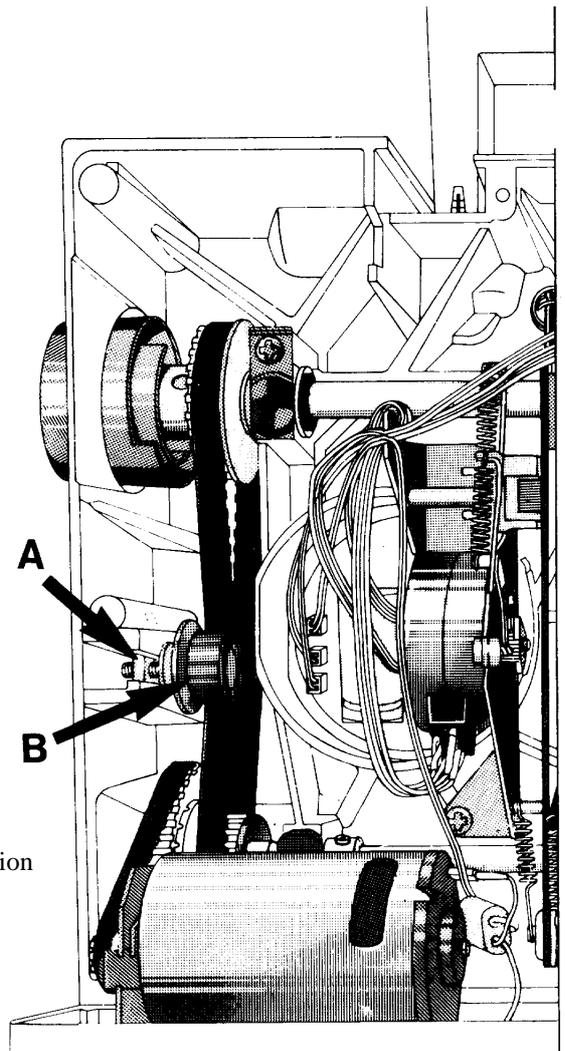
The cog belt, long

Requirements

The belt tension should not be so loose that it permits slipping when the machine is locked and the foot control is depressed. A tighter tension makes more noise. The belt should not be damaged.

Adjustment

Loosen the nut (A) at the side of the belt tension roller (B) by means of a 10 mm fixed spanner and shift the belt tension roller until the required tension is obtained. Tighten the nut.



The gap between the hook cover and the driver

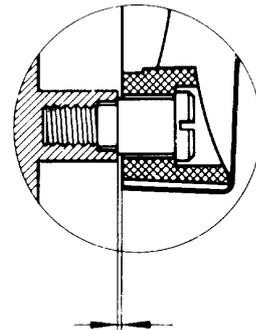
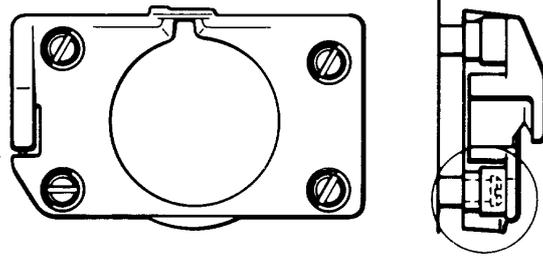
The hook cover is mounted on four fixed supports.

Requirement 1

The hook cover shall have both radial and axial play.

Comments

To enable the thread to pass on both sides of the hook, space is required between the hook cover and the driver. This space must be greater than the thickness of the hook.

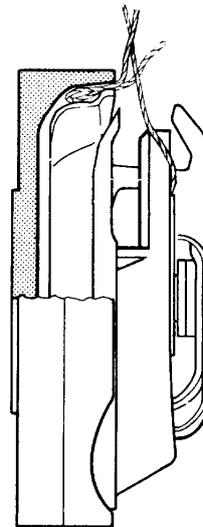


Requirement 2

The gap between the hook cover and the driver should be such that when the hook is exchanged for the hook clearance gauge 411 16 49-01 or 411 16 35-01, the gauge should have no play but can be turned.

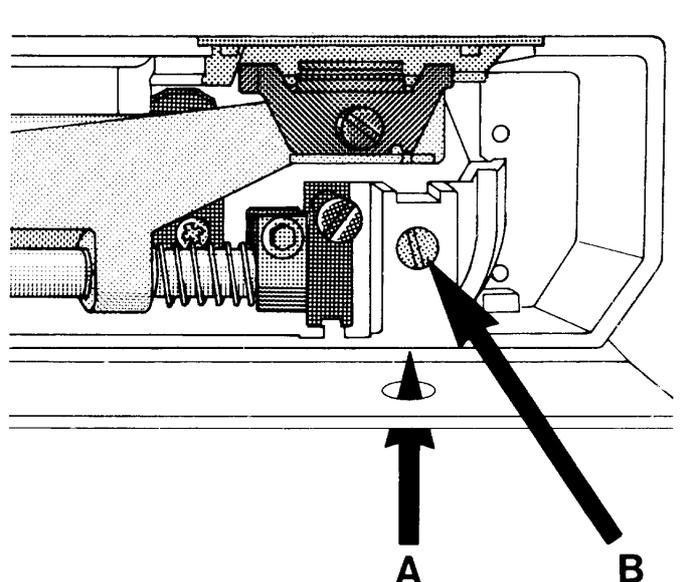
Adjustment

Undo the screws which hold the hook cover. Exchange the hook for the hook clearance gauge, as above, and replace the hook cover. Undo the screw (A), which is accessible through the hole in the base plate and shift the shaft (B), without turning, to the correct position. Tighten the screw. Reinsert the hook.



Comments

1. The shaft (B) is eccentrically mounted and if it is turned it will affect the play in the hook gear.
2. In addition check "The gap between the hook and the needle", see page 19.
3. The timing of the hook in relation to the needle is only slightly affected.



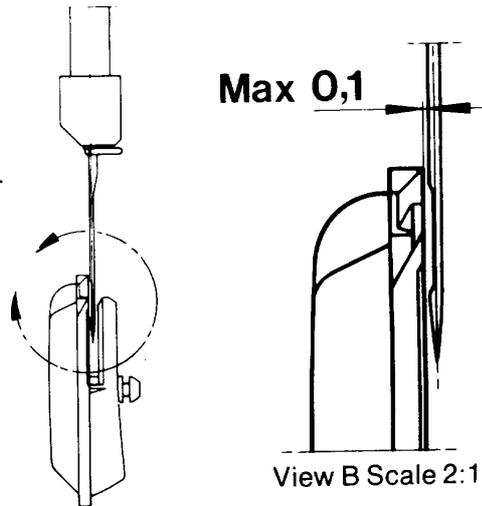
The gap between the hook and the needle

Requirements

Set the machine for straight stitching central position. Insert a new needle into the needle bar. Lay the back of the machine on the table. Turn the handwheel until the needle is in the position as shown in the illustration. Press the hook against the driver. The gap between the needle and the tip of the hook should be as small as possible.

Comments

The hook comes into contact with the needle at point P, fig 1, i.e. the part of the hook which is under the tip of the hook, the so-called needle support.



Setting the needle gap

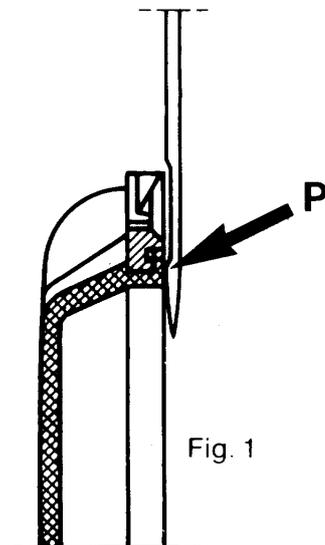


Fig. 1

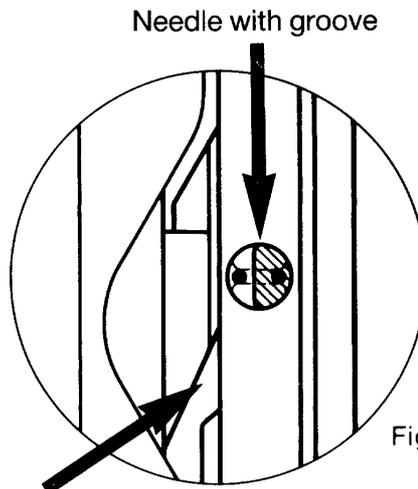


Fig. 2

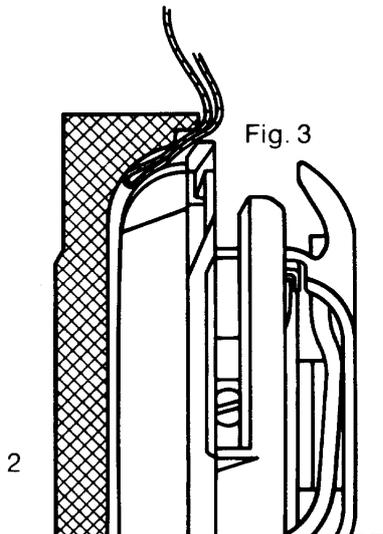
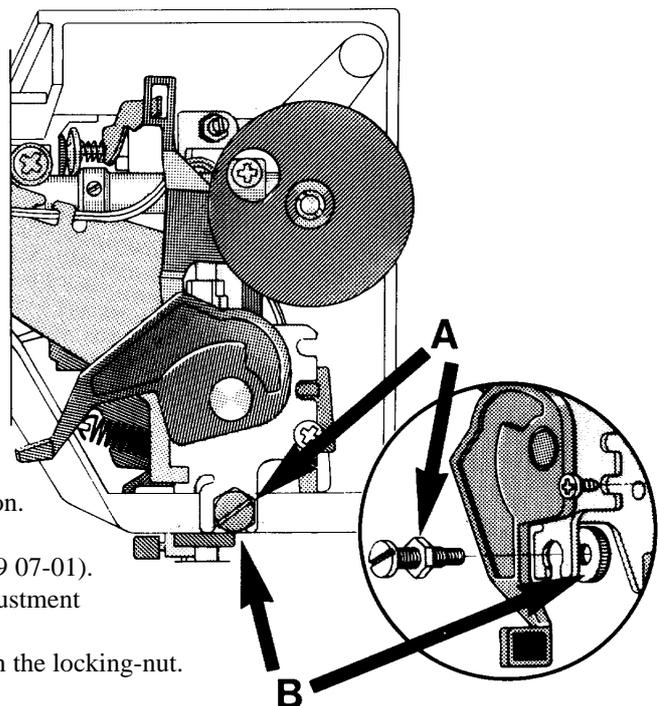


Fig. 3

To enable the thread loop to go between the hook and the driver, according to fig. 3, a certain axial play must be possible. Contact between needle and hook can therefore result and this causes a sound, which can be heard if the machine is running without thread. This contact damages neither the hook nor the needle, as long as a needle with a groove according to system 705 H is used. See fig. 2.

