

SERVICE MANUAL

MODEL: 2222

CONTENTS

TROUBLESHOOTING.....	1 - 3
SERVICE ACCESS (1) FACE COVER, BELT COVER.....	4
SERVICE ACCESS (2) BASE PLATE	5
SERVICE ACCESS (3) FRONT COVER.....	6
SERVICE ACCESS (4) REAR COVER	7
TOP TENSION	8
BOBBIN TENSION	9
PRESSER BAR HEIGHT AND ALIGNMENT	10
NEEDLE SWING	11
NEEDLE DROP	12
CLEARANCE BETWEEN NEEDLE AND HOOK (ADJUSTMENT METHOD NO.1).....	13
CLEARANCE BETWEEN NEEDLE AND HOOK (ADJUSTMENT METHOD NO.2).....	14
FEED DOG HEIGHT	15
NEEDLE BAR HEIGHT	16
NEEDLE TIMING TO SHUTTLE.....	17
BUTTONHOLE FEED BALANCE.....	18
BARTACK FEED OF BUTTONHOLE	19
DISENGAGEMENT OF CAM FOLLOWER	20
MOTOR BELT TENSION.....	21
WIRING	22

TROUBLESHOOTING

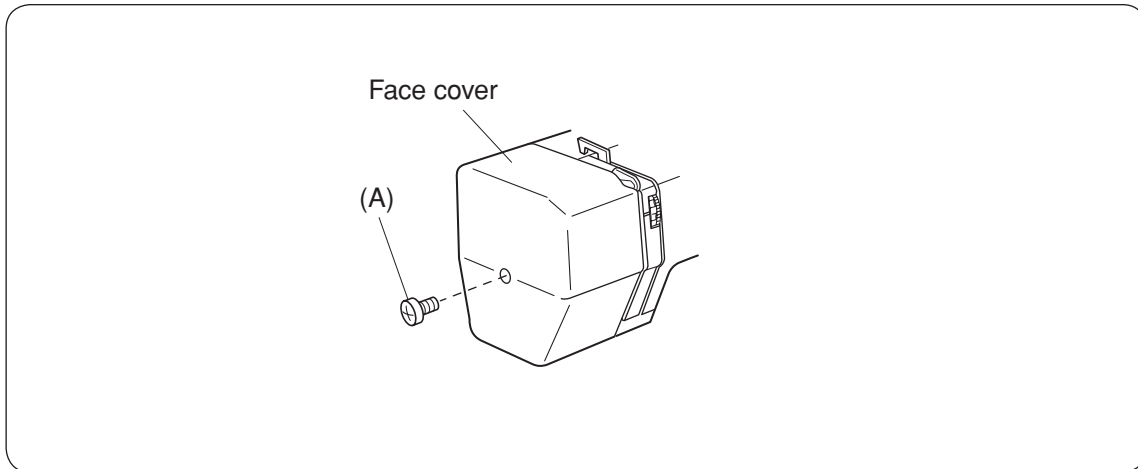
PROBLEM	CAUSE	REMEDY	REFERENCE
1. Skipping stitches	<ol style="list-style-type: none"> 1. Needle is not inserted properly. 2. Needle is bent or worn. 3. Incorrectly threaded 4. Needle or thread are inappropriate for fabric being sewn. 5. Sewing on stretch fabric 6. Inappropriate needle bar height 7. Inappropriate needle to hook timing 8. Inappropriate needle to hook clearance 	<p>Insert the needle properly.</p> <p>Change the needle.</p> <p>Rethread.</p> <p>Use the recommended sewing needle and thread.</p> <p>Use A #11 blue tip needle.</p> <p>See mechanical adjustment "Needle bar height."</p> <p>See mechanical adjustment "Needle timing to shuttle."</p> <p>See mechanical adjustment "Clearance between needle and hook."</p>	<p>P. 16</p> <p>P. 17</p> <p>P. 13, 14</p>
2. Fabric not moving	<ol style="list-style-type: none"> 1. Incorrect feed dog height 2. Thread on bottom side of fabric is jammed up. 3. Feed dog teeth are worn. 	<p>See mechanical adjustment "Feed dog height."</p> <p>Make sure to bring both needle and bobbin thread under the foot when starting sewing.</p> <p>Change the feed dog.</p>	<p>P. 15</p>

PROBLEM	CAUSE	REMEDY	REFERENCE
3. Breaking upper thread	<ol style="list-style-type: none"> 1. Initial sewing speed is too fast. 2. Thread path is incorrect. 3. Needle is bent or dull. 4. Upper thread tension is too strong. 5. Needle size is inappropriate for fabric. 6. Needle eye is worn. 7. Needle hole in needle plate is worn or burred. 	<p>Start with medium speed.</p> <p>Use the proper thread path.</p> <p>Replace with a new needle.</p> <p>Adjust upper thread tension correctly.</p> <p>Use appropriate needle and thread for fabric in use.</p> <p>Change the needle.</p> <p>Repair the hole or replace the needle plate.</p>	P. 8
4. Breaking bobbin thread	<ol style="list-style-type: none"> 1. Incorrectly thread bobbin case. 2. Too much thread is around on the bobbin. 3. Lint is stuck inside the hook race. 4. Thread quality is too low. 5. Thread is jamming around the bobbin. 6. Bobbin thread tension is too strong. 	<p>Thread bobbin case correctly.</p> <p>Adjust the position of stopper.</p> <p>Clean the hook race.</p> <p>Change to a high quality sewing thread.</p> <p>Clear out the jamming thread.</p> <p>Adjust bobbin thread tension correctly.</p>	P. 9
5. Needle breaks	<ol style="list-style-type: none"> 1. Needle is hitting the needle plate. 2. Needle is bent or worn. 3. Needle is hitting the hook race. 4. The fabric moves while the needle is piercing it, or the needle zigzags while in fabric. 5. Fabric is being pulled too strongly while sewing. 	<p>See mechanical adjustment "Needle drop ."</p> <p>Change the needle.</p> <p>See mechanical adjustment "Clearance between needle and hook ."</p> <p>See mechanical adjustment "Needle swing."</p> <p>Guide the fabric gently while sewing.</p>	<p>P. 12</p> <p>P. 13, 14</p> <p>P. 11</p>

PROBLEM	CAUSE	REMEDY	REFERENCE
6. Noisy operation	1. Backlash between shuttle hook gear and lower shaft gear is too great.	See mechanical adjustment "Clearance between needle and hook (NO. 2)."	P. 14
	2. Lower shaft gear is loose.	Eliminate the looseness.	
	3. Inappropriate belt tension.	See mechanical adjustment "Motor belt tension."	P. 21E
	4. Upper shaft gear is loose.	Eliminate the looseness.	
	5. Not enough oil.	Oil all moving parts.	
7. Deformation of pattern	1. Inappropriate zigzag synchronization.	See mechanical adjustment "Needle swing."	P. 11
	2. Inappropriate disengagement of cam follower.	See mechanical adjustment "disengagement of cam follower."	P. 20
	3. Upper thread tension is too strong.	Adjust upper thread tension correctly.	P. 8
	4. Inappropriate feed balance BALANCE	See mechanical adjustment "Feed balance on stretch stitch."	P. 18

SERVICE ACCESS (1)

