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Elna 6005 Heirloom Edition

SERVICE MANUAL

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CONTENTS

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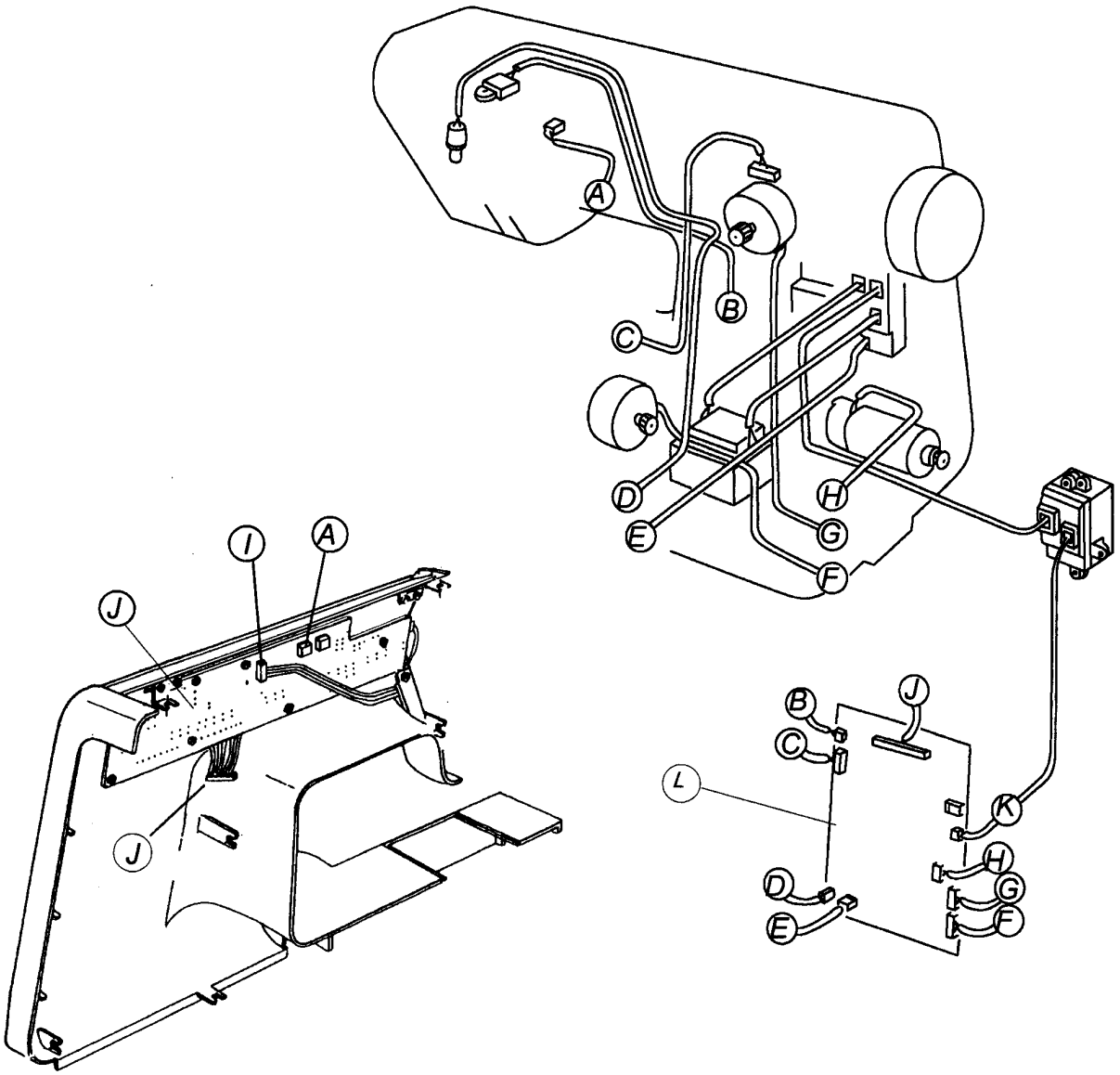
Wiring Diagram

NAME OF ELECTRONIC PARTS AND WIRING
Each connector should be connected as follows

A: THREAD TENSION SWITCH
B: BUTTONHOLE SENSOR
C: UPPER SHAFT SENSOR
D: SEWING LIGHT
E: C-BOARD
F: FEED STEPPING MOTOR
G: ZIGZAG STEPPING MOTOR
H: DC MOTOR
I: F-BOARD
J: K-BOARD
K: RECEPTACLE (SECONDARY)
L: A-BOARD



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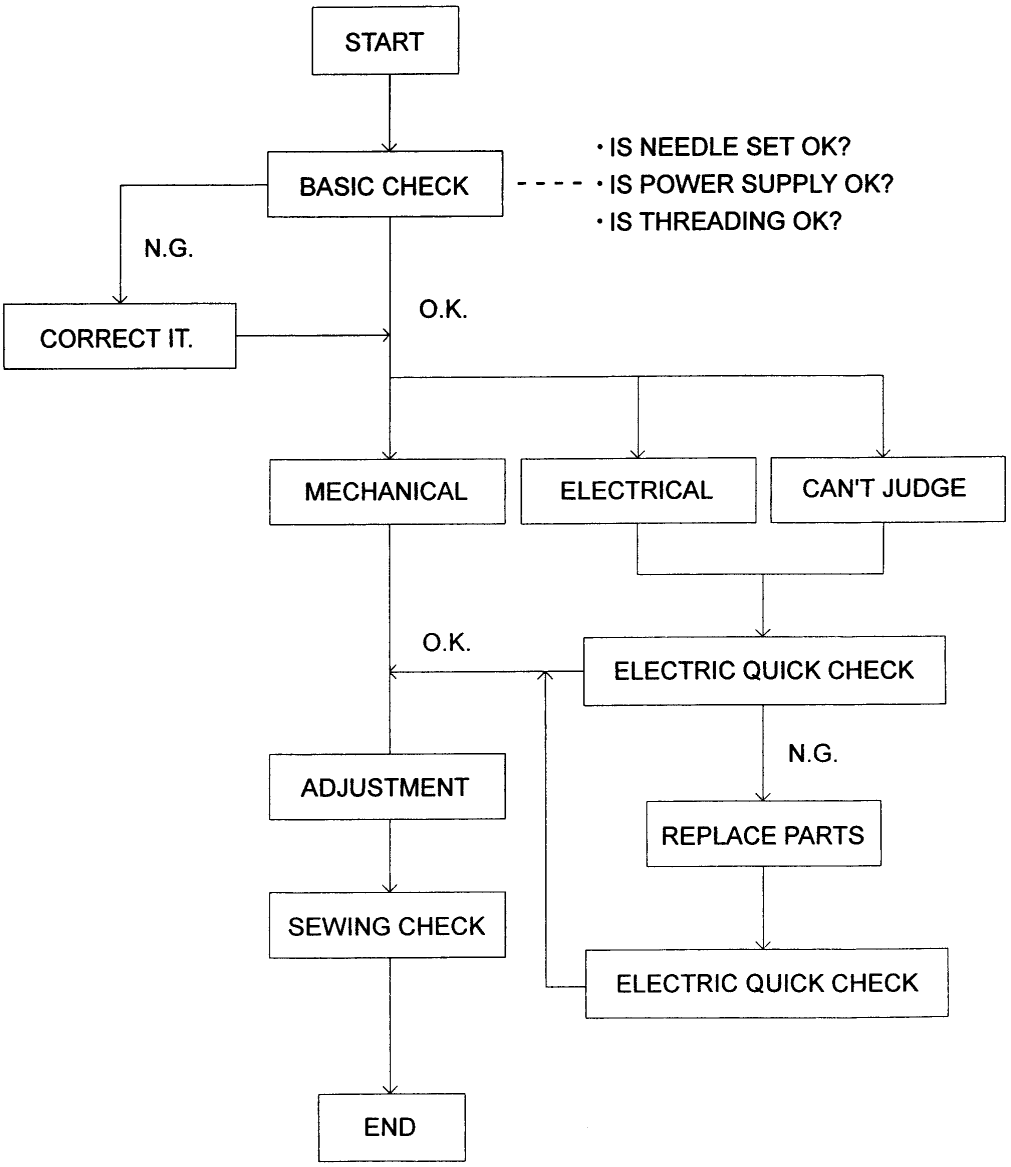
MACHINE DOESN'T WORK WELL



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WHAT TO DO WHEN

CONDITION	CAUSE	HOW TO FIX	REFERENCE
1. Skipping stitches.	1. Needle is not inserted properly.	1. Insert the needle properly.	
	2. Needle is bent or worn.	2. Change the needle.	
	3. Incorrectly threaded.	3. Retread.	
	4. Needle or thread is inappropriate for fabric being sewn.	4. Use the recommended sewing needle and thread.	
	5. Sewing on stretch fabric	5. Use a No. 11 blue tip needle.	
	6. Presser foot pressure is too weak.	6. Adjust the presser bar level to make the pressure stronger.	
	7. Inappropriate needle bar height.	7. See mechanical adjustment “Needle bar height”	Page 14
	8. Inappropriate needle to hook timing.	8. See mechanical adjustment “Needle to shuttle timing”.	Page 15
	9 Inappropriate needle to shuttle clearance.	9. See mechanical adjustment “Clearance between needle and hook”.	Page 16
2. Fabric not moving.	1. Presser foot pressure in too weak.	1. Adjust the presser bar level to make the pressure stronger.	
	2. Incorrect feed dog height.	2. See mechanical adjustment “Feed dog height”.	Page 18
	3. Feed dog is in down position.	3. Raise the feed dog level.	
	4. Thread on bottom side of fabric is jammed up.	4. Make sure to bring both needle and bobbin.	
	5. Feed dog teeth are worn.	5. Thread under the foot when starting sewing.	
3. Breaking upper thread.	1. Initial sewing speed is too fast.	1. Start with medium speed.	
	2. Thread path is incorrect.	2. Use the proper thread path.	
	3. Needle is bent or dull.	3. Replace with a new needle.	
	4. Upper thread tension is too strong.	4. Adjust needle thread tension correctly.	Page 20
	5. Needle size is inappropriate for fabric.	5. Use appropriate needle for Fabric and thread in use.	
	6. Needle eye is worn.	6. Change the needle.	
	7. Needle hole in needle plate is worn or burred.	7. Repair the hole or replace the needle plate.	
4. Breaking bobbin thread.	1. Incorrectly threaded bobbin.	1. Thread bobbin correctly.	
	2. Too much thread is around on the bobbin.	2. Adjust the position of stopper.	
	3. Lint is stuck inside the bobbin holder.	3. Clean the hook race	
	4. Thread quality is too low.	4. Change to a high quality sewing thread.	
	5. Thread is jamming around the bobbin.	5. Clean out the jamming thread.	

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CONDITION	CAUSE	HOW TO FIX	REFERENCE
5. Needle breaks.	1. Needle is hitting the needle plate.	See mechanical adjustment "Needle position".	
	2. Needle is bent or worn.	Change the needle.	
	3. Needle is hitting the hook.	See mechanical adjustment "Clearance between needle and hook.	
	4. The fabric moves while the needle is piercing it or the needle zigzag while in fabric.	See mechanical adjustment "Zigzag synchronisation".	Page 19
	5. Fabric is being pulled too strongly while sewing.	Guide the fabric gently while sewing.	
6. Noisy operation.	1. Backlash between shuttle hook gear and lower shaft gear is too great.	See mechanical adjustment "Backlash (lower shaft gear)".	Page 17
	2. Lower shaft gear is loose.	Eliminate the looseness.	
	3. Inappropriate belt tension.	See part removal and replacement "Driving motor (DC motor)".	Page 30
	4. Not enough oil.	Oil all moving parts.	
7. Deformation pattern	1. Inappropriate feed balance.	See mechanical adjustment "Stretch stitch feed balance.	Page 21
	2. Inappropriate zigzag synchronisation.	See mechanical adjustment "Zigzag synchronisation".	Page 19
	3. Upper thread tension is too strong.	See mechanical adjustment "Needle thread tension".	Page 20

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A Operation 1

Be cautious of sudden running of the machine when turning on the power switch.

If nothing is happened on the machine when the power switch is turned on, turn off the power switch and check the following points:

Step 1: Make sure that all of the connectors are connected properly.
Disconnect the power supply cord from the machine and go to the Step 2.
Step 2: Replace the machine socket, then turn the power switch on. If nothing is happened, turn off the power switch and go to the Step 3.
Step 3: Replace the printed circuit board A, then turn the power switch on. If nothing is happened, turn off the power switch and go to the Step 4.
Step 4: Replace the printed circuit board C, then turn the power switch on. If nothing is happened, turn off the power switch and go to the Step 5.
Step 5: Replace the transformer unit, then turn the power switch on. If nothing is happened, turn off the power switch and go to the Step 6.
Step 6: Replace the fuse.

