

SERVICE MANUAL FOR DOMESTIC SEWING MACHINE

XL, XR and PS series

XL 3010, 3022, 3025, 3027, 3030
4010, 4020, 4030, 4040, 4050, 4060

XR 31, 33, 34, 35, 37, 40

PS 31, 33, 35, 37, 40

GENERAL INFORMATION

- This service manual is compiled for repairing service of DOMESTIC SEWING MACHINE XL, XR and PS series.
- Use this manual with Parts Catalogue for fault findings when you make a repair.
- This machine is manufactured based on up-to-date product specifications at the time of this issue, but there may be changes of specifications for improvements. Contact manufacturer or local sales company for such changes.

*XL 3010, 3022, 3025, 3027, 3030
4010, 4020, 4030, 4040, 4050, 4060
XR 31, 33, 34, 35, 37, 40
PS 31, 33, 35, 37, 40

Brother industries, Ltd.
Nagoya, Japan

- Symbols used are:

Move the part this way	
Set the clearance as indicated	
Move the part to its highest or lowest position	

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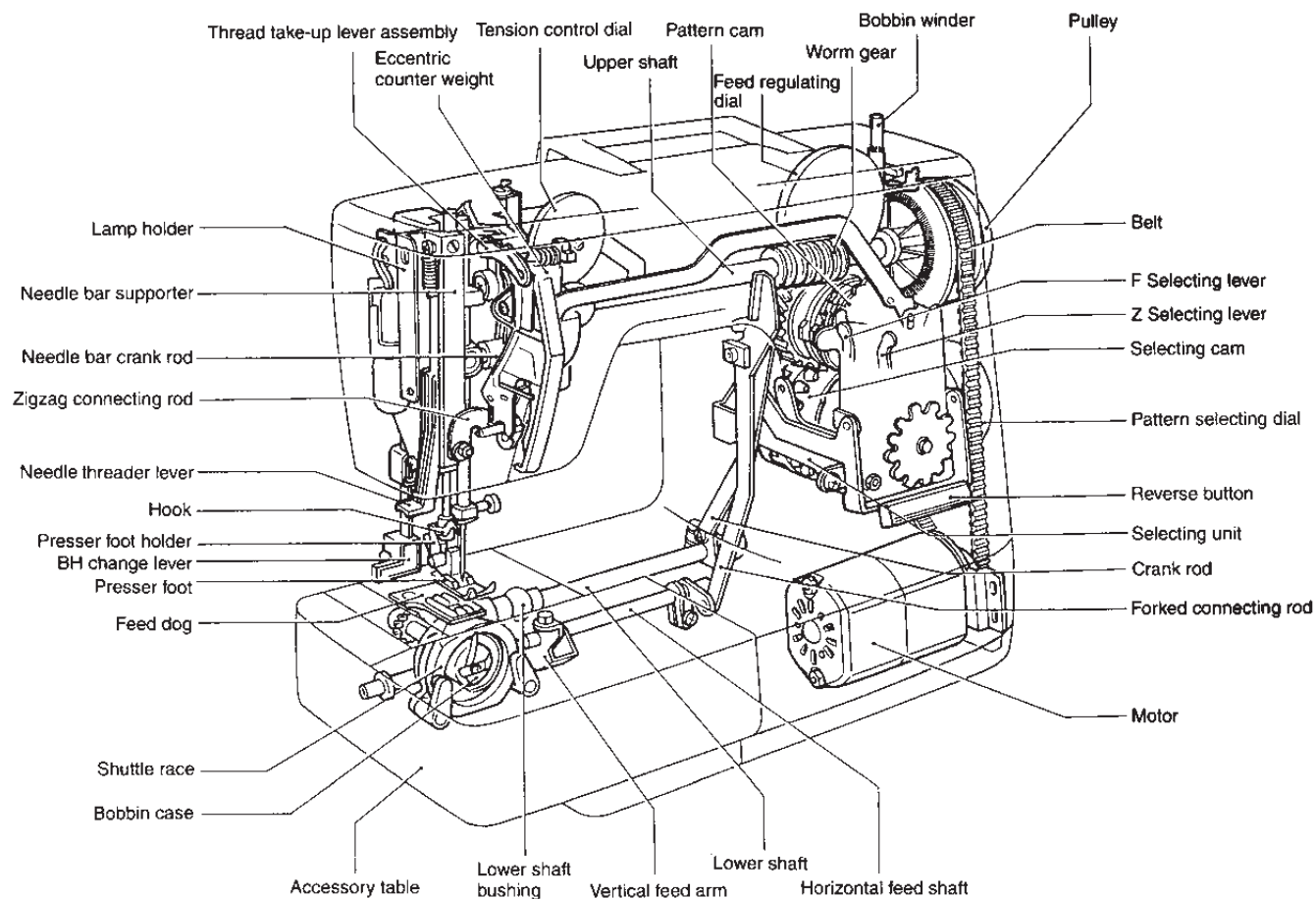
CAUTION

1. Always use rubber gloves when handling a printed circuit board, and do not touch the metal portion of the printed circuit board with bare hands.
2. Keep the human body earthed to avoid generating static electricity.
3. Pack a printed circuit board with aluminum foil and avoid impact with it while storing or transporting.
4. Do not touch or damage the metal portion of a printed circuit board with a screwdriver or any other tool during repairing.

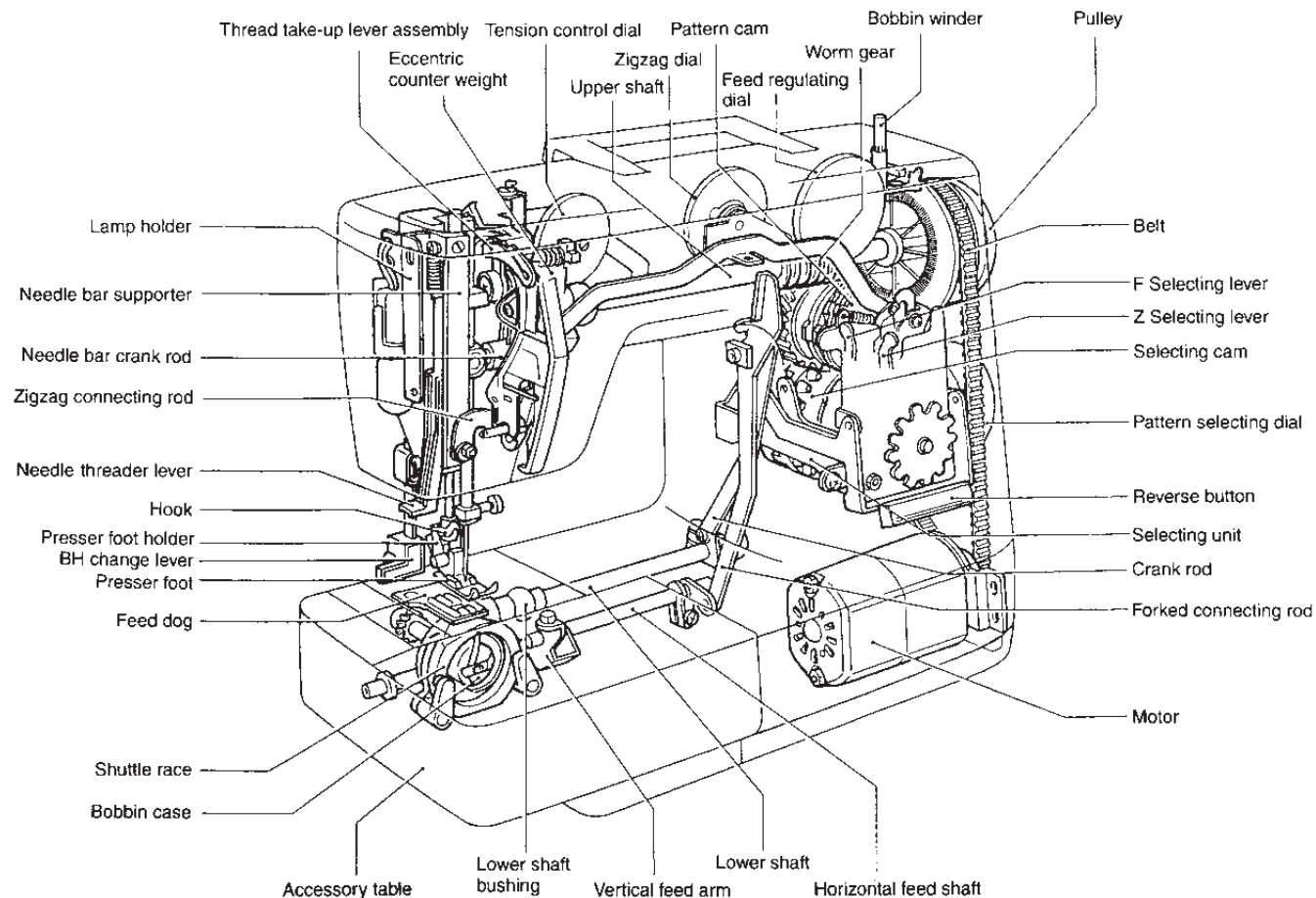
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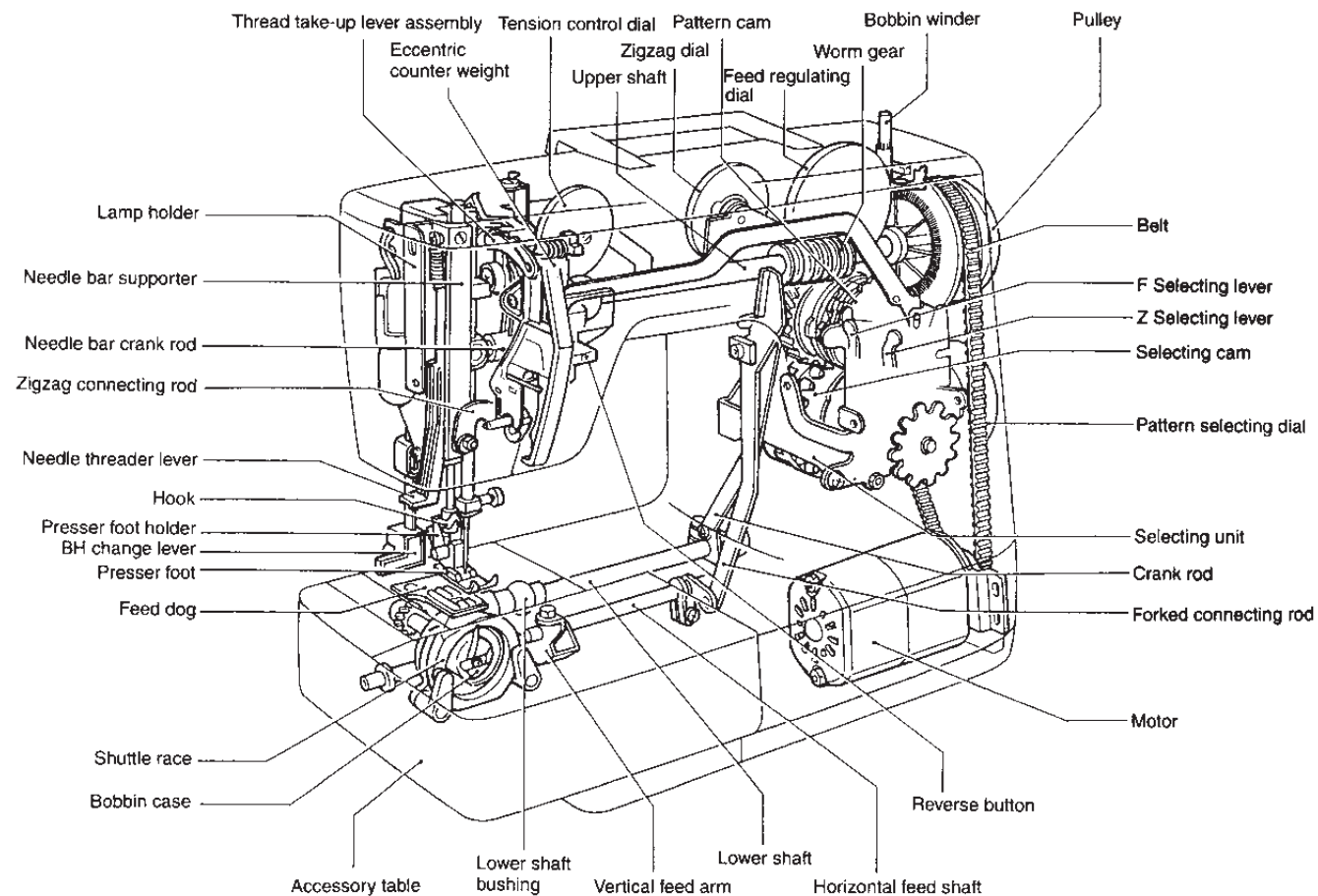
1. MECHANICAL CHART (XL SERIES)



1. MECHANICAL CHART (XR SERIES)

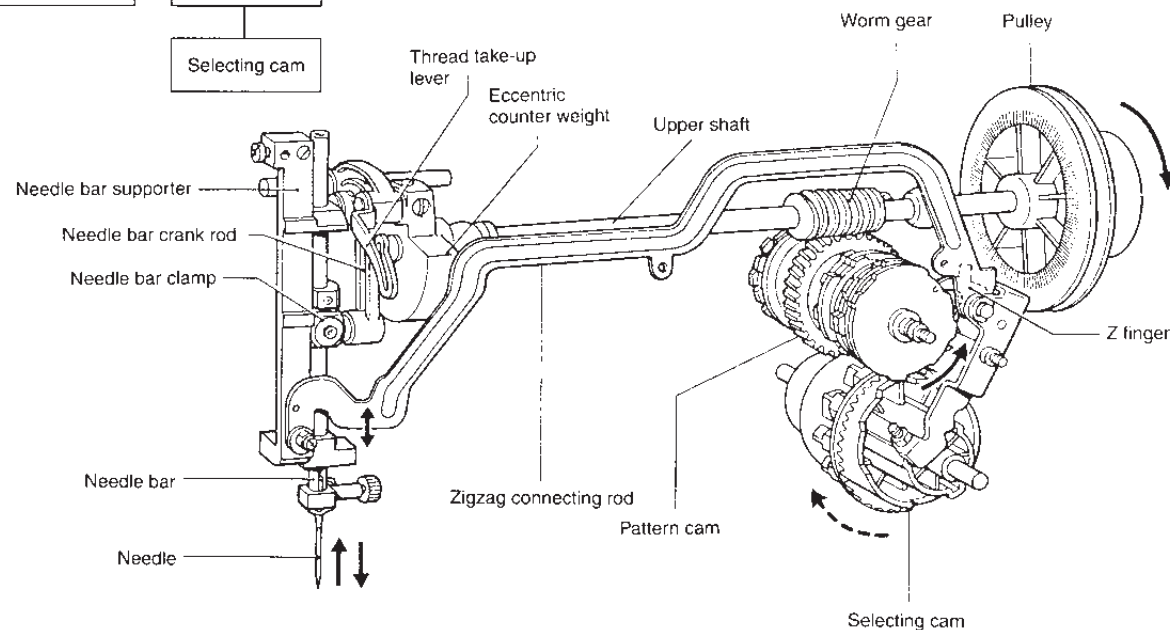
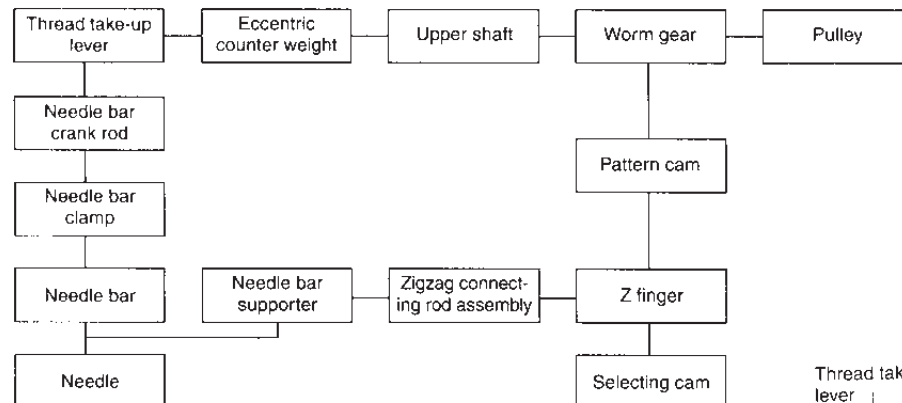