Adjustment

Setting according to Requirements. The position of the needle is adjusted by moving the sewing head in the feeding direction. Loosen the nut (A). Use a 10 mm fixed spanner (411 85 99-01) or box spanner (411 19 07-01). Shift the sewing head by turning the lower adjustment nut (B) until the required position is reached. Hold the adjustment nut in position and tighten the locking-nut.



Setting the timing of the hook in relation to the needle

Requirements

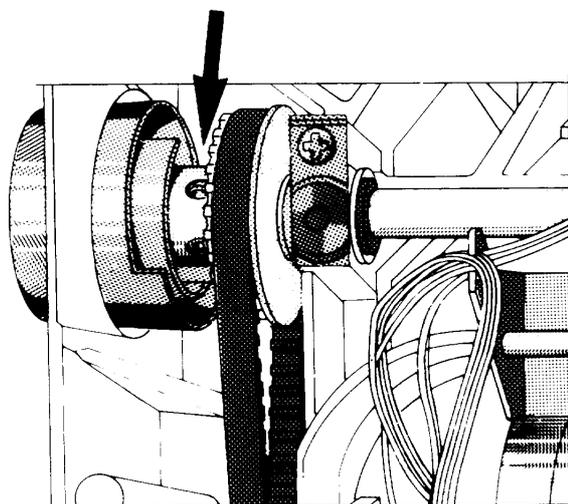
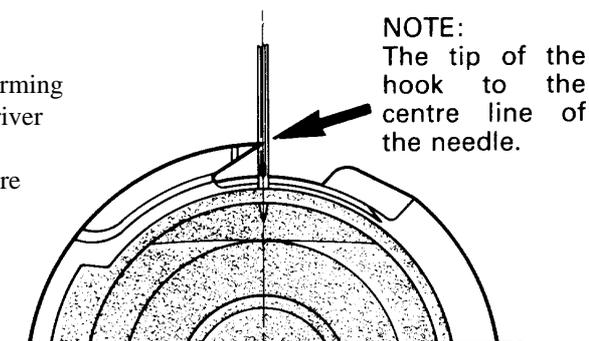
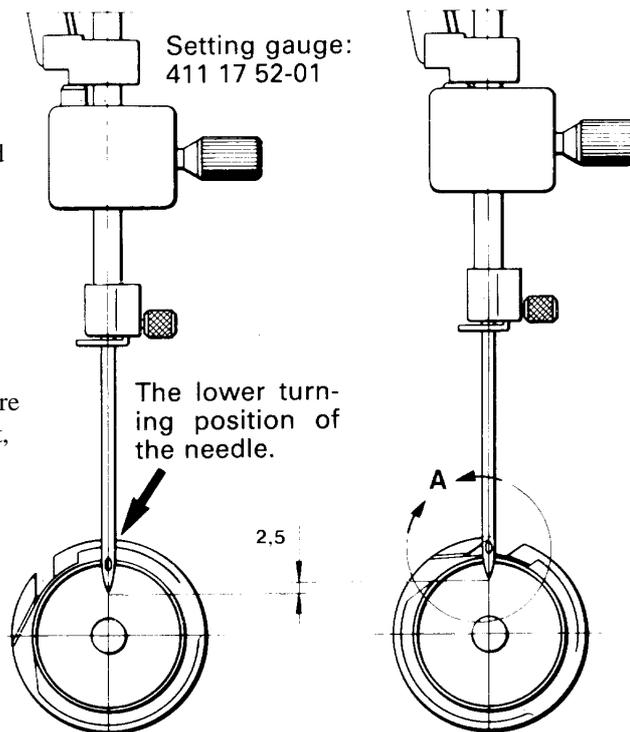
Set the stitch selector at straight stitching. As the needle is moving upward the tip of the hook should pass the centre of the needle when the needle is 2.5 mm above the lower turning position (the distance for forming the loop).

Adjustment

Remove the rear cover. To facilitate the access there are three set screws on the pulley on the arm shaft, one untreated and two black ones. Unscrew the untreated screw and one of the black ones completely, then loosen the other black screw so that the shaft is still transported when the handwheel is turned. Turn the handwheel until the needle is at the lower turning position. Place the setting gauge 411 1752-01 on the needle bar. Push the gauge up until the spring-loaded stud just touches the needle bar frame and tighten the screw. Remove the hook cover. Move the needle up by pulling the short cog belt in toward the machine until the springloaded stud rests against its stop in the gauge, according to the illustration to the right. The needle has now moved up 2.5 mm from the turning position (the distance for forming the loop). Hold the handwheel and turn the hook and driver by pulling the short cog belt in the same direction as before until the tip of the hook comes in front of the centre of the needle. Tighten one of the black screws. Turn the handwheel in the opposite direction until the needle returns to the lower turning position. Hold the hook back with one finger, so that it is pushed downward and backward and re-pull the short cog belt in toward the machine. When the stud of the setting gauge is once again resting against its stop, the tip of the hook should be in the centre of the needle. Make any necessary adjustment. When tightening the screws on the pulley, the untreated pointed screw should change places with the black screw that was unscrewed earlier. Replace the hook cover and rear cover.

Comments

By moving the needle all the time by means of the short cog belt, this will counteract any possible play between the long cog belt and the cog wheel.



The upper position of the needle bar

Requirements

Set the machine for zig-zag, right-hand position, and 6 mm stitch length. Move the needle by pulling the short cog belt in toward the machine.

When the tip of the hook reaches the centre line of the needle, the underneath of the tip should be in line with the top edge of the needle eye.

Comment I

The gap between the tip of the hook and the needle eye is influenced by the timing of the hook in relation to the needle. Therefore check the timing according to the previous page before making any adjustment.

Comment II

The gap between the tip of the hook and the needle eye, with the needle at the centre position (1.5 mm) is the starting measurement but as this is difficult to estimate, use the corresponding measurement with the needle at the right-hand position instead.

Adjustment

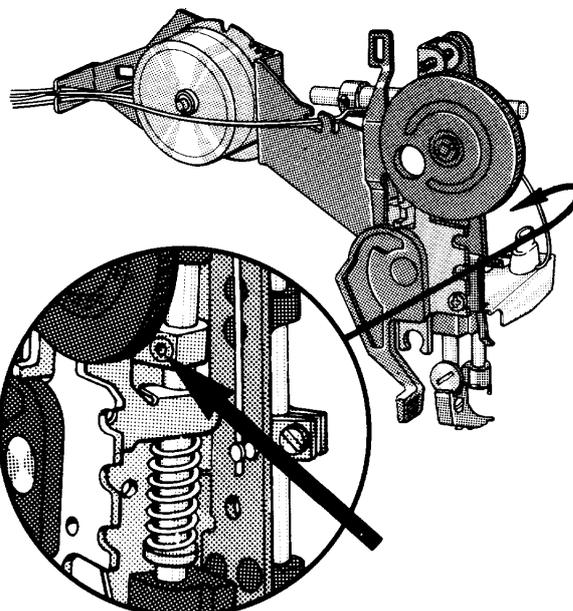
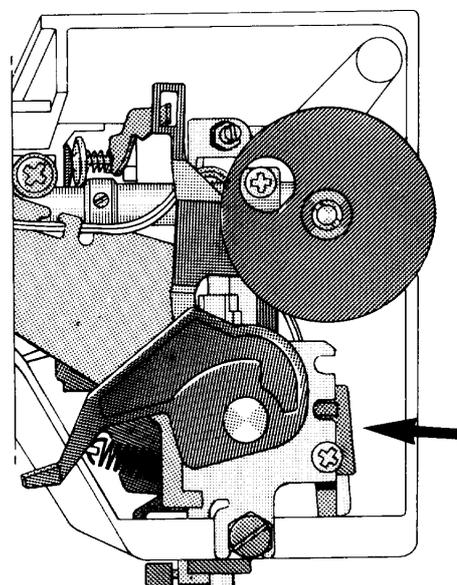
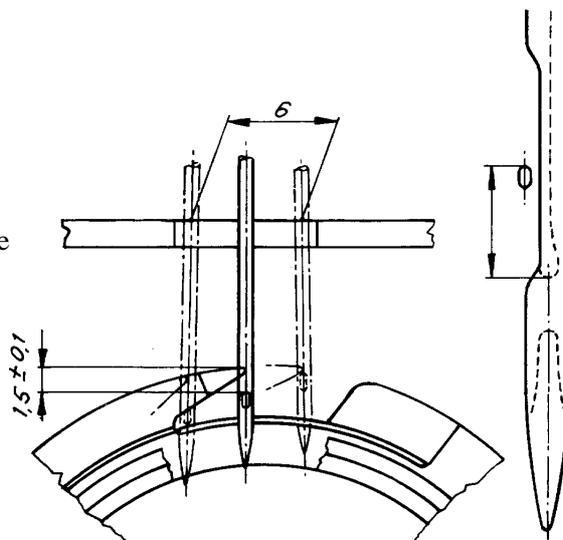
Set the machine for zig-zag, right-hand position. Turn the handwheel until the needle is at its lower turning position. Push the hook downward and hold it fast, so that the catch of the hook rests against the left side of the slot in the driver. Move the needle up by pulling the short cog belt in toward the machine until the tip of the hook reaches the centre of the needle.

Remove the light and loosen the screw.

Move the needle bar axially until the gap underneath the tip is in line with the top edge of the needle eye. Before tightening the screw, check that the needle eye is at right angles to the hook by fitting a twin needle and observing the needle positions in the needle hole of the stitch plate.

Comments

As the needle bar is made in the form of a tube, the screw must not be tightened too hard. There is a risk that the needle bar will be deformed and thereby move stiffly in its bearings.



The presser bar

Requirements

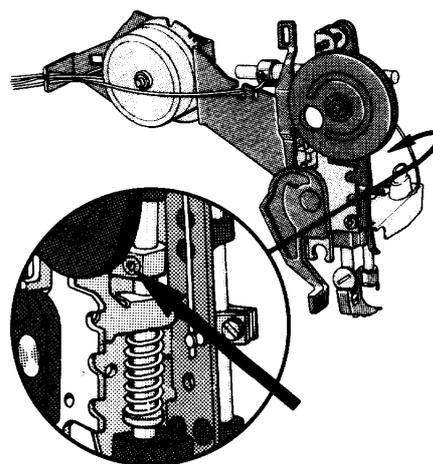
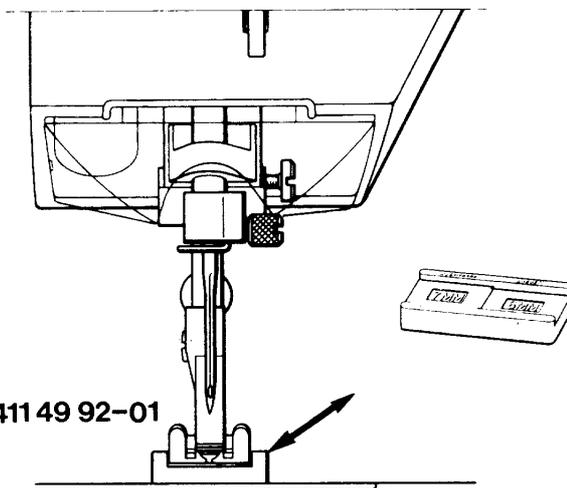
A. The presser bar should be set in such a way that the side of the presser foot is parallel to the marking lines on the stitch plate.