FACE COVER



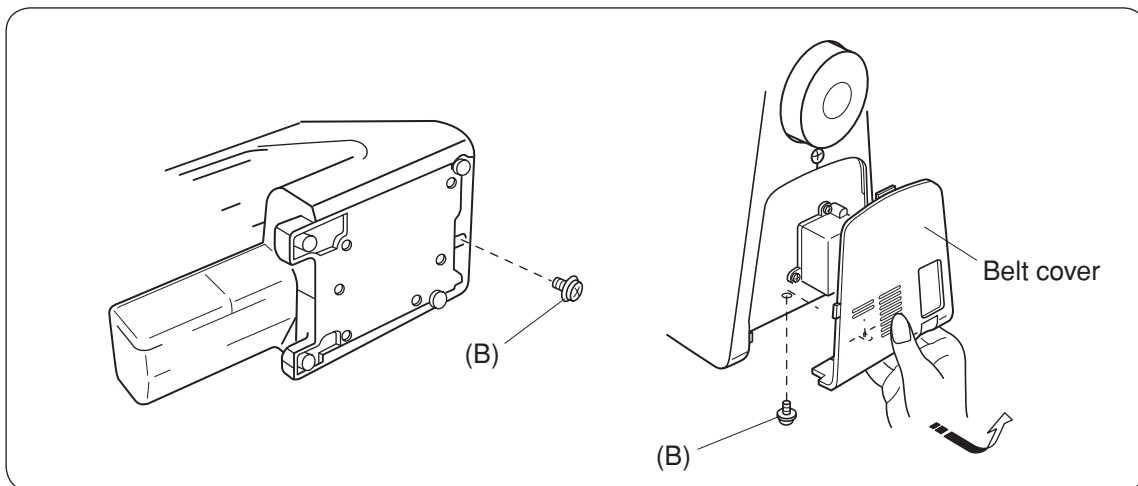
TO REMOVE

1. Remove the face cover by removing the setscrew (A).

TO ATTACH

2. Mount the face cover in reverse procedure of the removing.

BELT COVER



TO REMOVE

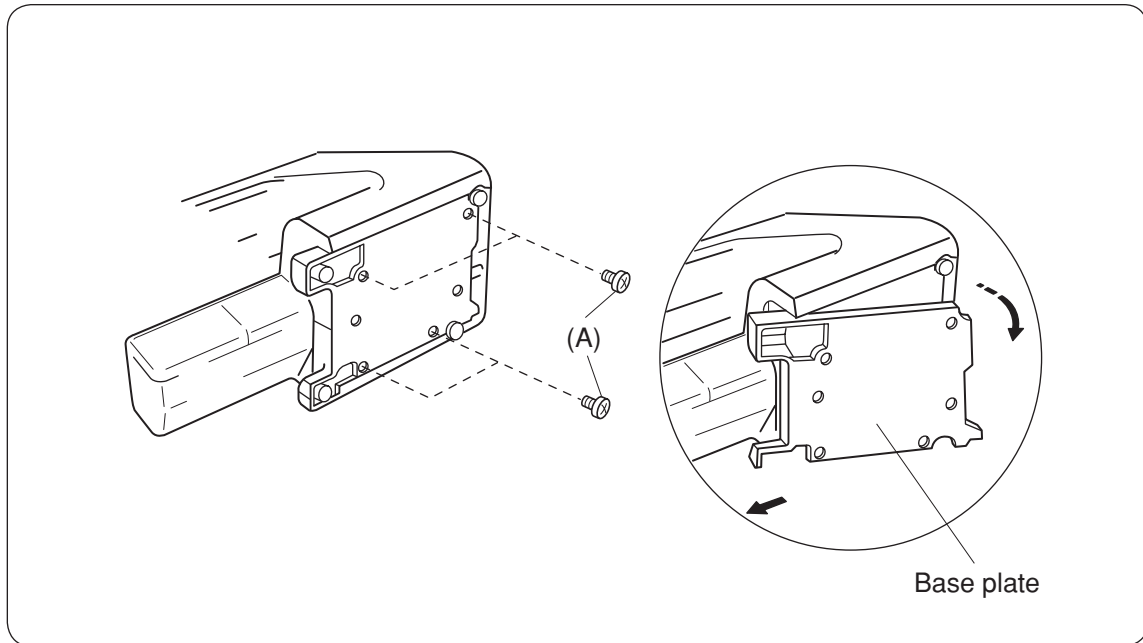
1. Loosen setscrew (B).
2. Take the belt cover out.

TO ATTACH

3. Mount the belt cover in reverse procedure of the removing.

SERVICE ACCESS (2)

BASE PLATE



TO REMOVE

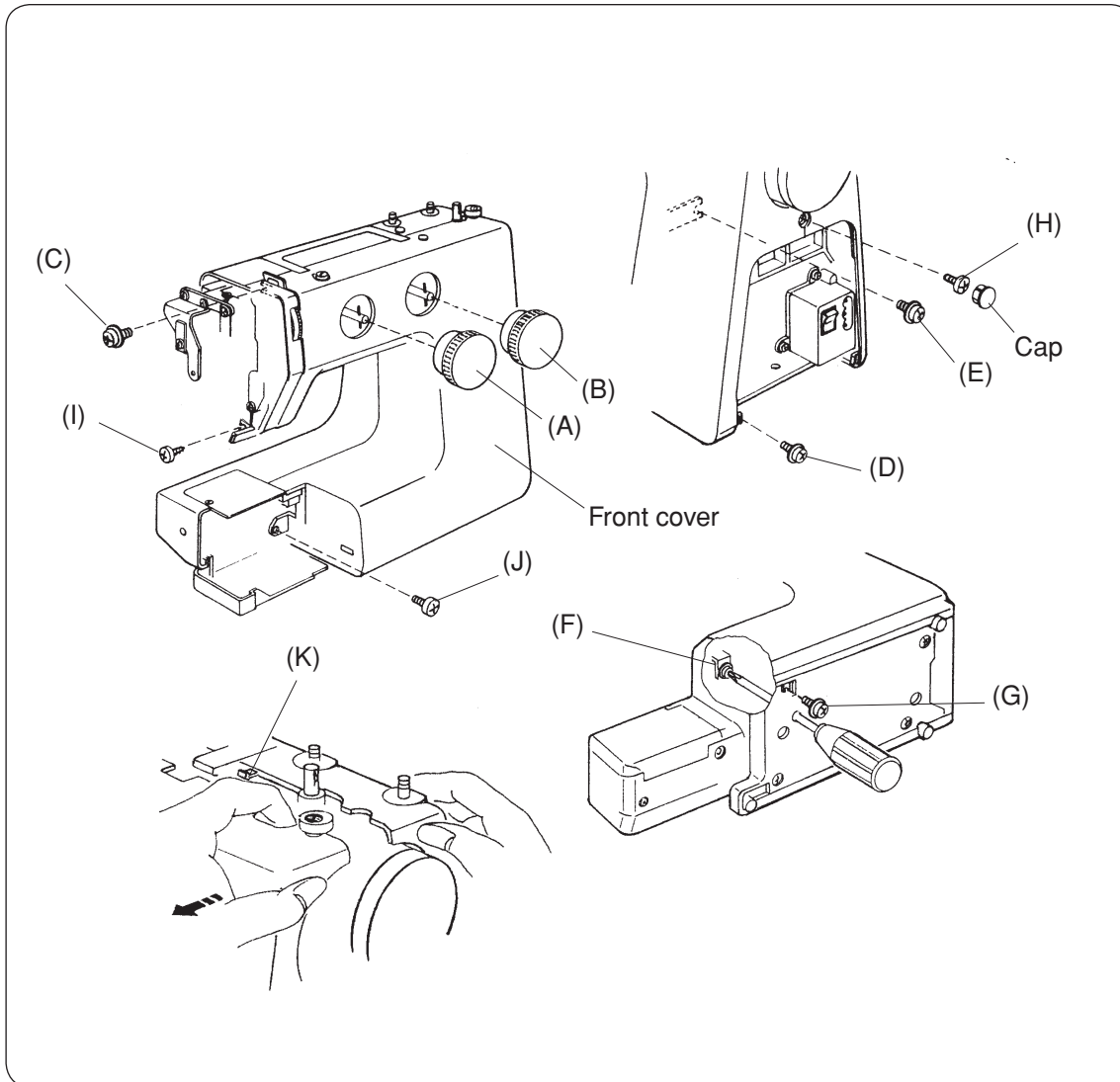
1. Remove the setscrews (A).
2. Remove the base plate.

TO ATTACH

3. Mount the base plate in reverse procedure of the removing.

SERVICE ACCESS (3)

FRONT COVER



TO REMOVE

1. Remove the face cover, and remove the belt cover (See page 4).
2. Remove dials (A) and (B).
3. Loosen setscrews (C), (D), (E), (F), and (G) and then, remove the front cover by removing setscrews (H), (I), and (J).

