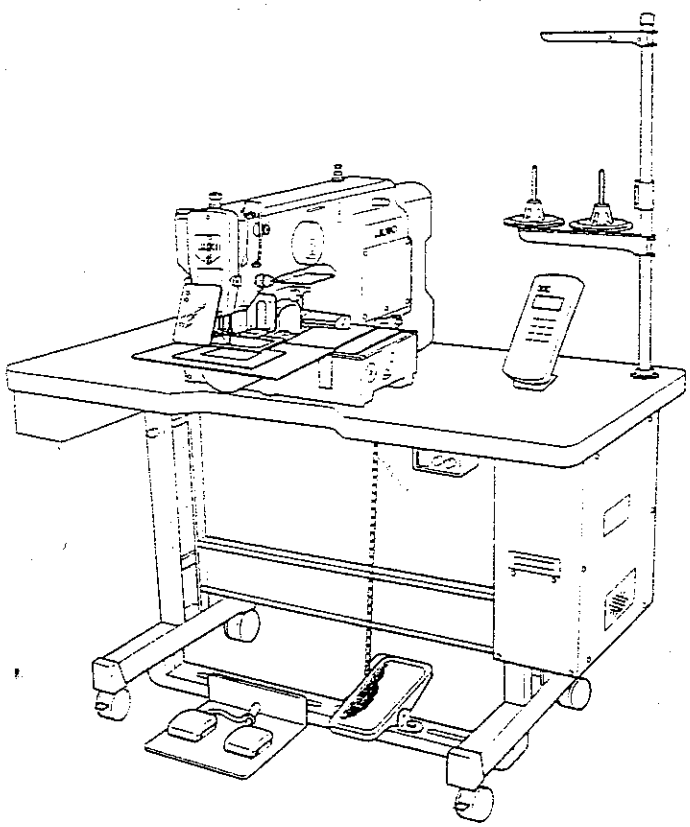
JUKI

Computer-controlled Cycle Machine
with Input Function

AMS-210D

ENGINEER'S MANUAL



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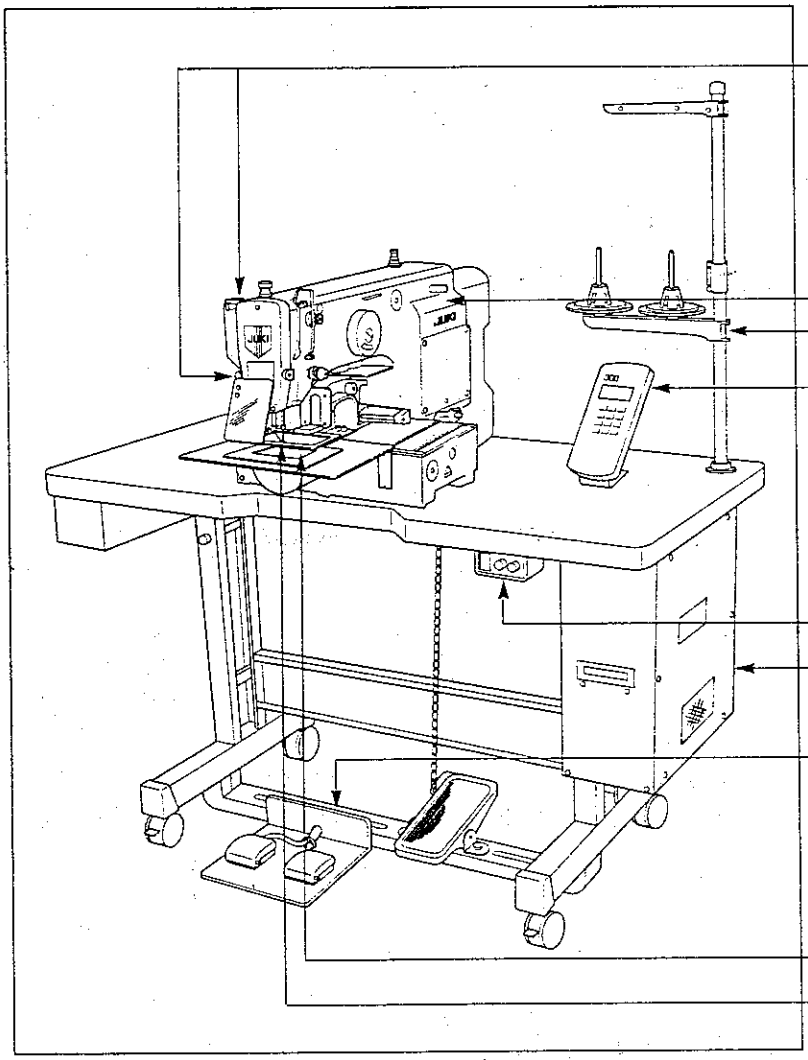
1. SPECIFICATIONS