If lamp does not light up when turning on the power switch, turn off the power switch. Then check the following points:
Step 1: Replace the lamp bulb, then turn on the power switch. If nothing is happened, turn off the power switch and no to the Step 2.
Step 2: Replace the printed circuit board A. Then turn on the power switch.

If LCD (Liquid Crystal Display) shows nothing when turning on the power switch, turn off the power switch and check the following points:
Step 1: Replace the printed circuit board K. Then turn on the power switch, If nothing is happened, turn off the power Switch. and go to the Step 2.
Step 2: Replace the printed circuit board A, Then turn on the power off the power switch.

If machine continue to sew the same part of a stitch, turn off the power switch and check the following points:
Step 1: Replace the printed circuit board A. Then turn on the power switch. If nothing is happened, turn off the power switch and go to the Step 2.
Step 2: Replace the stepping motor for zigzag and/or feed. If nothing is happened, turn off the power switch and go to the Step 3.
Step 3: Replace the lamp bulb.

Operation Preparation (Use diagnosis chart).

Preparation

1. Turn off the power switch.
2. Set the bobbin winder spindle to the left.
3. Raise the feed dog.
4. Shift the speed setting lever to the left.
5. Remove the presser foot and lift up the presser foot lever.
6. Move the needle bar to up position.
7. Connect the foot control to the machine.

If defect is found during the Step 01, turn off the power switch and take the following steps:

Step 1 Replace the printed circuit board F. Then check the machine.
Step 2: Replace the printed circuit boards K. Then check the machine.
Step 3: Replace the printed circuit boards A. Then check the machine.

If defect is found on the Step 02, turn off the power switch and take the following steps:

Step 1: Replace the printed circuit board F. Then check the machine.
Step 2: Replace the printed circuit board K. Then check the machine.
Step 3: Replace the printed circuit board A. Then check the machine.

To proceed further step, press.
"M" button on correct condition.
"C button on defect condition.

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DIAGNOSIS CHART			6
Step	Test operation	Correct condition	Defect condition
1. Step LCD, LED test.	Turn on the power switch while pressing "REVERSE", AUO-LOCK", THEN PRESS "1" within 2 seconds.	1. LCD shows (Special Mode). 2. LCD shows (Self-Check Start). 3. Buzzer sounds. 4. The 6 LED blinks. **Press Enter to the next test.**	If the machine does not go to Test mode, replace the following parts in order and recheck 1. Printed circuit board F 2. Printed circuit board K 3. Printed circuit board A 4. Printed circuit board L
2. Step Keys	Press the keys shown below in order. "Reverse, Auto-Lock, U/D, Twin Needle, Width -, Width +, Length -, Length +, Clear, Enter, Turn-Over, Memory, Mode, and stitch patterns 1 to 0.	1. Buzzer sounds. 2. LCD shows (Key). 3. Each time you press the key, buzzer sounds. 4. It goes to the Step (3) automatically if in correct condition.	If buzzer does not sound when you press the key, replace the following parts in order and recheck. 1. Printed circuit board F. 2. Printed circuit board K. 3. Printed circuit board A.
3. Step Buttonhole.	1. Pull down the buttonhole lever. 2. Move the buttonhole lever back and forth.	1 Buzzer sounds and LCD shows (BH Sensor L). 2 LCD shows (BH Sensor H) when the sensor is closed. 3 LCD shows (BH Sensor L). when the sensor is open.	If machine does not work properly, replace the following parts in order and recheck. 1. Buttonhole sensor. 2. Printed circuit board K. 3. Printed circuit board A.
4. Step Bobbin winder switch.	1 Shift the bobbin winder spindle to the right. 2 Shift the bobbin winder spindle to the left.	1. Buzzer sounds each time and LCD shows (Spool).	If not working, replace the following parts in order and recheck. 1. Printed circuit board K. 2. Printed circuit board A.
5. Step Tension switch.	1 Turn the thread tension dial.	1 Buzzer sounds and LCD shows (Thread Tension). 2 LED turns on when the dial is state "Auto". 3 LED turns off when dial is turned from "Auto".	If not working, replace the following parts in order and recheck. 1. Printed circuit board K. 2. Printed circuit board A. 3. Printed circuit board L.
6. Step Upper shaft sensor.	1 Turn the balance wheel toward you to move the needle bar from the highest to the lowest position, then from the lowest to the highest position.	1 Buzzer sounds and LCD shows (PH Sensor L,H). 2 LCD shows (PH Sensor L,H), when the needle bar is moved from the lowest to the highest. 3 LCD shows (PH Sensor H,L), when the needle bar is moved from the highest to the lowest.	If not working properly, replace the following parts in order and recheck. 1. Upper shaft sensor. 2. Printed circuit board A.
7. Step Stepping motor for zigzag.	1 Turn the balance wheel toward you to move the needle bar from the highest to the lowest position. Then press "Reverse" key.	1 Buzzer sounds and LCD shows Zigzag motor. 2 The stepping motor moves to the primary setting position.	If not working, replace the following parts in order and recheck. 1. Stepping motor for zigzag. 2. Printed circuit board A.
8. Step Stepping motor for feed.	1 Turn the balance wheel toward you to move the needle bar from the highest to the lowest position. Then press	1 Buzzer sounds and LCD shows (Feed motor). 2 The stepping motor moves to the primary setting position. (feed at "O").	If not working properly, replace the following parts in order and recheck. 1. Stepping motor for feed. 2. Printed circuit board A.

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	"Reverse" Key.		

7 DIAGNOSIS CHART

Step	Test operation	Correct condition	Defect condition
9. Step Foot control.	1 Depress the foot control as far as it will go. Then release it.	1 Buzzer sounds and LCD shows (controller). 2 Buzzer sounds when the foot controller is depressed and released.	If not working properly, replace the following parts in order and recheck. 5. Foot control. 6. Machine socket. 7. Printed circuit board A.
10. Step Speed control lever.	1 Move the speed control lever from the leftmost position to the rightmost position.	1 Buzzer sounds and LCD shows (Volume). 2 Buzzer sounds at the leftmost and the rightmost positions.	If not working properly, replace the following parts in order and recheck. 1. Printed circuit board K. 2. Printed circuit board A.
11. Step Buttonhole.	1 Press the Reverse button.	1 Buzzer sounds and LCD shows (DC Motor). 2 The machine runs at low speed, then at high speed and stops at the highest position automatically.	If machine does not work properly, replace the following parts in order and recheck. 1 Buttonhole sensor. 2 Printed circuit board K. 3 Printed circuit board A.

When the check is completed, LCD shows (SELF – CHECK END).
If the machine works properly, LCD shows (SELF – CHECK OK).
If not , LCD shows (ERROR O) then it shows the part to be replaced by the following letters:

A – Printed circuit board A
B – Buttonhole sensor
C – Foot control
D – Driving motor
K – Printed circuit board K
L – Light bulb
P – Upper shaft sensor
R – Machine socket
X – Stepping motor for ZZ
Y – Stepping motor for feed

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FACE COVER

To remove

1. Remove the cap **A** and set screw **B**.
2. Remove the face plate **D** while pulling it toward you so that face plate hook **C** is released.

To attach

1. Attach the face plate.
2. Tighten the set screw **B** and attach the cap **A**.

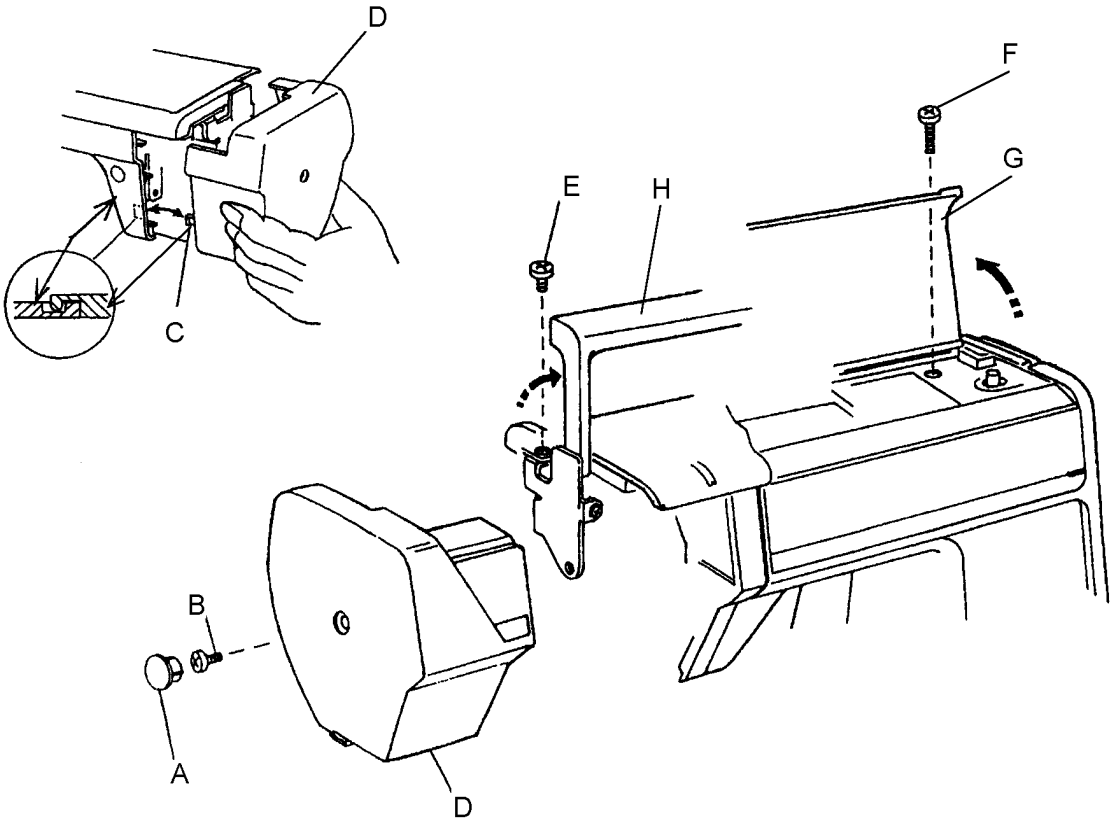
TOP COVER

To remove

1. Remove the set screw **F**.
2. Lift up the handle **H** and remove the set screw **E**.
3. Close the top cover lid **G** and pull the top cover to the back.

To attach

1. Lift up the handle **H** and insert the top cover **G** from the back.
2. Tighten the set screws **F** and **G**.



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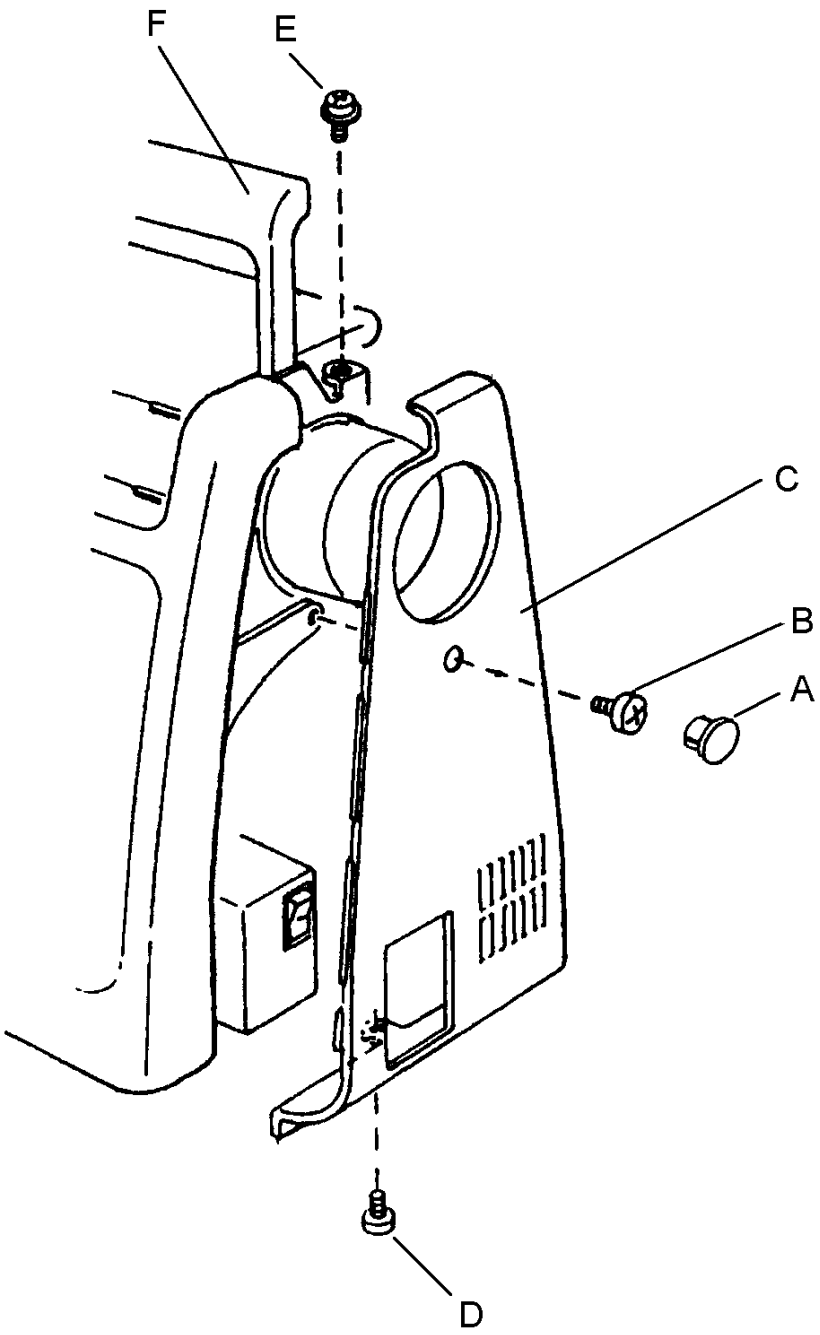
To remove
1. Remove the cap **A**
2. Remove the screws **B** and **D**
3. Lift up the handle **F** and loosen the screws **E**

