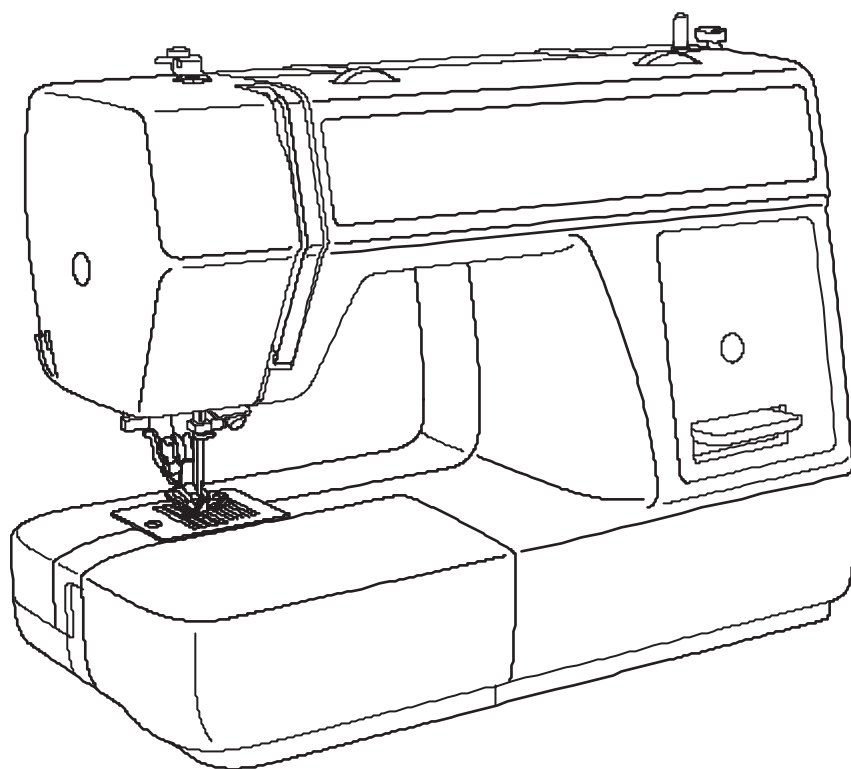


Service Manual



E10

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ATTENTION

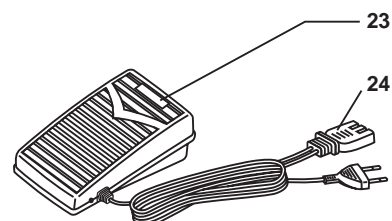
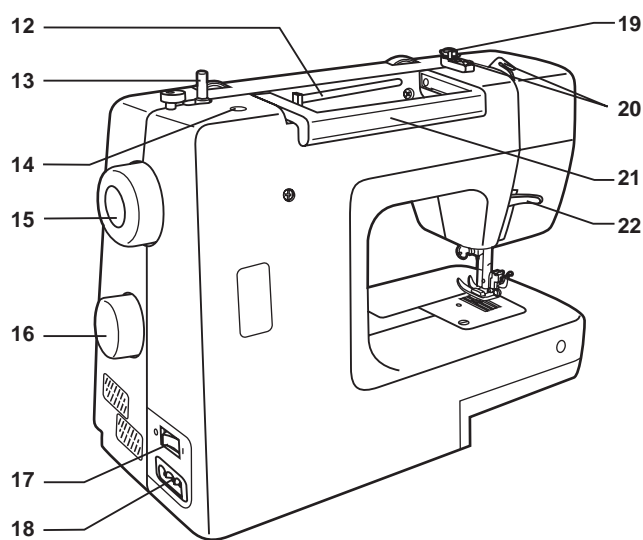
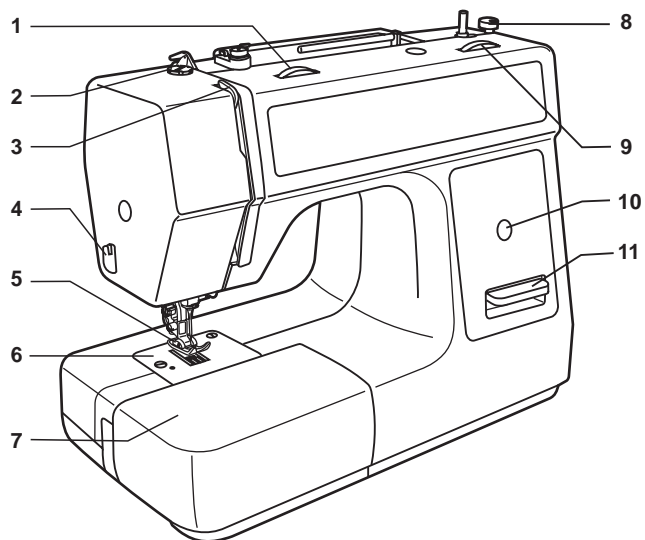
Be sure to observe the following, as they may well become causes for fire, electric-shock, injuries, and damage to parts.

- Be sure to unplug power source before engaged in disassembly, installation, adjustment.
- In case of installing please pay special care to clamp electrical cords, etc., scars to sheath, mis-circuit, etc.
- Be sure to use regular standard part in replacing.

Products specification

ITEM	E10
Machine style	Free arm
Size of machine(mm) L x W x H	374x160x275
Weight (kg)	6.7(only machine)
Max rotation speed (rpm)	750 ± 50
Motor power / Light power (W)	North America 60W / 10W Europe 70W / 15W
Motor type	AC
Needle position	Center and right position
Zigzag out-breaking device	Multiple-player cams conversion type
Hook system	Semi rotary hook
Thread take up lever	Slit type
Presser foot lift	Two-steps type
Needle threader	No
Needle plate	Screw fixing type
Upper thread tension adjust device	Top of upper plate inclusive turning knob
Bobbin winder	Self releasing with automatic stop
Reverse	Press down type
Press-bar pressure regulating device	Option
Kinds of stitches	19
Dials	2
Stitch length adjust device	Dial type
Max. length of stitch (mm)	4.2
Max. width of zigzag (mm)	4.6-4.8mm
Face plate upper plate	Plastic
Sewing table	Coupled with accessories / Spare parts box
Lamp	Inclusive within face cover
Speed control device	Controller
Power supply switch	Pulsating, two steps
Protective cover	Option
Nos. of accessories	Option

Names of principal parts

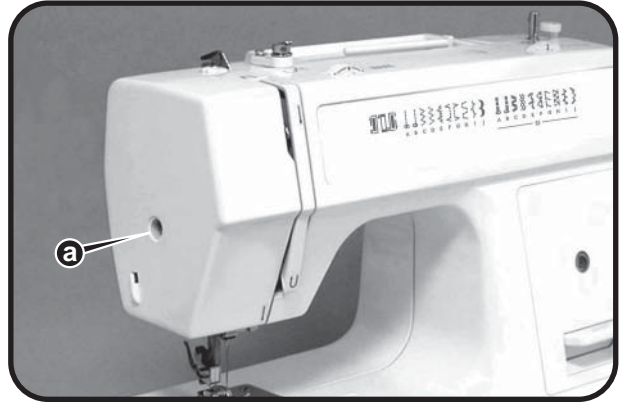


-
- | | |
|----------------------------------|-------------------------------|
| 1. Thread tension dial | 13. Bobbin winder |
| 2. Presser foot pressure | 14. Hole for second spool pin |
| 3. Thread take-up lever | 15. Hand wheel |
| 4. Thread cutting | 16. Pattern selector dial |
| 5. Presser foot | 17. Power switch |
| 6. Needle plate | 18. Main plug socket |
| 7. Sewing table/ Accessories box | 19. Bobbin thread guide |
| 8. Bobbin stopper | 20. Upper thread guide |
| 9. Stitch length dial | 21. Handle |
| 10. Stitch display | 22. Presser foot lever |
| 11. Reverse sewing lever | 23. Foot speed control |
| 12. Spool pin | 24. Power cord |

Removing methods of external parts

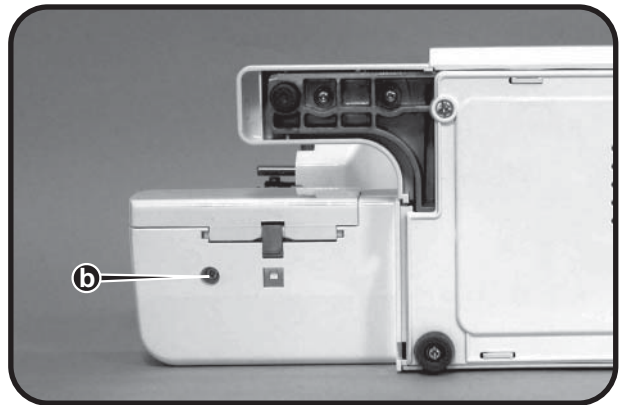
Face cover

- Remove the screw (a).
- Remove the face cover.



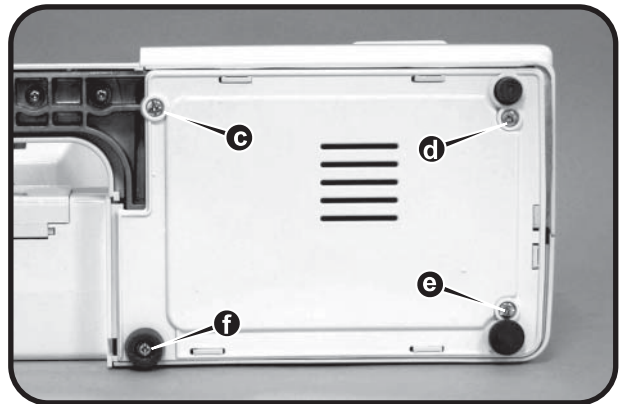
Free arm cover

- Remove the screw (b) and free arm cover.



