

# Technical Manual for the EP 1B embroidery machine



- Single Head, Single Needle
- Easy To Operate
- Low Power Consumption
- High Quality Results

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## 1. Setting Method for Adjusting or Repairing Machine

1. Lay the machine on its side, and insert thick books or the like below the machine as shown in Fig.1-1,1-2.
2. Set the machine by adjusting the height of the arm by using a hard book or the like so that baseplate (A) is almost perpendicular to the floor as shown in Fig.1-1,1-2.

\* Parts marked as shown in  in photos show that these parts are to be detached.

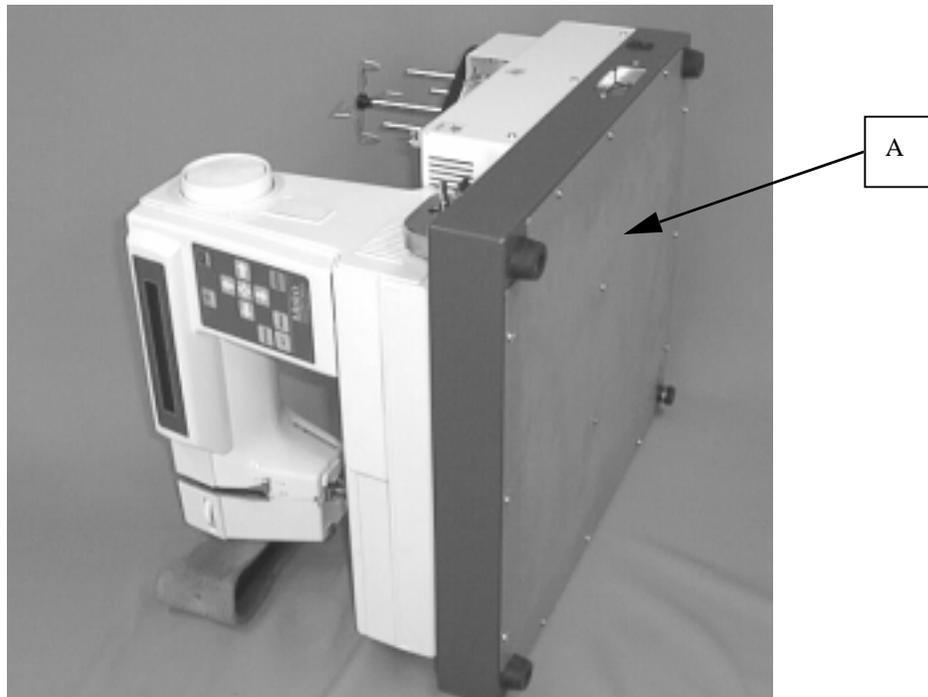


FIGURE 1-1

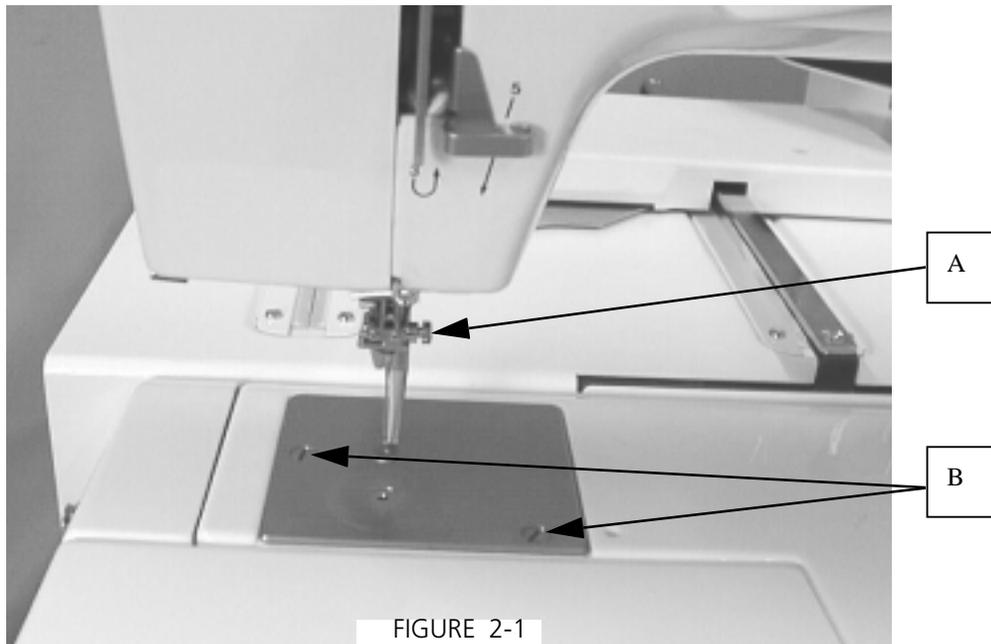


FIGURE 1-2

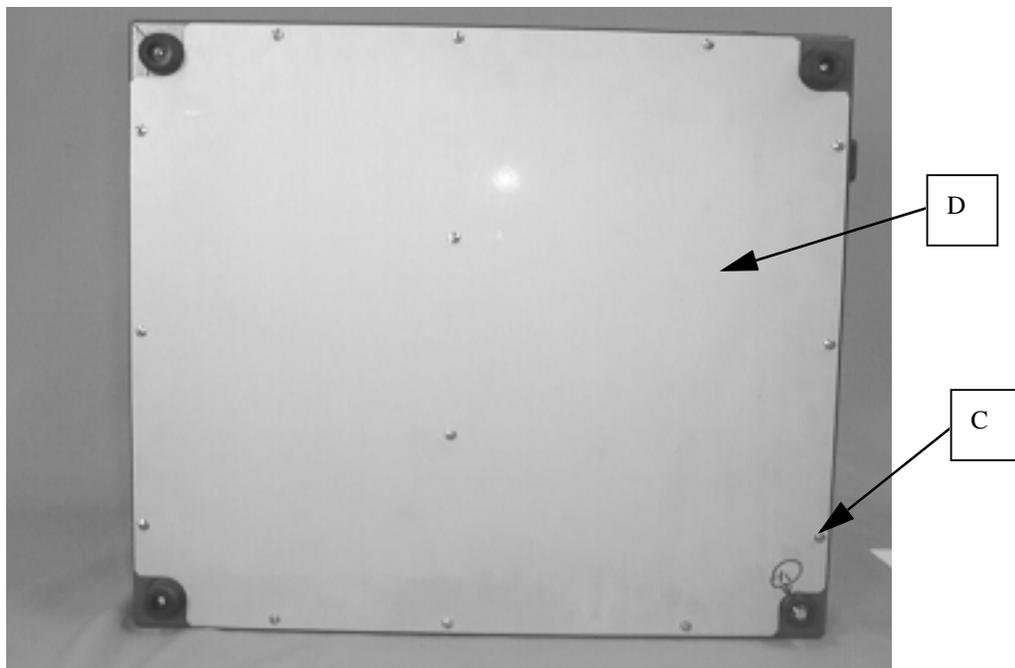
## 2. Replacement of Hook Race (unit)

This paragraph describes the replacement of hook race, removal of the cover plate, adjustment of a play of the lower shaft gear, adjustment of needle / hook timing relationship, depth of needle penetration, and lower shaft thrust play, and other instructions.

1. Remove the needle by loosening needle setscrew (A), and remove the throat plate by removing setscrew(B) as shown in Fig.2-1.



2. Remove bottom plate (D) by removing 14 bind screws 4x5(C). Fig.2-2.



3. Remove the bed rubber stopper (F). Fig.2-3.
4. Set the needle bar to the lowest position, and loosen the clamp screw at the bed rubber stopper (F) position.

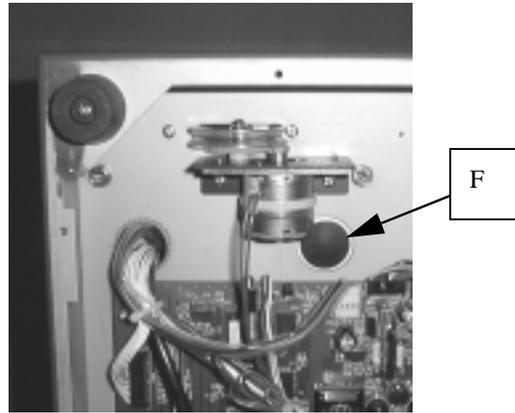


FIGURE 2-3

5. After removing the Hook race body cover by removing bind screws 4x6.5(E), remove the bed cover (unit) (H) by removing two bind screws 4x12(G). Fig.2-4-1,2-4-2.

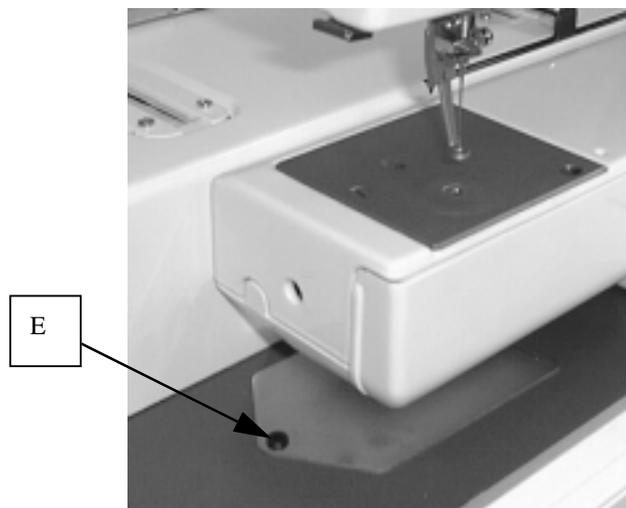


FIGURE 2-4-1

6. Remove two setscrews (J) shown in Fig.2-5, and remove the gearbox rear cap and bobbin thread sensor.

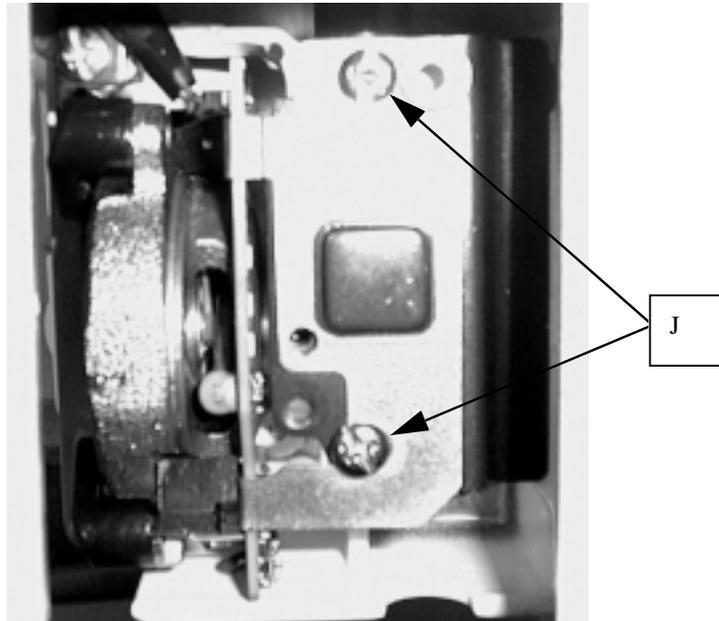


FIGURE 2-5

7. After removing the hook race body cover and hook body, turn the lower shaft gear in the arrow 1 direction as shown in Fig.2-6, loosen socket screw(K), and shift the lower shaft gear rightward in the arrow 2 direction. Loosen socket screw (L) next.

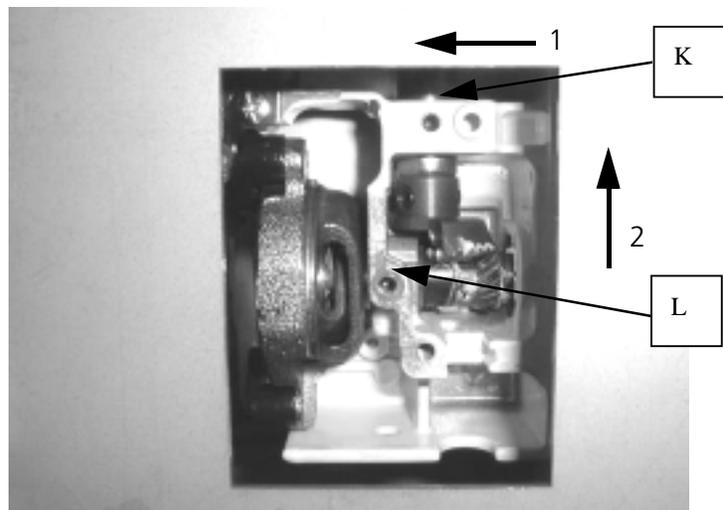


FIGURE 2-6

8. Loosen socket screw(M) shown in Fig.2-7.

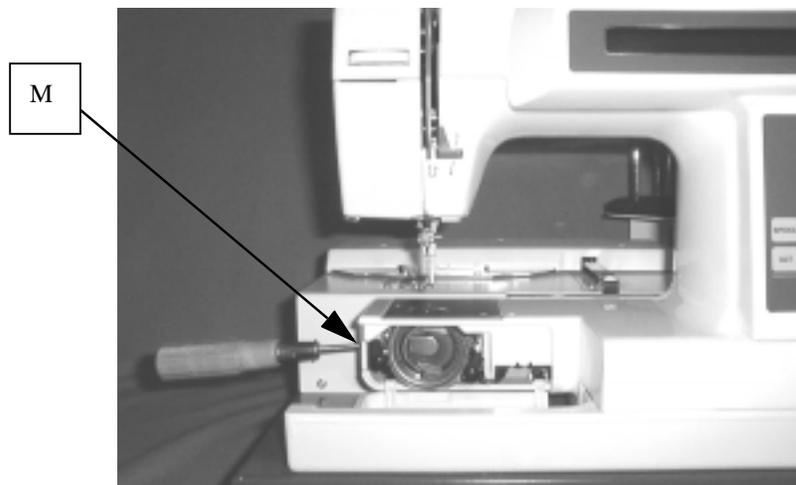


FIGURE 2-7

9. Draw out the hook race body(unit) in the arrow 1 direction as shown in Fig.2-8. After removing the hook race body cover and hook body, assemble new hook race body(unit) in the arrow 2 direction.

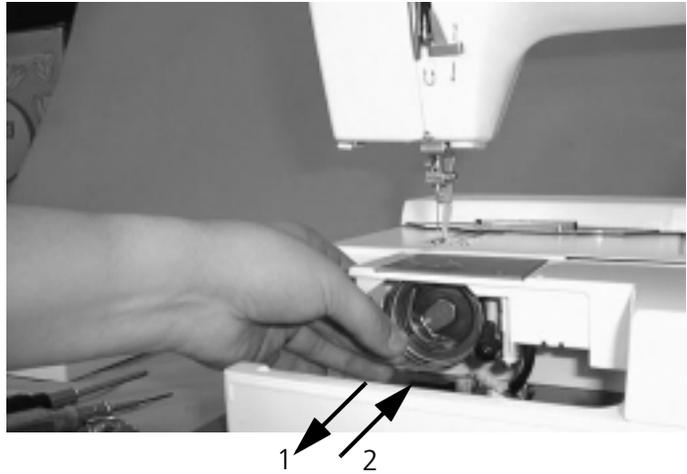


FIGURE 2-8

10. Set the hook body to the hook race body as shown in Fig. 2-9 mount the needle, and set the needle bar to the lowest position. Set the hook body tip to the rear side of the needle, adjust the gap between the needle and the hook body tip to 0-0.15mm, and tighten socket screw(L) lightly.



FIGURE 2-9

11. After mounting the hook race body cover, adjust the hook race body(unit) by turning it so that the needle is positioned at the center of the groove of the hook race cap spring (O) as shown in Fig.2-10.



FIGURE 2-10

- For adjusting the gap between the needle and the hook body, bring the books(P) supporting the arm to the handwheel side as shown in Fig.2-11 for the purpose of preventing a change of the gap between the needle and the hook body due to the deformation of the arm.



FIGURE 2-11

- Set the part(Q) of the hook race body(unit) and hook body tip(R) to the phase shown in Fig.2-12 approximately.

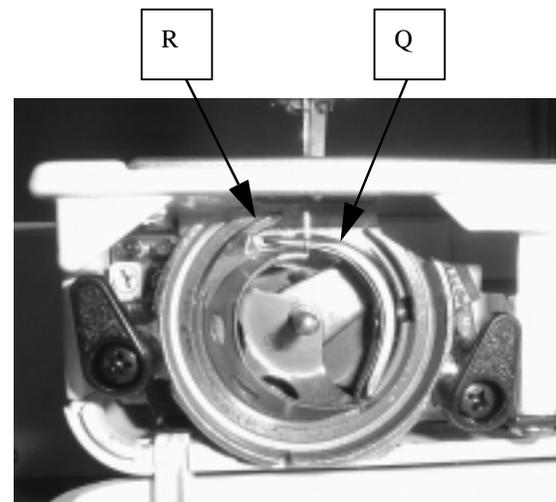


FIGURE 2-12

- After fixing the hook body, turn the lower shaft gear in the arrow 1 direction until it touches the wall as shown in Fig.2-13 and lightly press it to the hook shaft gear by shifting it in the arrow 2 direction.

Turn the lower shaft front bushing in either direction, and tighten socket screw(K).

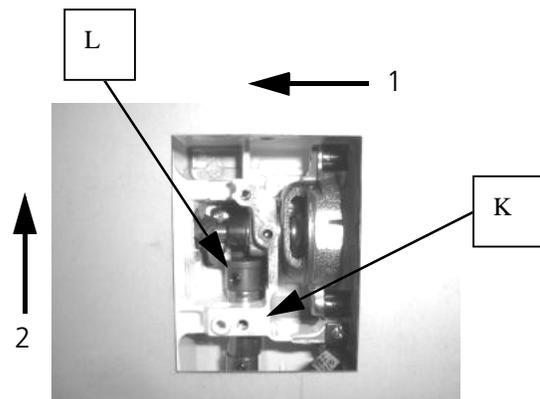


FIGURE 2-13

14. Mount a dial gauge to the needle bar, and lift the needle bar until it reaches 2.3mm above the lowest position. Fig.2-14-1.

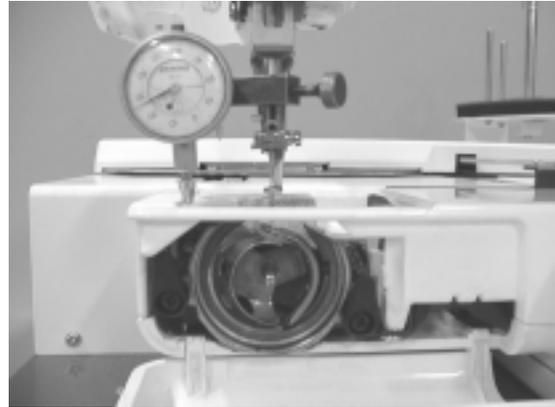


FIGURE 2-14-1

Set the hook body tip to the left side race of the needle as shown in Fig.2-14 -2(S). (Shift the hook body by turning it clockwise from its extreme left point by using the hook shaft gear.) Tighten two screws(L).

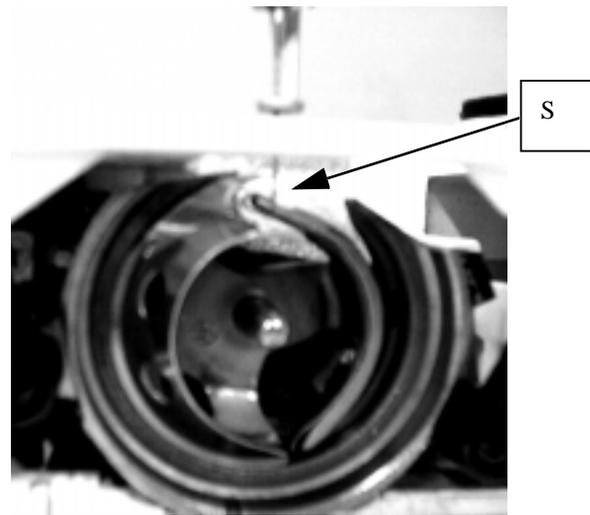


FIGURE 2-14-2

Adjust the depth of needle penetration by loosening needle bar clamp screw(U) Fig.2-14-3 so that the distance between the outer circumference of the hook body and the upper end of the needle becomes 2.3mm in this set phase.