1) Sewing area	: X (lateral) direction 130 mm Y (longitudinal) direction 60 mm
2) Max. sewing speed	: 2,500 s.p.m. (when sewing pitch is 3 mm or less)
3) Stich length	: 0.1 to 12.7 mm (adjustable in 0.1 mm steps)
4) Feed motion of feeding frame	: Intermittent feed (2-shaft drive by stepping motor)
5) Needle bar stroke	: 41.2 mm
6) Needle	: DP x 5, DP x 17
7) Lift of feeding frame	: 22 mm (standard) Max. 30mm (Magnet type : Max. 25 mm)
8) Intermediate presser stroke	: 4 mm (standard) (0.5 to 10 mm)
9) Lift of intermediate presser	: 20 mm
10) Shuttle	: Double-capacity semi-rotary hook (self-lubricated)
11) Lubricating oil	: New Defrix Oil No. 2 (supplied by oiler)
12) Memory medium	: 3.5 inch micro floppy disk (2DD, 2HD) Memory pattern : 44 to 691 pattern / cassette
13) Temporary stop facility	: Used to stop machine operation during a stitching cycle.
14) Enlarging/Reducing facility	: Allows a pattern to be enlarged or reduced on the X axis and Y axis independently when sewing a pattern. Scale : 0.01 to 4 times (0.001 steps)
15) Enlarging/Reducing method	: Pattern enlargement/reduction can be done by increasing/decreasing either stitch length or the number of stitches.
16) Max. sewing speed limitation	: The maximum sewing speed can be set limited to any value within a range of 200 to 2,500 s.p.m., using the external control knob.
17) Pattern selection	: 1 to 999 patterns can be selected by specifying the desired pattern Nos.
18) Bobbin thread counter	: Tells the time to replace the bobbin.
19) Memory back-up	: In case of a power interruption, the pattern being used will automatically be stored in memory so that the interrupted sewing cycle may be resumed simply by pressing the Set Ready switch after the power is restored.
20) 2nd origin setting facility	: Using jog keys, a 2nd origin (needle position after asewing cycle) can be set in the desired position within the sewing area. The set 2nd origin is also stored in memory.
21) Needle-up stop facility	: When the needle does not stop in its upper position, the needle can be brought up to the upper position by turning again the needle threading switch.
22) Sewing machine motor	: 400W servo-motor
23) Dimensions	: 1,200 mm (W) x 710 mm (L) x 1,200 mm (H) (Excluding thread stand)
24) Gross weight	: 120 kgs
25) Power consumption	: 600 VA
26) Operating temperature range	: 5°C to 40°C
27) Operating humidity range	: 20% to 80% (No dew condensation)
28) Line voltage	: Rated voltage ±10% 50 / 60 Hz
29) Air pressure used	: 0.5 to 0.55 MPa (5 to 5.5 kgf / cm^2) } For pneumatic type only.
30) Air consumption	: 1.8 ℓ / min } For pneumatic type only.
31) Needle highest position stop facility	: After the completion of sewing, the needle can be brought up to its highest position.

2. CONFIGURATION

(1) Names of main unit



- Switches on the machine head

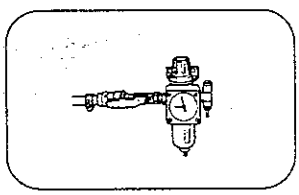
No.	Name
1	Temporary stop switch
2	Wiper switch

- Machine head
- Thread stand
- Switches on the operation box
- Power switch
- Control box
- Pedal switch

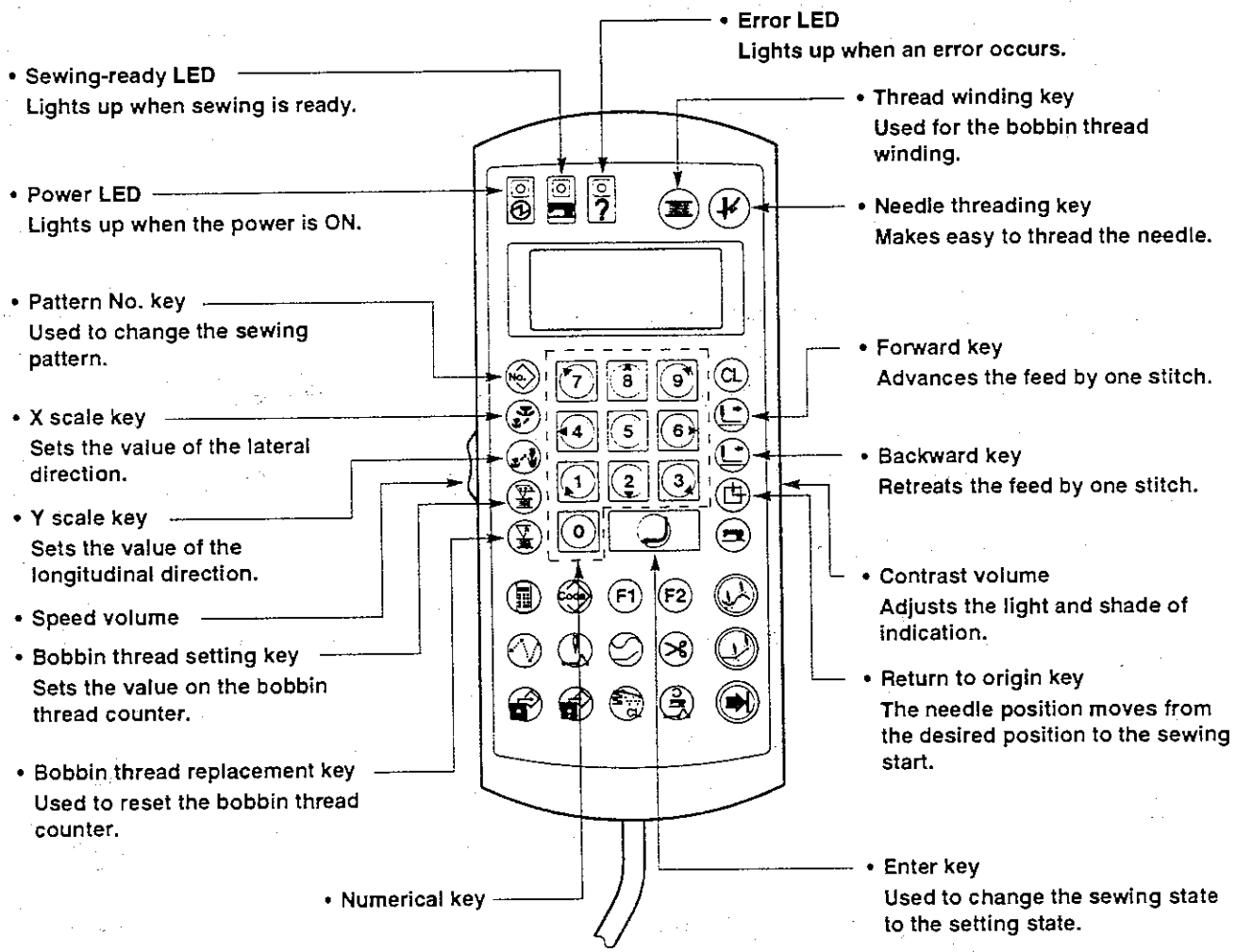
No.	Name
1	Feeding frame switch
2	Start switch