1. MECHANICAL CHART (PS SERIES)

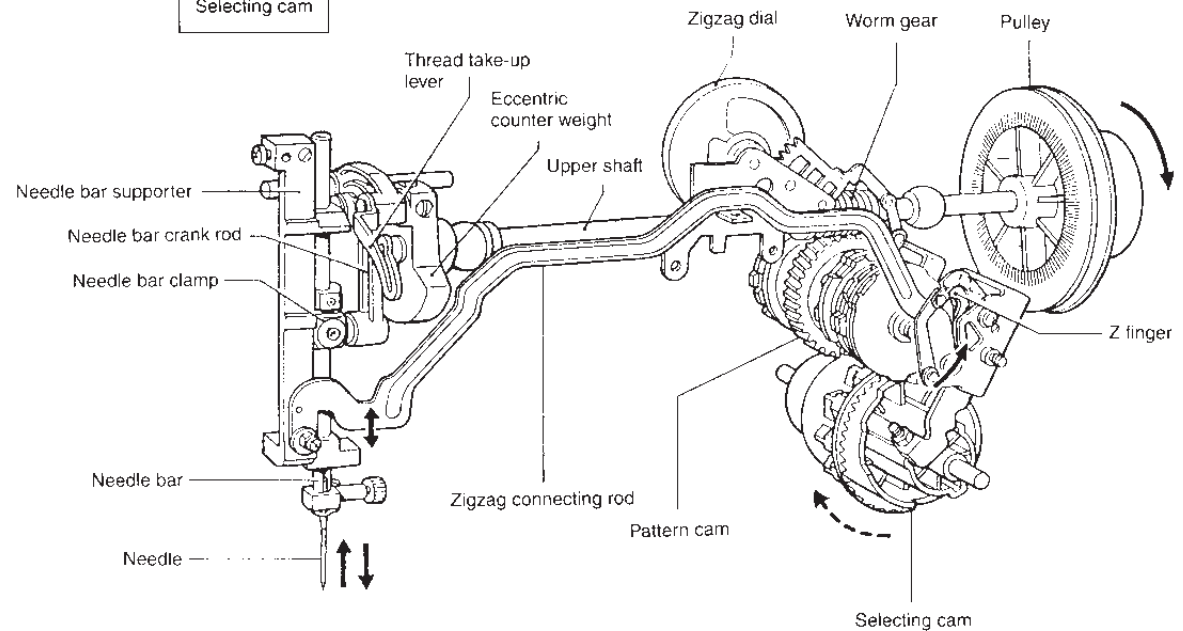
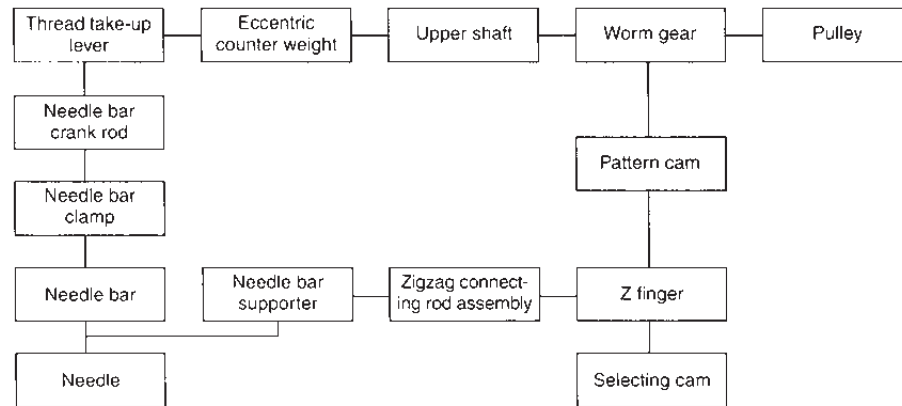


2. POWER TRANSMISSION CHART

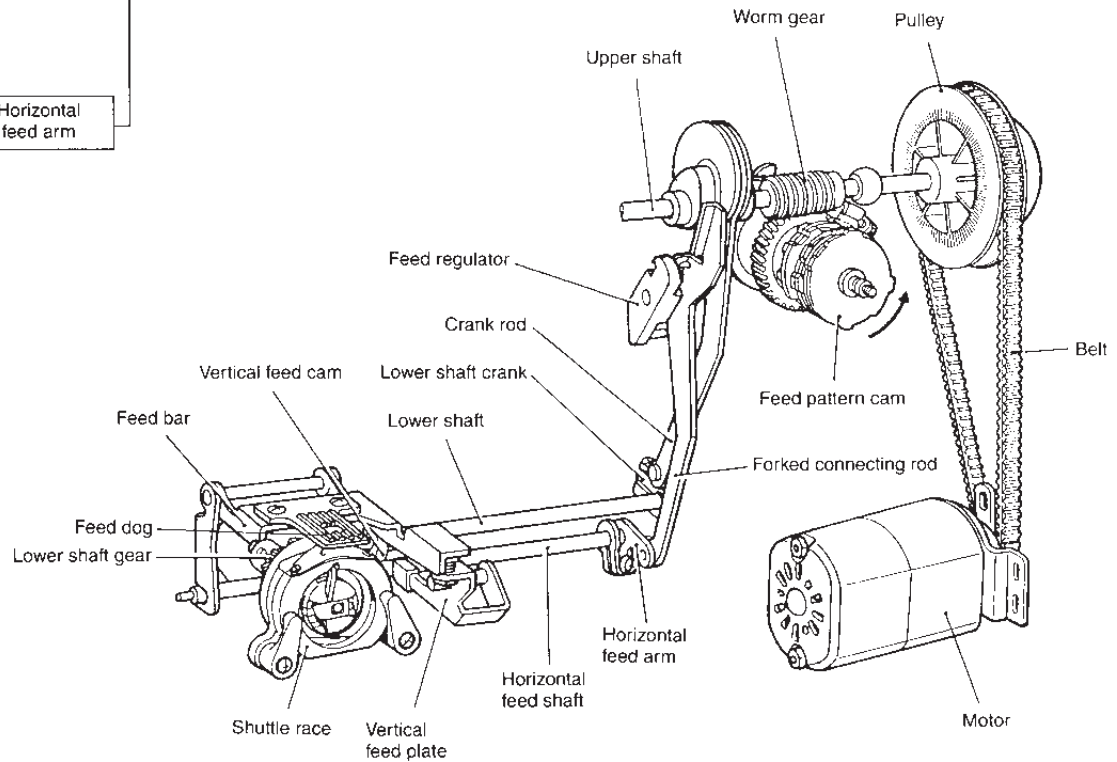
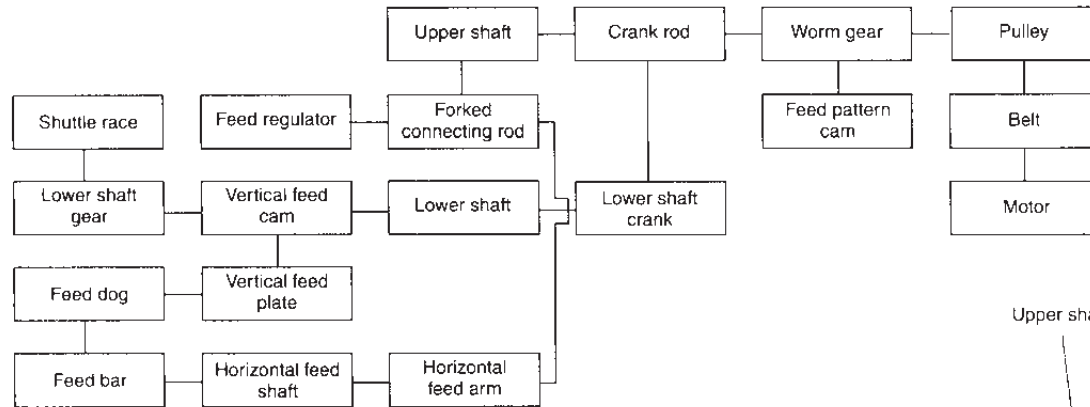
(A) Generating mechanism of needle bar, thread take-up lever and zigzag movements (XL series)



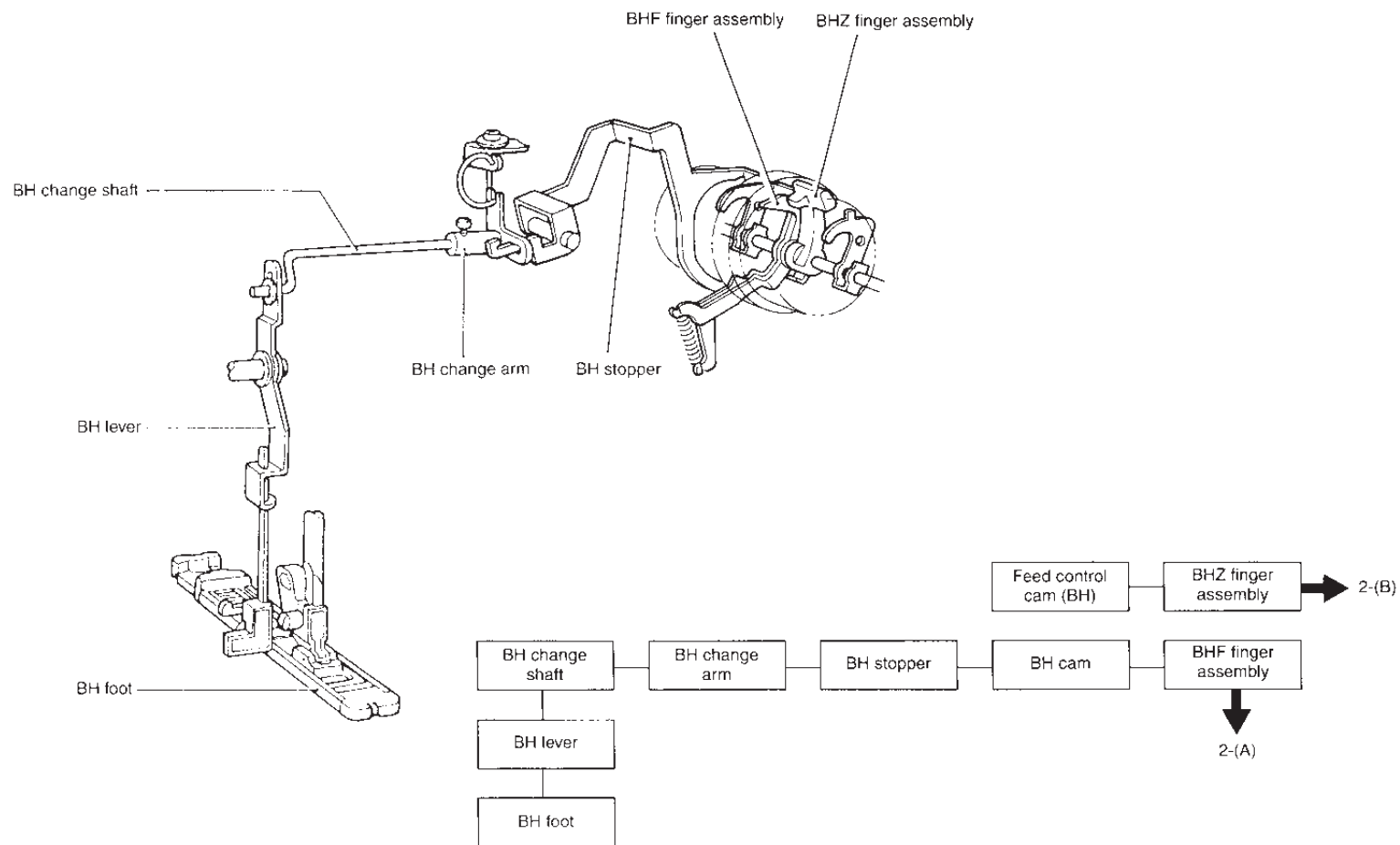
(A) Generating mechanism of needle bar, thread take-up lever and zigzag movements (XR and PS series)



(B) Mechanism of feed dog and oscillating hook movement



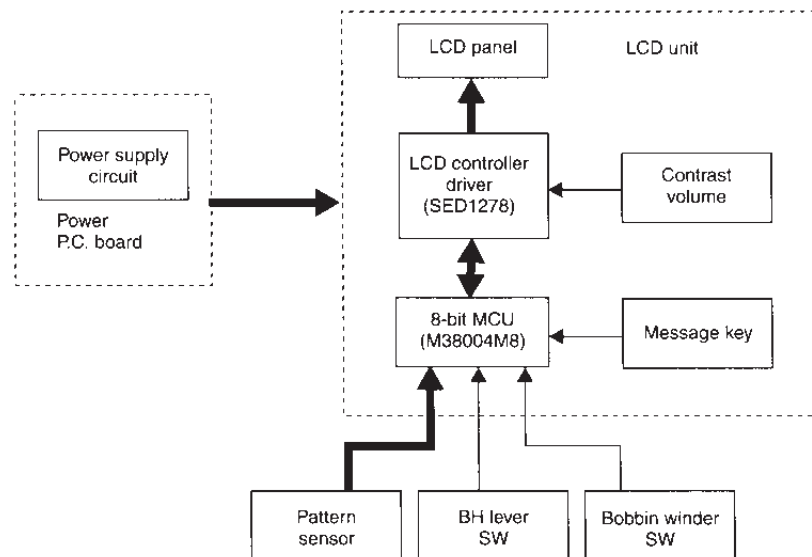
(C) Automatic 1-step BH mechanism



3. DISPLAY SYSTEM BY MICRO-COMPUTER

An 8 bit micro-computer in models installed with an LCD (liquid crystal display) regulates the LCD controller driver which controls the information shown on the display.

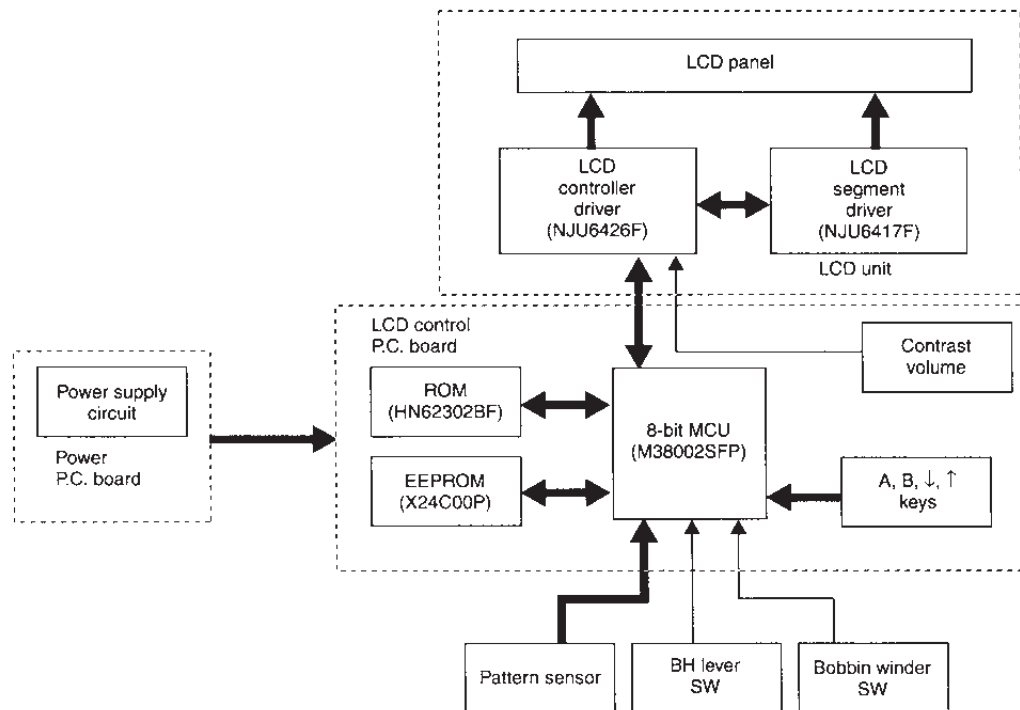
<1 LINE DISPLAY SYSTEM BLOCK CHART>



3. DISPLAY SYSTEM BY MICRO-COMPUTER

An 8 bit micro-computer in models installed with an LCD (liquid crystal display) regulates the LCD controller driver which controls the information shown on the display.

<4 LINE DISPLAY SYSTEM BLOCK CHART>



II. TROUBLES AND CHECK POINTS

1. Machine skips stitches.	12	19. No letter appears on LCD.	16
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16. Needle does not drop correctly.	15		
17. Fabric gathers.	15		
18. Machine does not work when pattern selector dial is turned.	15		

TROUBLES	CAUSE	CORRECTION
1. Machine skips stitches.	1. Improper setting of the needle. 2. Bent or blunt needle. 3. Improper threading. 4. Improper combination of needle/thread/fabric. 5. Stretch fabric is used. 6. Improper timing of needle and shuttle hook. 7. Improper attachment of needle bar. 8. Improper clearance between the needle and shuttle hook.	Set the needle correctly. Change the needle. Reset threading correctly. Select correct combination of needle/thread/fabric. Use stretch fabric needle, optional stretch presser foot. * Refer to P. 28. * Refer to P. 29. * Refer to P. 24.
2. Fabric does not feed.	1. Stitch length is set at "0". 2. Improper height of feed dog. 3. Thick fabric. 4. Feed dog is worn out.	Set proper stitch length. * Refer to P. 34. Change the fabric. Change the feed dog.
3. Fabric does not feed straight.	1. Uneven pressure on right/left side of presser foot.	Change the presser foot and the feed dog.
4. Machine runs slowly.	1. Accumulated lint or thread in race. 2. Lack of oil. 3. Accumulated lint on feed dog. 4. Tight gearing of lower gear/drive shaft gear. 5. Improper tension of drive belt. 6. Improper oil is used.	Clean shuttle race and oil. Oil. Clean feed dog. Adjust to the proper gearing. * Refer to P. 25. Adjust to the proper tension of drive belt. * Refer to P. 33. Wipe up improper oil with volatile oil, and use sewing machine oil.
5. Upper thread breaks at start.	1. Improper position of thread take-up lever. 2. Improper threading.	Change to proper position of thread take-up lever. Thread correctly.