B. The lift of the presser bar should be 7 mm.

Adjustment

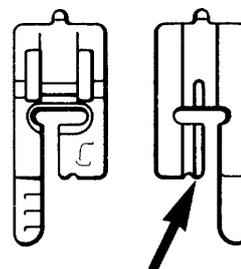
Lower the feed dog and insert the gauge 411 49 92-01 onto the stitch plate. Raise the presser bar lifter and fit the presser foot into the recess in the gauge. Loosen the screw in the presser bar guide. Use a 2.5 mm adam key (411 86 01 -01) and turn the presser bar so that the side of the gauge is parallel with the marking lines on the stitch plate. The play between the presser foot and the holder shall be equal on both sides. Press the presser bar downward and ensure that the guide rests against the curve in the presser bar lifter. Tighten the screw in the presser bar guide.

411 49 92-01



Comment

On the underneath of the buttonhole foot there is a guide, which steers the fabric. If the position of the presser bar is not correct in relation to the needle, the distance between the columns will be affected.



Needle bar

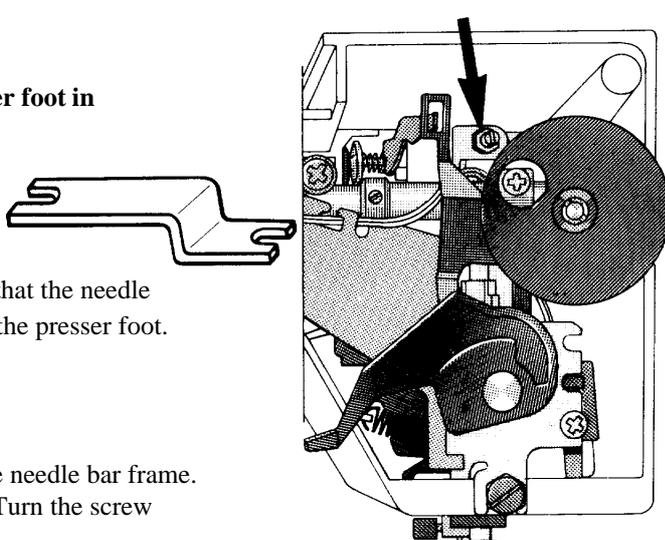
Setting the needle in relation to the presser foot in the feeding direction

Requirements

The needle bar should be set in such a way that the needle descends in the centre of the needle hole in the presser foot.

Adjustment

Loosen the nut at the screw for fastening the needle bar frame. Use the 7 mm special key (411 67 32-01). Turn the screw until the required centering is reached. Thereafter check the gap between the tip of the hook and the needle. See page 19.

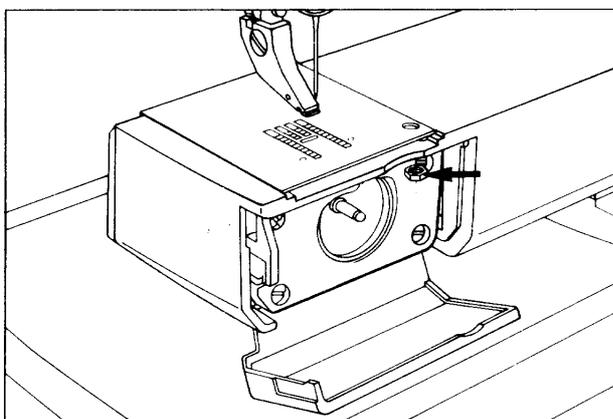
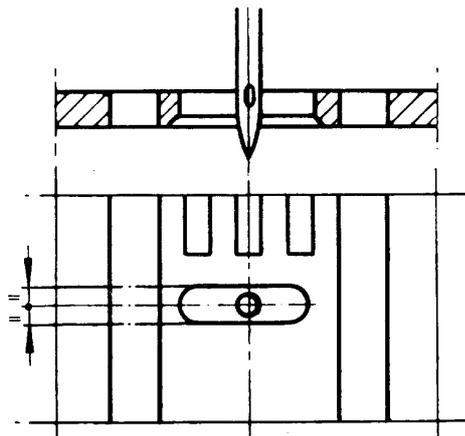


The stitch plate

Setting in the feeding direction in relation to the needle.

Requirements

The stitch plate must be centred in relation to the needle in the feeding direction. Give due consideration to the angled position of the needle in relation to the stitch plate.

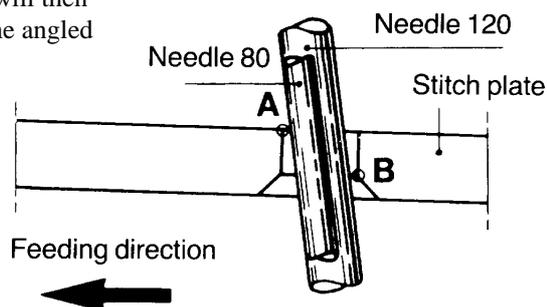


Adjustment

Adjust the stitch plate to the needle. Insert a new needle in the needle clamp. Loosen the nut on the underneath of the arm. Use a 5 mm fixed spanner (411 85 98-01). Adjust the stitch plate to the correct position. Fix and hold the stitch plate with your hand and tighten the nut.

Comments

The gap between the centre line of the needle and the flat part of the needle base varies with the thickness of the needle. To enable the needle (120) to move freely from the front edge of the underneath of the needle hole, set the stitch plate so that the needle (90) is between point A and B. Needle (80) will then lie slightly behind the centre of the needle hole. Note the angled position of the needle.

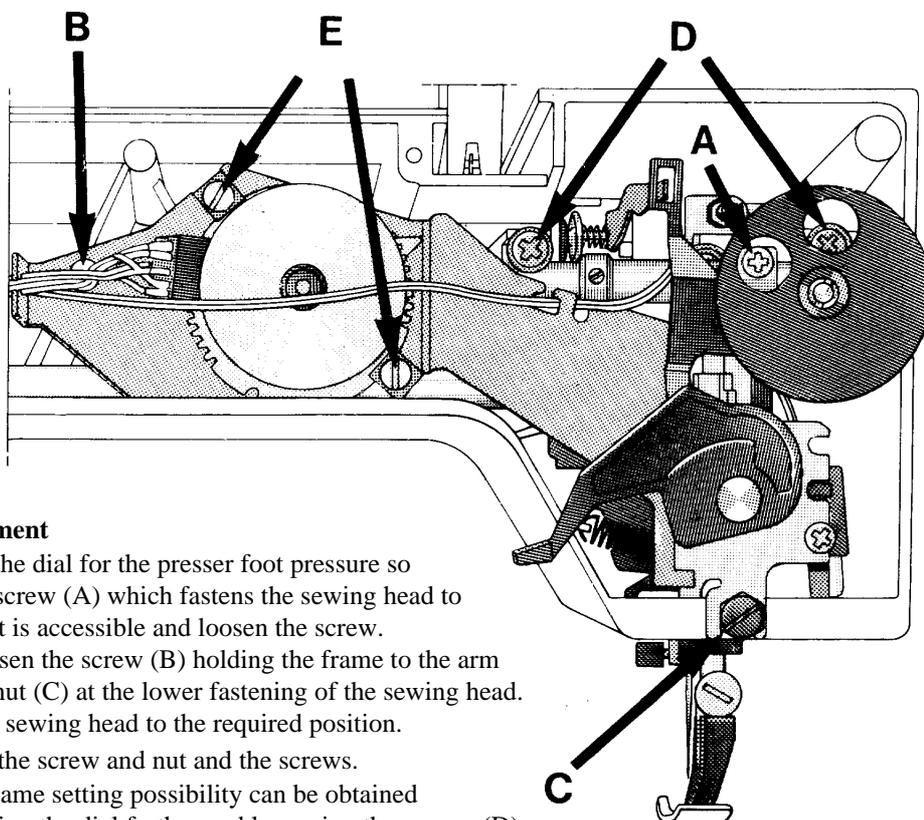


The sewing head

Setting the presser foot in relation to the stitch plate at right angles to the feeding direction.

Requirements

The sewing head should be set in such a way that the needle hole in the presser foot coincides with the needle hole in the stitch plate.



Adjustment

- I. Turn the dial for the presser foot pressure so that the screw (A) which fastens the sewing head to the shaft is accessible and loosen the screw. Also loosen the screw (B) holding the frame to the arm and the nut (C) at the lower fastening of the sewing head. Shift the sewing head to the required position. Tighten the screw and nut and the screws.
- II. The same setting possibility can be obtained by turning the dial further and loosening the screws (D) holding the shaft to the arm in stead of screw (A) and moving the sewing head with the step motor.

The centre and zig-zag positions of the needle

Setting the needle at right angles to the feeding direction.

Requirements

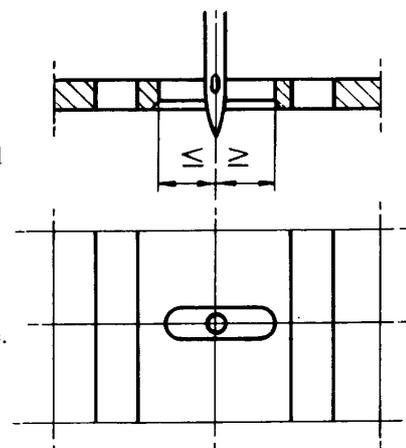
The zig-zag positions of the needle shall be symmetrically positioned in the needle hole and the centre position shall be in the middle of the needle hole in the stitch plate.

Adjustment

See illustration above. Turn on the main switch. Turn the handwheel twice. Loosen the two screws (E) which hold the step motor in place. Insert a screwdriver in the hole at the toothed part and turn the step motor until the centre position is reached. Tighten the fastening screws and check the zig-zag positions.

Comments

The sideways movement of the needle must be completed when the needle is about 6 mm above the level of the stitch plate. There is no possibility of adjustment.

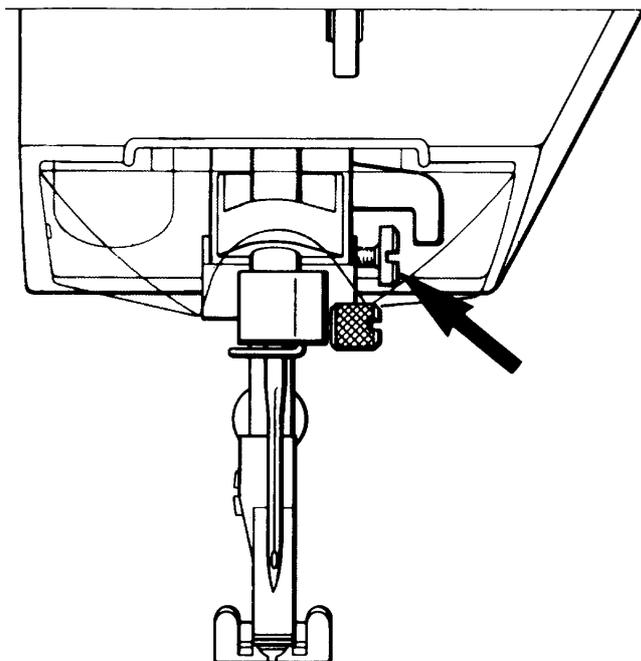


The stop, needle bar frame

The stop is U-shaped with limitations on both sides.