To attach
1. Attach the belt cover **C** with the screws **B**, **D** and **E**
2. Attach the cap **A**



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Base plate

To remove

1. Remove the screw **A** and 4 screws **B**
2. Remove the base plate **C**.

To attach

1. Reverse this procedure

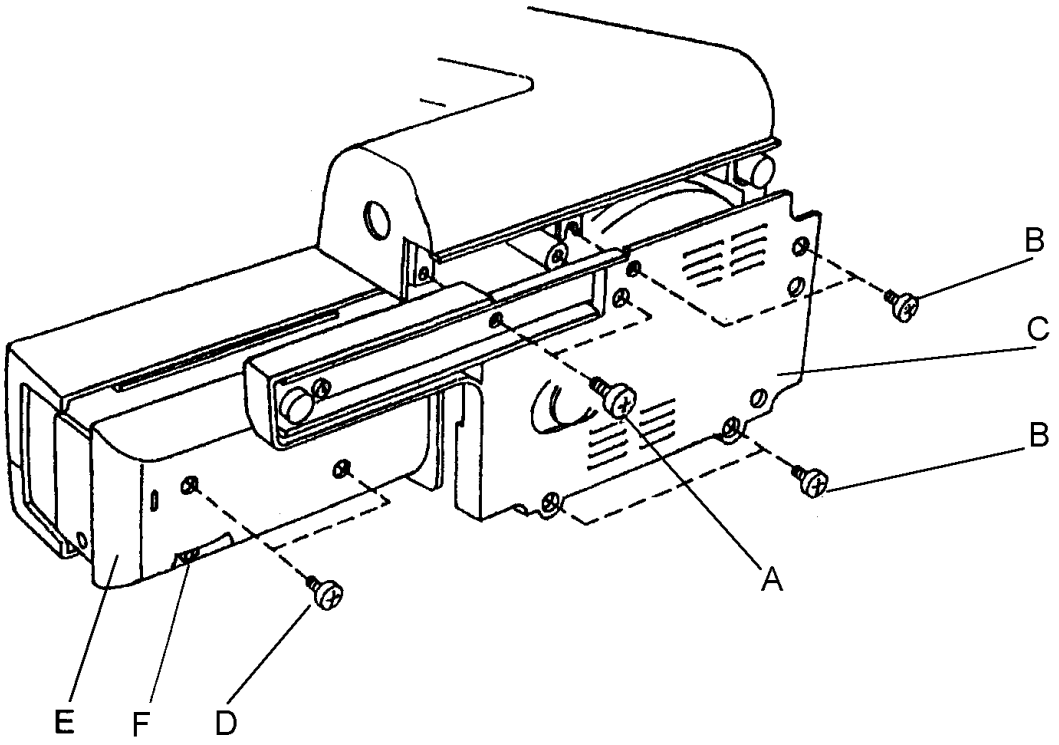
Bed cover

To remove

1. Remove the 2 screws **D**
2. Remove the bed cover **E**

To attach

Move the drop lever **F** to the left and attach the bed cover with the screws **D**.



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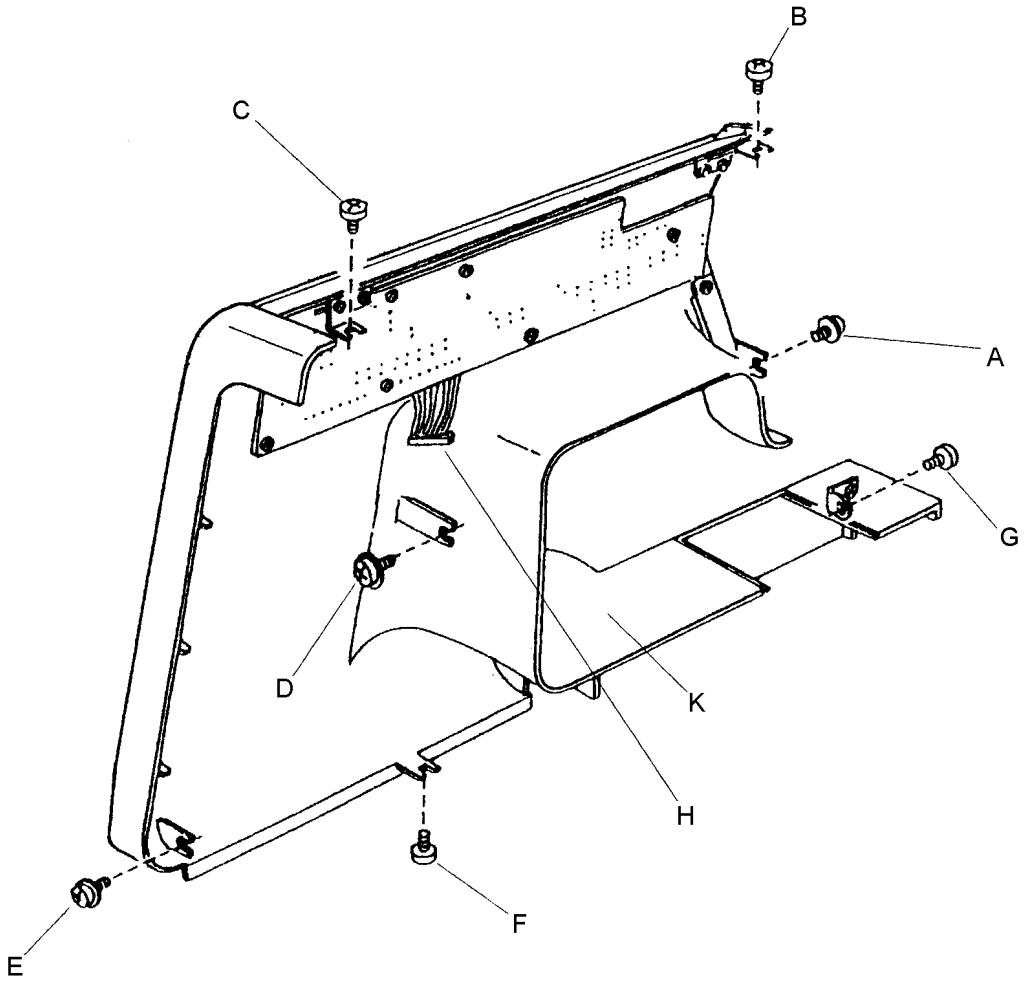
To remove

1. Remove the face cover, top cover, belt cover and bed cover (see pages **8**, **9**, and **10**).
2. Remover the screw **A** and loosen the screws **B**, **C**, **D**, **E**, **F** and **G**.
3. Pull out the connector **H** and remove the front cover **K**.

To attach

Reverse this procedure



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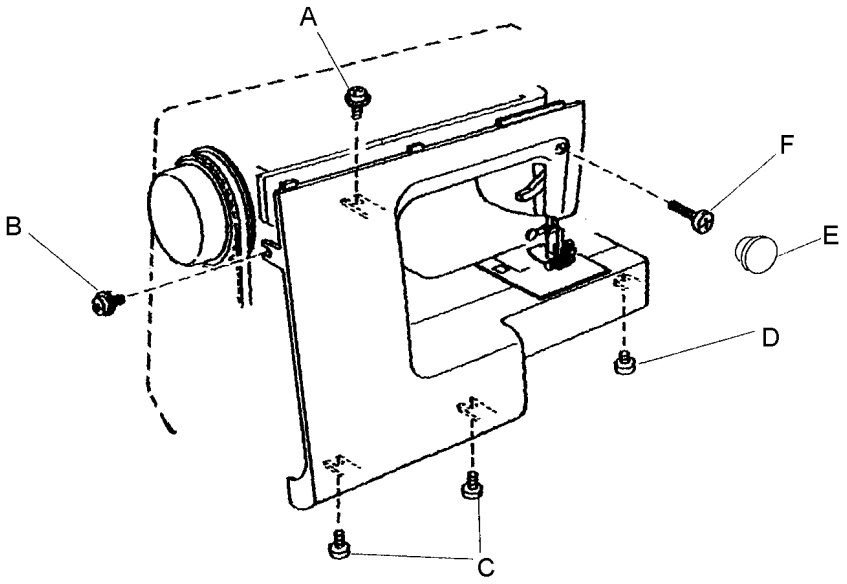
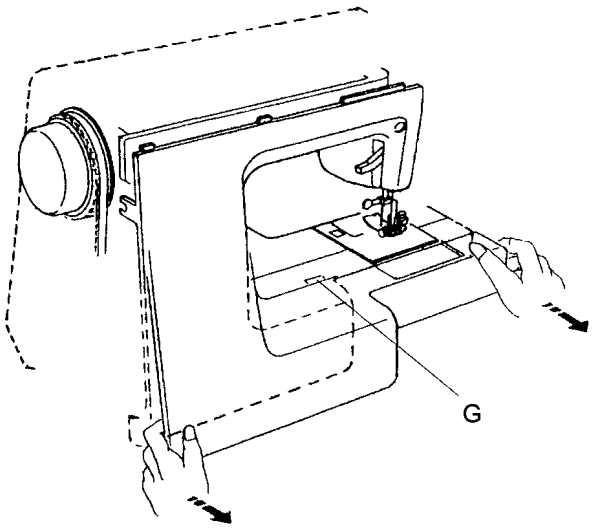
To remove

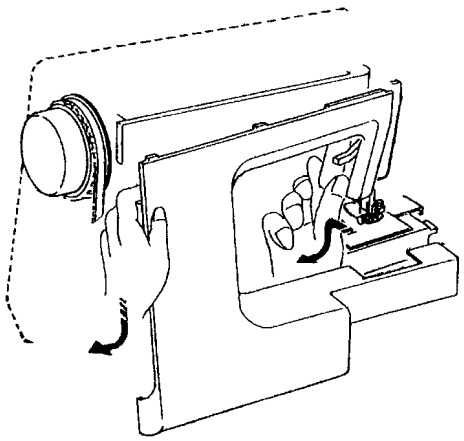
1. Remove the face cover, top cover, belt cover and bed cover (see pages **8**, **9**, and **10**).
2. Loosen the screws **A**, **B**, **C** and **D**.
3. Remove the cap **E** and remove the screw **F**.
4. Remove the rear cover while pulling it toward you and pushing it to the left.
   Unhook the projection **G** and twist the rear cover to clear the presser bar lifter area.

To attach

Reverse this procedure.







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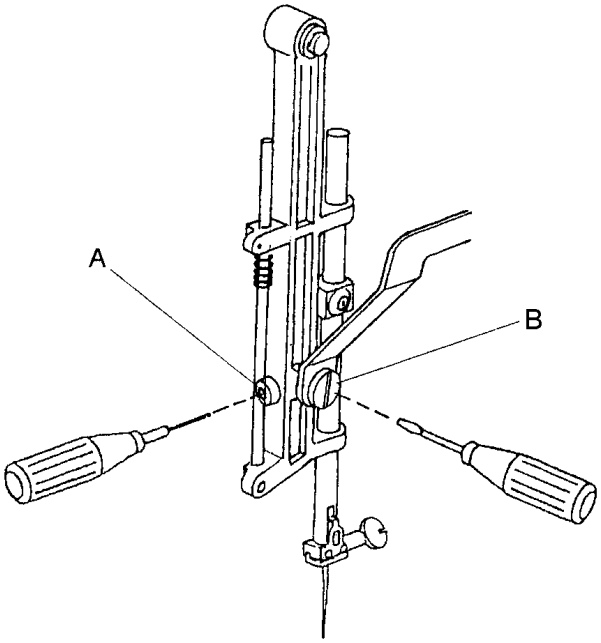
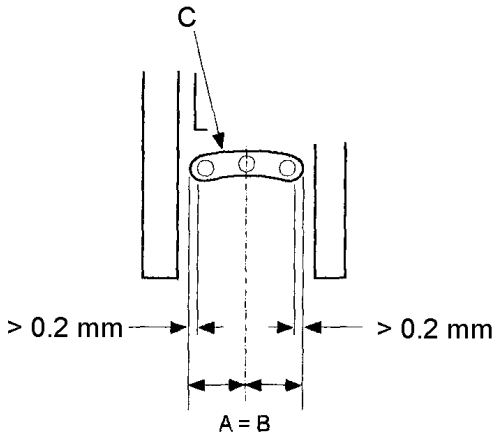
When selecting pattern N°. 1, the needle should be in centre position of needle slot in the needle plate, or when the needle swing is in maximum zigzag width, the distance between both sides of needle slot in the needle plate and the needle positions should be equal.