TROUBLES	CAUSE	CORRECTION
6. Upper thread breaks during sewing.	1. Bent or blunt needle. 2. Improper setting of needle. 3. Thread tension is too tight. 4. Thread is tangled. 5. Inferior needle eye. 6. Inferior needle slot of needle plate. 7. Inferior upper thread path. 8. Inferior thread. 9. Needle hits needle plate or shuttle hook. 10. Scratch on the shuttle hook. 11. Inferior thread treatment on shuttle hook. 12. Inferior thread clearance between shuttle hook and shuttle driver.	Change the needle. Set the needle correctly. Adjust tension control dial correctly. Thread correctly. Change the needle. Change the needle plate. Clean or replace. Check or change the thread. Change the position of needle bar and shuttle race. * Refer to P. 24. Change the shuttle hook. Change the shuttle hook. Adjust the gap between shuttle hook and driver spring.
7. Upper thread breaks during reverse sewing.	1. Fabric is pulled excessively. 2. Improper use of reverse sewing button.	Guide the fabric. Push reverse sewing button as far as it will allow.
8. Lower thread breaks.	1. Lower thread tension is too tight. 2. Too much thread is wound on bobbin. 3. Scratch on the slot of bobbin case. 4. Thread is tangled. 5. Bobbin does not turn in bobbin case. 6. Inferior thread.	Adjust tension by loosening tension spring screw of bobbin case. Change to other bobbin or adjust bobbin winder. Change the bobbin case. Thread correctly. Change the bobbin. Check or change the thread.

TROUBLES	CAUSE	CORRECTION
9. Needle breaks.	1. Touch pattern dial while needle is in the fabric. 2. Needle hits bobbin case. 3. Needle hits needle plate. 4. Bent or blunt needle. 5. Improper clearance between the needle and shuttle hook. 6. Machine feeds while needle is in the fabric. 7. Needle flows. 8. Fabric is pulled excessively.	Operate machine correctly. Set the needle correctly. Make sure the correct needle is used. * Refer to P. 31. Change needle. * Refer to P. 24. * Refer to P. 30. * Refer to P. 26, 27. Guide the fabric.
10. Noise.	1. Play of worm/pattern cam gear. 2. Play of under shaft gear/driver shaft gear. 3. Lack of oil. 4. Play of upper shaft. 5. Improper gap between shuttle hook and driver spring. 6. Noise from forked connecting rod. 7. Noise from shuttle race.	Adjust to proper gearing. Adjust to proper gearing. Oil. Adjust play of the upper shaft. Adjust the gap by bending driver spring or shuttle driver. Adjust the horizontal feed shaft arm, or replace the forked connecting rod. Rub scratch on outside of shuttle hook.
11. Forward and reverse feedings differ.	1. Improper adjustment of feed regulator adjusting plate.	Adjust screw of feed regulator adjusting plate. * Refer to P. 42.
12. Improper length of buttonhole legs.	1. Improper adjustment.	Adjust screw. * Refer to P. 44.

TROUBLES	CAUSE	CORRECTION
13. Improper buttonhole size against button size.	1. Improper adjustment of buttonhole length.	Adjust the length of buttonhole.
14. Unbalanced patterns.	1. Stitch length dial is not set at "4". 2. Feed dog is worn out. 3. Improper height of feed dog. 4. Improper attachment of feed dog. 5. Release volume is too small. 6. Forward and reverse feedings differ.	Operate machine correctly. Change the feed dog. * Refer to P. 34. Attach the feed dog correctly. Adjust the release volume. * Refer to P. 31. * Refer to P. 43.
15. Needle hits needle plate when pattern selector dial is turned.	1. Release volume is too big.	Adjust the release volume.
16. Needle does not drop correctly.	1. Bent needle. 2. Incorrect needle drop with straight stitch. 3. Needle flows. 4. Improper attachment of needle bar supporter.	Change the needle. Adjust eccentric stud. * Refer to P. 26, 27. Adjust the needle drop.
17. Fabric gathers.	1. Thread tension is too tight. 2. Blunt needle. 3. Improper combination of needle/thread/fabric. 4. Improper threading.	Reduce the tension. Change the needle. Select correct combination of needle/thread/fabric. Reset threading correctly.
18. Machine does not work when pattern selector dial is turned.	1. Release volume is too small.	Adjust the release volume. * Refer to P. 31.

TROUBLES	CAUSE	CORRECTION
19. No letter appears on LCD.	1 line LCD	1 line LCD
	1. Improper setting of LCD contrast key. 2. Disconnection of connector CN1. 3. Voltage between terminal 2-1 of JW4 on power unit is less than DC5V. 4. Inferior LCD unit.	Adjust LCD contrast key. Connect CN1 on LCD unit. Replace the power unit. Replace the LCD unit.
	4 line LCD	4 line LCD
	1. Improper setting of LCD contrast manual. 2. Disconnection of connector P1. 3. Disconnection of connector P5. 4. Voltage between terminal 2-1 of JW4 on power unit is less than DC5V. 5. Inferior LCD control PCB or LCD module.	Adjust LCD contrast manual. Connect P1 on LCD control PCB. Connect P5 on LCD module. Replace the power unit. Replace the LCD control PCB or LCD module.
20. Message key does not work.	1 line LCD	1 line LCD
	1. Message key top does not work. 2. Inferior LCD unit.	Check the message key and key top. Replace the LCD unit.
	4 line LCD (A,B,↓,↑)	4 line LCD (A,B,↓,↑)
	1. Each key tops do not work. 2. Inferior LCD control PCB.	Check each keys and key tops. Replace the LCD control PCB.
21. LCD contrast does not control.	1 line LCD	1 line LCD
	1. LCD contrast key does not work. 2. Improper LCD contrast.	Check the slide volume and slide key. Replace the LCD unit.
	4 line LCD	4 line LCD
	1. LCD contrast key does not work. 2. Improper LCD control PCB.	Check the slide volume and slide key. Replace the LCD control PCB.

TROUBLES	CAUSE	CORRECTION
22. Different pattern name appears on LCD.	1 line LCD	1 line LCD
	1. Disconnection of connector CN2 on LCD unit. 2. Inferior LCD unit or pattern sensor.	Connect CN2 on LCD unit. Replace the LCD unit or pattern sensor.
	4 line LCD	4 line LCD
	1. Disconnection of connector P3 on LCD control PCB. 2. Inferior LCD control PCB or pattern sensor.	Connect P3 on LCD control PCB. Replace the LCD control PCB or pattern sensor.
23. Message "Bobbin Winding" always appears on LCD.	1 line LCD	1 line LCD
	1. BW switch does not work. 2. Inferior BW switch. 3. Inferior LCD unit.	Adjust the BW stitch. *Refer to P.39. Replace the BW switch. *Refer to P.39. Replace the LCD switch.
	4 line LCD	4 line LCD
	1. BW switch does not work. 2. Inferior BW switch. 3. Inferior LCD control PCB.	Adjust the BW stitch. *Refer to P.39. Replace the BW switch. *Refer to P.39. Replace the LCD control PCB.
24. Message "Bobbin Winding" does not appear when bobbin winding is set. (1 line LCD)	1. Disconnection of connector CN4 on LCD unit. 2. BW switch does not work. 3. Inferior BW switch. 4. Inferior LCD unit.	Connect CN4 on LCD unit. Adjust the BW stitch. *Refer to P.39. Replace the BW switch. *Refer to P.39. Replace the LCD unit.

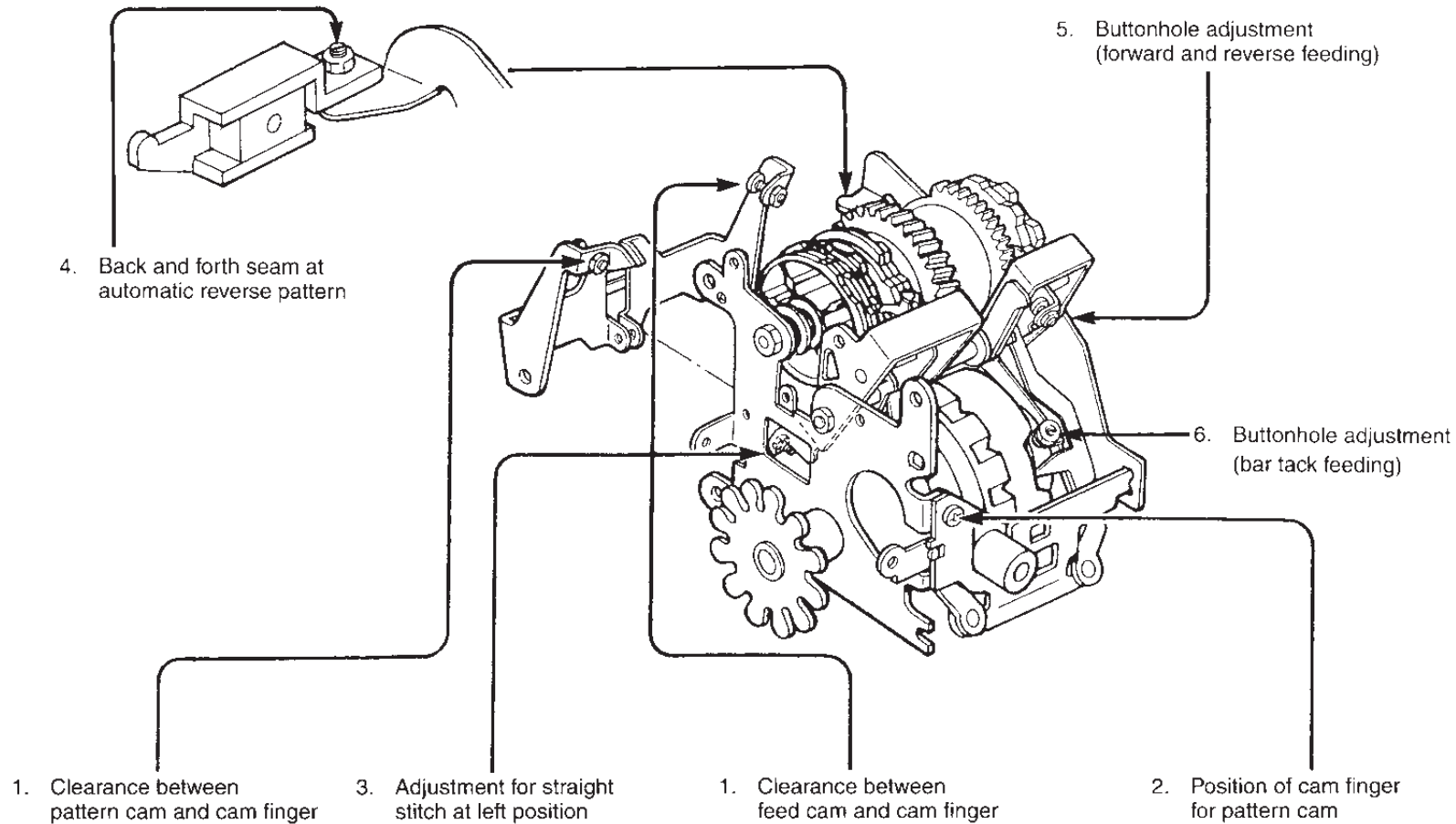
TROUBLES	CAUSE	CORRECTION
25. Message "Bobbin Winding Selected" does not appear when bobbin winding is set. (4 line LCD)	1. Disconnection of connector P4 on LCD unit. 2. BW switch does not work. 3. Inferior BW switch. 4. Inferior LCD control PCB.	Connect the P4 on LCD unit. Adjust the BW switch. *Refer to P.39. Replace the BW switch. *Refer to P.39. Replace the LCD control PCB.
26. Message "Lower BH Lever" does not appear when buttonhole is set and buttonhole lever is not lowered. (1 line LCD)	1. Disconnection of connector CN3 on LCD unit. 2. BH lever switch does not work. 3. Inferior BH lever switch. 4. Inferior LCD unit.	Connect the CN3 on LCD unit. Adjust the BH lever switch. *Refer to P.48. Replace the BH lever switch. *Refer to P.48. Replace the LCD unit.
27. Message "Lower Buttonhole Lever" does not appear when buttonhole is set and buttonhole lever is not lowered. (4 line LCD)	1. Disconnection of connector P2 on LCD unit. 2. BH lever switch does not work. 3. Inferior BH lever switch. 4. Inferior LCD control PCB.	Connect the P2 on LCD unit. Adjust the BH lever switch. *Refer to P.48. Replace the BH lever switch. *Refer to P.48. Replace the LCD control PCB.

TROUBLES	CAUSE	CORRECTION
28. Message "Lower BH Lever" appears when button- hole lever is lowered.	1 line LCD	1 line LCD
	1. BH lever switch does not work.	Adjust the BH lever switch. *Refer to P.48.
	2. Inferior BH lever switch.	Replace the BH lever switch. *Refer to P.48.
	3. Inferior LCD unit.	Replace the LCD unit.
	4 line LCD	4 line LCD
	1. BH lever switch does not work.	Adjust the BH lever switch. *Refer to P.48.
	2. Inferior BH lever switch.	Replace the BH lever switch. *Refer to P.48.
	3. Inferior LCD control PCB.	Replace the LCD control PCB.
29. Motor does not run.	1. Disconnection of connector CN1 on power unit. 2. Inferior foot controller. 3. Inferior motor or inferior brush. 4. Inferior power unit.	Connect CN1 on power unit. Replace the foot controller. Replace the motor. Replace the power unit.
30. Light is off.	1. Disconnection of connector CN2 on power unit. 2. Inferior light bulb. 3. Inferior power unit.	Connect CN2 on power unit. Replace the light bulb. *Refer to P.56. Replace the power unit.