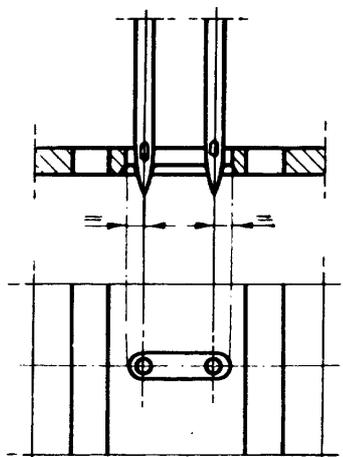
Requirements

The stop for the needle bar frame shall be set in such a way that the needle bar frame does not touch the stop when in any of the outer zig-zag positions. Please note that only very light pressure may be applied to the needle bar frame.



Adjustment

Switch on the main switch and set the machine for maximum zig-zag width.
Turn the handwheel two turns and set the needle at the lowest position.
Lightly press the needle bar frame to one side. Then turn the screw until there is a little play.
Check at the other side.



The thread tension of the bobbin case

Requirements

The thread tension spring of the bobbin case shall give a thread resistance of 18-22 g (0.55-0.70 ozs) when pulling the thread slowly.

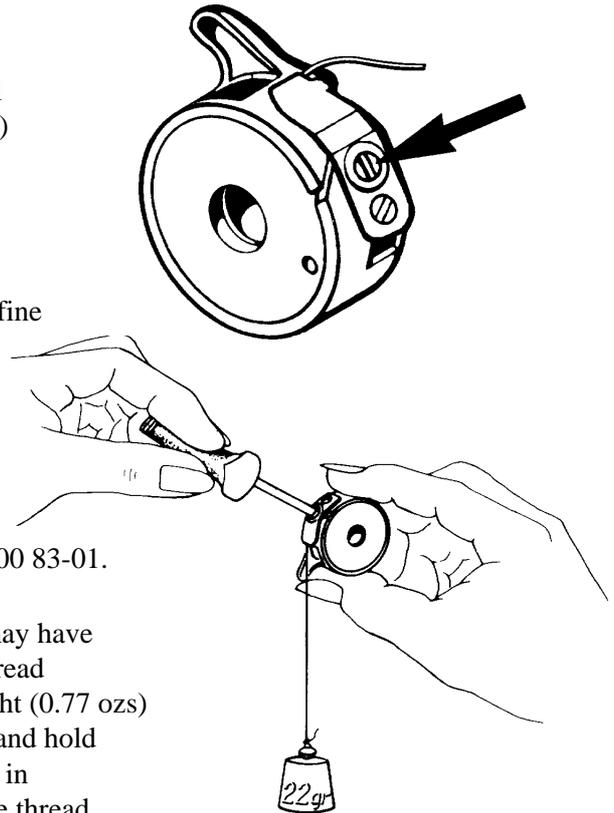
Comments

The rating of the lower thread tension has been lowered several times to reduce the tendency for fine fabrics to pucker. Machines manufactured before Autumn 1985 were set at 20-24 g (0.70-0.85 ozs) but the rating was subsequently changed to 18-22 g (0.55-0.70 ozs). Both the older and new machines should be set at the new rating.

A 22 g weight can be ordered, Ordering No. 412 00 83-01.

Adjustment

Remove any loose pieces of thread or fluff that may have collected under the thread tension spring. The thread tension can be tested by using a 22 g testing weight (0.77 ozs) (412 00 84-01). Attach the thread to the weight and hold the bobbin case, letting the thread hang vertically in the direction of the bobbin case finger. When the thread tension is correctly set, the weight of the testing weight should pull the thread slowly from the bobbin case. Adjust the thread tension by means of the screw.



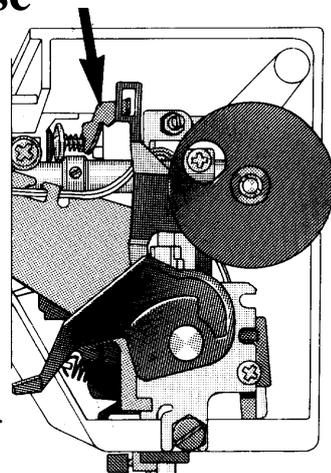
The lever- The thread tension release

Requirements

The lever, which gets its impulse from the presser bar lifter, should disengage the thread tension discs, via the release arm, when the presser bar is lifted but must not touch the release arm when the presser bar is lowered.

Adjustment

Lower the presser bar lifter. Apply pressure to the upper part of the lever until the release arm is freed and there is a gap of approx. 0.5 mm between the release arm and the hole in the lever.



Thread tension magnet

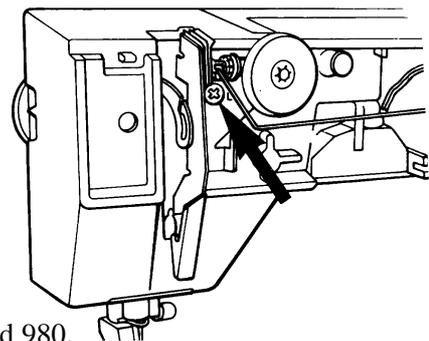
Models 960, 980 and 990

Requirements

The thread tension magnet shall reduce the thread tension when changing from straight stitching to buttonholing.

Adjustment

Exchange the faulty thread tension magnet on models 960 and 980.
Exchange the circuit board on model 960.



Setting the thread tension dial

Requirements

When the white dot on the thread tension dial is in the middle of the index on the front panel, you should have the right thread tension for proper thread take-up for normal sewing.

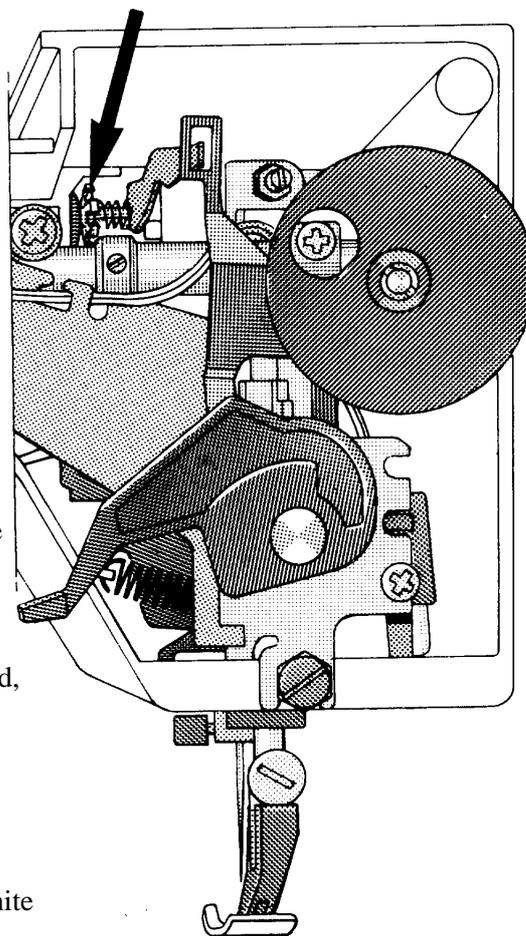
Adjustment

Remove the rear cover. At the side of the thread tension knob there is a cogged nut, which determines the setting of the thread tension spring. This is accessible from the rear by means of a screwdriver.

Set the thread tension dial with the white dot right above the shaft. When test sewing with normal fabric and thread, turn the cogged nut until the correct take-up is obtained for straight stitching and zig-zag.

Comments

The thread tension you have when the dial is set at the white dot should only be regarded as a general indication. When sewing fabrics which are not of normal quality, and if absolutely perfect stitching is necessary, the thread tension should be adjusted accordingly.



The thread take-up spring

Requirements

Thread take-up spring (A) should be able to move freely in the slot of the adjustment casing and be strong enough to take up the thread.

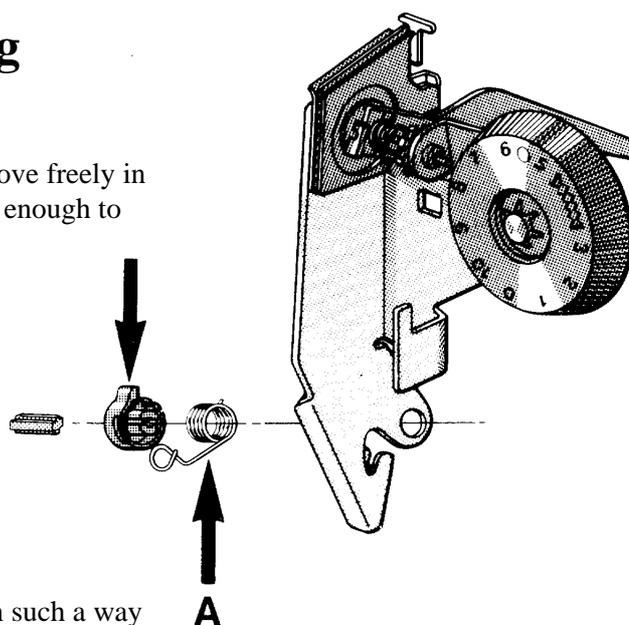
The adjustment casing

Adjustment

Exchange the damaged take up spring.
See page 37.

Requirements

The casing covering the spring should be set in such a way that the thread take-up spring has finished its movement when the needle eye reaches the fabric, after a completed stitch. Check by sewing on a fine fabric.



The feed dog setting

A. The position of the feed dog in relation to the grooves in the stitch plate.

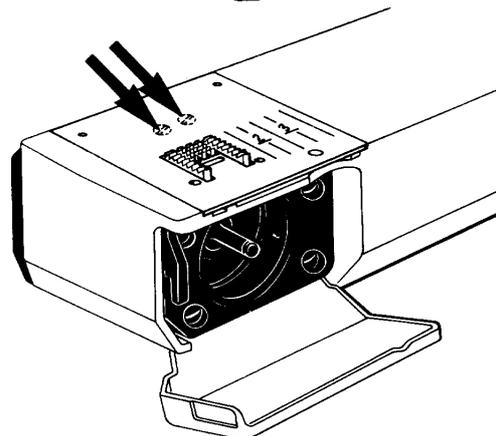
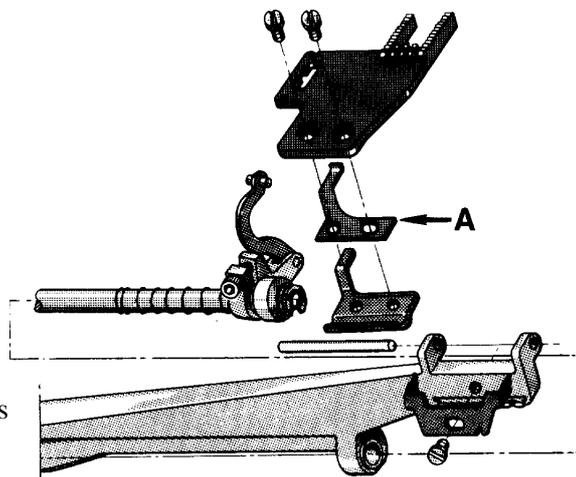
Check the spring (A) on the underneath of the feed dog at the link.