- Feeding frame
- Intermediate presser

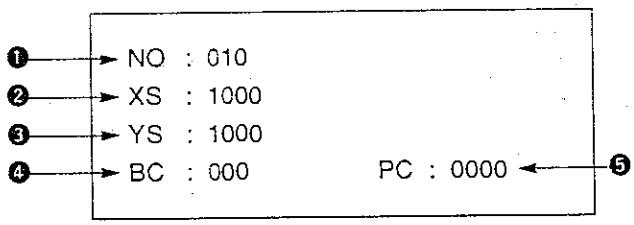
Air regulator (for pneumatic type only)



(2) Names of the switches for the sewing machine operation



(3) Names of display indications



❶ Indication of Pattern No. : Can be changed by No. key and Numerical key.

❷, ❸ Enlargement/reduction indication : Indication of 1000 shows 100%.

- X (Y) – : 100% fixed.
- X (Y) P : Enlargement/reduction can be made by increasing/decreasing the pitch.
- X (Y) S : Enlargement/reduction can be made by increasing/decreasing the number of stitches.

❹ Bobbin thread counter : Set by [Bobbin thread setting] key and numerical key.

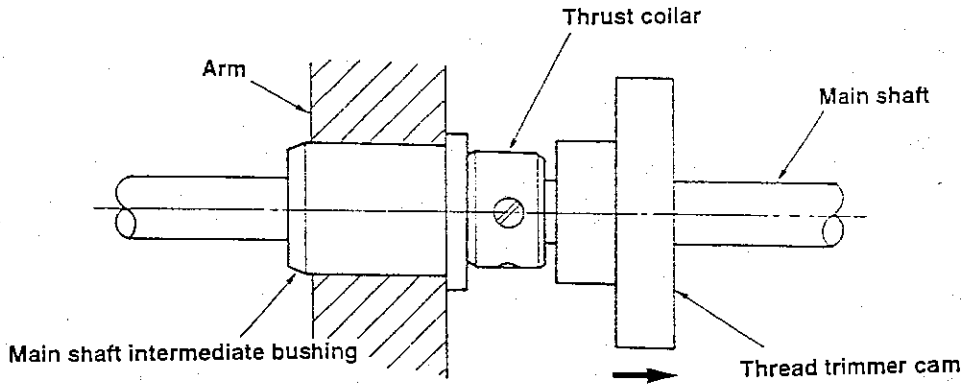
❺ Production counter : Pressing [Clear] key, push [Bobbin thread replacement] key to clear the counter to 0000.