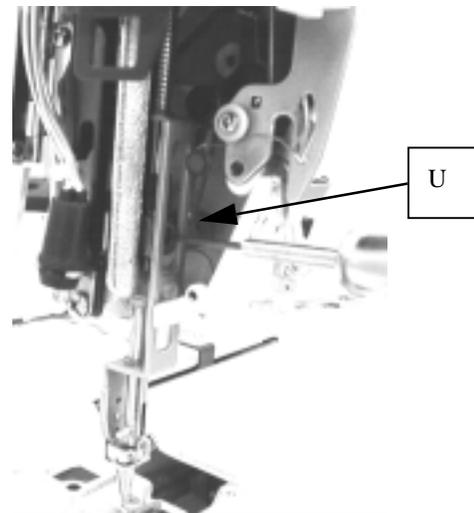


FIGURE 2-14-3

- Method of easily adjusting the needle displacement quantity / the depth of needle penetration. After setting the needle bar to its lowest position, set the needle and part(a) of hook body(X) to the phase(W) shown in Fig.2-15 by turning the hook shaft gear.

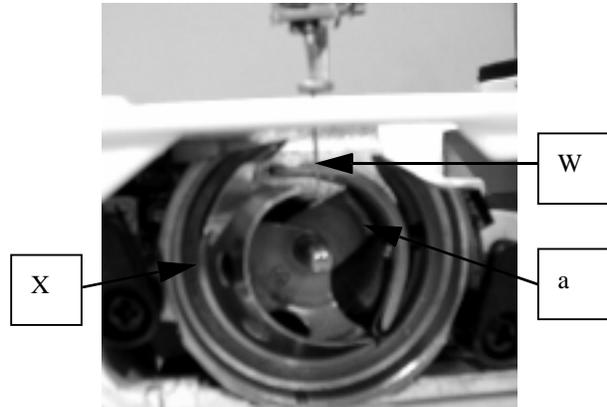


FIGURE 2-15

15. If a thrust play exists in the hook shaft, loosen two socket screws(V) of the hook shaft ring, and tighten the hook shaft by the hook shaft ring while holding the hook driver by hand so as to eliminate the thrust play as shown in Fig.2-16.

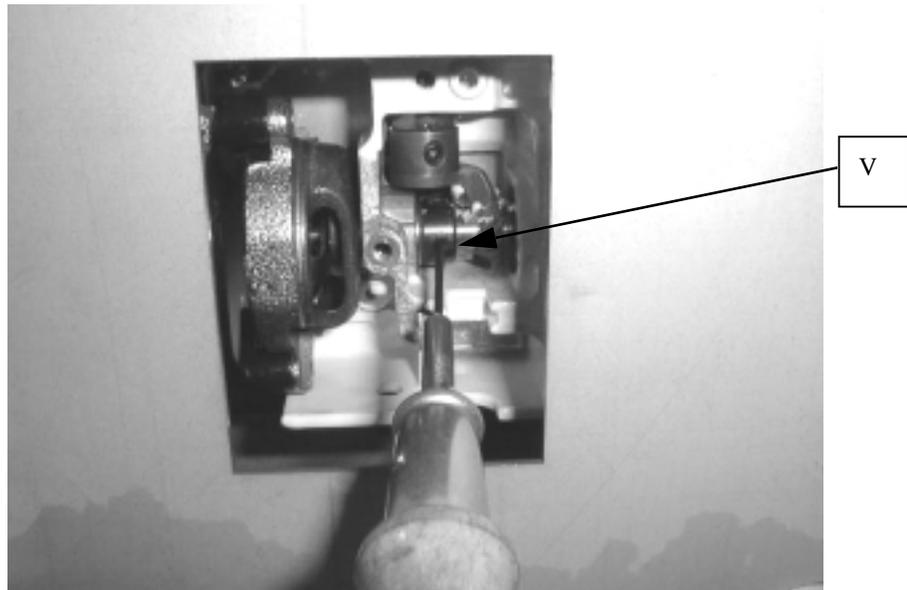


FIGURE 2-16

16. Fix the gearbox rear cap and the bobbin thread sensor by two setscrews(J). In this case, press the bobbin thread sensor to the hook race body(unit) shown by an arrow as shown in Fig.2-17.

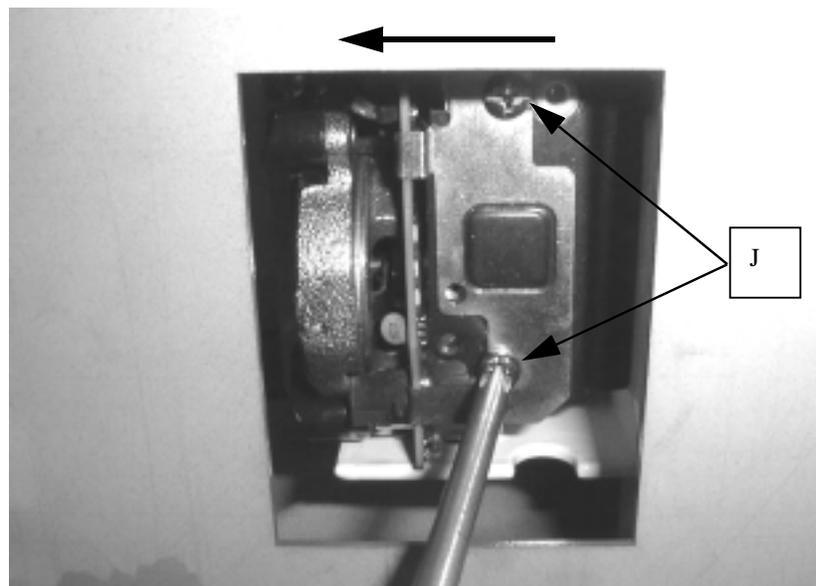


FIGURE 2-17

17. Mount the set plate by setscrew, and mount the bed cover(unit), base rubber cap, and cover plate.

### 3. Replacement of Needle Bar (unit)

This paragraph describes the needle position adjustment, presser foot height adjustment and other work in addition to the replacement of needle bar(unit).

1. Remove the top cover(unit).
2. Remove setscrew(A), two setscrews(B), and snap ring(C), and then, remove front bracket(D).

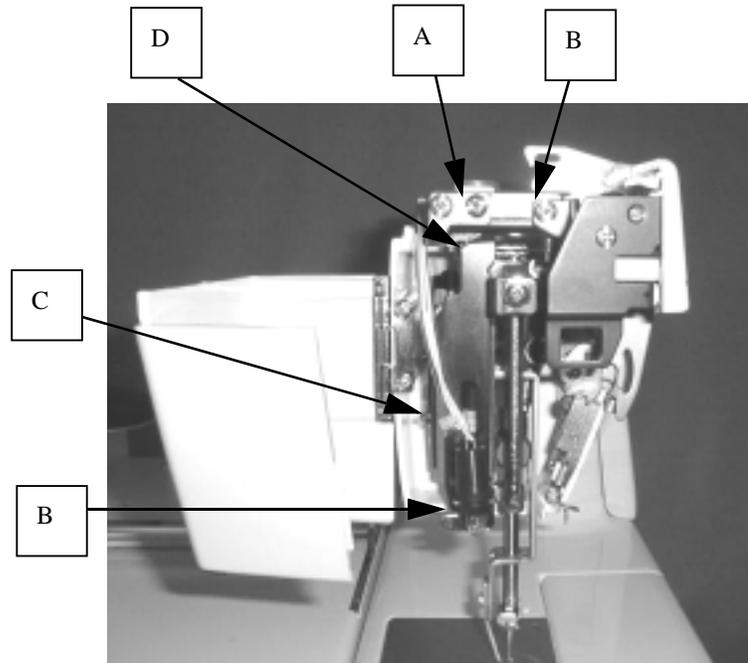


FIGURE 3-1

3. Remove left hand setscrew(E) shown in Fig.3-2-1, loosen socket screw about 6 turns, and then, loosen socket screw(G). Fig.3-2-2.

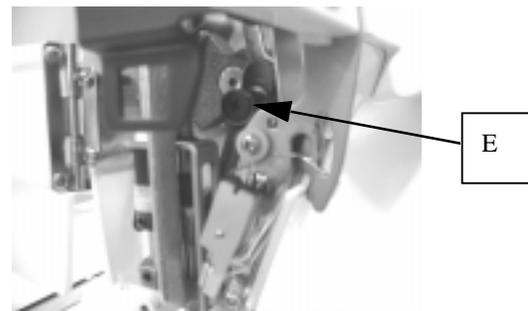


FIGURE 3-2-1

4. Draw out the guide bar bushing(H) in the arrow 1 direction (Fig.3-3), and then, draw out guide bar(I) in the arrow 2 direction as shown in Fig.3-2-2.

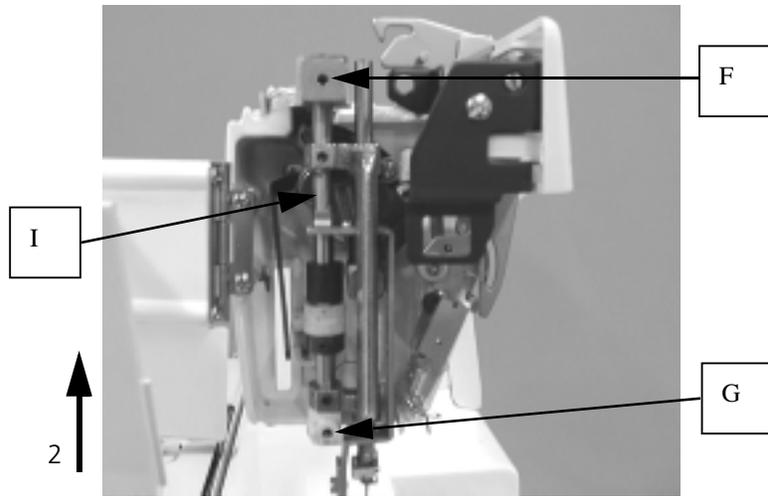


FIGURE 3-2-2

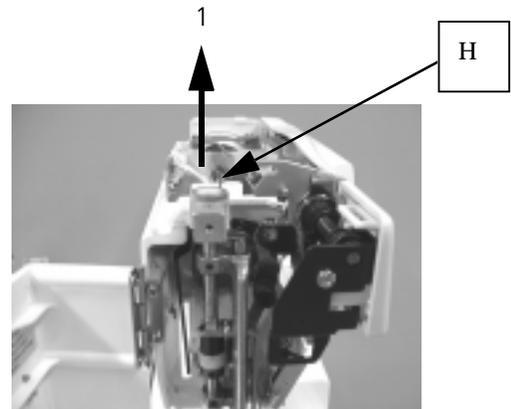


FIGURE 3-3

5. Set guide bar(I) to the arm in the arrow direction, while inserting needle bar crank rod(K) to the needle bar crank pin as shown in Fig.3-4,3-5.

Set guide bar bushing(H) in the direction of socket screw(F) of the horizontal hole as shown by arrow, so that socket setscrew(F) meets the horizontal hole of guide bar bushing(H), and press needle bar supporter(J) in the arrow direction.

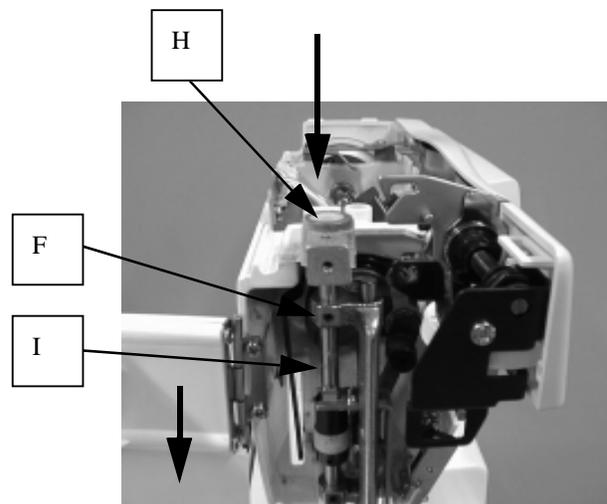


FIGURE 3-4

6. Tighten socket screw(F) lightly as shown in Fig.3-5.

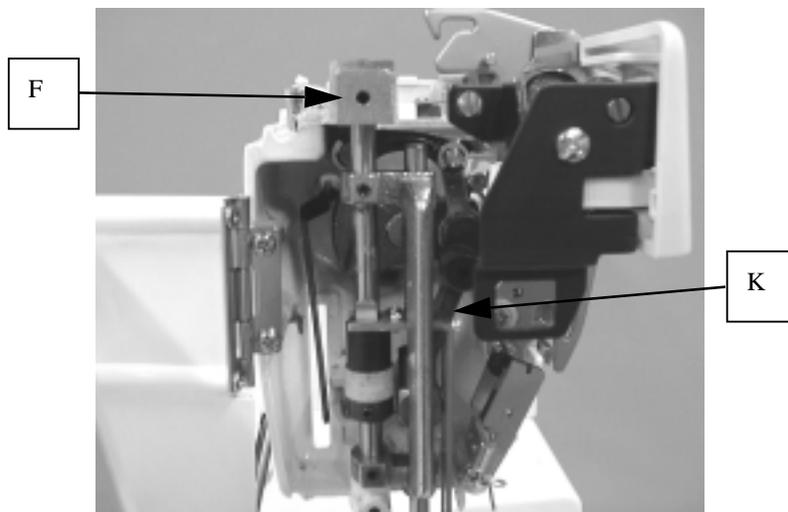


FIGURE 3-5

7. Insert the needle into throat plate needle hole(L) while lifting the presser foot as shown in Fig.3-6 ,adjust the needle bar supporter(J) horizontally so that the horizontal gap becomes more than 0.6mm, tighten socket screw(G), and then, securely tighten socket screw(F).

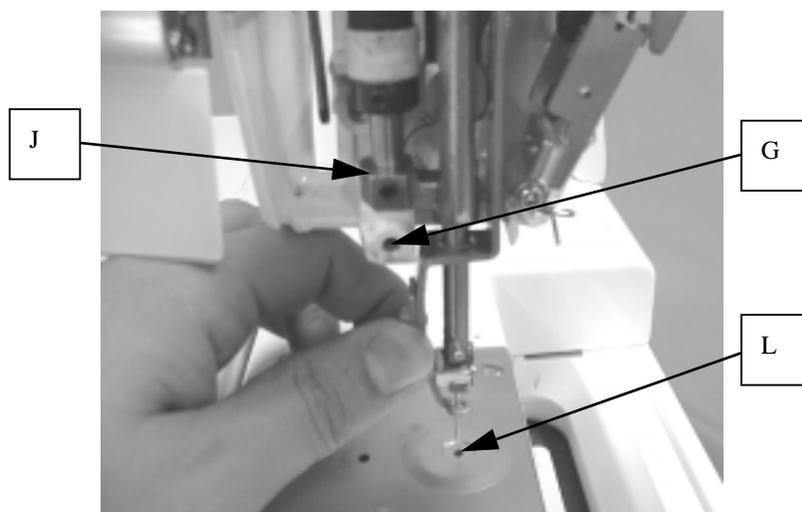


FIGURE 3-6

8. Fix front bracket(D) by setscrews (A), (B) while hooking the tip of the thread tension release plate(1) (M) to the protrusion of disk presser(N) as shown in Fig.3-7.

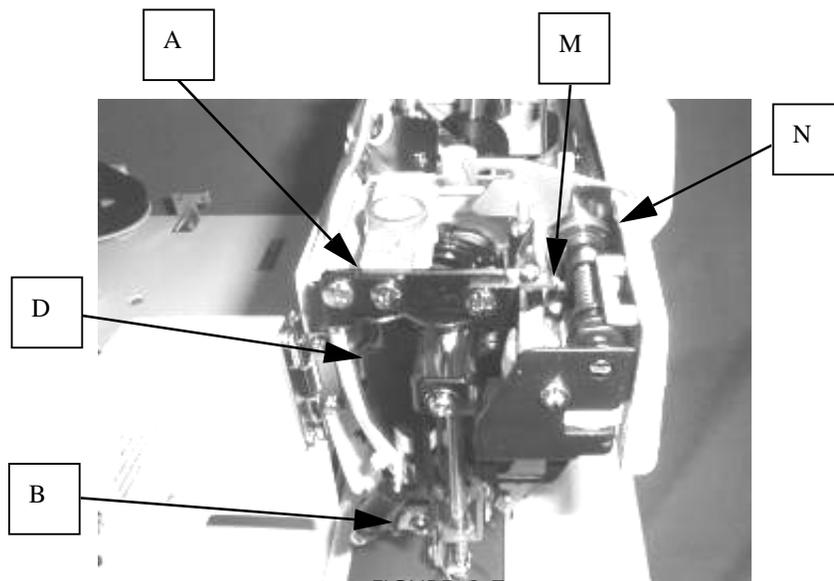


FIGURE 3-7

9. Set the snap ring(C) to the pin of the thread tension release lever as shown in Fig.3-8.

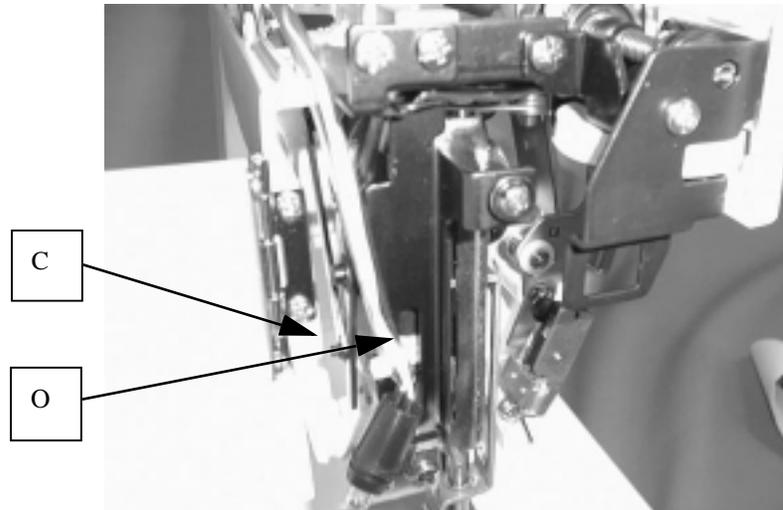


FIGURE 3-8

10. Adjust the height of ring(O). Set the presser foot to the lowest position as shown in Fig.3-8, and adjust the height of ring (O) so that the gap between the presser foot bottom and the upper face of the throat plate becomes 1.2-2.0mm. Fig.3-9.