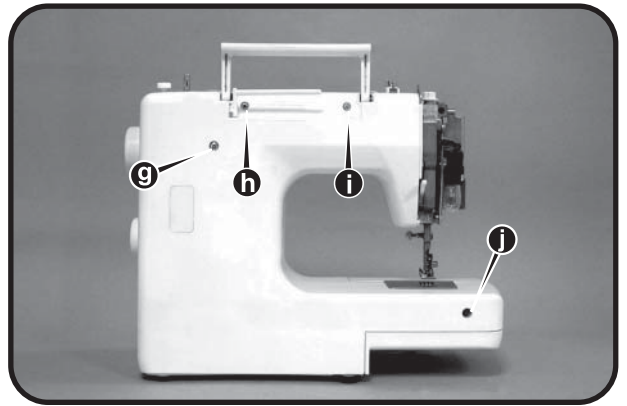
Base cover

- Lay down machine.
- Remove 3 screws (c, d, e).
- Remove free arm base cushion rubber (f).
- Remove the base plate.

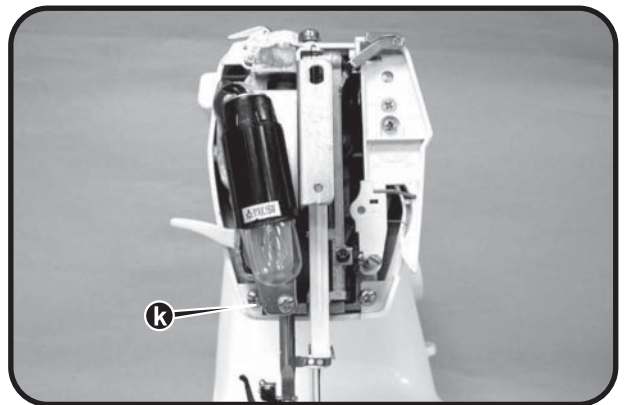


Back cover

- Remove the face cover, free arm cover, and base cover first.
- Lift handle and remove 4 screws (g, h, i, j).

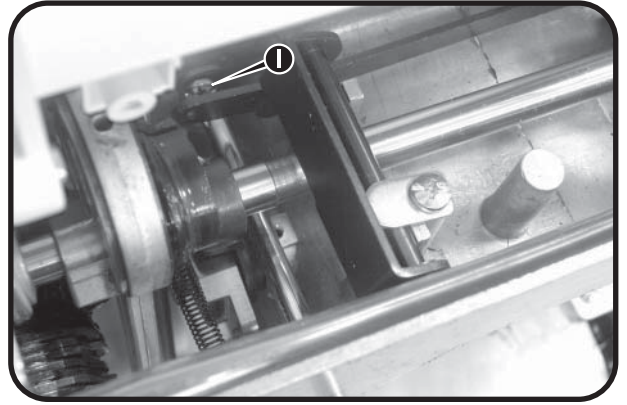


- Loosen screw (k) about 3mm.
- Remove the back cover.

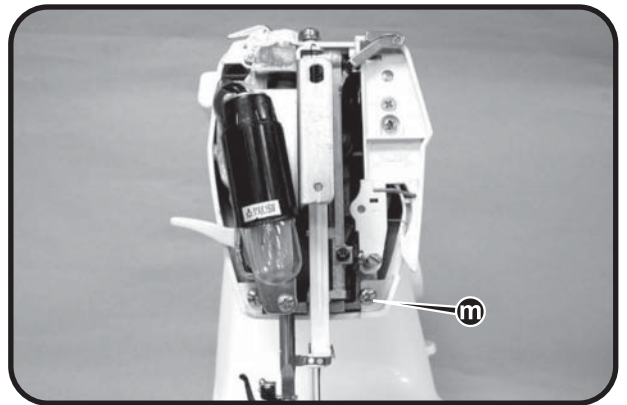


Front cover

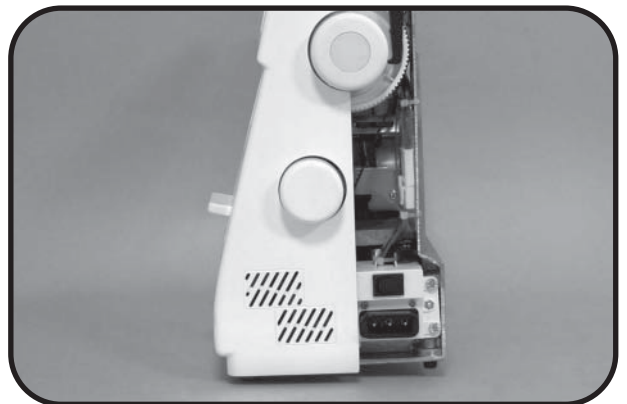
- Remove the face cover, free arm cover, base cover and back cover first.
- Remove the screw (l).



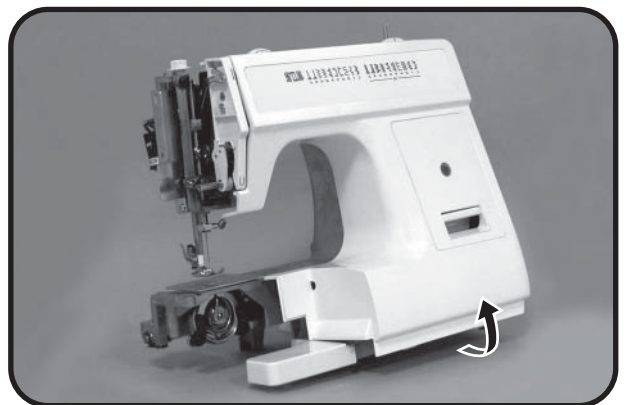
- Loosen screw (m) about 3mm.



- Remove the pattern selector dial.



- Remove the front cover following direction of arrow.



Lower thread tension

Check

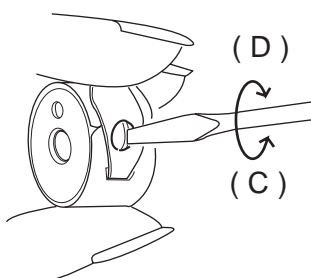
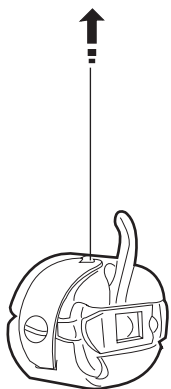
Set the bobbin in the bobbin case and pass a thread through the tension spring.

The lower thread tension should be between 25 and 40 grams when pulling the thread in the direction of (A).

Adjustment

1. If the lower thread tension is too tight, turn the adjusting screw in the direction of (C).
2. If the lower thread tension is too loose, turn the adjusting screw in the direction of (D).

(A)



Upper thread tension

Check

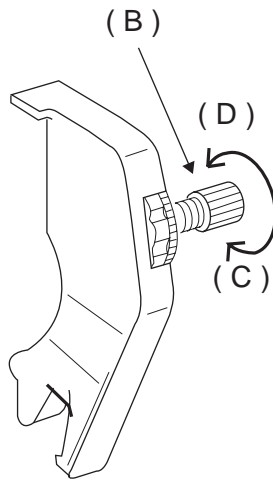
A correct interlacing of the upper thread and the bobbin thread (cotton thread 50/2 or synthetic fiber thread 100/35) must take place approximately in the middle of the fabric at straight and zigzag stitch setting with the tension dial at "4".

alt. Check

The standard upper thread tension should be between 60-70 grams when pulling a cotton thread 50/2 or synthetic fiber thread 100/35 with the tension dial at "4". The presser foot should be lowered when checking the upper thread tension.

Adjustment

1. Remove the face cover and the front cover.
2. Turn the adjusting nut (B) in the direction of (C) when the upper thread tension is too tight.
Turn the adjusting nut (B) in the direction of (D) when the upper thread tension is too loose.
3. Attach the front cover.



Presser bar height and alignment

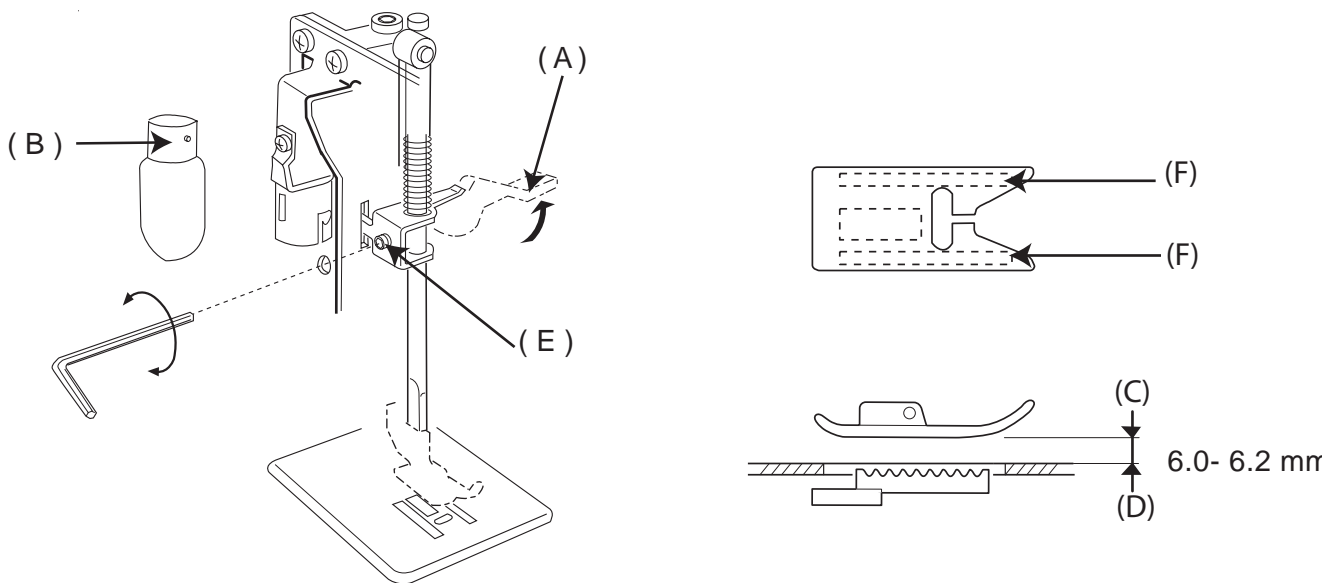
Check

1. Raise the presser foot lever (A).
2. The distance between the presser foot (C) and the needle plate (D) should be 6.0-6.2 mm.