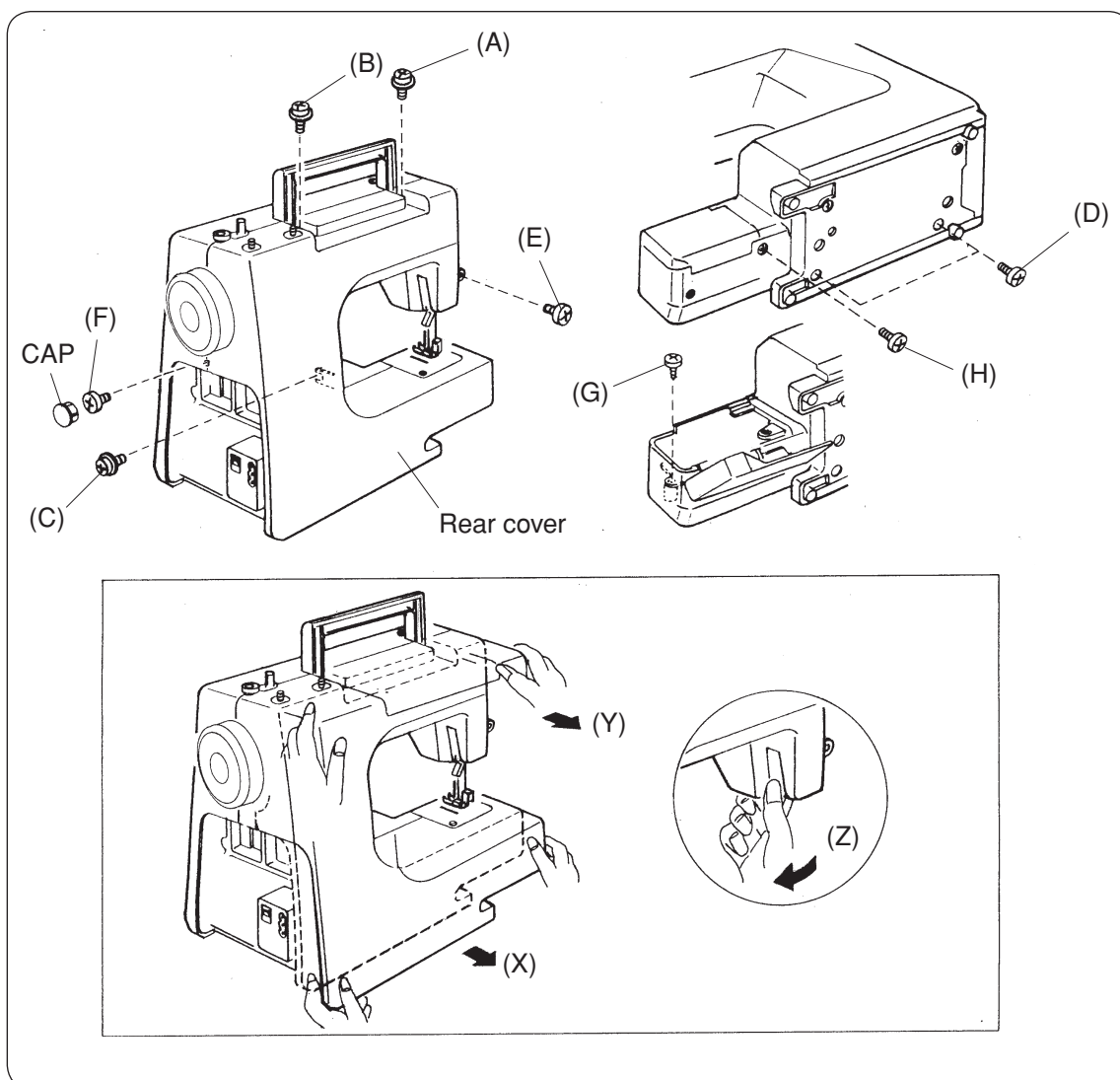
NOTE: Unhook the tab (K) from the rear cover when removing the front cover.

TO ATTACH

4. Mount the front cover in reverse procedure of the removing.

SERVICE ACCESS (4)

REAR COVER



TO REMOVE

1. Remove the face cover and belt cover (See page 4).

NOTE: PULL UP THE SPOOL PINS.

2. Loosen setscrews (A), (B), (C) and (D) (2 pcs.), and then, remove the rear cover by removing setscrews (E), (F), (G) and (H).

NOTE: Remove the rear cover in the order of (X) (lower part) → (Y) (upper part) → (Z) (presser foot lifter part).

TO ATTACH

3. Mount the rear cover in reverse procedure of the removing.

MECHANICAL ADJUSTMENT

TOP TENSION

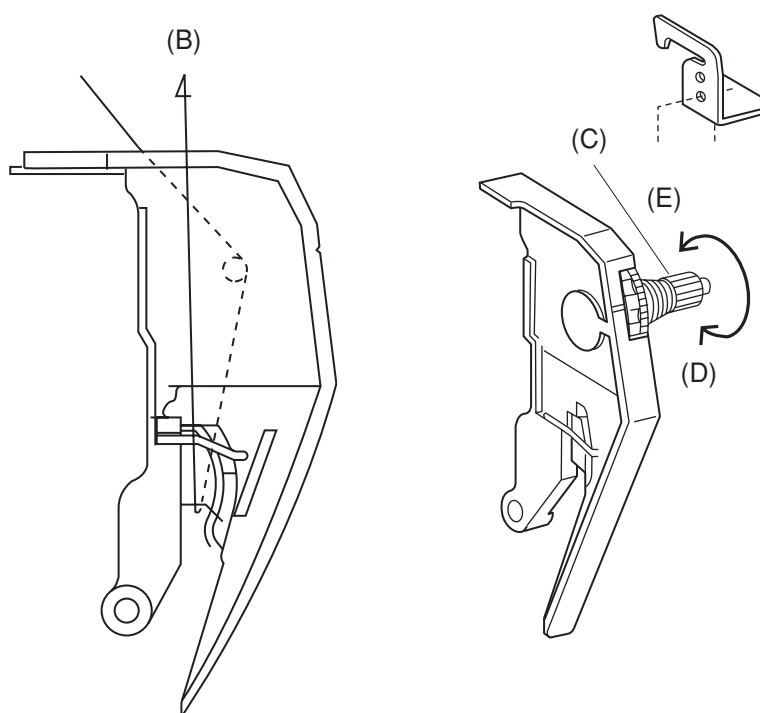
TO CHECK:

The standard upper thread tension should be 65–95 g when pulling the thread (cotton thread #50) in the direction of (B) with setting the tension dial at "3". (make sure the foot should be lowered.)

If the tension is out of the standard range, adjust it as follows:

ADJUSTMENT PROCEDURE:

1. Remove the front cover unit (See page 6).
2. Turn the adjusting nut (C) in the direction of (D) when the upper thread tension is too tight.
Turn the adjusting nut (C) in the direction of (E) when the upper thread tension is too loose.
3. Attach the front cover unit.



MECHANICAL ADJUSTMENT

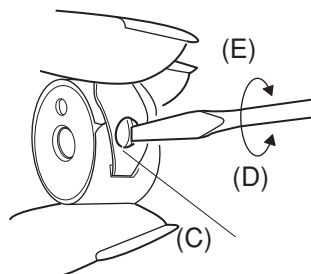
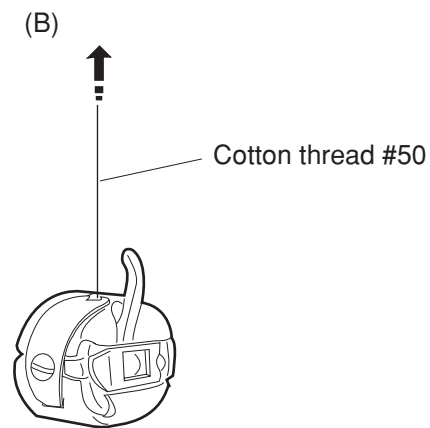
BOBBIN TENSION

TO CHECK:

Set the bobbin in the bobbin case and pass the thread (cotton #50) through the tension spring. The bobbin thread tension should be 45–55g when pulling the thread in the direction of (B). If the tension is out of the range, adjust it as follows:

ADJUSTMENT PROCEDURE:

1. Turn the adjusting screw (C) in the direction of (D) when the bobbin thread tension is too tight.
2. Turn the adjusting screw (C) in the direction of (E) when the bobbin thread tension is too loose.