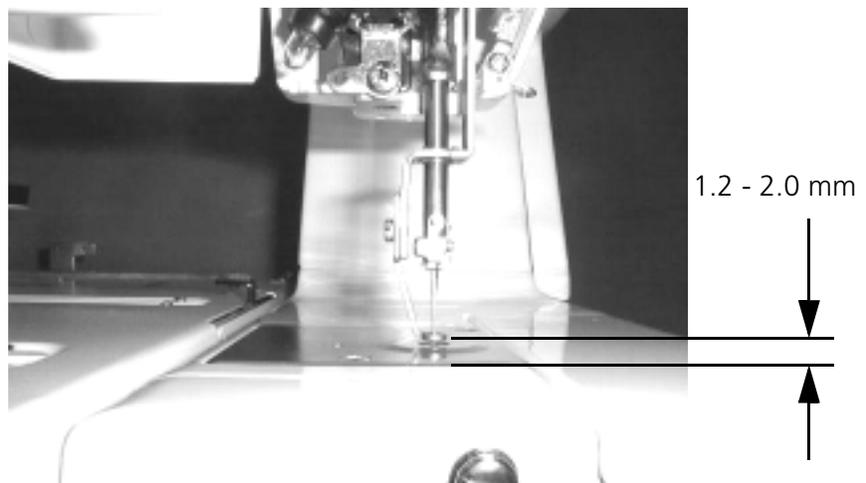


FIGURE 3-9

### 4. Removal of X-Y Cover

1. Remove the carriage cover(B) by removing three bind screws 3x10(A). Fig.4-11.

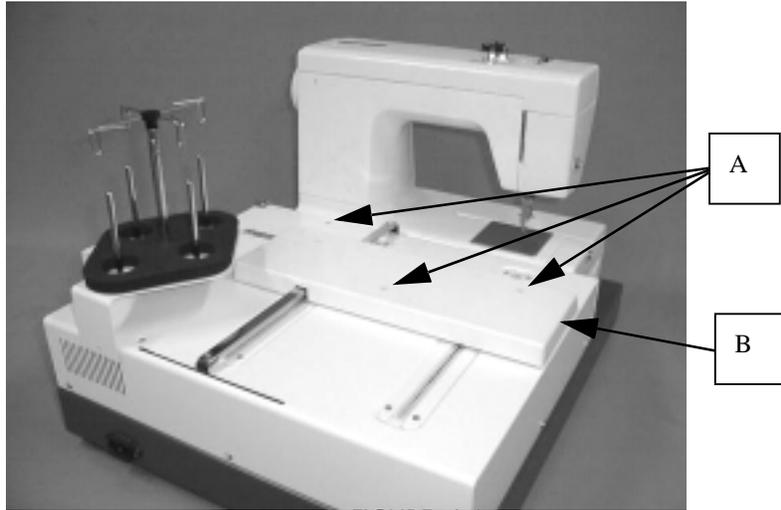


FIGURE 4-1

2. Remove X-guide bar(F) and carriage(unit) (E) by removing two countersunk screws 4x5(D). Fig.4-2.

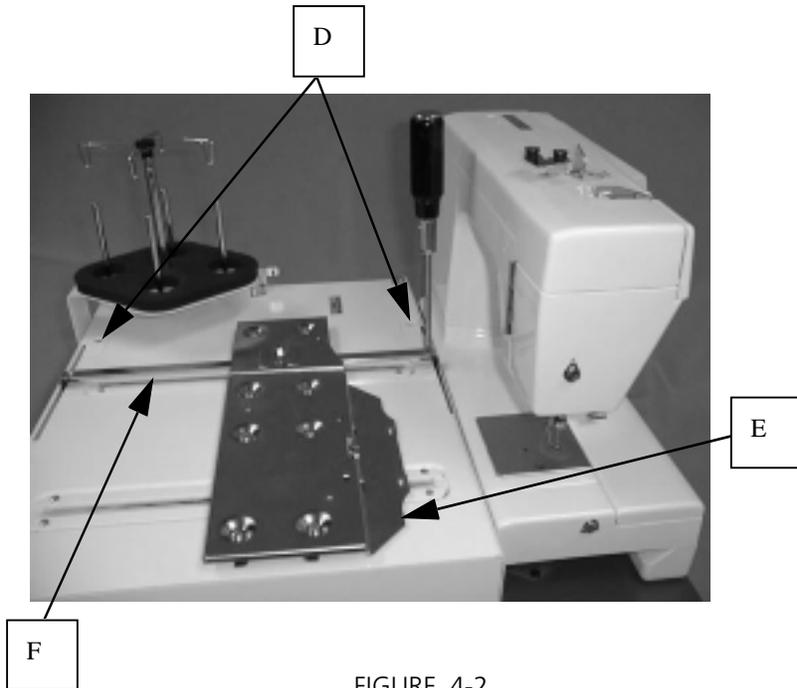


FIGURE 4-2

3. Shift the X-carriage (G1) and X-carriage(G2) to the maximum limit in the arrow direction. Fig.4-3.
4. Remove four-seat holders(I) by removing twelve bind screws 3x4(H).

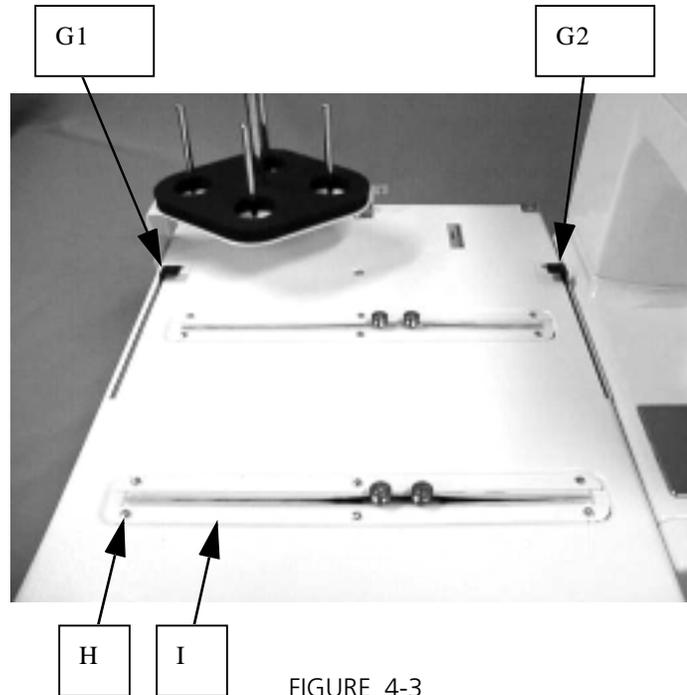


FIGURE 4-3

5. Shift the Y-carriage (J) to the cover removing position(Q). Fig.4-4.
6. Remove bind screw 3x4 and small plain washer(K).
7. After loosening two bind screws 3x4 and small plain washers(C), shift cover(L) in the arrow direction.

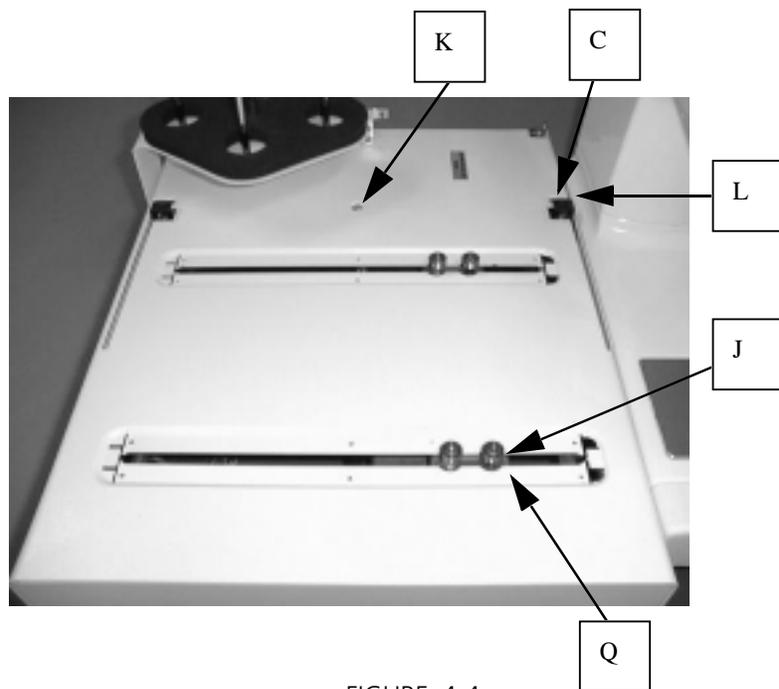
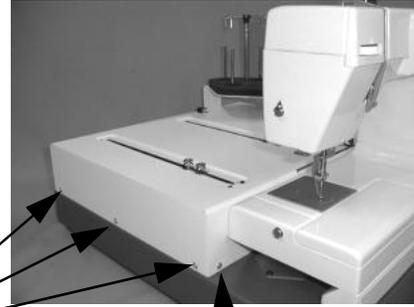


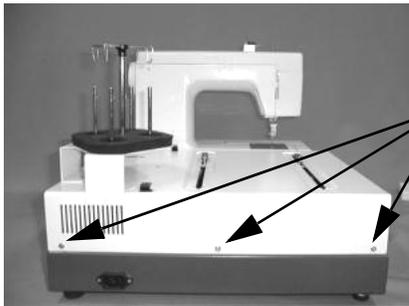
FIGURE 4-4

- 8. Remove bind screw 3x8 and toothed lock washer 3.5 (M). Fig.4-7.
- 9. Remove ten bind screws 3x4 and finished plain washers 3 (N). Fig.4-5,6,7.



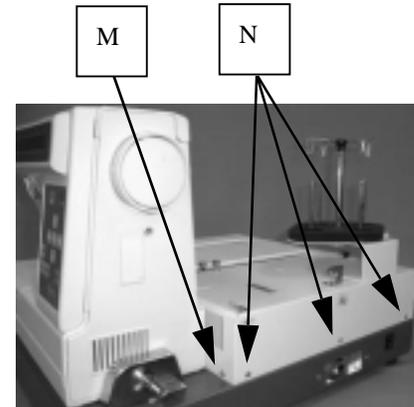
N

FIGURE 4-5



N

FIGURE 4-6



M

N

FIGURE 4-7

## 5. Replacement of A Board, LAN Board, Power Supply Unit 24V and Power Supply Unit 5V

1. Remove the bottom plate(B) by removing 14 bind screws 4x5 (A). Fig.5-1

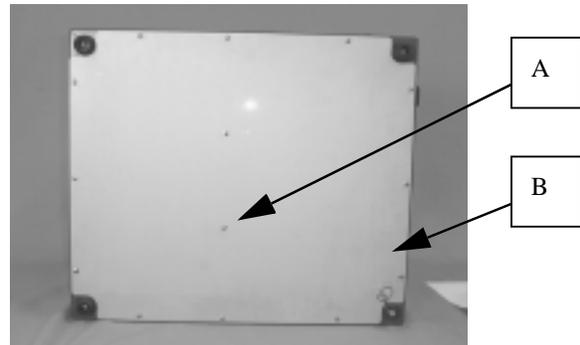


FIGURE 5-1

2. (a) Replacement of A board. (C)

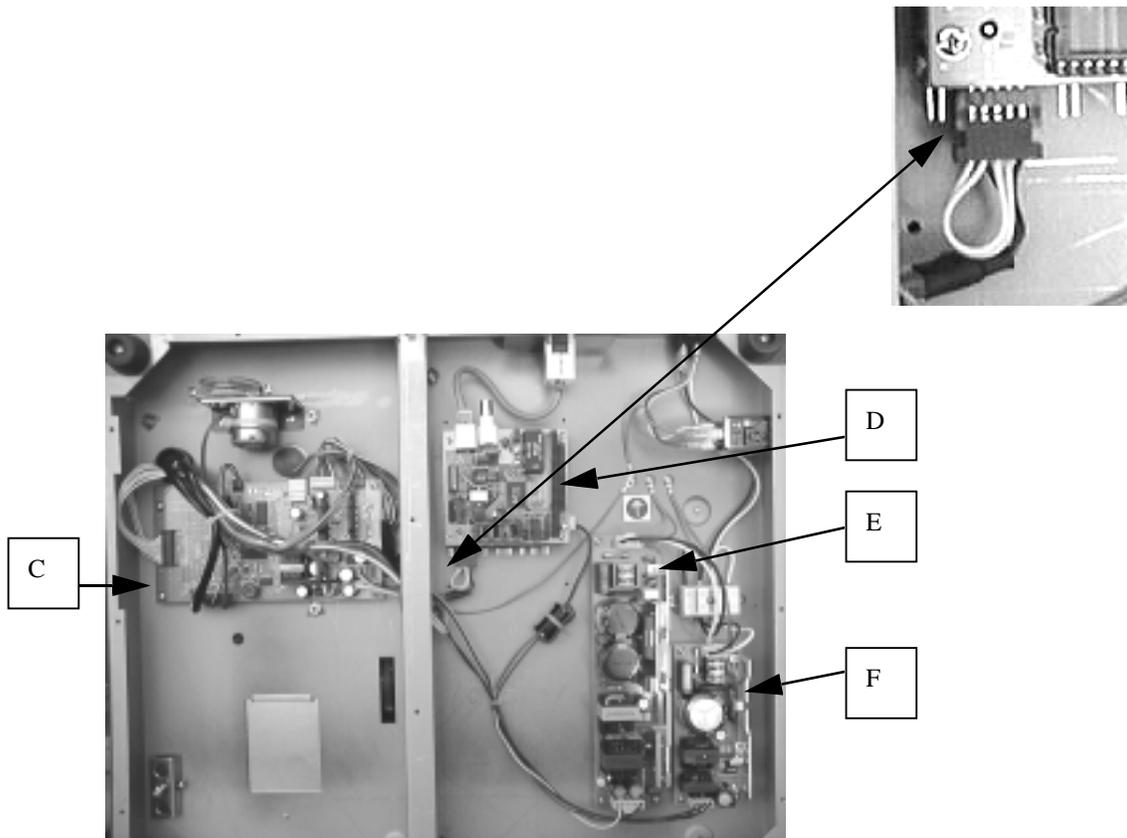


FIGURE 5-2

- I. Remove the connectors. Fig.5-3
- II. Replace A board with a new one by removing fore bind screws 3x6.
- III. Assemble it in the reverse order.

## (b) Replacement of AT board and LAN board.(D)

I. Remove 3 connectors. Fig.5-3

II. Replace AT board and LANboard with a new one by removing 4 bind screws.

III. Insert plastic spacer firmly. Assemble it in the reverse order.

## (c) Replacement of the Power supply 24V (E) and the Power supply 5V.(F)

I. Remove 2 connectors. Fig.5-3

II. Replace power supply units with a new one by removing 4 bind screws.

## 3. Confirm the connection of the connectors and assemble the Bottom plate.

Note: When you have replaced the A board or the AT board with a new one, please upgrade an application software.

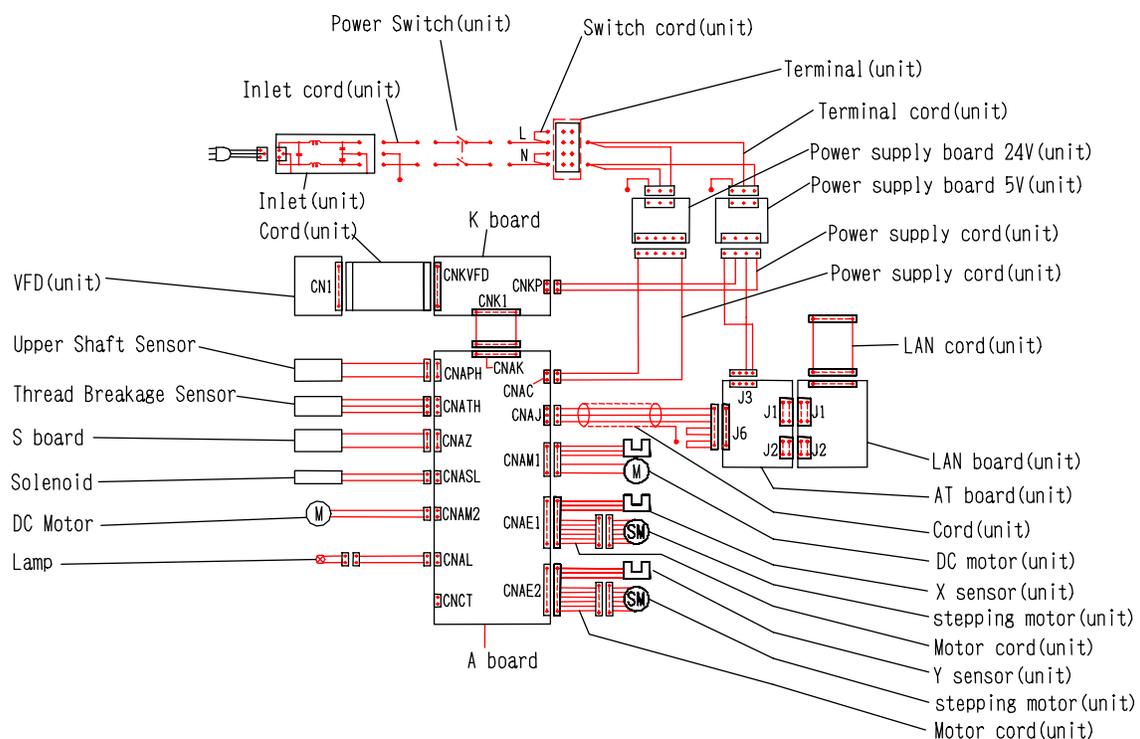


FIGURE 5-3

## 6. Replacement of K Board and Display Tube (VFD)

1. Remove the bottom plate by removing 14 bind screws.
2. Remove a connector from the A board.
3. Remove the top cover and the belt cover. Fig.6-1

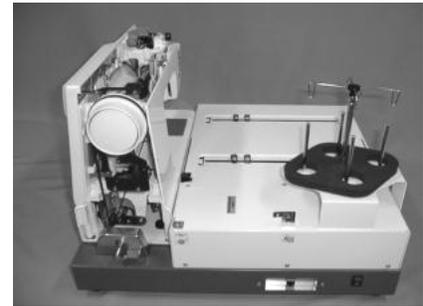


FIGURE 6-1

4. Remove the front cover by removing 3 bind screws 4x8(A) and 1 bind screw 4x10(B). Fig.6-2,6-3

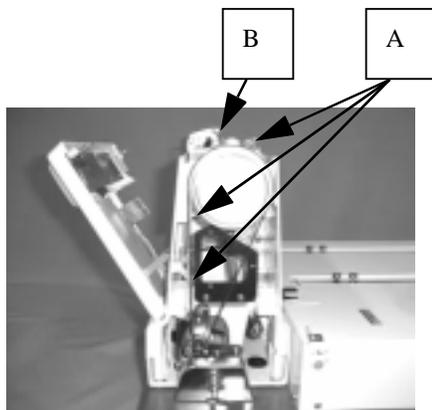


FIGURE 6-2



FIGURE 6-3

## 5. (a) Replacement of K board

I. Remove the insulating paper(C) from the front panel by removing 4 bind taptight screws 3x8. Fig.6-4

II. Remove the flexible cord(D) for VFD from the connector.

III. Remove the 5V cord(E) from the connector.

IV. Remove the K board by removing 2 bind taptight screws 3x8 (F).

V. Assemble the front panel in the reverse order.

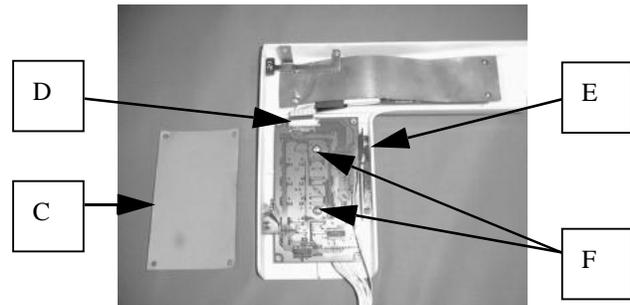


FIGURE 6-4

## (b) Replacement of Display tube (VFD).

I. Remove the front panel bracket(G) by removing 2 bind taptight screws 3x8. Fig.6-5

II. Remove the shield cover(H) by removing 4 bind taptight screws 3x16. Fig.6-5

III. Replace the display tube after removing the flexible cord from the connector of the display.

IV. Assemble the front cover in the reverse order.

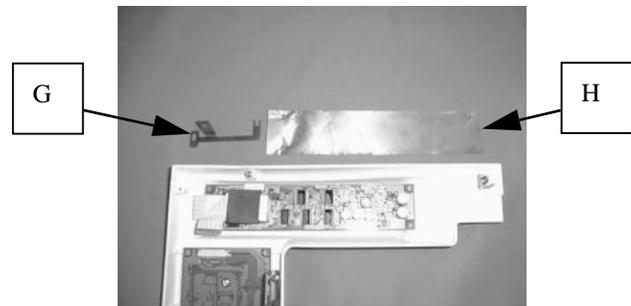


FIGURE 6-5

6. Assemble the display tube to main body by removing 3 bind screws 4x8 and 1 bind screw 4x10. (At the time , please put K board cord through the hole of the bottom plate.)