If not, adjust as follows:

1. Turn on the power switch.
2. Select pattern 1 or pattern 2 at maximum zigzag width.
3. Loosen the screw **A**.
4. Turn the eccentric pin **B** to adjust the needle centring.
5. Tighten the screw **A**

Note: Check the hook timing after this adjustment.





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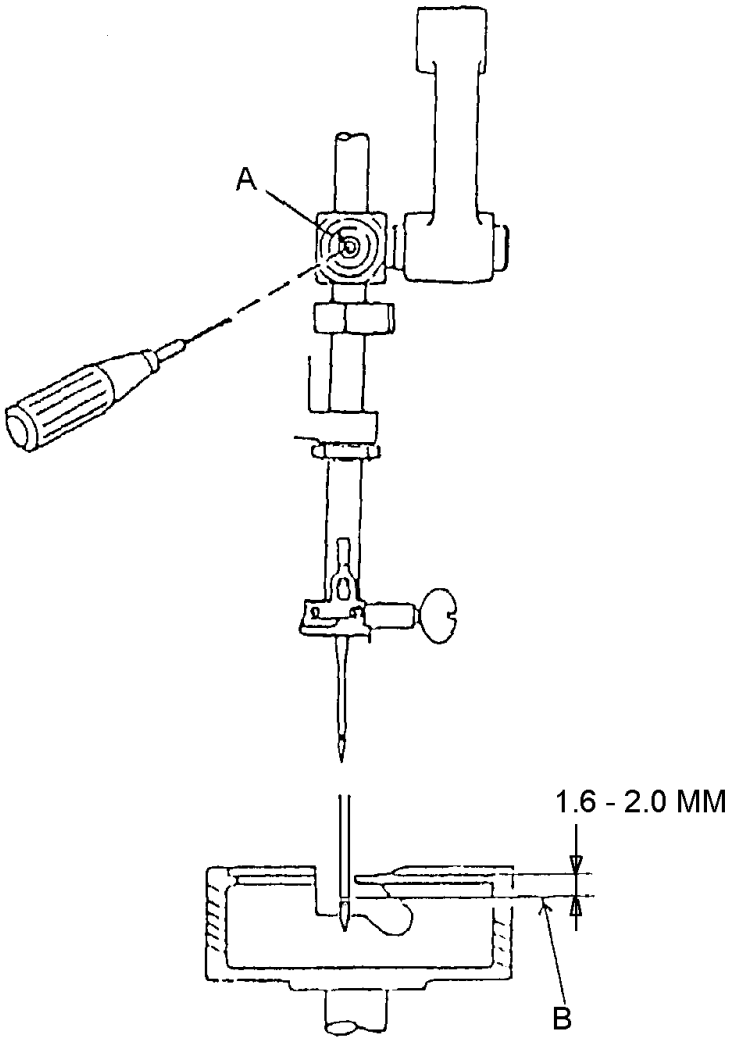
A regular needle #14 should be used for this adjustment.
The distance between the upper edge of needle eye and the tip of shuttle hook should be in the range of 1.6 - 2.0 mm when the tip of shuttle hook meets the right side of the needle as the needle is moved up from its left and lowest position by turning the handwheel toward you.

1. Remove the needle plate and bobbin holder.
2. Turn on the power switch and select pattern (no. 2).
3. Turn the handwheel toward you until tip of shuttle hook meets the right side of the needle.
4. Loosen the needle bar connecting stud set screw **A**.
5. Adjust the height of the needle bar by moving the needle bar upward or downward without turning it. (Make sure the needle setting groove of the needle bar is in the front).
6. Tighten the set screw **A**.
7. Insert the bobbin holder and attach the needle plate.



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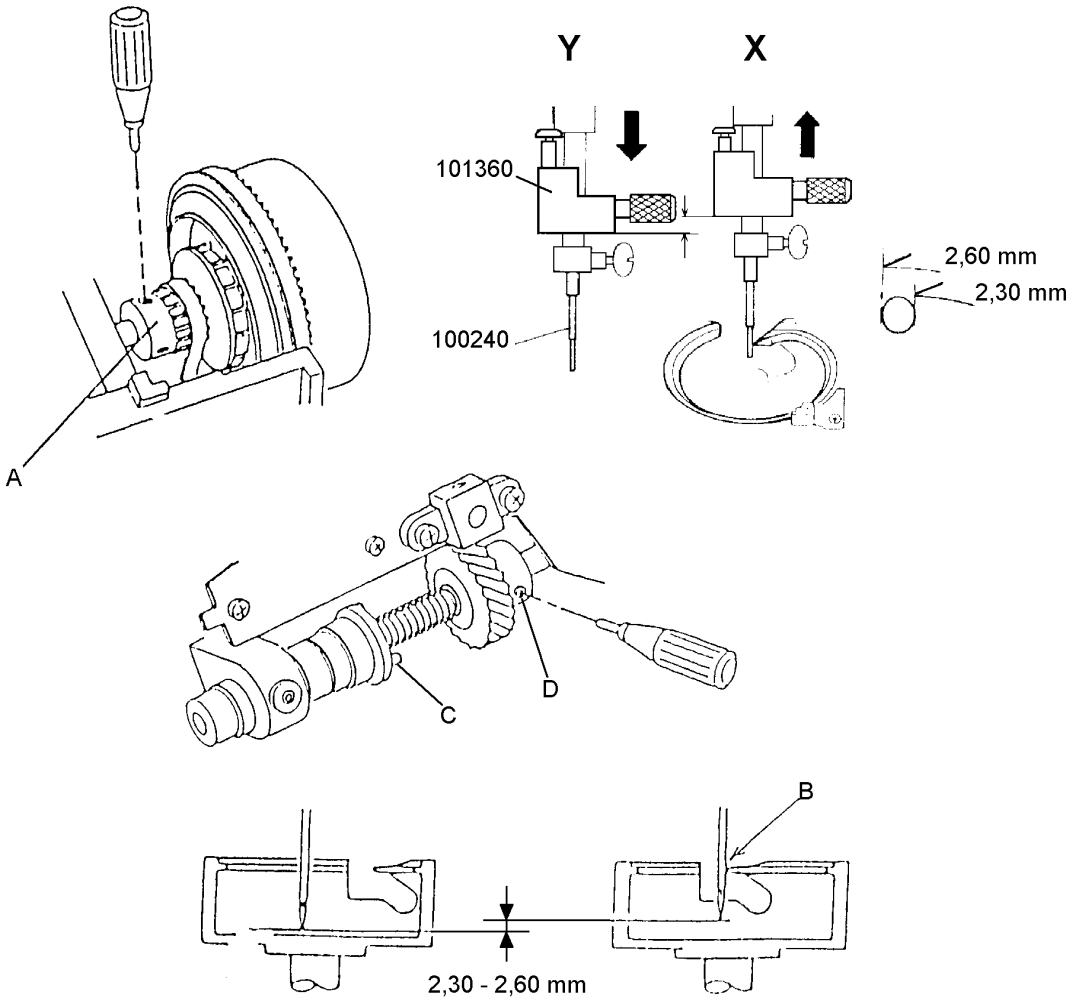
A regular needle **B** #14 should be used for this adjustment. Select pattern **2**. Turn the handwheel toward you to position the needle bar from its lowest position, moving up approximately 2,30 mm to 2,60 mm. At this position, the tip of the hook should meet the right side of the needle.

1. Remove the needle plate and the bobbin holder.
2. Turn on the power switch and select pattern **2**.
3. Remove the top cover, belt cover and bed cover (See pages **8**, **9** and **10**).
4. Turn the handwheel toward you and set the needle bar to its lowest position.
5. In this condition, the peg **C** on the feed lifting cam should be in its lowest position.
   If not: loosen the set screws **A** of upper shaft belt wheel. With the needle bar in its lowest position, hold the handwheel in place while turning the upper shaft belt to position the peg **C** on the feed lifting cam in its lowest position. Tighten the set screws **A** of upper shaft belt wheel
6. Set the needle bar to its lowest position, fit the timing gauge 101360 in contact with the needle bar cradle, then loosen one of the lower shaft hook gear screw **D**.
7. Turn the balance wheel slowly forwards until the gauge butts. In this position, the hook should be between the 2 positions illustrated
8. Unscrew the second screw of lower shaft hook gear and adjust the position of the hook.
9. Tighten the screws **D**, turn balance wheel several times and recheck the timing and refit the machine.



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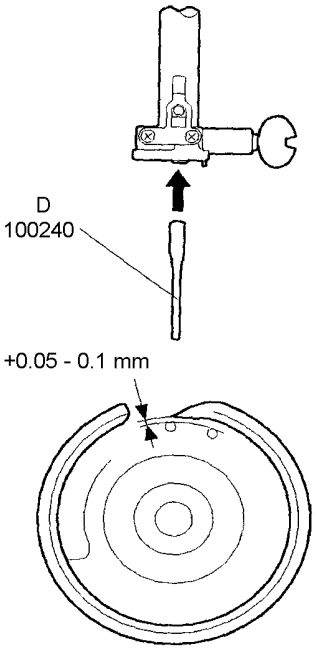
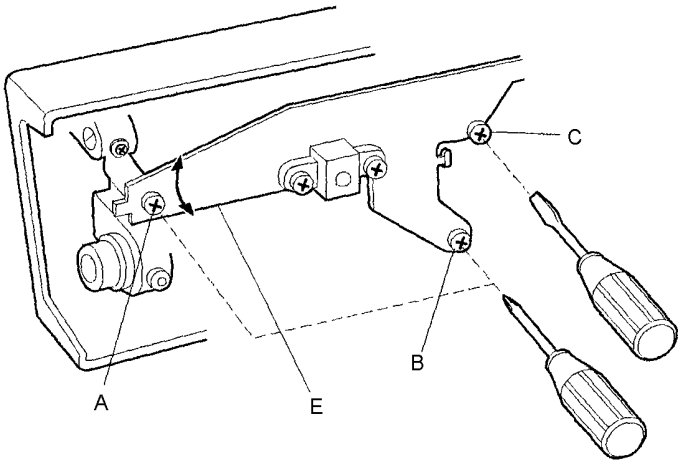
The clearance between the needle and the point of hook should be +0.05 –0.1 mm.

If not, adjust as follows:

1. Remove the needle plate and bobbin case.
2. Replace the needle with master needle **D**.
3. Turn on the power switch and select pattern **2**.
4. Loosen the set screws **A**, **B**, **C** and slightly loosen the hinge screw **C**.
5. Turn the handwheel and adjust the clearance between the master needle and the point of shuttle hook in the left and right needle positions to +0.05 -0.1 mm by moving the shuttle hook set plate **E** up or down.
6. Tighten the set screws **A B** and **C**.
7. Replace the master needle **D** with the needle.
8. Insert the bobbin case and attach the needle plate.





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BACKLASH OF HOOK DRIVE GEAR AND LOWER SHAFT GEAR

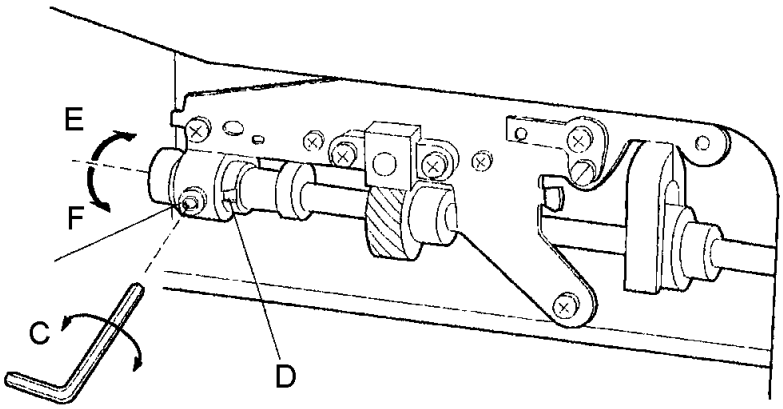
The backlash of the gears should be smooth and should be less than 0.8 mm when the point of the hook is under the feed dog.