Adjustment

1. Remove the face cover.
2. Remove lamp bracket.
3. Raise the presser foot lever and loosen the 3mm Allen screw (E) on the side of the presser bar holder. Adjust the distance between the zigzag foot (C) and the needle plate (D) to 6.0-6.2 mm.
4. Tighten the screw (E) securely.
5. Attach the lamp bracket and face cover.

NOTE! When you tighten the screw (E), make sure that both sides of the presser foot are parallel to the feed dog slots (F) on the needle plate.



The centre position of the needle in the feeding direction

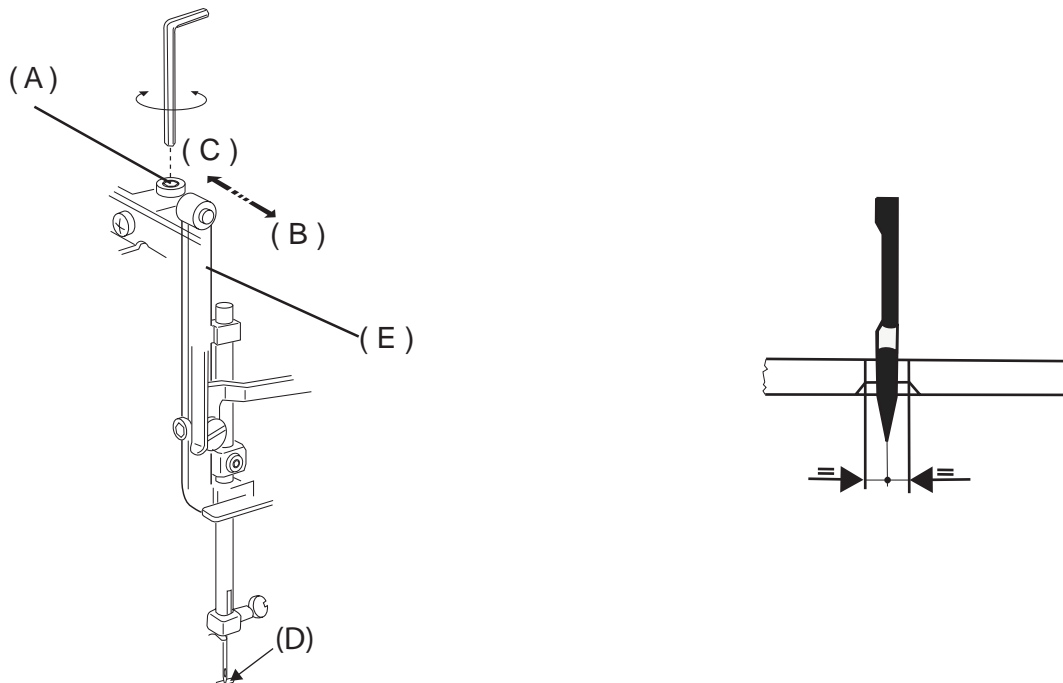
Check

1. Set the pattern selector dial to straight "A".
2. Insert a new #90 needle
3. Set the needle so the needle eye is just above the needle plate
4. The needle shall pass through the centre of the needle hole (D) in the feeding direction.

Adjustment

1. Remove the face cover.
2. Set the pattern selector dial to straight "A".
3. Set the needle so the needle eye is just above the needle plate.
4. Loosen the 2mm Allen screw (A) of needle bar supporter (E).
5. Move needle bar supporter (E) forward / backward to adjust needle.
 - Backward (C) - to move needle forward.
 - Forward (B) - to move needle backward.
6. Set the point of needle so it passes through the centre of the needle hole (D) in the feeding direction.
7. Tighten screw (A) of needle bar supporter (E).

NOTE! This adjustment affects the "Clearance between needle and hook" adjustment.



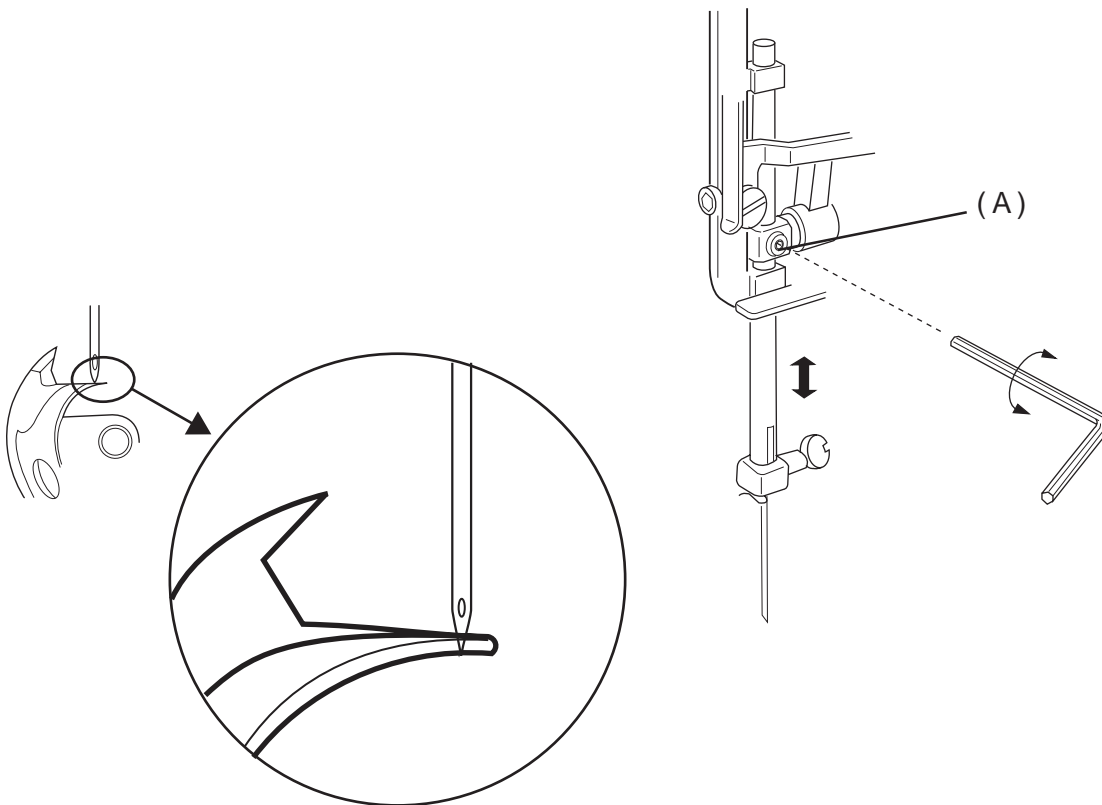
Height of needle bar

Check

1. Set pattern selector dial to straight "A".
2. Remove shuttle hook holder.
3. Set needle at its lowest point.
4. Check that the point of the needle and the bottom surface of shuttle hook will align.

Adjustment

1. Remove the face cover
2. Set pattern selector dial to straight "A".
3. Remove the shuttle hook holder.
4. Set needle at its lowest point.
5. Loosen 2mm Allen screw (A) of needle bar bracket.
6. Adjust height of needle by moving the needle bar upward / downward.
7. Stop at the position when the point of the needle and bottom surface of shuttle hook will align.
8. After adjustment, tighten screw (A) of needle bar bracket.
9. Re-assemble the shuttle hook holder accordingly.
10. Attach the face cover.



Turning movement of the needle in zigzag and the play of the worm gear

Check 1

The needle should start swinging when the needle tip is 5 - 10 mm above the needle plate (G) and should stop swinging 10 - 5 mm before entering into the hole of needle plate.

Check 2

It is impossible to obtain an equally large play in one rotation of the cog wheel, but it should be as small as possible at the tightest spot during the revolution.

Rotate the cogwheel (C) back and forth and check the play. It should be zero or as small as possible.

Adjustment

1. Remove the face cover, fre arm cover, base cover, back cover and front cover.
2. Select the zigzag stitch "C" and set the width at "Max".
3. Turn the hand wheel to set the needle bar at the right needle position.
4. Loosen the 2mm Allen screws (a, b).
5. Insert the Allen key into one of the Allen screws (a,b).
6. Turn the hand wheel so that the needle tip comes 5 - 10 mm above the needle plate (G) in upward travel as shown.

- If needle flow is less than 5 mm, turn arm shaft worm gear (D) toward back (K).
- If needle flow is more than 10 mm, turn arm shaft worm gear (D) toward front (M).