7. Assemble the top cover and the belt cover.

8. Connect the K board cord to A board.

9. Assemble the bottom plate.

## 7. Replacement of Power Supply Switch, Inlet and Connector Fixing Plate

1. Remove the bottom plate by removing 14 bind screws 4x5.

2. (a) Replacement of Power supply switch.(A)

I. Replace the switch by pushing out the switch from the inside of the base plate. Fig.7-1,7-2

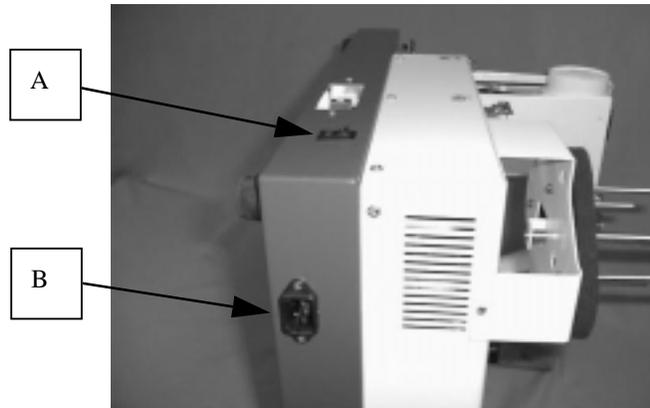


FIGURE 7-1

(b) Replacement of Inlet.(B)

I. Replace the inlet by removing 2 countersunk head screws.(C) Fig.7-1,7-2

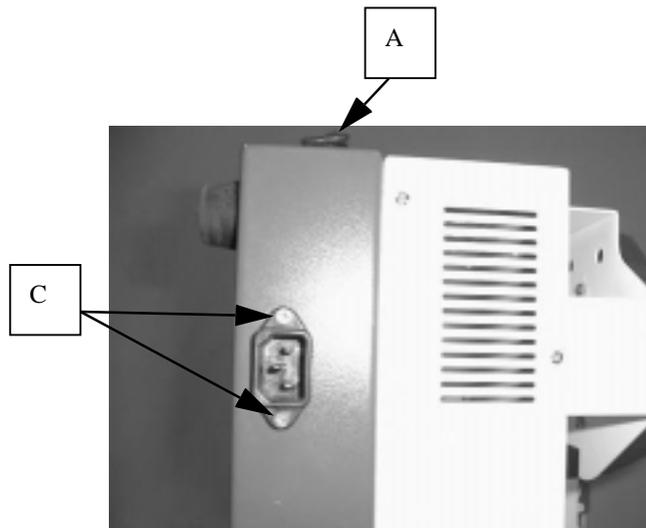


FIGURE 7-2

(c) Replacement of Connector fixing plate.(D)

I. Replace the connector fixing plate by removing 2 bind screws 4x6.5 (E) Fig.7-3

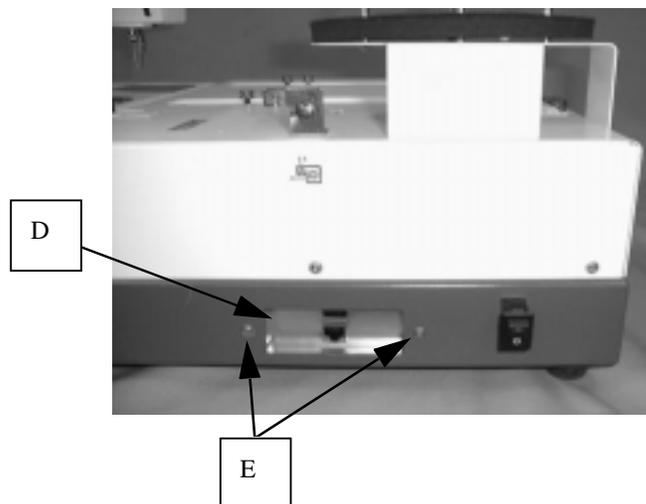


FIGURE 7-3

## 8. Replacement of X-Y Mechanism

1. Remove the bottom plate by removing 14 bind screws 4x5.  
Fig.8-1



FIGURE 8-1

2. Remove the connectors(A) from A board. Fig 8-2.
3. Remove the X-Y cover. par.4

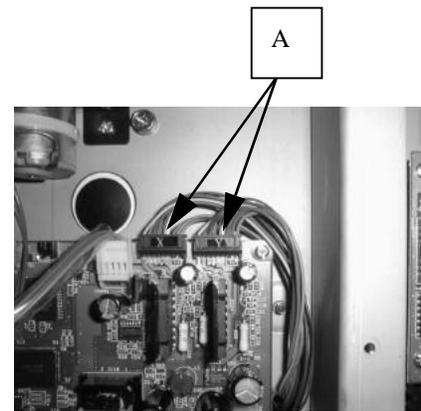


FIGURE 8-2

4. Remove setscrews(B), and then, remove the X-Y mechanism from the baseplate. Fig.8-3
5. Mount new X-Y mechanism onto the baseplate.

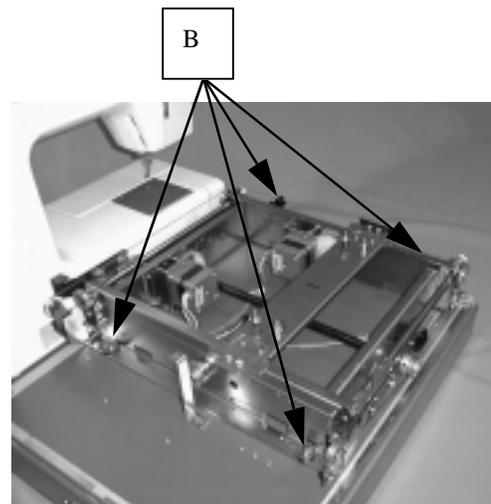


FIGURE 8-3

6. Tighten the X-Y mechanism by setscrews(B) lightly. In this case, tighten the leaf spring to part(C) shown in Fig.8-4 together.

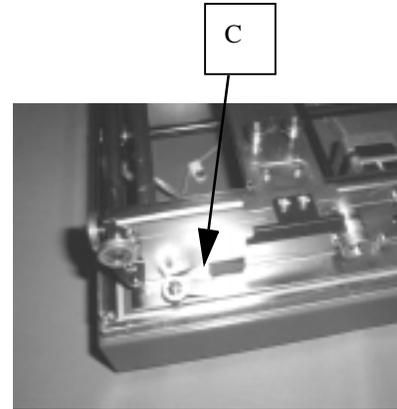


FIGURE 8-4

7. Mount carriage (unit) (D), and set the positioning jig (E) to the carriage (unit). (The positioning jig is the same as the one for EP1) Fig.8-5

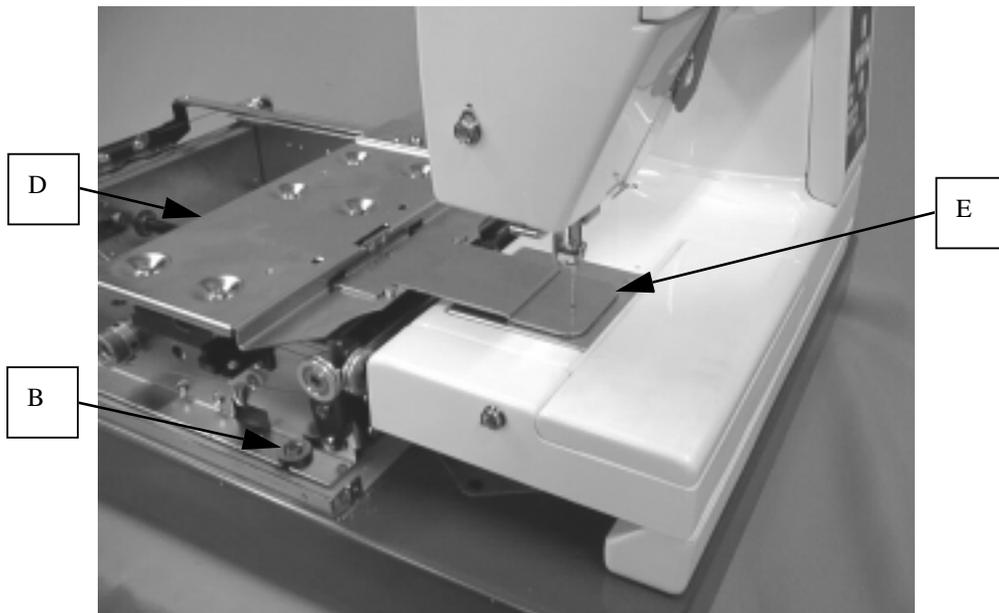


FIGURE 8-5

8. After connecting EP 1B and PC, start up both of them and initialize the X-Y mechanism.
9. Adjust the X-Y mechanism while moving it so that the needle is inserted into the hole of jig (E) as shown in Fig.8-5, and tighten setscrews (B).
10. Remove the carriage (unit), mount the X-Y cover, and then, mount the carriage (unit) again.

### 9. Removal of Machine

1. Remove the bottom plate by removing 14 bind screws 4x5. Fig.9-1



FIGURE 9-1

2. Disconnect the connectors of cords (A),(B),(C),(D),(E),(F) and (G) from A board. Fig.9-2

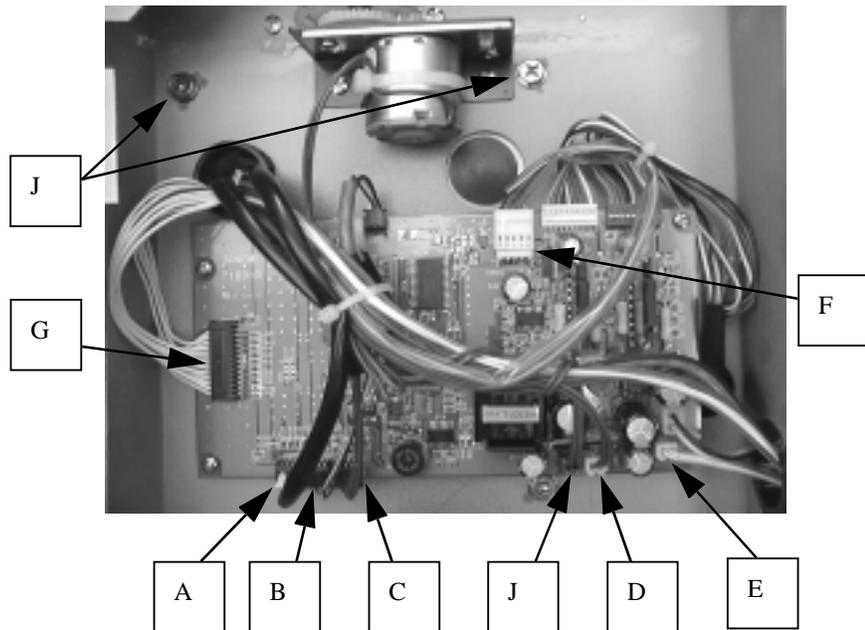


FIGURE 9-2

3. After loosening bind screw 4x10 (H), remove pan head screw 6x35 (I). Fig.9-3

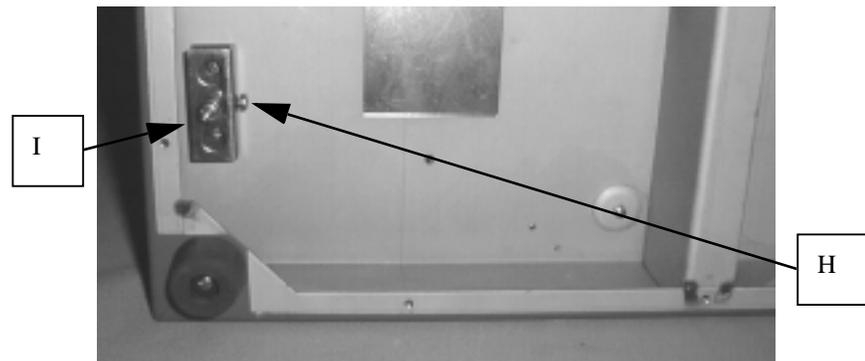


FIGURE 9-3

4. Remove the main body by removing 3 each of the hexagon socket head cab bolts (J) with the spring washers. Fig.9-2

## 10. Replacement of Thread Breakage Sensor, S Board(unit), Upper Shaft Sensor and Solenoid.

### 1. Replacement of Tread breakage sensor.

#### (a) Replacing Magnet sensor.

I. Remove 14 bind screws 4x5, and remove bottom plate. Fig.10-1.

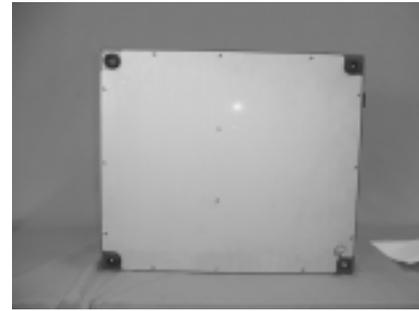


FIGURE 10-1

II. Remove magnet sensor connector(A) from A board. Fig.10-2.

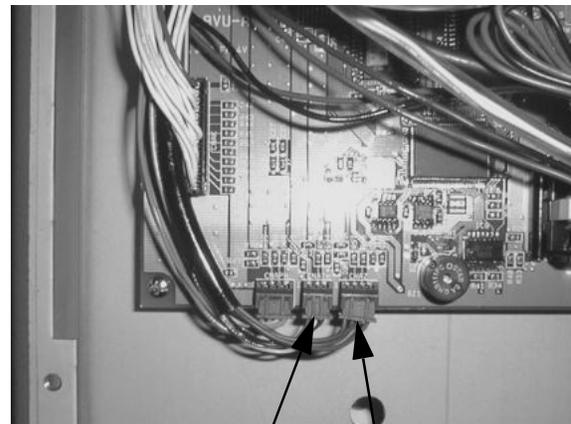


FIGURE 10-2

III. Remove 2 screws on nylon clips(B), and remove magnet sensor cord.

IV. Remove 2 bind screws 3x4, and thread breakage sensor plate (2) (C).

V. Remove a countersink head screw 2x8(D), and replace magnet sensor. Fig.10-5.

VI. Assemble them in the reverse order.

VII. After replacing, adjust the tension. Par.12-3.

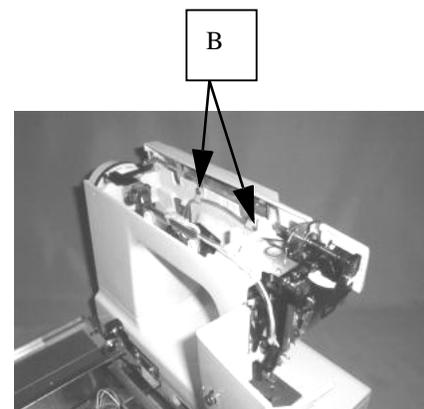


FIGURE 10-3

(b) Replacing Upper thread tension unit (upper thread tension spring and magnet).

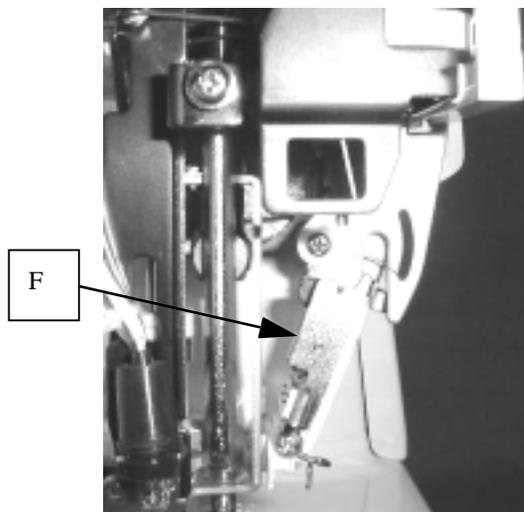


FIGURE 10-4

I. Remove 2 bind screws 4x8(E), and replace upper thread tension unit(F). Fig.10-5.

II. After replacing, adjust the tension. Par.12-3.

2. Replacement of S board(unit).

I. Remove 14 bind screws 4x5, and remove bottom plate.

II. Remove S board connector(G) from A board. Fig 10-2.

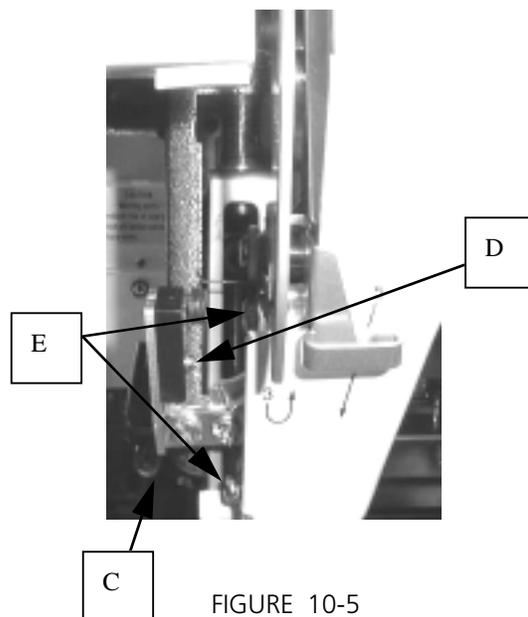


FIGURE 10-5

III. Remove set screw 4x6.5(H), and remove shuttle cover.(I) Fig.10-6.

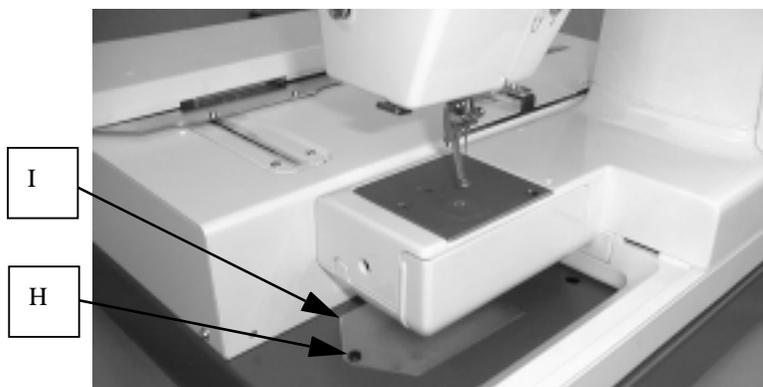


FIGURE 10-6

IV. Remove 2 bind head screws 4x12(J) from backside of base plate, and remove bed cover.(K) Fig.10-7.

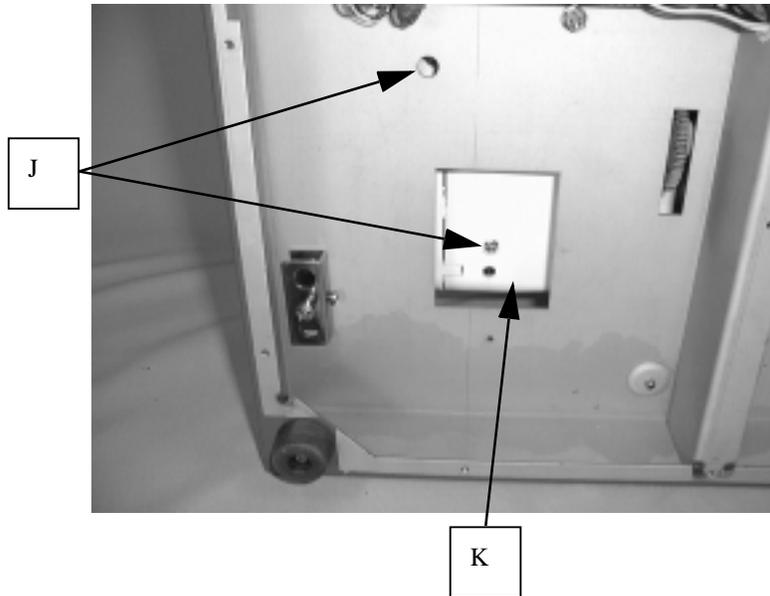


FIGURE 10-7

V. Remove nylon clip SL-3N and clip band, and remove 2 pan head screws(L), and replace S board. Fig 10-8.

VI. After replacing, assemble them in the reverse order.

VII. Adjust the sensitivity and tension. par.12-1.

### 3. Replacement of Upper Shaft Sensor and Solenoid.

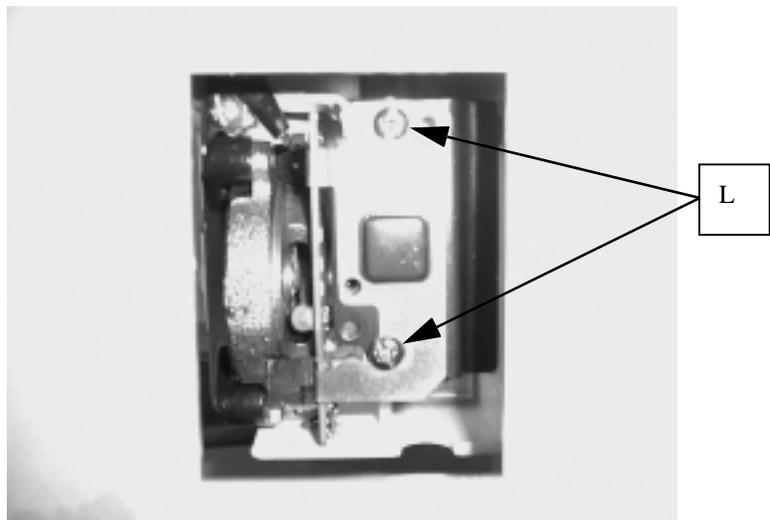


FIGURE 10-8

- I. For replacing the solenoid, remove the solenoid from the set plate by removing setscrews (M) and setscrews (P) shown in Fig.10-9.

