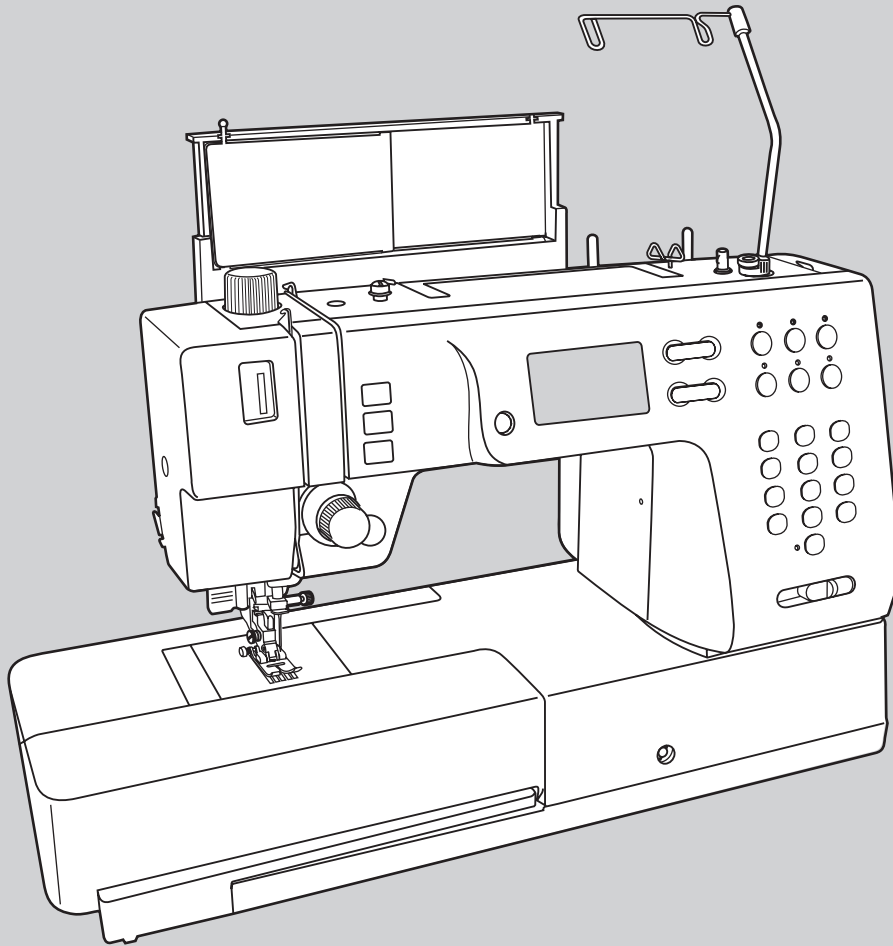


REPAIR MANUAL



CONTENTS

1. Machine main parts	3
2-3. Electronic parts	4-5
4. Removal of machine covers and base	
4.1 Stitch pattern plate.....	6
4.2 Spool stand assembly	6
4.3 Accessory tray	6
4.4 Face plate cover	6
4.5 Belt cover.....	7
4.6 Top cover	7
4.7 Front cover	7-8
4.8 Machine base	8
4.9 Free arm base cover	8
5. Adjustments	
5.1 Symbol reference chart	9
5.2 Upper shaft lateral play.....	10
5.3 Take up lever Adjustment Noise level	11
5.4 LCD warning message - Presser foot is not lowered	12
5.5 Height of presser foot Knee lifter.....	13-14
5.6 Needle bar orbital motion	15
5.7 Needle center position adjustment	16
5.8 Zigzag needle position	17
5.9 Needle threader adjustment	18
5.10 Dual feed adjustment.....	19
5.11 Feed dog drop - Horizontal feed timing	20-21
5.12 Height of needle bar	22
5.13 Hook timing	23-24
5.14 Needle clearance.....	25
5.15 Hook gear and lower shaft gear backlash play	26
5.16 Position of rotary hook holder (Thread escapement)	27
5.17 Feed-dog height	28
5.18 Position of feed-dog in relation to the needle plate (left to right)	29
5.19 Upper thread tension adjustment	30
5.20 Bobbin case thread tension adjustment	31
5.21 Motor belt tension	32
5.22 Forward - Reverse pattern adjustment (Fine tuning)	33-34
5.23 Darning stitch adjustment.....	35
5.24 BH photo sensor adjustment and position.....	36
5.25 Bobbin winding	37
5.26 Fuse replacement.....	38
5.27 Gauge.....	39

CONTENTS

6. Main PC board	40
7. Electrical components Trouble shooting	
7.1 Sewing machine malfunction	41-42
7.2 LCD display malfunction.....	43
7.3 DC Motor malfunction.....	44
7.4 Function key and stitch selection key not operating	45
7.5 Number and memory clear button not operating	45
7.6 LCD brightness dial malfunction.....	46
7.7 Needle up-down - Reverse - Autolock malfunction	47
7.8 Speed volume malfunction	48
7.9 Feed step motor malfunction	49
7.10 Zigzag step motor malfunction	50
7.11 Bobbin winder motor malfunction	51-52
7.12 The bobbin winder is on "off" position - LCD screen is "on"	53-54
7.13 BH problem	55-56
7.14 Foot controller problem	57-58
7.15 LED lamp malfunction	59-60
7.16 Needle plate micro switch malfunction	61-62
8. Electronic diagram	63
9. Power Supply diagram	64

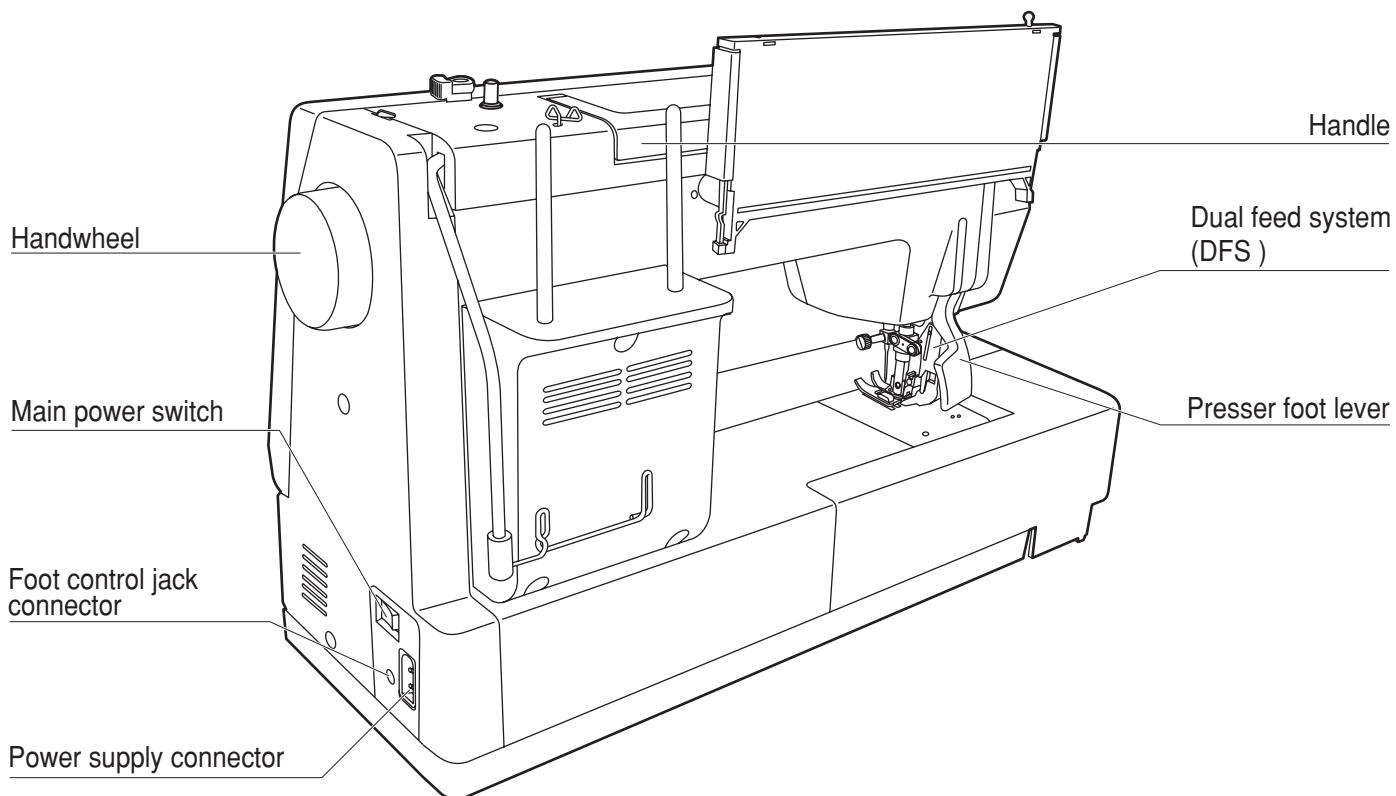
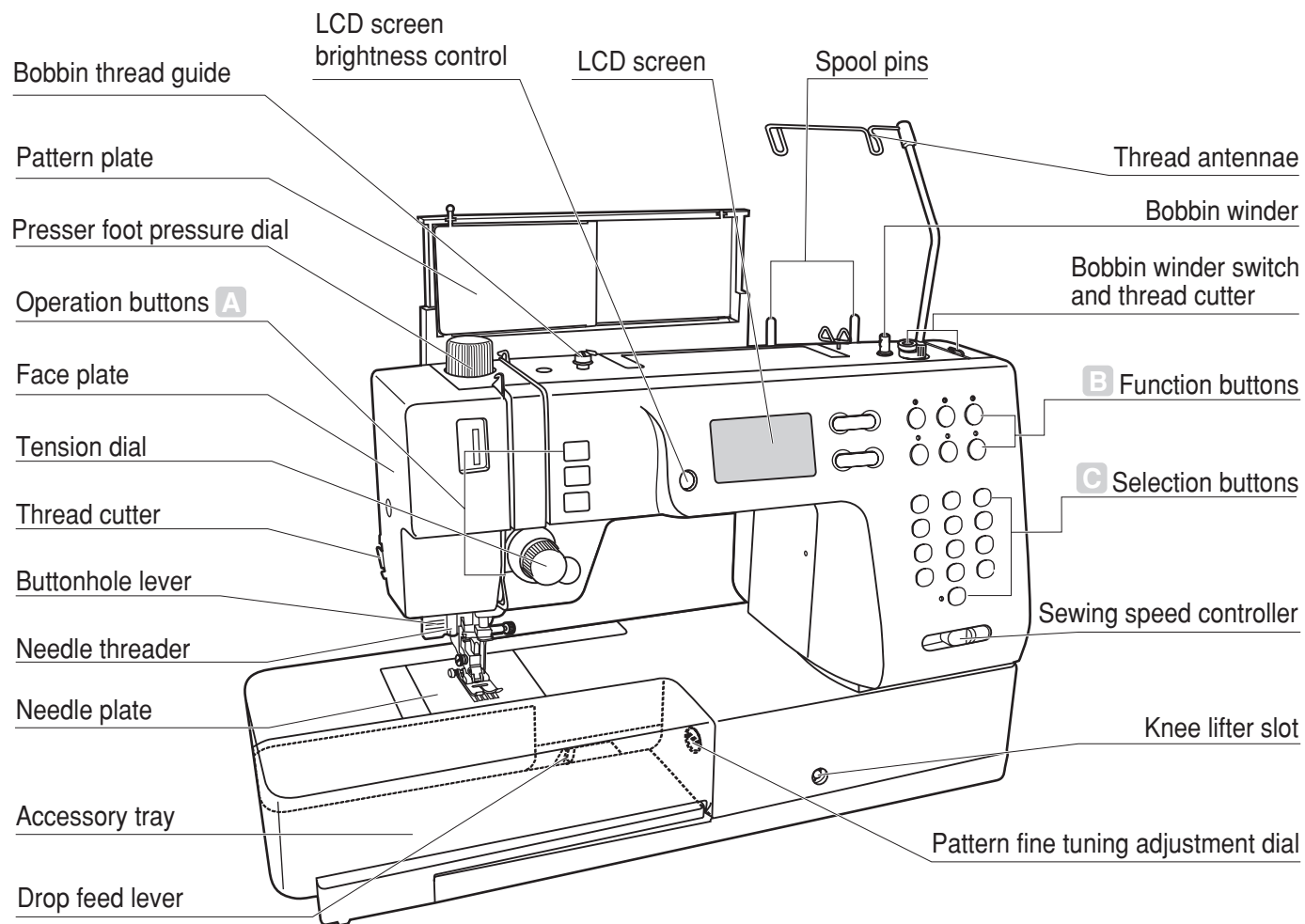


ATTENTION

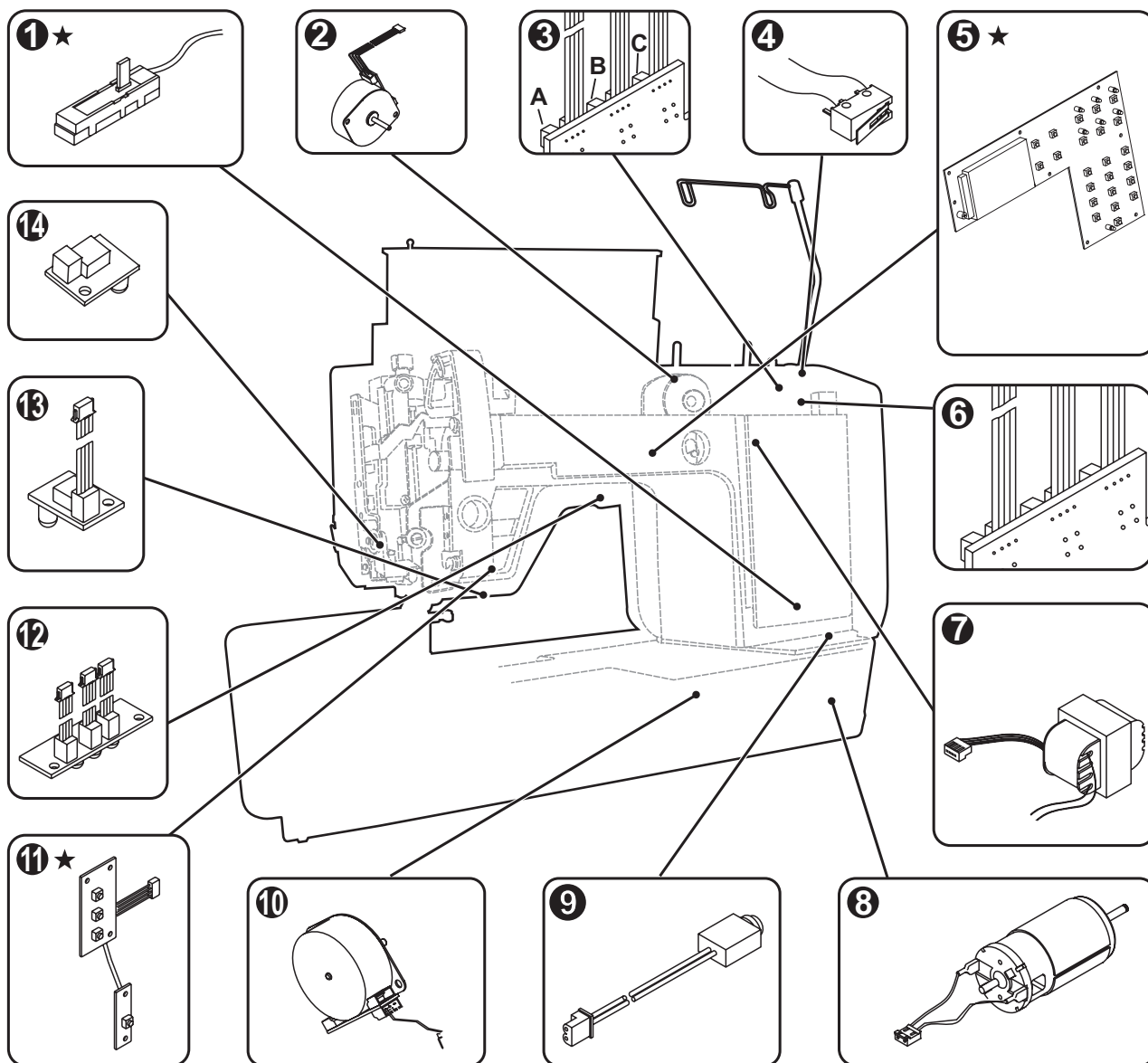
Carefully check the following, as they may well become causes for fire, electric-shock, injuries, and damage to parts.

- 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, miss-circuit, etc.
- Use regular standard part in replacing.

1. Machine main parts



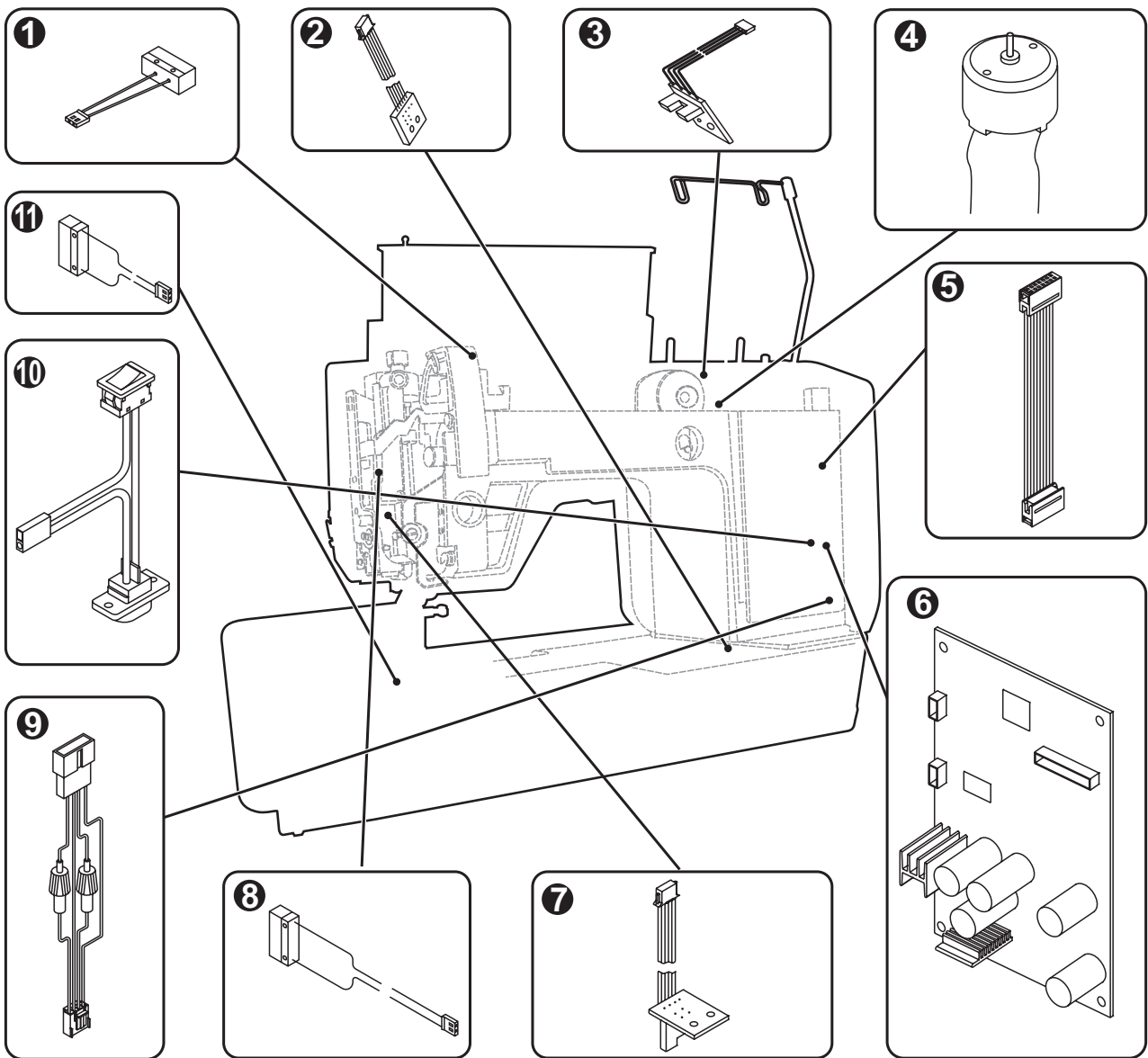
2. Machine electronic parts



- | | |
|--|--|
| 1. Slide volume | 10. Feed step motor |
| 2. Step motor (zigzag) | 11. Control switch (Up & down- Reverse and Start/Stop) |
| 3A. Photo sensor (needle position up/down) | 12. LED light sewing area (3 x LED lights) |
| 3B. Photo sensor (needle swing) | 13. LED light needle area right side (2 x LED lights) |
| 3C. Photo sensor (speed) | 14. LED light needle area left side (2 x LED lights) |
| 4. Micro switch (Bobbin winder motor) | |
| 5. LCD key panel | |
| 6. Bobbin winder PC board | |
| 7. Transformer | |
| 8. DC motor | |
| 9. Foot controller plug (Jack) | |

★ : Item indicated with a "star" are located on the front cover.

3. Machine electronic parts

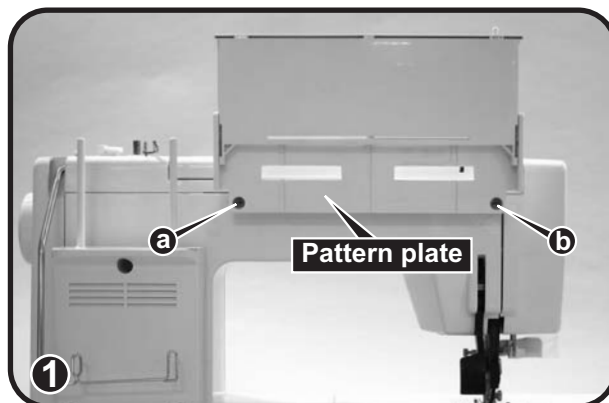


- | | |
|--|------------------------------------|
| 1. Micro switch (presser foot) | 10. ON/OFF switch receptacle assy. |
| 2. Photo sensor (Feed) | 11. Micro switch (Needle plate) |
| 3. Photo sensor (zigzag) | |
| 4. Bobbin winder motor | |
| 5. Main Lead wire
(LCD board to Main board) | |
| 6. Main circuit board | |
| 7. Photo sensor (B/H) | |
| 8. Micro switch (BH) | |
| 9. Safety fuse lead wire | |

4. Removal of machine covers and base

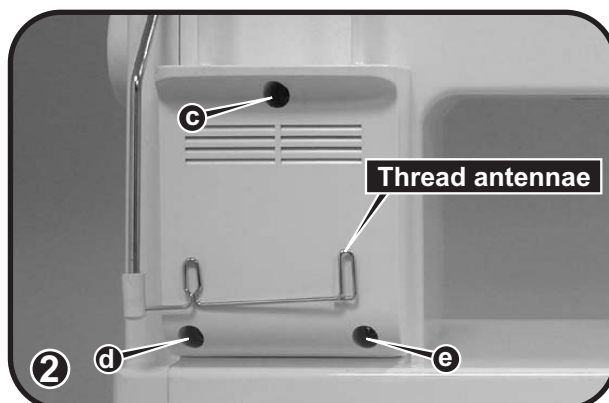
4-1 Stitch pattern plate

Remove 2 screws (a-b). (Fig.1)



4-2 Spool stand assembly

Remove 3 screws (c-d-e). (Fig.2)



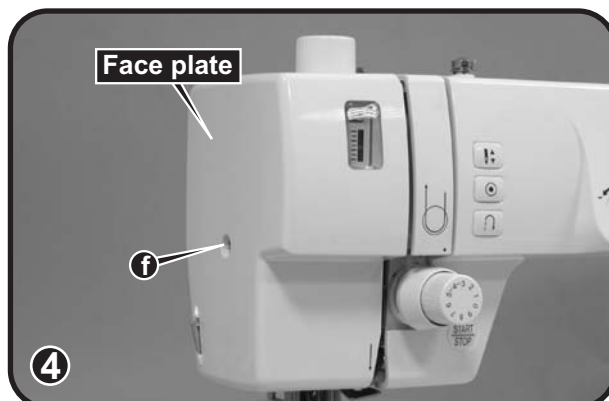
4-3 Accessory tray

Slide accessory tray to the left to remove. (Fig.3)



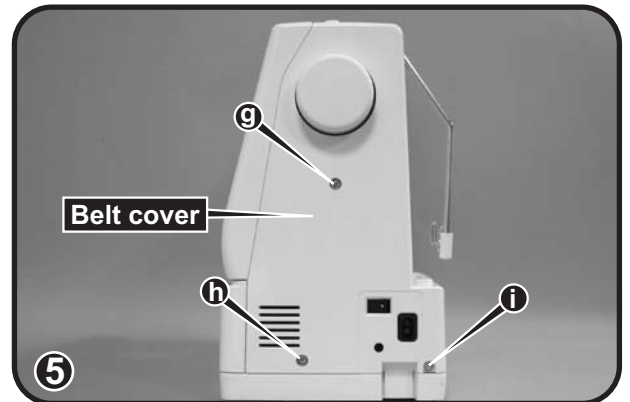
4-4 Face plate cover

Remove screw (f). (Fig.4)



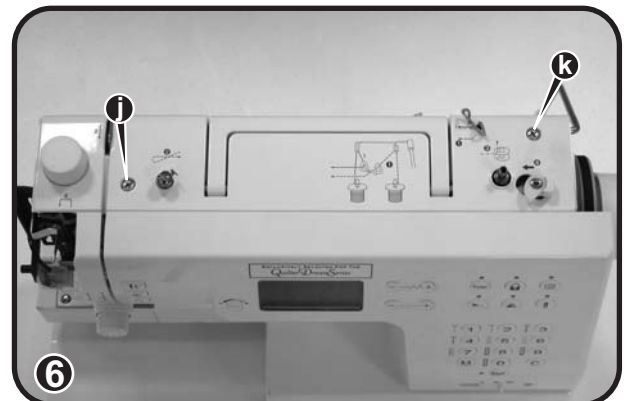
4-5 Belt cover

Remove 3 screws (g-h-i). (Fig.5)



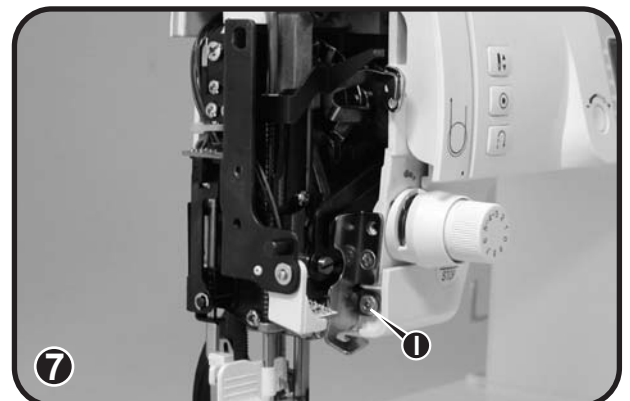
4-6 Top cover

Remove 2 screws (j-k) and disconnect the bobbin winder motor. (Fig.6)



4-7 Front cover

Loosen screw (l) one full turn. (Fig.7)

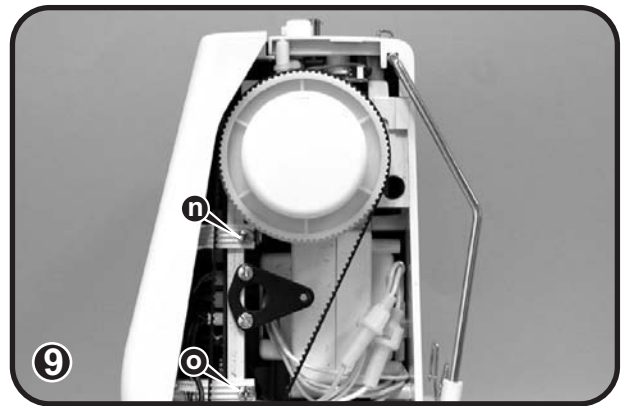


Loosen screw (m) one full turn. (Fig.8)

(Screw "m" is located inside front cover, use a long shaft phillips screw driver.)