3. ADJUSTMENTS

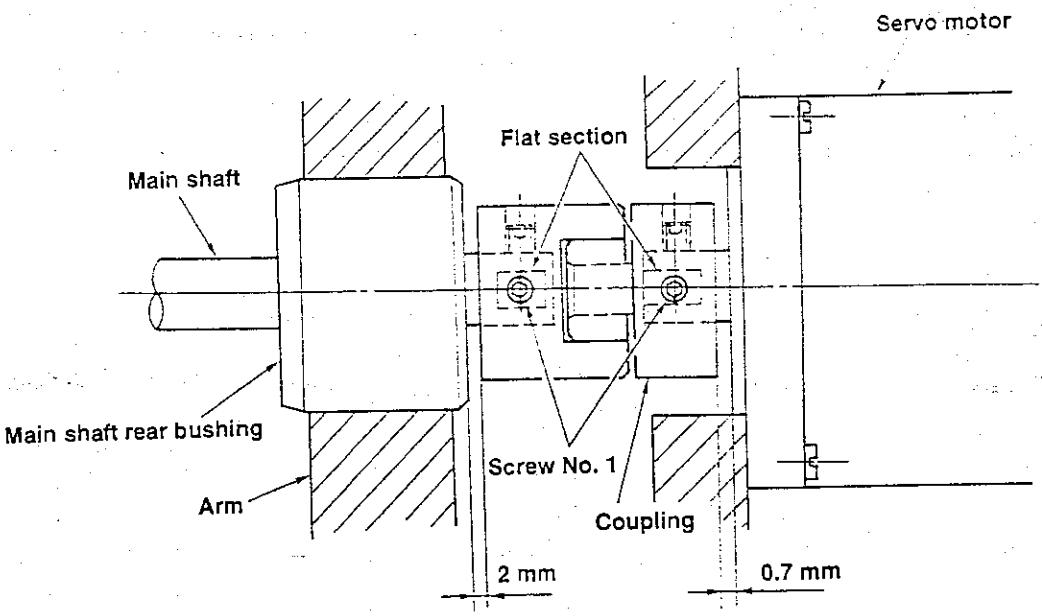
(1) Adjustment of the main shaft components

Standard Adjustment

1) Adjusting the play of the main shaft



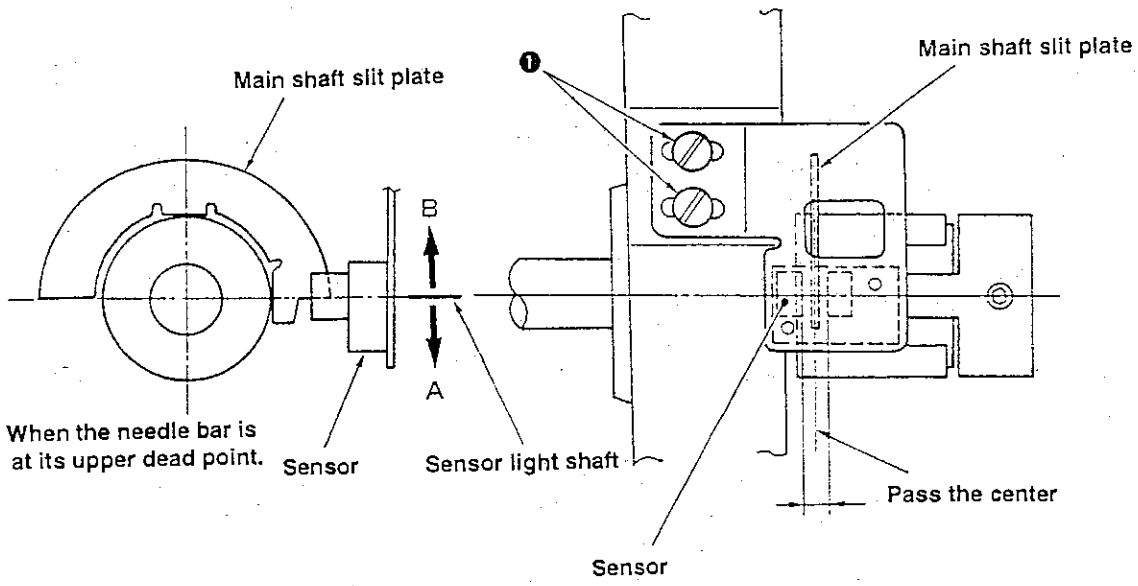
2) Installing the main shaft coupling



Adjustment Procedures	Results of Improper Adjustment
○ Drawing the thread trimmer cam in the direction of arrow, lightly press the thrust collar to the main shaft intermediate bushing. Then tighten it.	
① Making the clearance between the servo motor and the coupling 0.7 mm, fit the screw No. 1 to the flat section. Then install the coupling. ② Making the clearance between the main shaft rear bushing and the coupling 2 mm, fit the screw No. 1 to the flat section. Then install the coupling. ③ When engaging the respective couplings, be sure to align the two positions of the screws in the direction of rotation.	○ If the position of the couplings is not correct, the main shaft does not stop at the normal angle.