MECHANICAL ADJUSTMENT

PRESSER BAR HEIGHT AND ALIGNMENT

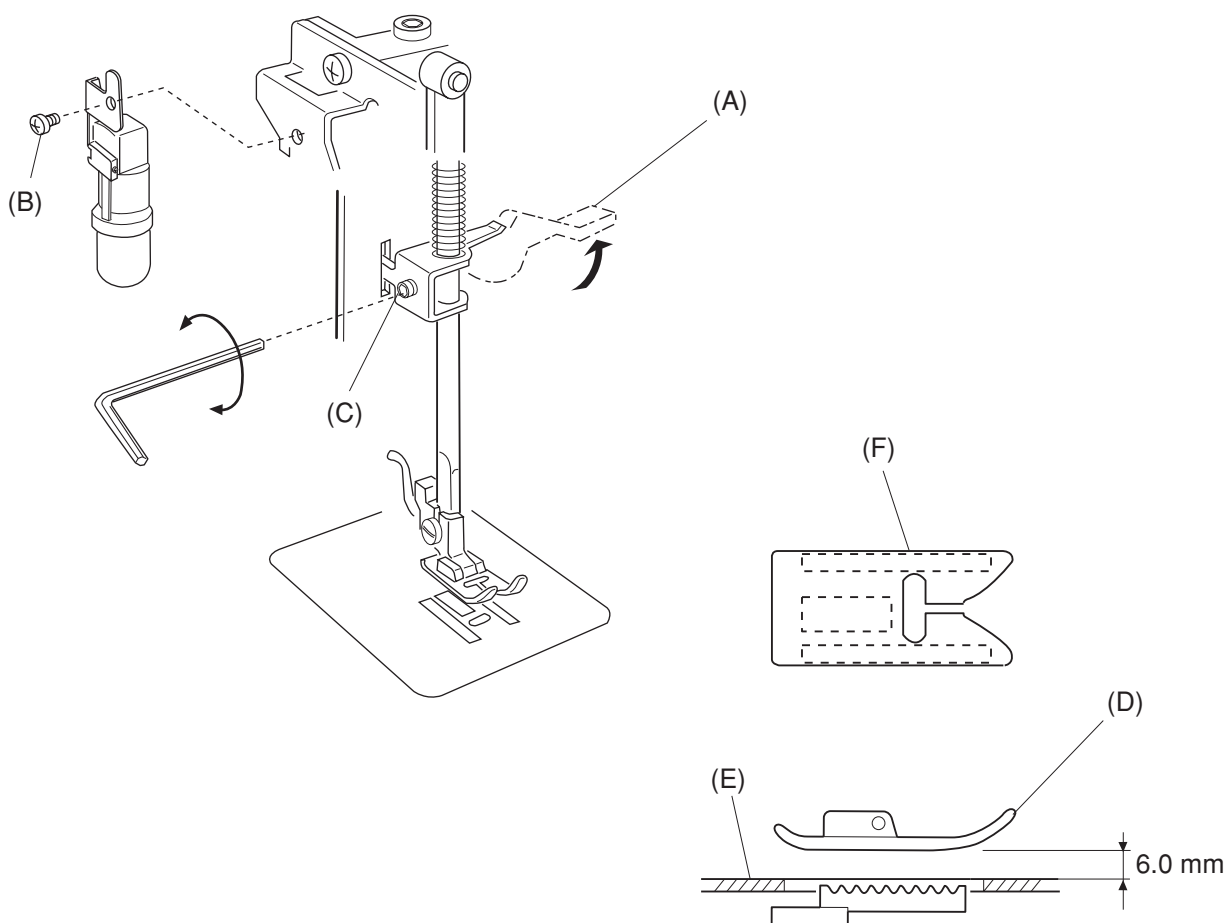
TO CHECK:

1. Raise the presser foot lever (A).
2. The distance between the presser foot (D) and the needle plate (E) should be 6.0 mm (0.24").

ADJUSTMENT PROCEDURE:

1. Remove the face cover (See page 4).
2. Raise the presser foot lever and loosen the setscrew (C) on the presser bar holder.
Adjust the distance between the presser foot (D) and the needle plate (E) to 6.0 mm (0.24").
3. Tighten the setscrew (C) securely.
4. Tighten the setscrew (B) to secure the lamp socket.
5. Attach the face cover.

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



MECHANICAL ADJUSTMENT

NEEDLE SWING

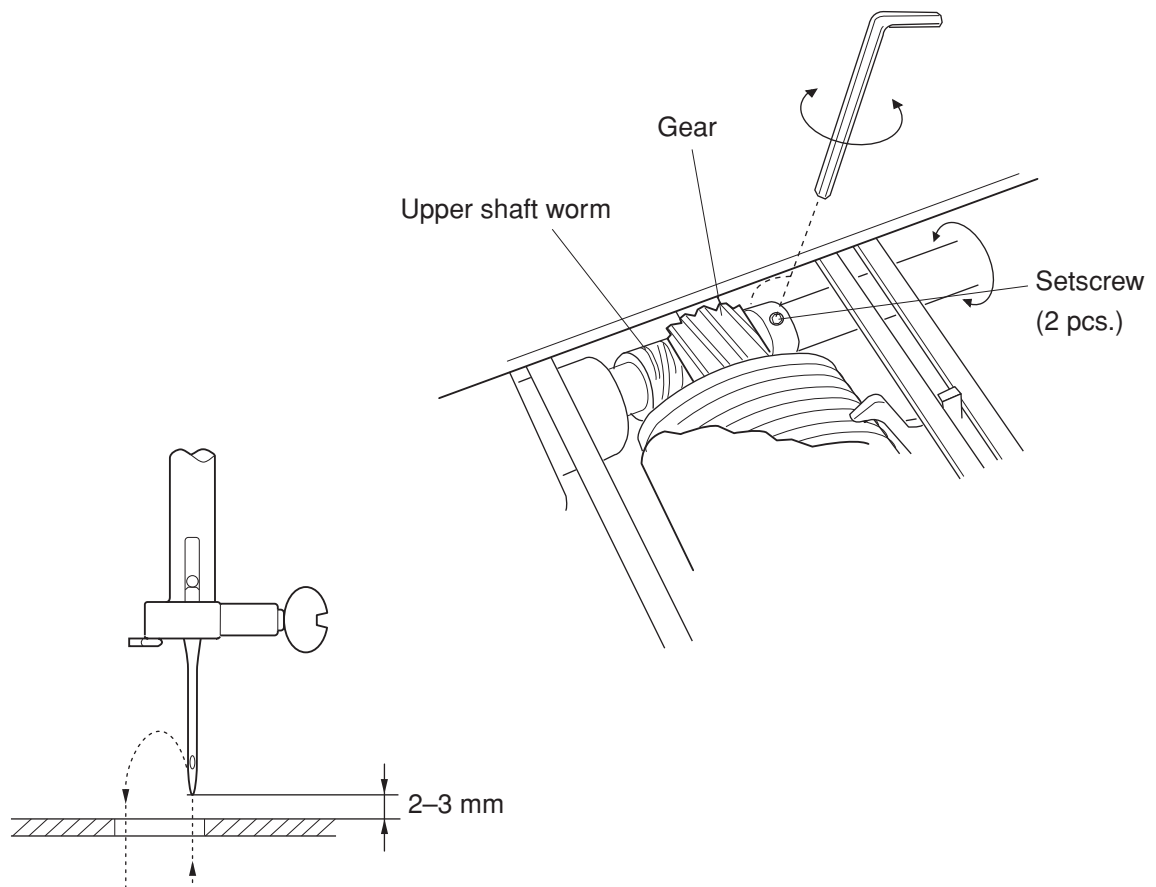
TO CHECK:

Adjust the needle swing according to the following procedure, If the needle bar starts moving sideways while the needle is in the fabric when sewing the zigzag pattern (with maximum zigzag width).

ADJUSTMENT PROCEDURE:

1. Set the pattern selector dial with maximum zigzag width, and remove the front cover (See page 6).
2. Loosen two setscrews.
3. Adjust the needle swing by turning the handwheel, while holding the worm so as not to rotate it, until the needle swing starts at 2–3 mm above the needle plate after the needle has come out of the right side of the needle hole.
4. Tighten two setscrews.
5. Mount the front cover.

NOTE: After adjusting the needle swing, check that the upper shaft worm and gear rotate smoothly without any backlash between them.



MECHANICAL ADJUSTMENT

NEEDLE DROP

TO CHECK:

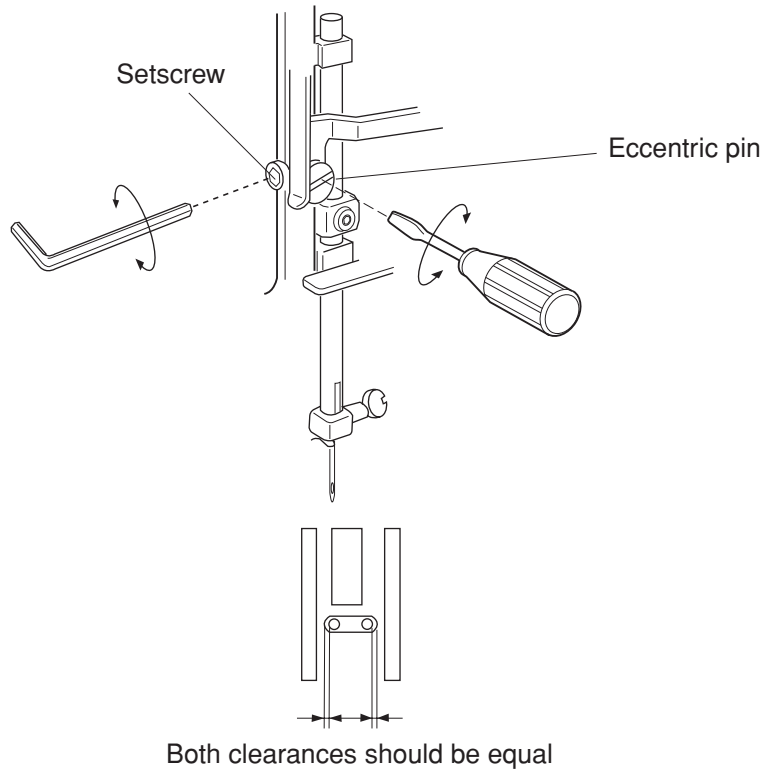
When the needle swings in maximum zigzag width, the distance between both ends of the needle hole on the needle plate and the needle drop positions should be equal.