Loosen 2 screws (n-o) one full turn. (Fig.9)



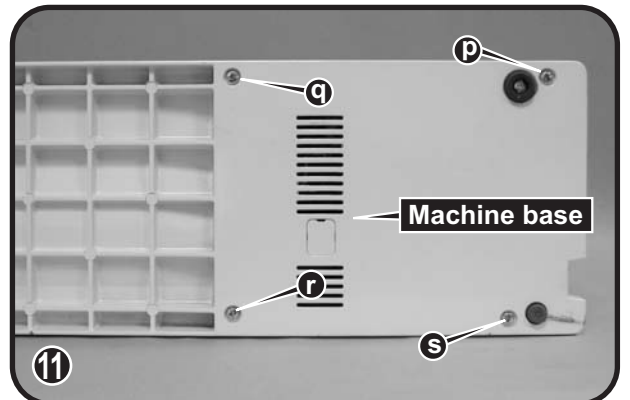
Remove front cover by pulling cover towards you and lifting it up. (Fig.10)

Note : Prior of removing front cover, disconnect main PC board plug.



4-8 Machine base removal

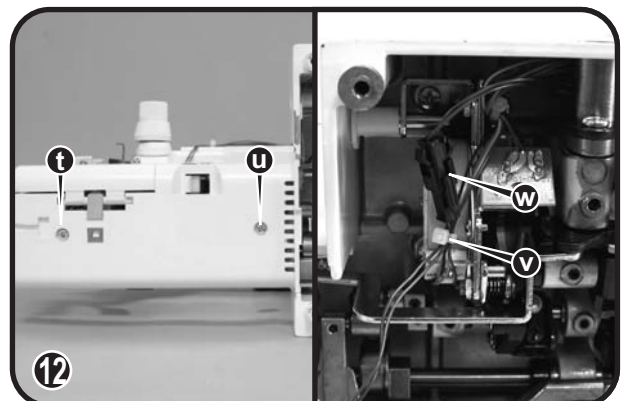
Remove 4 screws (p-q-r-s). (Fig.11)



4-9 Free arm base cover

Remove 2 screws (t-u). (Fig.12)

Remove plastic tie (v) and disconnect lead wire plug (w). (Fig.12)



5. Adjustments

5-1 Symbol reference chart



Noise occurring while the machine is running.



Skip stitching, needle breakage, and problems associated with needle.



Fabric feeding, problems associated with stitch length.



Stitch tension problem.



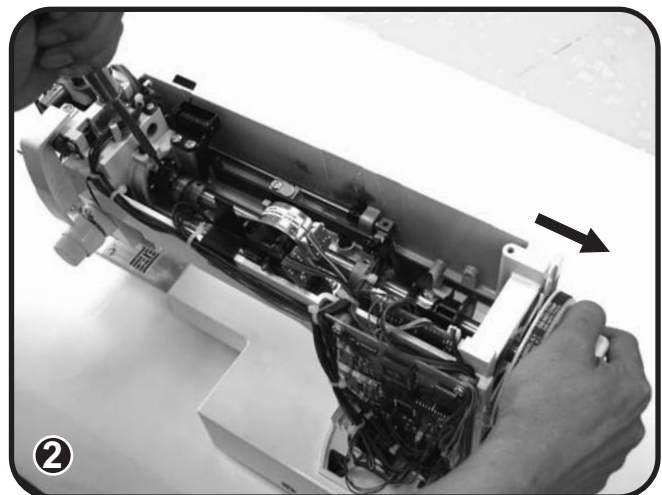
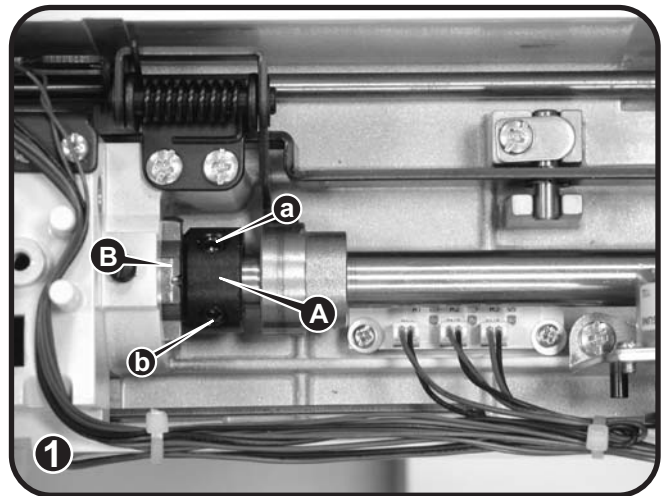
BH right and left stitching is not even, incorrect length and problems associated with buttonhole sewing.



Bobbin winding problem.

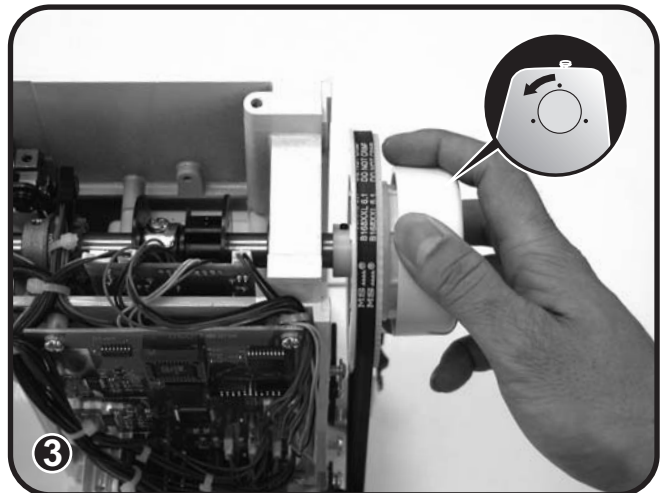
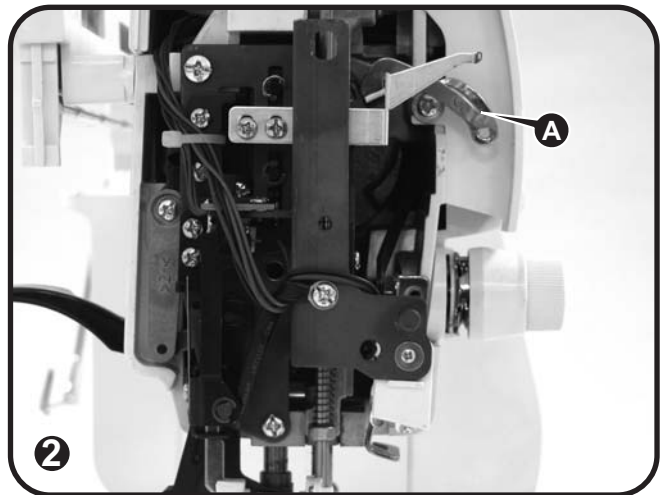
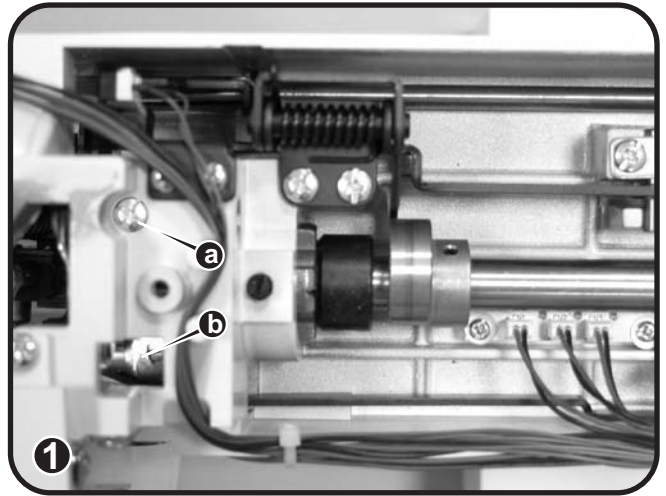
5-2 Upper shaft axial play

- 1) Remove the face plate and top cover.
- 2) Loosen 2 screws (a-b) on main shaft collar (A). (Fig.1)
- 3) Pull hand wheel to the right. (Fig.2)
- 4) Push main shaft collar (A) to the left against main shaft bushing (B), and tighten screws (a-b). (Fig.1)
- 5) Make sure there is no lateral play between main shaft collar and bushing. (Fig.1)
- 6) Make sure main shaft rotates smoothly after adjustment. No hard spot or bind allowed.
- 7) If rotation of shaft is too tight, loosen screws (a-b) and proceed as per above step 3-4.



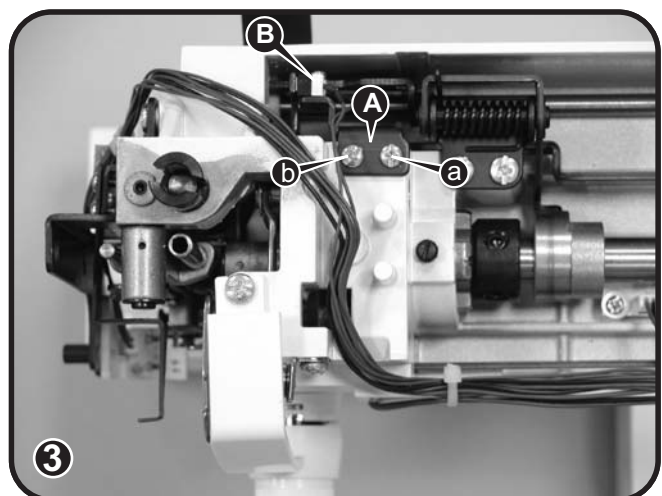
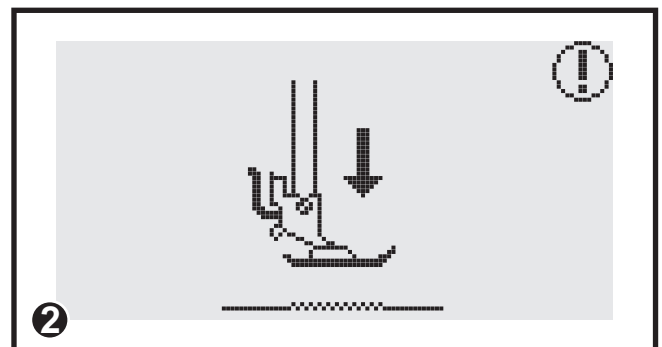
5-3 Take up lever - Adjustment - Noise level

- 1) Remove face plate and top cover.
- 2) Loosen 2 screws (a-b). (Fig.1)
- 3) Adjust thread take up lever by pushing lever support to the right to remove excess play and tighten the screws (a, b). (Fig.1-2)
- 4) Turn handwheel, check for noise and movement. (Fig.3)
- 5) If adjustment is too tight or too loose, proceed as per above step 2-3.



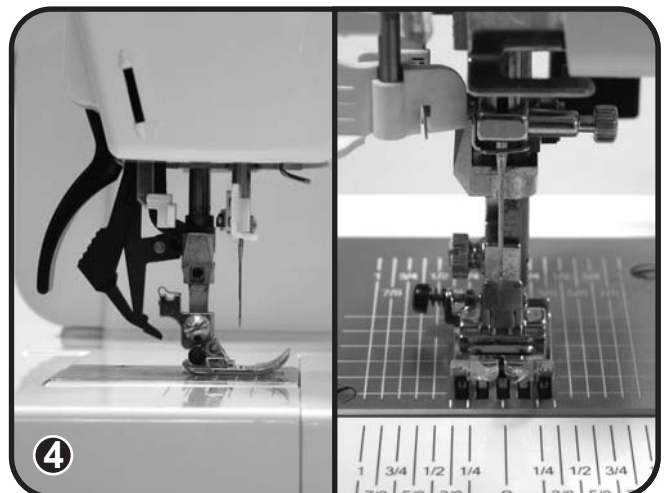
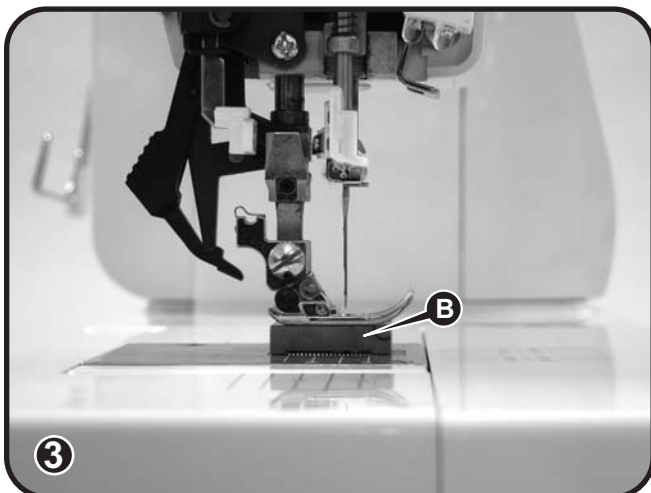
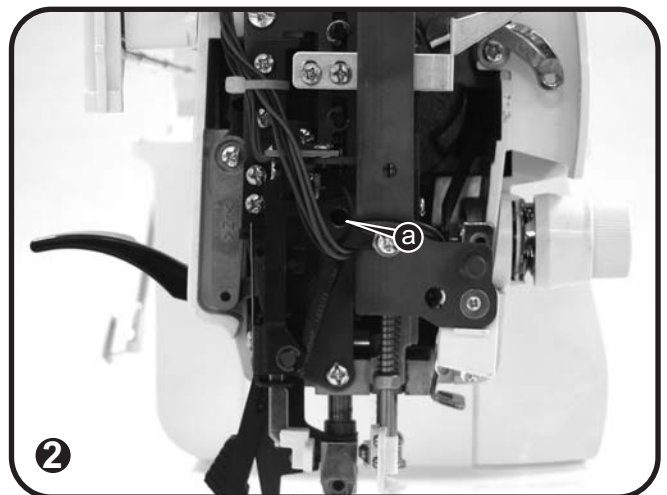
5-4 LCD warning message - Presser foot is not lowered

- 1) Remove the face plate and top cover.
- 2) Turn on the power switch, raise presser foot(A), press start/stop button, illustration on LCD should display "Lower presser foot". (Fig.1-2)
- 3) If LCD display doesn't indicate to Lower presser foot, the position of micro switch (B) is not adjusted properly. To adjust loosen 2 screws(a, b), push the plate (A) to the left and check if any warning message appears. (Fig.2-3)
- 4) If unit doesn't work or it is damaged replace defective unit. (Fig.3)



5-5 Height of presser foot - Knee lifter

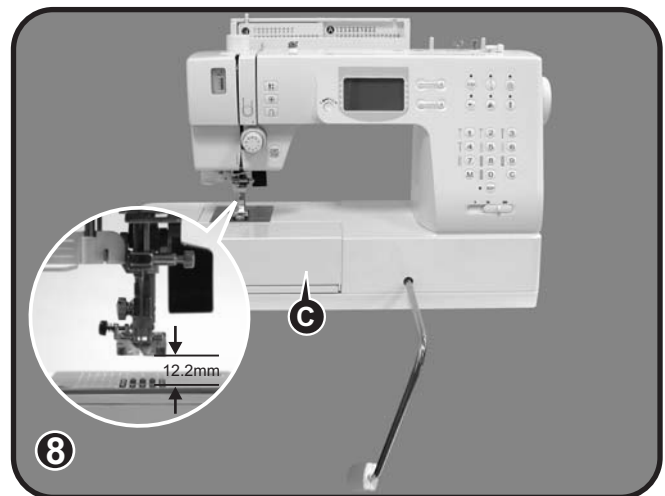
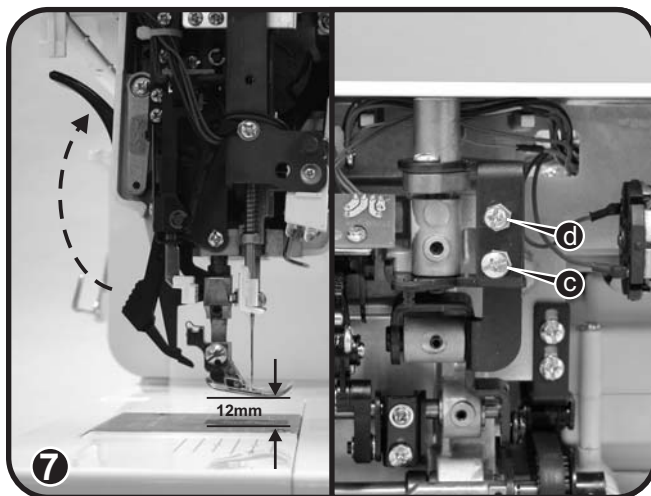
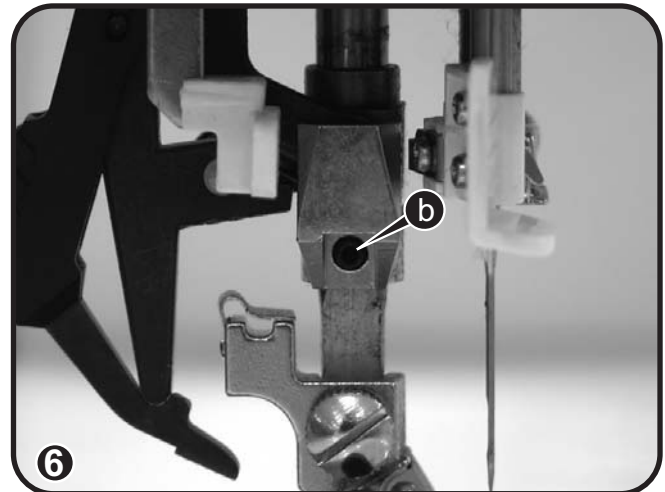
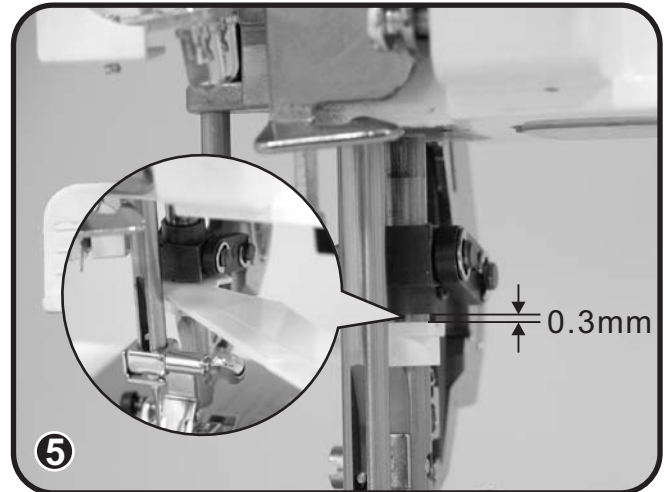
- 1) Remove face plate.
- 2) Raise the presser foot lever (A) and lower feed dog. (Fig.1)
- 3) Loosen the set screw (a). (Fig.2)
- 4) Place gauge (7.0~7.2mm) on the needle plate. (Fig.3)
- 5) Pull down the presser bar until the presser foot equally touches the gauge (B). (Fig.3)
- 6) Tighten the set screw (a). (Fig.2)
- 7) Make sure the presser foot is parallel with the needle plate markings and feed dogs. (Fig.4)
- 8) Recheck height of presser foot.



8) Raise the presser foot to second position. Set the needle at the highest position. The gap between presser bar and press bar ring should be around 0.3 mm. Adjust the gap by loosening screw(b). In case of improper adjustment, noise will occur. (Fig.5-6)

9) Adjustment of knee lifter :

1. Raise presser bar to second position.
2. Turn screw(c) clockwise until end of screw touches the knee presser bar lifter crank plate. The gap between screw head(c) and the knee presser bar lifter support base should be 12 mm. (Fig.7)
3. Turn screw (d) clockwise until end of screw touches recess on casting when unit is fully engage to the right. The distance between screw head (d) to knee presser bar lifter support base should be 12mm. (Fig.7)
4. Attach the knee lifter for test. The presser foot height of second position is more than 12mm. (Fig.8)

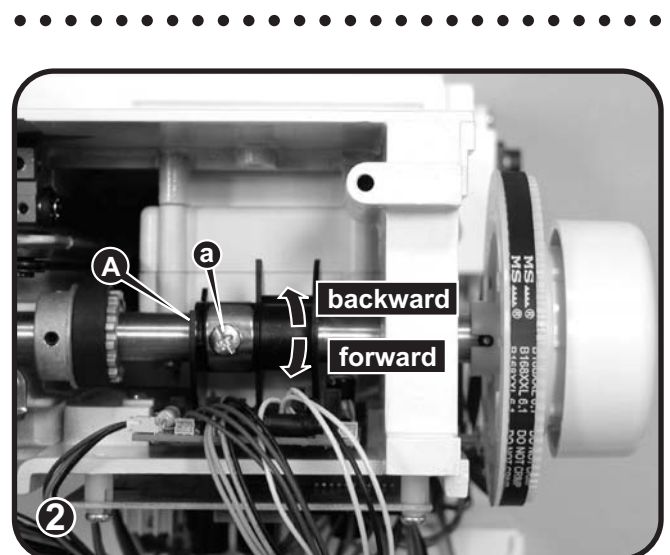
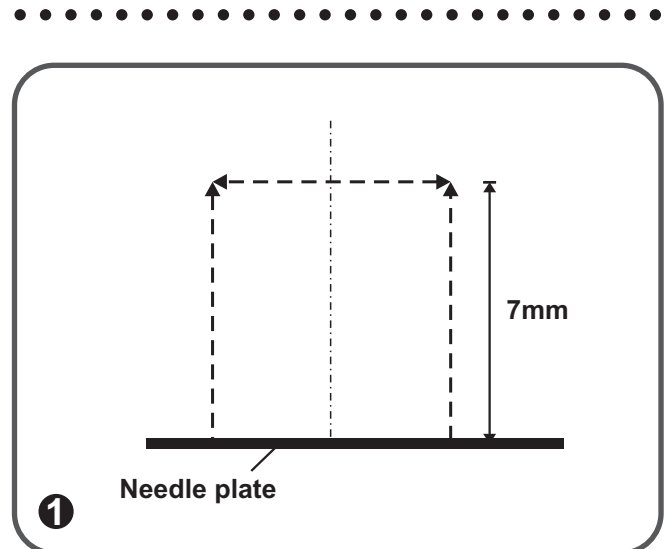
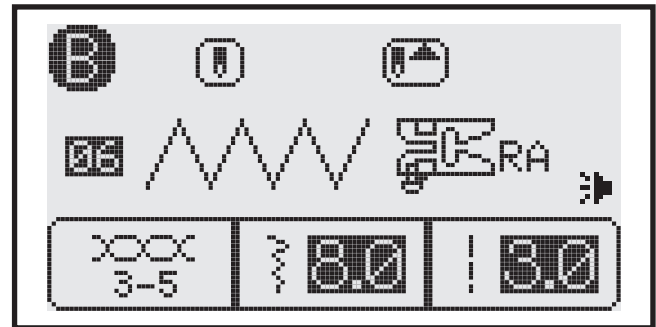


5-6 Needle bar orbital motion



- Select group "B" pattern 06, zigzag 8 mm.

- 1) Remove the face plate and top cover.
- 2) Check height of needle bar swing by turning the handwheel counterclockwise toward you. The needle bar motion from right to left or left to right should start to swing when needle is at 7 mm. (Fig.1)
- 3) If needle swing is less or more than 7 mm, loosen screw (a) on sensor flag unit, and turn flag (A) backward (↑) or forward (↓) to obtain proper setting. (Fig.2)
- 4) Tighten screw (a) and recheck adjustment.
- 5) Check and make sure that the upper shaft rotary sensor flags do not make contact with the photo sensor after adjustment. Turn the hand wheel slowly and check for clearance.

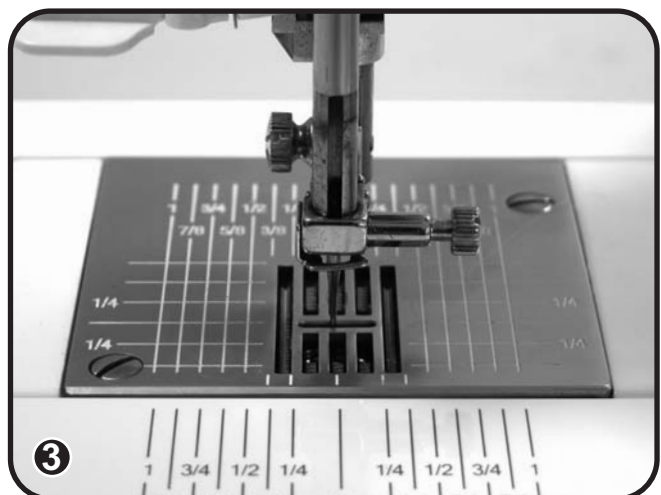
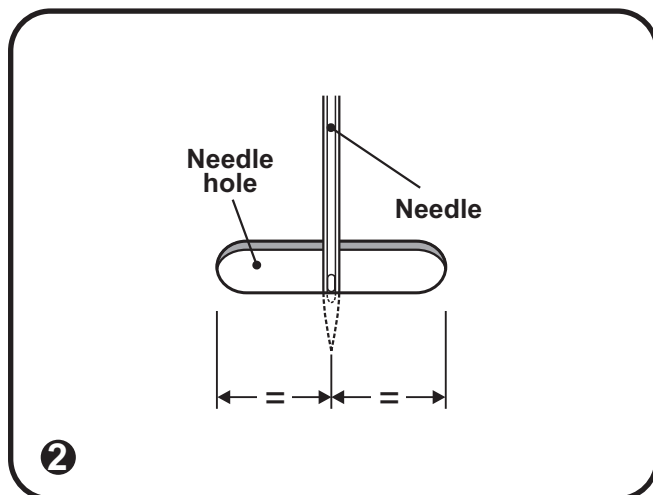
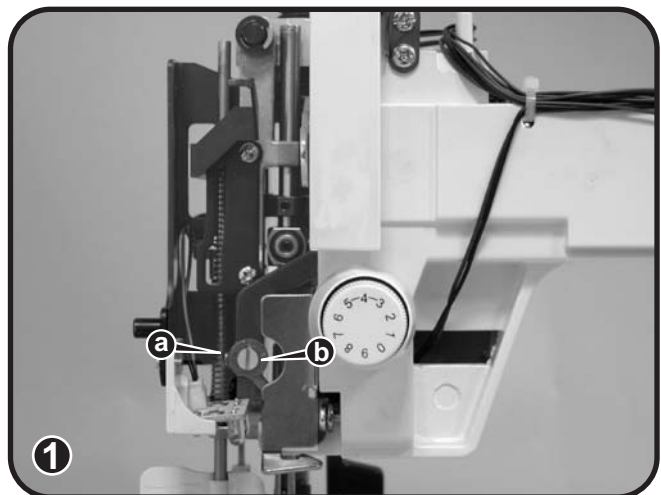
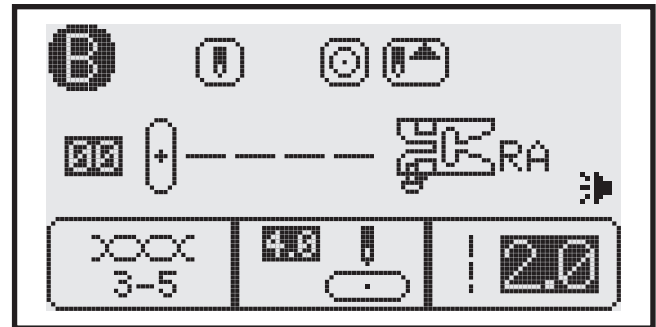


5-7 Needle center position adjustment



- Select group " " pattern 00.