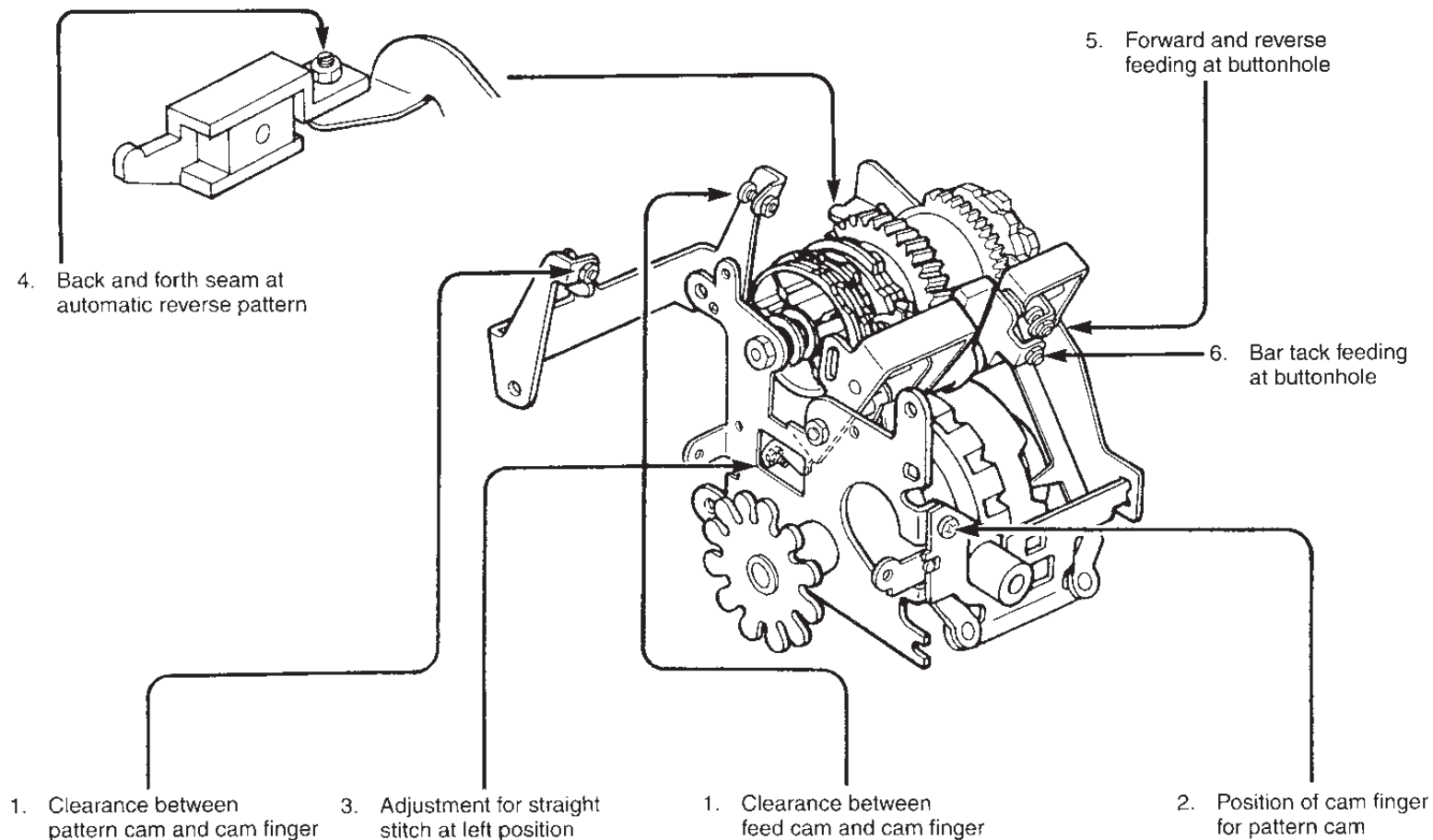
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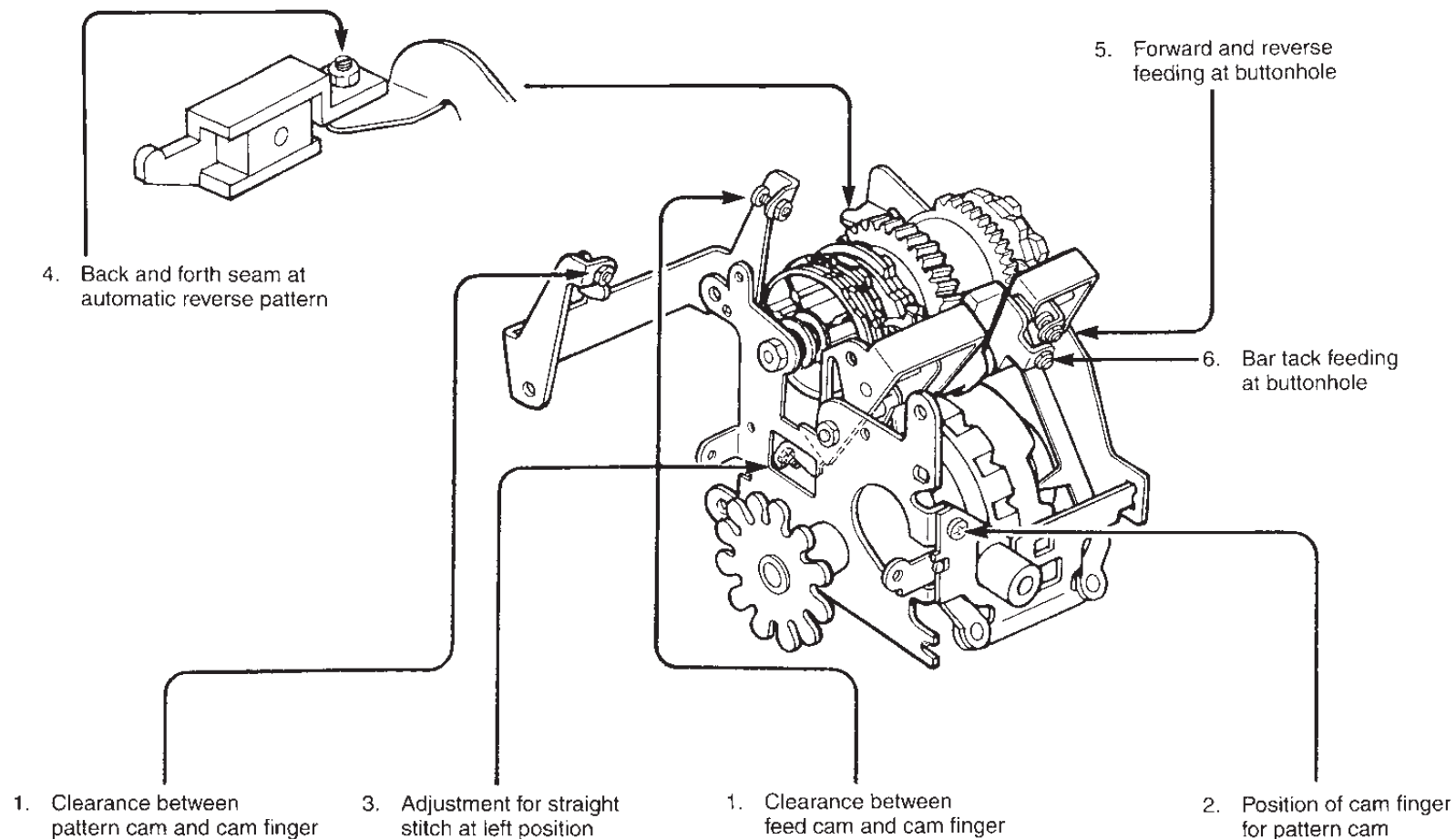
1. ADJUSTMENT OF EACH CONTROL UNIT (4-STEP BH MODEL)



1. ADJUSTMENT OF EACH CONTROL UNIT (XL SERIES 1-STEP BH MODEL, 2-STEP BH MODEL)



1. ADJUSTMENT OF EACH CONTROL UNIT (XR AND PS SERIES 1-STEP BH MODEL)



2. CLEARANCE BETWEEN NEEDLE AND HOOK POINT

STANDARD

1. The clearance between needle and hook should be 0.02 ~ 0.1 mm.
2. Shuttle race should be correctly positioned.

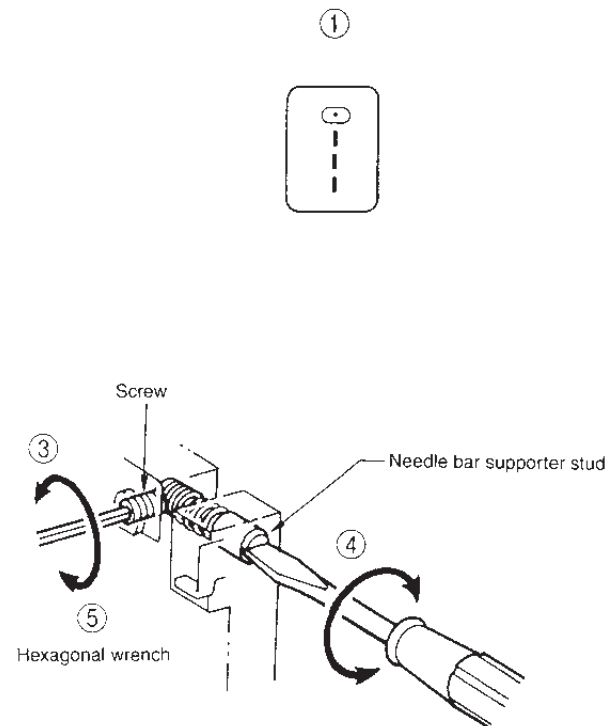
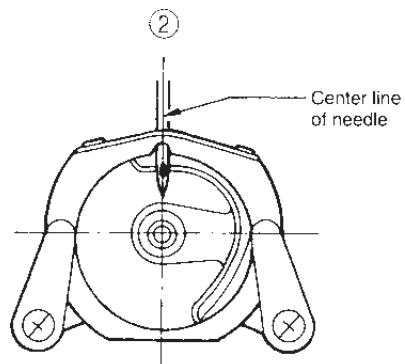
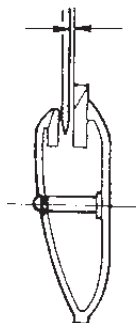
ADJUSTMENT

1. Set pattern dial at straight stitch (center position).
2. Check the needle drop at center position by using correct needle.
3. Loosen screw.
4. Adjust the needle bar supporter stud.
5. Tighten screw.

NOTE

Check the position of shuttle hook.

0.02 ~ 0.1 mm



3. CLEARANCE BETWEEN SHUTTLE DRIVER AND RACE WAY

STANDARD

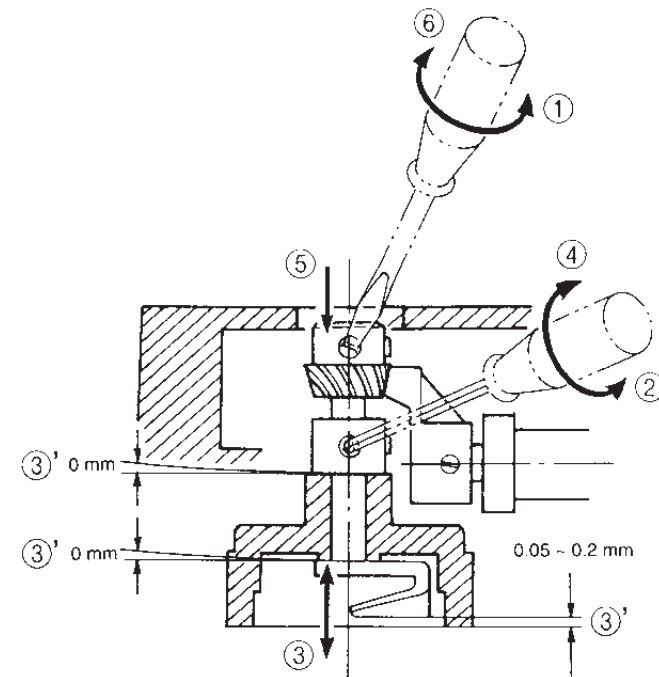
The clearance between shuttle driver and race way should be 0 mm and smooth revolution is obtained.

ADJUSTMENT

1. Loosen two screws.
2. Loosen two screws.
3. Adjust the clearance of drive shaft.
4. Tighten two screws.
5. Adjust the contact between driver shaft gear and lower shaft gear.
6. Tighten two screws.

NOTE

Check the position of shuttle hook.



4. SEWING TIMING OF THE NEEDLE (XL SERIES)

STANDARD

When pattern dial is set to zigzag, the needle should drop in the needle hole balanced.

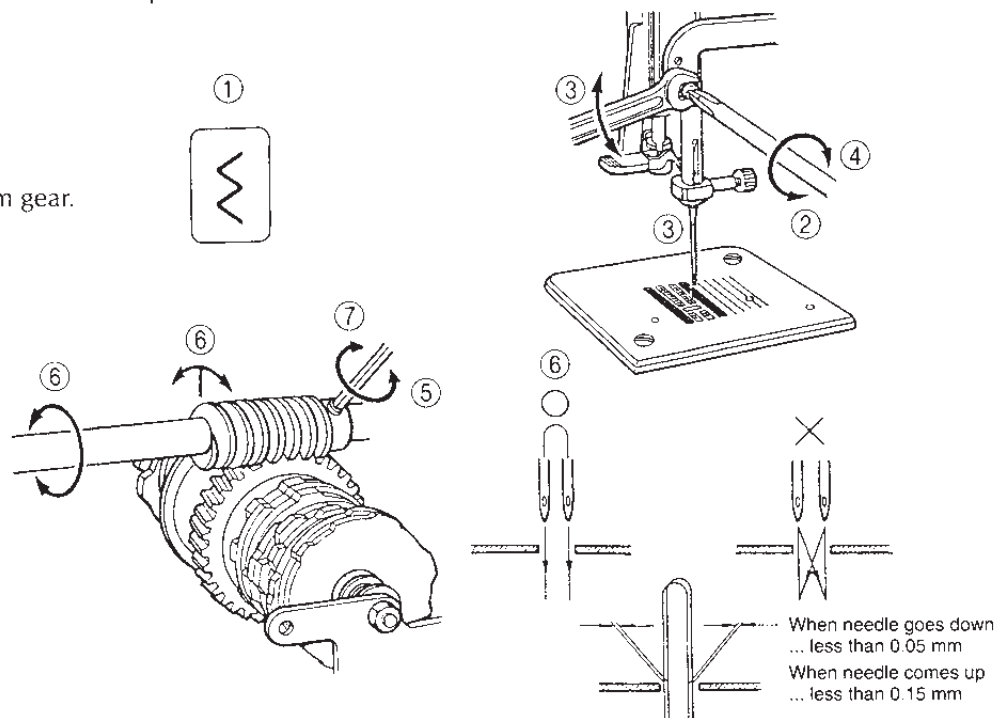
When pattern dial is set to zigzag, needle swing on the way up from lowest position to needle plate should be less than 0.15 mm and that on the way down from needle plate to lowest position should be less than 0.05 mm.

ADJUSTMENT

1. Set the pattern dial to maximum width zigzag.
2. Loosen screw on zigzag connecting rod.
3. Adjust position by turning eccentric nut so that the needle drops in the needle hole balanced.
4. Tighten set screw for the eccentric nut.
5. Loosen three set screws on worm gear.
6. Adjust needle swing by turning worm gear.
7. Tighten three screws on worm gear.

NOTE

Make sure that the biting worm gear with pattern cam gear.



4. SEWING TIMING OF THE NEEDLE (XR AND PS SERIES)

STANDARD

Set pattern dial to ZIGZAG.

The needle should drop in the needle hole balanced.

When zigzag width is set to "5" and full turn the zigzag width dial from 0 to 5 in the right position of needle, horizontal movement of the needle should be less than 0.1 mm.

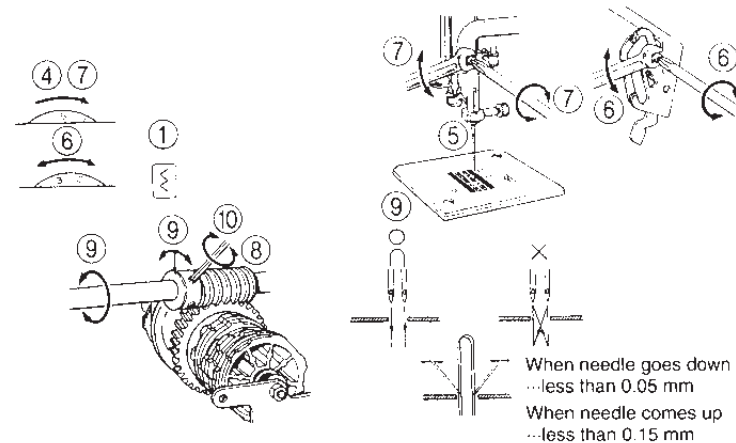
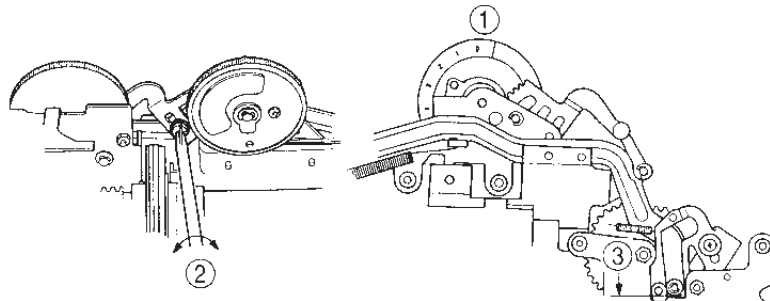
Needle swing on the way up from lowest position to needle plate should be less than 0.15 mm and that on the way down from needle plate to lowest position should be less than 0.05 mm.

ADJUSTMENT

1. Set pattern to ZIGZAG and stitch width dial to "0".
2. Loosen the screw securing the Z gear lever.
3. Tighten the screw securing the Z gear lever until the zigzag connecting rod comes in contact with the feed bracket F.
(At this point, check to make sure there is no backlash between the Z gear lever and the Z dial gear.)
4. Set stitch width dial to "5".
5. Set the right position of needle by turning the pulley.
6. Turning stitch width dial from 0 to 5 and adjust eccentric nut so that the needle does not swing.
7. Turning stitch width dial to "5" and adjust eccentric nut so that the needle drops in the needle hole balanced.
8. Loosen three set screws on worm gear.
9. Adjust needle swing by turning worm gear.
10. Tighten three screws on worm gear.

NOTE

Make sure that the biting worm gear with pattern cam gear.



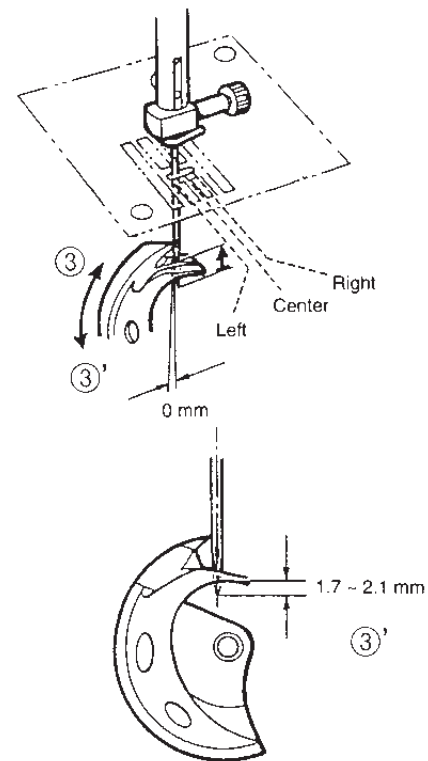
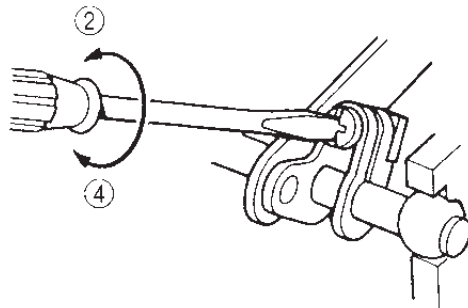
5. POSITION OF SHUTTLE HOOK

STANDARD

Set pattern dial to zigzag, when needle raises from its (left) lowest position by 1.7 ~ 2.1 mm, the hook point should meet with the side of needle at right needle movement.

ADJUSTMENT

1. Set pattern dial to maximum width zigzag.
2. Loosen screws.
3. Adjust the hook to achieve above standard.
4. Tighten screws.