7. Tighten the 2 Allen screws.
8. Check the swing of the needle.
9. Check that setting play of worm gear (D) sideways hasn't changed.

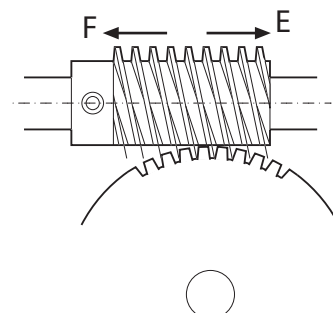
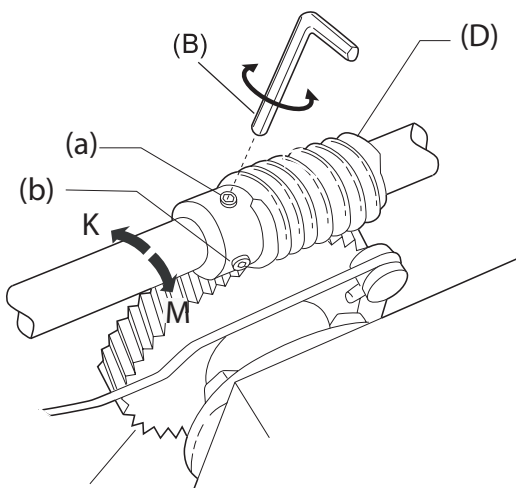
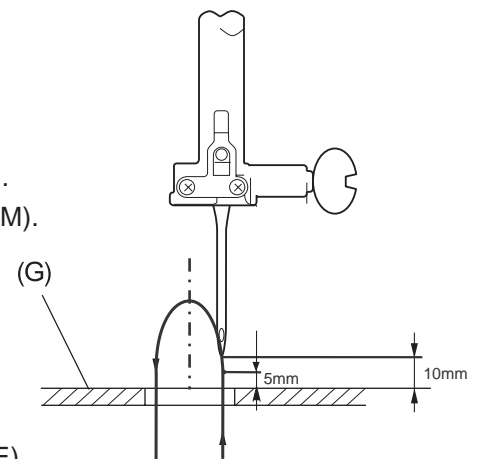
If so ...

Loosen the 2 Allen socket screws (a, b) again and move the worm gear:

- to increase the backlash, move the worm gear (D) to the direction of (E).
- to decrease the backlash, move the worm gear (D) to the direction of (F).

10. Tighten the 2 Allen screws.

11. Re-check "Turning movement of the needle in zigzag" again.



The centre position of the needle in straight stitching

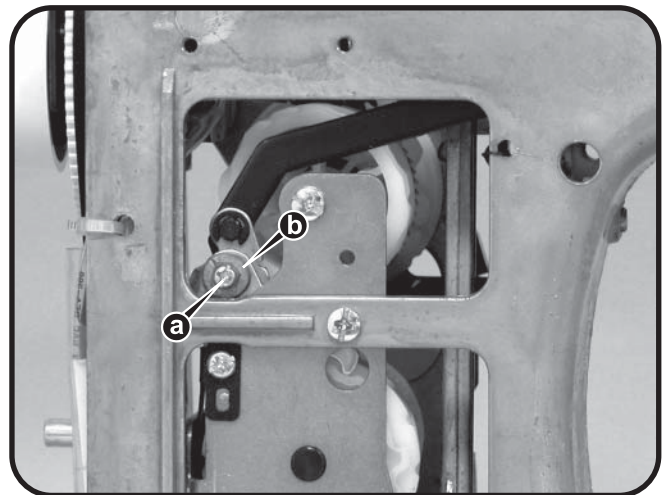
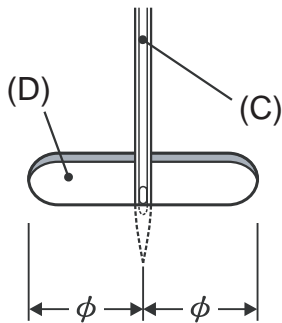
Check

1. Set pattern selector dial to straight "A".
2. Insert a new #90 needle.
3. The point of needle (C) shall pass through the centre of the needle hole (D) in the needle plate.

Adjustment

1. Set pattern selector dial to straight "A".
2. Remove plate (A).
3. Loosen screw (a) than adjust screw nut (b).
Clockwise = needle moves right
Counter-clockwise = needle moves left
4. Make sure needle drops on middle of needle hole.
5. Tighten screw (a) and attach plate (A).

NOTE! This adjustment affect "Buttonhole - the columns, cutting space" adjustment.



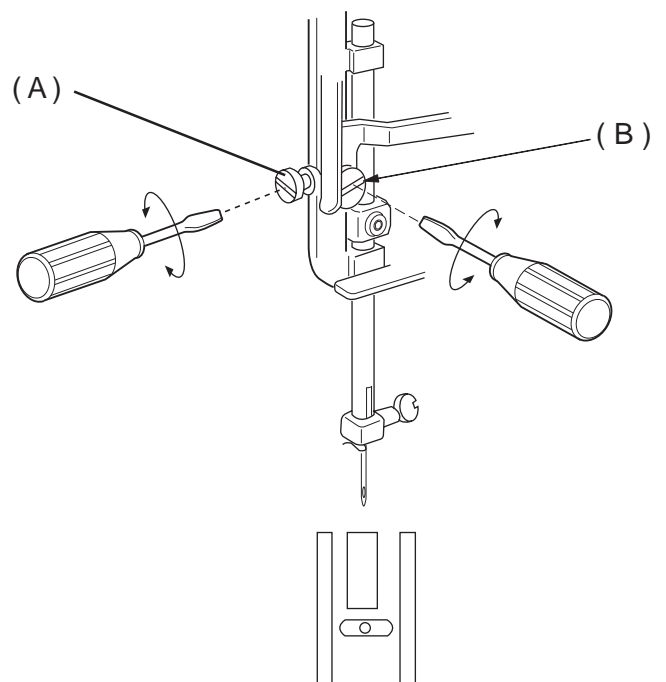
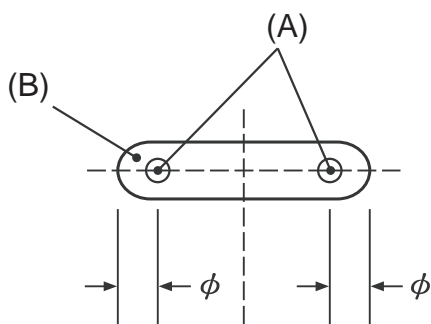
Needle position of zigzag

Check

When the needle (A) swings in maximum zigzag width, the distance between both ends of the needle hole (B) on the needle plate and the needle drop positions should be equal.

Adjustment

1. Remove the face cover.
2. Set the pattern selector dial to zigzag "C" and maximum width.
3. Loosen screw A.
4. Adjust needle position by turning screw (B) of zigzag regulator crank:
 - Clockwise = needle moves right.
 - Counter-clockwise = needle moves left.
4. Re-check so the distance between both ends of the needle hole on the needle plate and the needle drop positions is equal
5. Attach the face cover.



Play of arm shaft

Check

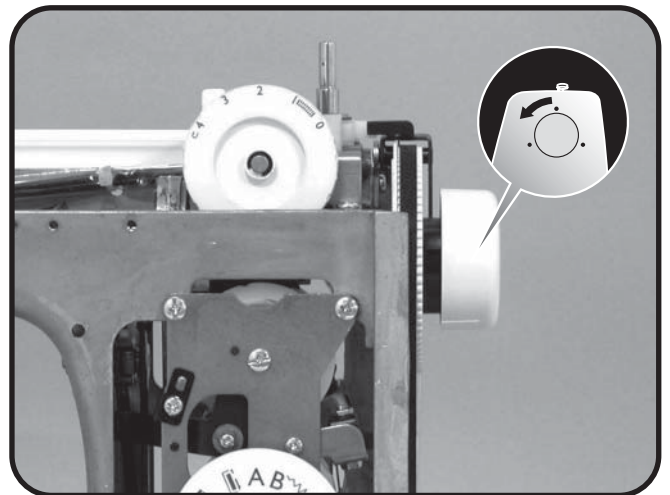
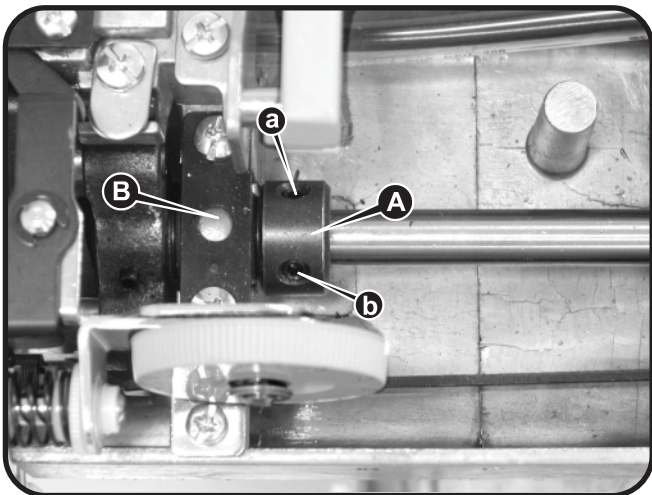
The axial play of the arm shaft should not be larger than 0.005 mm.

Adjustment

1. Remove the free arm cover, face cover, back cover and front cover.
2. Loosen the 2 screws (a, b) of arm shaft collar (A).
3. Pull hand wheel backward.
4. Push arm shaft collar (A) to left tightly against arm shaft bushing (B) and then fasten and secure screws (a, b).
5. Re-check the distance between arm shaft collar and arm shaft bushing.