If not, adjust as follows:

ADJUSTMENT PROCEDURE:

1. Remove the face cover (See page 4).
2. Set the pattern selector dial at maximum zigzag width.
3. Loosen the setscrew.
4. Turn the eccentric pin to adjust the needle drop.
5. Tighten the setscrew.
6. Attach the face cover.

NOTE: Check the hook timing after this adjustment.



MECHANICAL ADJUSTMENT

CLEARANCE BETWEEN NEEDLE AND HOOK (ADJUSTMENT METHOD NO. 1)

TO CHECK:

The clearance between the needle and shuttle race should be -0.05 to $+0.10$ mm.

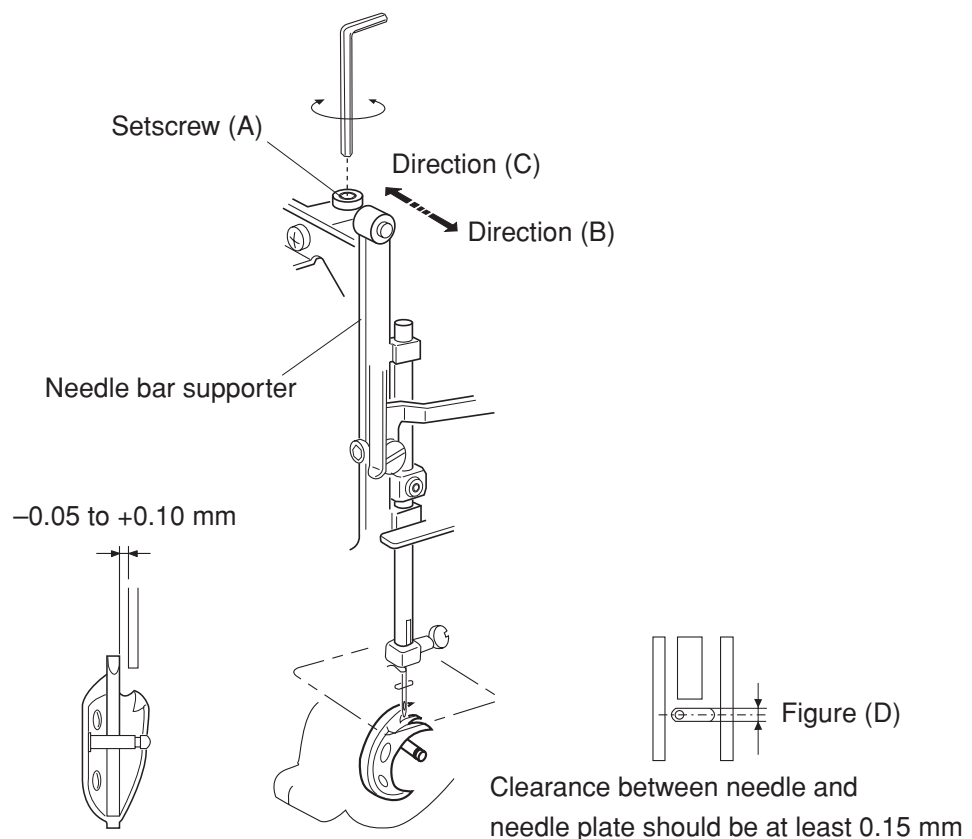
If not, adjust as follows:

ADJUSTMENT PROCEDURE:

1. Remove the face cover (See page 4).
2. Set the pattern select dial at "C".
3. Loosen setscrew (A), and move the needle bar supporter in the direction of the arrows to get a clearance between -0.05 to $+0.10$ mm.
 - * If clearance is too wide, move the needle bar supporter to direction (B).
 - * If clearance is too narrow, move the needle bar supporter to direction (C).

NOTE: After this adjustment, check that the clearance between the needle and needle plate is more than 0.15 mm as shown in figure (D). If not, adjust the clearance between needle and shuttle race by using adjustment method NO.2 (see next page). Readjust the clearance between needle and needle plate more than 0.15 mm.

4. Attach the face cover.



MECHANICAL ADJUSTMENT

CLEARANCE BETWEEN NEEDLE AND HOOK (ADJUSTMENT METHOD NO.2)

TO CHECK:

Use this adjustment method NO. 2 if the clearance cannot be adjusted by the method NO.1.

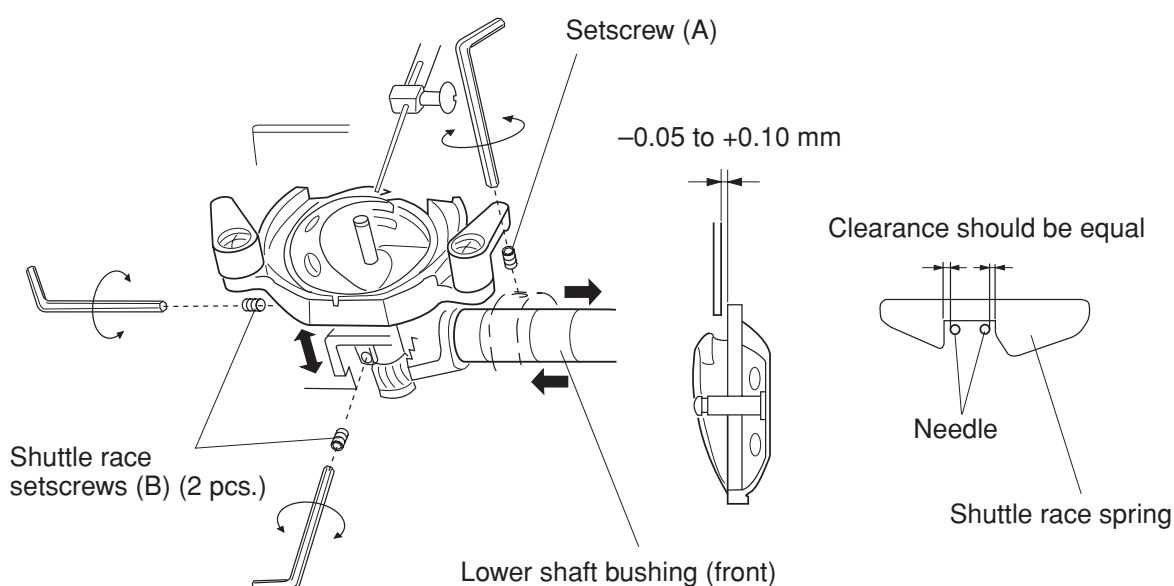
The clearance between the needle and shuttle race should be -0.05 to $+0.10$ mm.

ADJUSTMENT PROCEDURE:

1. Set the pattern selector dial at "C: D".
2. Remove the rear cover (See page 7).
3. Loosen the setscrew (A) on the lower shaft bushing and slide the gear about 0.5 mm to the right to create some slack between the gears.
4. Lower the needle and loosen the two shuttle race setscrews (B).
Move the shuttle race unit axially either forward or backward to adjust the clearance between the needle and the shuttle race in the range of -0.05 to $+0.10$ mm.
5. Set the pattern select dial at "W", turn the handwheel to check if the clearance between the needle and inner edges of the shuttle race spring at the left and right needle drops are equal.
If not, adjust by turning the shuttle race unit.
6. Tighten the two shuttle race setscrews (B).
7. Loosen the setscrew on the lower shaft bushing and slide the gear back to the original position while adjusting the backlash.
8. Tighten screw (A) firmly.
9. Attach the rear cover.

NOTE: The rotary play of the tip of the shuttle driver should be less than 0.3 mm and the lower shaft should turn smoothly.

After the adjustment, check the hook timing.