Standard Adjustment

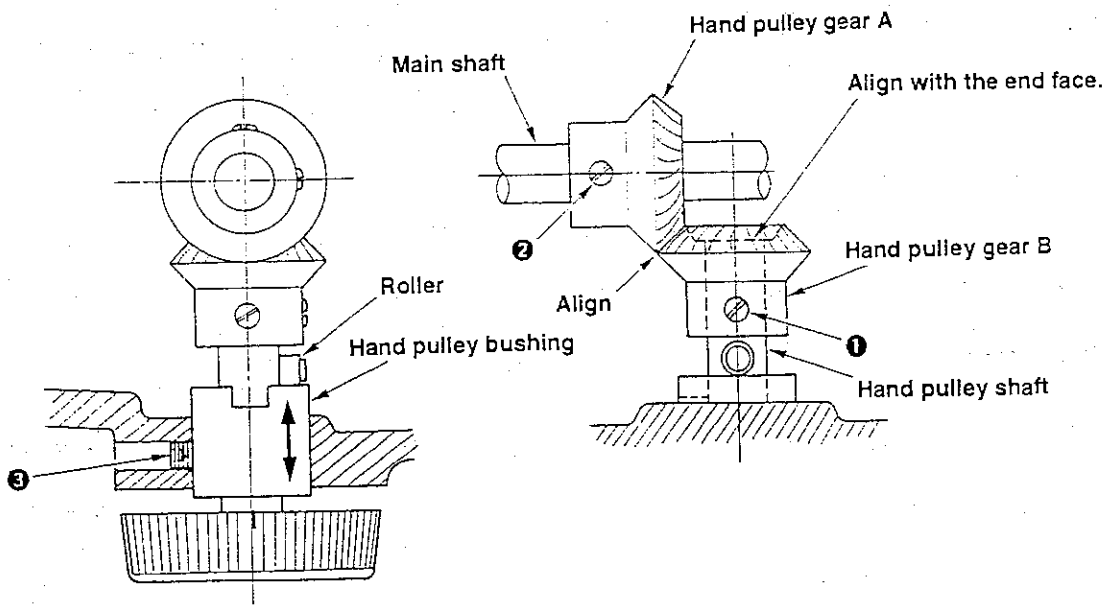
3) Adjusting the main shaft sensor



(2) Adjustment of the hand pulley

Standard Adjustment

1) Adjusting the backlash



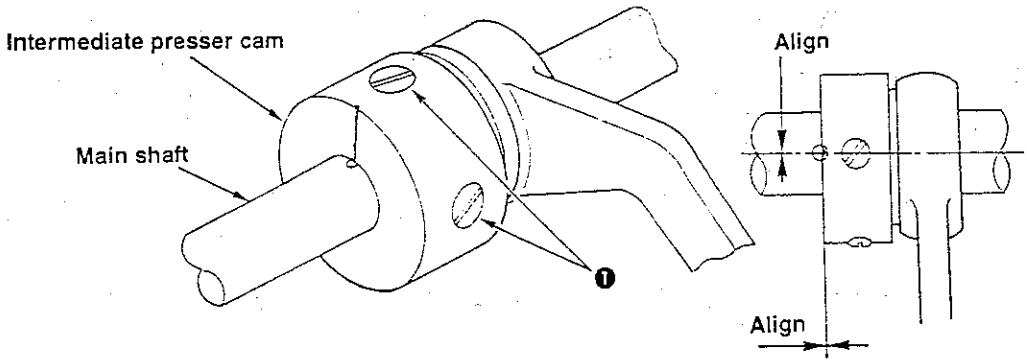
Adjustment Procedures	Results of Improper Adjustment
○ Adjust the position of the sensor so that the main shaft slit plate passes nearly the center of the sensor without interfering each other, and the end part of the slit plate nearly aligns with the light shaft of the sensor when the needle bar is at its upper dead point. Then tighten it with secrews ❶.	○ If the sensor is slid to the side A, the height of the needle point will be lower than the specified value when the sewing machine stops. ○ If the sensor is slid to the side B, slip-off of the needle thread will occur at the sewing start. ○ If the sensor is slid to the side A, needle breakage may occur when sewing heavy-weight materials.

Adjustment Procedures	Results of Improper Adjustment
① Align the hand pulley gear B with the end face of the hand pulley shaft, and tighten with setscrew ❶. ② Align the hand pulley gear A with the shoulder of the hand pulley gear B, and tighten with setscrew ❷. ③ Move the hand pulley bushing in the direction of arrow and adjust so that there is a slight backlash between the gears when the roller is riding on the end face of the hand pulley bushing. Then tighten with setscrew ❸. **(Note) The hand pulley gear A and B are not the same. Assemble them after confirming the mesh direction.**	○ If the backlash is too small, it will cause the uneven torque when turning the hand pulley.

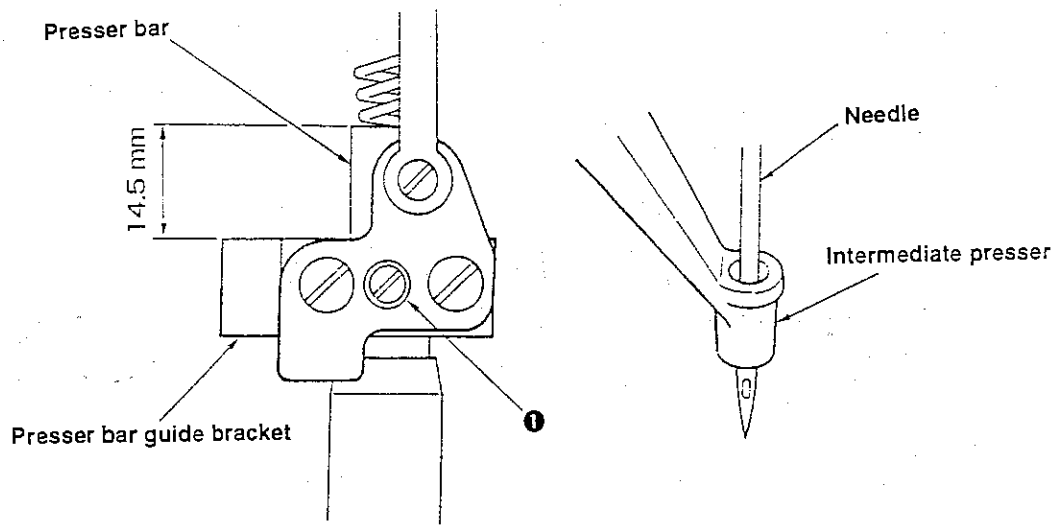
(3) Adjustment of the intermediate presser mechanism components