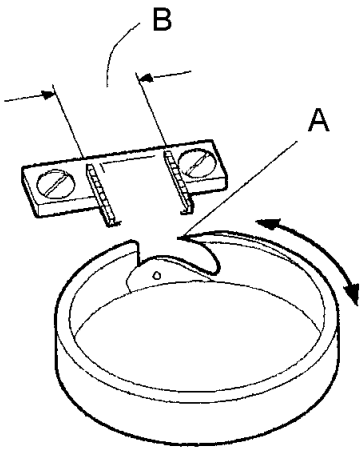
To check:

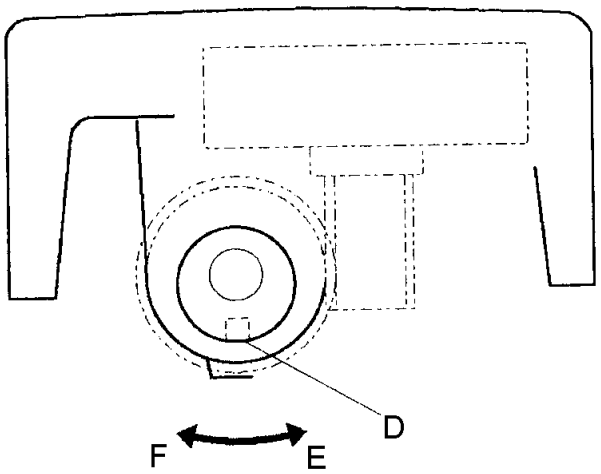
1. Turn the power switch off.
2. Remove the needle plate and bobbin holder.
3. Turn the handwheel slowly toward you until the tip of the shuttle hook **A** is between both ends **B** of feed dog.
4. Rotate the hook race clockwise and counter clockwise by finger. Check the play. It should be within 0.8 mm.

If there is more than 0.8 mm, adjust as follows:

1. Remove the bed cover and loosen the screw **C**.
2. Turn the lower shaft bushing **D** eccentric, in the direction **E** when the play at shuttle hook tip is too small.
3. Turn the lower shaft bushing **D** eccentric, in the direction **F** when the play at shuttle hook tip is too large.
4. Tighten the screw **C** securely after adjustment.







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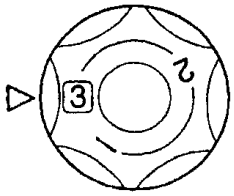
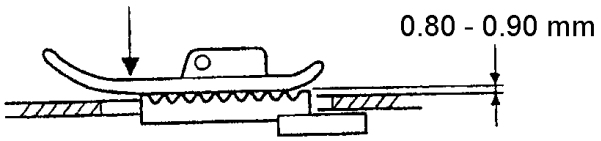
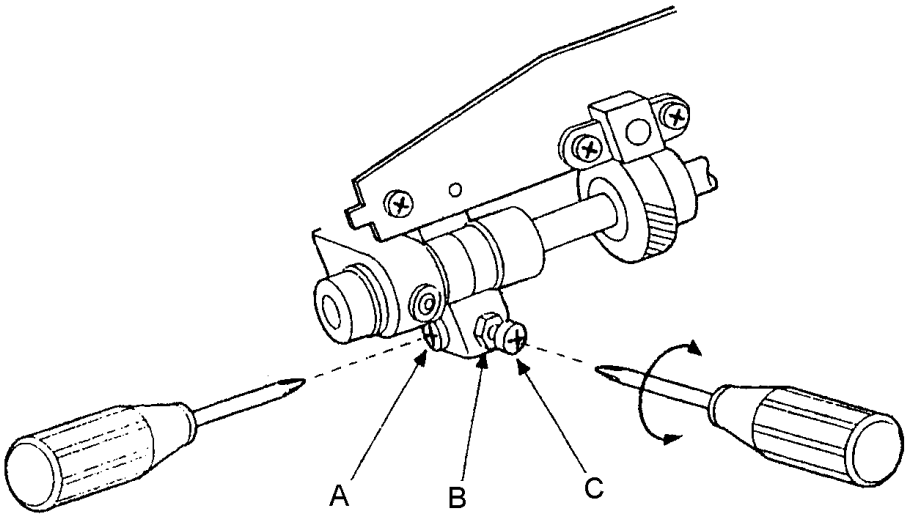
The highest position of the feed dog should be between 0.80 and 0.90 mm from the surface of the needle plate when the pressure dial is set at 3 and the presser foot is lowered.

1. Set the pressure dial at 3 and lower the presser foot.
2. Turn on the power switch.
3. Remove the bed cover (see page **10**).
4. Turn the balance wheel toward you to set the feed dog at the highest position.
5. Loosen the screw **A** and the nut **B**.
6. Adjust the feed dog height by turning the adjusting screw **C**.
7. Tighten the nut **B** and the screw **A**.







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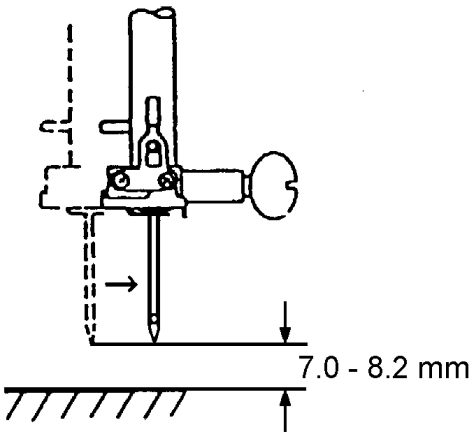
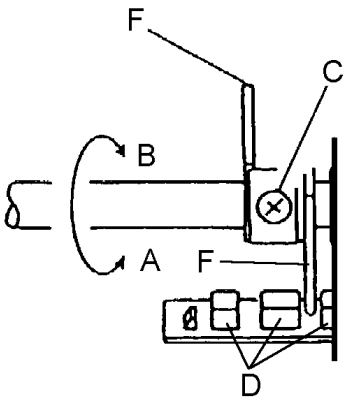
NOTE: When the machine is set to maximum zigzag width, the needle should start to swing laterally between 6.3 to 7.5 mm above the needle plate.

1. Remove the top cover (see page **1**).
2. Turn on the power. Select zigzag pattern no. 2 and set the zigzag width to maximum.
3. Slowly turn the handwheel toward you until the needle starts to swing.

- If higher than 7.5 mm, loosen the screw **C** and turn the sensor disk **F** in direction **A**.
- If lower than 6.3 mm, loosen the screw **C** and turn the sensor disk **F** in direction **B**.

4. Set the sensor disk **F** as close as possible to the sensors **D** (it should not touch the upper shaft sensor. Tighten the screw **C**.
5. Turn the handwheel several times toward you and recheck the start of the needle swing.
6. Fix the upper cover.





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Check: Set the upper thread tension dials **F** to 3. The standard upper tension should be 75 - 90g when pulling the thread (cotton thread 50/3) in direction **C**.

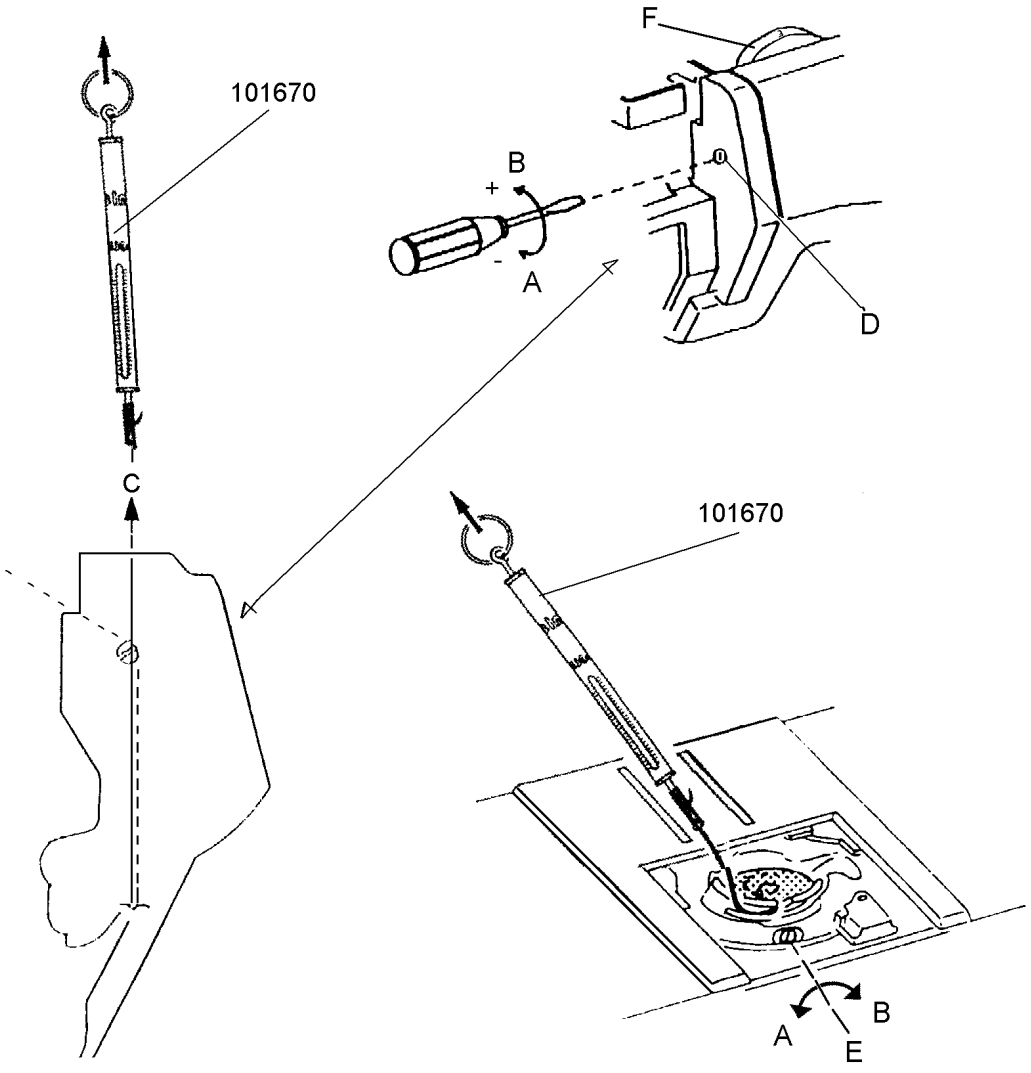
Adjust the upper tension:

1. Set the thread tension dial **F** to 3.
2. Open the face plate and adjust the thread tension by turning the thread tension screw **D** in the direction of
   - **A** for loosen the tension
   - **B** for tighten the tension
3. Close the face plate.

Check: The correct factory setting of the lower thread tension is 9 to 11 g, measured with a cotton thread no 50/3.

Adjust the lower tension:

1. Turn the screw **E** to adjust the lower tension in direction to
   - **A** for loosen the tension
   - **B** for tighten the tension.



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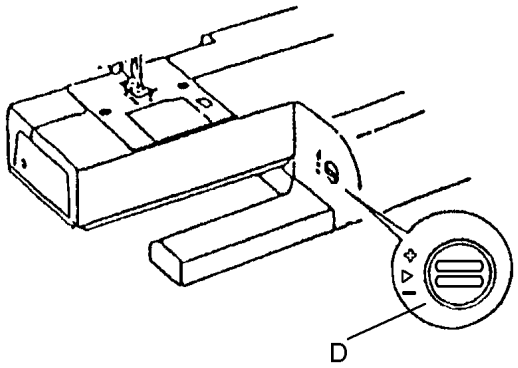
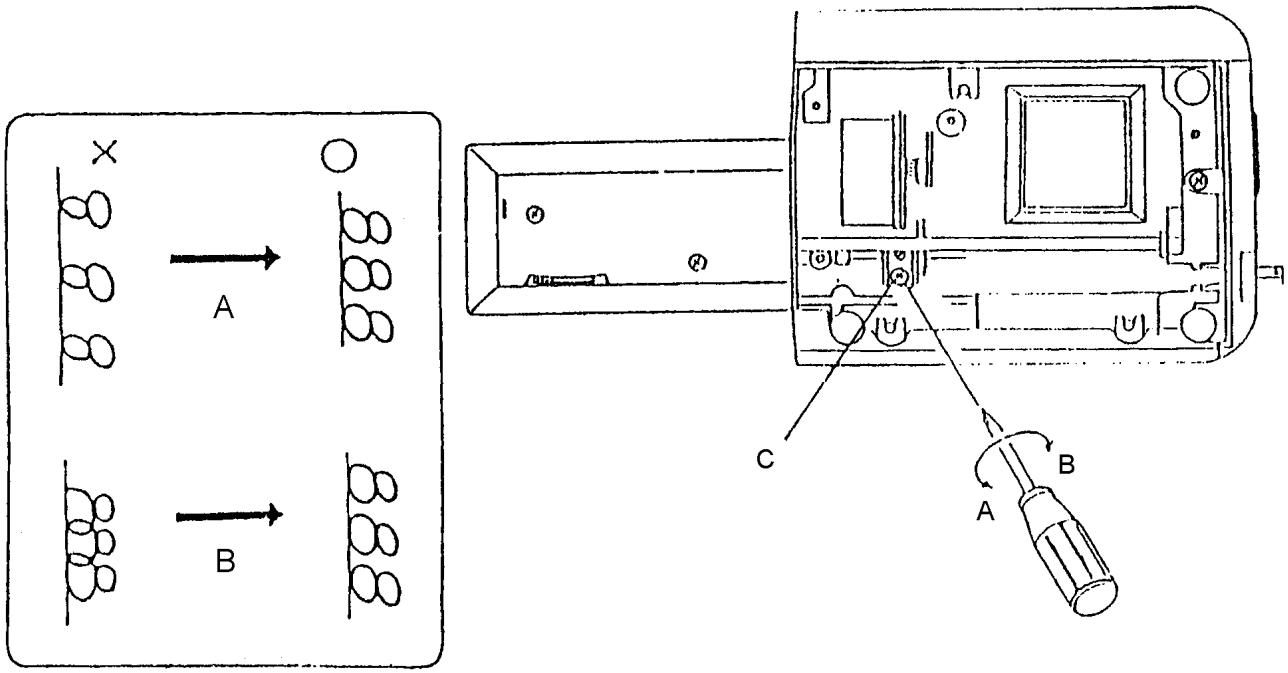
When pattern “8” is sewn with the feed balancing dial at the standard setting mark, see figure **D**, the stitch pattern should be as shown below.