Requirements

The feed dog should be parallel with the grooves in the stitch plate.

Adjustment

Turn the handwheel until the feed dog is in its highest position. Remove the stitch plate and loosen the screws which hold the feed dog, fit the stitch plate into place and adjust the feed dog until it lies parallel with the grooves in the stitch plate. Then remove the stitch plate without moving the feed dog. Tighten the screws and check that the feed dog is positioned correctly in the stitch plate.



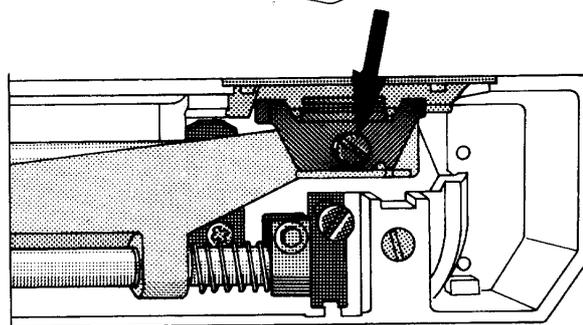
B. The sideways setting of the feed dog

Requirements

The feed dog should move freely in the grooves of the stitch plate.

Adjustment

Loosen the screw (1 0/36) in the transistor clip which holds the shaft of the feed dog and shift the feed dog until it ceases to touch the stitch plate. Tighten the screw.



C. The feed dog lift

Requirements

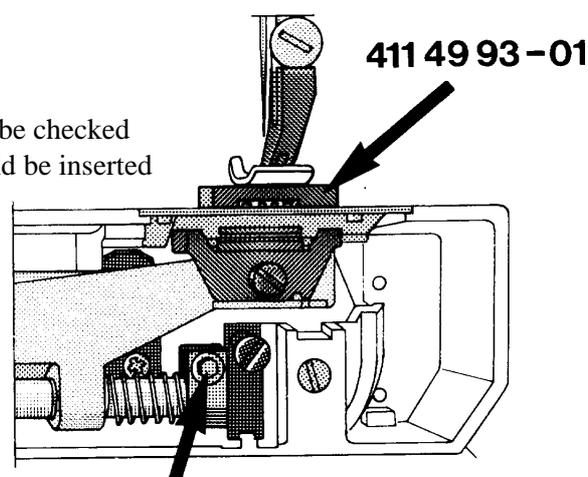
The height of the feed dog above the stitch plate can be checked by means of setting gauge 411 49 9301, which should be inserted under the presser foot. Set the machine for sewing buttonholes. Switch on the main switch. Turn the handwheel two turns until the feed dog reaches its highest position. The teeth of the feed dog shall be in contact with the gauge.

Adjustment

Set the machine for sewing buttonholes. Turn the handwheel two turns and find the highest position of the feed dog. Loosen the screw (1 0/38) on the crank at the front bearing of the feed dog shaft and set it so that the teeth of the feed dog are in contact with the setting gauge. Tighten the screw. Check the feed dog lift.

Comment

The setting gauge 411 49 93-01 will give a feed dog lift of 1 mm.

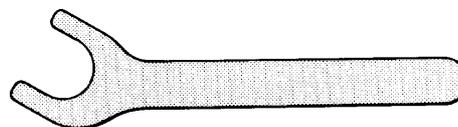
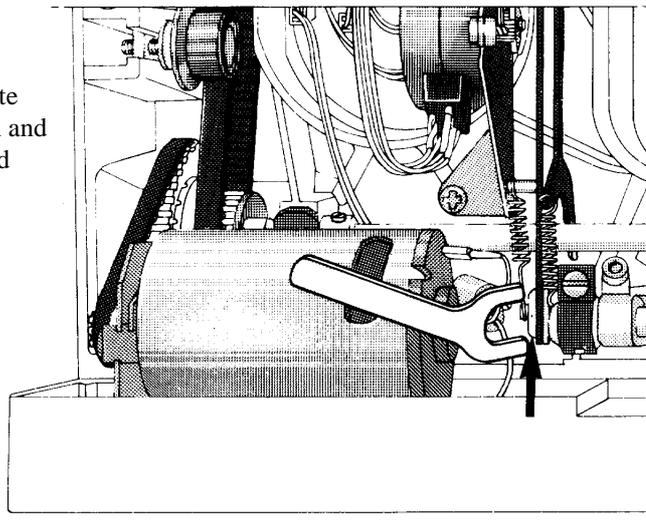


D. The lengthwise movement of the feed dog

The feed dog must not strike against the stitch plate when the machine is set at maximum stitch length and running at maximum speed, neither when forward feeding nor reverse feeding.

Adjustment

Set the machine for sewing buttonholes. Turn the handwheel two turns and find the highest position of the feed dog. Use the special key 411 86 63-01 and turn the eccentric bushing at the bottom fastening of the stitch regulating fork (8/20), so that the feed dog is in the centre of the grooves in the stitch plate. Check according to Requirements. Check the ratio between forward and reverse feeding.



411 86 63-01

Comments

If the feed dog is set as far front as possible, the machine will have a better chance to start sewing a seam at the edge of the fabric.

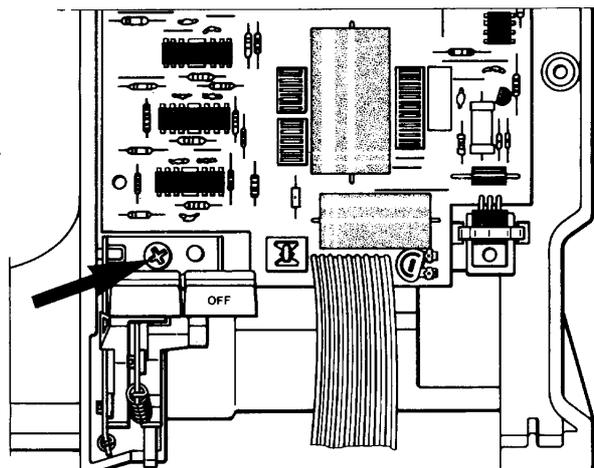
E. The feed dip

Requirements

The rocker shall be able to engage and disengage the feed dog and indicate in both positions.

Adjustment

If functioning faultily, exchange the whole unit. Unscrew the screw and lift out the unit from the front.



Setting the stitch length

Likeness, balance between forward and reverse feeding when sewing buttonholes, pattern (trimotion) stitches and letters.

Requirements

- A.** Both the columns should be sewn with the a stitch density making them to look identical.
- B.** The machine shall sew patterns and letters that correspond to that indicated by the symbols and the needle shall return to the same hole when sewing trimotion stitches.

Check

Use the thread supplied with the machine and fine woven cotton fabric. Before turning on the main switch, press buttons 1 and 3 (reverse feeding and minus foot stitch length) and keep them depressed whilst the main switch is turned on. Run the machine one turn (calibration).

Set the various machines according to the following table

Model	Setting	Stich
940,960	15	Blanket stitch
975,980 E		
980 without repeatable buttonholes	Next last stitch to the right	
950,980with repeatable	Buttonhole. Press the finishing button	
990	holes off button	

Depress the foot control. The machine will sew a button hole with 40 stitches in each column. some machines will not sew the bars.

Requirements

940,950,960

Right-hand column max. 2 stitches shorter than the left-hand column.

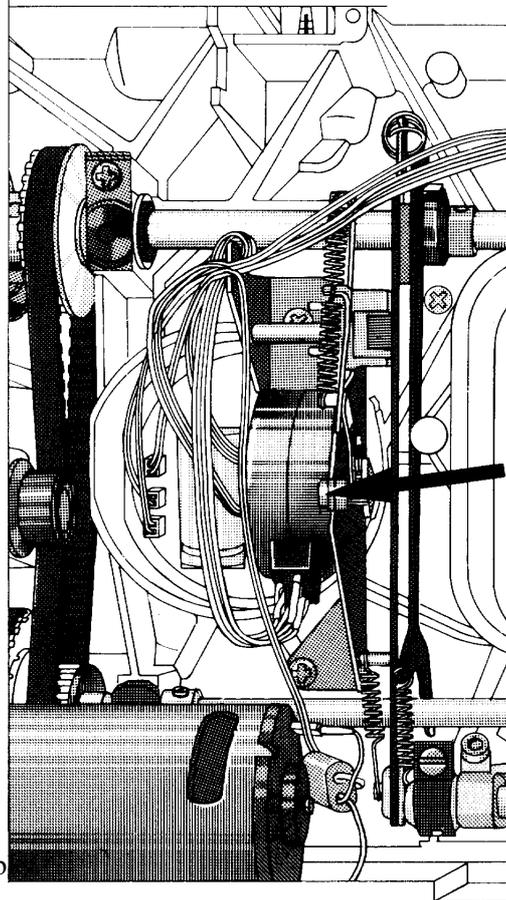
Right-hand column max. 8 stitches longer than the left-hand column.

980,990

Right-hand column 2 -1 0 stitches longer than the left-hand column.

Adjustment

Loosen the screw which holds the step motor for the fee movement against the fastening plate. Insert a screwdriver in the groove at the toothed part and turn the step motor until the requirements are met. Then check the buttonhole balance and on models 980 and 990 letters DT8 and ABQ. Make any necessary adjustments.



The bobbin-winding device

Limiting when bobbin-winding

Requirements

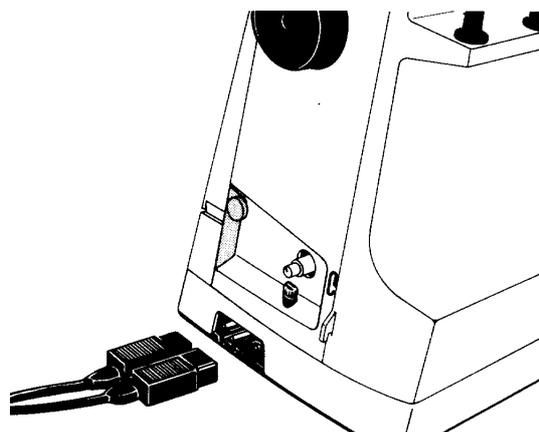
When bobbin-winding, the machine shall stop when the bobbin is full, with the thread up to approx. 1 mm from the edge of the bobbin.

Adjustment

The amount of thread can be adjusted by means of the pulley (4/28) under the bobbin spindle.

Comments

If the amount of thread is reduced too much, the machine does not start sewing.



Pre-setting of the step motors

Regarding dismantling and mounting of the step motor units, see pages 38 and 40.