Standard Adjustment

1) Adjusting the intermediate presser cam

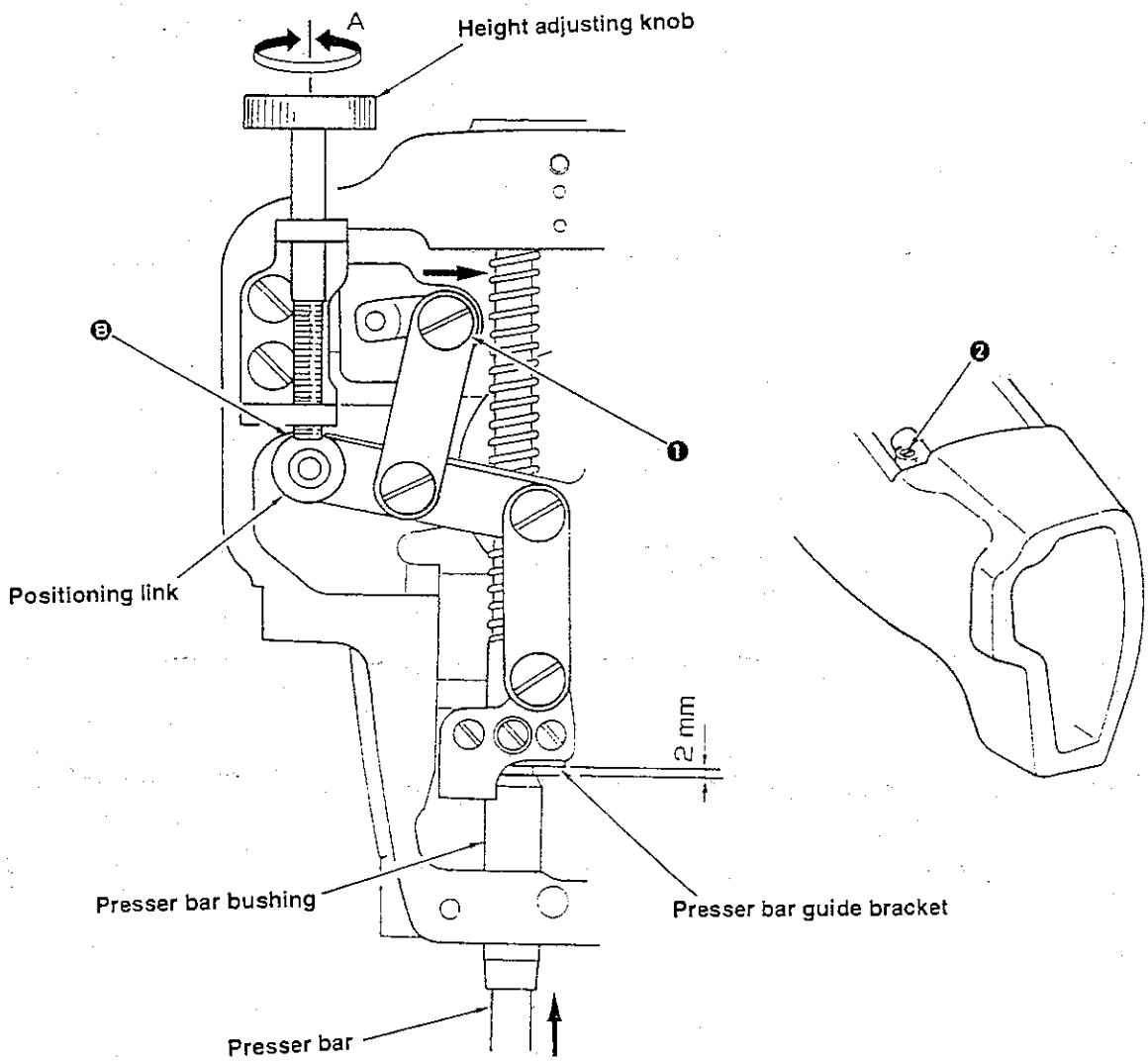


2) Adjusting the presser bar



Adjustment Procedures	Results of Improper Adjustment
○ Adjust so that the end face of the intermediate presser cam aligns with the center of the engraved point of the main shaft and the engraved line of the intermediate presser cam aligns with the engraved point of the main shaft. Then tighten it with setscrews ❶. (The center of the screw No. 1 of the itermediate presser cam aligns with the engraved point of the main shaft.)	○ Stitch skipping or poor-tightened stitches may occur.
○ Adjust the protruding amount of the presser bar from the presser bar guide bracket to 14.5 mm, and confirm that the needle passes the center of the intermediate presser. Then tighten it with setscrew ❶. **(Note) Keep the screwing pressure of setscrew ❶ at 40 to 45 kgfcm.**	○ If the protruding amount of the presser bar is excessive, intermediate presser spring breakage or intermediate presser failure may occur. ○ If the screwing pressure is excessive, the presser bar will be deformed, and action failure may occur.