- 1) Remove face plate.
- 2) Loosen Allen screw 1.5 mm (a). (Fig.1)
- 3) Adjust needle bar position by turning screw (b) clockwise or counterclockwise to get proper setting. (Fig.1)
- 4) Make sure needle position is in center of needle plate hole. Tighten screw (a). (Fig.1-2)
- 5) Change to straight stitch needle plate. Turn the hand wheel to confirm if the needle position is in center of needle plate hole. (Fig.3)



5-8 Zigzag needle position

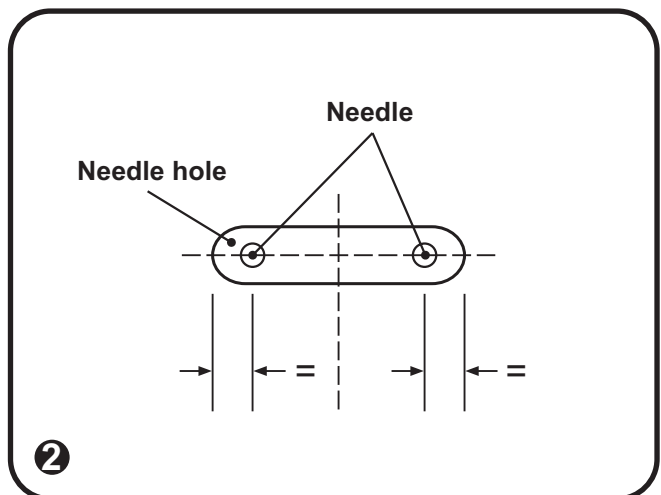
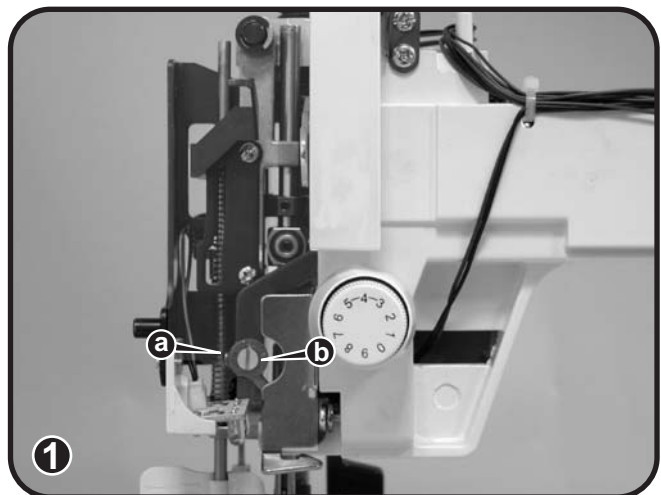
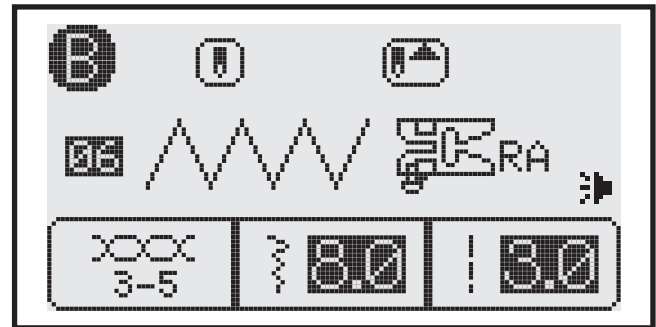
 - Select group "B" pattern 06, zigzag 8 mm.

- 1) Remove face plate.
- 2) Loosen Allen screw 1.5 mm (a). (Fig.1)
- 3) Adjust needle bar position by turning screw (b) clockwise or counterclockwise to get proper setting. (Fig.1)

Clockwise = left

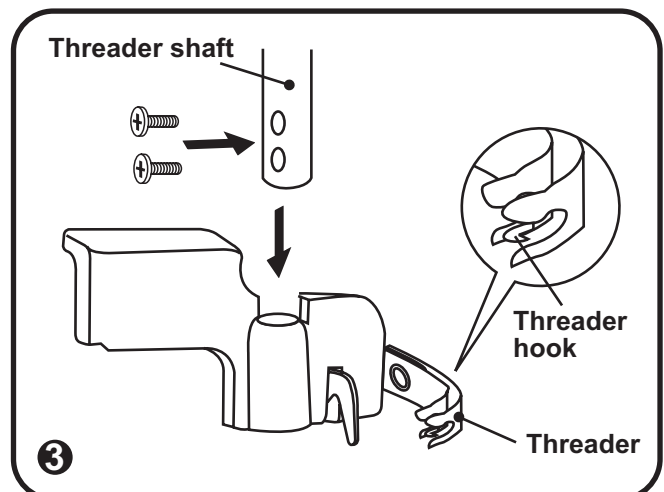
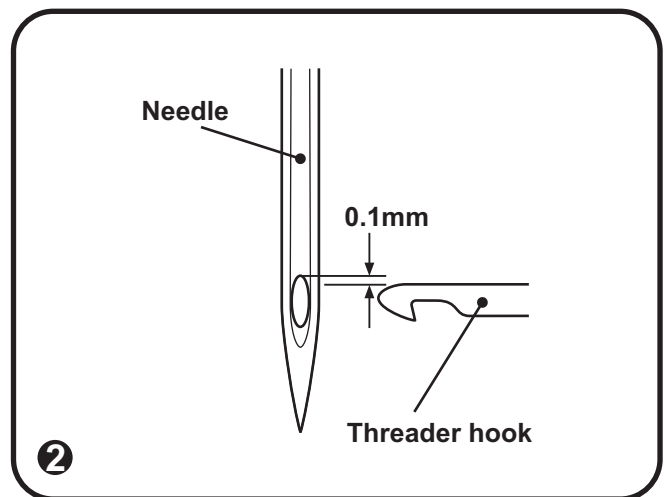
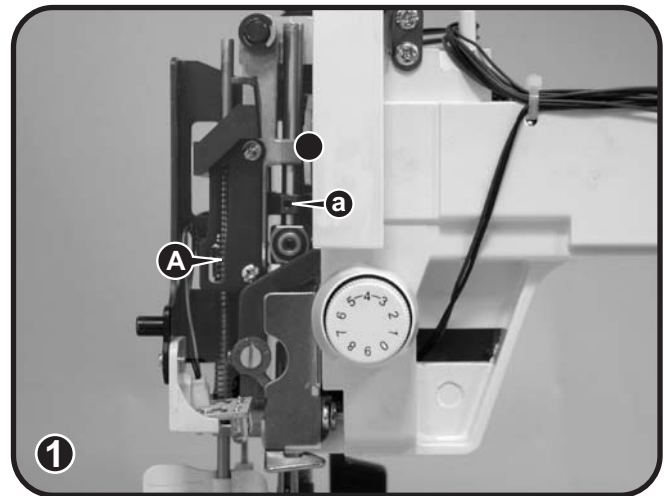
Counter-clockwise = right

- 4) Make sure needle position on left and right side of needle plate slot is at equal distance. Tighten screw (a). (Fig.1-2)
- 5) Recheck the needle position.



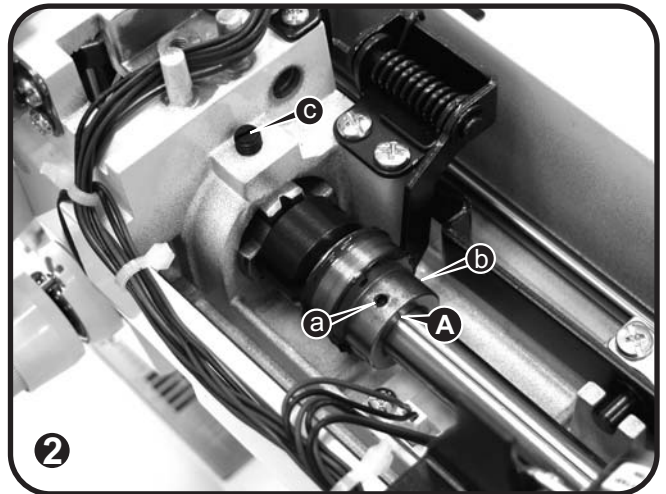
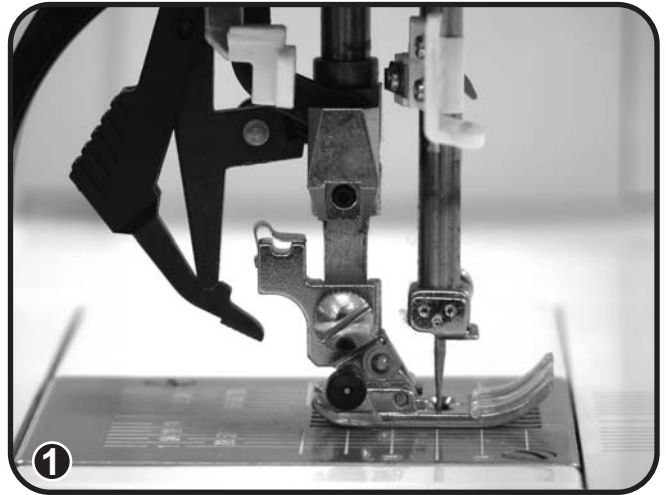
5-9 Needle threader adjustment

- 1) Remove face plate.
- 2) Switch on machine and bring needle bar to its highest position by pressing needle up/down button.
- 3) Loosen Allen screw 1.5mm (a). (Fig.1)
- 4) Slide needle threader shaft (A) all the way down and engage hook inside needle eye.
- 5) Adjust needle threader hook 0.1mm below needle eye. Bring stopper (a) against pin on needle threader shaft and tighten screw (a). (Fig.1-2)
- 6) Recheck needle threader operation. Make sure hook is entering needle eye freely.
- 7) Needle threader hook replacement. Remove both screws on back of the unit and replace device. (Fig.3)



5-10 Dual feed adjustment

- 1) Remove face plate and top cover.
- 2) Bring the needle bar to its lowest position. (Fig.1)
- 3) Check position of feed cam marking (A) with marking on main shaft (B) and screw (c). (Fig.2)
- 4) Loosen 2 screws (a-b)(Allen screw 2.0mm) and align marking on cam (A) with marking on shaft (B) and screw (c). (Fig.2)
- 5) Tighten 2 screws (a-b). (Fig.2)
- 6) Recheck dual feed adjustment.

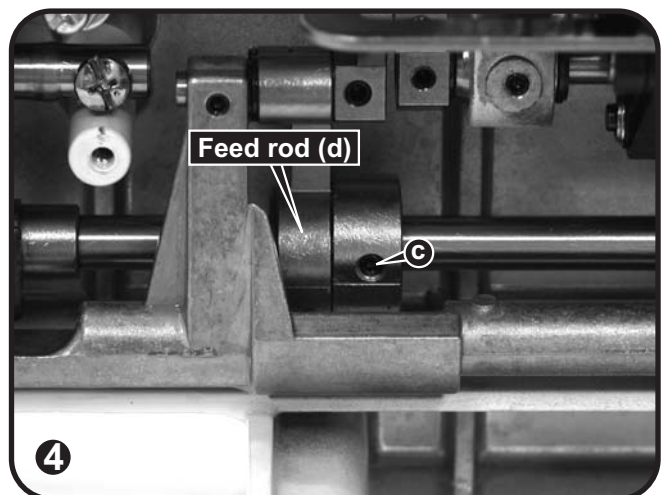
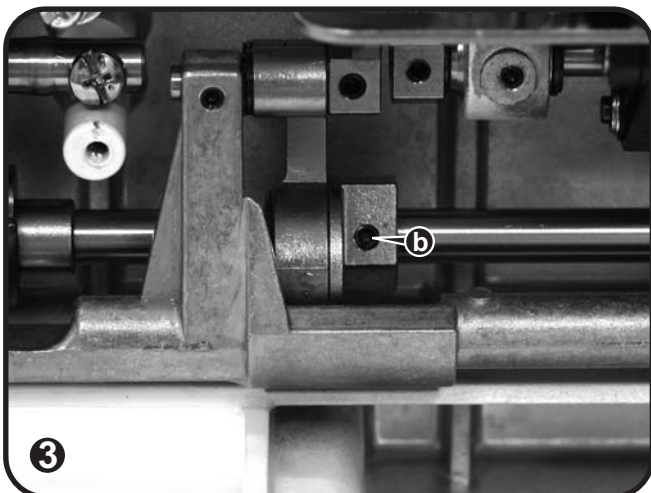
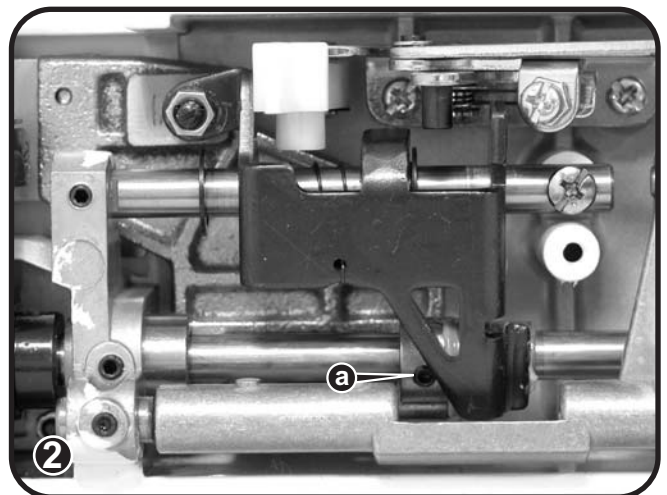
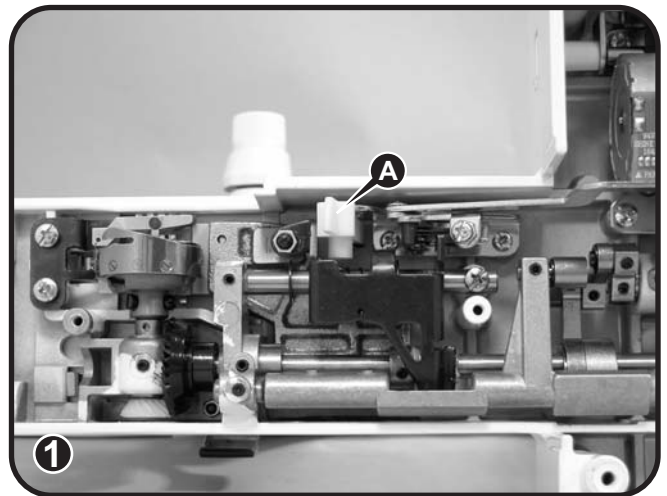


5-11 Feed dog drop

- 1) Remove machine base cover and free arm cover.
- 2) Turn the hand wheel until the needle raises to its highest position.
- 3) Move feed dog lifter crank (A) to the right. (Fig.1)
- 4) Loosen screw (a) on the feed lifting rock cam and adjust the position of cam so that set screw is facing up (center of lower shaft) and tighten screw (a). (Fig.2)

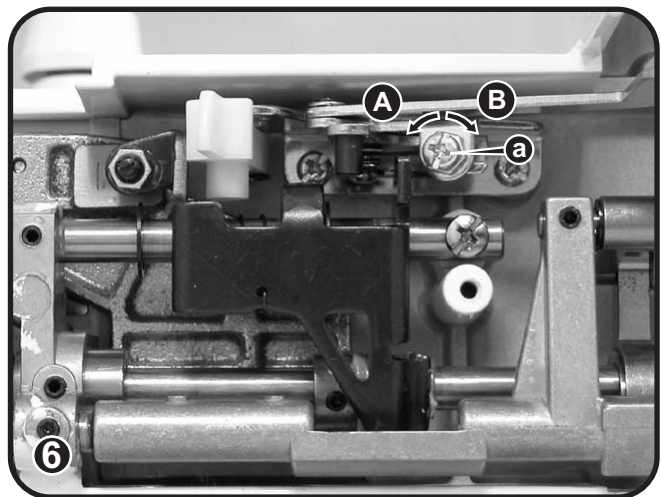
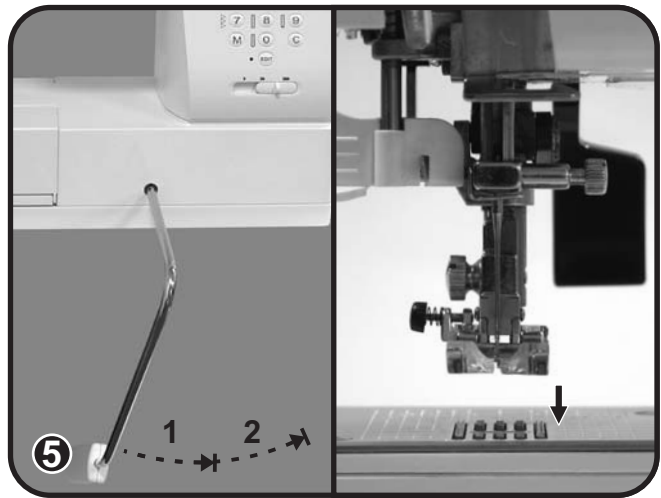
Horizontal feed timing

- 5) Loosen 2 screws (b-c). (Fig.3-4)
- 6) Turn hand wheel (counterclockwise) until needle reaches its highest position.
- 7) Align marking on the cam with reference mark on the feed rod (d) and tighten screws (b-c). (Fig.3-4)



Timing between use knee lifter and feed dog drop

- 8) Feed dog will drop to accompany push the knee lifter. When push the knee lift at first section, feed dog will drop promptly. (Fig.5)
- 9) If push the knee lift and feed dog drop too slowly, adjusting (a) screw clockwise, contrary, if feed dog drop too fast, adjusting (a) screw counterclockwise. (Fig.6)

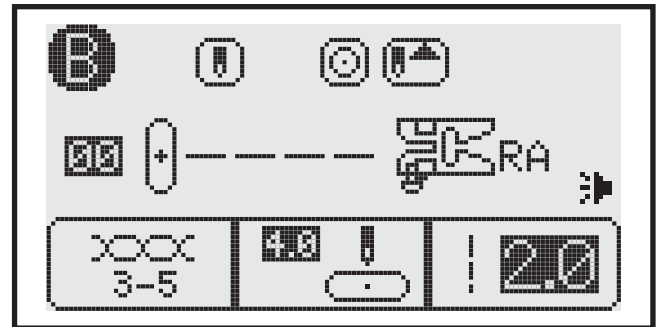


5-12 Height of needle bar



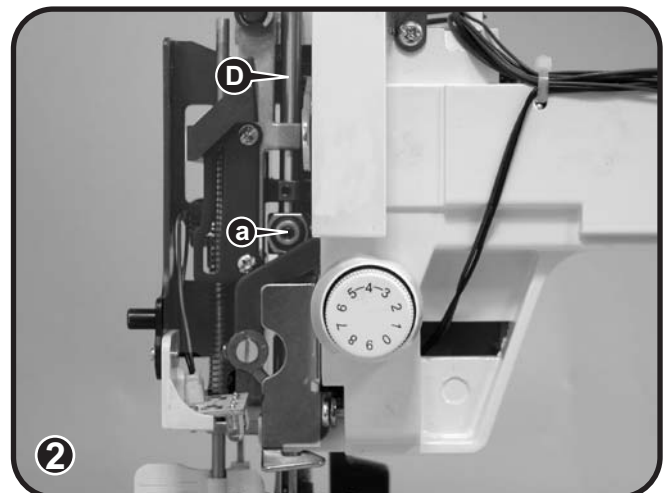
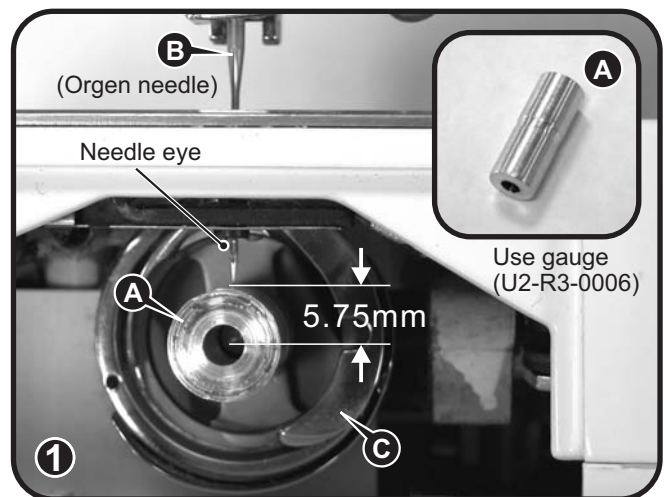
- Select group " " pattern 00.

- 1) Remove the presser foot and face plate.
- 2) Put the gauge (5.75mm) at the center of rotary hook, turn hand wheel, when needle down to the lowest position and touch the gauge. The distance from needle to the center of hook is 5.75mm \pm 0.25. (Fig.1)



- 3) Loosen the screw (a) and measure the height of needle bar by adjusting the needle bar (D). (Fig.2)

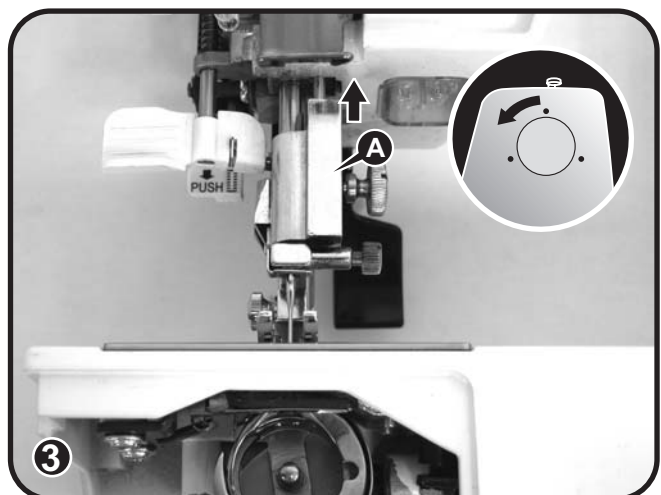
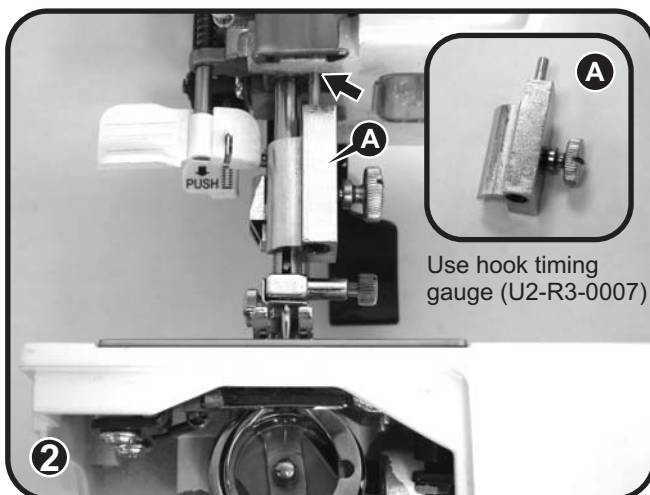
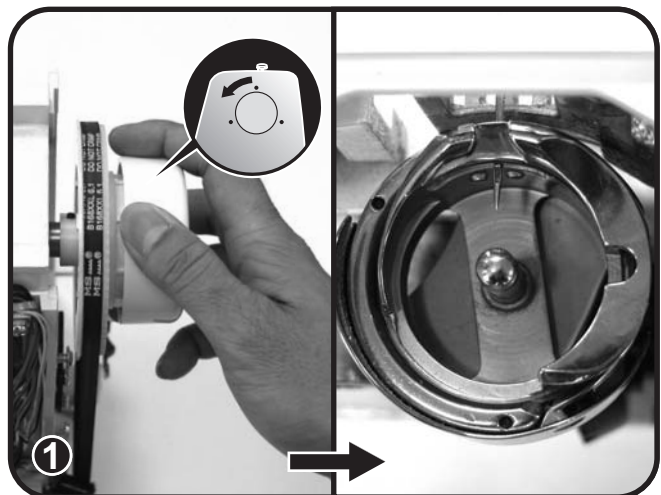
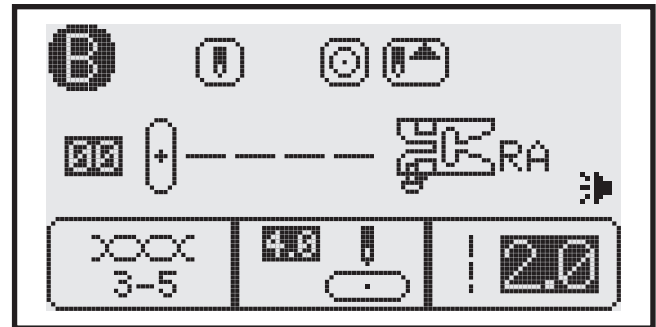
- 4) Adjust its height when the needle (B) is at the lower dead point and the upper side of the needle eye crosses the inner face of the rotary hook (C). (Fig.1)



5-13 Hook timing

 - Select group "  " pattern 00, straight stitch.