6. HEIGHT OF NEEDLE BAR

STANDARD

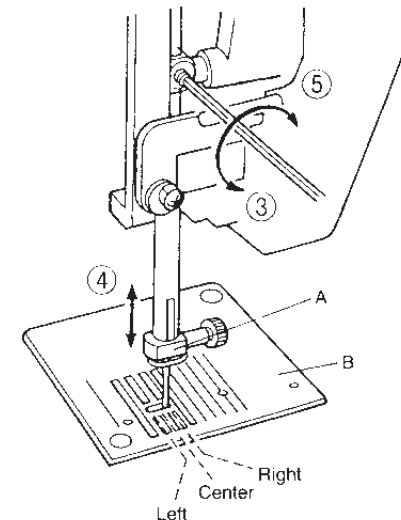
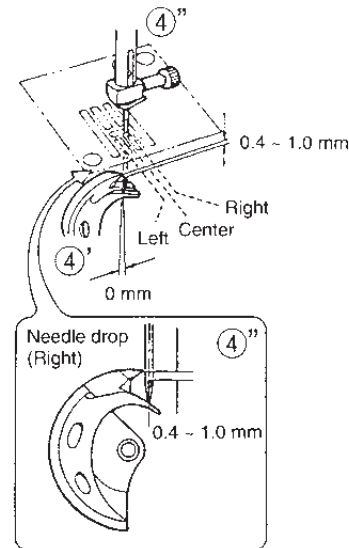
Set pattern dial to zigzag. The clearance between upper top of needle eye and hook point should be 0.4 ~ 1.0 mm when needle and hook meet at right needle position.

ADJUSTMENT

1. Set pattern dial to maximum width zigzag.
2. Set the position that needle meets with hook point by turning the pulley.
3. Loosen screw.
4. Adjust needle bar up and down.
5. Tighten screw.

NOTE

Make sure that front side of needle clamp A is parallel with front edge of needle plate B.



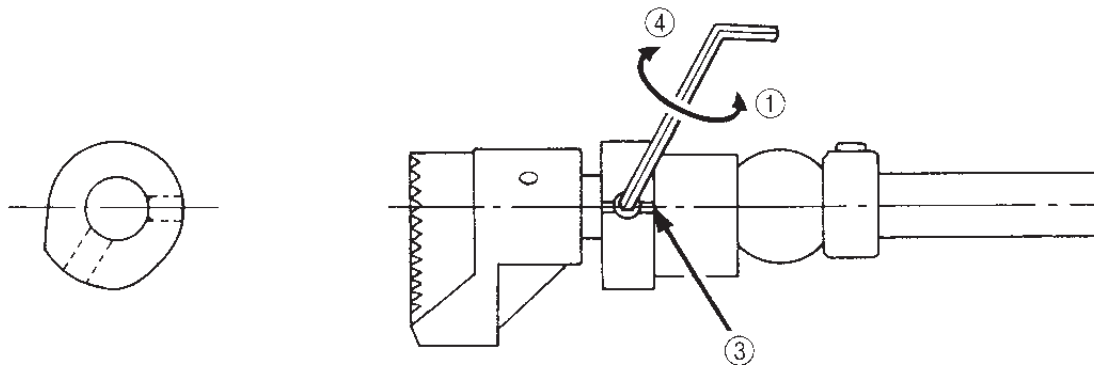
7. POSITION OF VERTICAL FEED CAM

STANDARD

When needle bar is set at its lowest position, center of both the lower shaft gear and vertical feed cam should be in a line.

ADJUSTMENT

1. Loosen two screws.
2. Lower the needle bar by turning pulley.
3. Adjust the position of vertical feed cam as shown in illustration.
4. Tighten two screws.



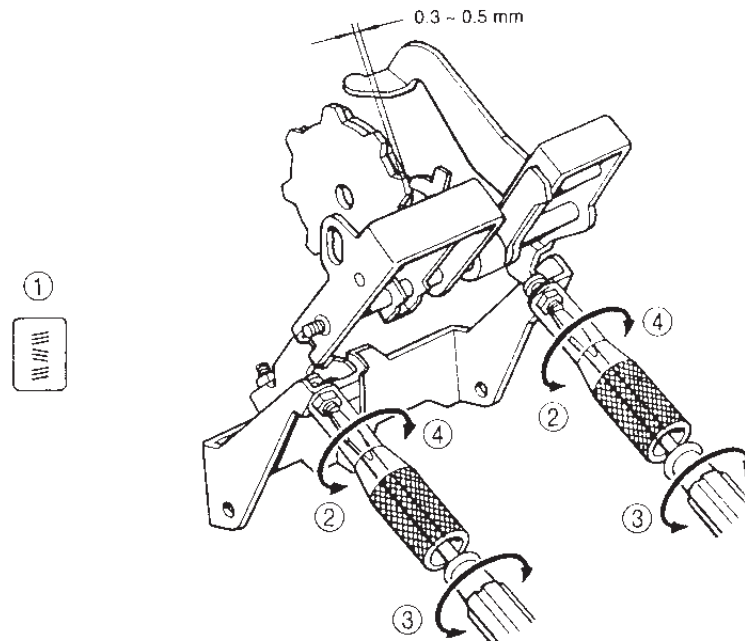
8. CLEARANCE BETWEEN CAM AND CAM FINGER

STANDARD

When pattern dial is set to rick-rack stitch and cam finger is released, clearance between cam finger and pattern cam & feed cam should be 0.3 ~ 0.5 mm.

ADJUSTMENT

1. By turning pattern selecting dial, select rick-rack stitch and release cam finger from pattern and feed cam.
2. Loosen the nut to release adjustment screw.
3. Adjust clearance by turning release adjustment screw.
4. Tighten the nut.



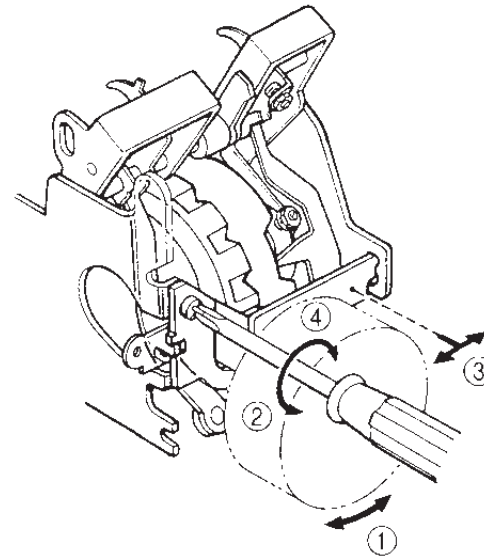
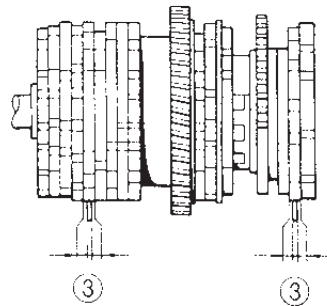
9. POSITION OF CAM FINGER FOR FEED CAM AND PATTERN CAM

STANDARD

Feed cam finger and zigzag cam finger should be center position of each cam.

ADJUSTMENT

1. Check the position of feed cam finger and zigzag cam finger by turning pattern selecting dial.
2. Loosen the screw on selecting lever holder.
3. Set the Z cam finger and F cam finger to the center position of each cam by adjust selecting lever holder.
4. Tighten the screw.
5. Make sure cam finger is located at the center position of each cam by turning pattern selecting dial.



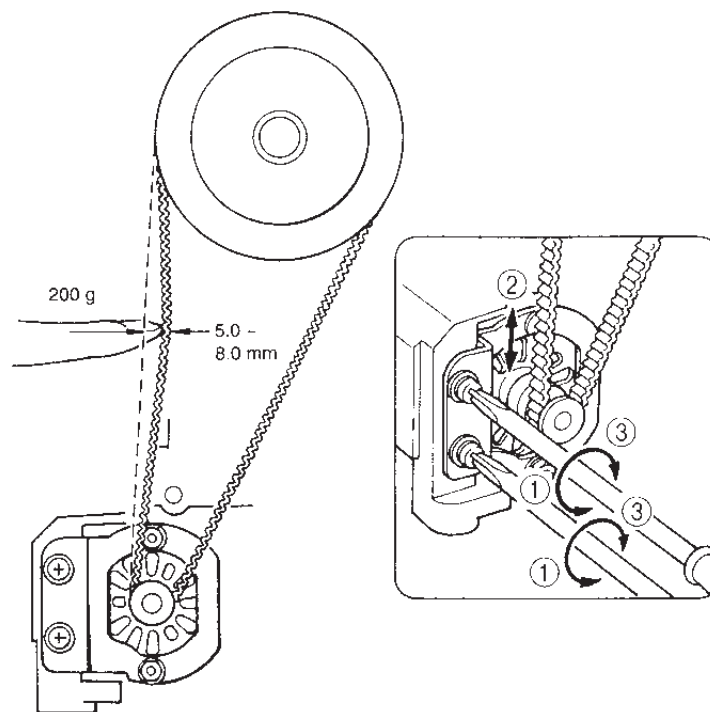
10. TENSION OF MOTOR BELT

STANDARD

There should be 5.0 ~ 8.0 mm of slack on the motor belt, when the center of each belt is just pushed with about 200 g pressure.

ADJUSTMENT

1. Loosen the screws on the motor holder.
2. Adjust belt tension by moving motor holder to meet with above standard.
3. Tighten the two screws.



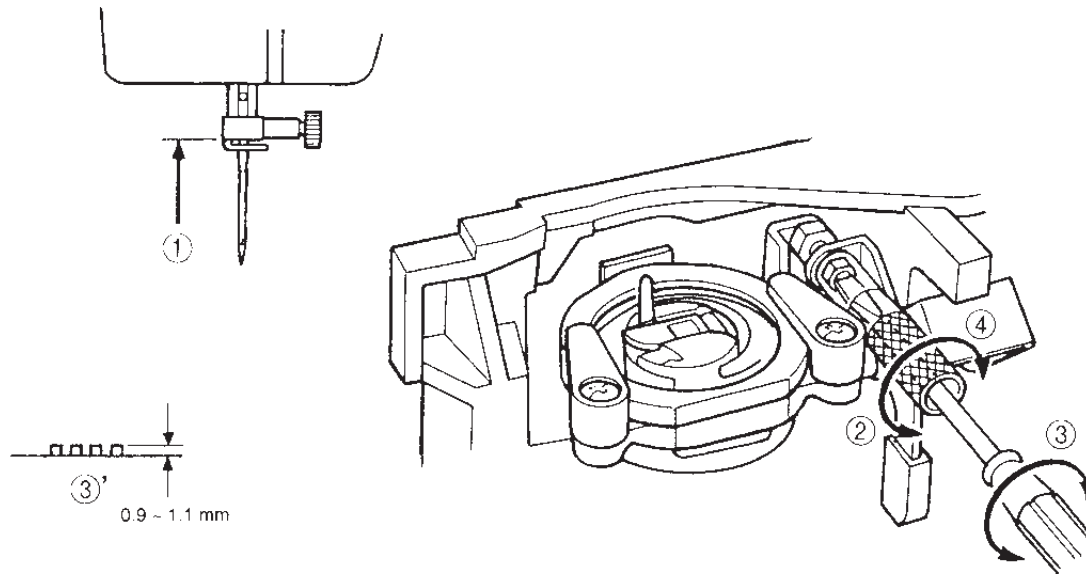
11. HEIGHT OF FEED DOG

STANDARD

Feed dog should be higher than needle plate by 0.9 ~ 1.1 mm when feed dog is raised to its highest position.

ADJUSTMENT

1. Raise needle bar to its highest position by turning pulley.
2. Loosen the nut for adjusting screw.
3. Adjust the height of feed dog by turning adjusting screw.
4. Tighten the nut.



12. HEIGHT OF PRESSER BAR

STANDARD

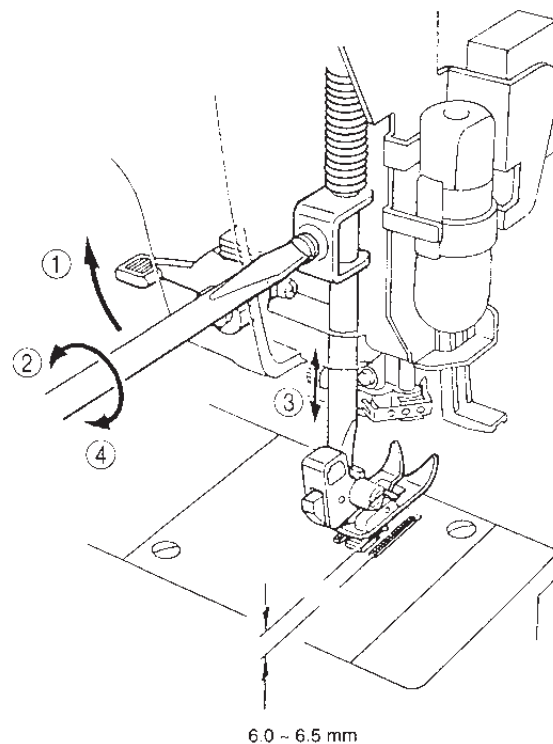
The clearance between presser foot and needle plate should be 6.0 ~ 6.5 mm.

ADJUSTMENT

1. Raise presser foot.
2. Loosen screw.
3. Adjust the height of bar.
4. Tighten screw.

NOTE

Check that presser foot and feed dog are in line.



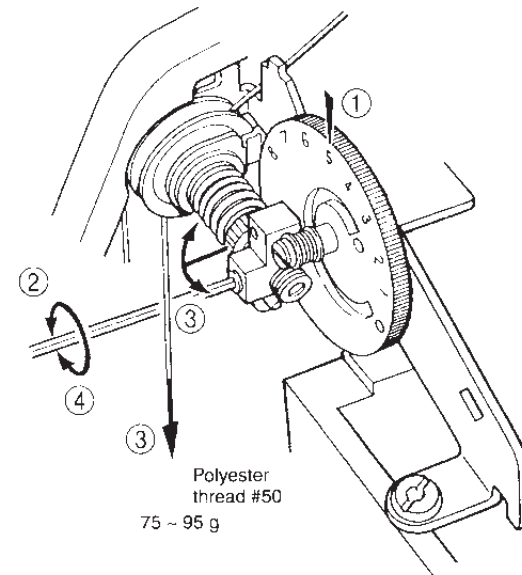
13. ADJUSTMENT OF THREAD TENSION DIAL

STANDARD

When thread tension dial is set at "5" and presser foot is lowered, upper thread tension should be 75 ~ 95 g using polyester thread #50.

ADJUSTMENT

1. Set thread tension dial at "5", put polyester thread between tension discs.
2. Lower the presser foot lifter.
3. Loosen the set screw for thread tension screw.
4. Measure thread tension using tension gauge and adjustment tension to 75 ~ 95 g by turning thread tension screw.
5. Tighten set screw.



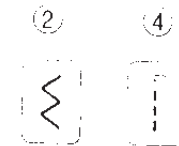
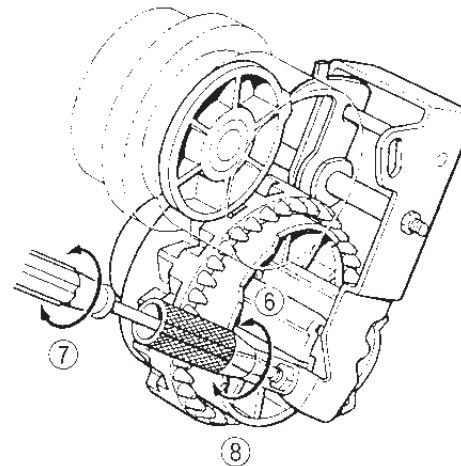
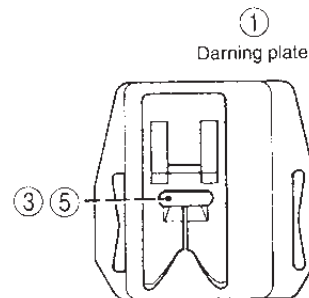
14. MAXIMUM STITCH WIDTH WHEN SET AT STRAIGHT (LEFT) AND ZIGZAG STITCH

STANDARD

Left end of straight stitch should be same position as left end of zigzag stitch.

ADJUSTMENT

1. Set darning plate to needle plate, and put a piece of paper under the presser foot.
2. Set pattern dial to zigzag stitch at maximum width.
3. Drop the needle into the paper by turning the pulley.
4. Set pattern dial to left straight stitch.
5. Drop the needle into the paper by turning screw.
6. Insert the box driver by loosening the nut of adjusting screw.
7. Adjust left straight needle position by turning screw. (Turn the screw to the right, needle position is moved to the right.)
8. Tighten the nut.