MECHANICAL ADJUSTMENT

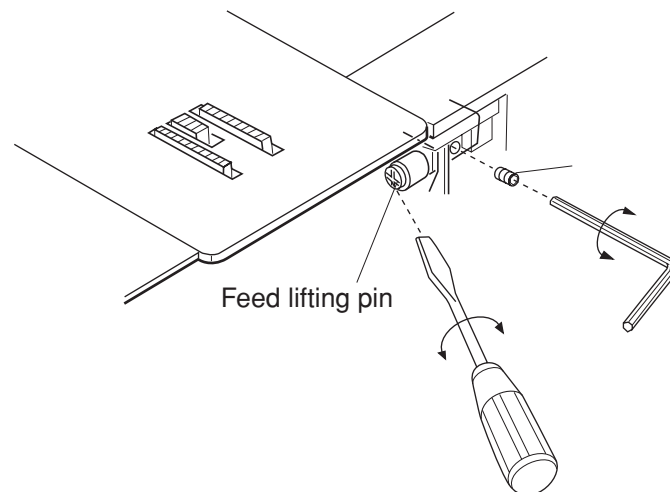
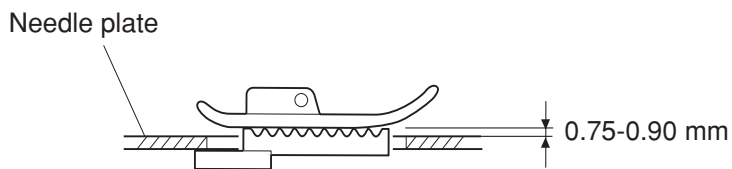
FEED DOG HEIGHT

TO CHECK:

1. Lower the presser foot.
2. Turn the handwheel toward you to bring the feed dog to its highest position. The height of the feed dog from the needle plate should be 0.75-0.90mm.
If it is not in the range, adjust as follows.

ADJUSTMENT PROCEDURE:

1. Open the shuttle cover.
2. Lower the presser foot and turn the handwheel toward you until the feed dog comes to its highest point.
3. Loosen the setscrew (A) .
4. Turn the feed lifting pin to adjust the height of feed dog (0.75-0.90 mm).
5. Tighten the setscrew (A).
6. Turn the handwheel toward you to recheck the height of feed dog.



MECHANICAL ADJUSTMENT

NEEDLE BAR HEIGHT

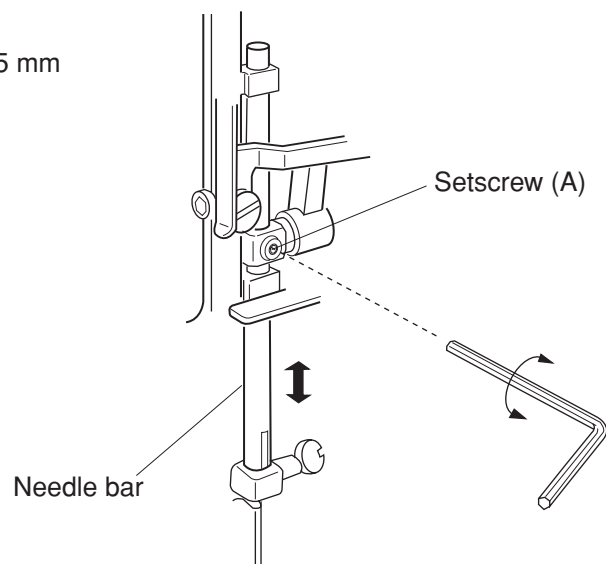
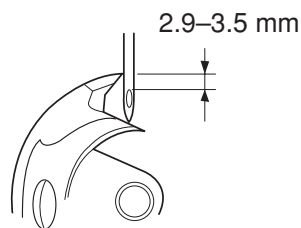
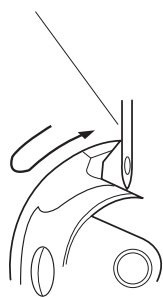
TO CHECK:

When the tip of shuttle hook meets the left side of the needle in ascending travel of the needle from its left and lowest position, The distance between the top of the needle eye and the tip of the shuttle hook should be in the range of 2.9-3.5 mm.

ADJUSTMENT PROCEDURE:

1. Open the face cover.
2. Set the pattern selector dial at " C D ".
3. Open the shuttle cover.
4. Remove the shuttle race ring.
5. Turn the handwheel toward you until the tip of the shuttle hook meets the left side of the needle.
6. Loosen the lower shaft crank arm screw (A).
7. Adjust the height of the needle bar by moving the needle bar upward or downward without turning it.
8. Tighten the setscrew (A).
9. Attach the shuttle race ring.

Tip of shuttle hook meets
left side of needle



MECHANICAL ADJUSTMENT

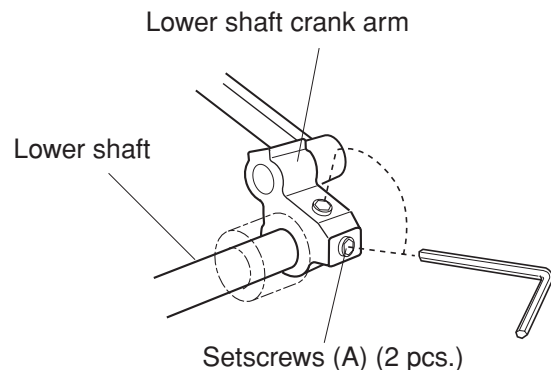
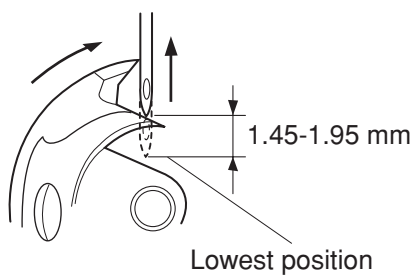
NEEDLE TIMING TO SHUTTLE

TO CHECK:

The height of the needle point from its lowest point of travel should be in the range of 1.45-1.95 mm when the tip of the shuttle hook just meets the left side of the needle at the left needle position.

ADJUSTMENT PROCEDURE:

1. Set the pattern selector dial at "C D".
2. Remove the base (See page 5).
3. Open the shuttle cover.
4. Remove the shuttle race ring.
5. Turn the handwheel toward you until the tip of the shuttle hook meets the left side of the needle.
6. Loosen the lower shaft crank arm screws (A).
7. While holding the shuttle hook so it doesn't turn, turn the handwheel toward you until the needle comes to its lowest position.
Then, further turn the handwheel to raise the needle about 1.7 mm from its lowest position.
8. Tighten the setscrews (A).
9. Turn the handwheel toward you to check if the height is in the range of 1.45-1.95 mm.
If it is not in this range, repeat the above procedure.
10. Attach the shuttle race ring.
11. Attach the base.