- 1) Remove machine base cover and free arm cover.
- 2) Remove bobbin case / presser foot and needle plate. Make sure needle bar is set in center position (see page 16). Turn the hand wheel counterclockwise until needle is at its lowest position. (Fig.1)
- 3) Set timing gauge (A) on the needle bar so that piston on the gauge touches bottom of needle bar cradle without forcing and tighten screw by hand. (Fig.2)
- 4) Turn the handwheel gently towards you until gauge stops at 2.54 mm. (Fig.3)

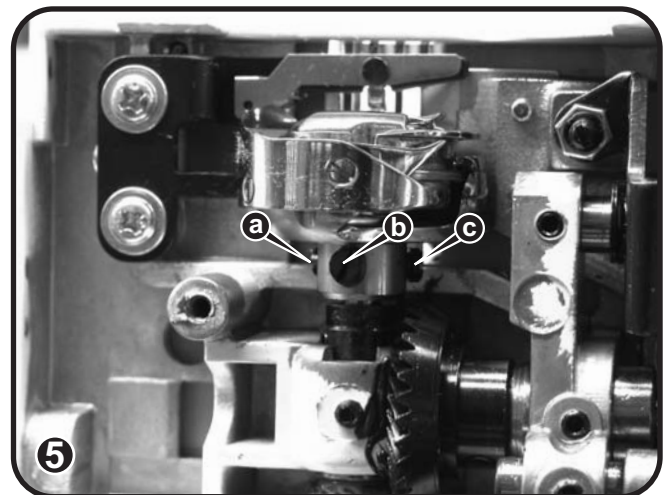
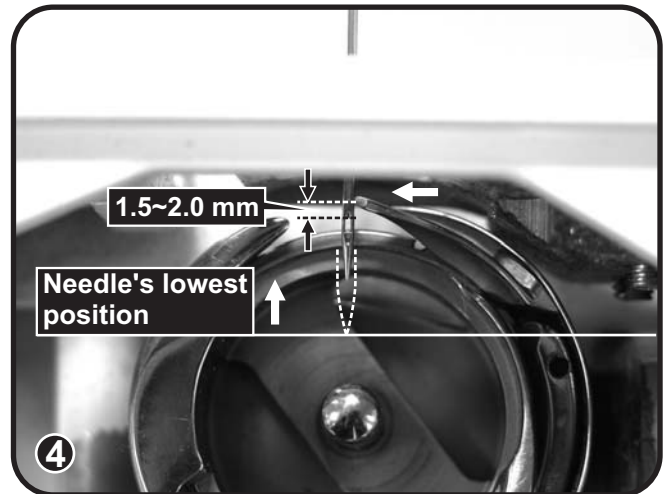


5) At this position the tip of the hook should be placed on the right edge of the needle. Distance between needle eye to tip of hook should be 1.5~2.0 mm. (Fig.4)

If the hook timing or distance is incorrect, loosen the 3 screws (a, b, c) on the hook unit. Adjust the hook timing and tighten screws. (Fig.5)

Recheck hook timing adjustment and needle clearance.

6) For adjustment of needle clearance refer to page 24.



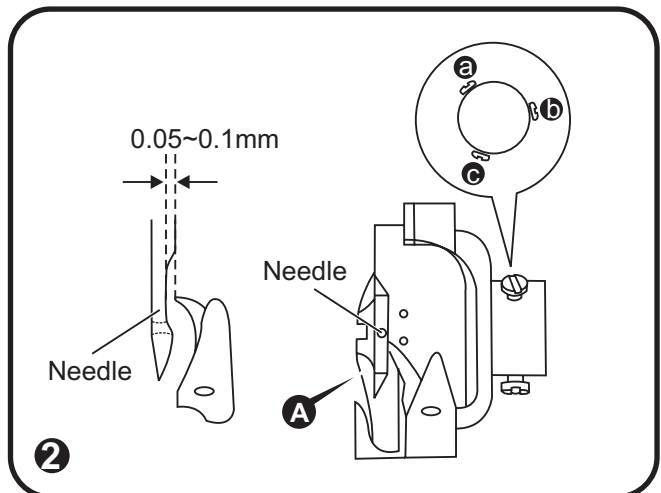
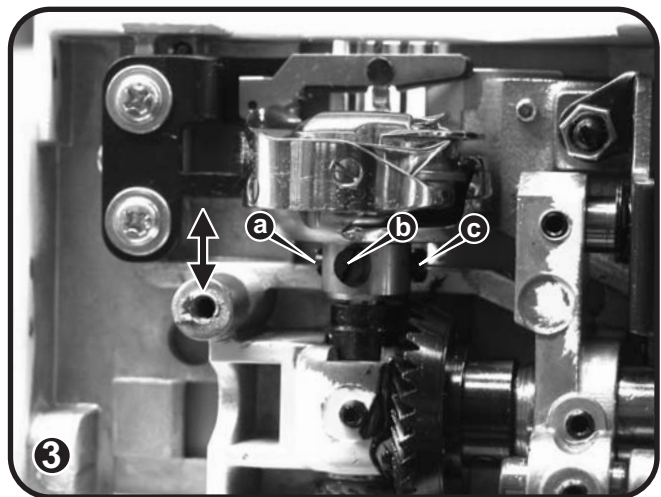
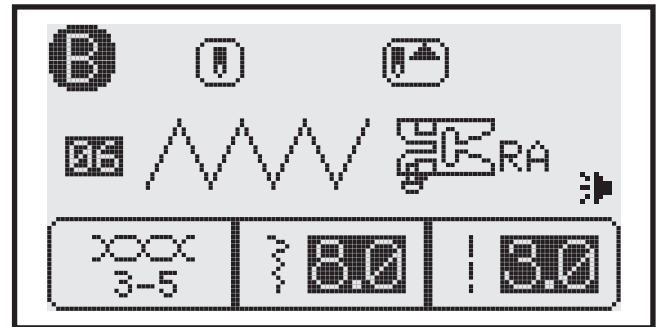
5-14 Needle clearance



- Select group "B" pattern 00, straight stitch.

- 1) Check position of needle into needle plate hole and needle bar height is correct.
- 2) Remove bobbin case and needle plate.
- 3) Replace needle.
- 4) Turn hand wheel toward you, bring tip of hook behind needle and check needle clearance. Gap between back of needle and tip of hook should be at 0.05 ~ 0.1 mm.
- 5) Adjust needle clearance by loosening screws (a-b-c) and positioning the hook closer or further away from the needle. Then tighten screws.
- 6) Recheck hook timing, needle clearance and position of rotary hook holder (thread escapement).

Note: Adjust rotary hook clearance noise by loosening the set screw, presses shuttle drive shaft collar to the downward against shuttle drive shaft busing, upward shuttle drive shaft gear and tighten screw. Make sure there is no play between collar and gear.



5-15 Hook gear and lower shaft gear backlash play

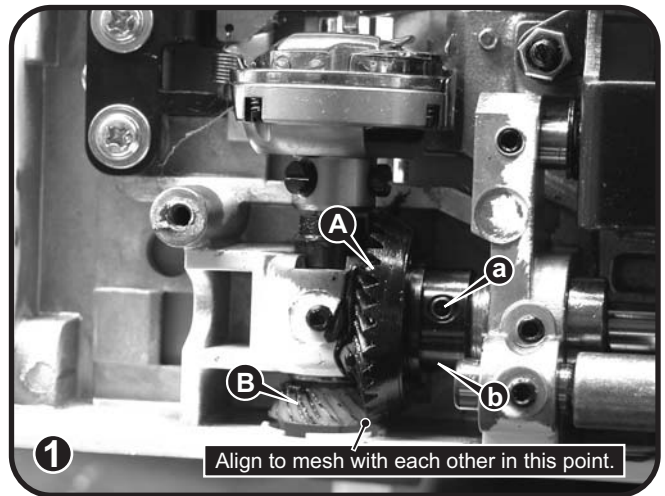


Problem:

- Shuttle drive does not turn or does not turn smoothly.
- Noises occur while the machine is running.

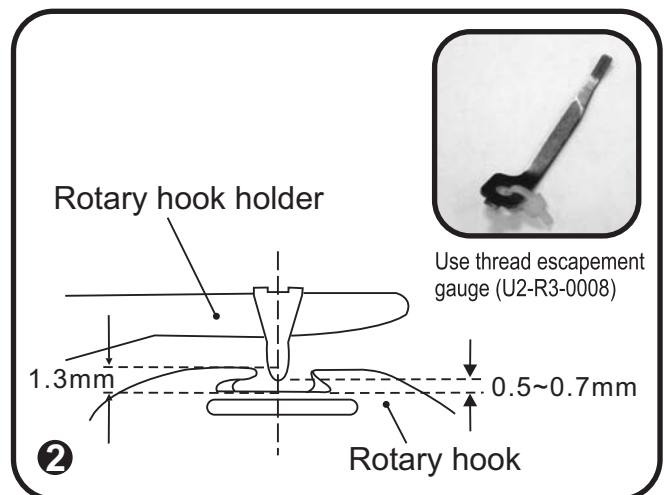
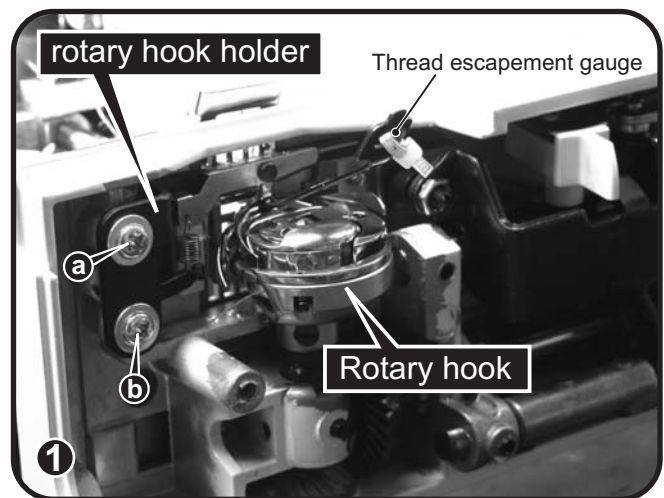
Adjustment:

- 1) Loose 2 screws (a-b) on the lower shaft gear. (A)
- 2) Adjust the lower shaft gear (A) closer or further away to the shuttle drive gear (B) and tighten the two screws. Allow a small backlash play between the gears.
- 3) Recheck hook timing and needle clearance page 22-23-24.



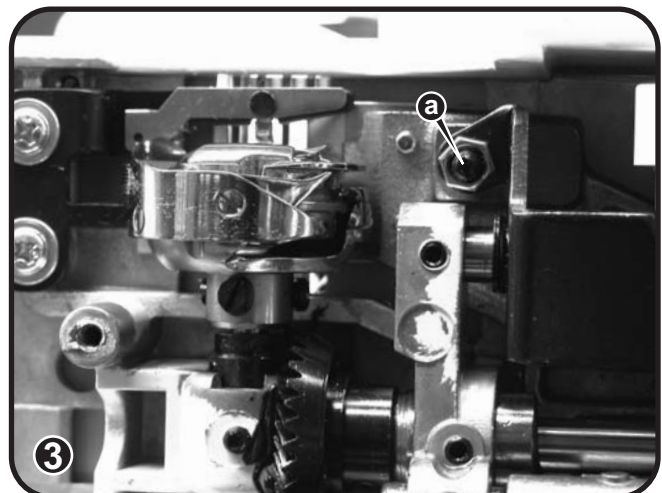
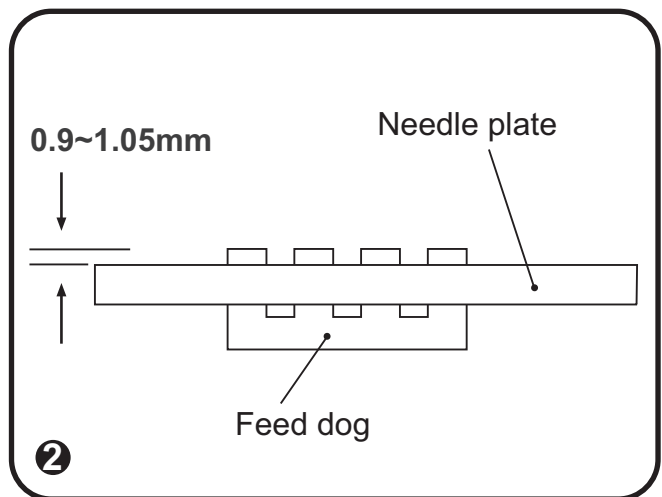
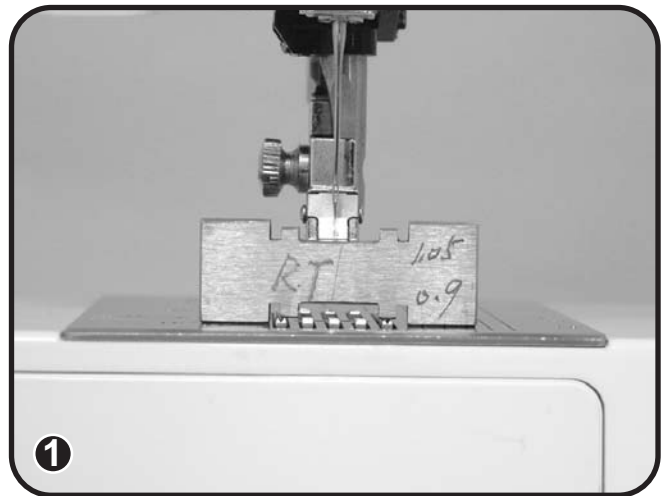
5-16 Position of rotary hook holder (Thread escapement bracket)

- 1) Remove machine base cover, free arm cover and bobbin case.
- 2) Loosen 2 screws (a-b) of the rotary hook holder (thread escapement). (Fig.1)
- 3) Adjust clearance between rotary hook holder (thread escapement) and rotary hook to 0.5mm ~ 0.7mm. (Fig.2)
- 4) Recheck position of rotary hook holder. Make sure escapement finger is correctly set in the rotary hook opening. (Fig.2)



5-17 Feed dog height

- 1) Remove machine base cover and free arm cover.
- 2) Turn the hand wheel to raise the feed dog to its highest position.
- 3) Place gauge on the needle plate, check height of feed dog. The height should be 0.9 ~ 1.05 mm. (Fig.1-2)
- 4) Adjust feed dog height by turning screw (a) clockwise to raise the feed dogs or counterclockwise to lower the feed dogs. (Fig.2-3)
- 5) Recheck the feed dog height.

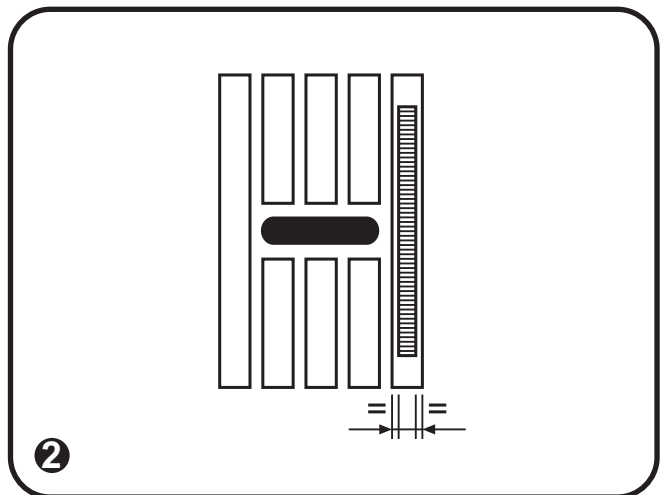
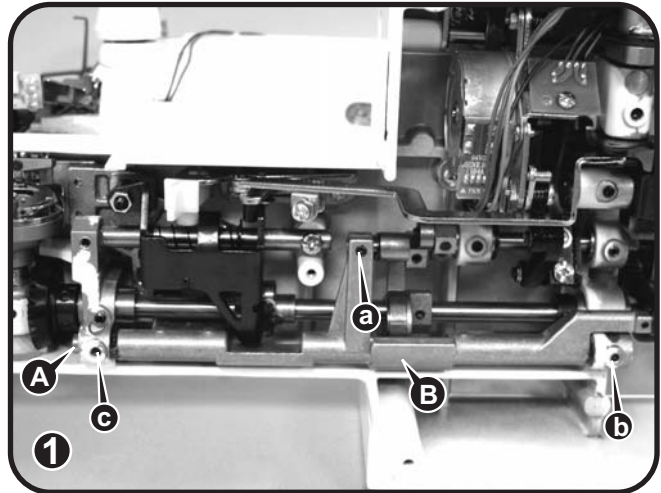


5-18 Position of feed-dog in relation to the needle plate slots (left to right)

- 1) Remove machine base cover and free arm cover.
- 2) Loosen screw (a) of the feed rock shaft (B).

Loosen screw (b-c) of the feed crank pivoting shaft (A).

- 3) Adjust feed dog to center position by moving feed crank shaft (A) to the left or to the right. (Fig.1-2)
- 5) Tighten screw (b), push left feed shaft to the right and tighten screw (c). Check and make sure that there is no lateral play on the feed rock shaft (B). (Fig.1)
- 6) Tighten screw (a) on the feed rock shaft (B).
- 7) Recheck position of feed dog with needle plate slots. (Fig.2)

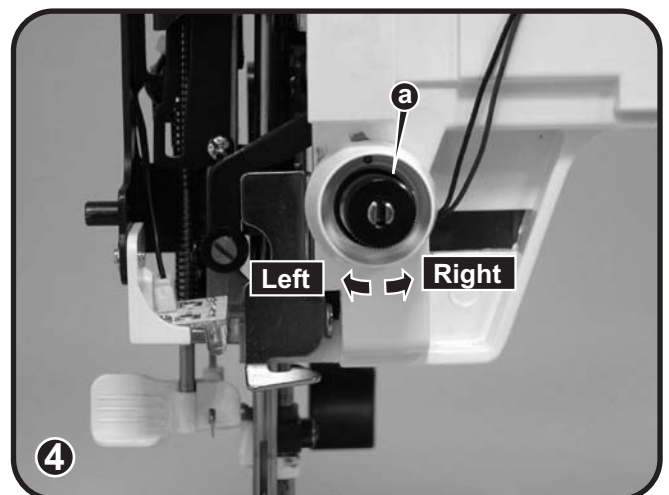
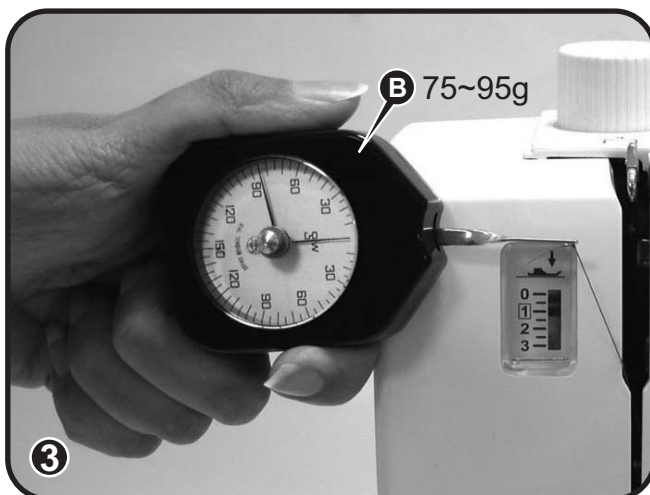
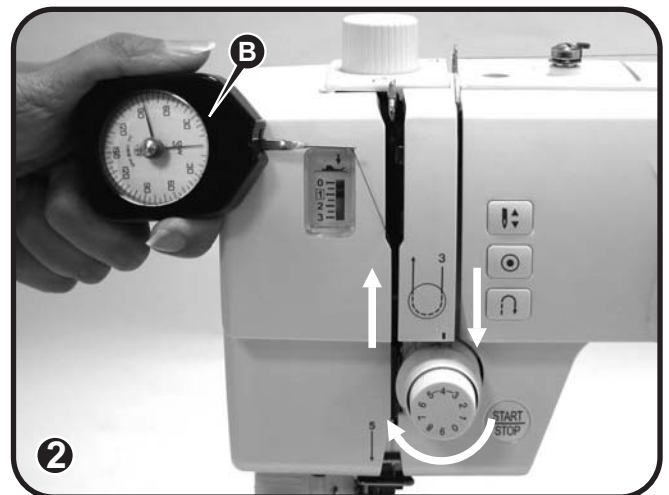


5-19 Upper thread tension adjustment



- 1) Remove face cover and set tension dial (A) to standard position "4". (Fig.1)
- 2) Use a dial tension gauge (150g) (B) to check the tension value. (Fig.2)
- 3) Attach thread to end of tension dial lever and place thread into tension disks. Lower presser foot and check tension value by pulling on the gauge. Reading should be 75~95g. (Fig.2-3)
- 4) To adjust the tension.
 - Remove tension dial knob.
 - Turn tension nut (a) clockwise to increase or counter-clockwise to decrease the tension. (Fig.4)
 - Place tension dial knob on main tension unit at standard position "4".
- 5) Recheck tension value (75~95g.)

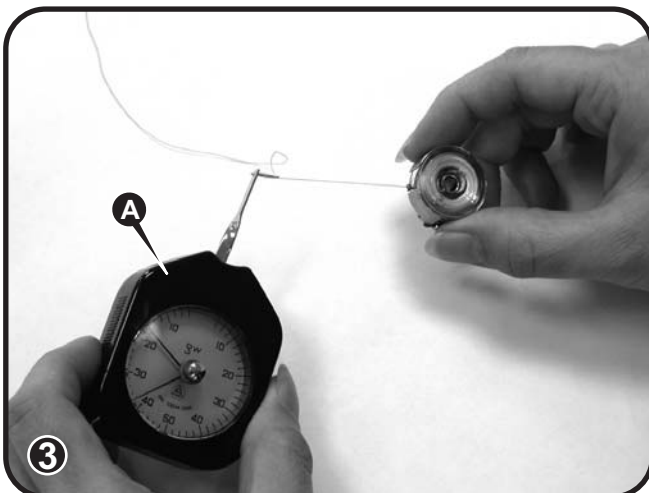
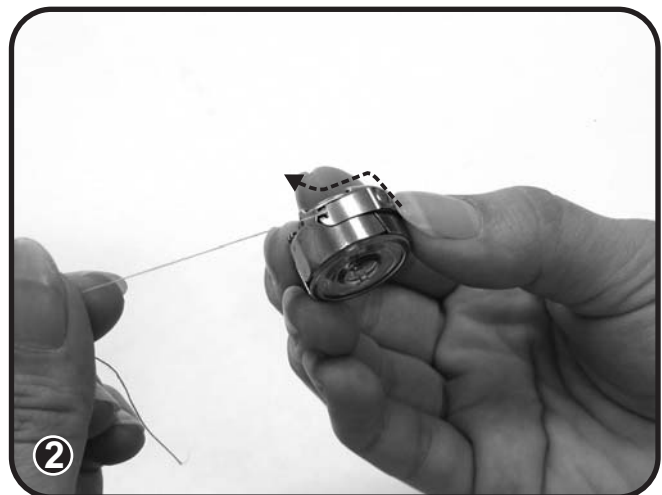
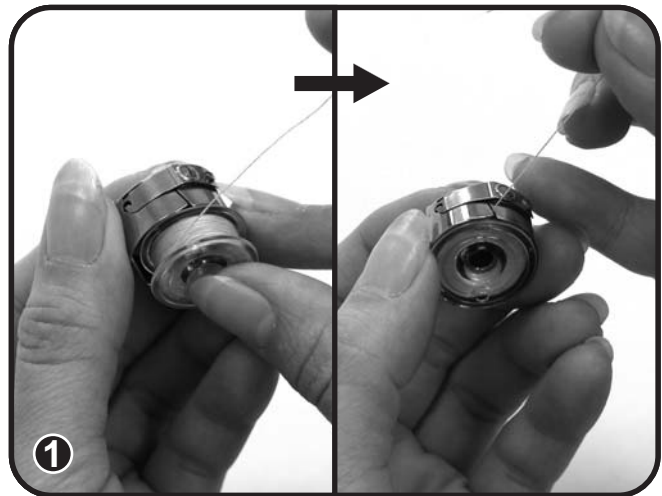
Recommended thread: Metrosene Plus (Polyester) 60/2 or Schappe Spun (Polyester) 60/3.



5-20 Bobbin case thread tension adjustment

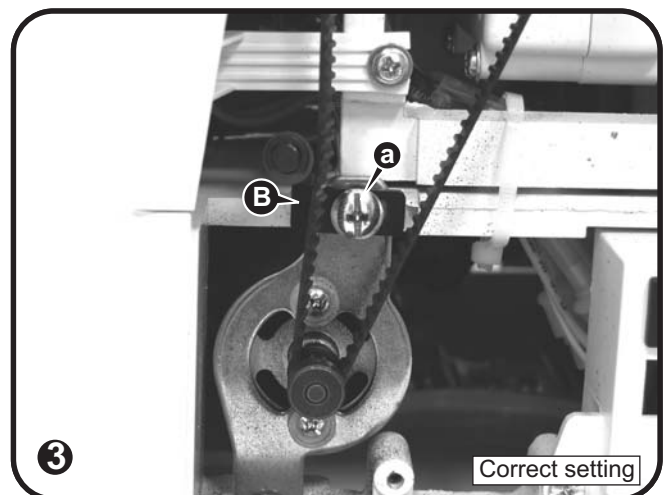
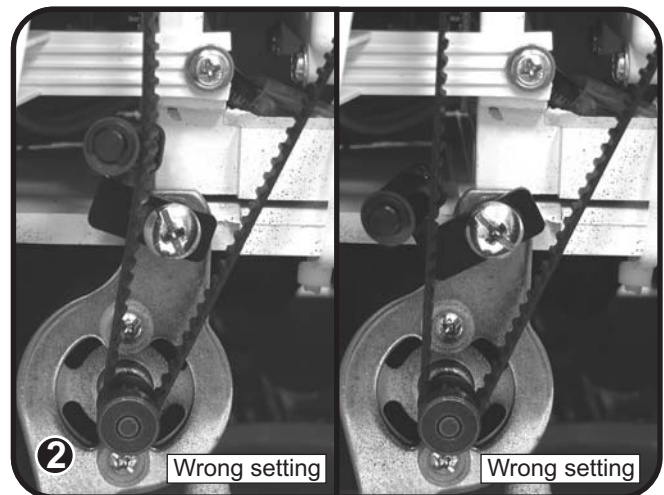
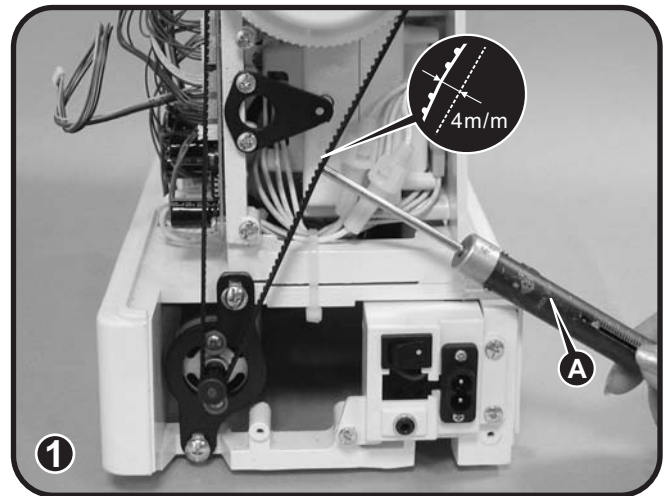
- 1) Use a dial tension gauge (50g) (A) to check the tension value. (Fig.3)
- 2) Attach thread to end of tension dial lever and place thread into tension. Check tension value by pulling on the gauge. Reading should be 15 to 18 gr. (Fig.1-2)
- 3) To adjust the tension.
 - Turn screw (a) clockwise to increase or counter-clockwise to decrease the tension. (Fig.4)
 - Recheck the tension value (15 to 18gr). (Fig.3)

Recommended thread: Metrosene Plus (Polyester) 60/2 or Schappe Spun (Polyester) 60/3.