NOTE! Be sure arm shaft operates smoothly after adjustment.

Arm shaft collar and arm shaft bushing being too tightly closed might cause insufficient operation of arm shaft.



Clearance between needle and hook

Check

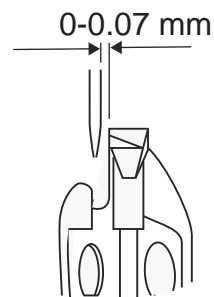
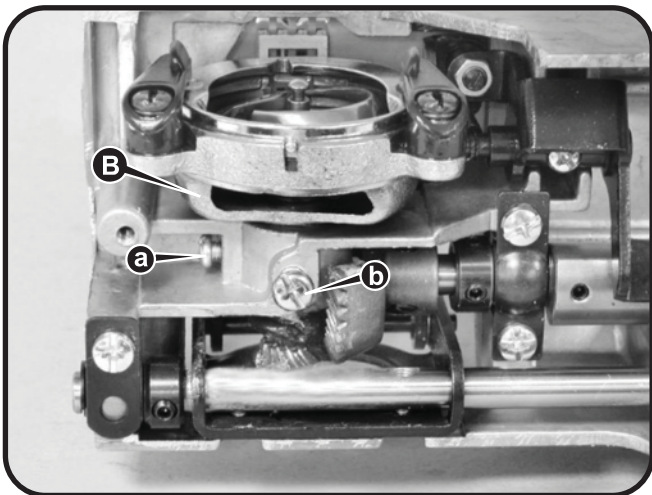
1. Insert a new #90 needle.
2. Set pattern selector dial to "C", stitch width to "Max".

The clearance between the needle and shuttle hook should be 0 to +0.07 mm.

Adjustment

1. Remove free arm cover.
2. Remove shuttle hook holder.
3. Set needle at its lowest point when it swings to right, stop at the position when point of the needle and shuttle hook align.
4. Loosen screws (a, b) of open shuttle race.
5. Move shuttle race (B) forward / backward to adjust movement.
Forward = tighten the distance
Backward = lengthen the distance
6. Make sure space between needle and tip of hook is 0- 0.07mm.
7. After adjustment, re-tighten the screws.
8. Re-assemble shuttle hook holder and covers.

NOTE! This adjustment affect "Timing of needle and hook" and "Play between shuttle driver shaft gear and lower shaft gear"



Play between shuttle driver shaft gear and lower shaft gear

It's impossible to obtain an equal large play in the rotation of a cogwheel, but it should be as small as possible at the tightest spot during the revolution.

Check

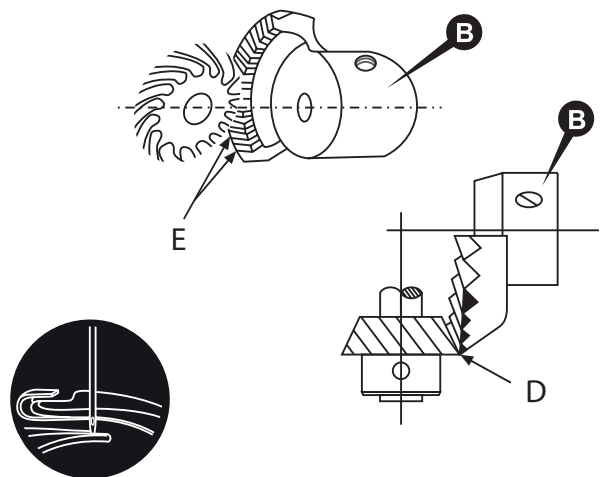
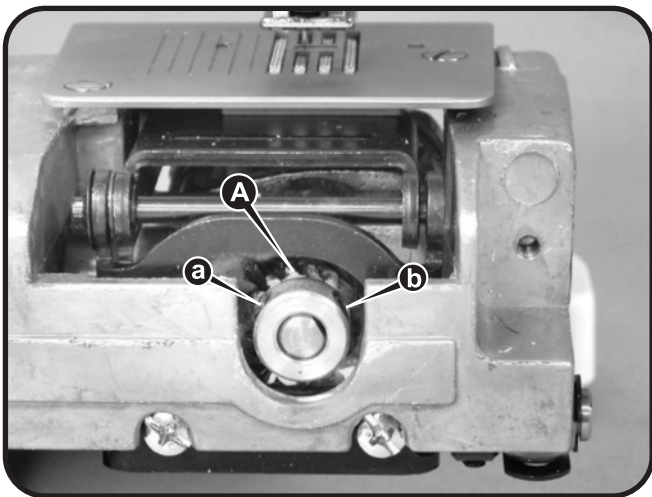
1. Remove the bobbin case, the shuttle hook holder and the shuttle.
2. Turn the shuttle driver back and forth with a finger and check the play.
3. Turn the hand wheel and check the play in at least three positions during the stroke of the shuttle driver.
4. The play shall be noticeable, but not exceed 0.5mm in sideways.

Adjustment of play

1. Remove the free arm cover.
2. Loosen 2mm Allen screws (a, b) of shuttle driver shaft gear.
3. Move the lower shaft gear (A):
 - backward if there is a too tight spot.
 - forward if the play is too big.
4. Re-tighten the screws of the shuttle driver shaft gear.
5. Insert shuttle hook and check "Timing of Needle and Hook".
6. Re-assemble free arm cover, shuttle, shuttle hook holder and bobbin case.

Adjustment of timing between shuttle driver shaft gear and lower shaft gear

1. Loosen 2mm Allen screws (a, b) of shuttle driver shaft gear.
2. Remove shuttle driver shaft gear (A).
3. Set needle to its lowest point. At this position the flat side of rear end of the shuttle driver shaft shall face 5 o'clock seen from the rear side of the machine.
4. Re-assemble shuttle driver shaft gear (A), align it with lower shaft gear (B) to mesh with each other at one point (D). If you need to move lower shaft gear, follow "Distance adjustment between shuttle driver shaft gear and lower shaft gear".
5. Tighten screws of shuttle driver shaft gear. Tighten first the Allen screw positioned at flat side of the shaft.
6. Check the play of the shuttle driver, above.
7. Insert shuttle hook and check "Timing of Needle and Hook".
8. Re-assemble back cover, free arm cover, shuttle, shuttle hook holder and bobbin case.



Distance adjustment between shuttle driver shaft gear and lower shaft gear

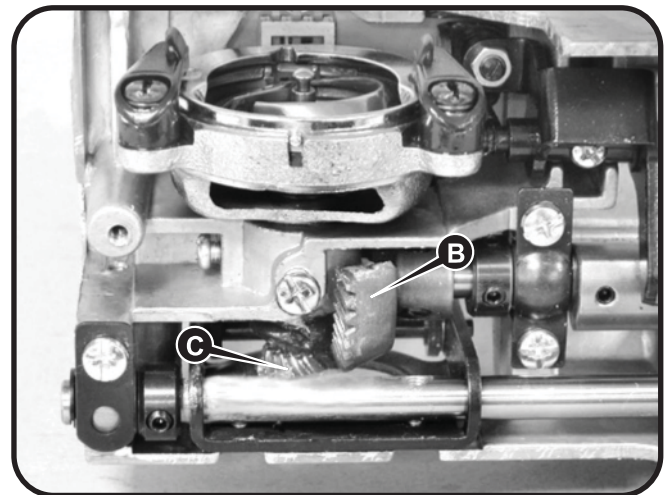
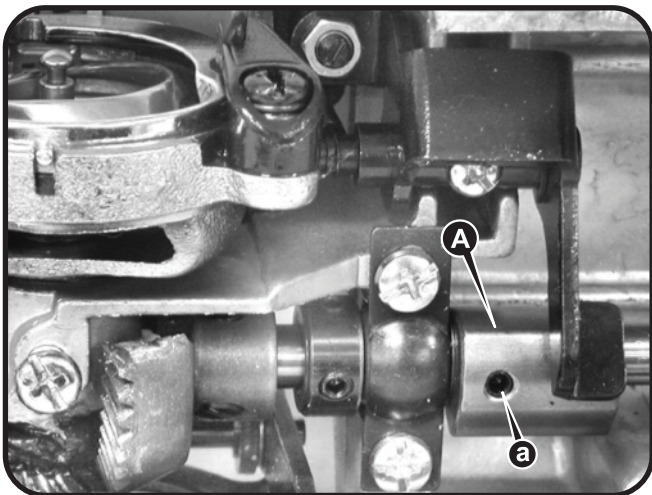
Check

The axial play of the lower shaft should not be larger than 0.005 mm.

Adjustment

1. Remove free arm cover and base cover. Loosen 2mm Allen screw (a) of feed lifting rod cam. Push feed lifting rock cam (A) to right.
2. Push lower shaft gear (B) to left tightly against shuttle driver shaft gear complete (C).
3. Push feed lifting rock cam (A) back toward left and secure it tightly.
4. Avoid over-tightening shuttle driver shaft gear and lower shaft gear. If gears are too tight then the torque will be bigger causing noise and shaking.

NOTE! This adjusting affect "Play between shuttle driver shaft gear and lower shaft gear"



Timing of needle and hook

Check

1. Set pattern selector dial to "C", stitch width to "Max".
2. Set needle bar at its lowest point when it swings to left.
3. Check that clearance between point of hook and left side of needle is 3.2 - 3.6mm.