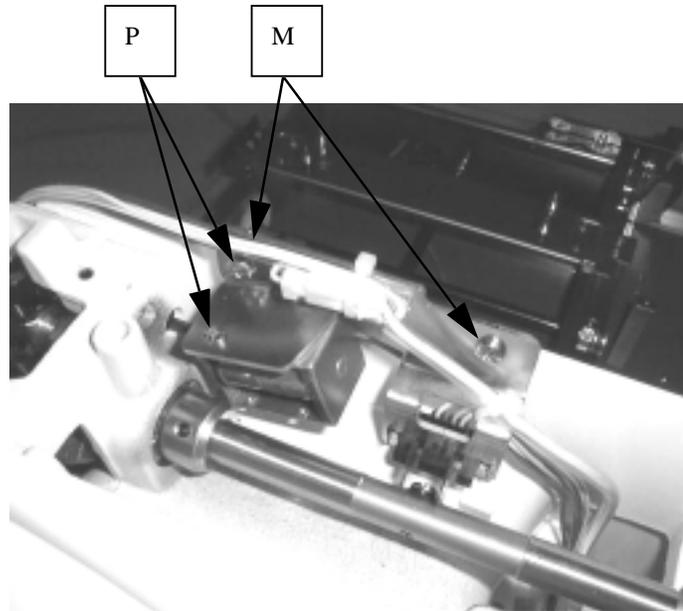


FIGURE 10-9

- II. Remove snap ring on thread tension release rod(N), and pull thread tension release rod and plunger of solenoid. Then remove spring pin 3x10(O) which connect thread tension release rod with plunger, and replace the plunger of solenoid. Fig.10-10,10-11.

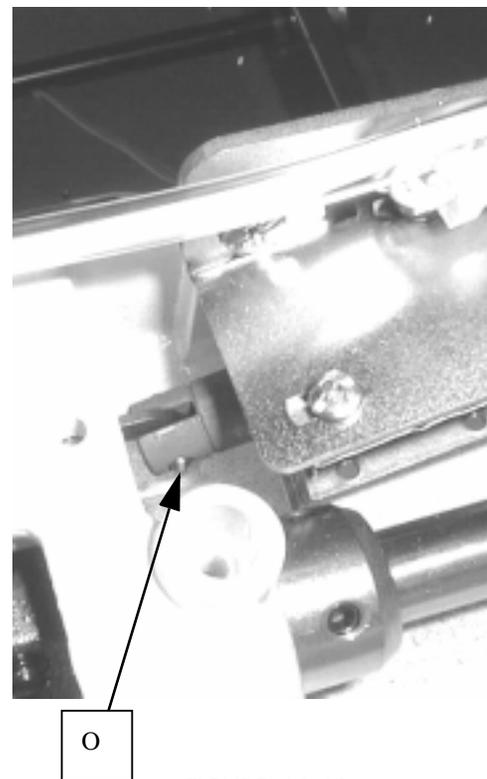
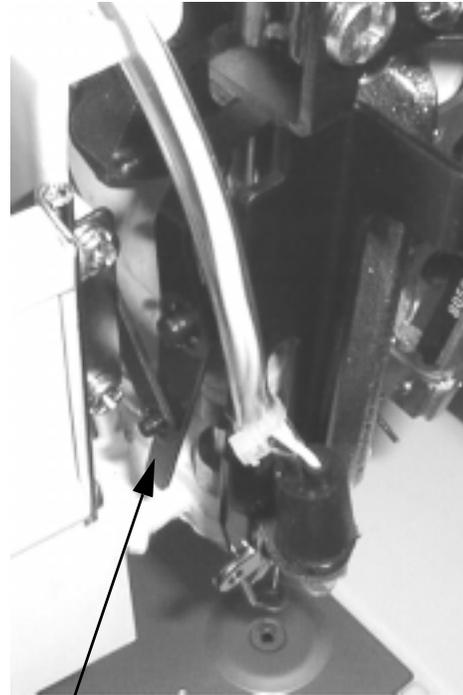


FIGURE 10-10

III. After removing set plate by removing screws(M) ,replacing the upper shaft sensor by pressing hook of the sensor.



N

FIGURE 10-11

## 11. Mounting of Machine

1. Mount the machine to the baseplate by using 3 machine mounting screws (A) and 3 finished plain washers. Fig.11-1.



FIGURE 11-1

2. Fix bind screws 4x5(B) after positioning the horizontal position of the machine by + pan head screws 6x35(C). Fig.11-2.

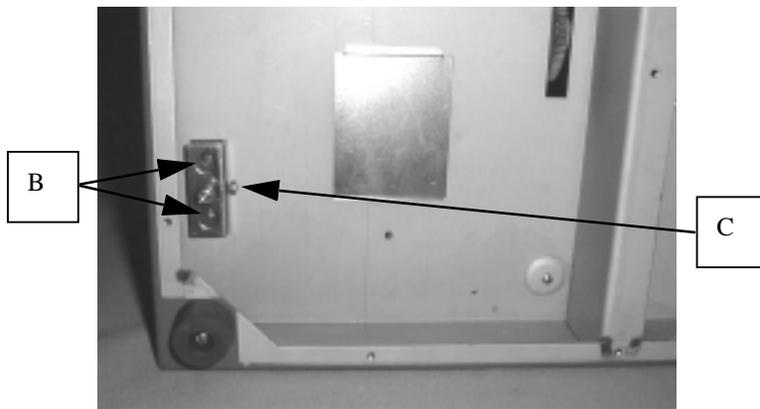


FIGURE 11-2

3. Connect connectors. Fig.11-3.

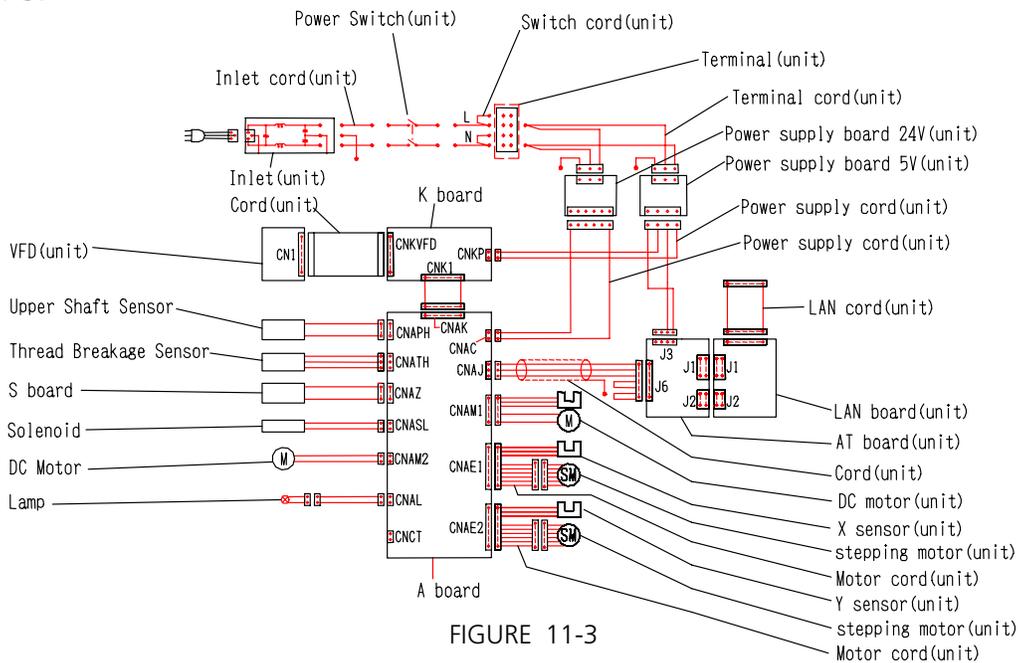


FIGURE 11-3

4. Mount ferrite core (K) as shown in Fig.11-1.

## 12. Adjustment of Bobbin Thread Sensor, Solenoid and Thread Breakage Sensor.

### 1. Adjustment and checking dust sensor and bobbin thread sensor.

Preparation:

Minus driver

Bobbin (wound thread 9 m)

Bobbin (wound thread 15m)

I. Remove dust on the surface of dust sensor and the inside of bobbin thread sensor holder.

II. In case of condenser C2(A) is leaning to dust sensor(B) side, lean it to opposite side. Fig.12-1.

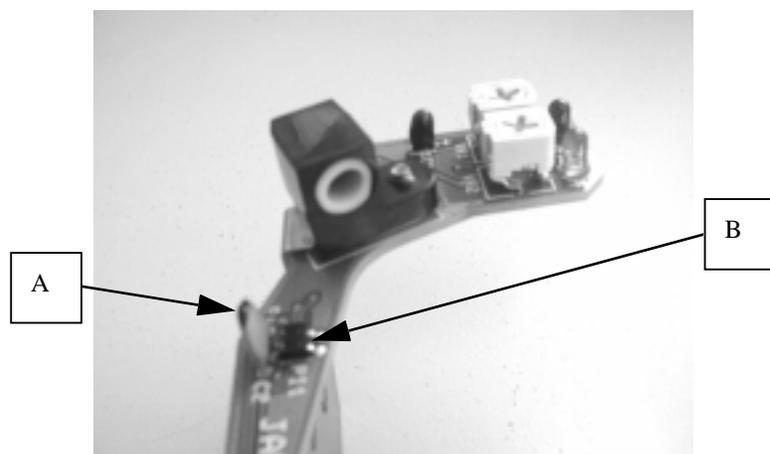


FIGURE 12-1

III. Mount the S board so that the gap between bobbin thread sensor holder and hook race body cover will be between 0 - 1.5mm.

IV. Turn handwheel to set the thread take-up lever at the highest position.

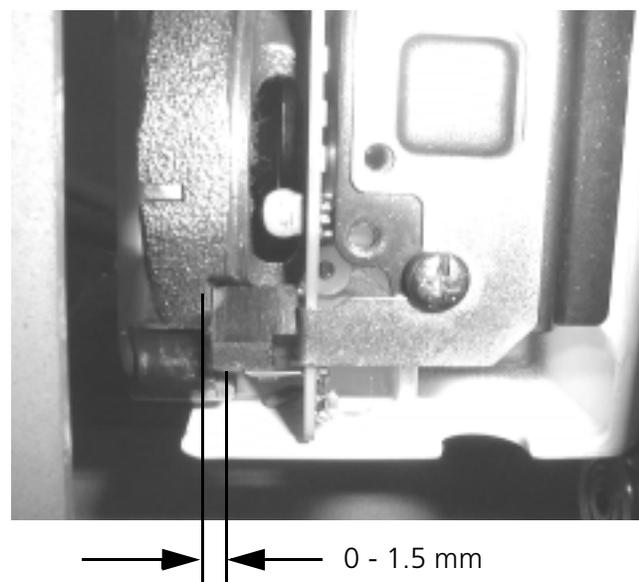


FIGURE 12-2

- V. Turn on power switch.  
Turn volume VR2(C) until the green LED starts blinking goes on and off. (dust sensor adjustment).

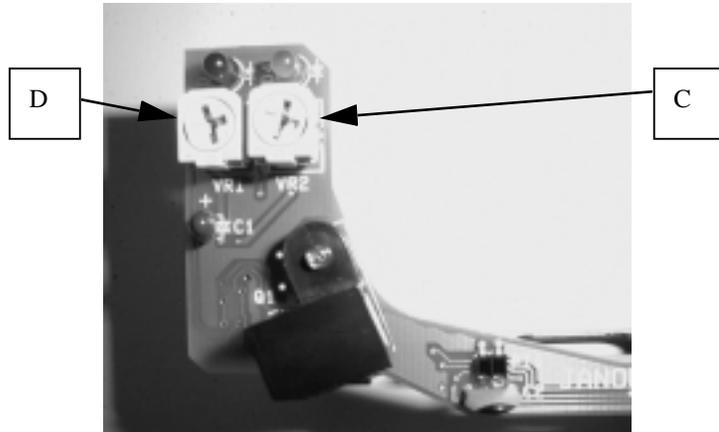


FIGURE 12-3

- VI. Set thread wound bobbin (9m) in a bobbin case. Embroider a suitable design, which is transferred from EDS3. Upper thread is not used in this case. Hold the upper thread tension spring at the "on" position by clip. (If you do not have a controller, turn on adjustment test equipment then drive a motor.) Turn volume VR1(D) until the red LED starts blinking (bobbin thread sensor adjustment). Be sure adjusting volume VR1 after adjusting VR2.

- VII. Set thread wound bobbin (15m) in a bobbin case, then embroider again. Confirm that the message "BOBBIN THREAD" does not appear.

## 2. Adjustment of the Solenoid.

- Adjust the solenoid with the operation stroke set to be less than 2mm. If the solenoid is replaced, the thread tension release function must be adjusted.

- I. Set the stitch balancing thread tension dial (E) to [9]. Make sure that the thread tension release is secure under the stop condition of the machine. If the stitch balancing thread tension dial is functioning, loosen setscrew(F), and fix setscrew(F) by relocating the thread tension release plate (G) leftward.

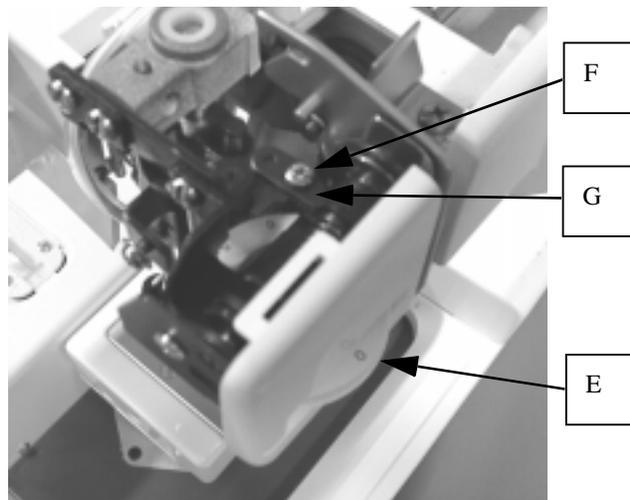


FIGURE 12-4

- II. Set stitch balancing thread tension dial (E) to [0] as shown in Fig.12-4. Operate the machine, and make sure that the solenoid functions to produce a gap between the thread tension release plate (1)(G) and the disk presser, and the stitch balancing thread tension is applied. If the stitch balancing thread tension is not applied, loosen setscrew (F), relocate thread tension release plate (1)(G) rightward, and fix setscrew (F).

- III. Make sure that condition (I) and (II) are satisfied.

3. Adjustment, placing and operation check of upper thread breakage sensor.

- I. Tighten screws (H) and (I) so that the gap between the left side of holding plate 1(K) and the center of magnet (L) will be 1.0 - 2.0mm. (Front-back adjustment).

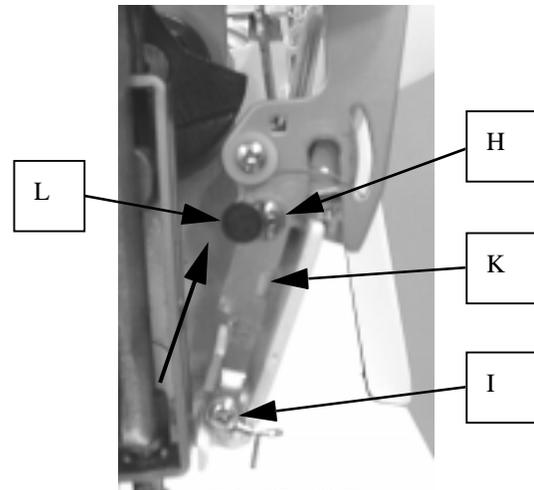


FIGURE 12-5

- II. Tighten the screws (J) so that the gap between sensor and magnet will be 1.0 - 2.0mm. (Right-left adjustment).

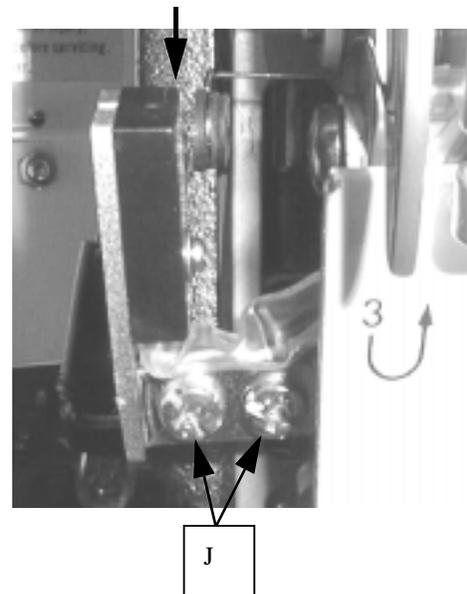


FIGURE 12-6

- III. Turn on power switch. Move the tension spring with finger to confirm that the LED turns on at the thread tension spring "on" position and turns off at the thread tension spring "off" position. Fig.12-7.
- IV. Confirm that faceplate does not touch the sensor when closed.
- V. Confirm that magnet does not touch sensor and LED is blinking while embroidering.



FIGURE 12-7

### 13. Replacement of Wire pulley

1. Remove the X-Y cover and then, remove the X-Y mechanism from the baseplate.
2. Draw the bushing (A) out of the X-Y mechanism, and draw out cushion (B) sideways.

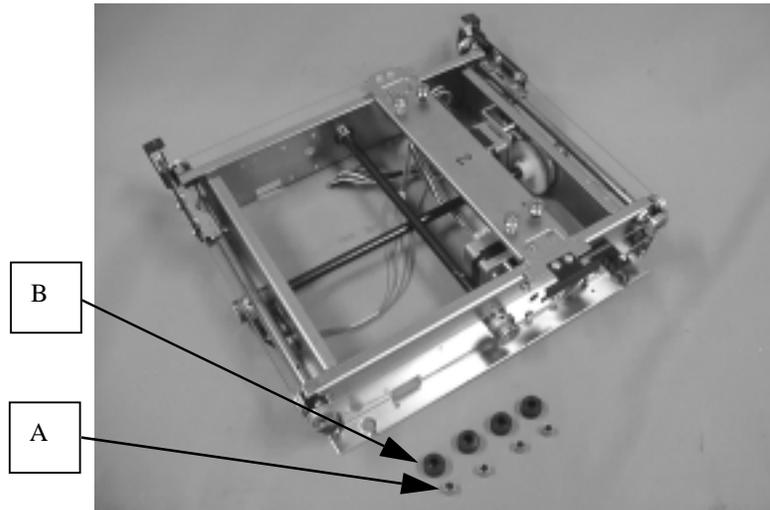


FIGURE 13-1

3. The gear (C) shown in Fig. 13-3 is protruded from the bottom face of the X-Y mechanism. Insert a bolt by nut (D), so that the gear (C) is free of being scratched when erecting the X-Y mechanism as shown in Fig. 13-3.
- Work (1)-(3) are applicable when removing the X-Y mechanism from the baseplate does repair or adjustment.

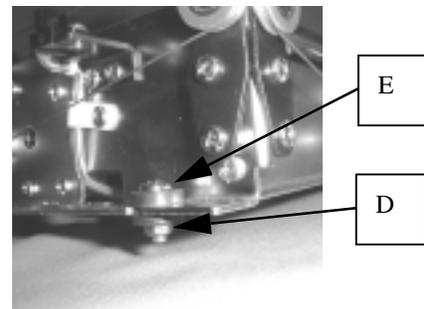


FIGURE 13-2

4. Fix the wire (G) being wound on pulley (H) securely by using grip band (I) so that wire (G) hooked to the wire pulley (F) to be replaced is not loosened from the the pulley (H) as shown in Fig.13-3,4.

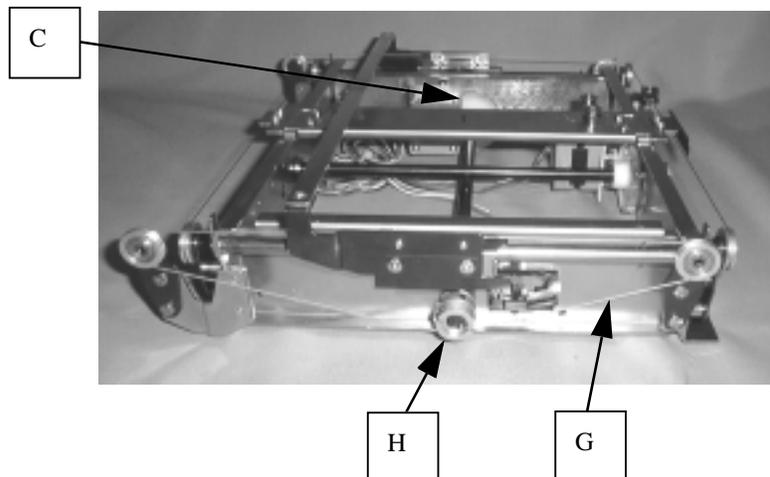


FIGURE 13-3

5. Remove setscrews (J)(K) shown in Fig.13-5 and remove wire pulley (F).
6. Fix the wire pulley temporarily by setscrews (J)(K) while applying the wire (G) to new wire pulley (F).