5-21 Motor belt tension

- 1) Remove belt cover and check tension of motor belt using a belt tension gauge (A). Tension reading should be 100gr with a 4 mm flex of the belt. (Fig.1)
- 2) To adjust the tension belt.
 - Loosen screw (a) of belt pulley adjusting plate (B). (Fig.3)
 - Move bracket up or down to obtain proper setting. (Fig.3)
 - Tighten screws (a) and recheck adjustment.
- 3) Run machine and check noise level.

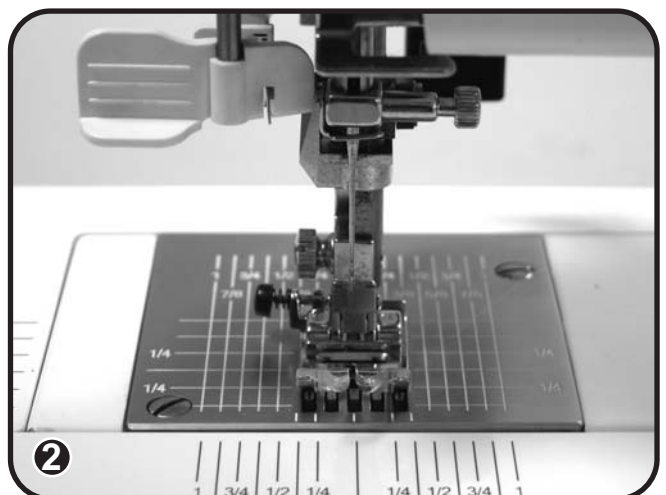
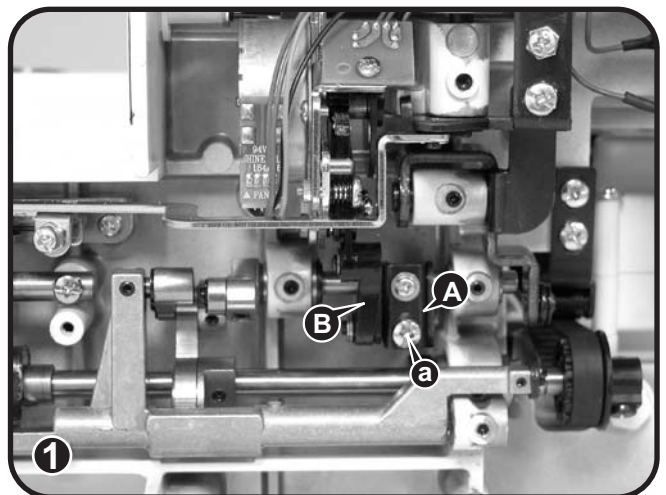
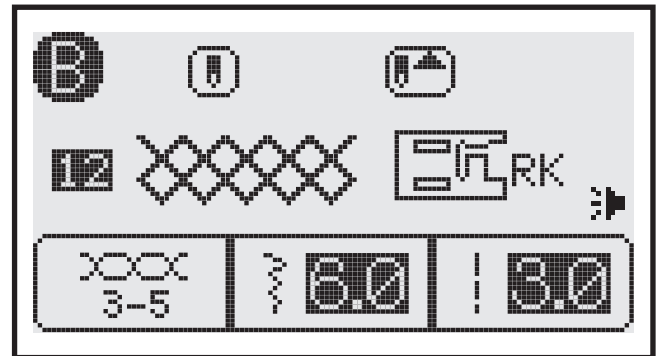


5-22 Forward / Reverse pattern adjustment



- Select group " " Pattern 12.

- 1) Remove machine base cover and free arm cover.
- 2) Make sure feed regulating crank (A) and feed rock rod (B) are moving freely. (Fig.1)
- 3) Place a piece of paper underneath presser foot. (Fig.2)



4) Set speed volume to slow speed and slightly press on the foot controller or start/stop key. Check if needle drop forward and reverse feeding is in the same hole.

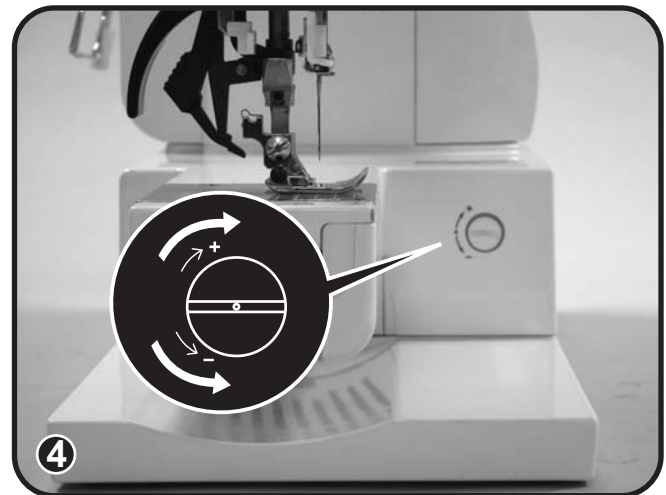
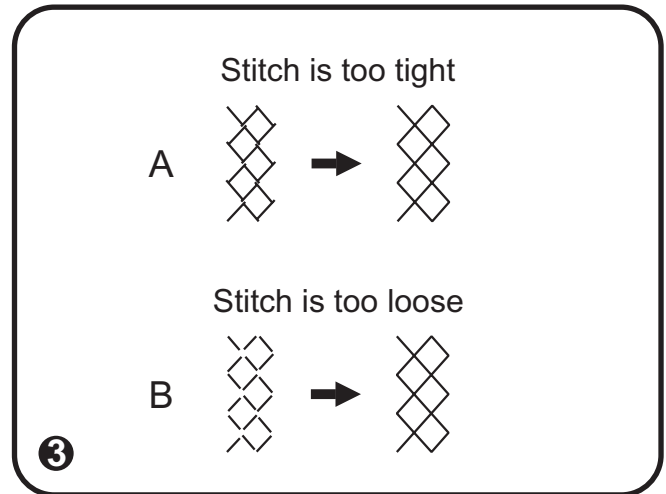
5) If necessary adjust fine tuning by turning feed crank screw (a) counter-clockwise to open (↓) and clockwise to close (↑) the honey comb stitch. (Fig.1-3)

Make sure fine tuning dial is set in horizontal position (center) prior of adjusting feed crank screw (a). (Fig.1-4)


6) Fine tuning dial adjustment.

A. If patterns are overlapping, adjust by turning the dial counterclockwise in the direction of " - ". (Fig.3-4)

B. If patterns are open, adjust by turning the dial clockwise in the direction of " + ". (Fig.3-4)



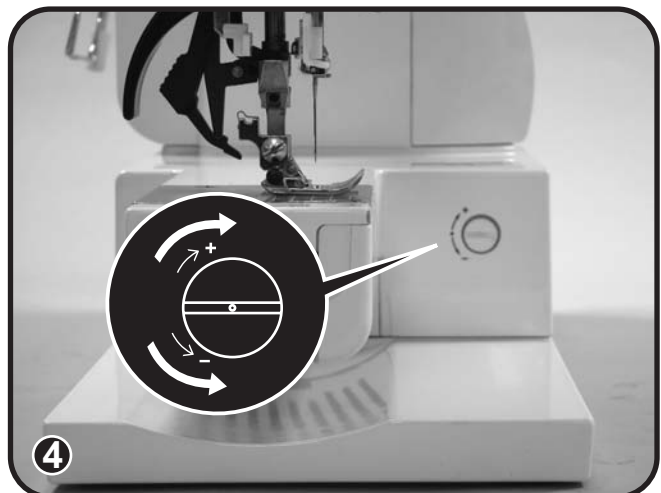
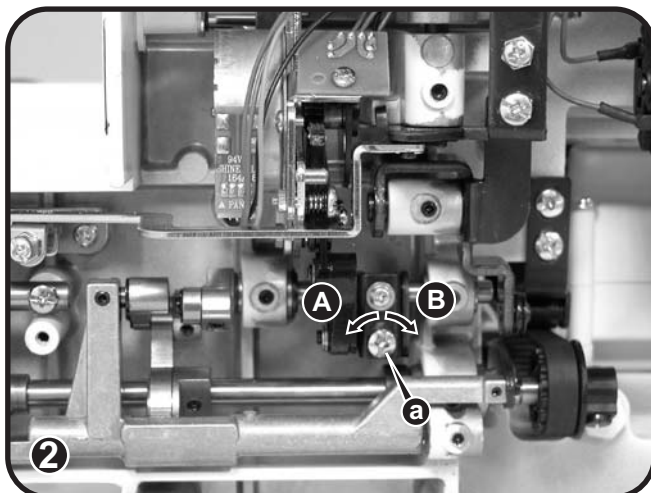
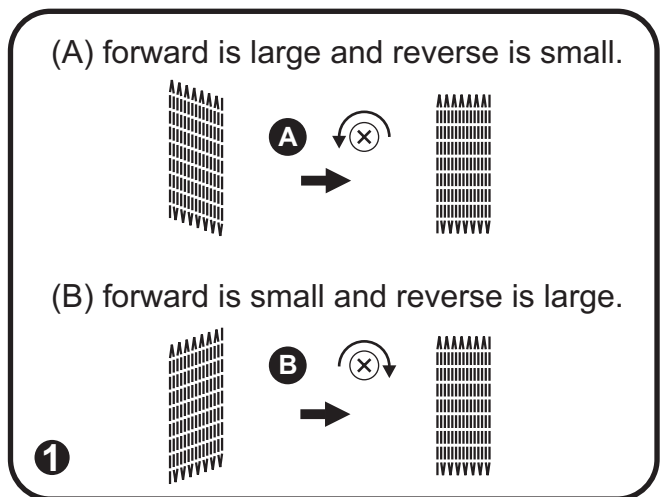
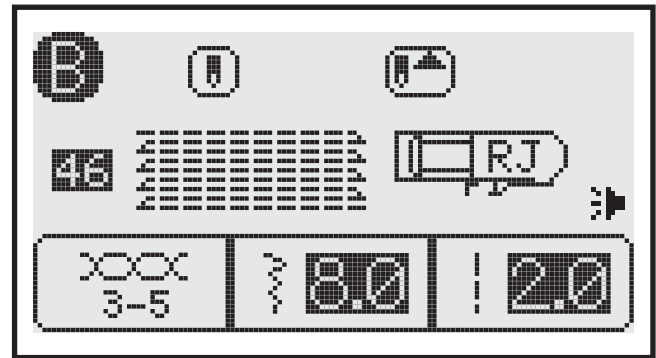
5-23 Darning stitch adjustment

 - Select group " **B** " Pattern 46.

- 1) Sew the darning stitch pattern.
- 2) If the rows of stitches are not evenly perpendicular adjust setting by turning screw (a) counterclockwise (A) or clockwise (B). (Fig.1-2)

Make sure fine tuning dial is set in horizontal position (center) prior of adjusting feed crank screw (a). (Fig.2)

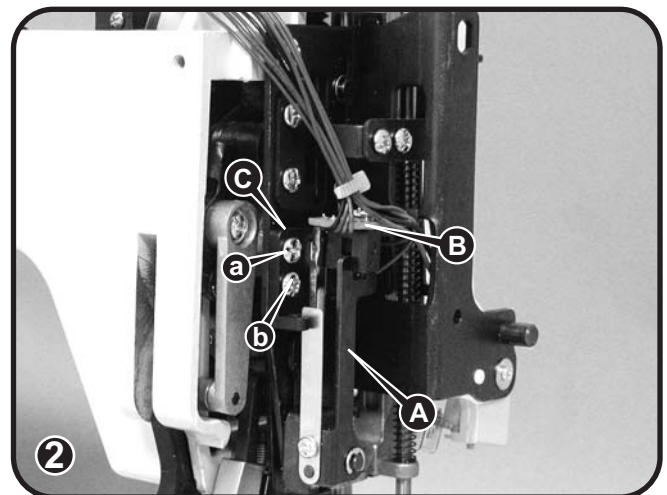
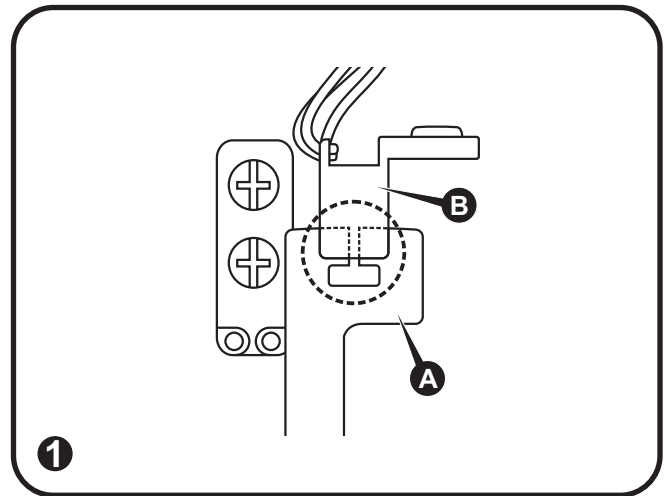
- 3) Fine tuning dial adjustment. Forward/reverse feeding not even, adjust by turning the fine tuning dial clockwise or counterclockwise in the direction of " - " or " + " to obtain even feeding. (Fig.1-2)



5-24 BH photo sensor adjustment and position

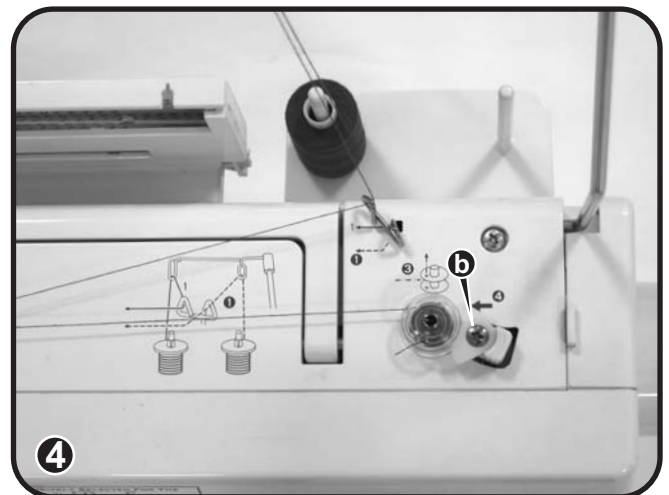
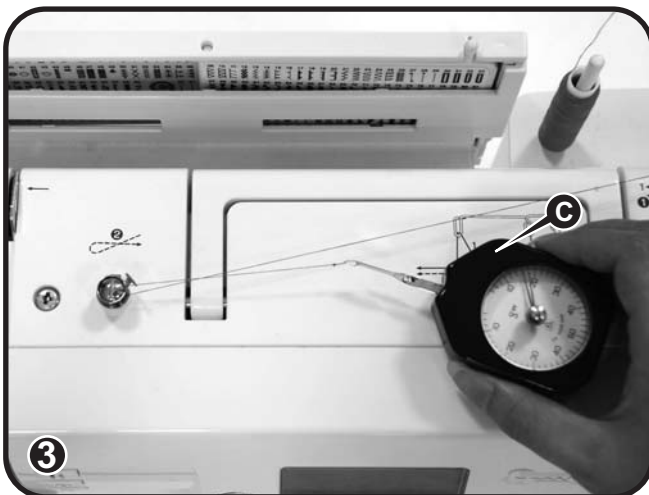
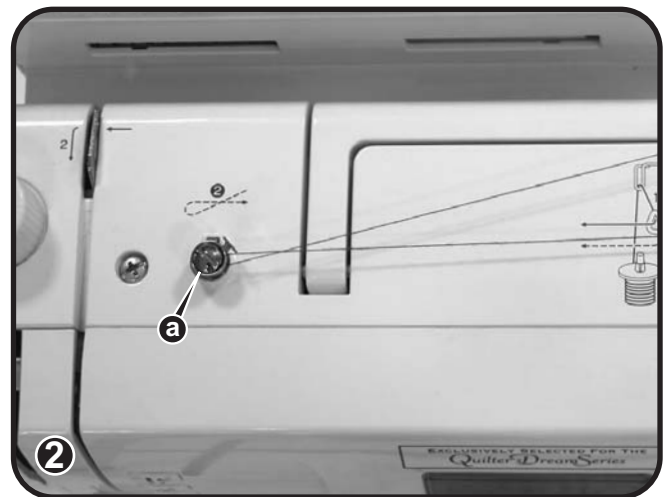
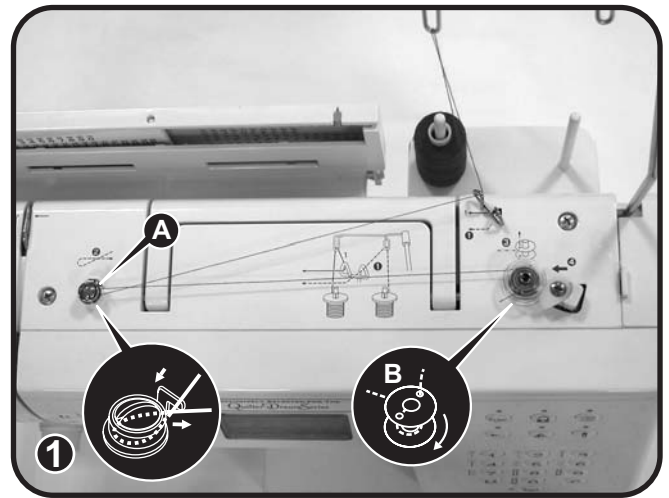


- 1) Remove the face plate.
- 2) Check and make sure that the crank lever (A) is set in the center of sensor (B) and no dirt or lint is obstructing the movement of the lever. (Fig.1)
- 3) If necessary, adjust position of BH crank lever (A) in center by loosening 2 screws (a-b) on bracket (C). (Fig.2)



5-25 Bobbin winding

- 1) Thread machine for bobbin winding. Make sure thread is correctly placed into guide (A). (Fig.1)
- 2) Insert thread inside bobbin hole (B); place empty bobbin on the bobbin winder spindle and engage bobbin winder lever to the left. (Fig.1)
- 3) Switch on machine and press bobbin winder button to wind the bobbin.
- 4) Make sure bobbin thread winding is even. If necessary adjust winding of thread by tightening or loosening screw (a). (Fig.2)
- 5) Use a dial tension gauge (50g) (C) to check the tension value. Reading should be 12 to 15 gr. (Fig.3)
- 6) If bobbin winding is less or more than 90 percent full, loosen screw (b) and adjust position of stopper bracket. (Fig.3)
- 7) Bobbin should be 80 to 90 percent full and filled evenly after adjustment.
- 8) When bobbin is full, the bobbin winder will automatically stop.



5-26 Fuse replacement

Function of fuse : The fuse is a protective component. In case of surge, the fuse will blow to ensure other electronic components from damage.

Type of fuse : Slow acting fuse

1) Remove belt cover and plastic tie (a).
(Fig.1)

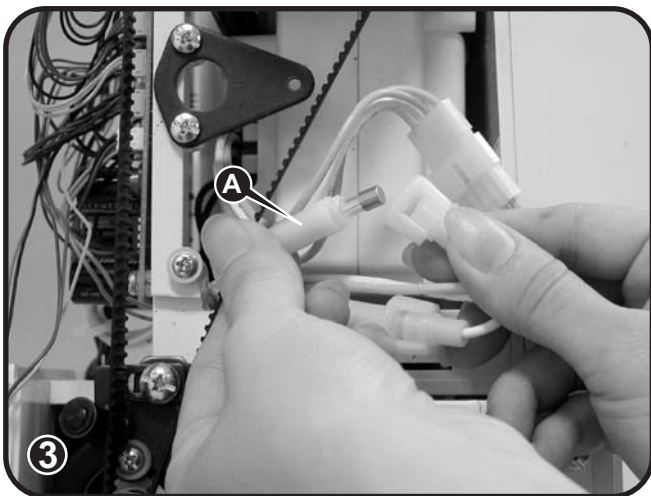
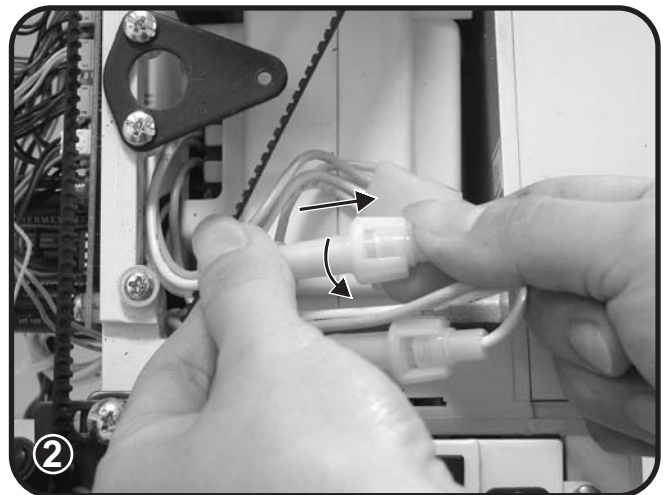
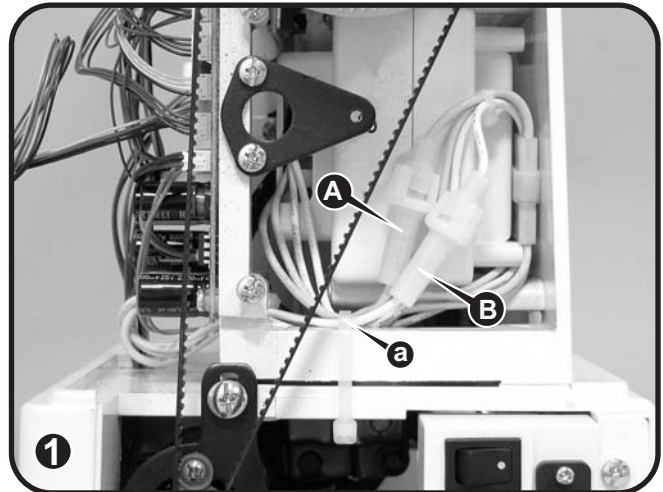
2) Check fuse:

Fuse A = Type 3A 250V

Fuse B = Type 3A 250V

3) To replace fuse; hold both end of fuse holder; push and rotate sleeve counterclockwise and remove fuse.
(Fig.2)

4) Check fuse condition: Turn to Ω in Multimeter, measure two ends of fuse, if fuse is good, it should have resist; Otherwise, if fuse burns out, resist is ∞ .
(Fig.4)



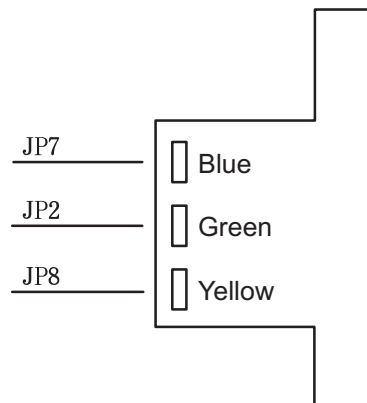
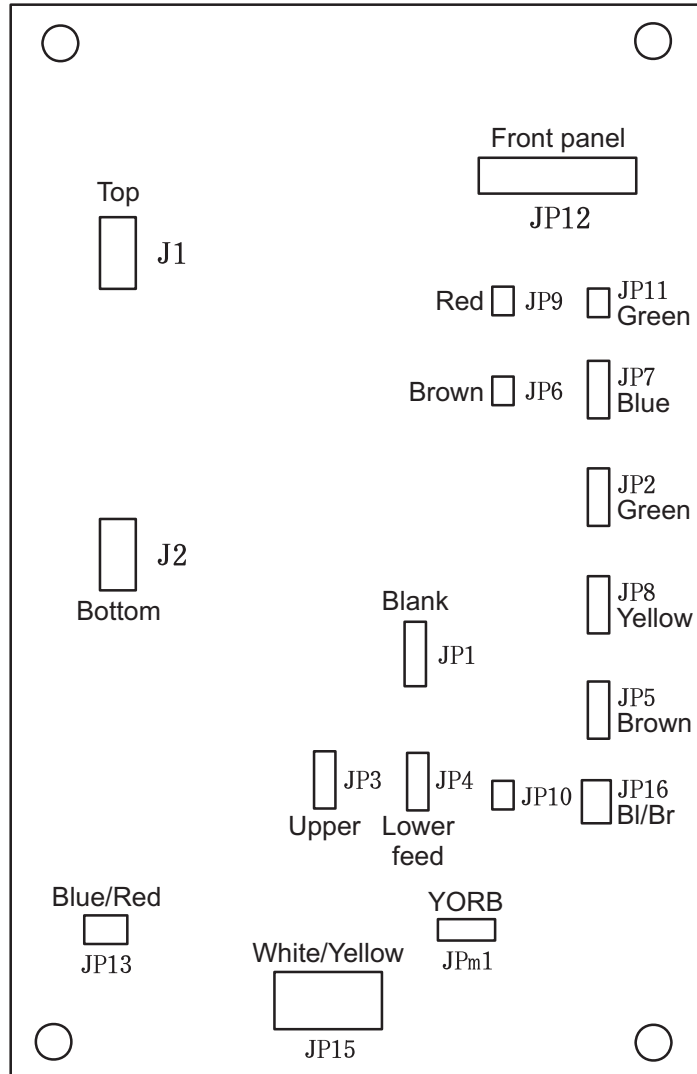
5-27 Gauge

Gauge	Description	Part number
	Feed dog height	U2-R3-0004
	7.0-7.2mm Height of presser foot	U2-R3-0005
	5.75mm Height of needle bar	U2-R3-0006
	2.54mm Hook timing	U2-R3-0007
	0.5mm Thread escapement	U2-R3-0008