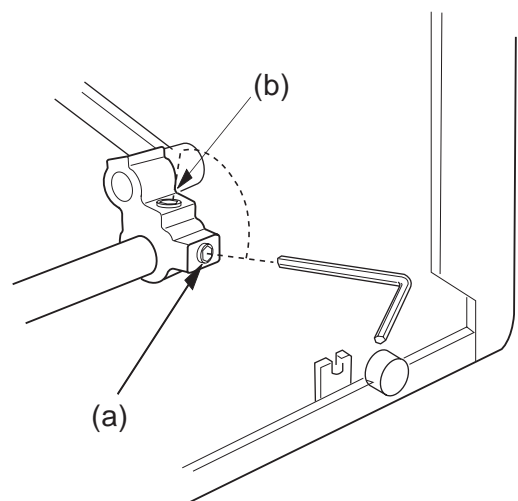
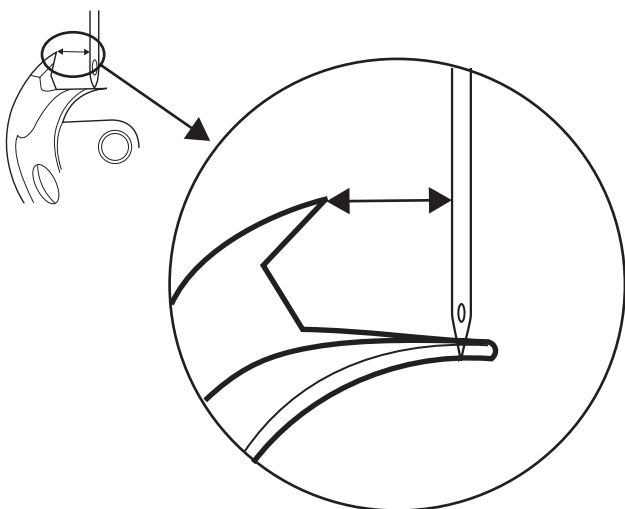
Adjustment

1. Set pattern selector dial to "C", stitch width to "Max".
2. Remove free arm cover and base cover.
3. Remove shuttle hook holder.
4. Set needle bar at its highest point and loosen the 2.5mm Allen screw (a) of crank connecting rod crank.
5. Set needle bar at its lowest point when it swings to left.
6. Loosen the 2.5mm Allen screw (b) of crank connecting rod crank.
7. Turn shuttle driver to adjust timing of needle and hook.
8. Tighten the screws of crank connecting rod crank when clearance between point of hook and left side of needle is 3.2 - 3.6mm.

Clockwise = timing is smaller

Counterclockwise = timing is bigger.

9. Re-assemble shuttle hook holder and covers.



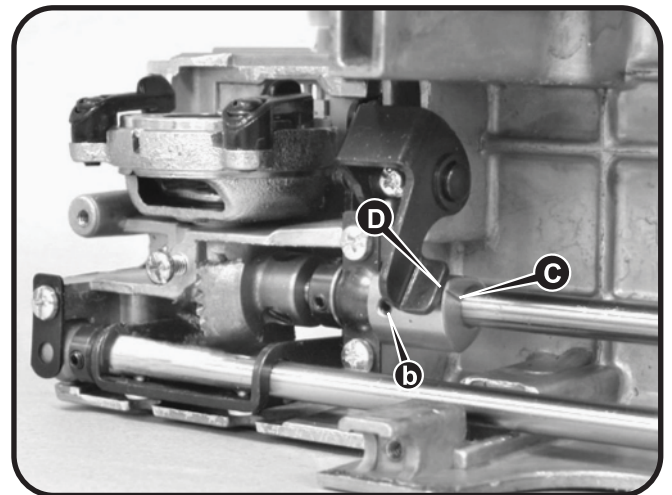
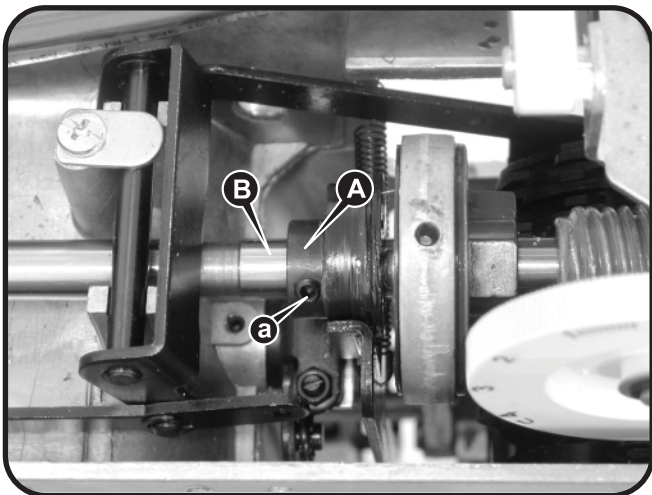
Setting the feed lifting in relation to the needle

Check

Problems associated with delivery amount, stitch unbalance and needle breakage, make the following check: Make sure hair line marking on feed cam (A) match correctly with marking of arm shaft (B).

Adjustment

1. Remove the face plate, free arm cover, base plate, back cover and front cover.
2. Loosen screw (a) in the feed cam (A).
2. Turn the feed cam (A) until the the line in it comes right in front of the line in the arm shaft (B).
3. Lift needle to its highest position.
4. Loosen screw (b) and make sure hair line marking on feed lifting rock cam (C) match correctly with marking of feed rock crank (D).



Feed dog height

Check

When the feed dog is in its highest position it should be 0.9 to 1.05 mm from the surface of the needle plate.

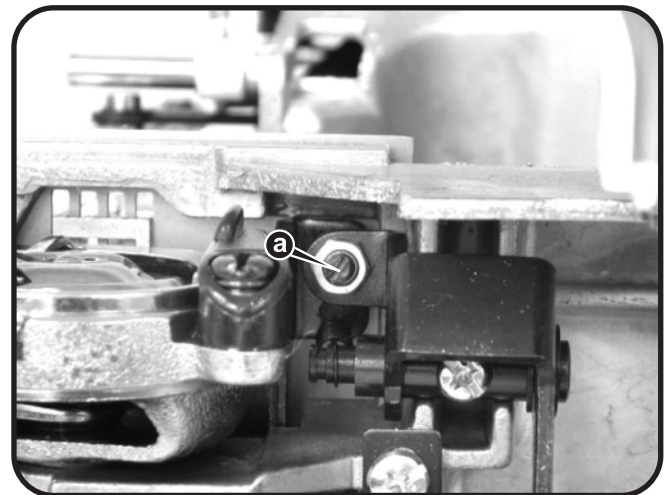
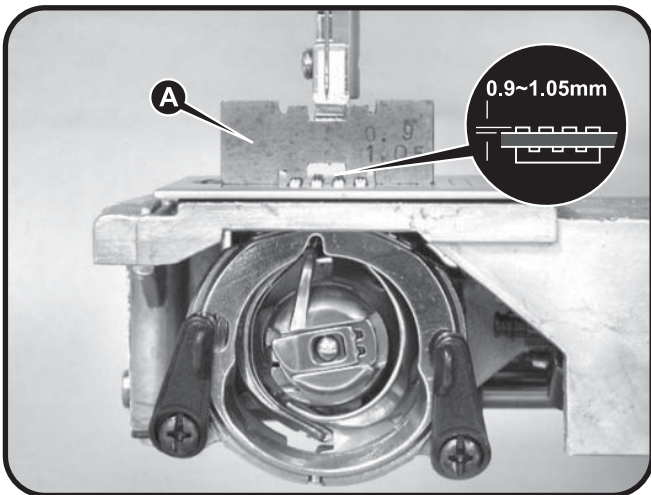
Adjustment

1. Turn the hand wheel until the feed dog comes to its highest position.
2. Remove the lower free arm cover.
3. Turn the adjusting screw (a) so that the feed dog height is between 0.9 mm to 1.05 mm from the surface of the needle plate (A).

Clockwise = the feed dog will be raised.

Counter-clockwise = the feed dog will be lowered.

4. Attach the lower free arm cover.



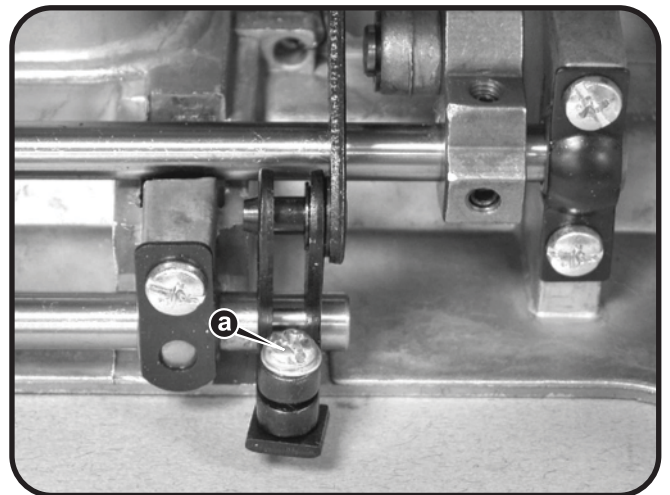
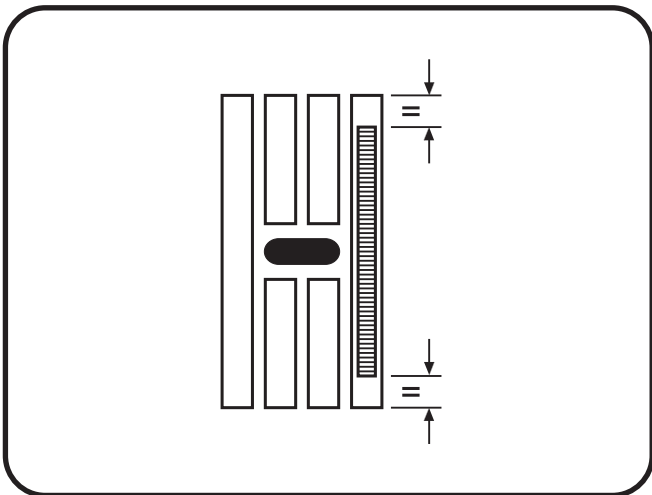
Clearance between feed dog and the needle plate – Front to Back

Check

1. Set pattern selector dial to "A". Turn stitch length dial to "4".
2. Turn hand wheel to move feed-dog forward and backward.
3. The feed dogs shall not at any point touch the needle plate in the back side or the front side.