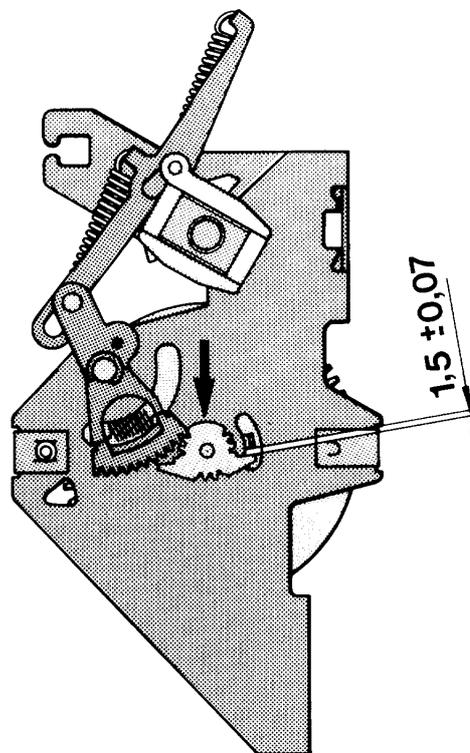
A. Control of the feeding movement

Dismount the stepmotor but connect the flat cable to the printed circuit. Ensure that the cable of the step motor is correctly connected according to the wiring diagram on the inside of the printed circuit. Loosen the screw in the driving wheel enough to enable it to be turned on its shaft. Use Adam key 411 66 89-01 (1.5 mm). Connect the machine and turn on the main switch. Press the push-button for straight stitching and set at maximum stitch length 6.0 mm.

Turn the handwheel 2-3 turns and stop with the needle in the lowest position. The step motor will then find its electric starting point.

Hold the driving side of the step motor toward you and insert a 1.5 mm feeler gauge between the left side of the stop and the stop of the cog wheel (see illustration).

Retain some axial play in the cog wheel and tighten the stop screw well but not excessively. By pressing the reverse feeding button the segment will move to the other side. Turn the main switch on and off repeatedly. Ensure that the step motor is in a stable position at 2.5 mm stitch length.



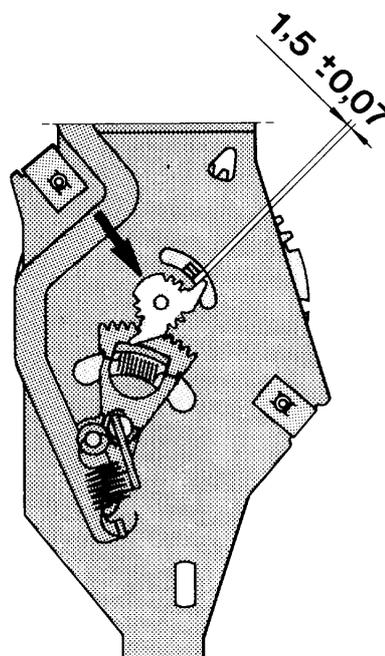
B. The movement of the needle bar frame(zig-zag movement)

Dismount the stepmotor but connect the flat cable to the printed circuit. Ensure that the cable of the step motor is correctly connected according to the wiring diagram on the inside of the printed circuit. Loosen the screw in the driving wheel enough to enable it to be turned on its shaft. Connect the machine and turn on the main switch. Press the push-button for changing the stitch width to maximum stitch width 6 mm.

Turn the handwheel 2-3 turns and stop with the feed dog in the highest position. The step motor will then find its electric starting point, i.e. the needle is in the left-hand zig-zag position.

Hold the driving side of the step motor toward you and insert a 1.5 mm feeler gauge between the left side of the stop and the stop of the cog wheel (see illustration).

Retain some axial play in the cog wheel and tighten the stop screw well but not excessively. Press the mirroring push-button. The segment will move to the right-hand zig-zag position (the right-hand zig-zag position of the needle). Turn the main switch on and off repeatedly. Ensure that the step motor is stable in the centre position.



Comments

Due to the limited setting tolerances a good quality feeler gauge must be used.
Ordering No. 412 15 92-01.

Dismantling and mounting instructions

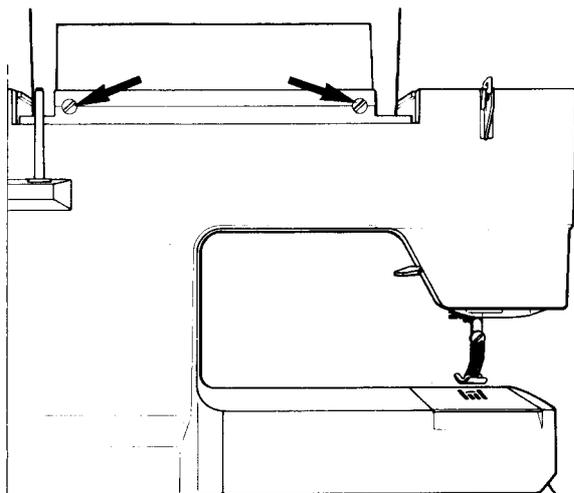
Contents	See page
Rearcover	33
Front panel	33-35
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Opto-coupler	36
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Thread tension device	37
Main switch	37
Feed dip button	37
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Rearcover

Dismounting

The rear cover is held in place by two screws, which are visible when the handle is lifted. Undo both the screws, insert a screwdriver from the side by the recess for the handle and carefully push out the upper edge from both sides. At the same time push the cover upward.

The cover on the free-arm can be released by pushing it forward at the same time as the front part is eased outward. There is a recess in the lower part intended for the insertion of a screwdriver when it is necessary to ease the cover outward. Do not undo the screw. It holds the clamp for the rear bearing of the feed lift shaft.



Mounting

First mount the free-arm cover by pushing it in a longitudinal direction into the mount under the screw.

Start by pushing the rear cover in the mount on the lower part of the arm head. Press the cover against the arm, making sure that the four other mounts are correctly positioned and that the upper edge is under the upper wall. Check that the wall at the motor cover slides down into the recess of the base plate. Tighten the screws in the upper front.

Front panel

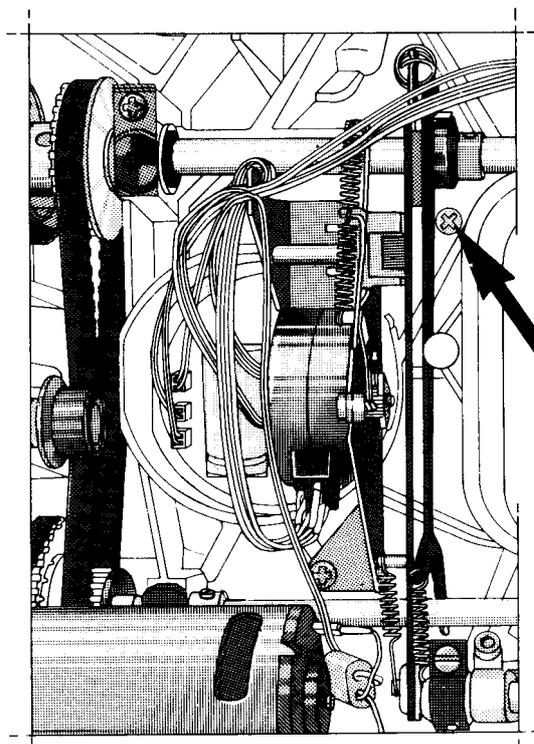
I Model 940 and 960

Dismounting

First dismount the rear cover. Remove the screw that is seen under the feeding eccentric. Remove the light guard. Lift the front panel upward.

Mounting

Check that the metal clip for the fixing screw is in place correctly and pushed against its stop. Put the front panel in place - ensuring that the three fastening points are correctly positioned. Tighten the screw under the feeding eccentric.



Frontpanel (cont.)

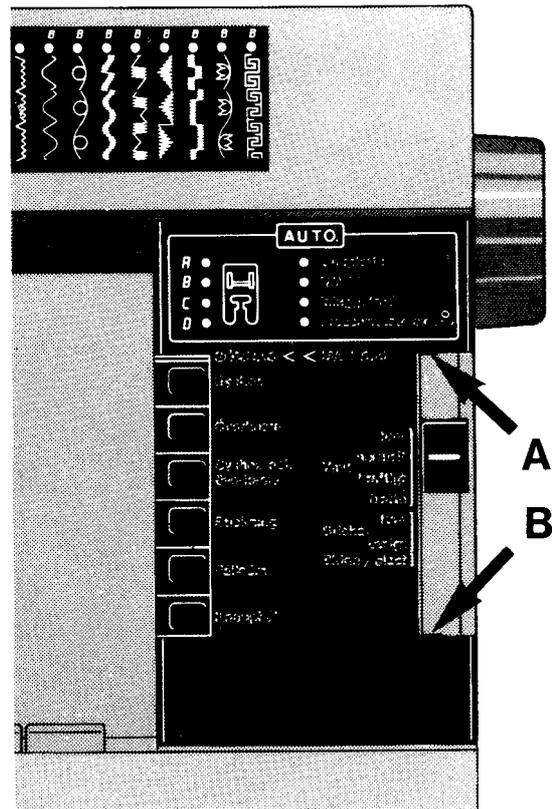
II Model 960

Dismounting

Remove the pushbutton assembly for the sewing guide.

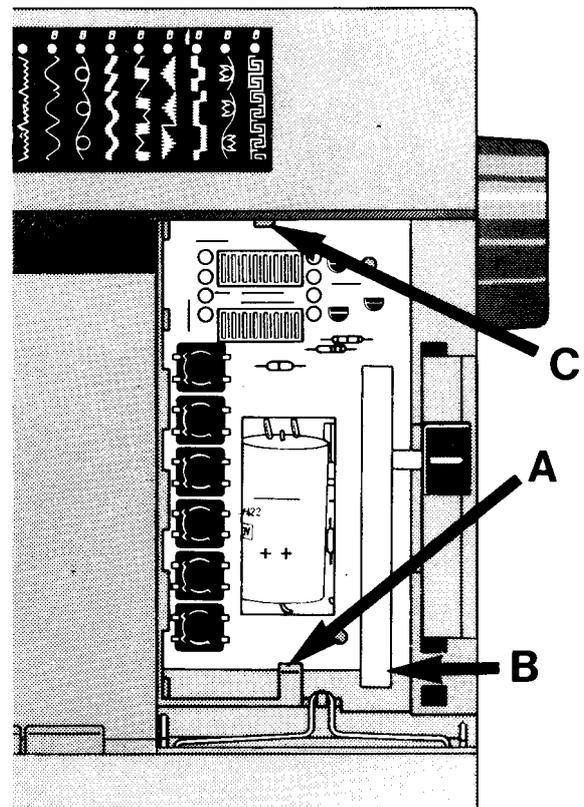
Press up the sprung hook at A and lift out the corner to the right A. Press the hook down at B and continue to lift out the entire right-hand side.

The pushbutton assembly can then be removed from the panel.



Remove the printed circuit for the guide.

Press down the hook at A and lift out the corner B. Press the hook up at C and remove the printed circuit board.



Dismount the rear cover. Remove the screw under the feeding eccentric.

Remove the light guard and lift the front panel upward.

Frontpanel (cont.)

II Model 960

Mounting of the panel

Check that the metal clip for the fixing screw is in place correctly and pushed against its stop.
Put the front panel in place - ensuring that the three fastenings are correctly positioned. Tighten the screw under the feeding excentric.