6. Main PC board

Main board

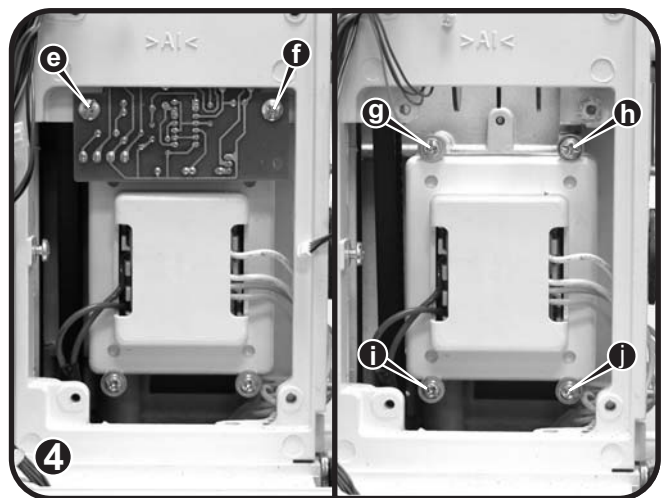
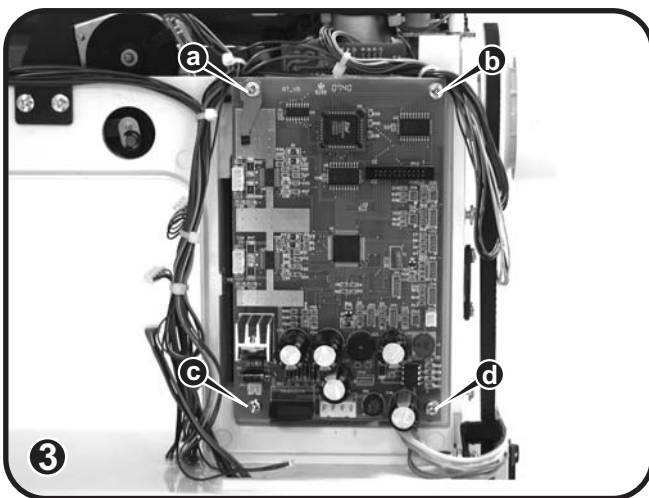
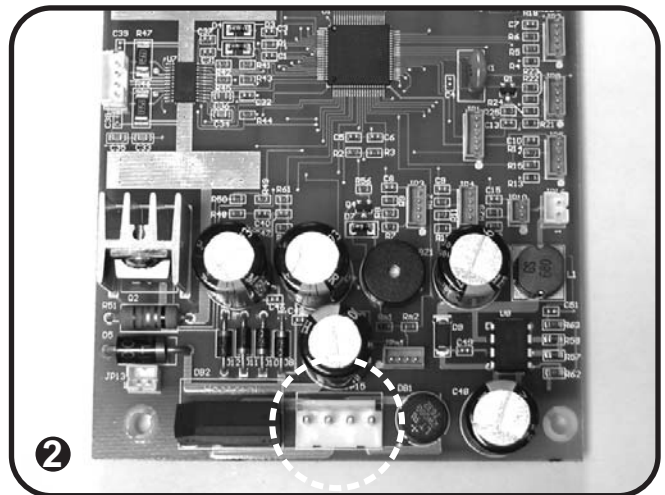
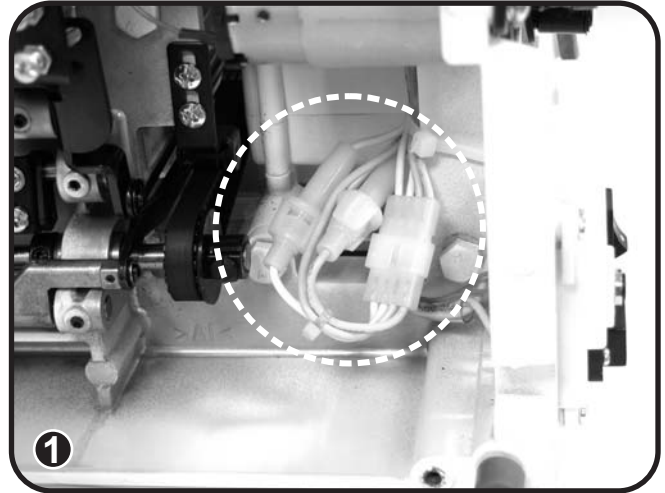
- JP1 : Programming connector
- JP2 : Photo sensor (Needle swing)
- JP3 : Photo sensor (zigzag)
- JP4 : Photo sensor (Feed)
- JP5 : Photo sensor (B/H)
- JP6 : Micro switch (B/H)
- JP7 : Photo sensor (Needle bar Up/down)
- JP8 : Photo sensor (speed)
- JP9 : Micro switch (Presser foot)
- JP10 :Foot controller jack
- JP11 :Micro switch (Bobbin winder)
- JP12 :LCD panel
- JP13 :DC motor
- JP15 :Transformer
- JP16 :LED light
- J1 : Step motor (zigzag)
- J2 : Step motor (Feed)
- JPm1:Bobbin winder motor



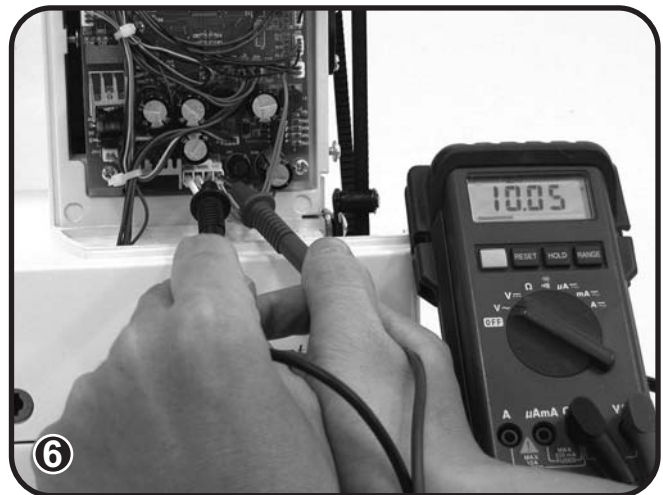
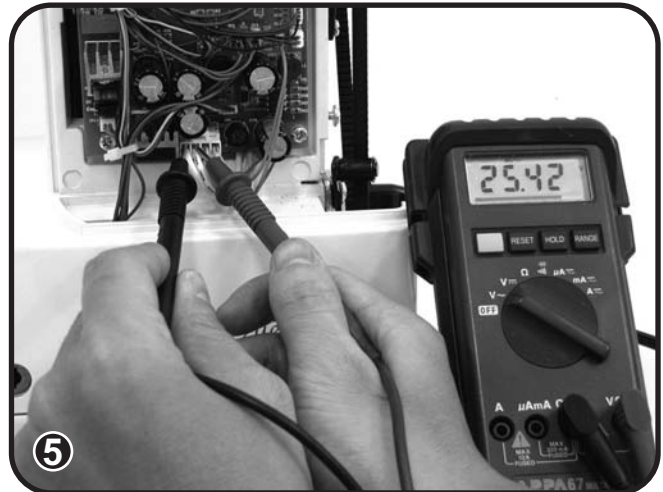
7. Electronic components trouble shooting

7-1 Sewing machine malfunction

- 1) Remove top cover, belt cover, face plate, free arm cover and front cover.
- 2) Check to see if the fuse is blown. (Fig.1)
- 3) Make sure transformer plug on main board is making proper connection. Make sure transformer plug in switch receptacle is making proper connection. (Fig.1-2)
- 4) Replace transformer and main board if item (Fig.2-3) are not showing any problem.
- 5) Main board replacement: Remove all the wire connectors on the main PCB and remove 4 screws (a-b-c-d). (Fig.3)
- 6) Transformer replacement: Remove main board, and remove 6 screws (e-f-g-h-i-j). (Fig.4)

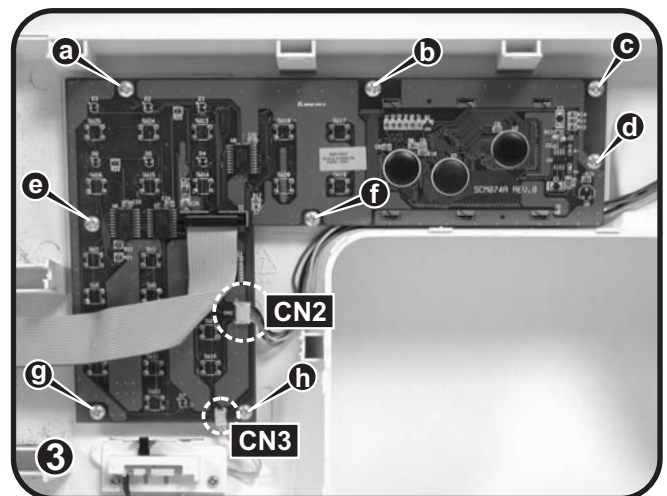
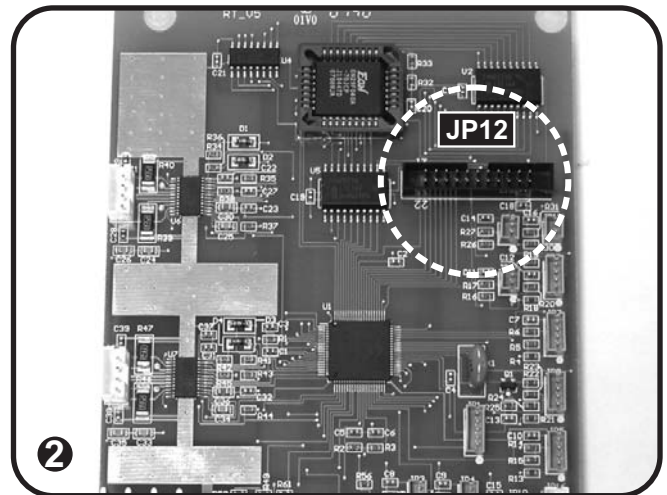
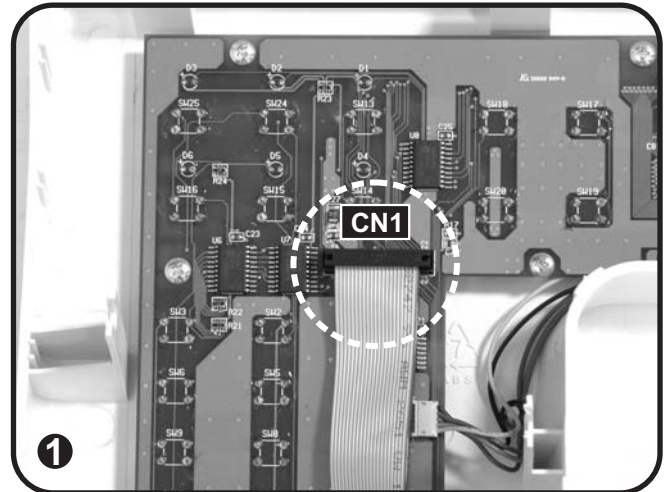


7) Check transformer condition: Sewing machine turns on, turn to AcV in Multimeter, measure the second pressure test in transformer, voltage will be 24V+/-5% (white) and 9.5V+/-5% (yellow). (Fig.5-6)



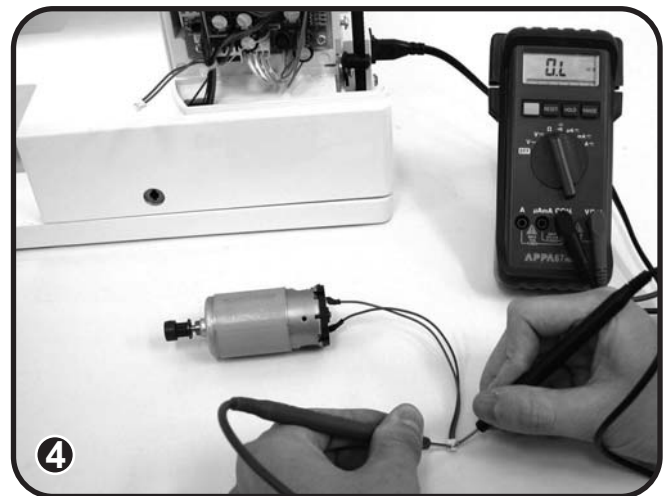
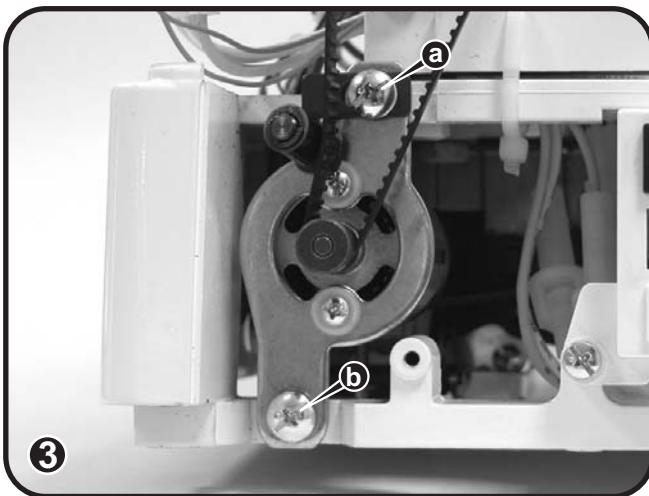
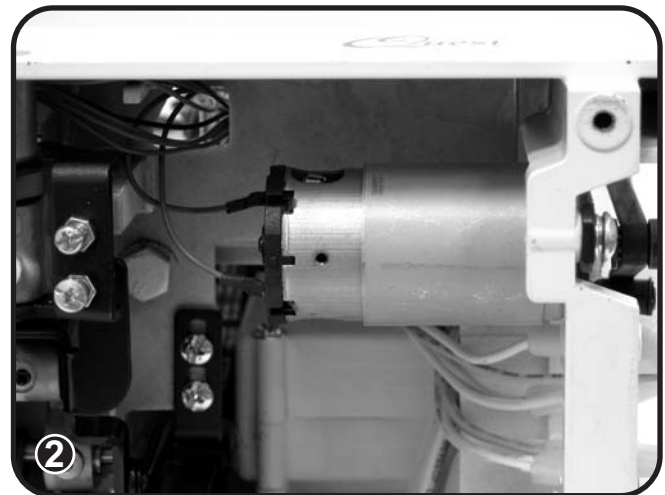
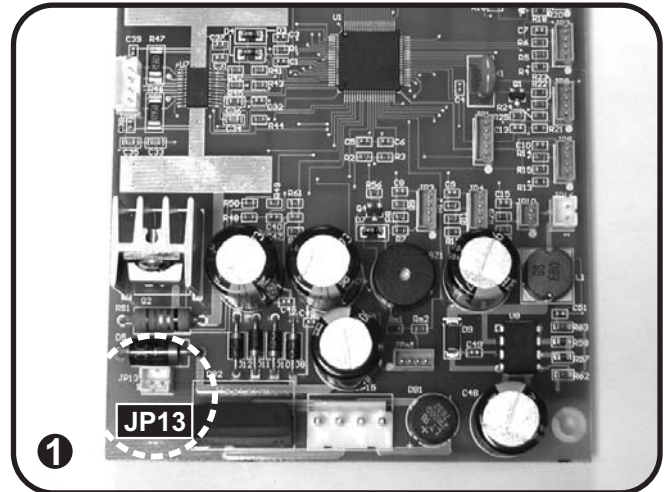
7-2 LCD display malfunction

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure that flexible cable on LCD control board "CN1" and main board "JP12" are connected properly. (Fig.1-2)
- 3) Replace LCD control board if item on main board doesn't have problem. (Fig.2)
- 4) LCD control board replacement:
Remove connector wire "CN2" and "CN3" on LCD control board and remove 8 screws (a-b-c-d-e-f-g-h). (Fig.3)



7-3 DC Motor malfunction

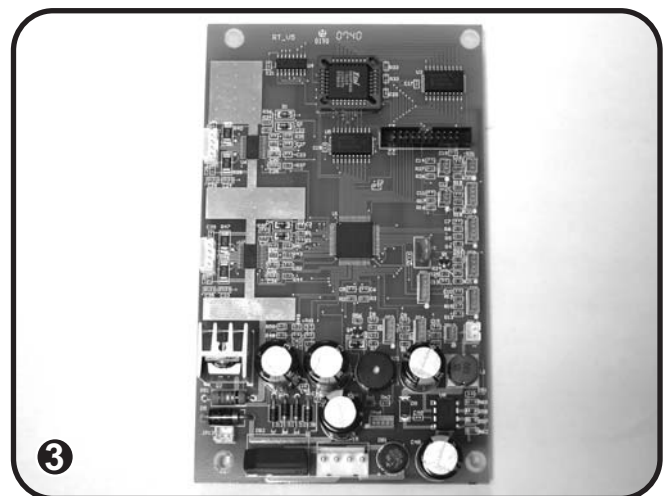
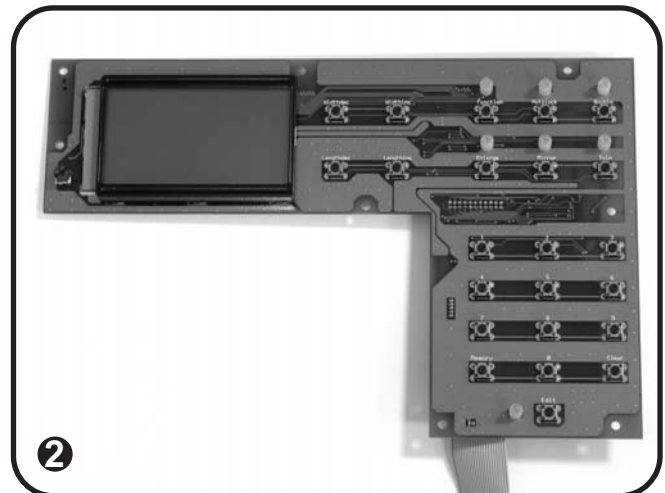
- 1) Remove top cover, belt cover, face plate, free arm cover and front cover.
- 2) Make sure that connector "JP13" on main board is connected properly. (Fig.1)
- 3) Replace DC motor if item on main board doesn't have problem. (Fig.2)
- 4) DC motor replacement: Remove connector wire "JP13" on main board and remove 2 screws (a-b). (Fig.3)
- 5) Refer to motor belt tension adjustment and pulley adjustment page 31.
- 6) Check DC motor condition: Turn to Ω in Multimeter, measure two ends of DC motor, if motor is good, it should have resist ($7\Omega \pm 5\%$); Otherwise, if motor burns out, resist is ∞ . (Fig.4)



7-4 Function key and stitch selection key not operating

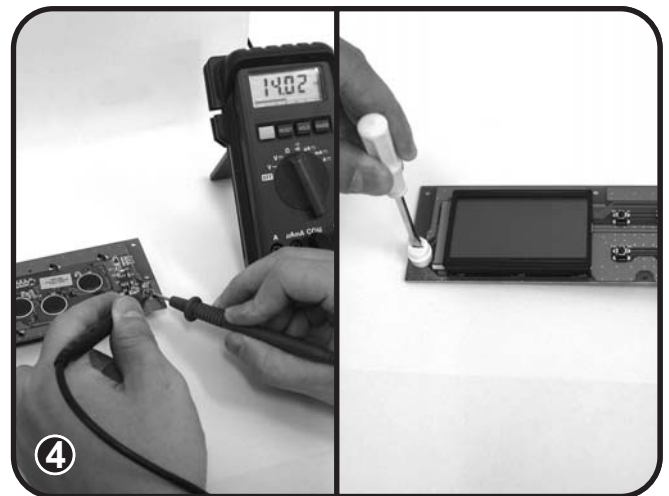
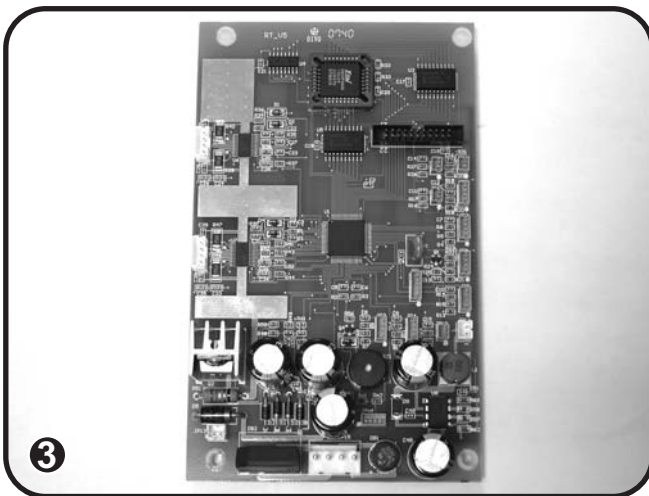
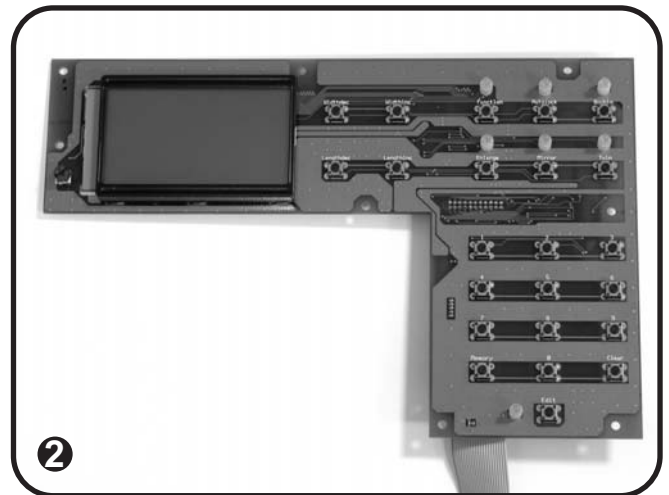
7-5 Number and memory clear button not operating

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure all buttons are correctly working. without any problem . (Fig.1)
- 3) If necessary replace LCD control board if item on main board doesn't have problem. (Fig.2)
- 4) If necessary replace main PCB if item on LCD board doesn't have problem. (Fig.3)
- 5) See LCD control board replacement procedure see page 31.



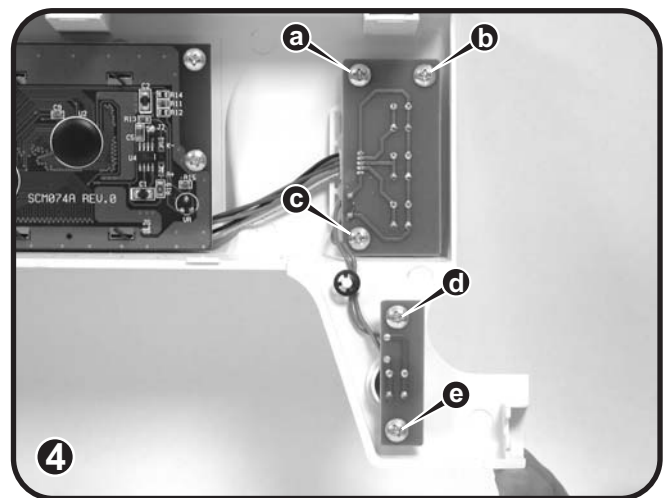
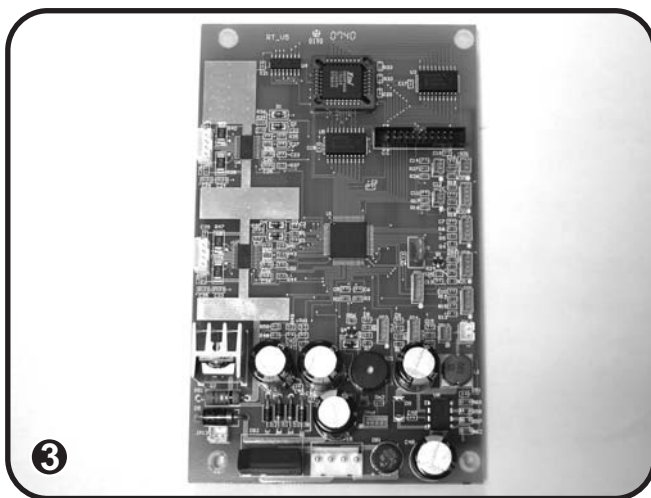
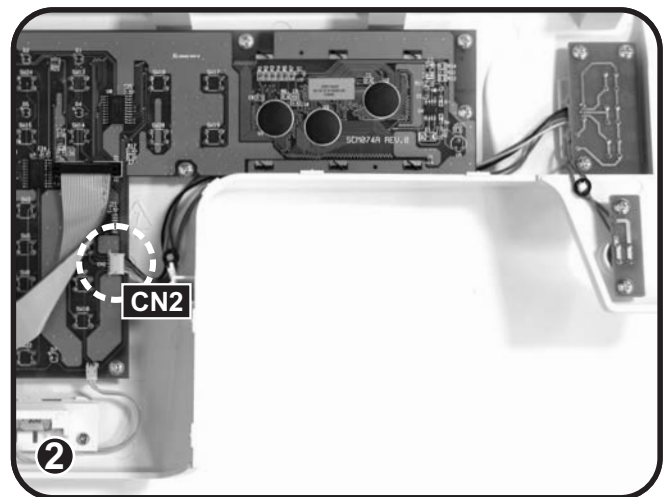
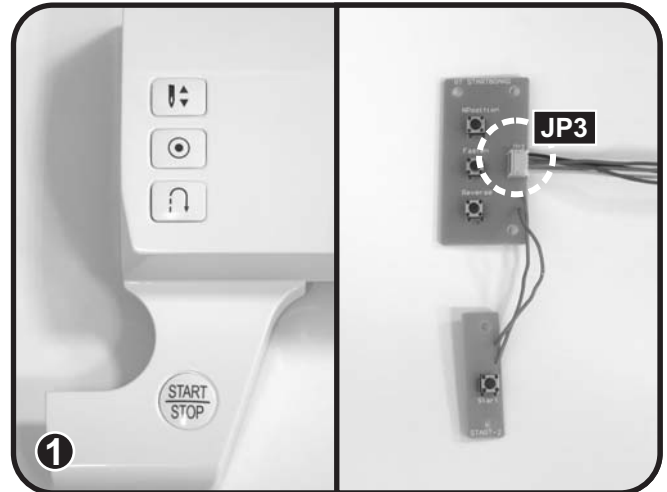
7-6 LCD brightness malfunction

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure adjustment dial (a) is correctly operating without any problem. (Fig.1)
- 3) If necessary, replace LCD control board or main board if dial (a) is correctly working. (Fig.2-3)
- 4) Refer to LCD control board or main board replacement page 39 and 40.
- 5) Check LCD brightness dial condition: Turn to Ω in Multimeter, measure two ends of dial, when turn dial to adjust, resist will be changed. (Fig.4)