Adjustment

1. Remove the base cover.
2. Loosen screw (a) of feed rock crank.
3. Moving feed-dog forward / backward until it is centered in the needle plate.
4. Tighten screw (a) after adjustment.
5. Attach covers.



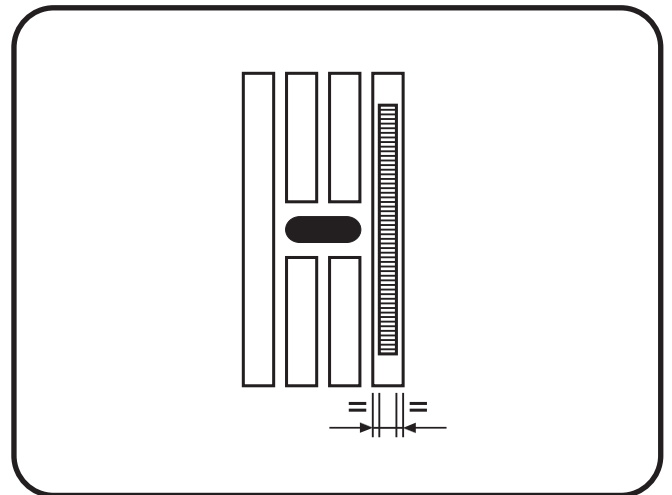
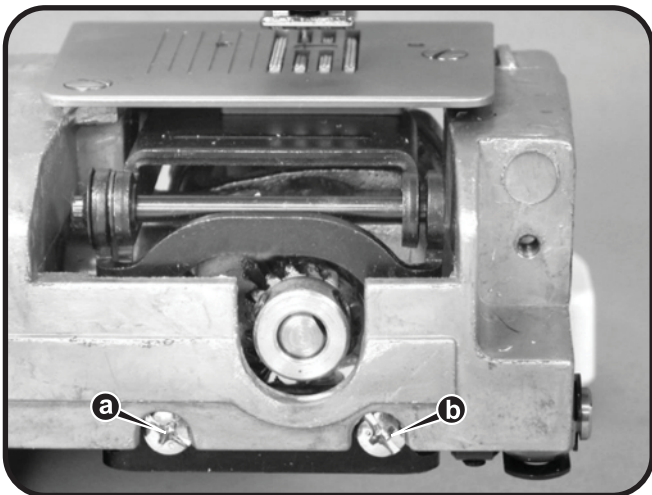
Clearance between feed dog and the needle plate – Side ways

Check

1. Set pattern selector dial to "A". Turn stitch length dial to "4".
2. Turn hand wheel to move feed-dog forward and backward.
3. The feed dogs shall not at any point touch the needle plate in the left side or the right side.

Adjustment

1. Remove the face plate, free arm cover, base plate and back cover.
2. Loosen screw (a, b). Move feed dog left / right to middle position.
3. Tighten screws (a, b) after adjustment.
4. Attach covers.



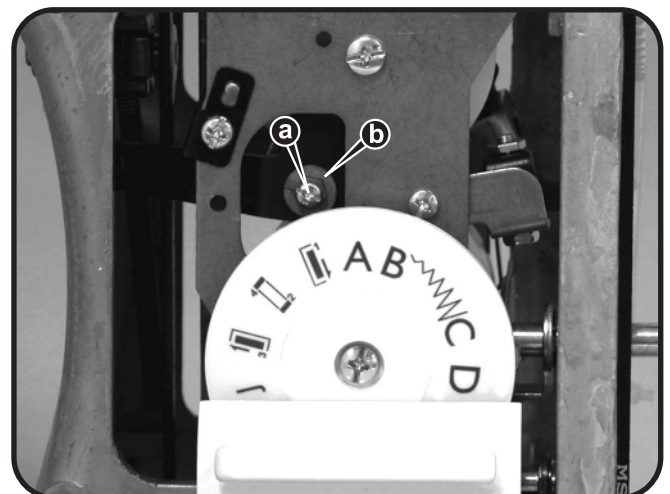
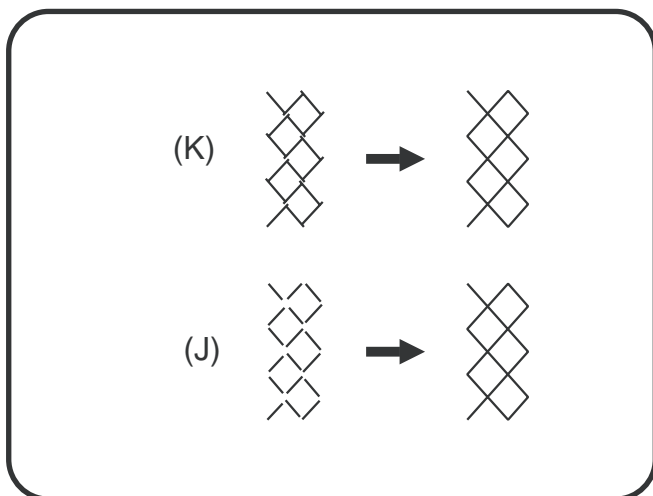
Stretch stitch balance

Check

When a stretch stitch is sewn the forward feeding and backward feeding should be equal when sewing stretch stitch pattern.

Adjustment

1. Remove the face cover, back cover and front cover.
2. Set pattern selector dial to "D", stitch length dial to "SI"
3. Put a piece of paper under the presser foot, and turn the hand wheel to check the needle drop position in forward and backward feeding.
4. Loosen the set screw (a) and adjust the regulator nut (b).
5. If the stitch gap is
 - too big (J), turn the regulator nut (b) clock-wise.
 - too tight (K), turn the regulator nut (b) counter clock-wise.
6. Attach the covers.



Buttonhole - the columns, cutting space

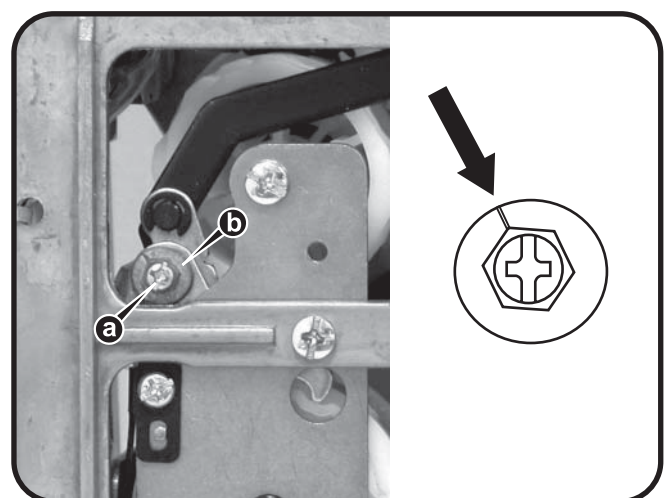
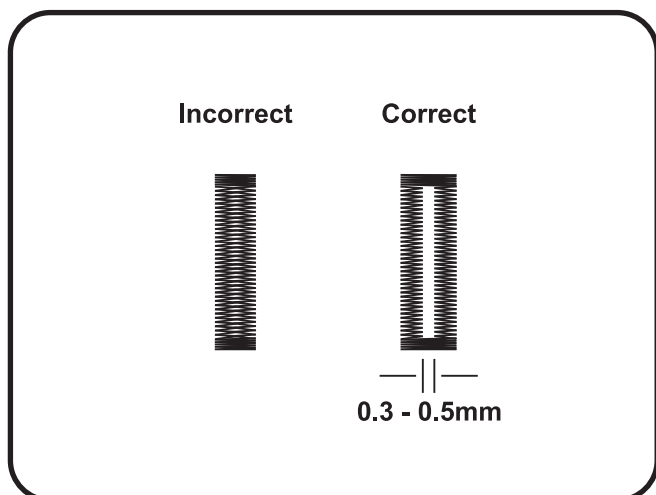
Check

The cutting space between columns shall be 0.3 - 0.5 mm.

Adjustment

1. Remove plate (A).
2. Loosen screw (a) then adjust screw nut (b).
3. Make sure cutting space is between 0.3 - 0.5mm. (At this moment, the hairline of the screw nut is positioned where the arrow pointed.)
4. Tighten screw (a) and attach plate (A).

NOTE! This adjustment affect "The centre position of the needle in straight stitching" adjustment.