3) Intermediate presser driving arm

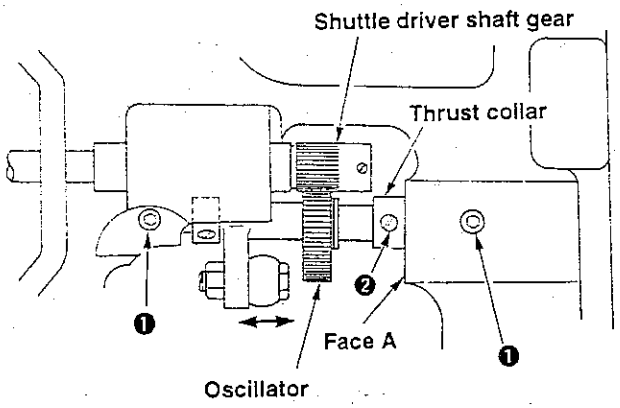


Adjustment Procedures	Results of Improper Adjustment
① Turn the height adjusting knob in the direction A so that the positioning link hits the section Ⓑ of the arm. ② Bring intermediate presser stroke adjusting screw ❶ to the right side and securely tighten it. ③ Turn the handwheel to make the needle bar at its lower dead point. Lift up the presser bar so that the positioning link comes in contact with the section Ⓑ of the arm and the clearance between the presser bar bushing and the presser bar guide bracket becomes 2 mm. Then tighten setscrew ❷ of the intermediate presser driving arm. ④ After tightening setscrew ❷, confirm that there is no play longitudinally in the intermediate presser driving arm. ⑤ Finally, adjust the stroke of the intermediate presser. (Refer to the instruction manual.)	○ If there is no clearance, the presser bar bushing interferes with the presser bar guide bracket during operation, resulting in producing noise. ○ If the clearance is excessive or too small, the height of the lowest dead point of the intermediate presser will vary due to the adjustment of the stroke of the intermediate presser.

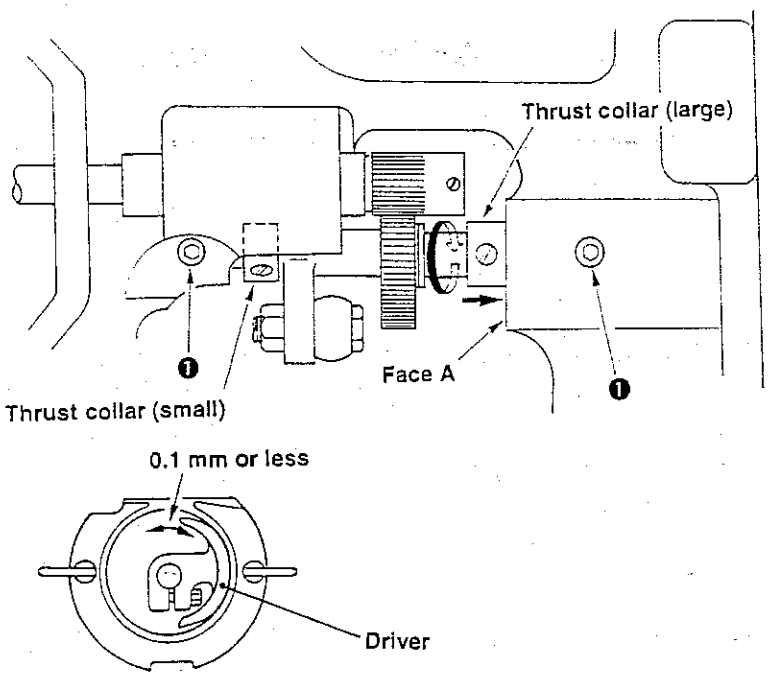
(4) Adjustment of the shuttle driver shaft components

Standard Adjustment

1) Adjusting the longitudinal position of the oscillator



2) Adjusting the backlash of the oscillator gear



Adjustment Procedures	Results of Improper Adjustment
① Loosen setscrews ❶ and ❷. ② When turning the main shaft several times, the oscillator moves in the direction of arrow, and it moves naturally to the position without the load. ③ Temporarily tighten setscrew ❶. ④ Strike the thrust collar to the face A of the bed, and tighten setscrew ❷. **(Note) There is no thrust collar in the initial products. So, perform "2) Adjusting the backlash of the oscillator gear" after performing the procedures up to the aforementioned step ❸.**	○ If the longitudinal position of the oscillator is not correct, it will cause the seizure of the oscillator or main shaft crank components.
① Loodsen setscrew ❶. ② Closely fitting the thrust collar (large) to the face A of the bed, turn the oscillator gear (large) in the direction of arrow to adjust the backlash. Adjust the backlash so that it is 0.1 mm or less at the tip end of the shuttle driver, and the shuttle driver smoothly rotates. ③ Tighten setscrew ❶. **(Note) 1. There is no thrust collar (large) in the initial products. So, adjust it by turning the thrust collar (small). At this time, be careful so that the longitudinal position of the oscillator does not change.** **2. Be sure to keep the rotating direction shown in the figure when removing the backlash.**	○ If the backlash is excessive, the shuttle noise wil be increased. ○ If the backlash is too small, it will cause the seizure of the oscillator or main shaft crank components. ○ When adjusting the backlash, if the longitudinal position of the oscillator is not correct, it will cause the seizure of the oscillator or main shaft crank components.