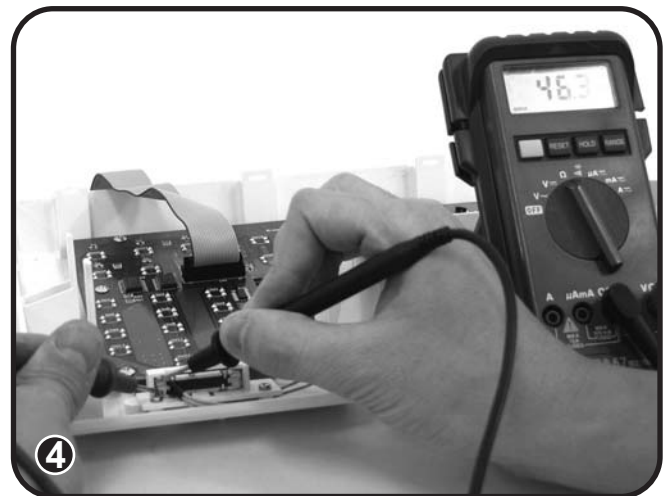
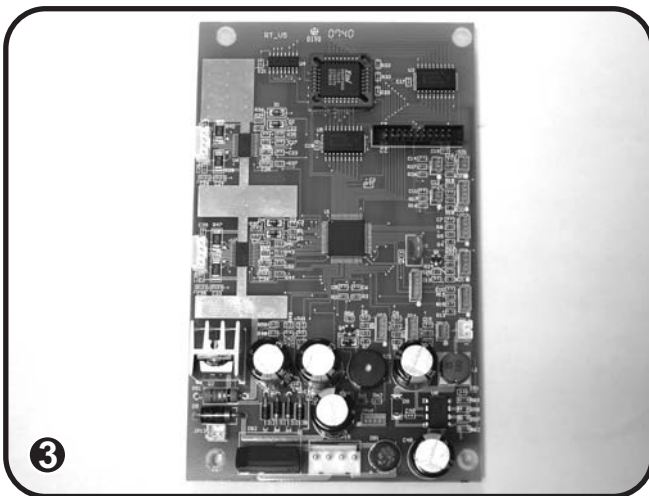
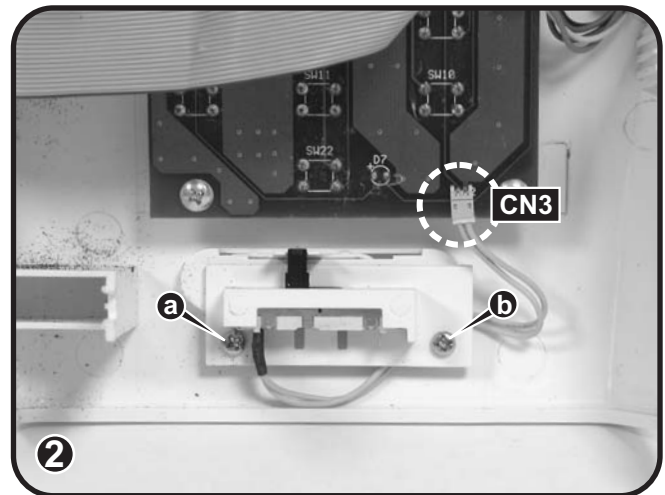
7-7 Needle up-down, Reverse & Auto-lock malfunction

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure lead wire plug "JP3" and "CN2" on LCD control board and reverse needle up/down board are correctly connected. (Fig.1-2)
- 3) Replace reverse - needle up/down board or main board if LCD control board is correctly working. (Fig.2-3)
- 4) To replace start/stop - reverse - needle up/down board remove 5 screws (a-b-c-d-e) and disconnect lead wire. (Fig.4)



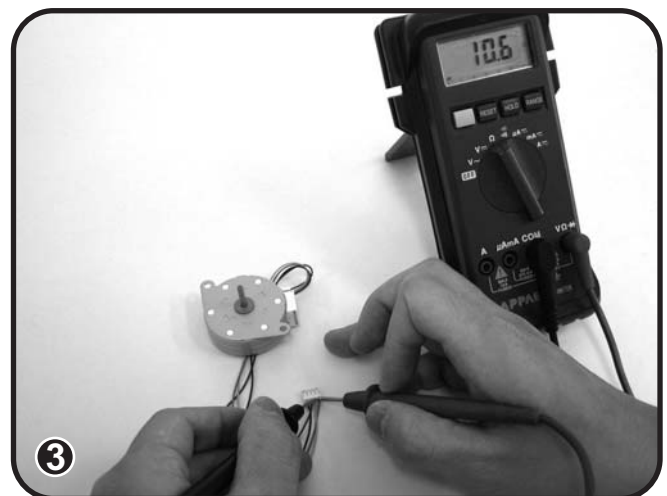
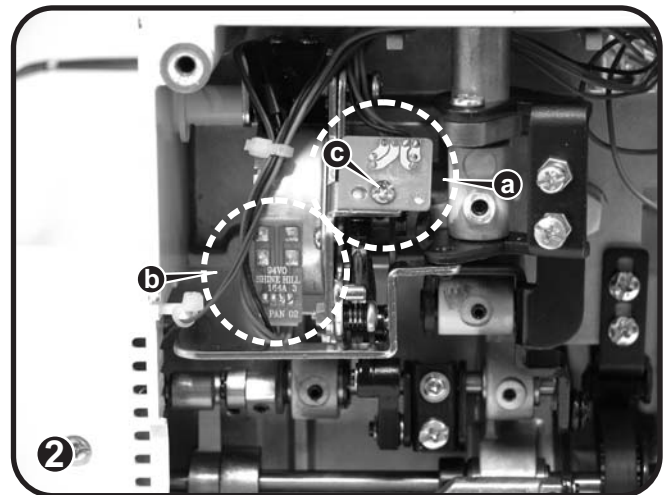
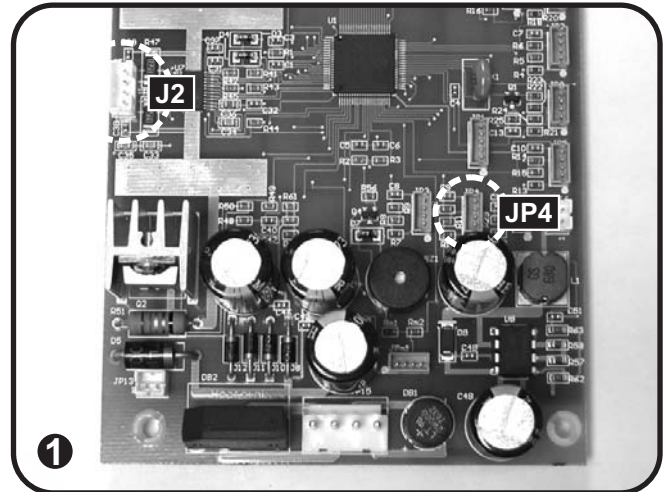
7-8 Speed volume malfunction

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure lead wire plug "CN3" on LCD control board is correctly connected. (Fig.1)
- 3) Replace slide resistor if main board is correctly working. (Fig.2-3)
- 4) Slide resistor replacement: Disconnect "CN3" lead wire on LCD control board and remove 2 screws (a-b). (Fig.2)
- 5) Check slide volume condition: Turn to Ω in Multimeter, measure two ends of slide volume, when turn slide volume, resist (0-44k Ω) will be changed. (Fig.4)



7-9 Feed step motor malfunction

- 1) Remove top cover, belt cover, face plate, free arm cover and front cover.
- 2) Make sure lead wire plug "J2" and "JP4" on main board and DC motor plug are correctly connected. Make sure photo-sensor switch is correctly working (b). (Fig.1-2)
- 3) Replace photo-sensor switch or feed step motor if item on main board doesn't have problem. (Fig.2)
- 4) Photo-sensor feed replacement: Disconnect "JP4" lead wire on main board and remove screw (c). (Fig.2)
- 5) Check step motor condition: Turn to Ω in Multimeter, measure the line of step motor, orange line and yellow line is one group, it should have resist. Black line and brown line is one group, it should have resist ($10.5\Omega \pm 5\%$). (Fig.3)



7-10 Zigzag step motor malfunction

- 1) Remove top cover, belt cover, face plate, free arm cover and front cover.
- 2) Make sure lead wire plugs "J1" and "JP3" on main board and zigzag step motor plug are correctly connected and photo-sensor switch (b) works correctly. (Fig.1-2)

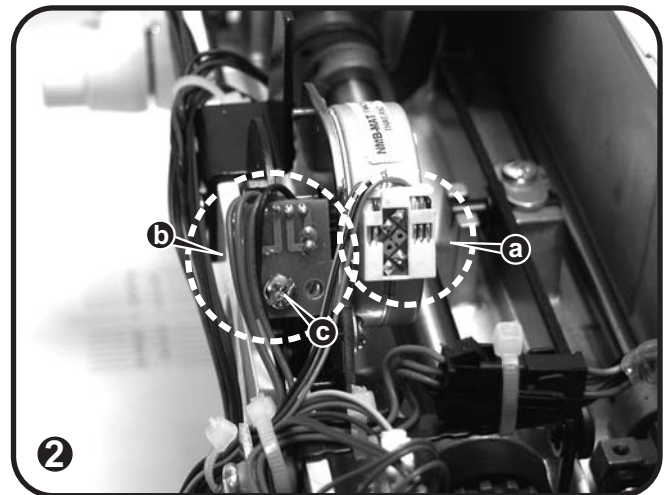
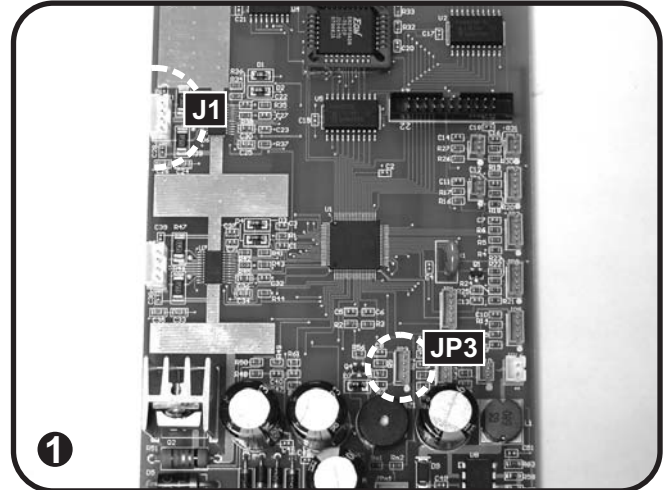
- 3) Check the ohm value of the stepper motor.

Leads 1 & 2 -- 10 ohms (+/- 1 ohm).

Leads 3 & 4 -- 10 ohms (+/- 1 ohm).

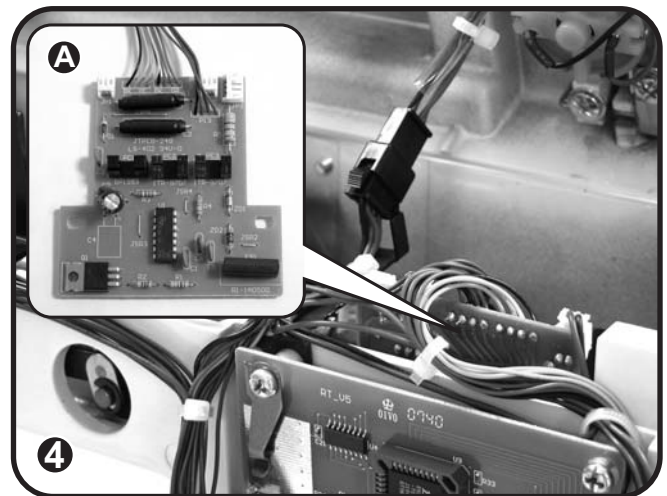
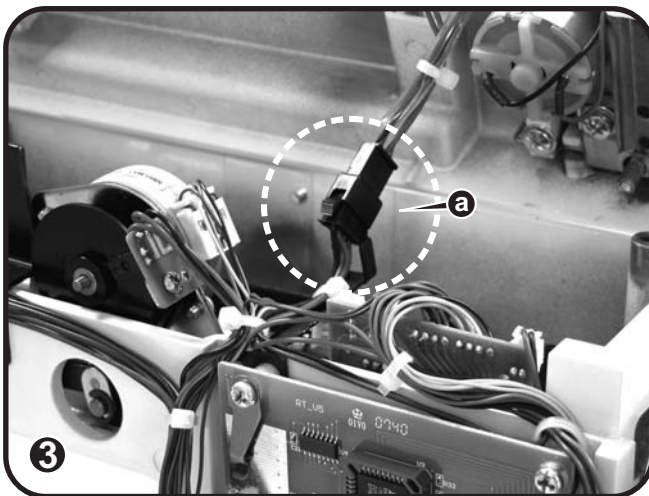
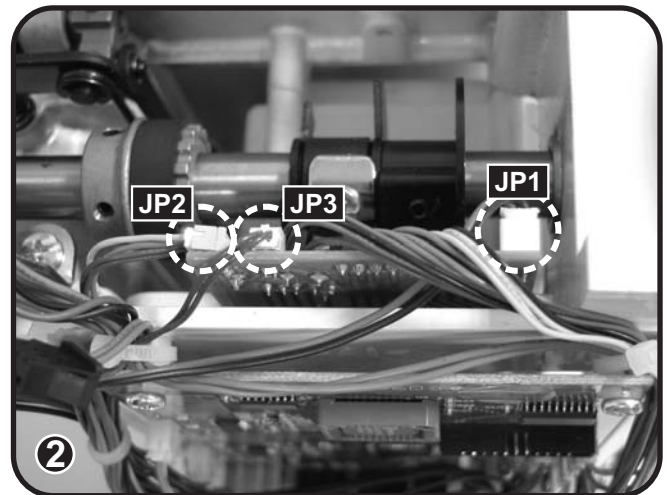
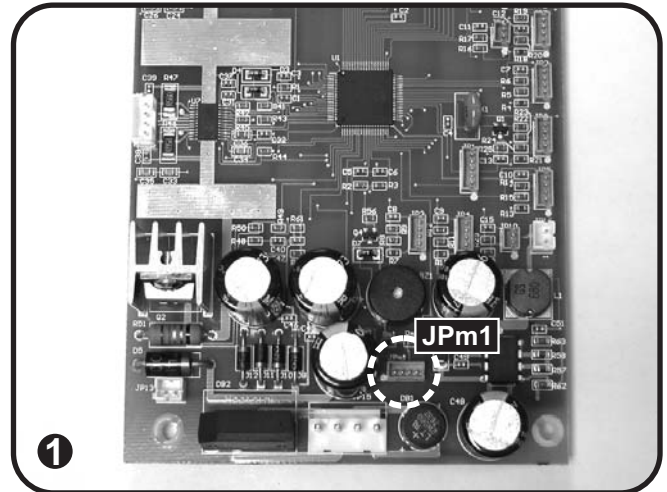
- 4) Replace photo-sensor switch or zigzag step motor if item on main board doesn't have problem. (Fig.2)

- 5) Photo-sensor zigzag switch replacement: Disconnect "JP3" lead wire on main board and remove screw (c). (Fig.2)



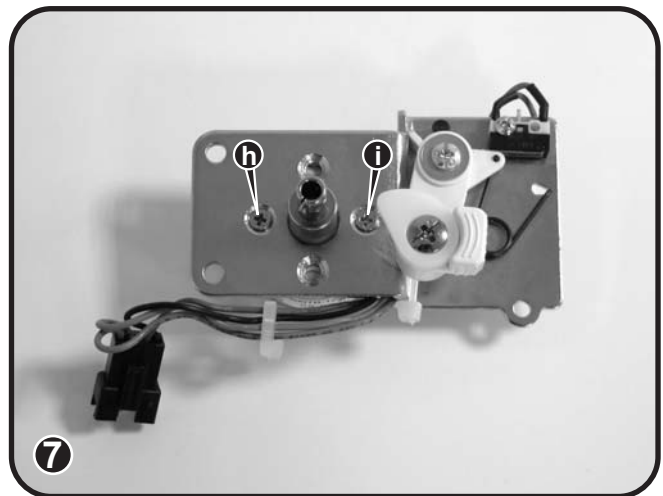
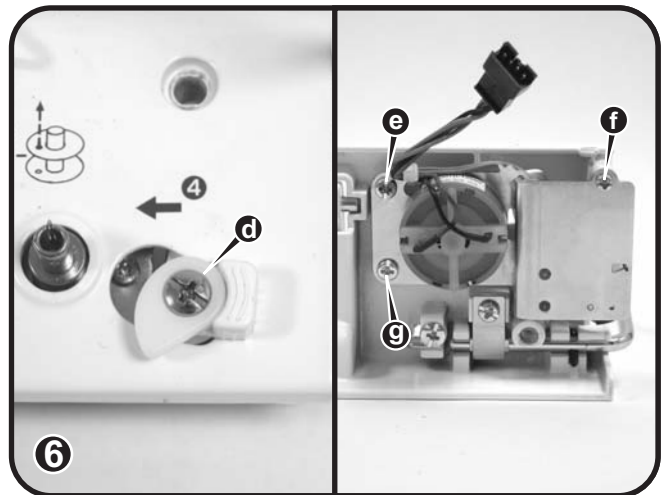
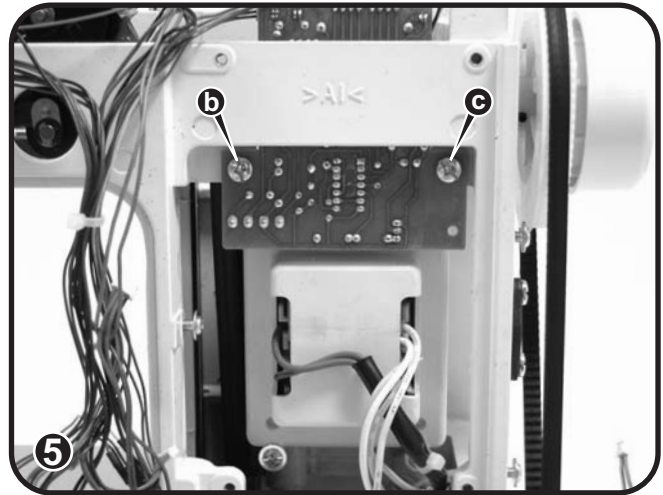
7-11 Bobbin winder motor malfunction

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure lead wire plug "JPm1" on main board is correctly connected. (Fig.1)
- 3) Make sure lead wire plugs "JP2" , "JP3" and "JP1" on bobbin winder board are correctly connected. (Fig.2)
- 4) Make sure lead wire plug (a) is correctly connected. (Fig.3)
- 5) Replace bobbin winder board (A) or bobbin winder motor or main PC board if lead wire connections (JPm1-JP2-JP3-JP1) are working correctly. (Fig.1-2-3-4)



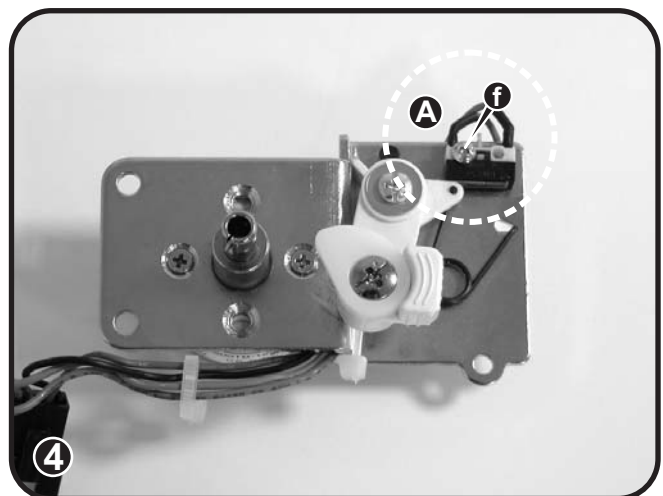
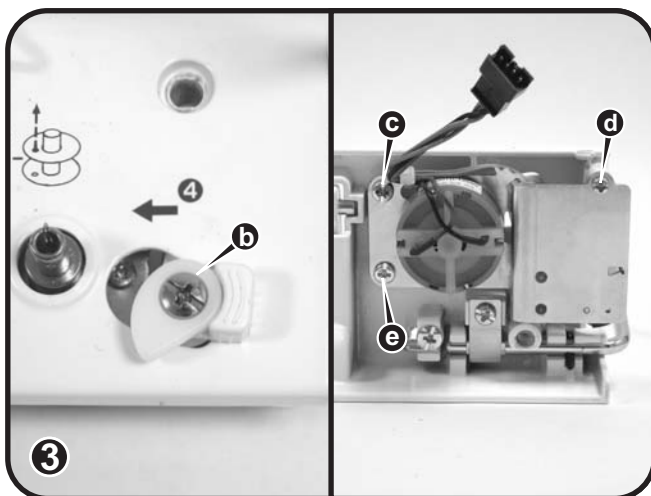
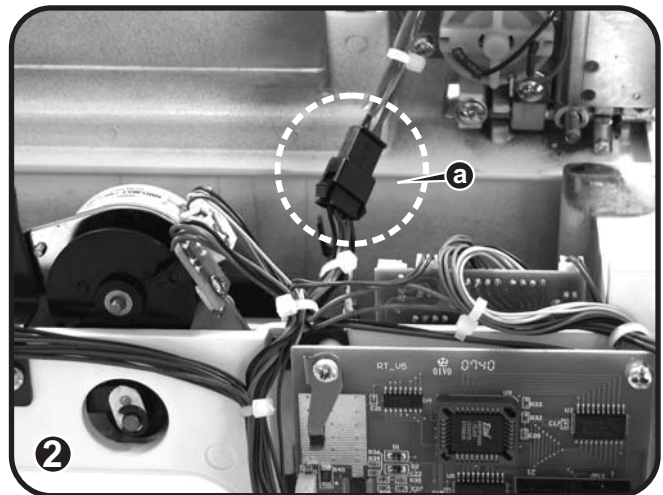
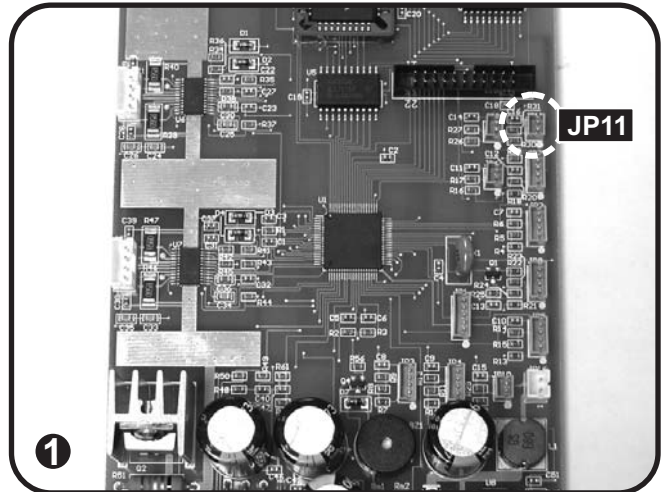
6) Bobbin winder board replacement:
Remove main board, disconnect lead wire on bobbin winder board and remove 2 screws (b-c), replace bobbin winder board. (Fig.5)

7) Bobbin winder motor replacement:
Disconnect lead wire plug (a) and remove 4 screws (d-e-f-g), and 2 screws (h-i), replace bobbin winder motor. (Fig.6-7)

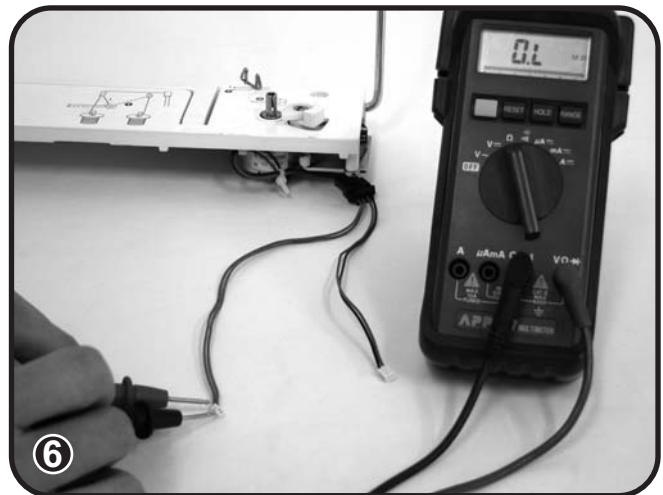
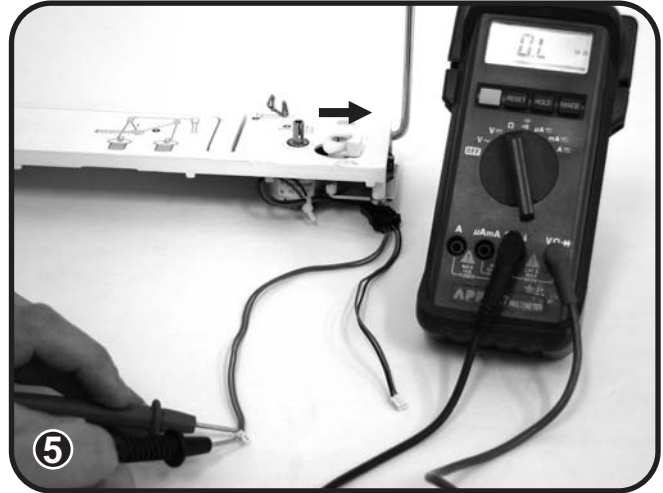


7-12 The bobbin winder spindle is in "off" position - LCD screen is "on"

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure lead wire plug "JP11" on main board is correctly connected. (Fig.1)
- 3) Make sure bobbin winder set and micro-switch are correctly connected (A). Loosen screws on micro-switch, check function and connection and tighten screw (f). (Fig.1-2-4)
- 4) Replace micro-switch or main PC board if connector (a) is correctly working. (Fig.2)
- 5) Make sure connector wire (a) is correctly connected. (Fig.2)
- 6) Micro-switch replacement: Disconnect lead wire plug (a), remove 5 screws (b-c-d-e-f) and replace micro-switch. (Fig.2-3-4)



-
- 7) Check bobbin micro switch condition:
Turn to Ω in Multimeter, measure two ends of bobbin micro switch (green line), when winding condition, resist is 0Ω ; otherwise, resist is ∞ . (Fig.5-6)

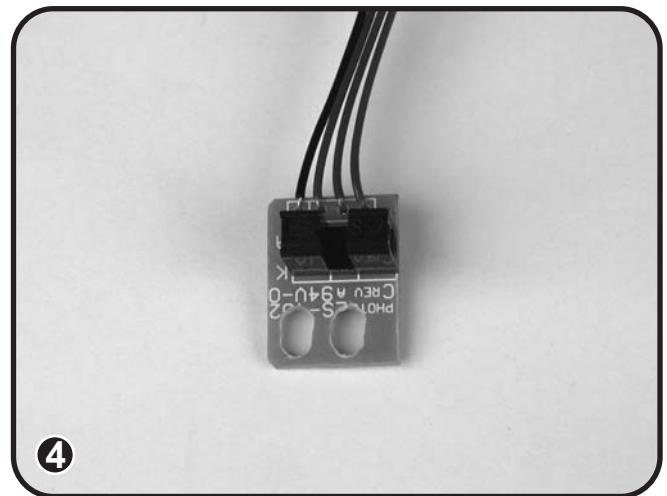
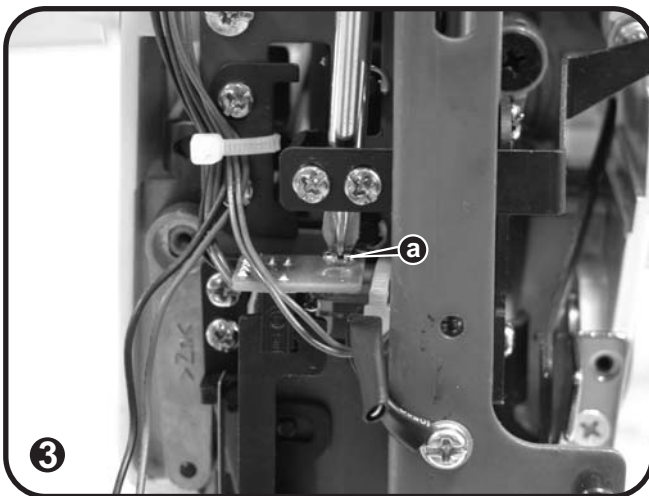
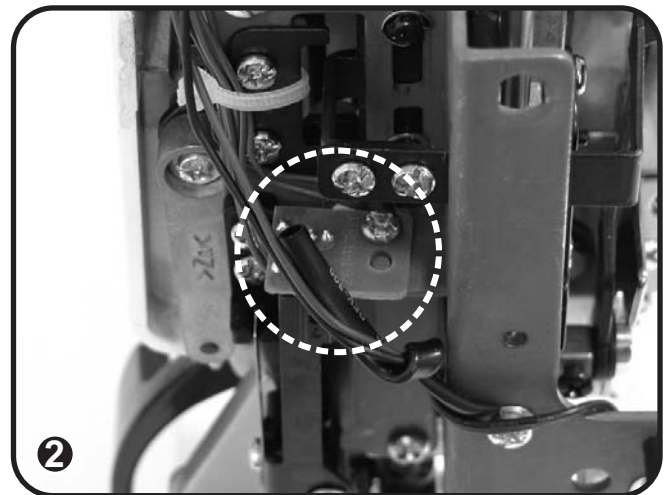
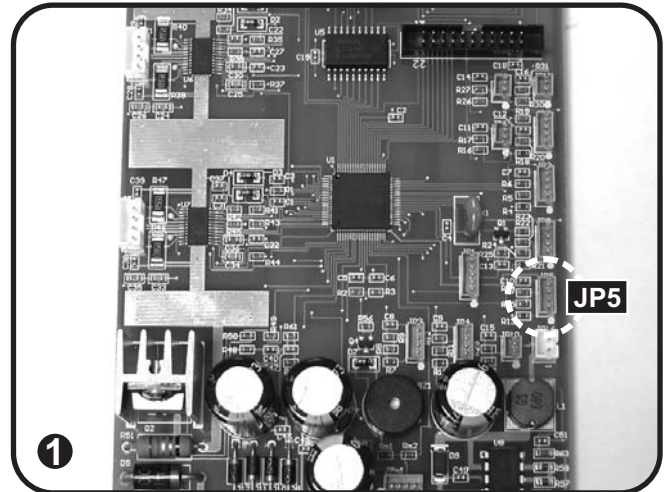