1. Turn on the power switch while pushing the reverse button, and then select the pattern No. 8 within 2.5 seconds. “CHECK PATTERN (8) will appear in the screen.
2. Set the feed balancing dial **D** at the standard setting mark.
3. Sew the pattern “8” (The machine will stop automatically after sewing eight stitch pattern).
4. Remove the base (see page 10).
5. Adjust the stretch stitch feed balance by turning the adjusting screw in the direction **A** or **B**.
6. Attach the base.





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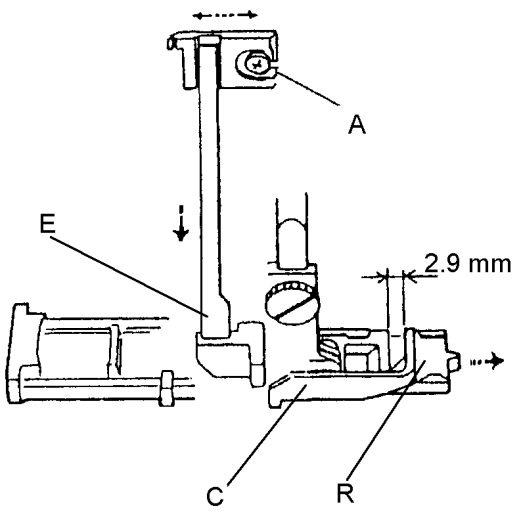
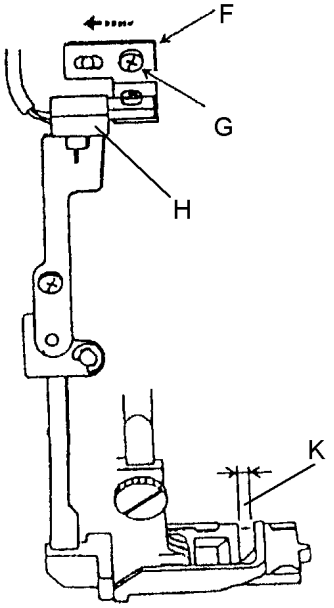
A) BUTTONHOLE LEVER GUIDE

1. Attach the automatic buttonhole foot **R**.
2. Loosen the set screw **A** and leave the clearance of 2.9 mm between the spring holder **C** and slider **B** by moving the buttonhole lever guide **C** in this condition the buttonhole lever **E** should touch the spring holder **C** slightly.
3. Tighten the set screw **A**.

B. BUTTONHOLE SENSOR

1. Turn the power switch on while pressing the reverse button, and then press BH1 at once. "BH SENSOR H or L" will appear in the screen.
2. Lower the buttonhole lever **E**. Then leaves the clearance of 1.6mm between the slider **B** and spring holder **C**.
3. Loosen the set screw **G** and move the buttonhole sensor base plate **F** from the right to left slowly. At the position where the screen message changes from "BH SENSOR L" to "BH SENSOR H", tighten the set screw **G**.
4. When the clearance between the spring holder **C** and slider **B** is:
   * 1.4 mm, the screen shows "BH SENSOR H".
   * 1.8 mm, the screen shows "BH SENSOR L".





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To check:

1. Raise the presser foot lever **B**.
2. The distance between the zigzag foot **A** and the needle plate **C** should be 6.0 mm.
   If the height is greater or less than 6 mm, adjust as follows.

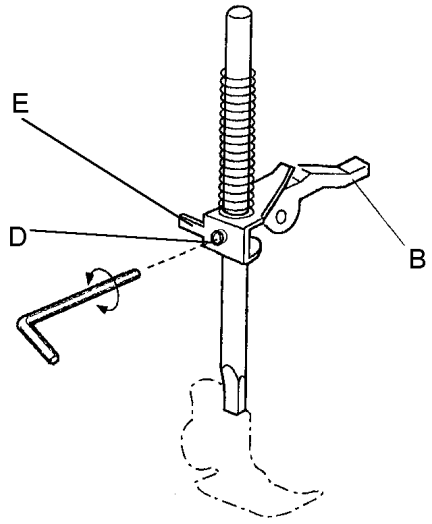
To adjust:

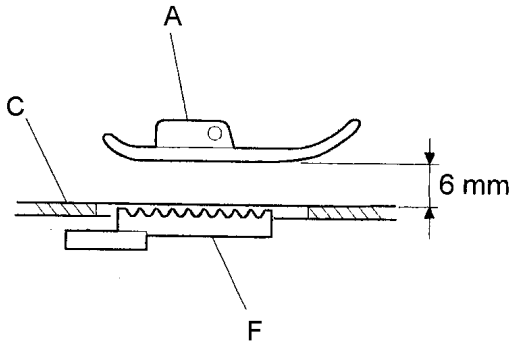
1. Remove the face cover (see page **8**).
2. Raise the presser foot lever **B** and loosen the screw **D** on the presser bar holder **E**.
3. Adjust the distance between the zigzag foot **A** and the needle plate **C** to 6.0 mm.
4. Tighten the screw **D** securely.

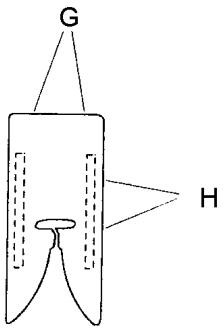
Note:

When you tighten the screw **D**, make sure that both sides of the zigzag foot **A** are paralleled with the feed dog slits **G**.

5. Attach the face cover.







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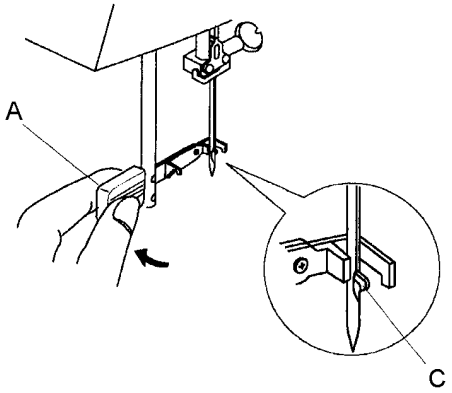
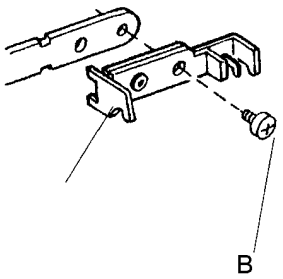
When the hook of the threader plate is damaged, change or adjust the part as follows.

To change the threader plate:
1. Raise the needle to its highest position and lower the threader knob **A** to its lowest position.
2. Loosen the screw **B** and remove the threader plate (Fig. **A**).

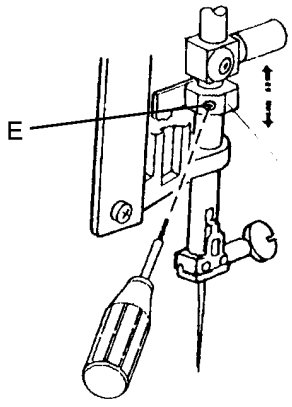
To change the needle threader:
1. If the hook of the threader plate **F** touches left or right side, loosen the screw **D** and adjust the hook position (Fig. **B**).
2. If the hook of the threader plat **F** touches the top or bottom side of the needle hole, loosen the screw **E** and adjust the hook position (Fig. **C**).

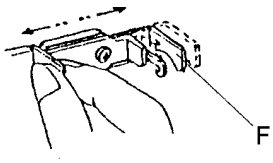


(Fig. C)



(Fig B)





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To remove:

1. Remove the front cover (see page **11**).
2. Take off the rear cover (see page **12**).
3. Pull out 4 connectors **D**, **E**, **F** and **G**.
4. Remove the 3 screws **A**.
5. Take off the c-board case unit **B**.

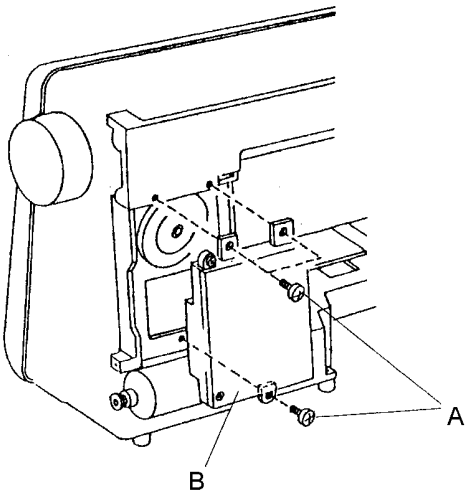
To attach:

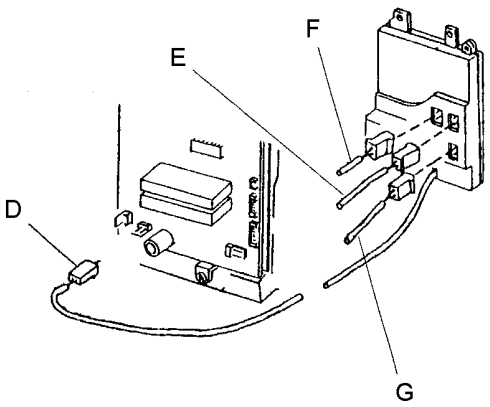
6. Reverse this procedure.

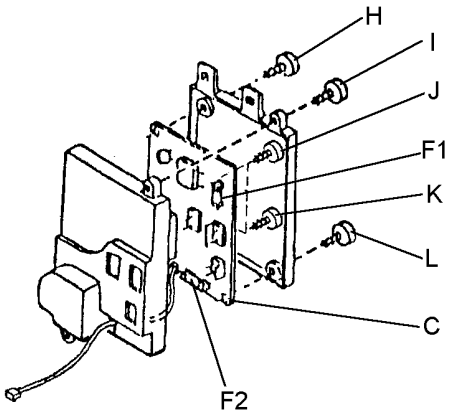
To change the fuse

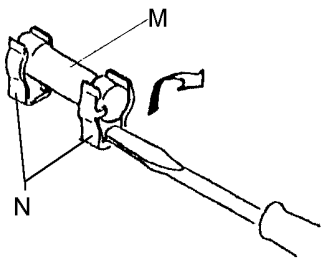
1. After removing the c-board case unit **B**, remove the 5 screws **H**, **I**, **J**, **K** and **L** to pull out the c-board **C**.

2. Replace the fuse **M** in the fuse holder **N** on c-board.
   If fuse F1 (125V-2.5A) is blown — Transformer or C-board is damaged.
   If fuse F2 (250V-3.15A) is blown — Too much power is on the DC motor when the uppershaft, lower shaft or hook race has heavy torque.