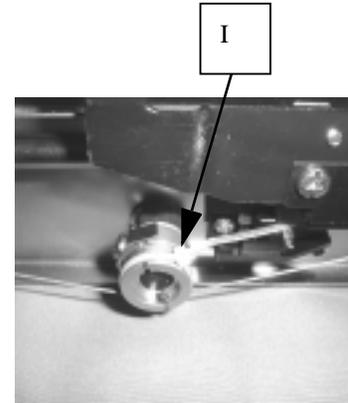


FIGURE 13-4

7. Cut grip band (I) as shown in Fig.13-6 with due care so as not to scratch the wire. Pull the wire pulley (F) with about 7Kgf by the spring balance in the arrow direction, and tighten screws in the order of setscrew (K) and setscrew (J). Fig13-5.
8. Turn the pulley (H) clockwise and counterclockwise several times by hand, and check the wire tension. Draw the wire pulley again, if the wire tension is not suitable.

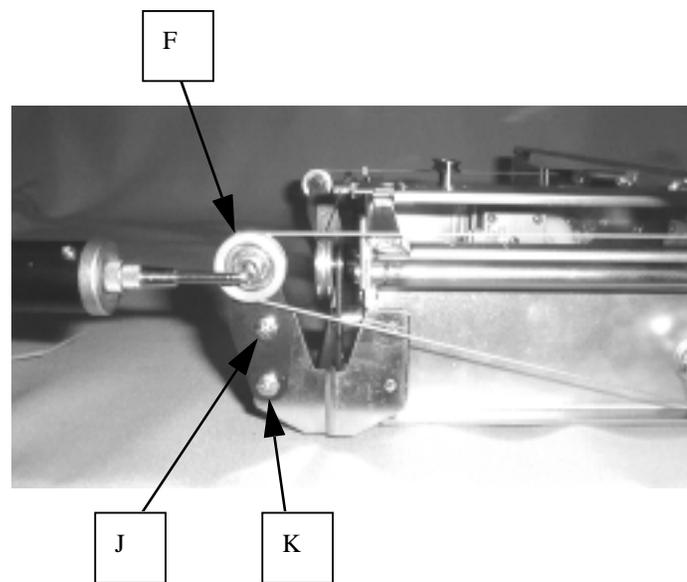


FIGURE 13-5

9. Remove bolts (D) and nut (E) from the X-Y mechanism, and set cushion (B) and bushing (A).
10. Fix the X-Y mechanism to the baseplate, while adjusting the needle position.
11. Mount the X-Y cover and carriage.

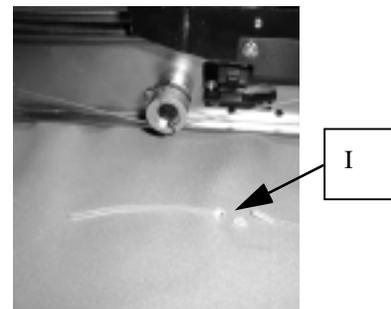


FIGURE 13-6

## 14. Replacement of X-Y Carriage

1. Perform steps (1)-(3) in par.13.

2. Fix the wire (C) to pulley (A) securely by using grip band (B) as shown in Fig.14-1. Loosen setscrews (D), and disconnect wire (C) from wire pulley (E).

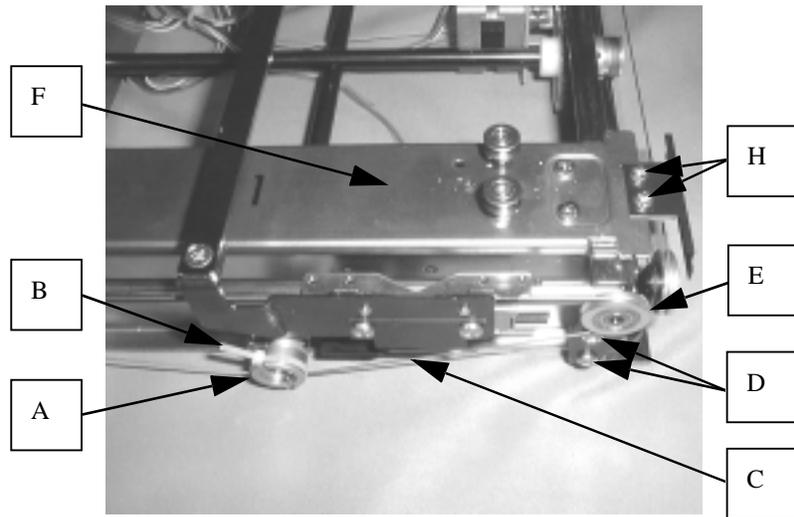


FIGURE 14-1

3. Bring the Y-carriage (F) toward the sensor until it touches stopper (G) as shown in Fig.14-2.

4. Remove setscrews (H)(H\*), and separate the wire (I) and Y-carriage from each other. Fig14-2.

5. Fix the wires being wound on the pulleys securely by grip bands (K) so that the right and left wires (I) are not loosened from pulley (J) as shown in Fig.14-2.

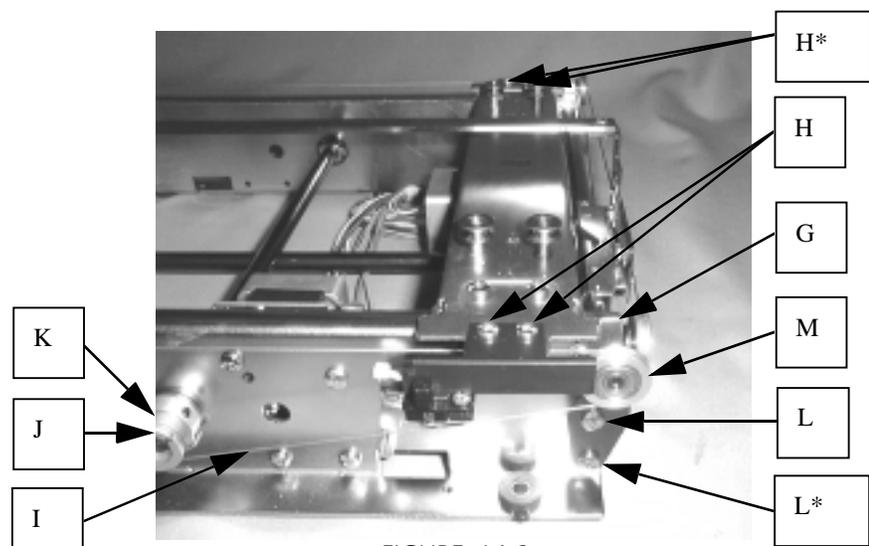


FIGURE 14-2

6. Loosen setscrew (L\*) and setscrew (L), and tilt down wire pulley (M). Fig.14-2.

- Loosen setscrews (N) , and tilt down the right and left stoppers (G\*). Fig.14-3.

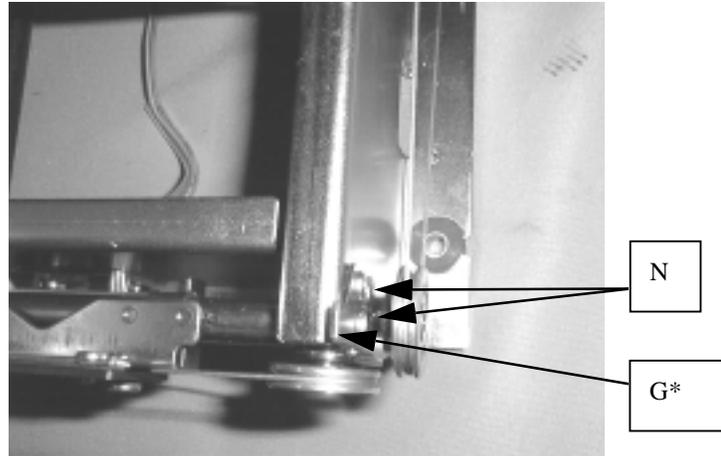


FIGURE 14-3

- Push the X-guide bar (P) slightly downward in the arrow direction as shown in Fig.14-4.

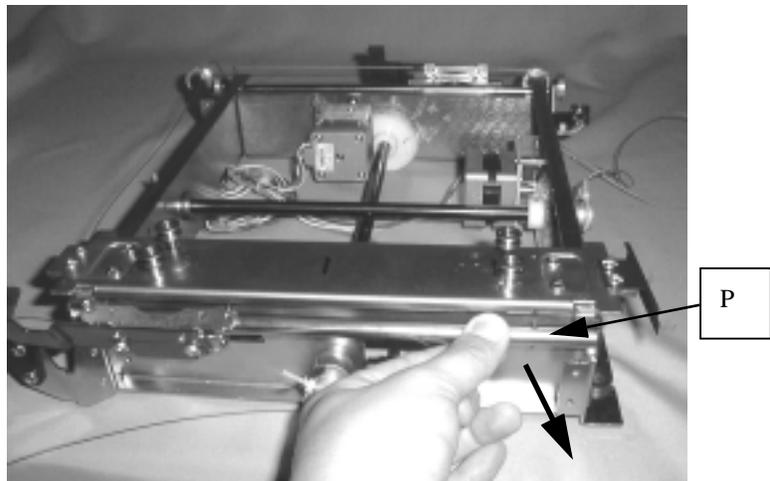


FIGURE 14-4

- Draw out Y-carriage (F) in the arrow 1 direction as shown in Fig.14-5.

- Set new Y-carriage (F) to carriage (R).

(Set the stitch frame of the carriage to be opposite to the nut side of Y-carriage (F).)

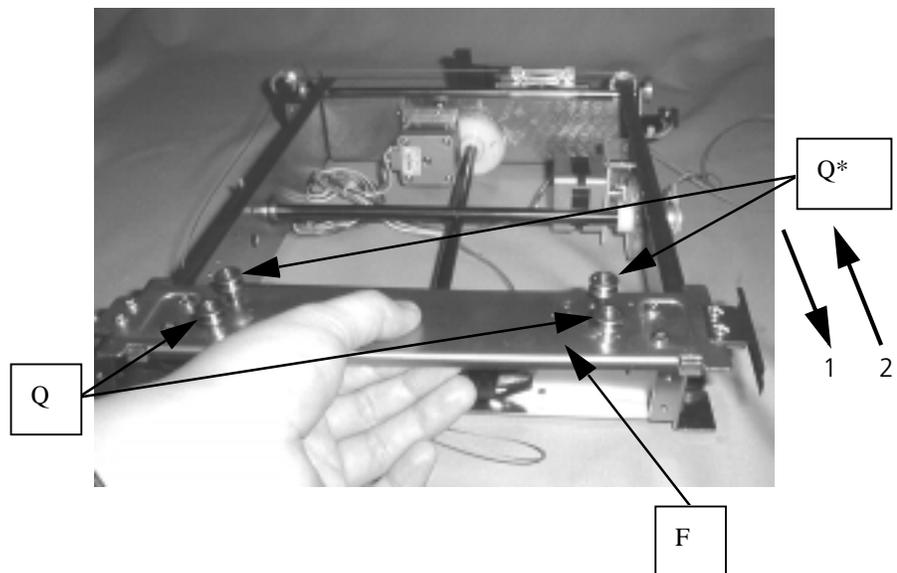


FIGURE 14-5

11. Loosen nut (U) slightly, and adjust the Y-carriage by turning the eccentric pin (S), to which V-bearing (Q) is mounted, so that the Y-carriage functions smoothly without any play to guide rails (T).

12. Tighten nut (U), and make sure that the Y-carriage (F) functions without any play.

13. Remove carriage (R) from Y-carriage (F), and insert it in the arrow 2 direction with V-bearing (Q\*) facing this side as shown in Fig.14-5.

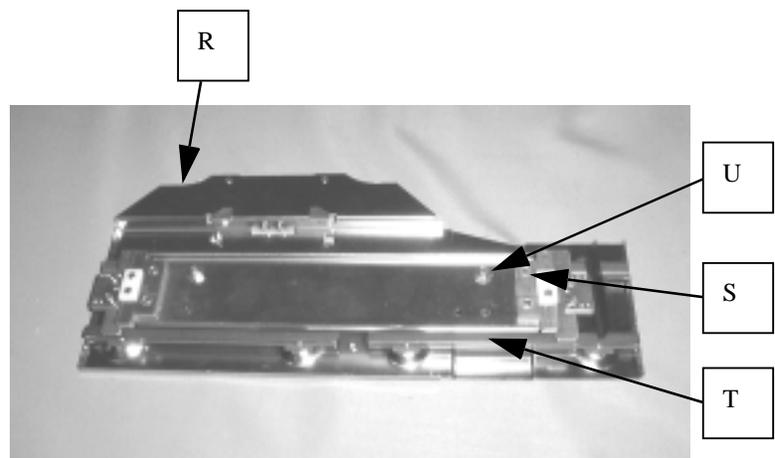


FIGURE 14-6

14. Apply the wire to right and left wire pulleys (M), tighten setscrews (L)(L\*) temporarily, and cut grip band (K) which fixes the wire with due care so not to scratch the wire.

15. Pull wire pulley (M) in the arrow direction with about 7 Kgf as shown in Fig.14-7, and tighten setscrews (L)(L\*).

16. Turn right and left pulley (J) several turns clockwise and counterclockwise, and check wire (I) for tension. If the tension of wire (I) is not suitable, pull the wire pulley (M) again.

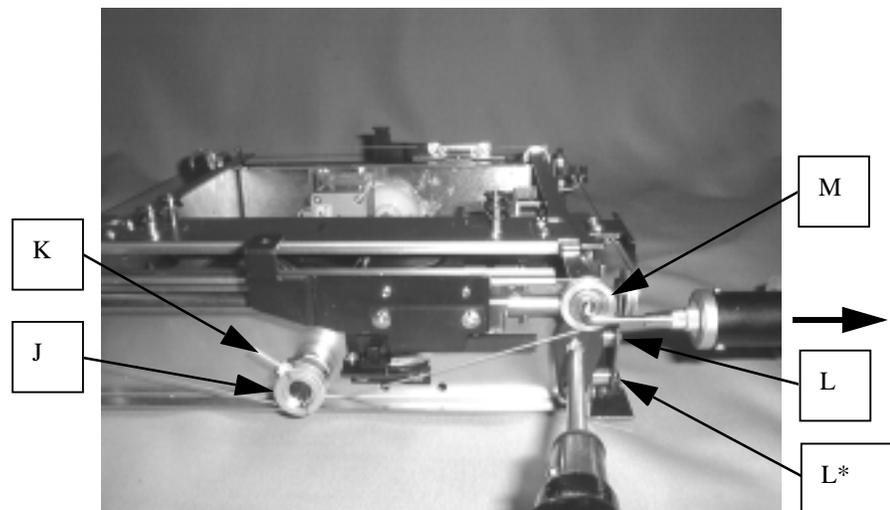


FIGURE 14-7

17. Fix the right and left wires (I) and Y-carriage (F) by setscrews (H) as shown in Fig. 14-8. Tighten Y-shield plate (F) together with Y-carriage on the Y-sensor side (V).

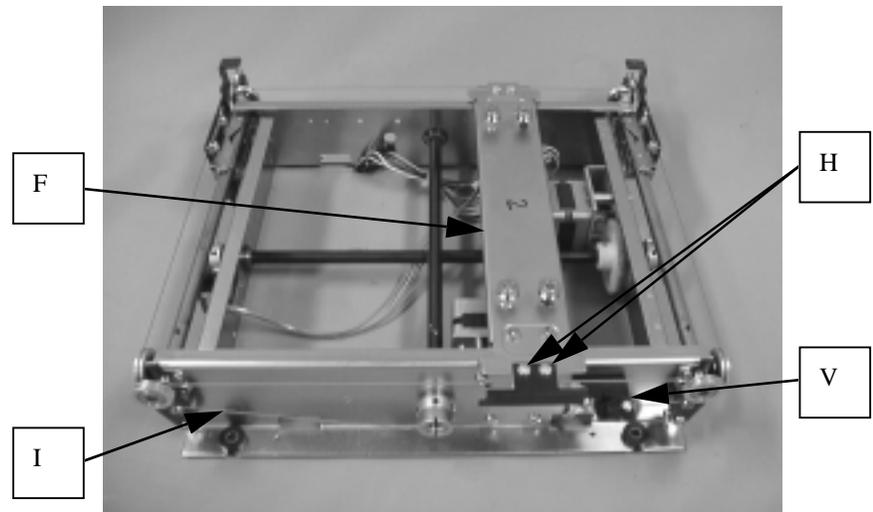


FIGURE 14-8

18. Fix setscrew (D) temporarily while applying wire (C) to wire pulley (E) as shown in Fig. 14-9.

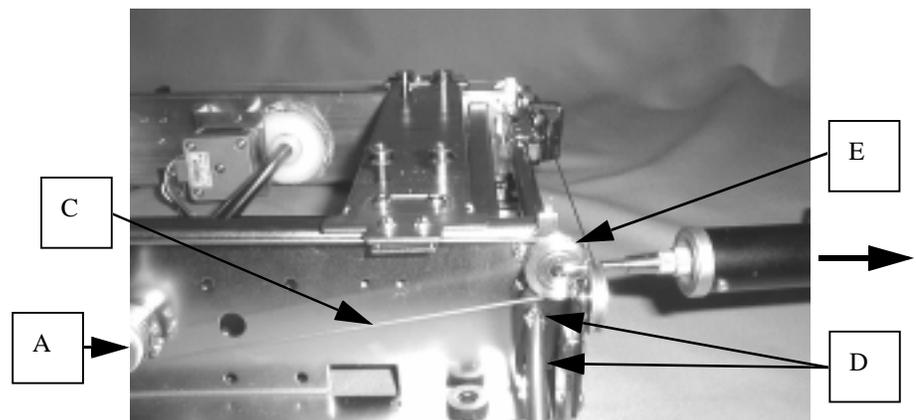


FIGURE 14-9

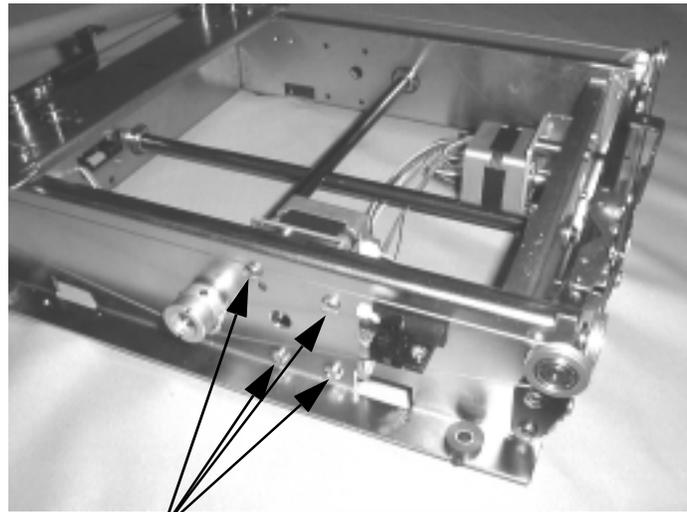
19. Cut grip band(B) with due care so as not to scratch the wire. Pull the wire pulley (E) by means of spring balance with about 7Kgf in the arrow direction as shown in Fig. 14-9, and tighten setscrew (D).

20. Turn pulley (A) clockwise and counterclockwise several times by hand, and check the wire (C) for normal tension. If the wire (C) tension is not suitable, pull the wire pulley (E) again.

21. Perform the same operation as described in 9.- 11. in par.13.

## 15. Replacement of Y(X) Stepping Motor and Y(X) Sensor

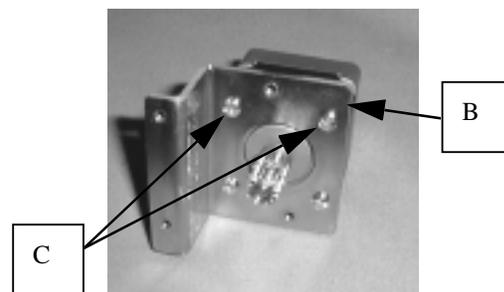
1. Perform steps 1. - 3. in par.13.
2. After removing motor cord (unit) from stepping motor, remove the stepping motor by removing setscrews (A) shown in Fig.15-1.