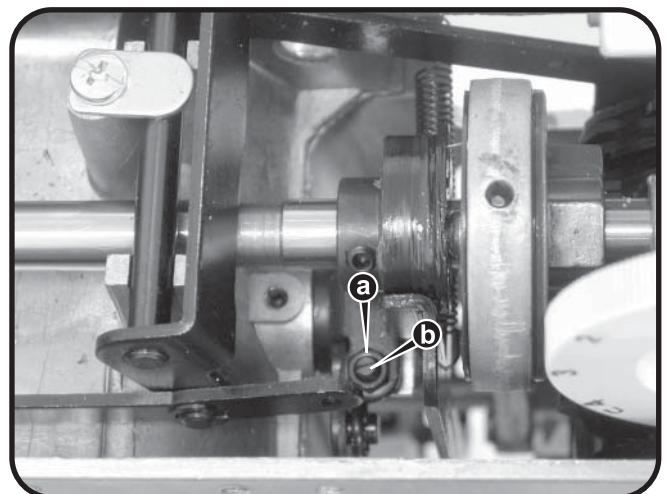
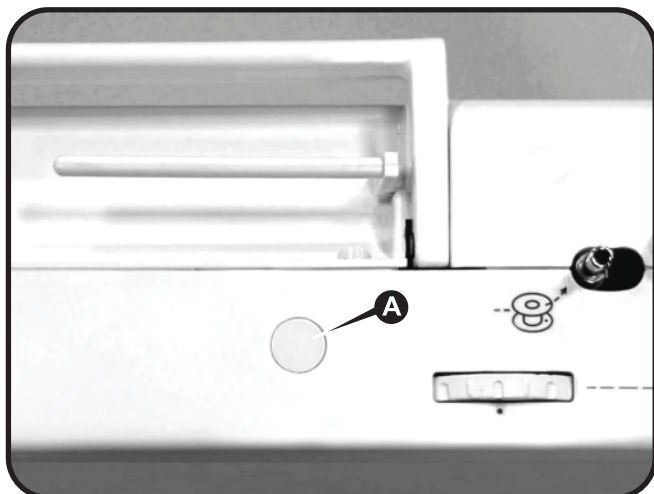
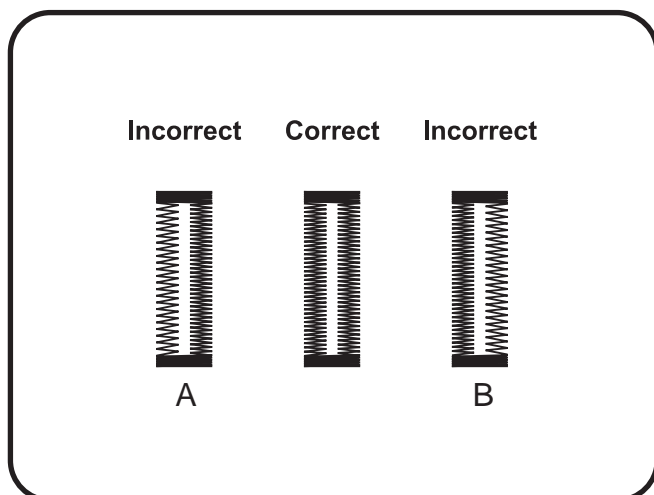
Buttonhole - the columns, feed balance

Check

When sewing a buttonhole, the stitches on each side of the buttonhole should be sewn with the same density.

Adjustment

1. Set stitch length dial to "0.5" to "1".
2. Sew the right side by setting the selector dial at "1" and then the left side by setting at "3".
3. Remove circle plate (A).
4. Loosen the 6mm screw nut (a) and adjust screw (b):
 - If the right row is denser (A), turn the adjusting screw (a) counter-clock-wise.
 - If the left row is denser (B), turn the adjusting screw (a) clock-wise.
5. After adjustment, tighten screw nut (a).
6. Attach the plate (A).




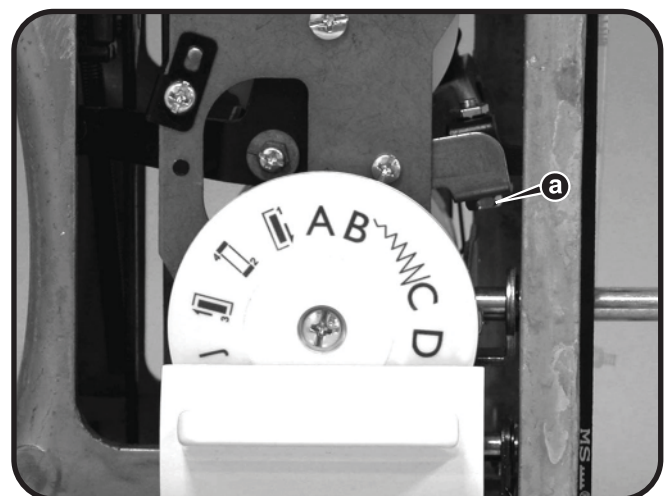
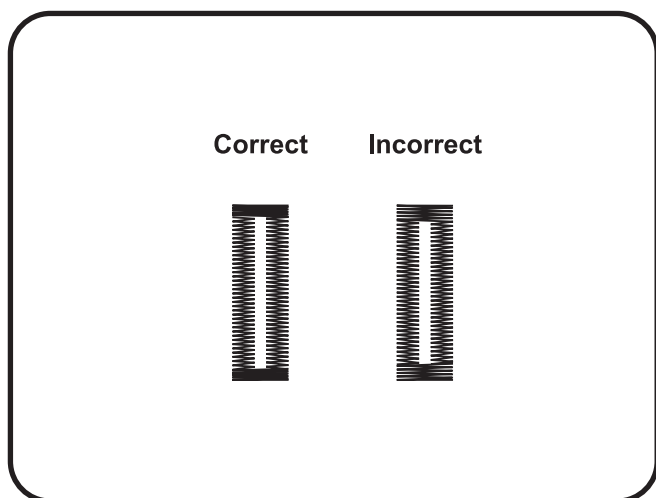
Buttonhole - bar tack, zero feeding

Check

When a button hole's bar tack is selected there should not be any feeding.

Adjustment

1. Set pattern selector dial to "  ".
2. Set stitch length dial to "0.5" to "1".
3. Sew a buttonhole to check if the fabric is feeding while sewing the bar tacks.
4. Remove the back cover and the front cover.
5. Adjust the screw (a):
 - If the fabric is fed forward, turn the screw (a) counter clockwise .
 - If the fabric is fed backward, turn the screw (a) clockwise.
6. Attach the covers.



Motor belt tension

Check

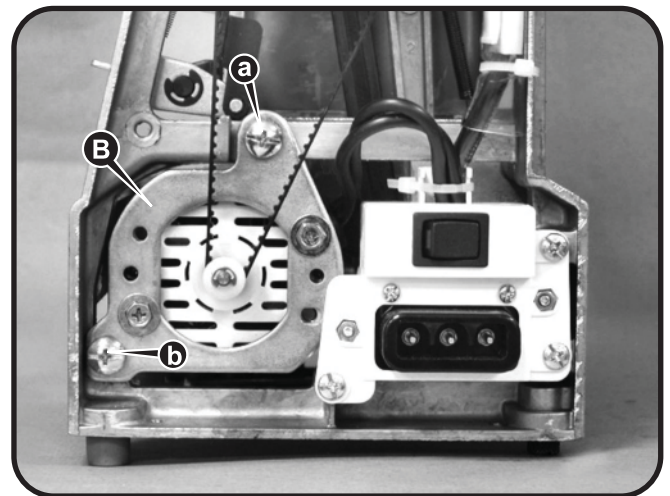
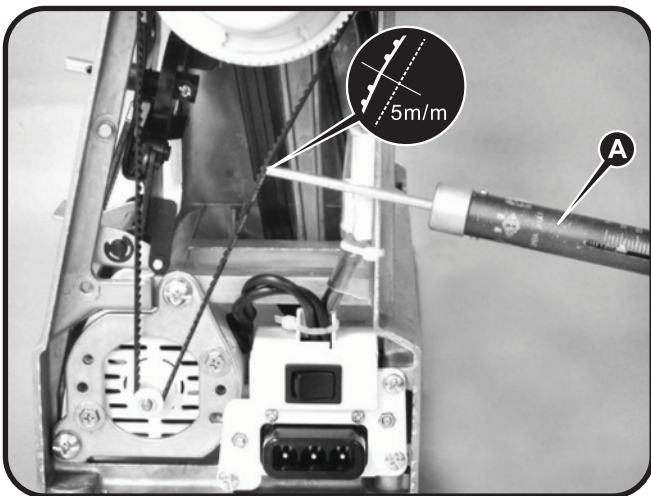
Too tight or too loose motor belt tension can cause belt noise.

Too tight motor belt tension can make the machine to run slow and overload the motor.

Too loose motor belt tension may cause jumping of the belt teeth on the motor pulley.

Adjustment

1. Remove the back cover, front cover and test tension of motor belt using belt tension gauge (A). Its standard measurement should be 100g.
2. Loosen the screws (a) and (b) of adjusting plate (B).
3. Move the motor
 - upwards, the belt will become more loose.
 - downwards, the belt will become more tight.
4. Tighten the set screws (a) and (b).
5. Attach the covers.



Bobbin winding

Check

When winding up the lower thread onto the bobbin it should wind it 80 percent full and filled evenly.

Adjustment

1. Place an empty bobbin on spindle and push it to the right.
2. Lead thread from spool to back side of thread guide.
3. Wind thread clockwise around bobbin winder tension disc.
4. Turn on the power switch and step on the foot controller to run the machine.
5. Observe the shape of bobbin winding:
 - When the lower part of bobbin winding is thicker, adjust the screw (a) counter clockwise.
 - When the upper part of bobbin is thicker, adjust the screw (a) clockwise.
6. Observe the intensity:
 - If bobbin is less than 80 percent full, loosen the screw (b), adjust bobbin winder bracket shaft (B) clockwise.
 - If bobbin is over 80 percent full, loosen the screw (b), adjust bobbin winder bracket shaft (B) counter-clockwise.
7. Tighten the screw (b).
8. Bobbin should be 80 percent full and evenly filled after adjustment.
9. Push bobbin to left after adjustment before sewing.