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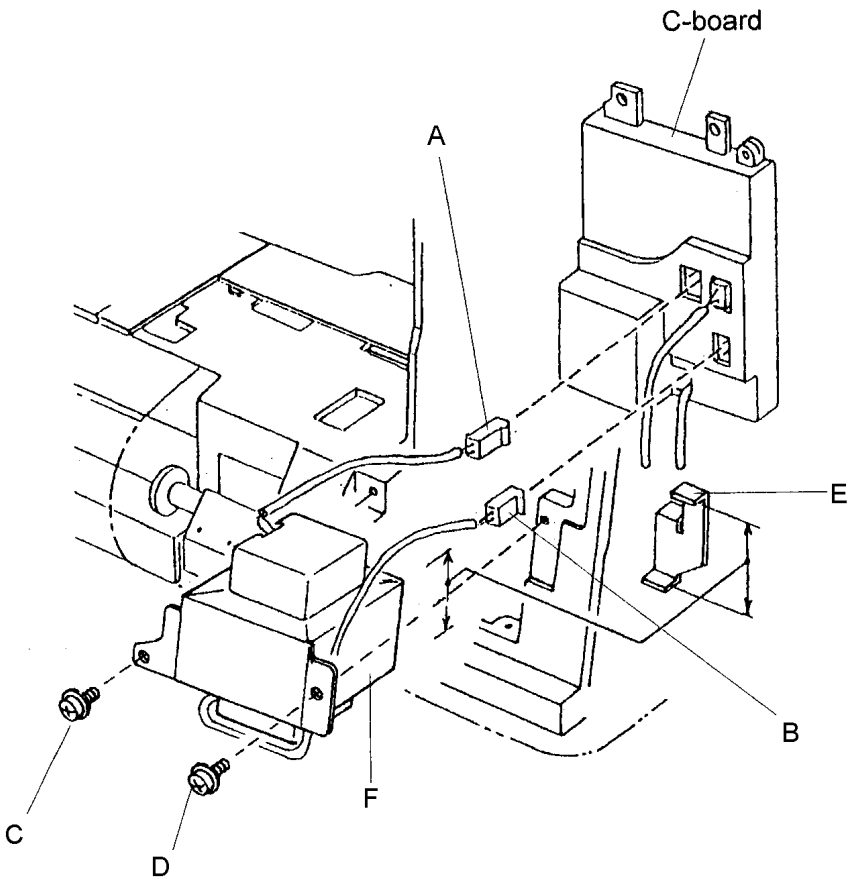
To remove:
1. Remove the front cover (see page **11**).
2. Remove the A-board (see page **28**).
3. Remove the C-board case (see page **25**).
4. Detach the connectors **A** and **B**.
5. Remove the screws **C** and **D**.
6. Take out the transformer **F**.

To attach:
1. Set the rear side of the transformer **F** on the supporter **E**.
2. Tighten the screws **C** and **D**.
3. Reconnect connectors **A** and **B**.
4. Replace C-board case unit, A-board and the front cover.



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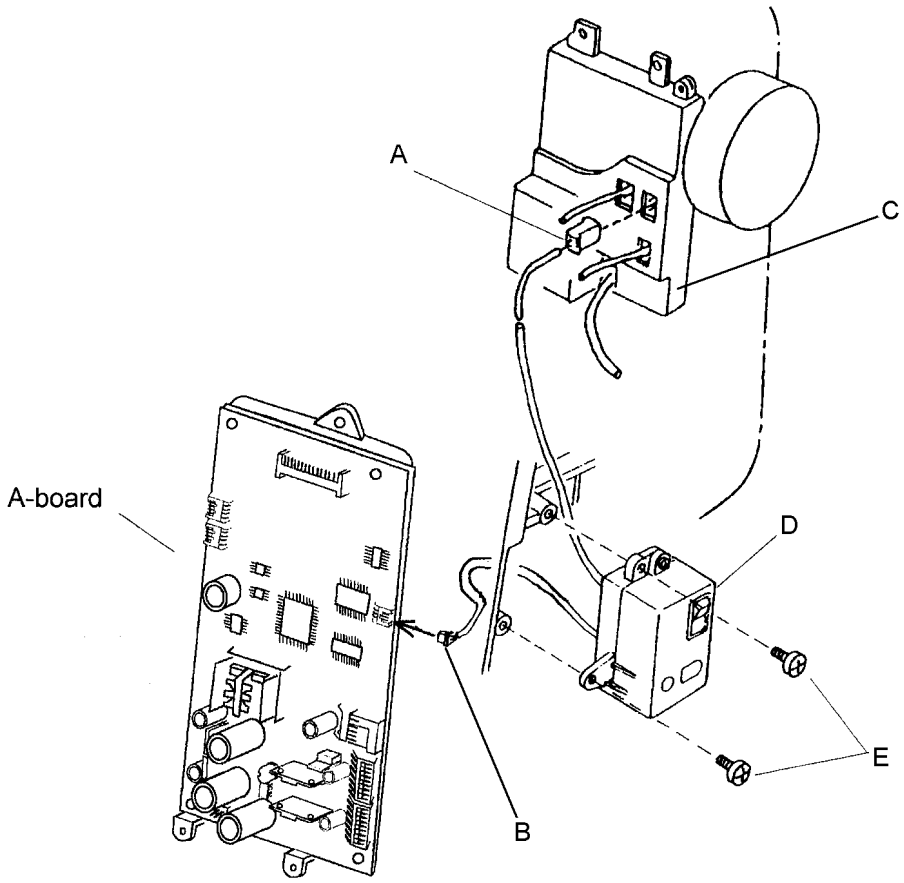
To remove:

1. Remove the front cover and the rear cover (see page **11** and **12**).
2. Remove the C-Board case unit **C** (see page **25**).
   Move it so that the connectors can be pulled out.
3. Pull out connectors **A** and **B**.
4. Remove the 2 screws **E**.

To attach:

1. Reverse this procedure.



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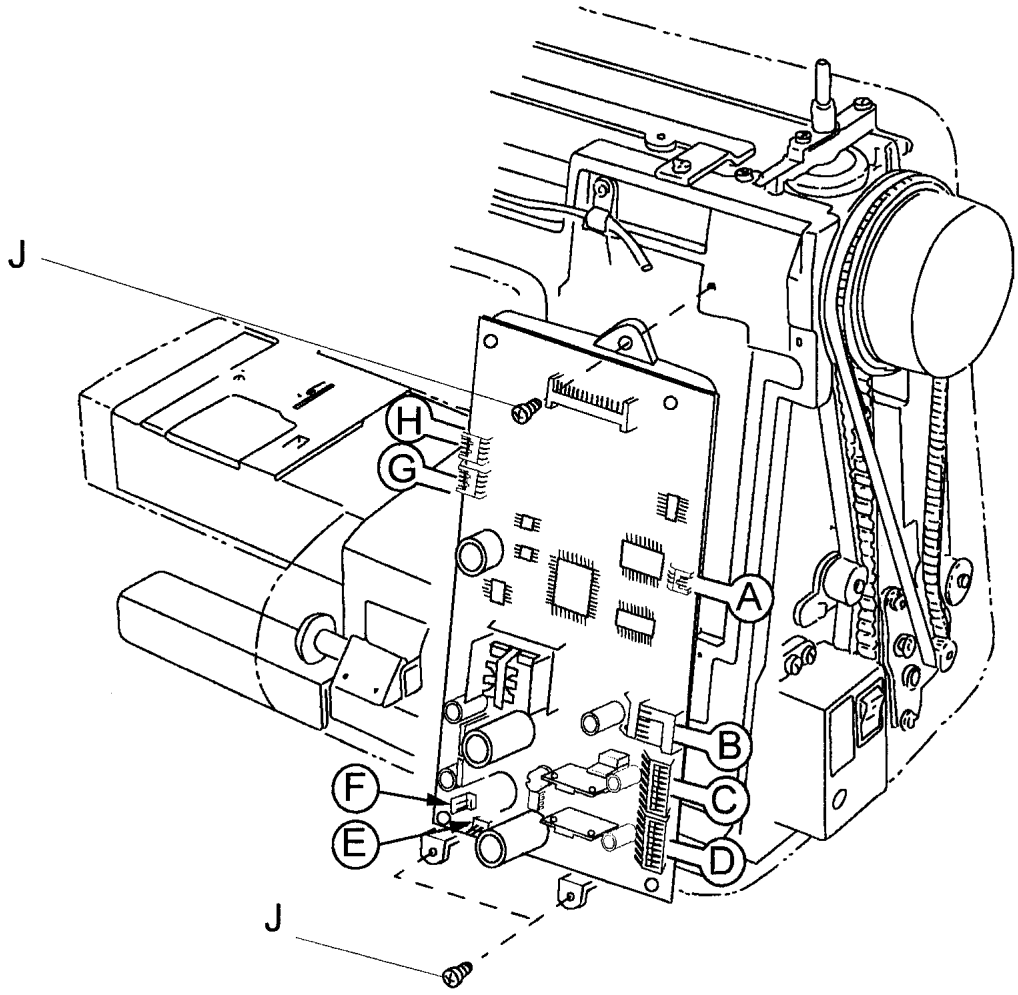
To remove:

1. Remove the front cover (see page **11**).
2. Pull out the 8 connectors **A**, **B**, **C**, **D**, **E**, **F**, **G** and **H**.
3. Remove the 3 screws **J**.
4. Take off the A-Board.
5. Install a new A-Board and reverse this procedure.



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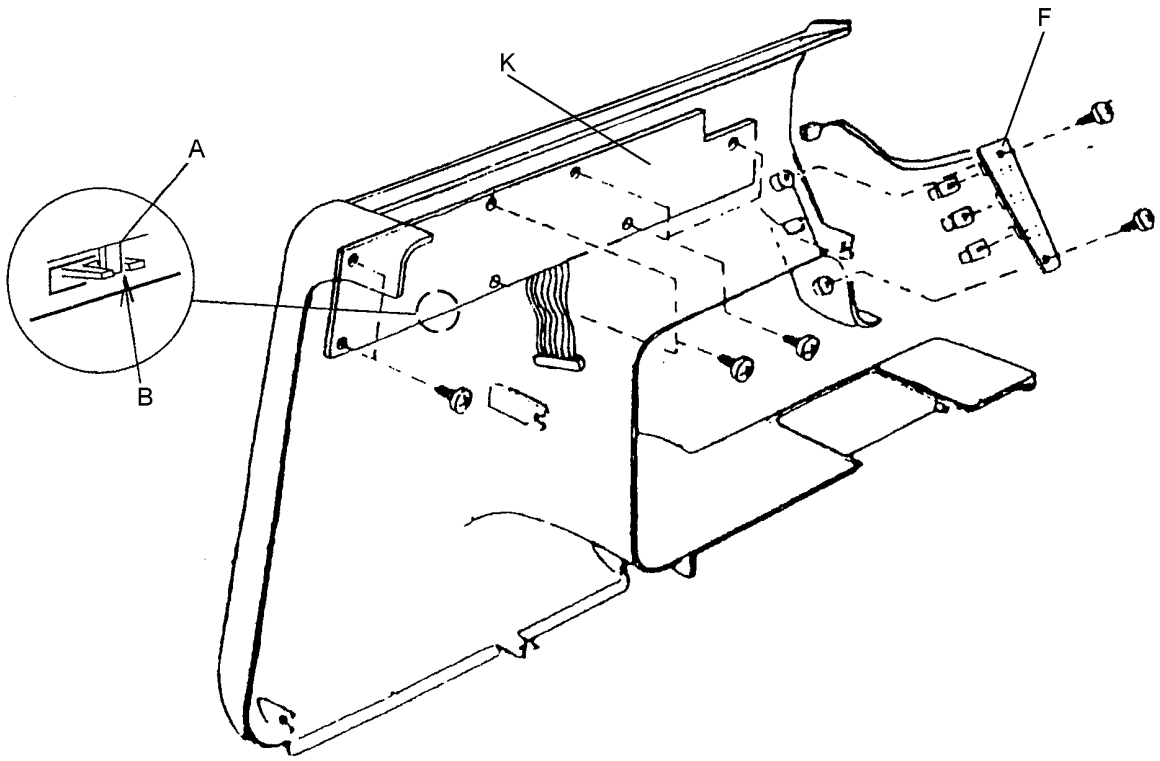
To remove:

1. Remove the front cover (see page **11**).
2. Remove the 7 screws for the printed circuit board F and 2 screws for the printed circuit board K.
3. Pull out the connectors of the printed circuit boards F or K, and then remove the printed circuit boards F or K.

To attach:

1. Insert the connectors of the printed circuit boards F or K.
2. Insert the lever into the groove **B** of speed control lever **A** as shown below.
3. Attach the printed circuit board K with the 7 screws, and then attach the printed circuit board F with the 2 screws.
4. Attach the front cover.