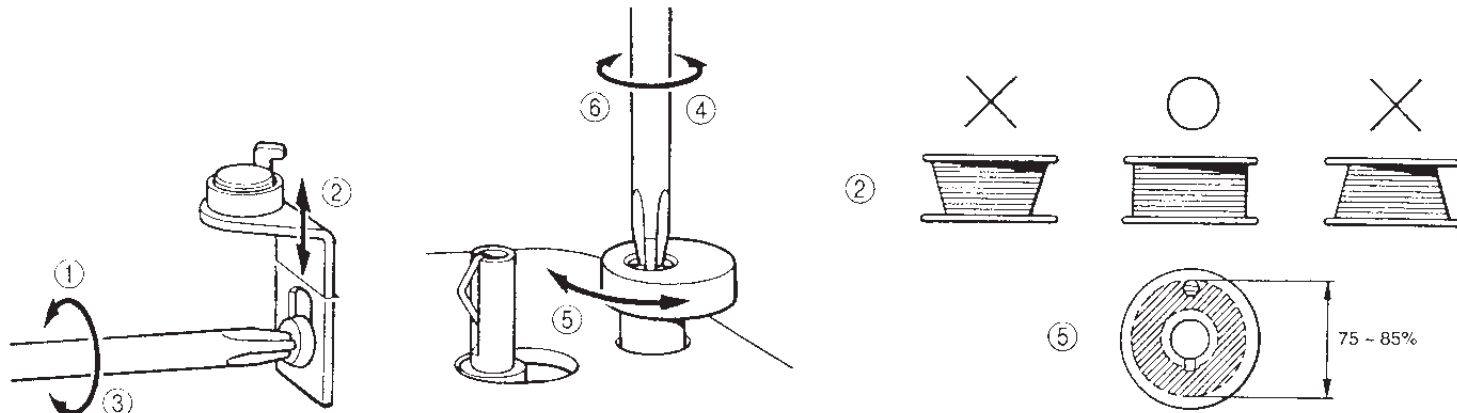
15. ADJUSTMENT OF BOBBIN WINDING

STANDARD

Thread should be wound parallel to the bobbin and be wound 75 ~ 85% of the outer-diameter of bobbin.

ADJUSTMENT

1. In case bobbin thread is wound unbalanced, loosen the screw for bobbin winder thread guide slightly.
2. Move bobbin winder thread guide vertically so that the bobbin thread is balanced when it is wound.
3. Tighten the screw for bobbin winder thread guide.
4. Loosen the screw for bobbin presser slightly.
5. Adjust bobbin thread amount moving the screw for bobbin presser.
6. Tighten the screw for bobbin presser.



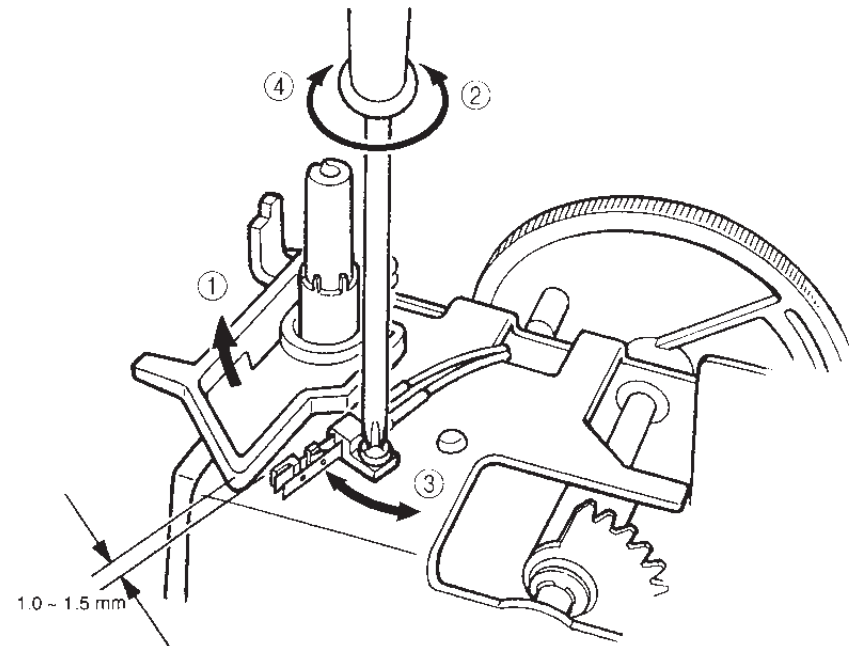
16. ADJUSTMENT OF BOBBIN WINDING SWITCH (LCD MODEL)

STANDARD

When bobbin winder is moved to bobbin presser, bobbin winding switch should be on. When bobbin winder is returned, there should be clearance between spring and switch.

ADJUSTMENT

1. Remove the cover.
2. Loosen screw.
3. Adjust the switch by moving it left to right.
4. Tighten screw.



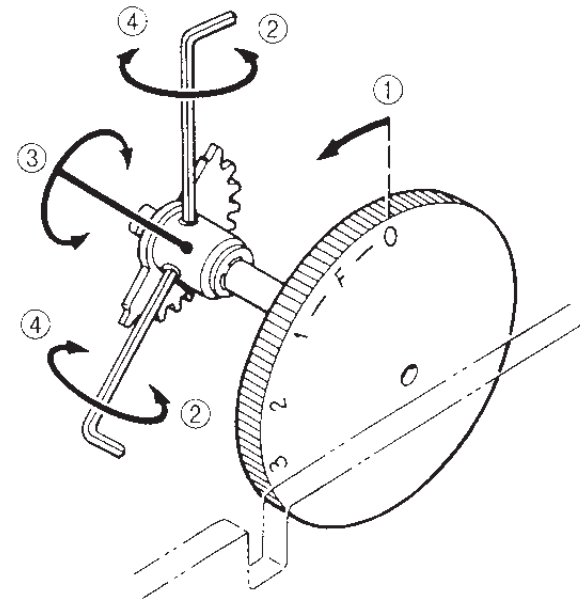
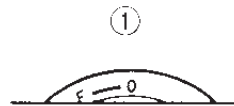
17. ADJUSTMENT OF FEED

STANDARD

When stitch length is set at "0", stitch length should be 0 mm.

ADJUSTMENT

1. Set pattern dial to maximum width zigzag and set stitch length to "0".
2. Loosen two hexagonal screws on feed dial gear.
3. Turn feed dial gear slightly so that stitch length become 0 mm.
4. Tighten two screws on feed dial gear.



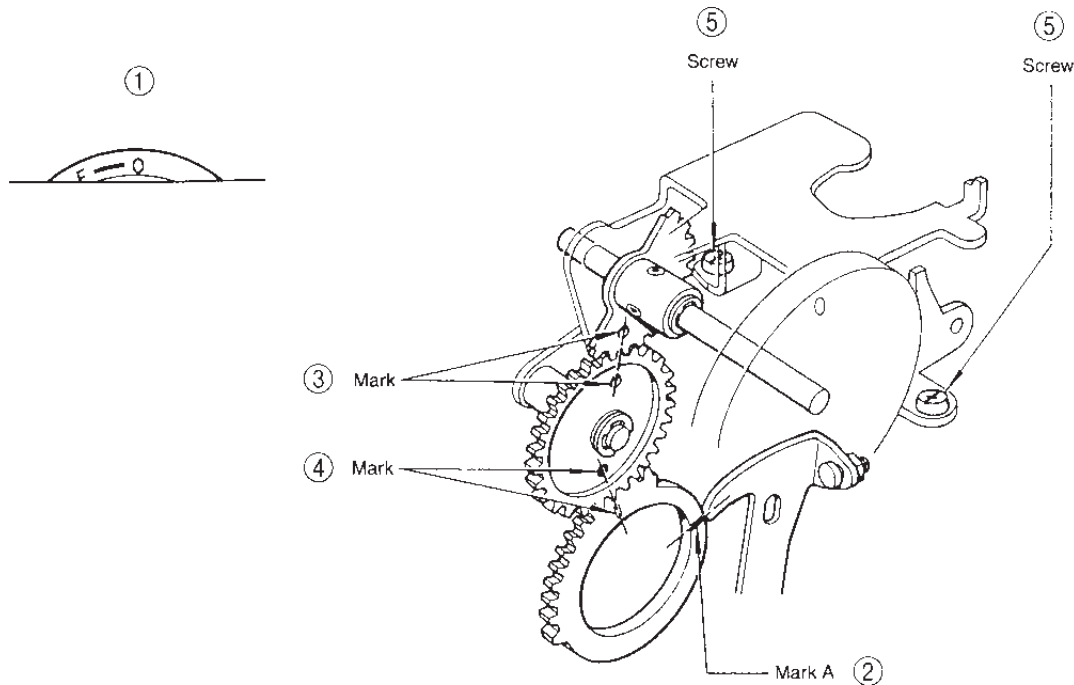
18. SETTING OF FEED BRACKET

STANDARD

When feed dial is set at "0", each mark on feed dial gear, feed gear, feed cam and feed finger should meet in line.

ADJUSTMENT

1. Set feed dial at "0".
2. Set the mark on the feed cam to feed finger.
3. Set the mark on the feed gear to the mark on feed cam.
4. Set the mark on the feed dial gear to the mark on feed gear.
5. Fix the feed bracket by tightening two screws.



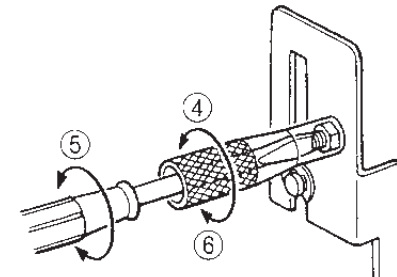
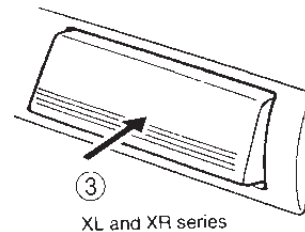
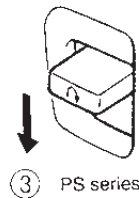
19. FORWARD AND REVERSE FEEDING FOR STRAIGHT STITCH

STANDARD

When stitch length is set at "2", there should be no difference between forward and reverse feed.

ADJUSTMENT

1. Set pattern dial to straight stitch (center position).
2. Set stitch length dial to "4".
3. Sew straight stitch on a piece of paper by turning pulley, then sew reverse straight stitch by pushing reverse button.
4. Loosen the nut for adjusting screw.
5. Adjust screw to achieve above standard.
6. Tighten the nut.



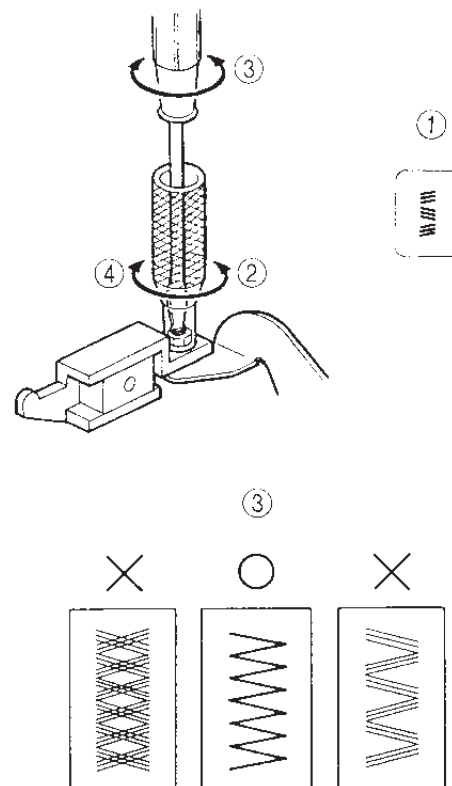
20. FORWARD AND REVERSE SEWING FOR STRETCH STITCH

STANDARD

When pattern dial is set to stretch stitch, there should be no difference between forward and reverse feed.

ADJUSTMENT

1. Set pattern dial to rick-rack stitch.
2. Loosen the nut for adjustment screw.
3. Adjust forward and reverse feeding by turning screw.
4. Tighten the nut.



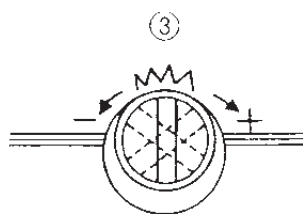
21. BUTTONHOLE ADJUSTMENT (FORWARD AND REVERSE FEEDING)

STANDARD

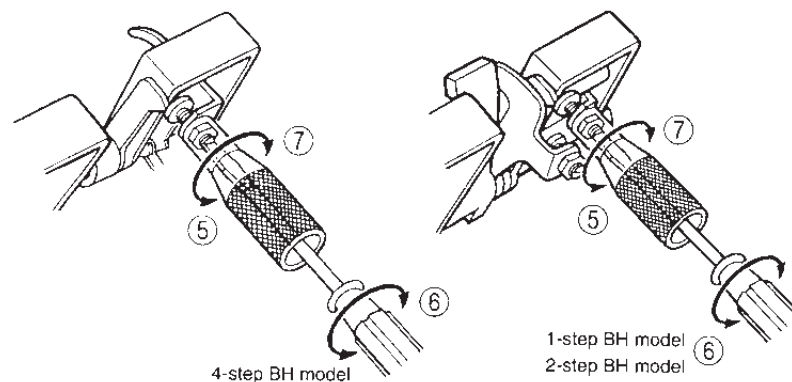
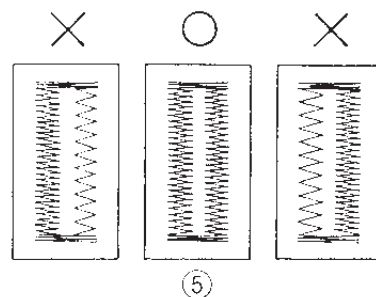
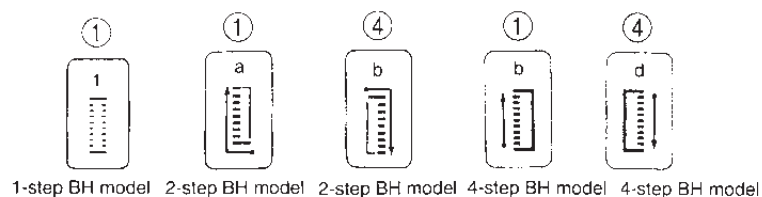
When pattern is set at "b" and "d", there should be no feeding difference between left and right legs.

ADJUSTMENT

1. Set pattern dial to "b" or "1" or "a".
2. Set stitch length dial to "F".
3. Set BH adjusting eccentric stud to figure ③.
4. Set pattern dial to "d" or "1" or "b" and sew right row of buttonhole then check the difference of sewing pitch between right and left rows.
5. Loosen the nut for adjusting screw.
6. Adjust forward and reverse feeding by turning the screw.



BH adjusting
eccentric stud



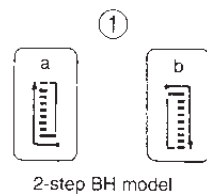
22. BUTTONHOLE ADJUSTMENT (BAR TACK FEEDING)

STANDARD

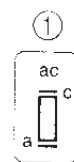
The feeding of bar tack should be less than 1.0 mm/10 feedings.

ADJUSTMENT

1. Set pattern dial to "1" or "ac" or "a" or "b".
2. Loosen the nut for bar tack feeding adjusting screw.
3. Adjust the screw.
 If forward feeding is obtained Turn screw counter-clock-wise.
 If back feeding is obtained Turn screw clock-wise.
4. Tighten the nut.



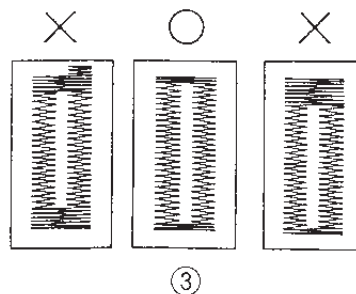
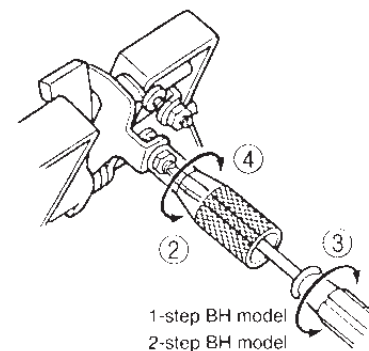
2-step BH model



4-step BH model



1-step BH model



4-step BH model

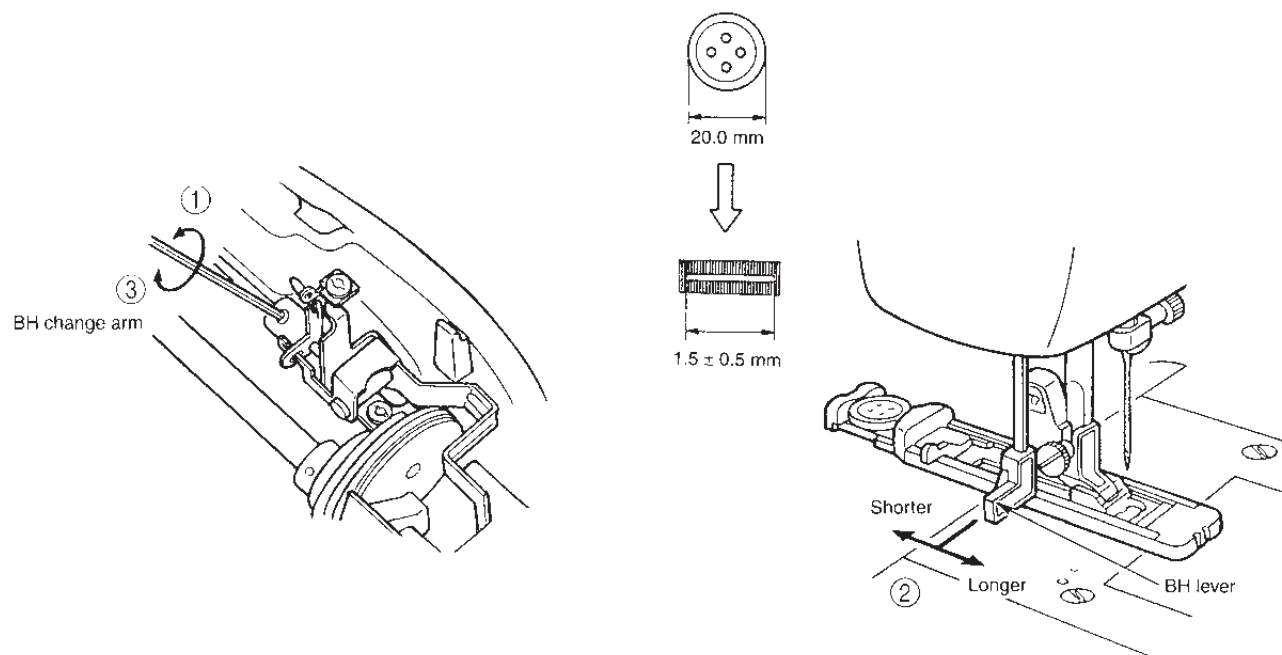
23. BUTTONHOLE ADJUSTMENT (THE LENGTH OF BUTTONHOLE) (1-STEP BH MODEL)

STANDARD

The length of buttonhole should be 1.5 ± 0.5 mm when the button is 20.0 mm in diameter.