MECHANICAL ADJUSTMENT

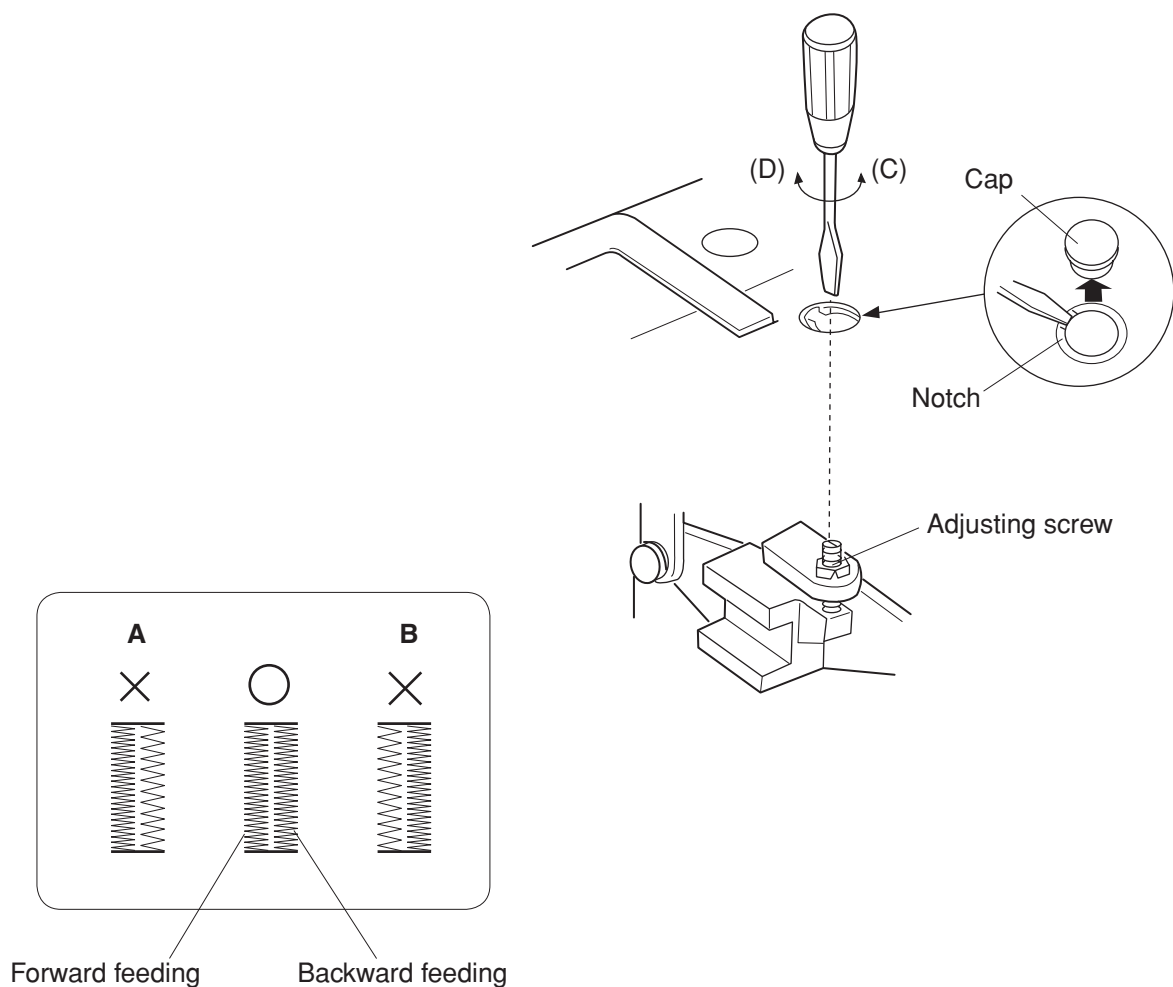
BUTTONHOLE FEED BALANCE

TO CHECK:

When sewing buttonhole, the stitches on each side of buttonhole should be the same stitch density. The range of 9-12 stitches in the right side row "backward feeding" against 10 stitches in the left side row "forward feeding" is considered acceptable.

ADJUSTMENT PROCEDURE:

1. Check the stitches by sewing buttonholes, and remove the cap.
2. Turn the adjusting screw in the direction of (C) in case of (A) (right stitches are rough), or in the direction of (D) in case of (B) (left stitches are rough).
3. Mount the cap.



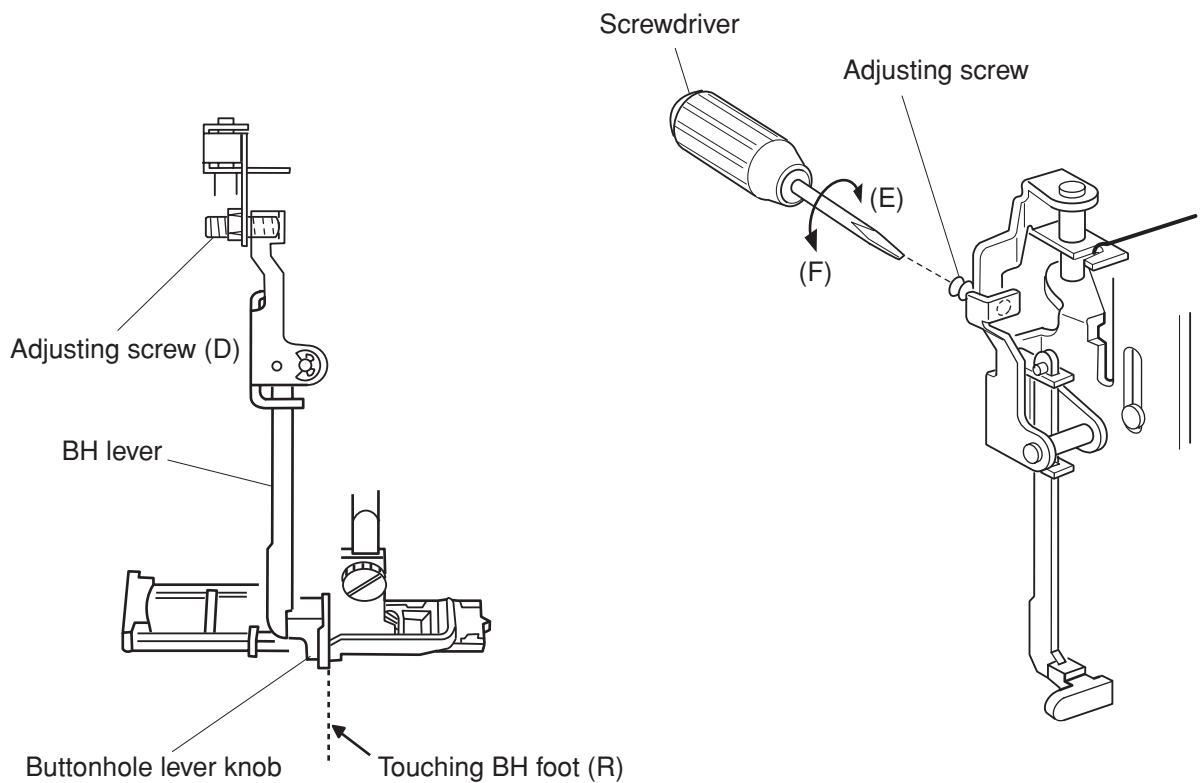
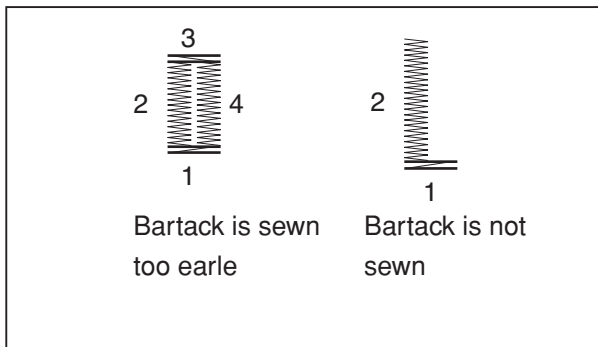
MECHANICAL ADJUSTMENT

BUTTONHOLE FUNCTION

The standard buttonhole size is 3 mm (0.12") longer than the actual button size when sewing with the automatic buttonhole foot. Adjusted as follows:

ADJUSTMENT PROCEDURE:

1. Attach the buttonhole foot (R).
2. Pull down the BH lever. Turn the adjusting screw until the BH lever knob slightly touches the end of the stopper.
3. If the buttonhole sewing step 2 switches over to step 3 (Bartack sewing) too soon, turn the adjusting screw in direction of (E).
If the Buttonhole sewing step 2 does not switch over to step 3 (Bartack sewing), turn the adjusting screw in direction of (F).




MECHANICAL ADJUSTMENT

DISENGAGEMENT OF CAM FOLLOWER

TO CHECK:

If the clearance between the cam follower and the top convex of the zigzag cam is not enough, the pattern selector dial is blocked or will not select the correct pattern.

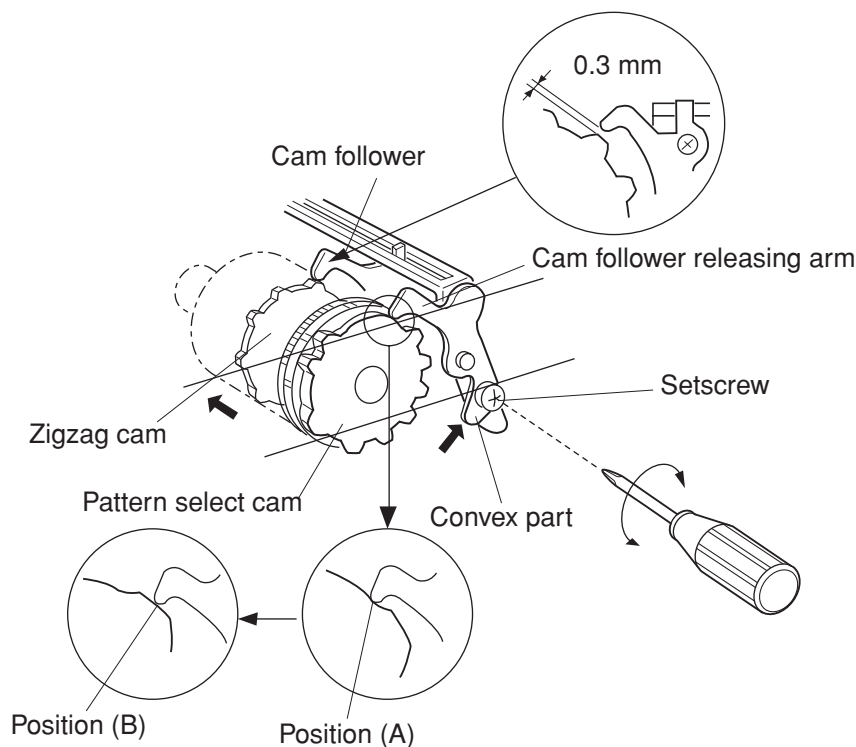
ADJUSTMENT PROCEDURE:

1. Remove the front cover (See page 6).
2. Set the pattern selector dial at pattern " ".
3. Put the cam follower to the zigzag cam and put the cam follower releasing arm to the pattern selector cam.
4. Loosen the setscrew.
5. Push the convex part of the cam follower releasing arm in the direction of arrow until the cam follower releasing arm touches position (A) of the pattern select cam, and then, tighten the setscrew.