A

FIGURE 15-1

3. Remove the stepping motor from the set plate for stepping motor (B) after removing setscrew (C) shown in Fig.15-2.

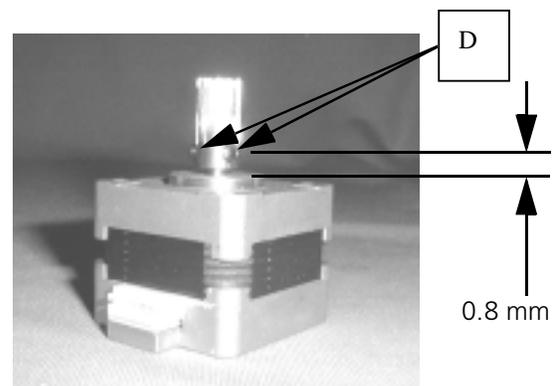


C

B

FIGURE 15-2

4. Remove the gear from the stepping motor after loosening two setscrews (D) shown in Fig.15-3.



0.8 mm

FIGURE 15-3

5. Mount the gear to new stepping motor. Keeping a gap of about 0.8mm between the stepping motor and the gear as shown in Fig.15-3. Assemble them so that the backlash will be 0.1 - 0.2mm. Fig.15-4.

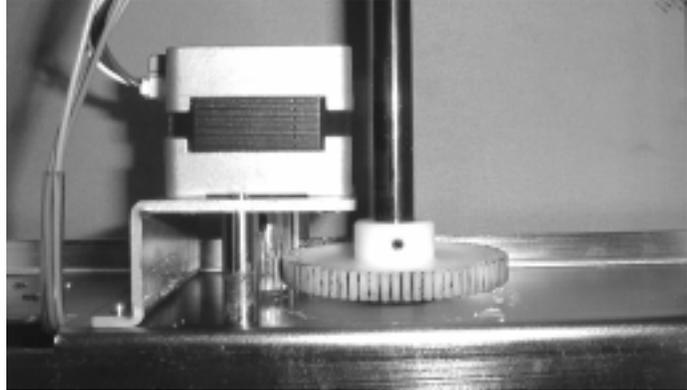


FIGURE 15-4

6. Remove 14 bind head screws 4x5 , and remove bottom plate. Remove Y(X) motor cord connector and Y(X) sensor connector(E) from A board. Fig.15-5.

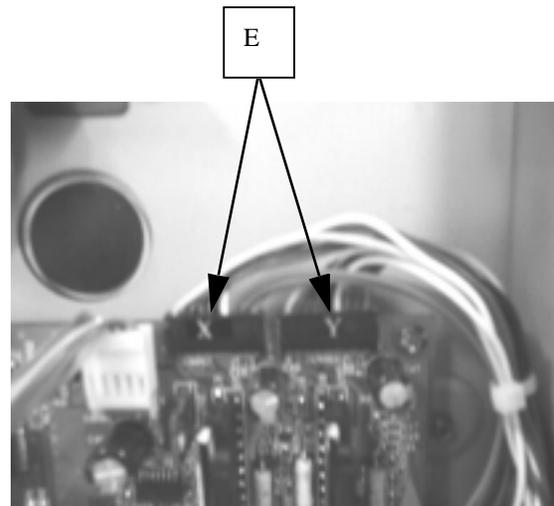


FIGURE 15-5

7. Pass the removed connectors under the base and remove clip band(F). Fig.15-6.

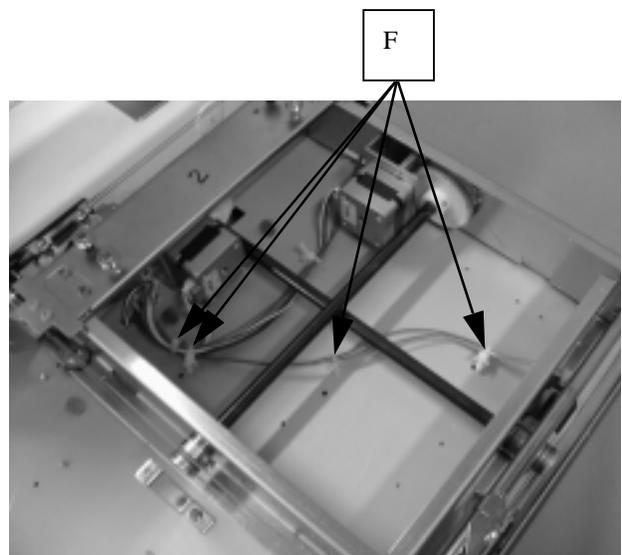


FIGURE 15-6

8. Remove stepping motor connector and 1 bind screw 3x6(G). Then replace Y(X) motor cord unit (Y(X) sensor). Fig.15-7.

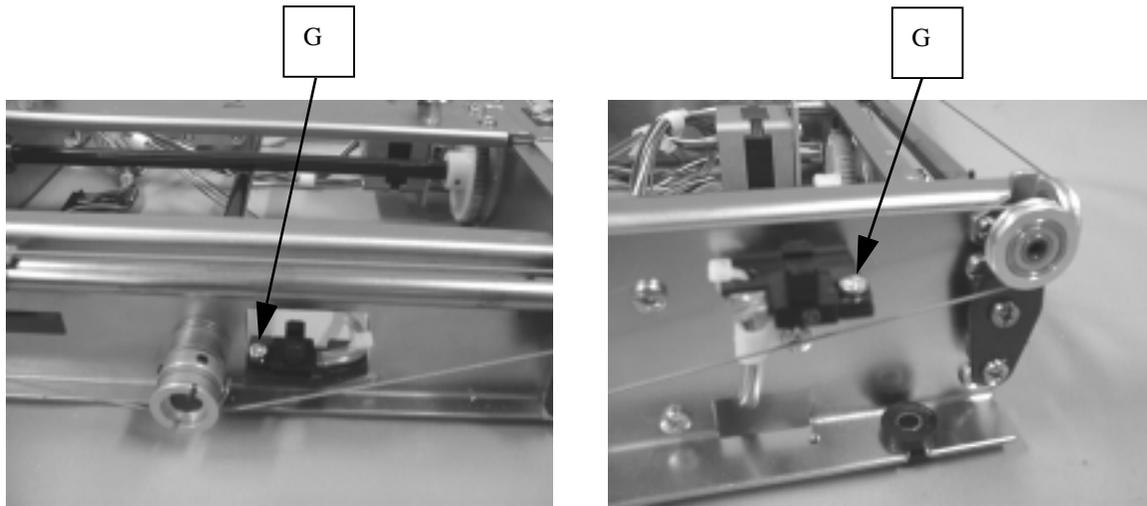


FIGURE 15-7

9. Assemble new one in the reverse order.
10. Turn on power switch of main unit and PC. Keep the condition in which the carriage can be moved. Then adjust sensor position. par. P.69.

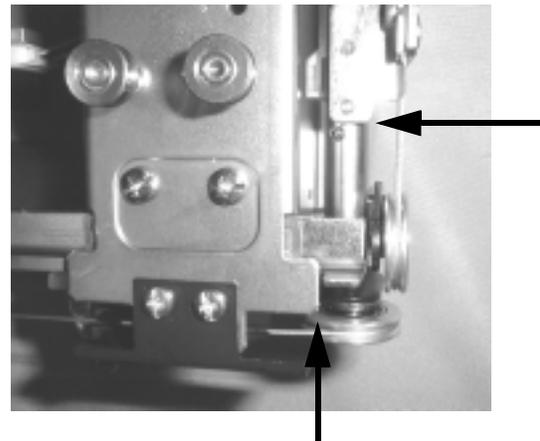


FIGURE 15-8

## 16. Replacement of Gear

This paragraph describes the replacement of wires as well as the replacement of the gear.

1. Perform steps (1)-(3) in par.13.
2. Draw spring pin (A) shown in Fig.16-1 out of the shaft (B) and gear (C).
3. Loosen setscrews (D) shown in Fig.16-2, and detach the wire (H) from wire pulley (E). Remove setscrew(G) from pulley (F), and then , remove wire holder (I). Remove wire (H) from pulley (F).
4. Remove the opposite wire in the same way as in step 3.

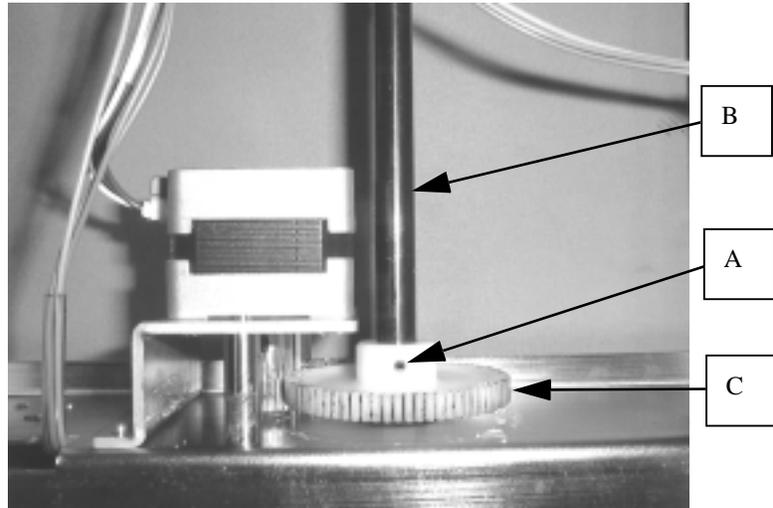


FIGURE 16-1

5. Loosen setscrews (J) shown in Fig.16-2, and separate the wire and the X-carriage from each other.

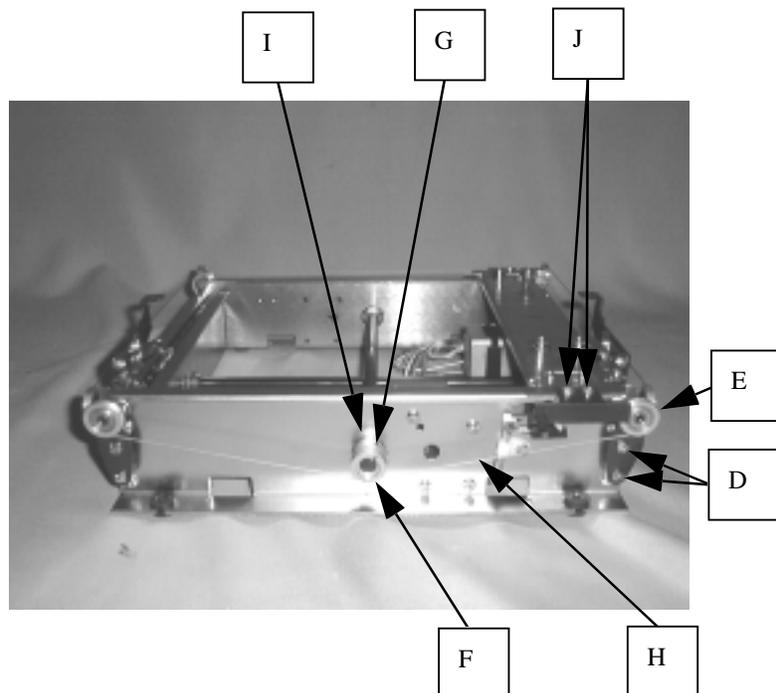


FIGURE 16-2

6. Draw pulley (F) on the sensor (L) side shown in Fig.16-6 after loosening socket screws (K)(K\*). (K screw is a WP screw.) Fig.16-3.

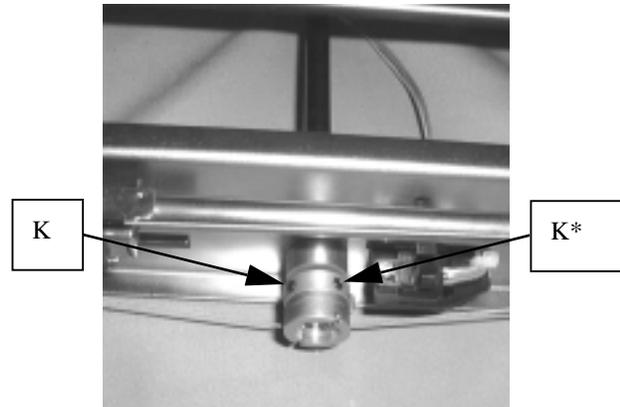


FIGURE 16-3

7. Remove ring (N) by removing setscrew (M) shown in Fig.16-4.
8. Draw out shaft (B).

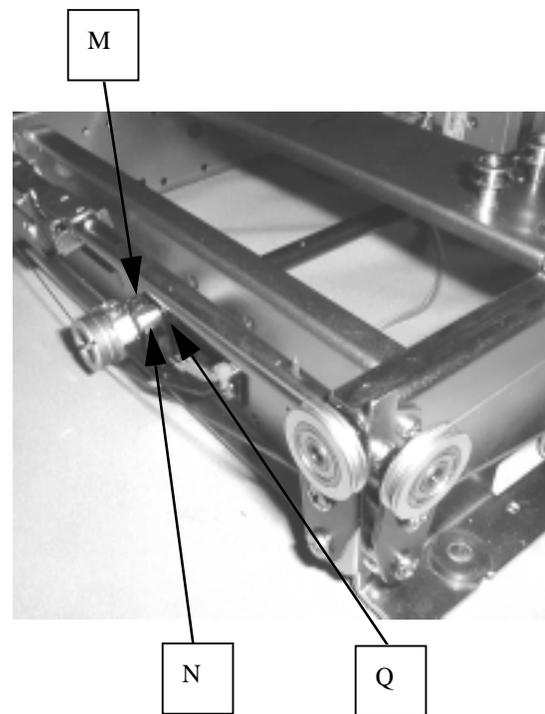


FIGURE 16-4

9. Insert shaft (B) from the opposite side of sensor (L), insert thrust washer (O), and put the gear (C) facing right as shown in Fig.16-5. Mount thrust washer (Q) and ring (N), and fix the ring (N) by setscrew (M) after adjusting the thrust play to about 0.1mm. Fig16-4.

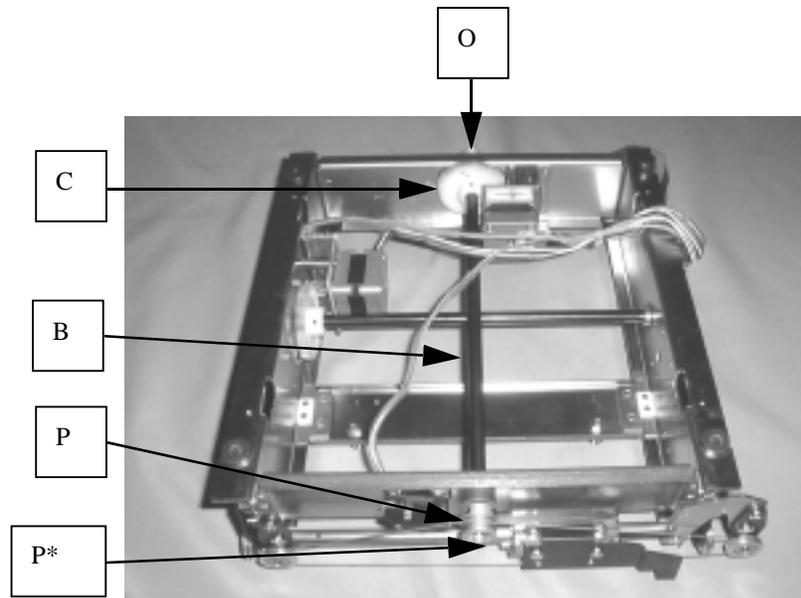


FIGURE 16-5

10. Set the opposite cut (P\*) to meet the cut (P) of the pulley as shown in Fig.16-6, and tighten socket screws (K)(K\*), so that the concaved face of pulley (F\*) and shaft end face (B) are positioned face to face.

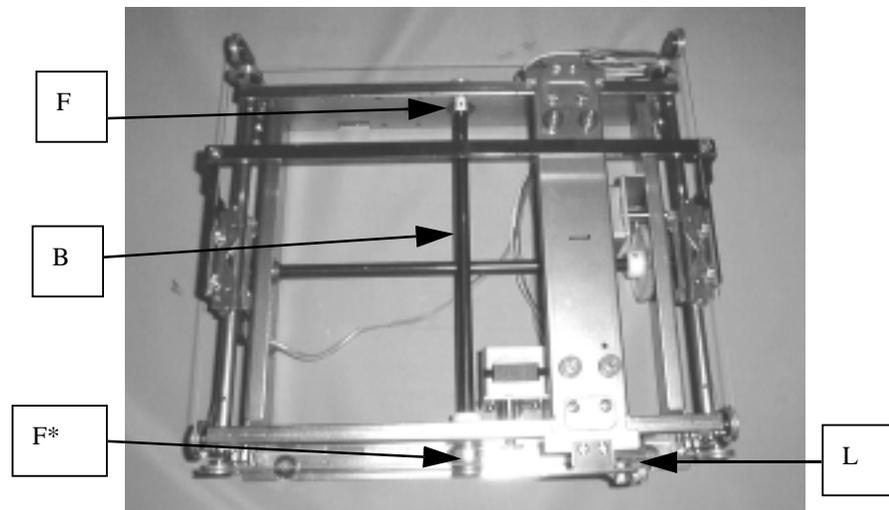


FIGURE 16-6

11. Put ball (R) mounted at the wire tip into the spot-faced hole which is the same phase as cut (P\*) as shown in Fig.16-7. Set the protrusion of the wire holder (I) to meet the other spot-faced hole, and fix the wire holder (I) by setscrew (M).

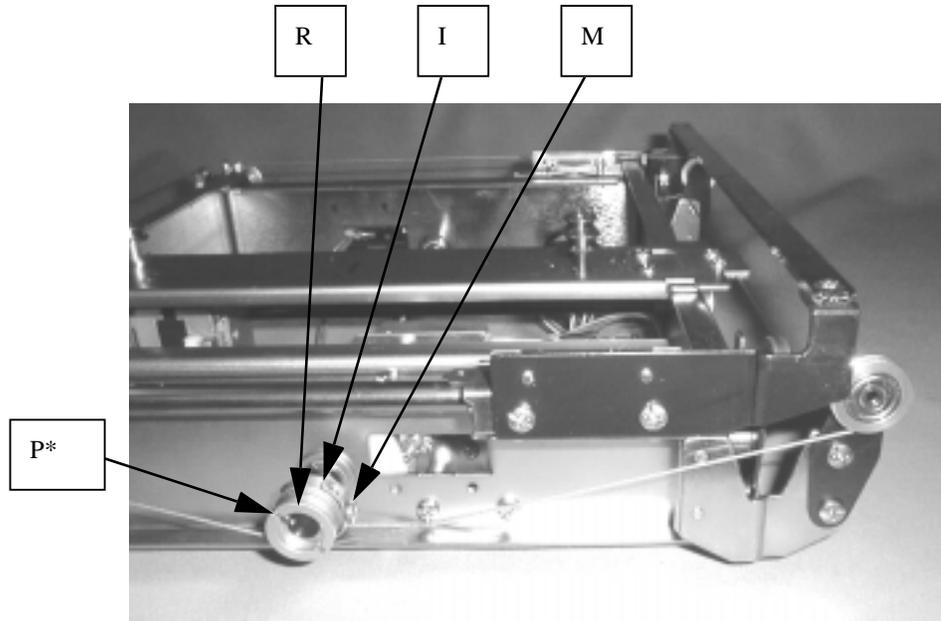


FIGURE 16-7

12. Turn wire (H) counterclockwise by six and half turns on the sensor (L) side pulley (F\*) while closely attaching the wire to pulley (F\*), apply it to wire pulleys (E) in the order of the right and left sides, and mount ball(R) to cut (P\*) as shown in Fig.16-8.