ADJUSTMENT

1. Loosen screw.
2. Adjust BH lever.
3. Tighten screw.



24. ADJUSTMENT OF BH LEVER TORQUE (1-STEP BH MODEL)

STANDARD

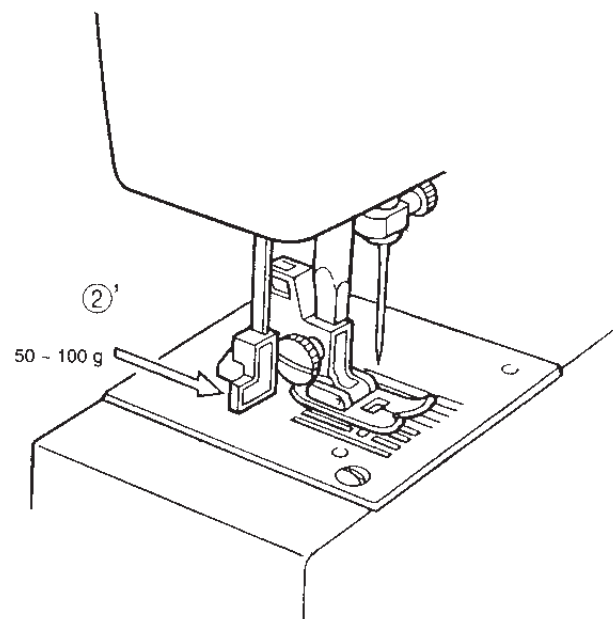
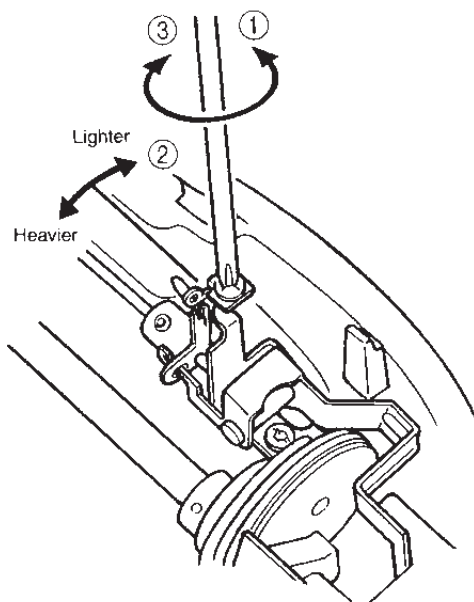
BH lever torque should be between 50 g and 110 g when changing from reverse sewing to forward sewing.

ADJUSTMENT

1. Loosen screw.
2. Adjust in accordance with the illustration.
3. Tighten screw.

NOTE

Check the length of buttonhole.



25. ADJUSTMENT OF BH LEVER SWITCH (LCD MODEL)

STANDARD

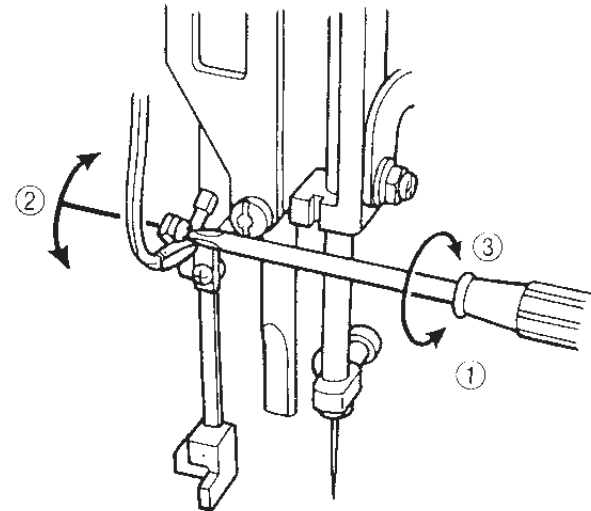
When the BH lever reaches its lowest position, it should have enough distance from BH lever switch. When BH lever is raised, BH lever switch should be clearly ON.

ADJUSTMENT

1. Loosen screw.
2. Move BH lever switch and ascertain suitable position.
3. Tighten screw.

NOTE

Make sure the LCD panel moves correctly.



26. NEEDLE THREADER

CAUTION

1. Needle threader accept only circle marked needle and thread combinations.
2. * marked combinations is not recommended since it might lead to the breakage of needle threader imperfect performance.
3. Lower the presser foot when you use needle threader.
4. Nylon transparent thread is applicable in needle #14 ~ 16.
5. Do not turn the balance wheel when you use needle threader.
6. Do not touch needle threader when machine is running.
7. Needle #9 might be hard to threading.
8. Needle should be located above needle plate for more than 8.0 mm for threading.

Thread Needle	#30	#50	#60	#80	#100	#120
#9	×	×	×	○	○	○
#11	×	×	○	○	○	*
#14	×	○	○	○	*	*
#16	*	○	○	*	*	*
#18	*	*	*	*	*	*

27. NEEDLE THREADER

(CHECKING THE HOOK POSITION IN HORIZONTAL DIRECTION)

STANDARD

The measure from inside of the hook guard to the center point of hook is 0.42 mm.

CHECK

As sewing needle HA¹ (#14) is standard, so prepare 5 pcs. of brand-new sewing HA¹ (#14) and check by changing all of these.

After Checking

- A. In case that, hook gets through eyelet of all needles Nothing is the matter.
- B. In case that, hook does not get through eyelet of all needles.....Adjust by bending hook.
- C. In case that, hook does not get through eyelet of some needles Needles through which the hook does not get, are bad.

Example for checking

When you check 5 pcs. of brand-new sewing needle, HA¹ (#9) on condition that it achieves A, if the hook does not get through eyelet of all of these needle, all of 5 needles are bad and you judge the hook position is not bad.

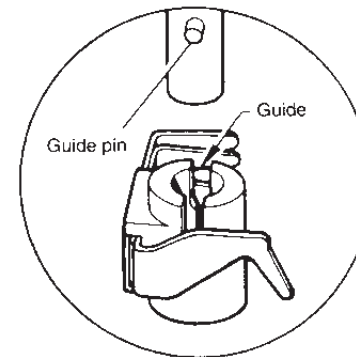
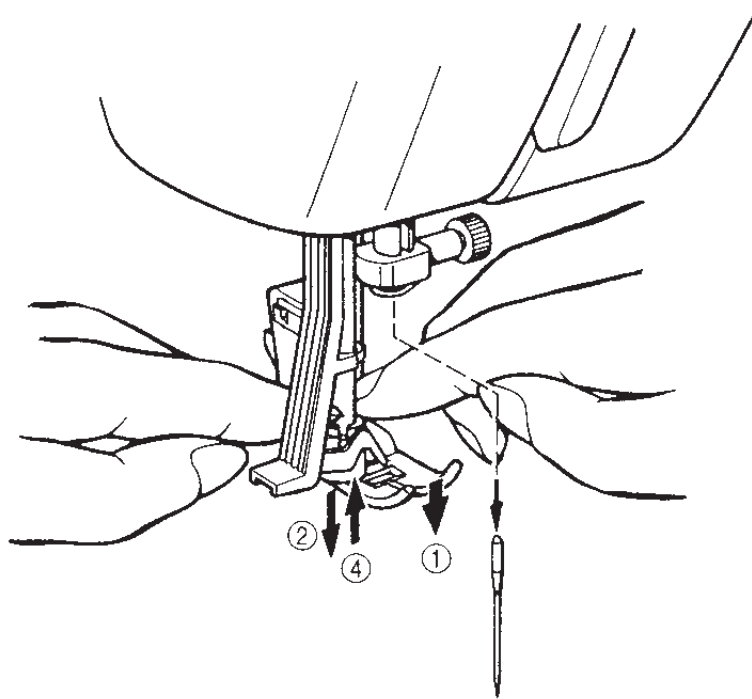
ADJUSTMENT

In case the hook is bad after above checking, adjust the hook by banding with pliers. In this time, do not bend hook guard absolutely.

28. NEEDLE THREADER (EXCHANGE)

HOW TO EXCHANGE NEEDLE THREADER

1. Remove needle and lower the presser foot.
2. Push down needle threader to take out.
3. Place new one so that guide is immediately under the guide pin as shown Figure A.
4. Push needle threader all the way up so that guide is placed in the pin.



③ Figure A

29. NEEDLE THREADER

(CHECKING THE HOOK POSITION IN VERTICAL DIRECTION)

STANDARD

1. The clearance between the top of hook and the top of needle eye is zero.
2. Threading is capable when needle is located higher than 8.0 mm from the needle plate.

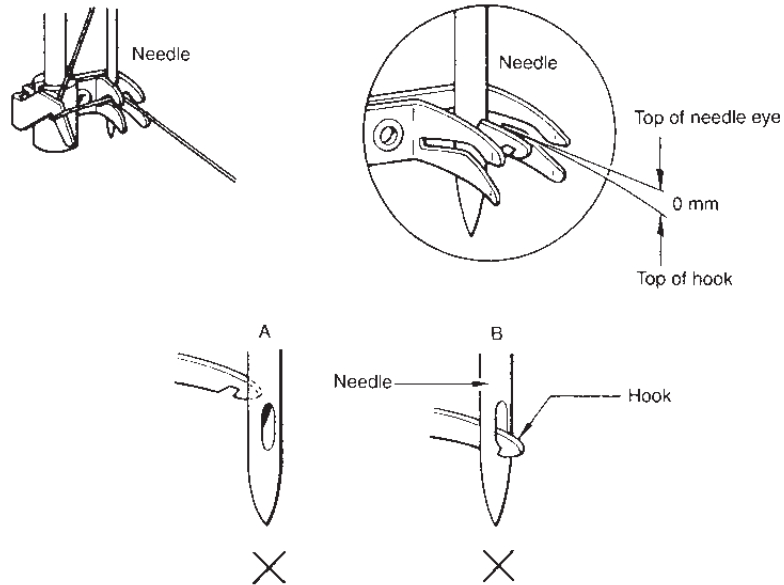
CHECK (Refer to illustration)

Case A

Hook position is too high. (Hook hits needle and can't get through needle eye.)

Case B

Hook position is too low. (Hook gets through needle eye but it catches bottom part of needle.)



30. NEEDLE THREADER

(ADJUSTMENT THE HOOK POSITION IN VERTICAL DIRECTION)

CASE A (Hook point is too high)

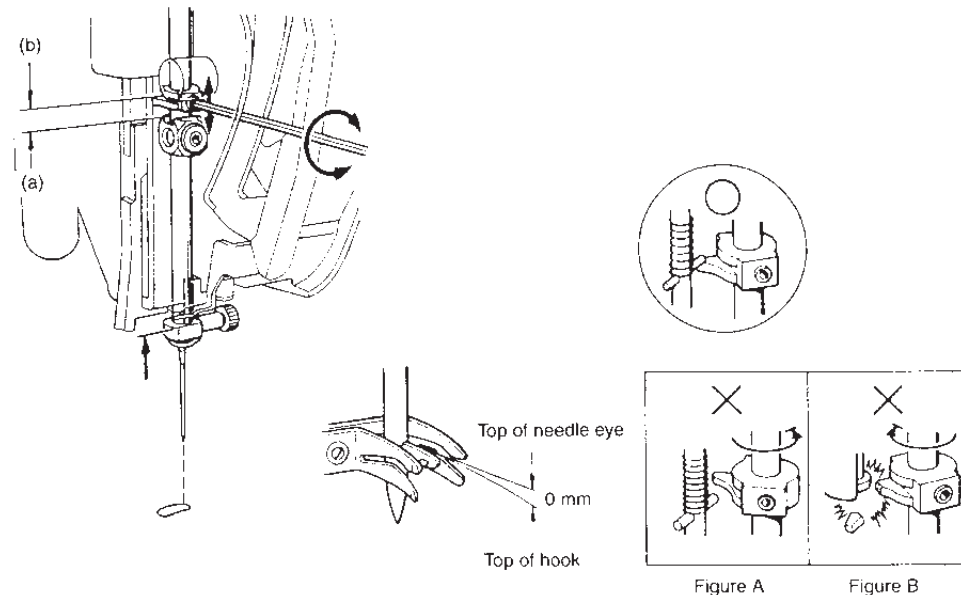
1. Set the needle position at right and loosen the screw.
2. Adjust needle threader slightly down and check the clearance between the top of hook and top of needle eye is zero.
3. Check if part (a) and part (b) is parallel.

CASE B (Hook point is too low)

1. Set the needle position at right and loosen the screw.
2. Adjust needle threader slightly up and check the clearance between the top of hook and top of needle eye is zero.
3. Check if part (a) and part (b) is parallel.

NOTE

Unless part (a) and part (b) is parallel, hook does not work.



IV. HOW TO CHANGE THE PARTS

1. REMOVING THE COVERS	55
2. LAMP REPLACEMENT	56
3. LEAD WIRES ARRANGEMENT	57
<LCD UNIT>.....	58
<DISPLAY SYSTEM>	59
<POWER UNIT>	60
<TEST MODE (Language/Machine Specifications Settings)>	61

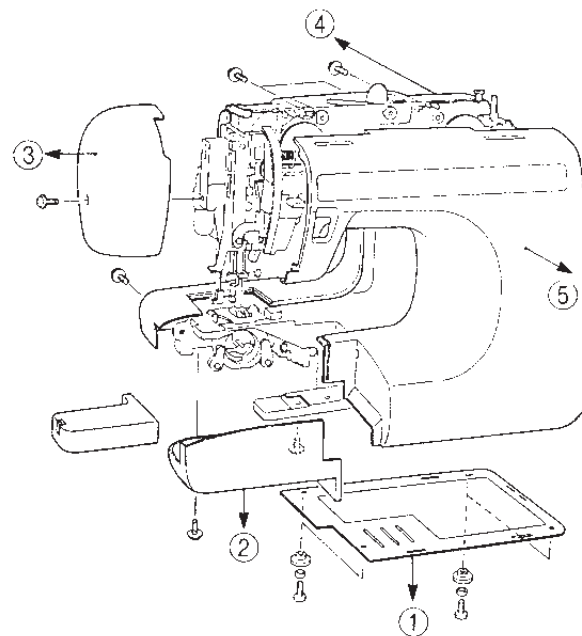
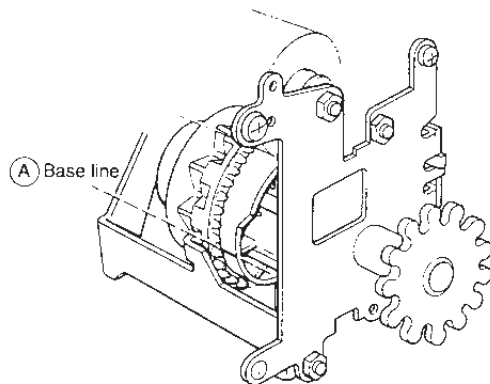
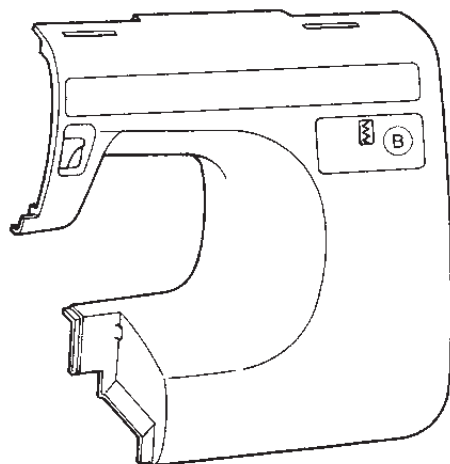
1. REMOVING THE COVERS

1. Remove the base plate by loosening four screws.
2. Remove the bed cover by loosening a screw.
3. Remove the face plate by loosening a screw.
4. Remove the rear cover by loosening five screws.
5. Remove the front cover by loosening a screw.