Fitting the pushbutton assembly

Push the left-hand side against the stop, align the hooks on the right-hand side and press the panel into position.

Check the position and operation of the I light emitting diodes:

Slide the knob to	"Non stretch, heavy"
Depress twice	"Hemming"
Slide the knob to	"Leather/vinyl"
Depress any pushbutton	
Slide the knob to	"Stretch, light"
Depress	"Buttonhole"

Check that the lamp under "Auto" lights up when the pushbuttons are depressed.

III Model 975,980 and 990

Dismounting

First dismount the rear cover. Remove the screw under the feeding excentric. Remove the light guard. Lift the front panel upward and tilt lower part outward. Remove the contact.

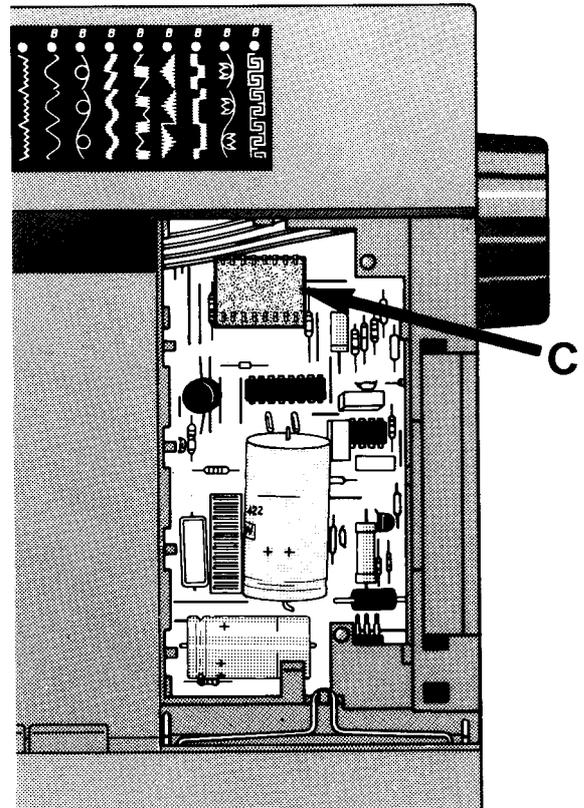
If the circuit board built into the front panel is to be exchanged, removed the nine screws.

Note that the push-buttons will be released when the printed circuit is dismounted.

Mounting

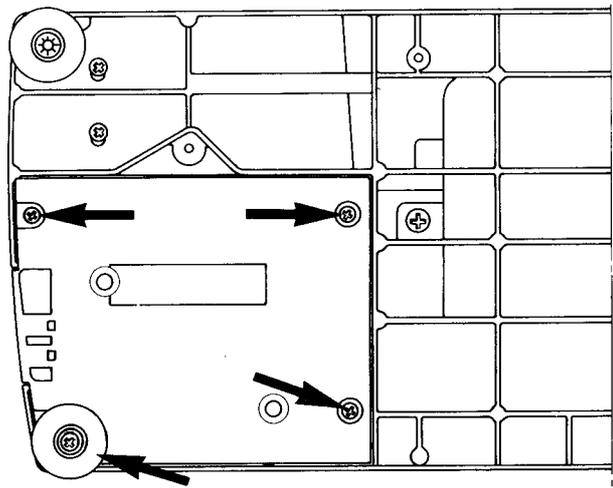
Before mounting, check that the metal clip for the mounting screw is in place correctly and pushed against its stop. Thereafter insert the contact and put the front panel in place - ensuring that the three fastening points are correctly positioned.

Tighten the screw under the feeding excentric.



Transformer

Remove the 3 screws from the base plate and the screw which holds the foot in place. The transformer can then be removed if the cord is removed from the connection to the unit.



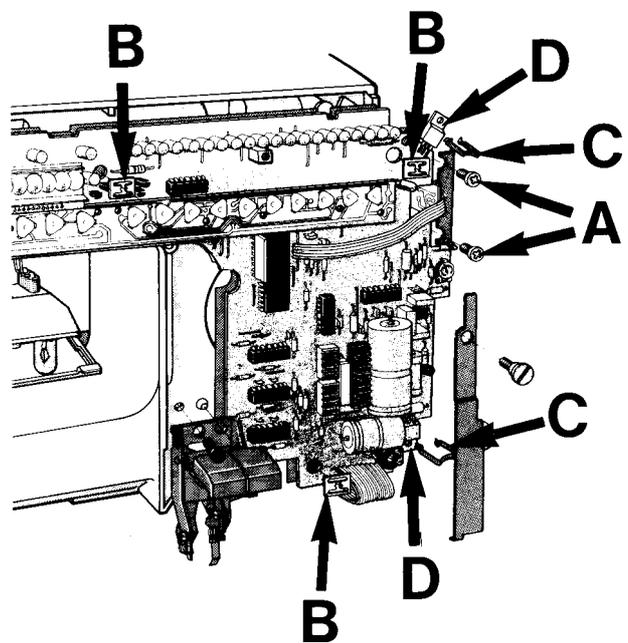
Opto-coupler

There is an opto-coupler at the handwheel which consists of a light and two phototransistors. It supplies the computer with information about the position of the needle bar. If the machine does not sew pattern stitches, i.e. does not re-set the feeding movement, or does not move the needle sideways, the reason could be that the light in the opto-coupler does not light up. Check therefore that the light is on before exchanging the printed circuit.

Dismounting

Remove the rear cover and front panel. Turn the handwheel until the thread take-up lever is at the highest position. Remove the screws (A) which hold the opto-coupler. Remove the opto-coupler, solder out the light and exchange it for a new one. Ordering No. 411 83 87-02.

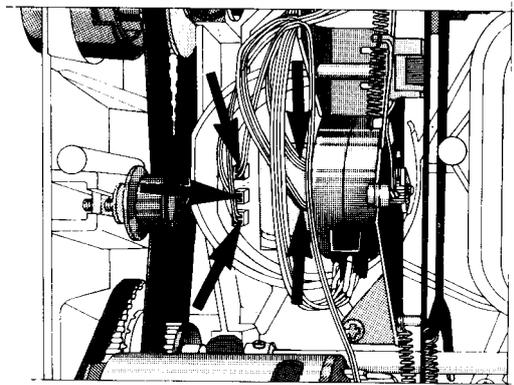
Take care that the soldering does not cause shortcircuiting between the wires of the two lights. Mount the opto-coupler.



Circuit boards

All the electronics are concentrated to the printed circuit underneath the front panel. First dismount the transformer unit. Remove the contacts from the step motors, drive motor and both lights. See fig. in the middle. Turn the handwheel until the thread take-up lever is at the highest position.

Remove the screw (A) which hold the opto-coupler and lift it out. Remove the 3 clips (B), the front clip and the 2 mounting clamps (C). Note that both the components (A) to right of the printed circuit must be electrically insulated but should be pressed against the frame.



Thread tension device with magnet

Dismounting - mounting

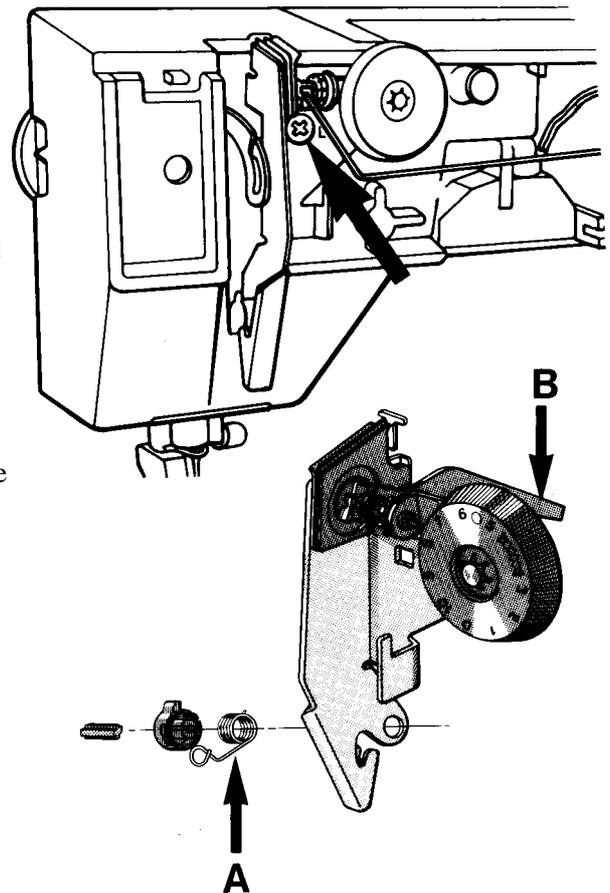
Dismount the rear cover and front panel.

Remove the rod to the magnet on model 960,980 and 990.

Undo the screw holding the frame to the arm and pull the thread tension device forward and straight out. The thread tension spring (A) can be exchanged if the wedge is pressed out from the holder and the adjustment casing is removed.

Adjustment, see page 27.

Ensure that the release lever (B) is inserted in the hole on the lever arm from the presser foot lifter.

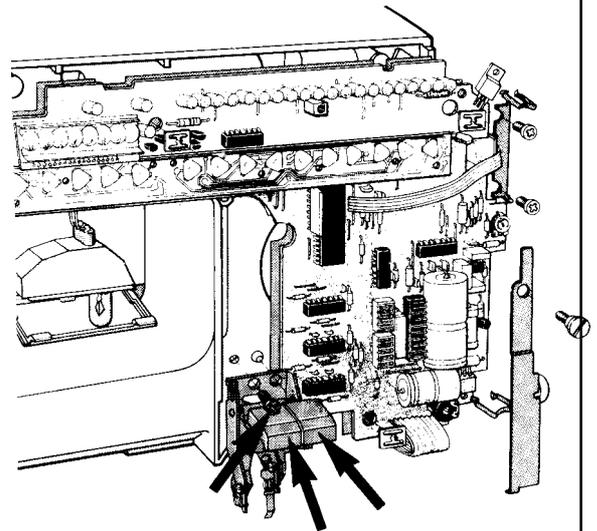


Main switch, feed dip button

Both buttons are mounted in the same holder.

To exchange, undo the screw holding the frame to the arm and then the whole mechanism can be removed.

Check the functioning of the switch when the mechanism is disassembled. There is a push-button on the left-hand side of the transformer which cuts the current when depressed.



Step motor unit for the feeding movement

Dismounting - mounting

Remove the rear cover. Release the cord connections and remove the cords from the cord holder.