7-13 BH problem

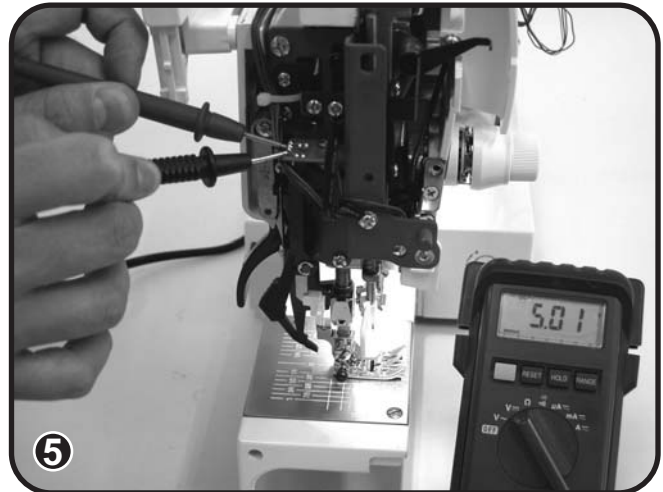
- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure lead wire plug "JP5" on main board is correctly connected. (Fig.1)
- 3) Check and make sure that BH photo sensor switch is correctly position on the bracket. (Fig.2)

Note: Refer to page 35 -- BH adjustment

- 3) BH photo-sensor switch replacement - Disconnect lead wire "JP5" on main board, remove screw (a) and replace BH photo-sensor switch. (Fig.2-3)
- 4) BH micro switch replacement Remove photo sensor switch to access to Micro switch or replace main PC board if BH sensor is not correctly working. (Fig.4)



7) Check photo sensor condition: Sewing machine turns on, turn to DcV in Multimeter, when photo sensor is hide, measure two end of photo sensor, it should have 5V+/-5% input. (Fig.5)

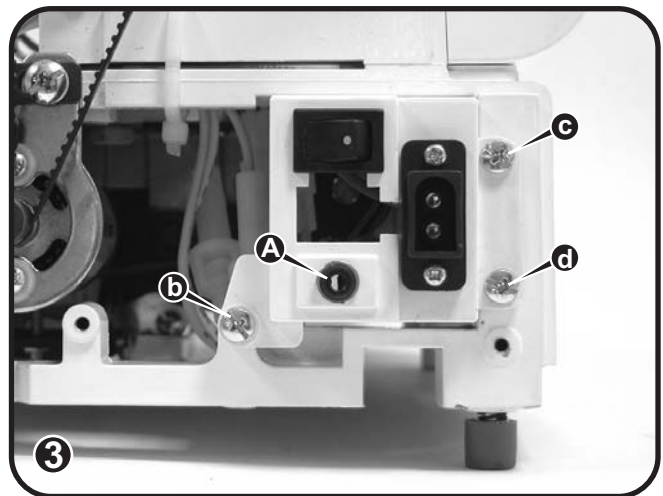
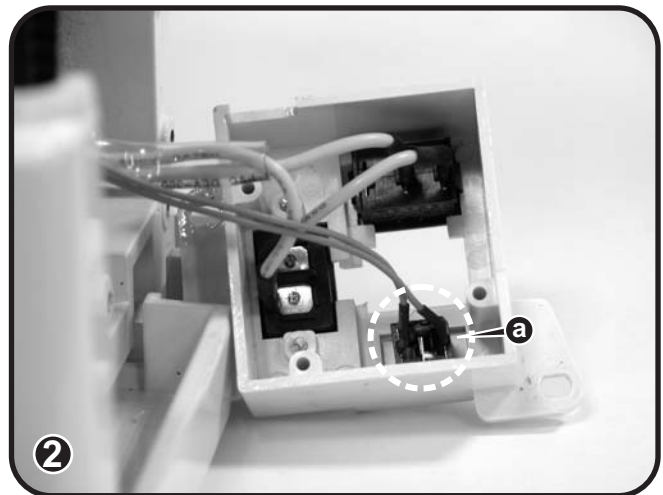
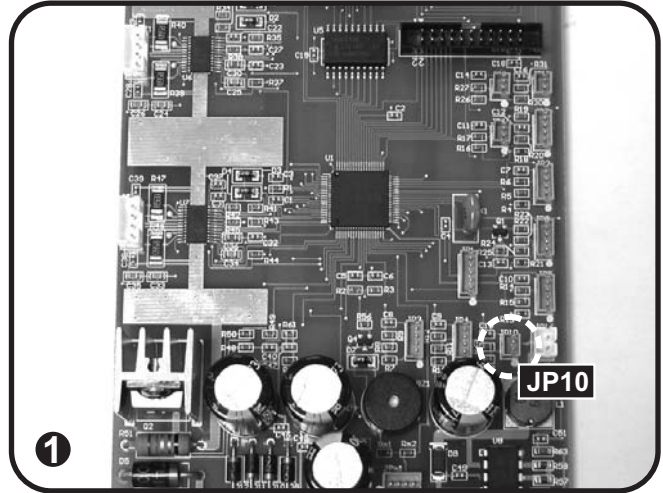


7-14 Foot controller problem

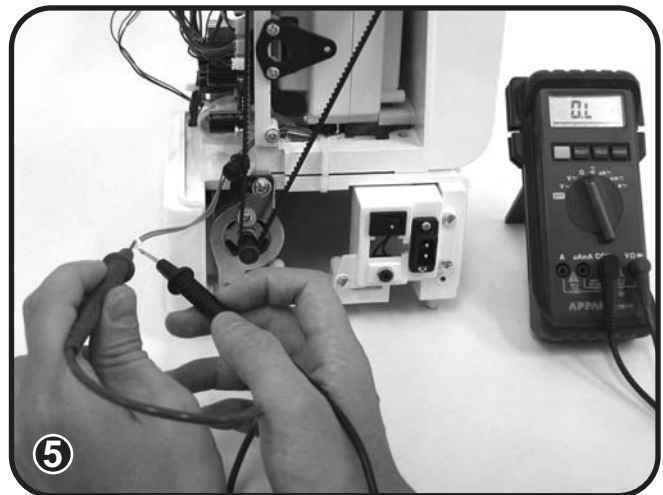
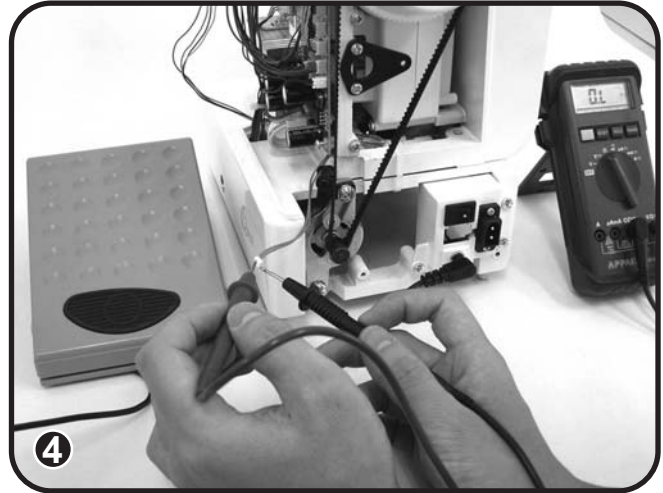
- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure lead wire plug "JP10" on main board is correctly connected. (Fig.1)
- 3) Make sure connection on foot control jack (a) is correctly in contact with the foot control plug. If connection is bad replace lead wire foot control jack. (Fig.2)

Foot control jack replacement:
Disconnect lead wire plug "JP10" on main board, remove 3 screws (b-c-d); remove lock nut (A) and replace foot control jack connector and lead wire. (Fig.3)

- 4) Replace foot controller or main board if foot control jack doesn't have problem. (Fig.2)

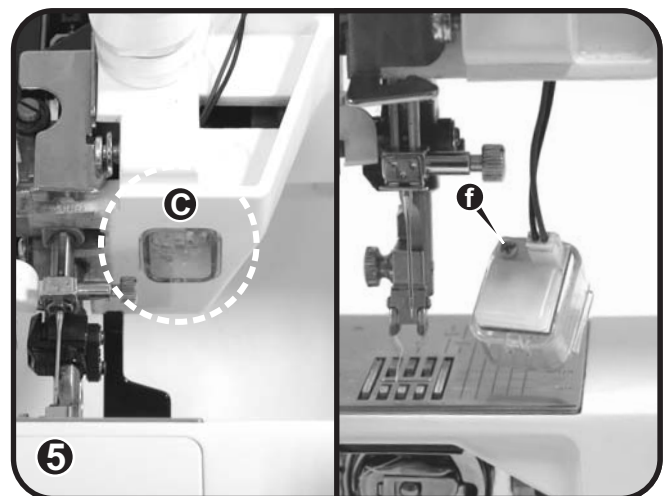
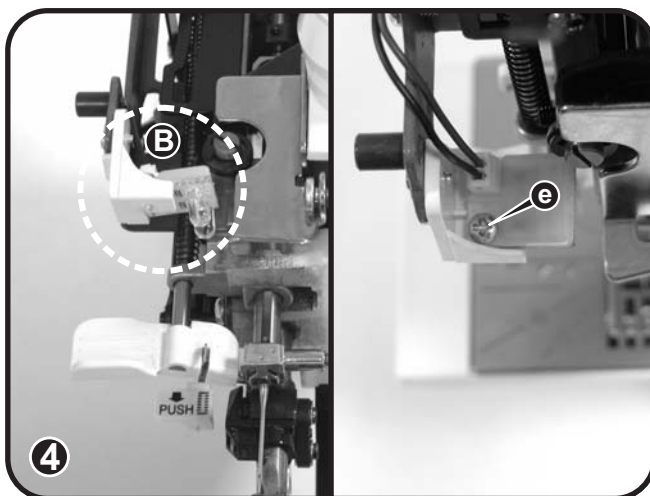
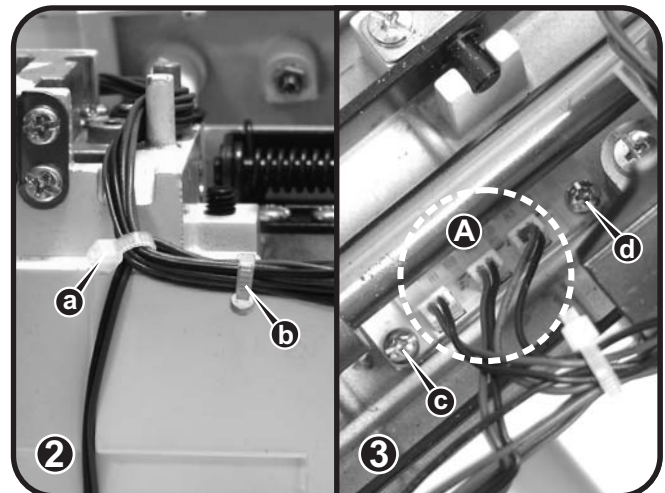
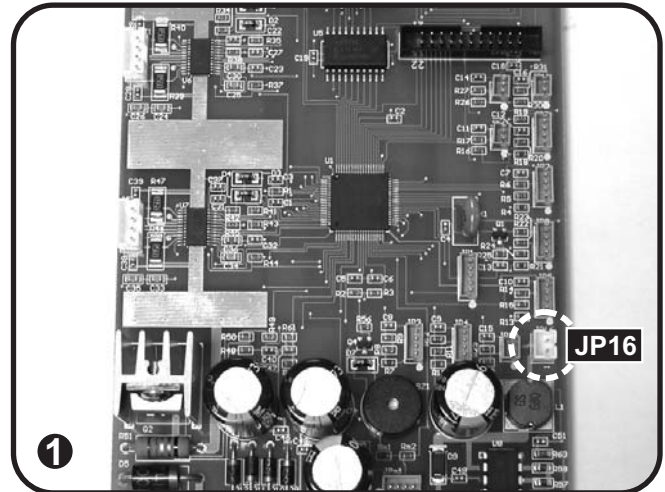


-
- 5) Check foot control socket condition:
Turn to Ω in Multimeter, measure two ends of foot control socket, when foot control inserts to foot control socket, it should have resist (140k Ω -150k Ω).
When no foot control inserts to foot control socket, resist is ∞ . (Fig.4-5)

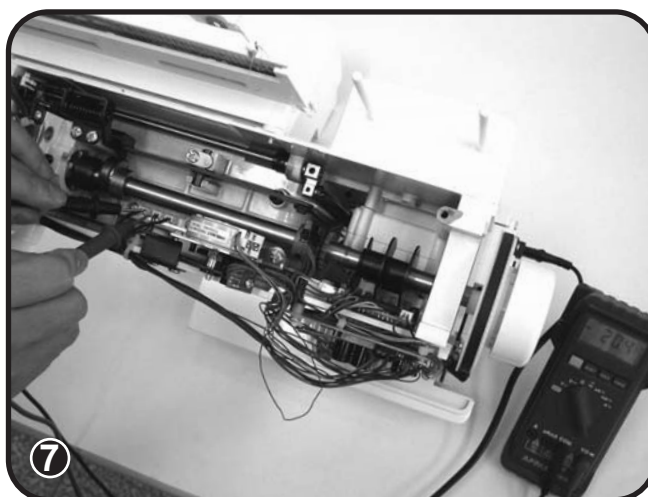
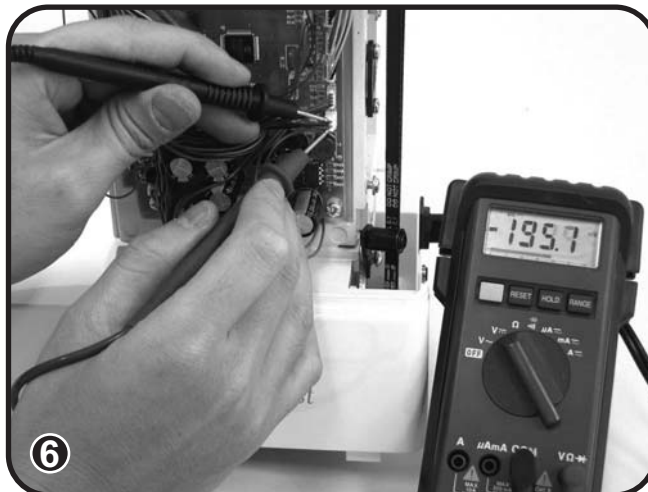


7-15 LED lamp malfunction

- 1) Remove top cover, belt cover, face plate and front cover.
- 2) Make sure lead wire plug "JP16" on main board and LED socket PCB unit "A-B-C" are correctly connected. (Fig.1-2-3-4)
- 3) Replace LED socket PCB unit or main board if there is no problem with lead wire. (Fig.2)
- 4) LED socket PCB unit replacement:
 - Remove plastic tie (a-b). (Fig.2)
 - LED sewing area A
Disconnect lead wires and remove 2 screws (c-d). (Fig.3)
 - LED left needle area B
Disconnect lead wire and remove screw (e). (Fig.4)
 - LED right needle area C
Remove plastic tie holding lead wire on front of machine. (Fig.5)
Snap LED unit off - disconnect lead wire and remove screw (f). (Fig.5)

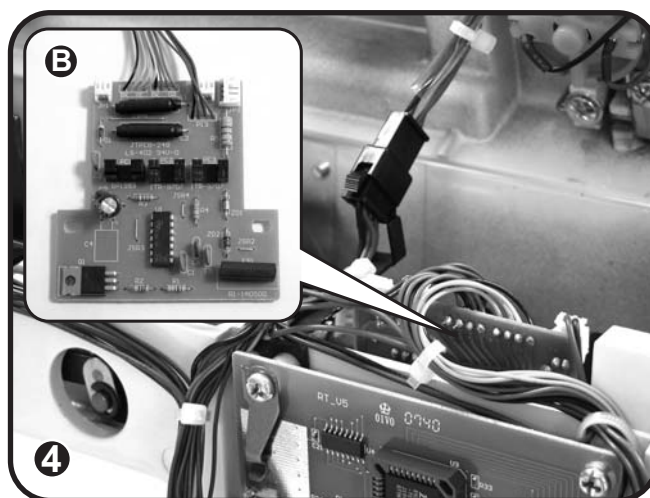
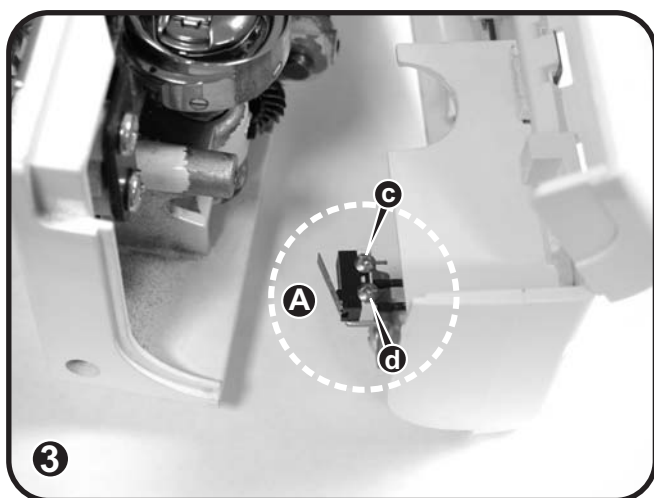
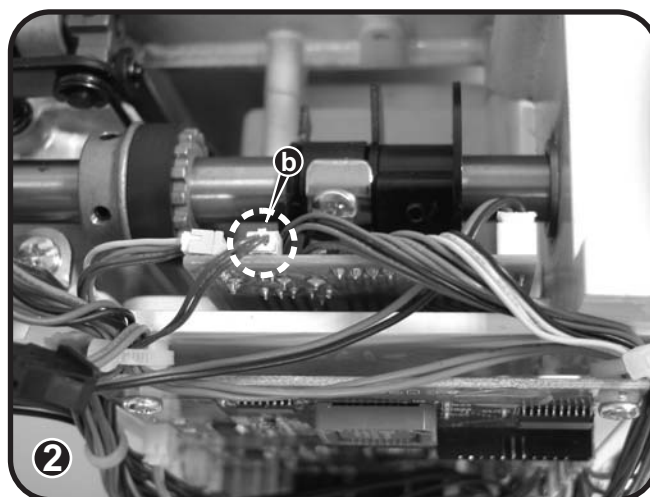
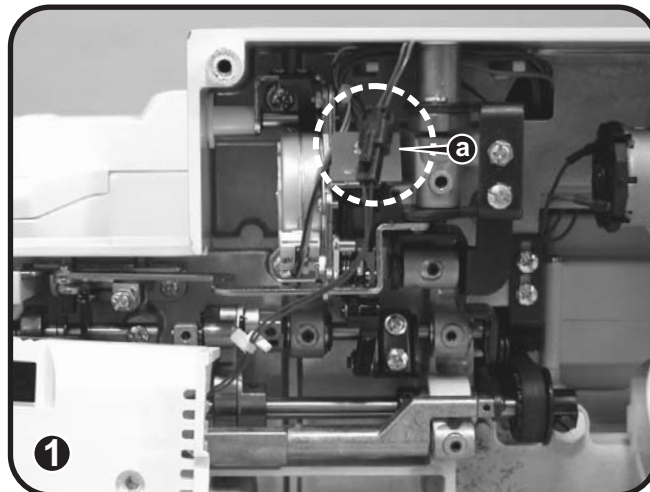


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- 5) Check LED lamp complete condition: Sewing machine turns on, turn to DcV in Multimeter, measure PC board JP16, voltage will be 5V+/-5%. (Fig.6-7)

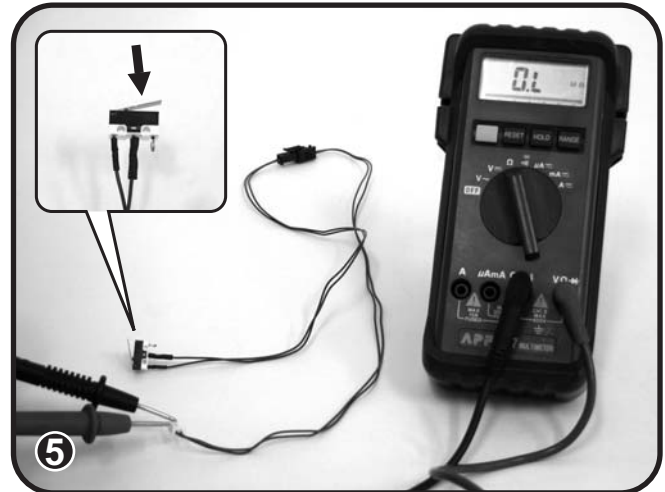


7-16 Needle plate micro-switch malfunction

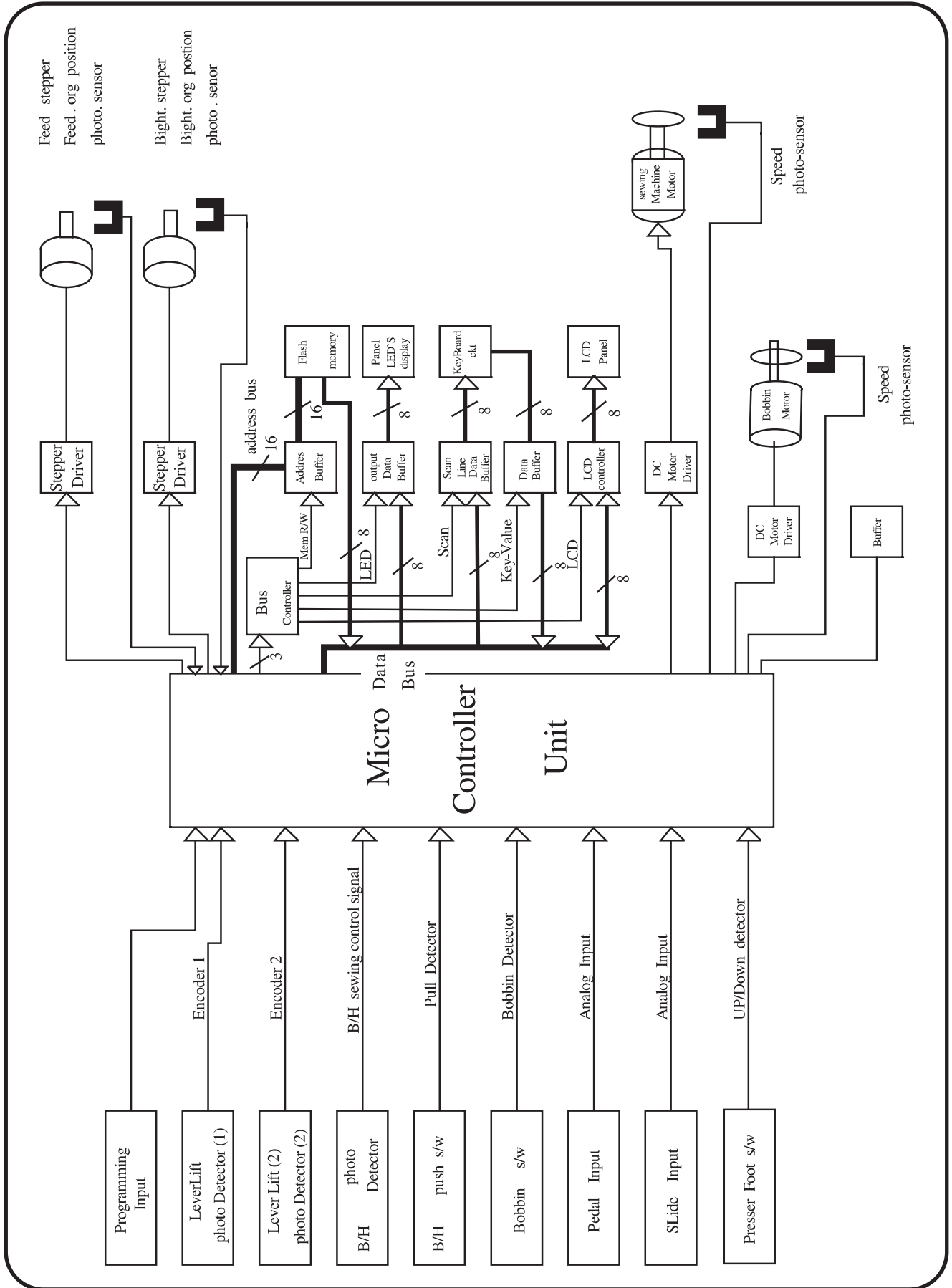
- 1) Remove top cover, belt cover, face plate, front cover, machine base and free arm cover.
- 2) Make sure lead wire connector (a) and lead wire plug (b) for needle plate micro switch are correctly connected. (Fig.1-2)
- 3) If necessary, replace micro switch "A" or bobbin winder PC board "B" if unit does not work. (Fig.3-4)
- 4) Micro-switch replacement in needle plate area:
Disconnect lead wire connector (a), remove plastic tie, remove 2 screws (c-d) and replace Micro-switch. (Fig.1-3)



-
- 5) Check needle plate micro switch condition: Turn to Ω in Multimeter, measure two ends of needle plate micro switch, when push needle plate micro switch, resist is 0Ω . When no push needle plate micro switch, resist is ∞ . (Fig.5)



8. Electronic Diagram



9. Power Supply diagram