NOTE

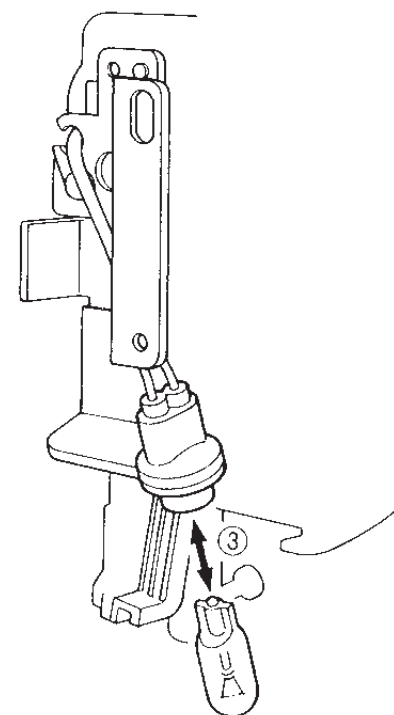
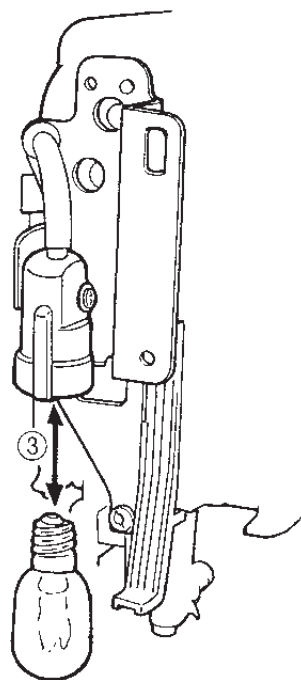
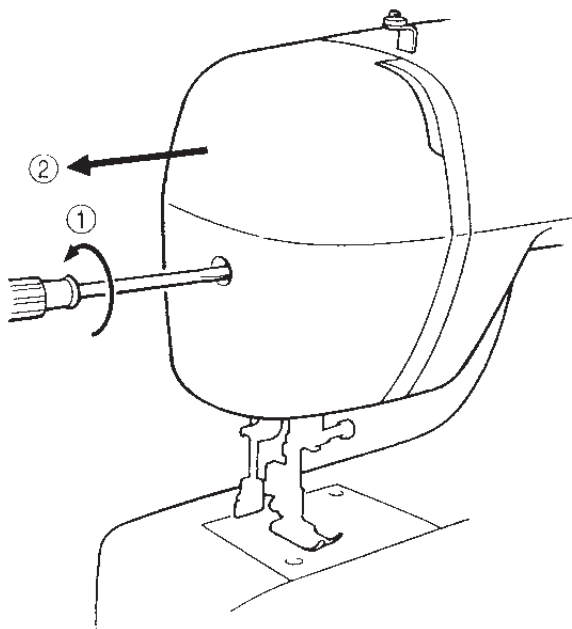
INSTALLING THE FRONT COVER

- A. Set the pattern dial to the zigzag stitch with the maximum width and check that the line on the selecting cam aligns with the upper end of the release lever.
- B. Set the pattern on the front cover to the zigzag stitch with the maximum width.



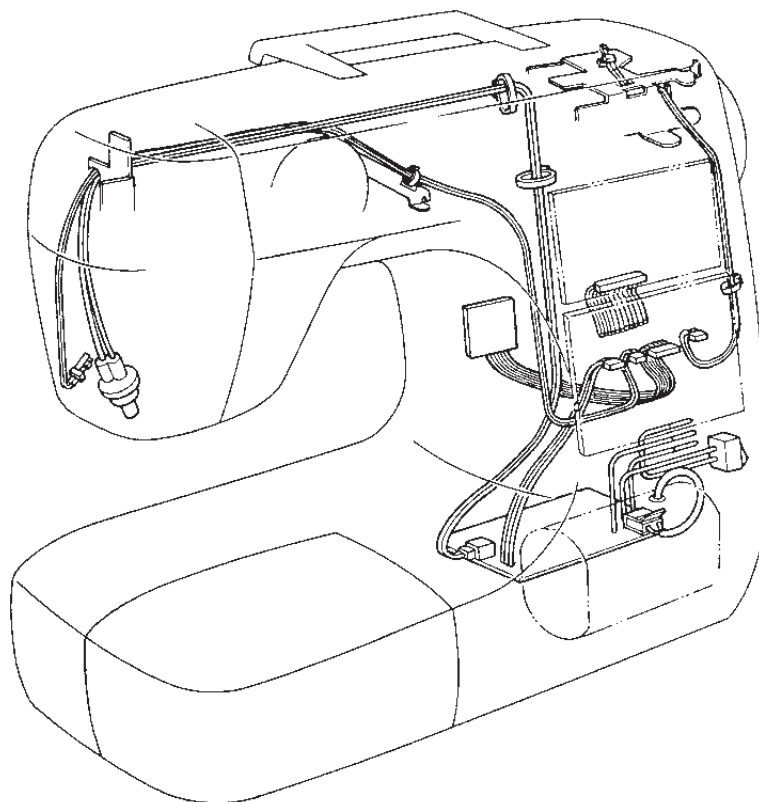
2. LAMP REPLACEMENT

1. Loosen the screw of face plate.
2. Remove face plate.
3. Attach new sew-light bulb to lamp socket.

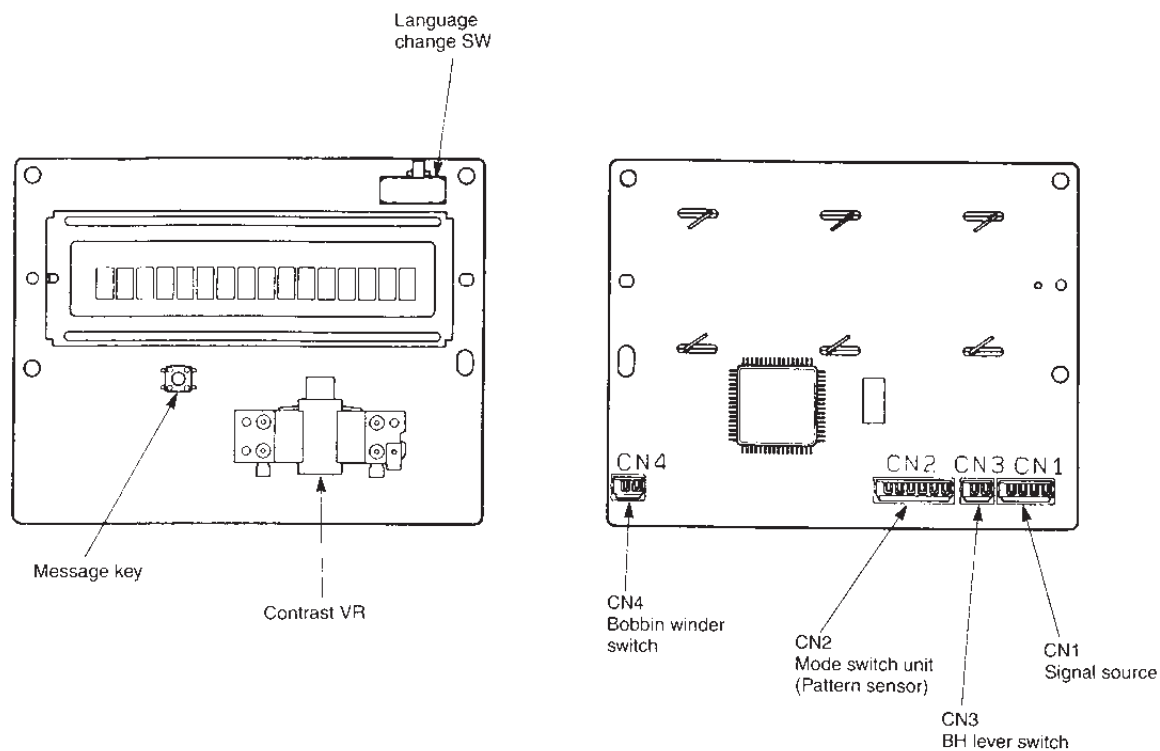


LCD MODEL

3. LEAD WIRES ARRANGEMENT

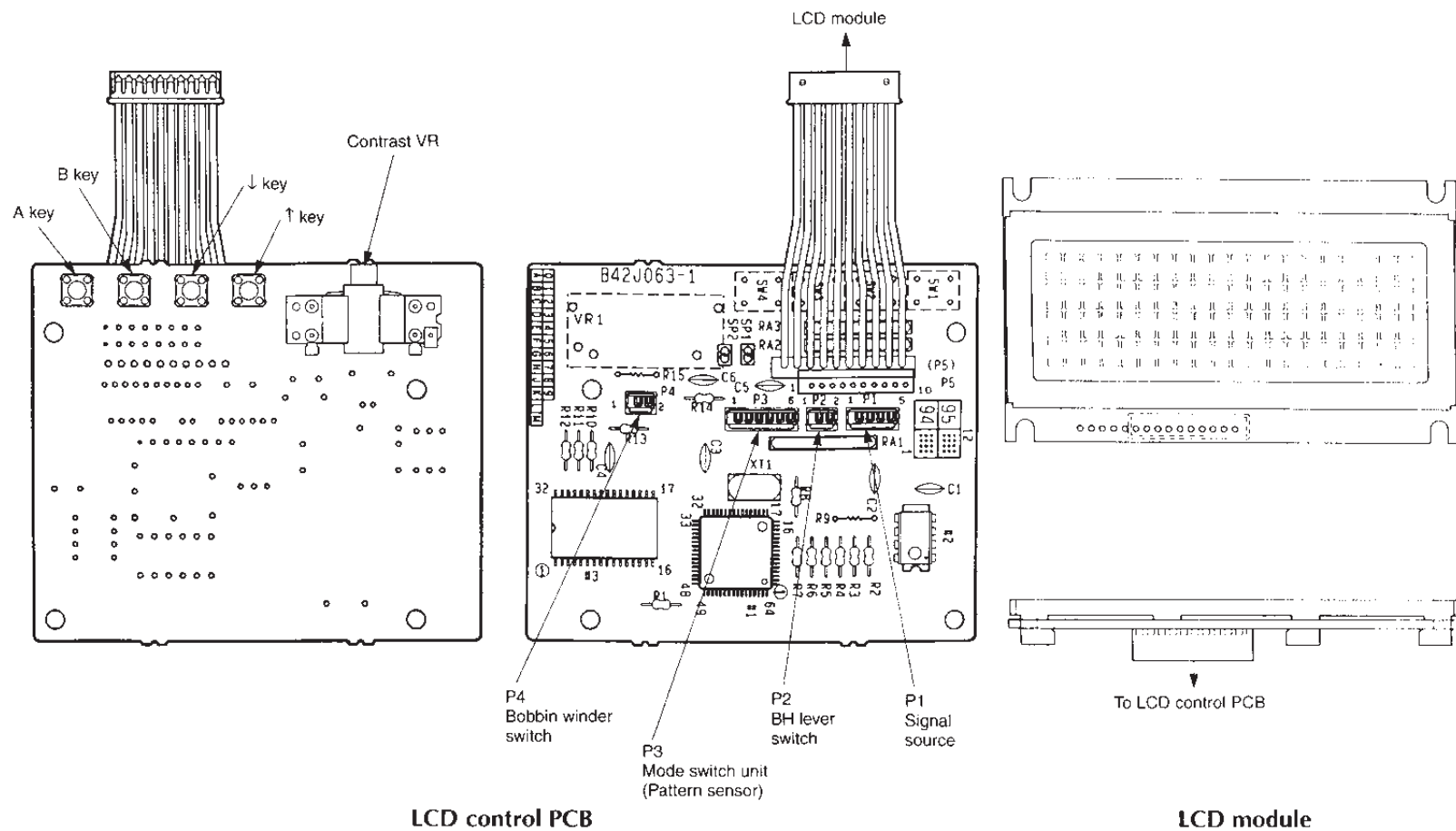


<LCD UNIT>



1 LINE LCD TYPE

<DISPLAY SYSTEM>

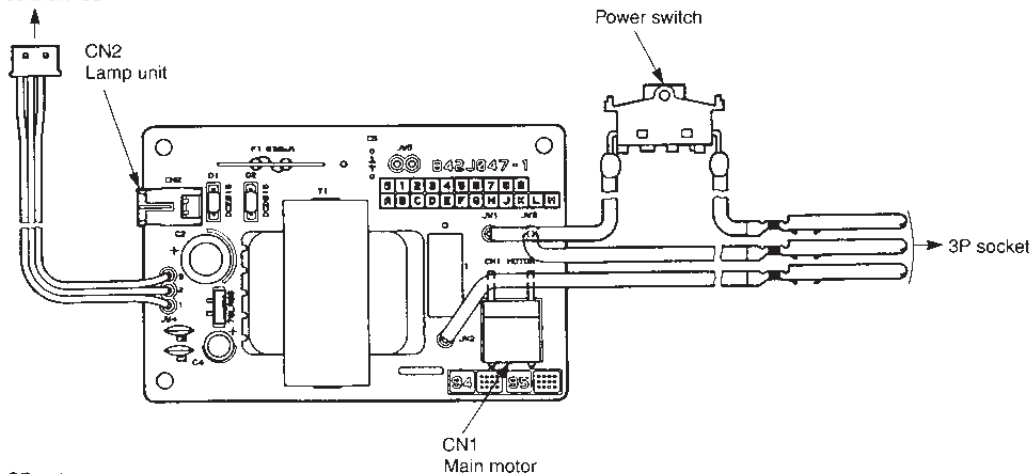


4 LINE LCD TYPE

<POWER UNIT>

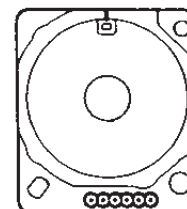
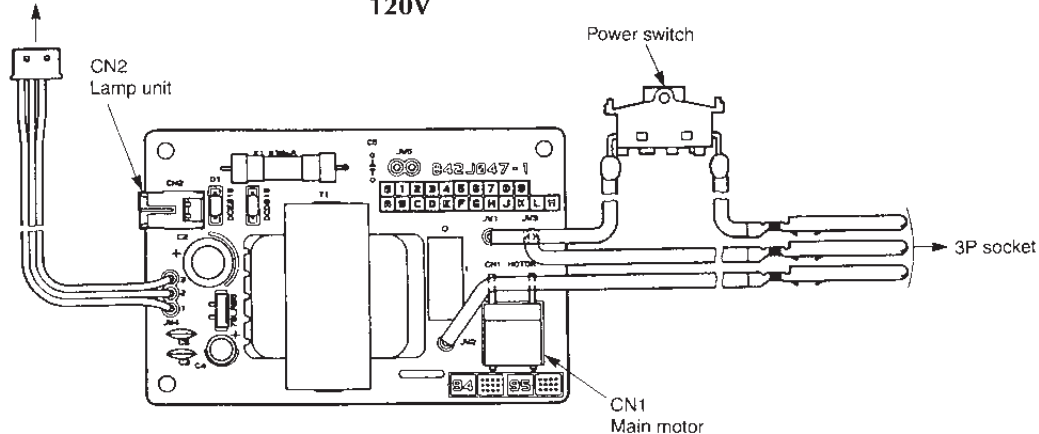
230V

To LCD unit or
LCD control PCB



120V

To LCD unit or
LCD control PCB



To LCD unit

MODE SWITCH UNIT
(1 LINE LCD TYPE)
(4 LINE LCD TYPE)

<TEST MODE (Language/Machine Specifications Settings)>

This Test Mode is used to switch the language in which LCD displays appear, and to switch the machine specifications.

Setting the Test Mode

1. Turn off the power supply.
2. Lower the BH lever.
3. Turn on the power supply while holding down both the ↑ and A keys on the display panel to enter the Test Mode. The LCD display will appear as shown in Figure 1.

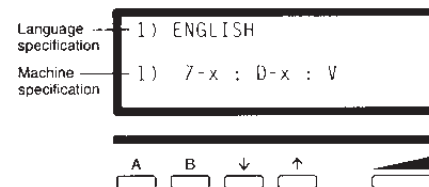


Figure 1

Setting the Language

1. Press either the A key (forward sequence) or the B key (reverse sequence) until the desired language is displayed on the LCD.

Setting the Machine Specifications

The teaching contents displayed on the LCD are determined by three possible combinations: 1) whether or not there is a zigzag manual dial; 2) whether or not there is a Drop Feed function; and 3) the construction and operation of the bobbin case (CB hook or Top bobbin).

1. Press the ↓ key (forward sequence) or the ↑ key (reverse sequence) to set the desired specifications.

When all of the settings have been completed, turn off the power supply to cancel the Test Mode.

1) ENGLISH	9) SUOMEKSI (FINNISH)
2) DEUTSCH (GERMAN)	10) SVENSK (SWEDISH)
3) FRANCAIS (FRENCH)	11) CESTINA (CZECH)
4) ITALIANO (ITALIAN)	12) SLOWAKIAN (SLOVAK)
5) NEDERLANDS (DUTCH)	13) MAGYAR (HUNGARIAN)
6) ESPAÑOL (SPANISH)	14) SLOVENSKO (SLOVENE)
7) DANSK (DANISH)	15) PORTUGUES (PORT.)
8) NØRSK (NORWEGIAN)	16) ニホンゴ (JAPANESE)

<Table of Language Specifications>

Zigzag Dial	Drop Feed Lever	Bobbin Operation	Display
NO	NO	CB hook	1) Z - X : D - X : V
NO	YES	CB hook	2) Z - X : D - O : V
YES	NO	CB hook	3) Z - O : D - X : V
YES	YES	CB hook	4) Z - O : D - O : V
NO	NO	Top bobbin	5) Z - X : D - X : H
NO	YES	Top bobbin	6) Z - X : D - O : H
YES	NO	Top bobbin	7) Z - O : D - X : H
YES	YES	Top bobbin	8) Z - O : D - O : H

<Table of Machine Specifications>

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