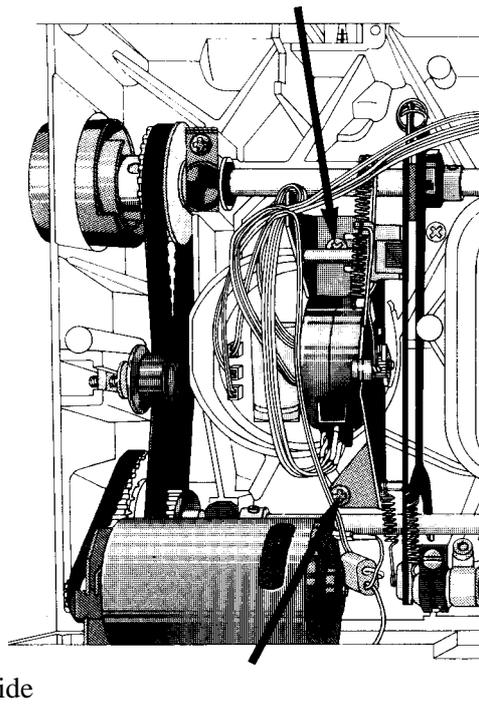
Undo both the screws holding the frame to the arm.
Pull the unit out.

Observe the spring washer on the pin of the stitch regulator fork, which presses the pulley against the bottom of the guide.

When the unit is re-mounted, run the cords as follows:

- 1) Start by running both the light cords through the cord holder and down to the printed circuit and connect.
- 2) Run the cord of the guide motor through the cord holder from the left and straight up, without connecting.
- 3) Run the cord of the drive motor under the cord of the guide motor through the cord holder from the right and down to the printed circuit and connect.
- 4) Run the cord of the guide motor above the cord holder from the right and down to the printed circuit and connect.
- 5) Run the cord of the needle motor through the cord holder and down to the printed circuit.

Ensure that the contacts are well pressed against the printed circuit.



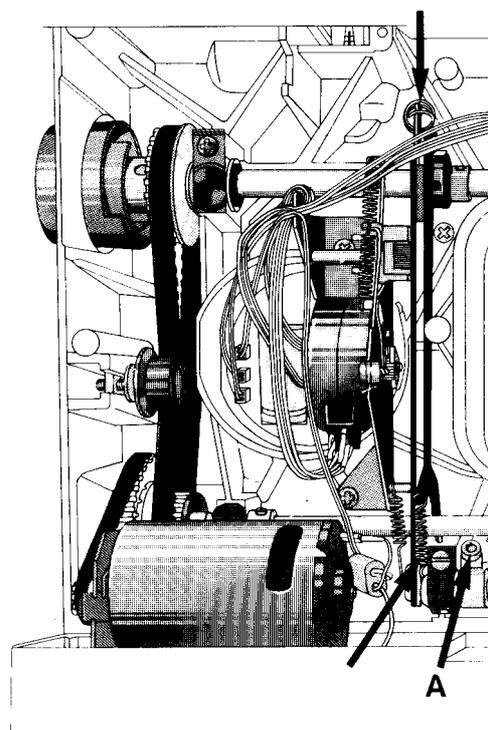
Stitch regulator fork and crank

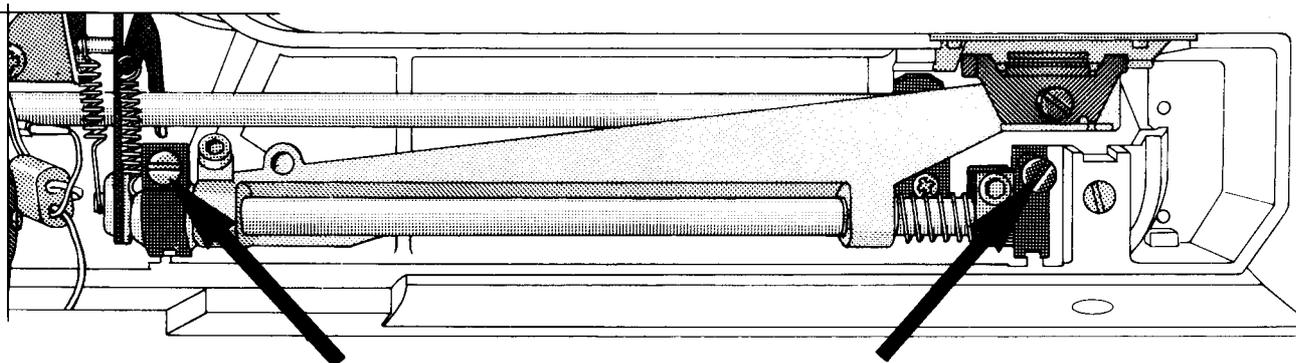
Dismounting - mounting

Remove the spring in the upper part of the fork and undo the screw (A). Use a 3 mm adam key. Push out the fork to the left and remove it. Remove the lower spring from the crank. Lift the crank up and remove it.

Mounting is done in the reverse order.

Be sure to mount the stitch regulator fork parallel with the holder for the step motor.





Feed unit

Remove the stitch plate, the step motor for the feed movement, the stitch regulator fork and the crank. Remove both the screws for the clamps for the feed lift shaft and remove the clamps. The whole feed unit can now be taken out from the front. When re-mounting, ensure that the lever of the feed lift shaft is correctly positioned on the stud of the crank.

Shuttle shaft - shuttle gear

The shuttle shaft can be dismantled if the inner clamps are removed. To dismantle the shuttle shaft, see page 5 "Driver".

Drive motor

Dismounting - mounting

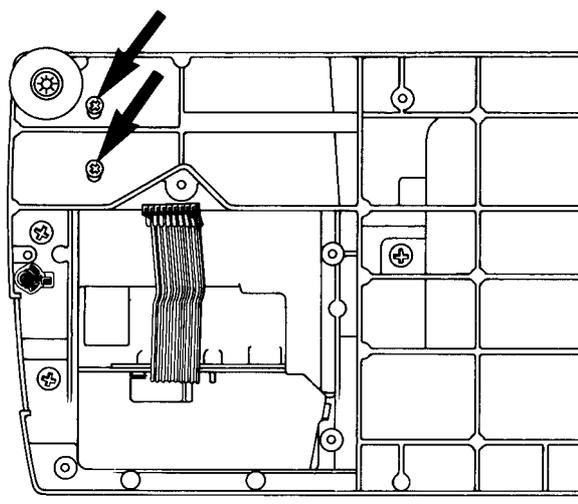
Remove the screws which secure the motor bracket to the base plate. When mounting, check that the cord is pressed well against the printed circuit and that the cord is mounted according to the diagram, i.e. with the red cord uppermost.

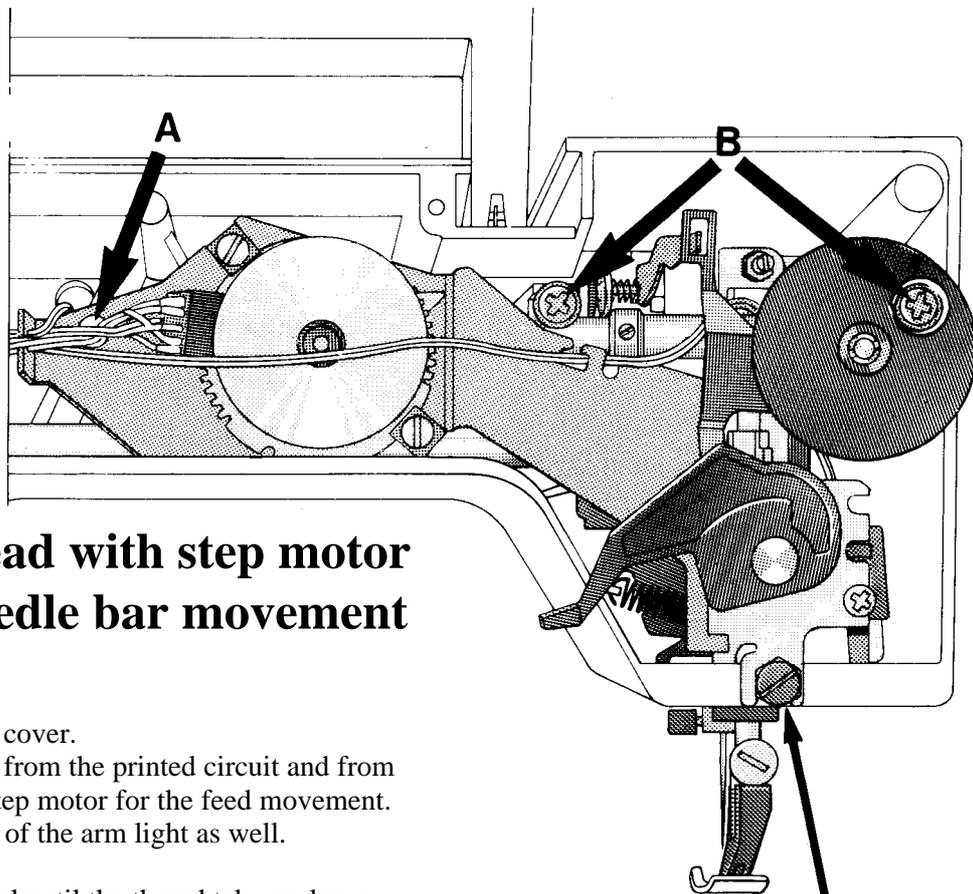
Comments

If the motor is not functioning, test with another foot control and check the function of the bobbin-stop. Another motor can be tested but it is not necessary to mount it on the base plate.

Bobbin-stop

Remove the transformer and remove the screws which secure the base plate to the arm. The bobbinstop sensor can now be pulled downward. Check that the sensor presses against the contact breaker on the transformer unit when it is mounted. Compare page 29.





Sewing head with step motor for the needle bar movement

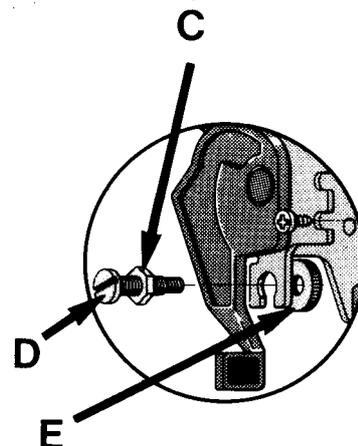
Dismounting

Dismount the rear cover.

Remove the cords from the printed circuit and from the holder at the step motor for the feed movement. Remove the cover of the arm light as well.

Turn the handwheel until the thread take-up lever is at the lowest position. Remove the screw (A) to the left of the step motor and the screws (B) for the supporting shaft of the sewing head. If the dial for the presserfootpressure is turned so that the hole comes out to the short side of the machine, the outside screw will also be accessible.

Undo the nut (C) which secures the lower part of the sewing head. Use a 10 mm fixed spanner. The shoulder screw (D) does not need to be unscrewed and the adjusting nut (E) must not be turned. The sewing head can now be released from its bearings after the upper part is tilted outward, the pivot of the cross head is pushed out of the needle bar crank and the bearing of the thread take-up lever is released.



Mounting

First insert the pivot of the cross head into the needle bar crank and then replace the thread take-up lever bearing. Put the sewing head in position and screw it into place.

Then check "The gap between the hook and the needle", according to page 18 and "The setting of the presser foot in relation to the stitch plate at right angles to the feeding direction", according to page 23.

Note that the sewing head is adjustable at right angles to the feeding direction. Loosen the screws (B) for holding the shaft of the sewing head and the nut at the lower part of the sewing head and the sewing head can be adjusted to the correct position.