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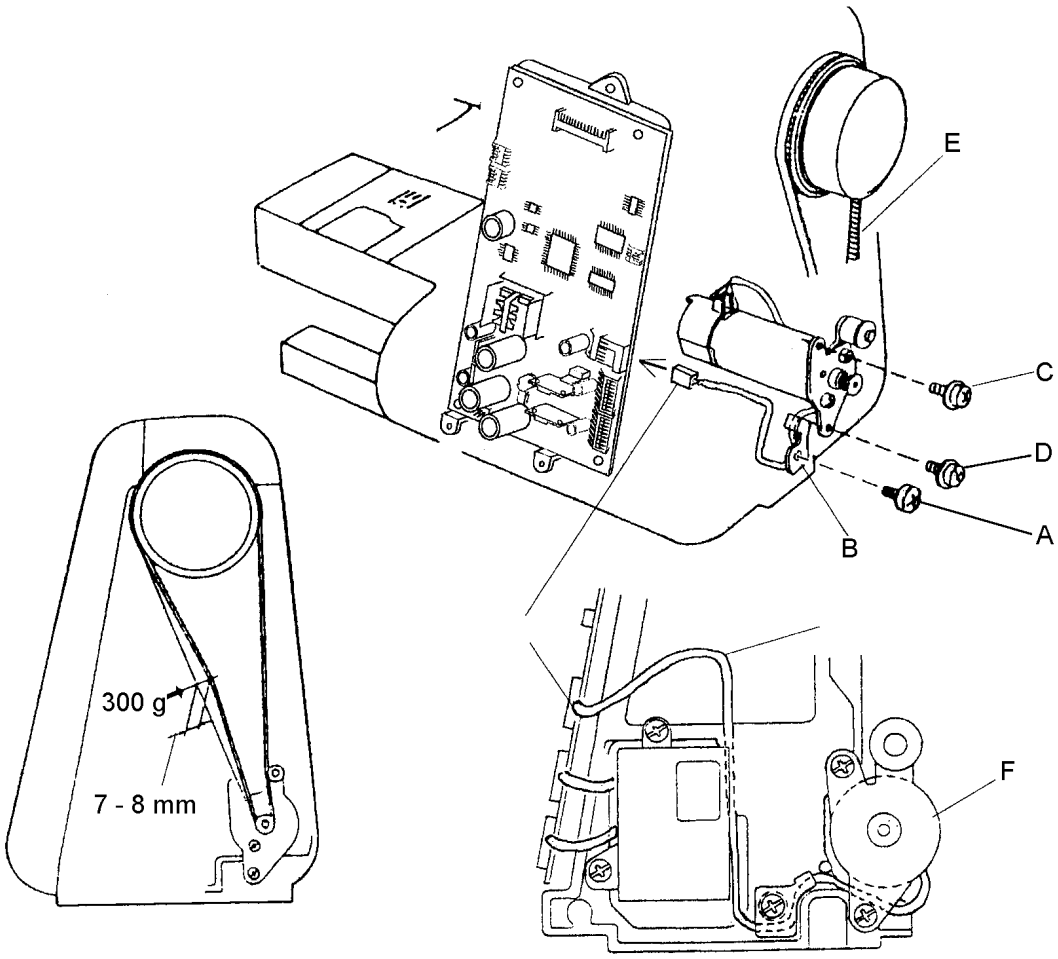
To remove:

1. Remove the front cover (see page 1**1**).
   Move the front cover so that you can pull out the driving motor connector.
2. Remove the receptacle (See page **27**).
3. Remove the belt.
4. Removes screw **A** and remove cord guide **B**.
5. Pull out the motor connector from the A-board.
6. Remove screws **C** and **D**.
7. Take out the motor.

To attach:

1. Set the motor in machine and replace screws **C** and **D**.
2. Snap the motor connector into the a-board.
3. Attach cord guide **B** using screw **A**.
4. Replace the motor belt.
5. Move the motor mounting bracket **E** by applying approximately 300 g pressure in the middle of the belt, it should deflect 7 to 9 mm when set properly.
6. Tighten screw **C** and **D**.
7. Replace the front cover.



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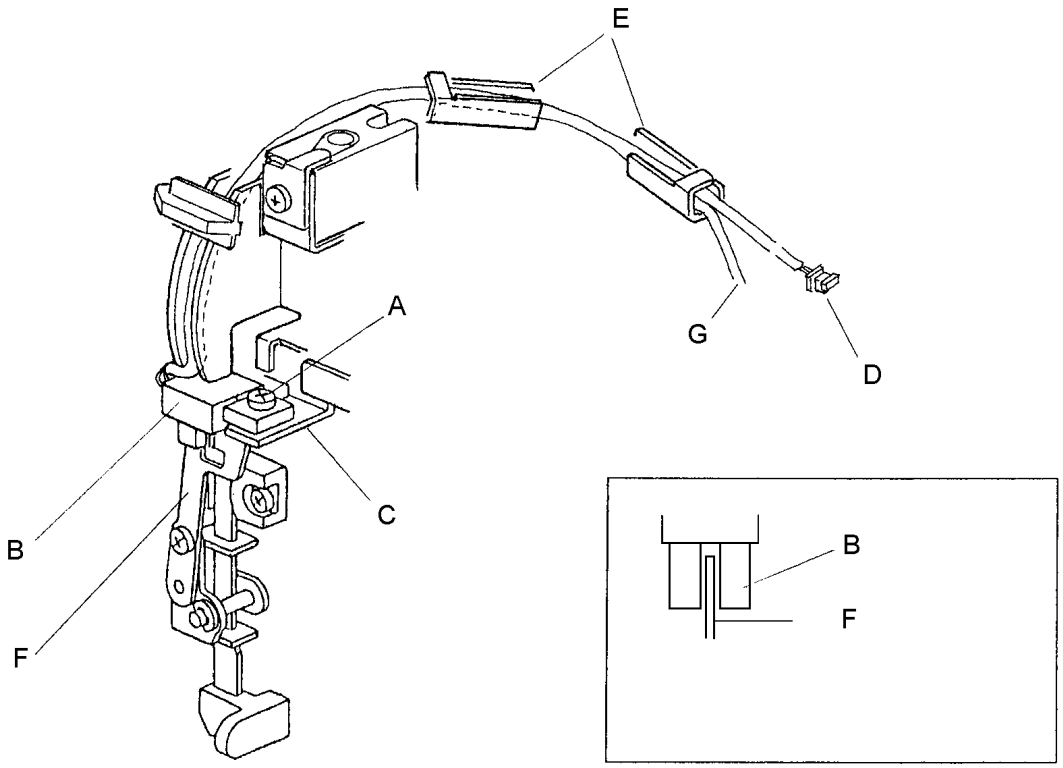
To remove:

1. Remove the front cover (see page **11**).
   Move it so that the connectors can be pulled out.
2. Remove the screw **A**, then remove the buttonhole sensor **B** from the sensor plate **C**.
3. Pull out the connector of buttonhole sensor **D** from the k-board.
4. Pull out the cord of buttonhole sensor from the cord guide **E** and then remove the buttonhole sensor **B**.

To attach:

1. Attach the buttonhole sensor **B** with screw **A**. Pull the sensor forward so that it touches the setting plate. Make sure it doesn't touch the buttonhole shield plate **F**, see illustration.
2. Pass the cord as illustrated and attach the front cover.
   After replacing the buttonhole sensor, sew a few buttonholes. If something is abnormal, adjust the "Buttonhole lever" (see page **22**).



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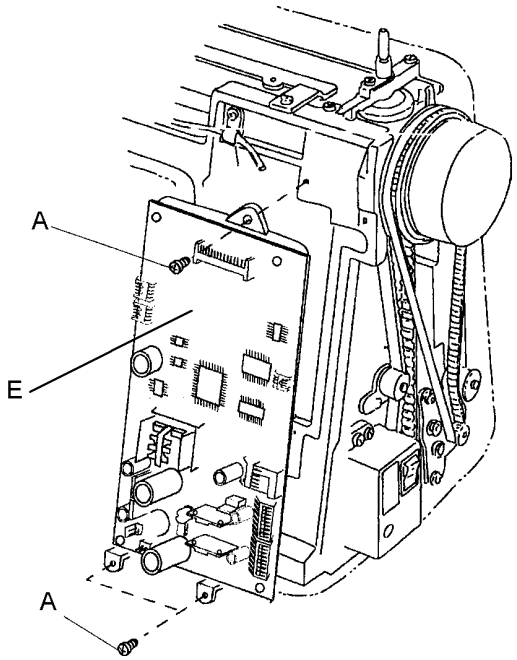
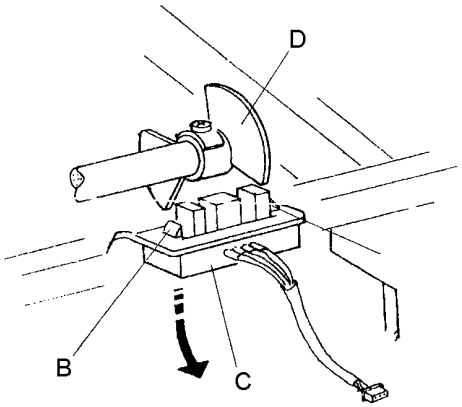
To remove:
1. Remove the front cover (see page **11**).
2. Pull out the 8 connectors from the A-board.
3. Remove the 3 screws **A** and remove the A circuit board **E**.
4. Push the holders **B** and remove the upper shaft sensor **C**.

To attach:
1. Attach the new upper shaft sensor **C** unit into the setting plate. After replacing the upper shaft sensor unit, make sure it doesn't touch the upper shaft shield plate **D**.
2. Attach the front cover.





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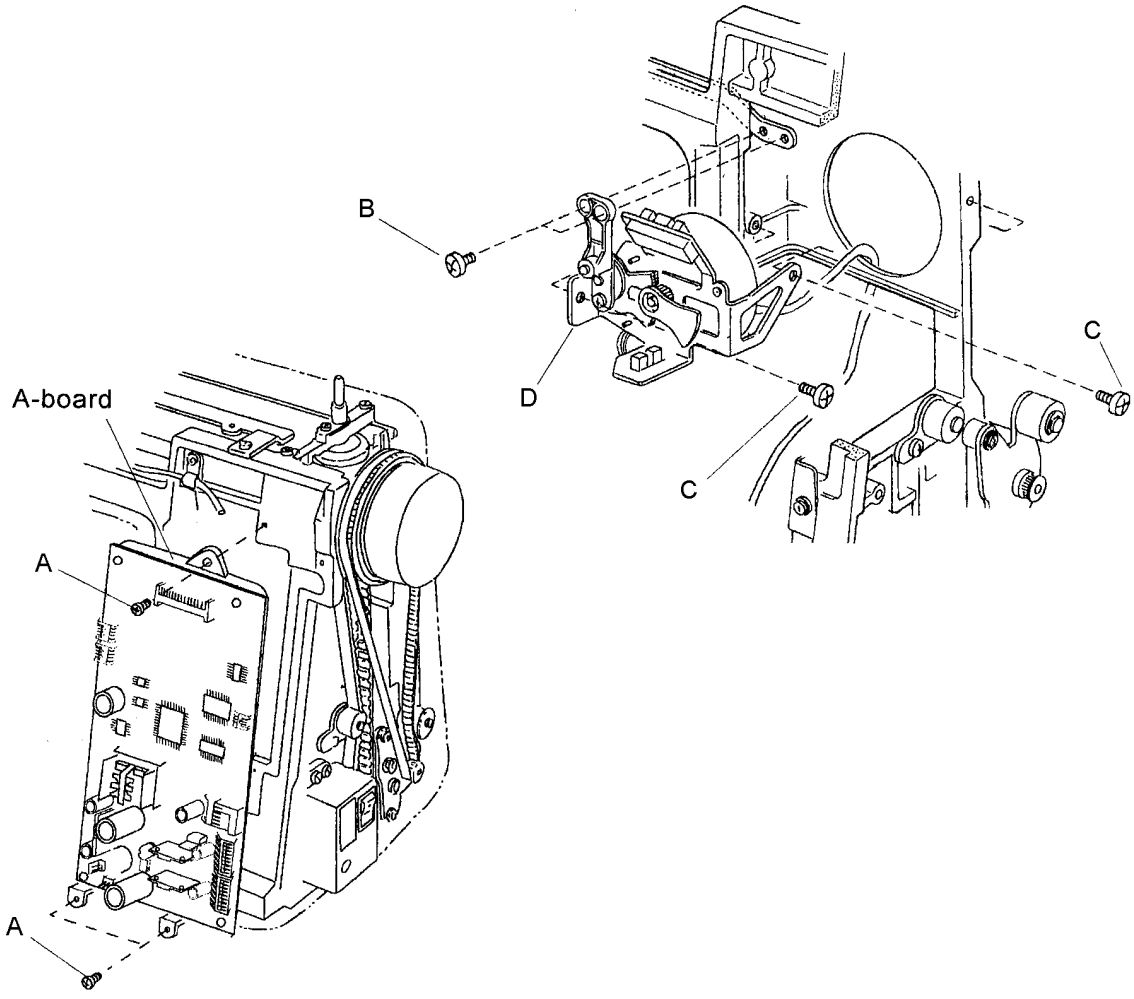
To remove:
1. Remove the C-board case unit and receptacle unit (see page **25** and **27**).
2. Remove the 3 screws **A** and the A-board setting plate.
3. Remove the 2 screws **B**, 2 screws **C** and remove the motor **D**.

To attach:
1. Reverse this procedure.



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To remove:
1. Remove the front cover (see page **11**).
2. Remove the receptacle unit (see page **27**).
3. Pull out the feed stepping motor connector from the A-circuit board.
4. Remove the snap ring **B** and the 2 screws **A**.
5. Remove the feed stepping motor **C** together with feed rod **D**.

To attach:
1. Slide the feed rod **D** onto the feed arm pin **F**.
2. Then attach the feed stepping motor by tightening the 2 screws **A**, tighten the 2 screws at the spot that where the feed arm moves smoothly.
3. Attach the snap ring **B**.
4. Attach the receptacle and the front cover.
5. Adjust the Stretch stitch feed balance (see page **20**).