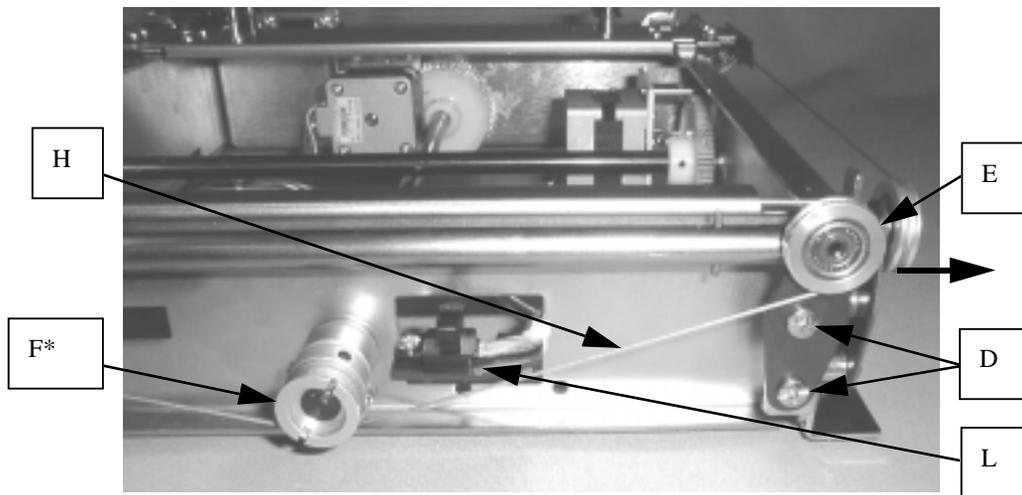


FIGURE 16-8

13. Bring the wire pulley (E) shown in Fig.16-8 in the arrow direction to eliminate the looseness of the wire, and tighten setscrews (D) lightly.

14. Wind the wire (H) onto the opposite pulley (F) clockwise by six and half turns as shown in Fig.16-9 under the winding condition of the wire onto pulley (F\*) by six and half turns, apply the wire to the wire pulleys (E) in the order of the left and right side, mount the ball(R) to the cut (P), and eliminate the looseness of the wire by wire pulley (E).

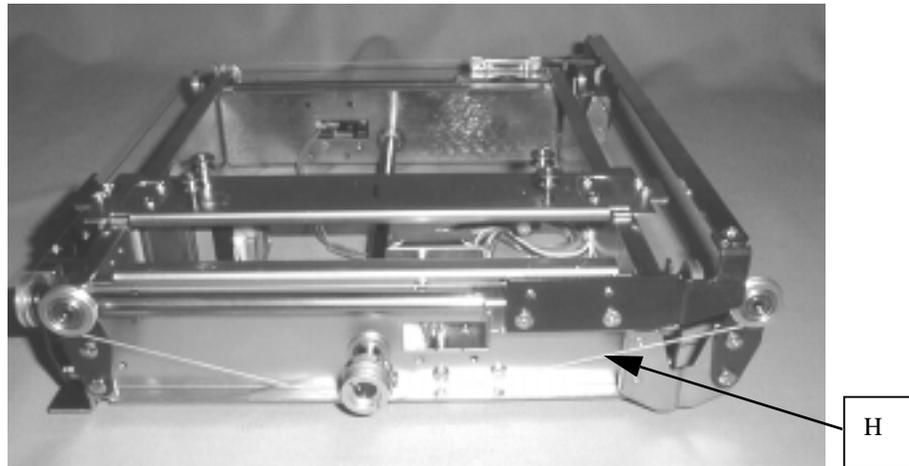


FIGURE 16-9

15. Repeat turning the pulleys clockwise and counterclockwise about ten turns by hand.
16. Perform steps 7. And 18. in par.13 for both wires to adjust the wire tension.

17. After winding the wire (H) onto pulley (F), where no X-sensor is mounted, by 4 turns externally and two turns internally as shown in Fig.16-10, bring the X-carriage (R) to the right, Where the Y-sensor is not mounted. Apply the X-carriage (R) to side bracket A (S), tighten setscrews (J) to connect the wire (H) and X-carriage (R) to each other.

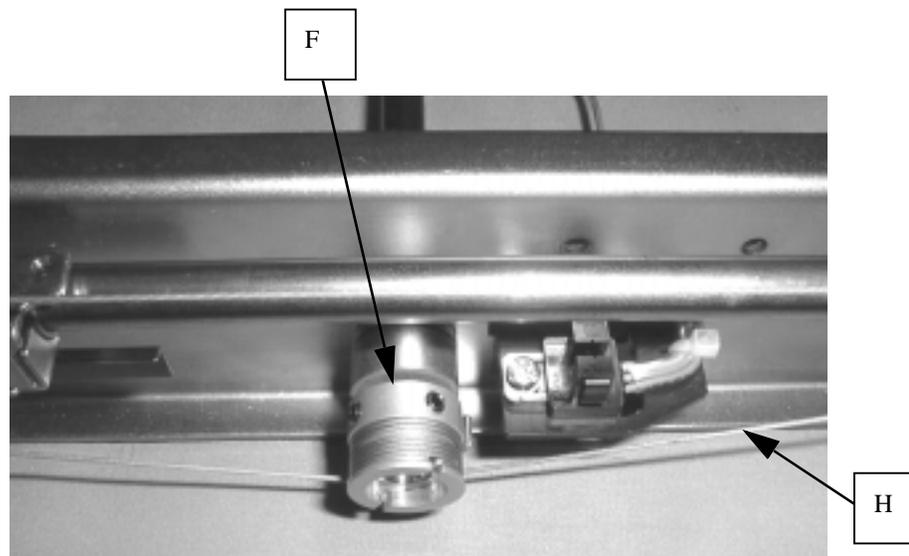


FIGURE 16-10

18. Connect the opposite wire and X-carriage to each other by setscrews (J).

19. Remove work bolts and nuts, set the cushion (T) to the side bracket (S) in the arrow 1 direction as shown in Fig.16-11, and set the bushing (U) in the arrow 2 direction.

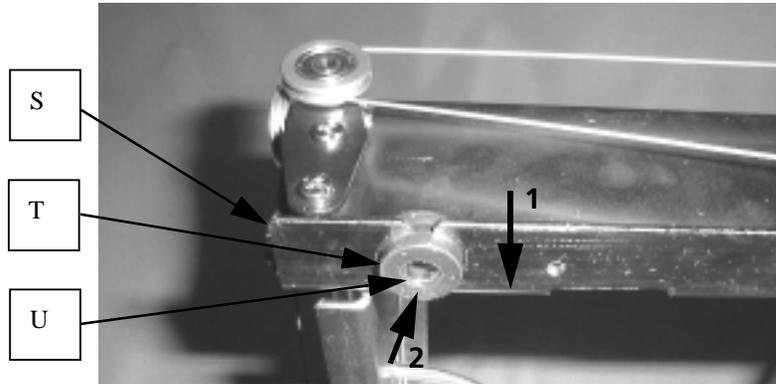


FIGURE 16-11

20. Connect the X-Y mechanism to the baseplate (irrespective of the relationship with the needle) and turn on the power supply.

21. Continue pushing ← key as shown in Fig.16-12 to bring the X-carriage (R) in the Y-sensor direction until it no longer moves, and make sure that the gap (a) between the spring pin 2x16(W) and X-carriage (R) is more than 0.3mm. If the gap (a) is less than 0.3mm, loosen setscrews (B) of X-sensor, and relocate the X-sensor leftward. Fig.16-13. Push → key, and make sure that the gap (a\*) between the side plate A and X-carriage (R) is more than 0.3mm.

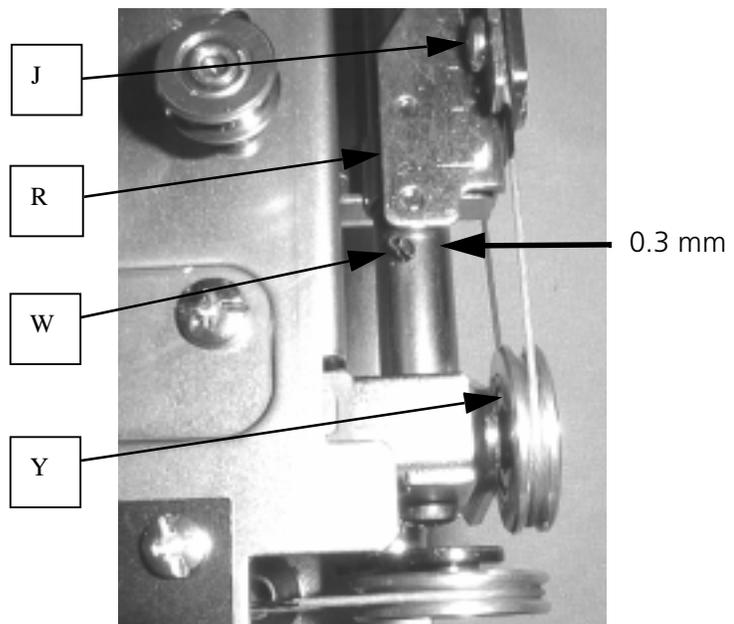


FIGURE 16-12

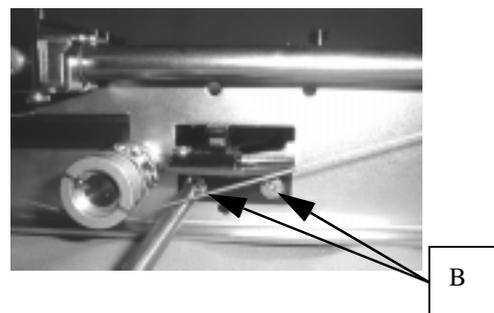


FIGURE 16-13

22. If the Y-direction wire has been replaced, make sure that gaps (b) and (b\*) between the Y-carriage and stopper (Y) are more than 0.3mm by using  $\uparrow$  and  $\downarrow$  keys before and after replacement. If gap (b) is less than 0.3mm as shown in Fig.16-12, loosen setscrews (Z) of the Y-sensor and shift the Y-sensor backward (or leftward in case of Fig.16-14).
23. Position the X-Y mechanism, and mount the X-Y cover and carriage according to steps 5. - 8. in par.8.

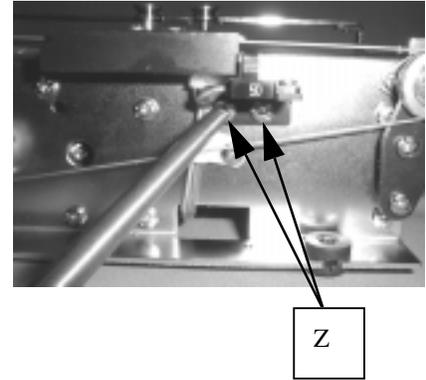


FIGURE 16-14

## 17. Self-diagnosis Mode

### (1) Diagnosis for keys

- (1) Press [ALT+↑] keys to turn on the power switch. After the message [Diagnose Mode] appears, [START KEY] will indicate that diagnosis mode has started.

[START KEY        ]

- (2) When START key is pressed, the screen will say [START KEY [OK]] and then change to [STOP KEY].

[STOP KEY        ]

- (3) Following the same procedures as the above, press STOP, ↑, →, ↓, ←, INIZ, SPOOL, MENU and ENTER keys.

[ALT+ENTER      ]

- (4) Press ENTER key while holding ALT key. If these keys function correctly, [ALT+ENTER [OK]] and then [KEYS:OK] will be displayed. Go to the next step for the buzzer diagnosis.

[Do You Hear?    ]

- \* Procedure common to all diagnosis operations

When pressing the specified key has no effect on the screen display, the diagnosis cannot proceed to the next step. In this case, press another key to display [XXXXXX KEY [NG]] and go to the next step. In diagnosis mode, all keys should function correctly because they are used to examine other parts. Otherwise, [SUMMERY of TEST] will be displayed and the result of the key diagnosis will be displayed.

### (2) Buzzer diagnosis

- (1) After the key diagnosis finishes, [Do You Hear ?] is displayed. The buzzer sounds intermittently. The sound is first low and gradually becomes loud. When the sound is heard and has become loud, press the ↑ key. While you are holding the ↑ key, [BUZZER: OK] is displayed. When the sound is not heard or will not become loud, press ↓ key. While you are holding the ↓ key, [BUZZER: NG] is displayed. After you release the ↓ key, the machine will then go to the LED diagnosis.

[START\_LED BLINK? ]

Hereafter, when the embroidery machine asks the user to judge the operation results, press the ↑ key to indicate "OK," and press the ↓ key to indicate "NG (No Good, or Failure)."

When ↑ key is pressed, [XXXXXXXX :OK] is displayed. When ↓ key is pressed, [XXXXXXXX :NG] is displayed.

### (3) LED diagnosis

- (1) After the buzzer diagnosis steps, START LED starts to blink. Press the  $\uparrow$  key to indicate "OK," and press the  $\downarrow$  key to indicate "NG (No Good, or Failure)."

[MENU\_LED BLINK? ]

- (2) When the MENU LED starts to blink, press the  $\uparrow$  key. When it does not blink, press the  $\downarrow$  key.

[FREE TENTION/ENT ]

### (4) Solenoid diagnosis

- (1) After the LED diagnosis, press the ENTER key. If the solenoid is in excitation, [ON TENTION/ENT] is displayed. If the actuation sound is heard, press the  $\uparrow$  key. If not, press the  $\downarrow$  key.

### (5) Upper shaft sensor diagnosis

The items in the screen message [000 H H] respectively indicate the number of H/L times on the VELO signal, SAFEPH signal level and XYACTPH signal level.

- (1) The leftmost number on the display of [000 H H], at the left side indicates how many times the SAFEPH becomes H. This means that the count number increases every time the VELO signal level becomes H. To confirm the the VELO signal, rotate the handwheel rotate one cycle. The number will be 410 to 420. (Driving motor has 45 slits on the gear, in this case moderating ratio is 9.2. Therefore, the number equals 414 (45slits x moderating ratio 9.2 =414)). The number varies between 410 and 420 approximately, depending on the rotation of the handwheel and shield plate position.
- (2) The two kinds of signal levels are indicated as H and L on the EP1B's phase diagram as per attached. Rotate the handwheel by hand. If it rotates according to the specifications, press the  $\uparrow$  key to indicate "OK." If the phase is out of range, remove the top cover and adjust the shield plate position.

[Z MOTOR/START ]

- \* On the item (5), if the result is NG (No Good), the diagnosis steps of rotating the DC driving motor for upper shaft will be skipped.

### (6) Diagnosis for the upper shaft DC driving motor

- (1) After confirming that the upper shaft sensor is OK, go to the DC driving motor diagnosis. When you press the START key, the DC driving motor for the upper shaft starts to rotate.

When the STOP key is pressed, the rotation of the motor stops. When  $\uparrow$  key is pressed, the rotation speed will increase.

[SPEED=200 ]

- (2) Following the above steps, in every 10 seconds, the machine rotates at the speed of 300 rpm, 400 rpm, 500 rpm, 600 rpm and 700 rpm respectively and then the machine stops.

[RESULT ?     ]

- (3) When the rotation speed is correct, press the  $\uparrow$  key and when it is not good (NG), press the  $\downarrow$  key.

### **(7) Spool diagnosis**

- (1) After checking the upper shaft DC driving motor diagnosis, [PUSH DOWN LEVER] is displayed. Move down the spool axis to the spool position. After a few seconds, the machine will display. . .

[PUSH/SPOOL     ]

- (2) Hold the SPOOL key, the spool winding motor starts to rotate and the following message will appear.

[RESULT?        ]

- (3) If the spool winding motor functions is all right, press the  $\uparrow$  key. When it does not work, press the  $\downarrow$  key. Then the judgement key to stop the motor.

- (4) While you are holding the judgment key, the result is displayed. When the key is released, [PUSH UP LEVER] will be displayed.

### **(8) Diagnosis of the initial setting sensor for the frame driving motor**

- (1) After the spool diagnosis, go to the next step.
- (2) Move the frame support backward by hand and confirm the rightmost item on the screen changes to display [REAR(Ans=H):H], then press  $\uparrow$  key.
- (3) Move the frame support to frontward by hand. After confirming the message [FRONT(Ans=L):L], press the  $\uparrow$  key.
- (4) Move the frame support rightward by hand. After confirming the message [RIGHT (Ans=H):H], press the  $\uparrow$  key.
- (5) Move the frame support leftward by hand. After confirming the message [LEFT (Ans=L):L], press the  $\uparrow$  key.

\* Operation common to all the initialization setting sensor diagnosis

Hold the  $\uparrow$  key to see [XY SENSOR:OK].

If the rightmost item on the screen does changed, press the  $\downarrow$  key to indicate "NG (No Good, or Failure)." In this case, the diagnosis of the frame driving motor will be skipped and the diagnosis for the upper thread breakage sensor will start.

### (9) Frame driving motor diagnosis

- (1) When the initialization setting sensor is OK, [INIZ XY/START] is displayed. Then press the START key. After the initialization, [MAX RECTANGULAR] is displayed and the frame will be moved around to confirm the maximum embroidery area.

[RESULT?        ]

- (2) When the result is all right, press the ↑ key.

[THREAD SENSOR ]

### (10) Upper thread breakage sensor diagnosis

- (1) When [THREAD SENSOR] is displayed, press the START key. Then DC driving motor for upper shaft starts to rotate.
- (2) When the spool winding spring is picked up by hand, [ON        ] is displayed.

When display OFF is switched to ON, press ↑ key. [THREAD SENSOR:OK] is displayed and then the DC driving motor for the upper shaft stops.

[BOBBIN SENSOR ]

### (11) Diagnosis for the bobbin thread sensor

- (1) When [BOBBIN SENSOR] is displayed, press the START key. If the upper shaft driving motor rotates and the bobbin has thread, [FULL BOBBIN] is displayed.
- (2) Press the STOP key to stop the driving motor. After removing the bobbin case, press the START key again. When the upper shaft driving motor restarts, the following message will appear.

[FEW BOBBIN        ]

- (3) When all steps are confirmed according to the above descriptions, press the ↑ key.

[DUST SENSOR        ]

### (12) Dust sensor diagnosis

- (1) Press the START key while [DUST SENSOR] is displayed. The driving motor for the upper shaft will rotate 4 cycles and stops at the top position. When there is no dust, [CLEAN] is displayed.
- (2) Remove the bobbin case and hook race body and put a vinyl resin tape on the dust sensor. Press the START key. When the driving motor for the upper shaft rotates 4 cycles and stops at the top position, [DUSTY] is displayed.
- (3) When all steps are confirmed according to the above described procedure, press the ↑ key.

[SUMMERY of TEST    ]

### (13) Display of the test results

- (1) When [SUMMERY of TEST] is displayed, press the ENTER key to see all the diagnosis results.

[\* KEY PANEL:OK ]

- (2) NC means No Check. An item which have not been diagnosed are indicated by the following message.

[\*XXXXXXXX:NC ]

### (14) Individual diagnosis

You can select desired item and carry out individual diagnosis.

- (1) To enter individual diagnosis mode, press ALT+ ENTER keys while the diagnosis results are displayed.

[#XXXXXXXXXX ]

- (2) Press the MENU key to select an item for diagnosis.

[# XY SENSOR ]

- (3) Press the ENTER key.

[REAR (Ans=H):H ]

In this step, when the MENU key is pressed, you can exit from the individual diagnosis for the item in the following steps, the same procedure as the above operations are carried out. In the individual diagnosis mode, when ALT+ENTER keys are pressed, the machine goes to the display mode for the diagnosis results. The results of the diagnosis will be displayed.

- \* For example, if you only want to diagnose initialization sensor, press any key so that the result will be judged "NG (No Good, or Failure.)" and go to the display mode for the test results. Press the ALT+ENTER keys to enter the individual diagnosis mode and carry out the initial setting sensor's diagnosis.

### (15) Data confirmation of EEPROM

In individual diagnosis, there is an item for data confirmation of EEPROM.

- (1) In individual diagnosis mode, press the MENU key. You can select the item of the confirmation for the EEPROM.

[# READ EEPROM ]

- (2) Press the ENTER key. [ 0 ]  
 After releasing the key. [ 0 425 143732]  
 Press the ENTER key. [ 4 ]  
 After releasing the key. [ 0 0 0 0 ]

While you are holding the ENTER key, the address value is displayed at word size and when the key is released, the machine displays the content for 4 words in hexadecimal notation.

### **(16) EEPROM data deletion**

In individual diagnosis, there is an item for deleting the EEPROM data. Selecting this item, you can rewrite all data to FFFFH which is the same as new chip.

- (1) In individual diagnosis mode, press the MENU key and select the item to delete EEPROM data.

[# CLEAR EEPROM ]

- (2) Press the ENTER key.

[INPUT CIPHER ]

- (3) Press the  $\uparrow, \downarrow, \leftarrow, \rightarrow$  keys in this order.

[Right CLEAR ]

- (4) Select the data confirmation of EEPROM. Make sure the display is showing FFFFH.

[FFFFFFFFFFFFFFFF]

EP-1B phase diagram