NOTE: After this adjustment, check that the clearance between the zigzag cam and the cam follower is about 0.3mm when setting the cam follower releasing arm onto position (B) of pattern selector cam.

6. Mount the front cover.

NOTE: Check the needle movement for straight stitch.



MECHANICAL ADJUSTMENT

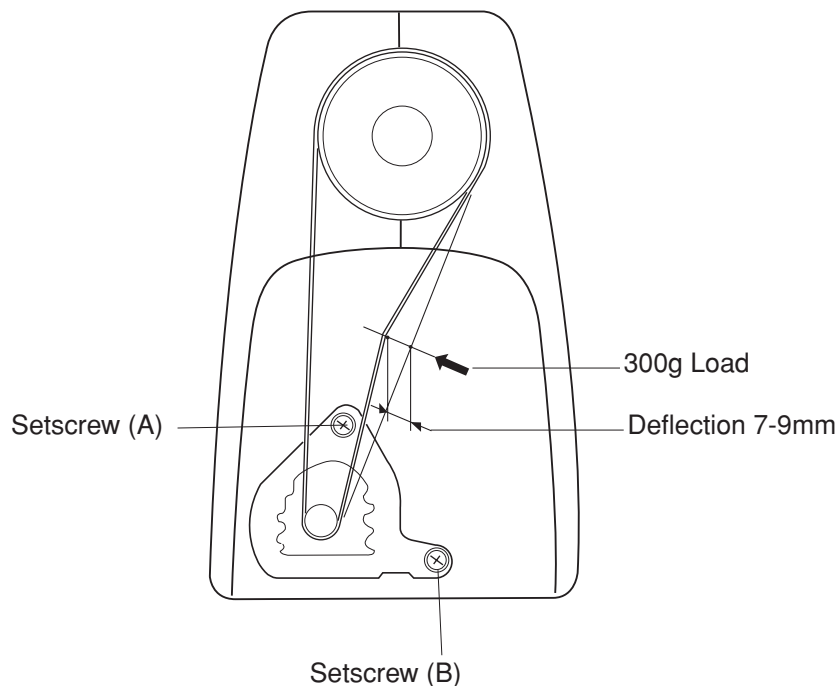
MOTOR BELT TENSION

TO CHECK:

1. Improper belt tension may cause noise, overload of motor, slow running or motor belt jumping.
2. The belt deflection should be 7mm - 9mm when pressing the middle of the motor belt with approximately 300 grams of pressure.

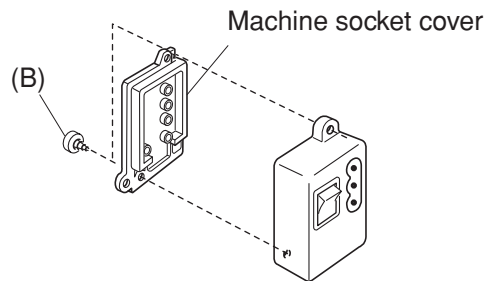
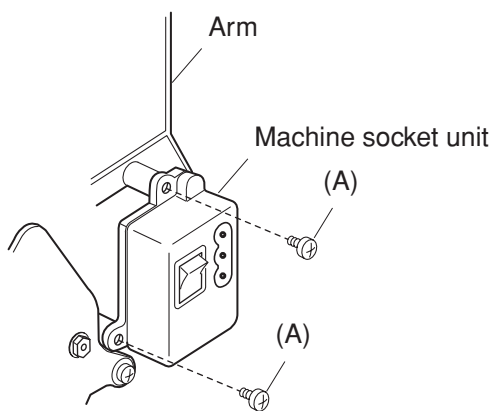
ADJUSTMENT PROCEDURE:

1. Remove the belt cover (See page 4).
2. Loosen the setscrews (A) and (B).
3. Move the motor up or down to adjust the deflection about 7mm - 9mm.
4. Tighten the setscrews (A) and (B).
5. Attach the belt cover.

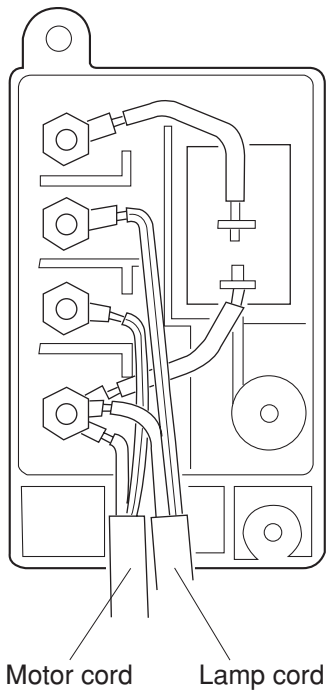


WIRING

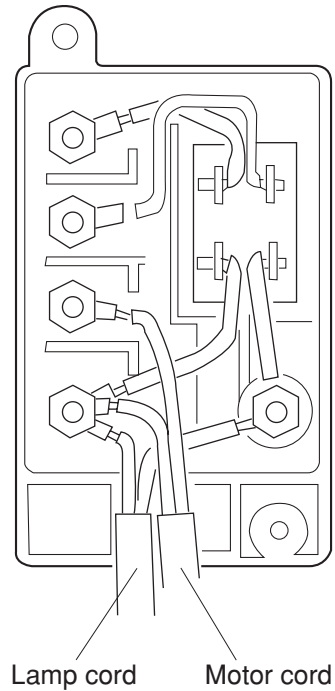
1. Remove the belt cover. (See page 4.)
2. Remove the screws (A), (B) and machine socket cover.
3. Follow the above procedure in reverse.



120V

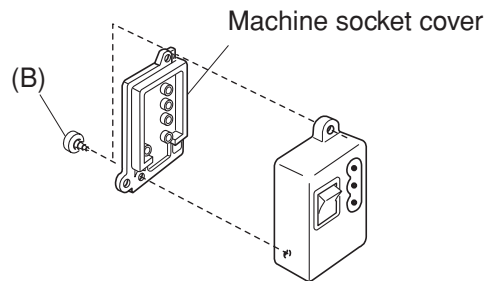
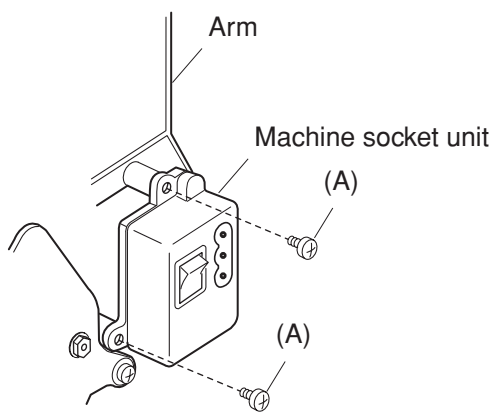


240V

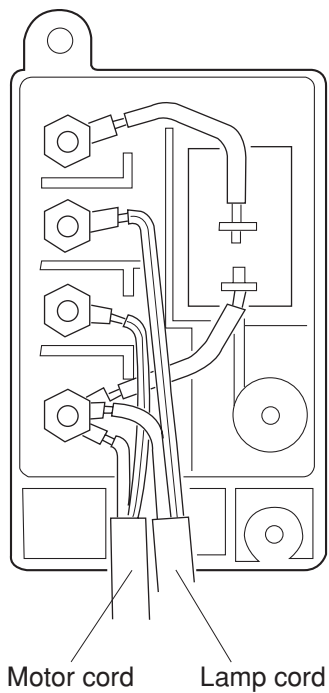


WIRING

1. Remove the belt cover. (See page 4.)
2. Remove the screws (A), (B) and machine socket cover.
3. Follow the above procedure in reverse.



120V



240V