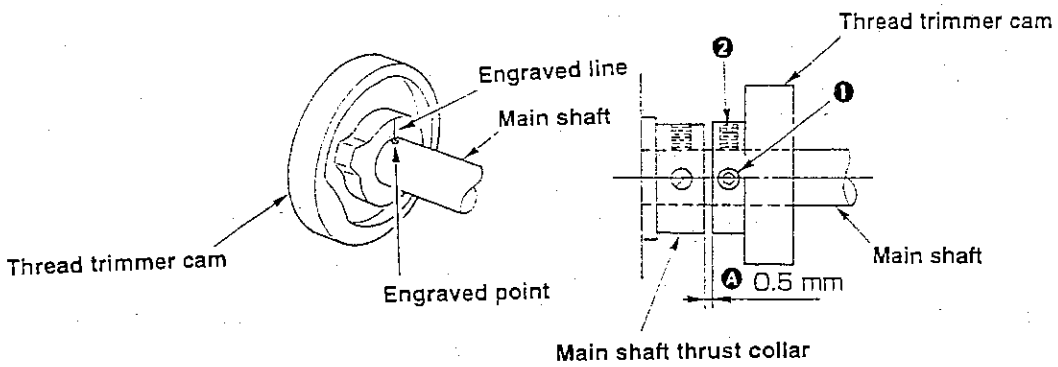
(5) Adjustment of the thread trimmer mechanism components

Standard Adjustment

1) Adjusting the thread trimmer cam

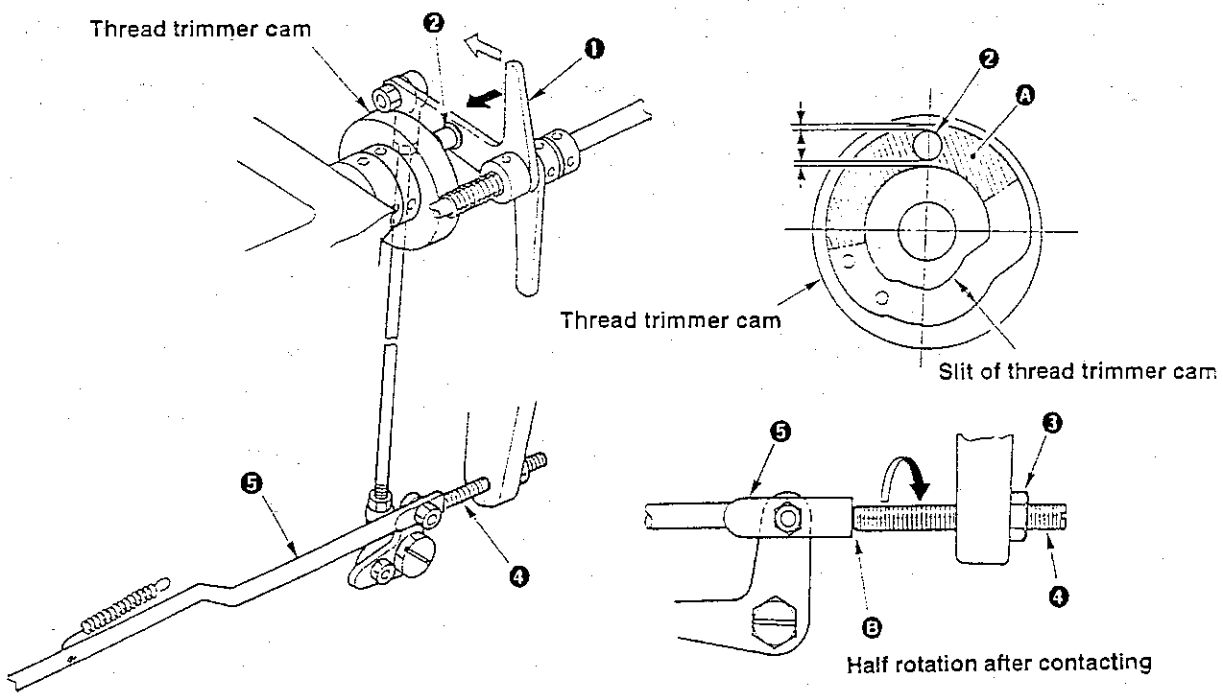
Position of the direction of the main shaft : Adjust the clearance Ⓐ between the thread trimmer cam and the main shaft thrust collar to 0.5 mm.

Position of the direction of the rotation : Align the engraved point of the main shaft with the engraved line of the thread trimmer cam.



2) Adjusting the thread trimmer link stopper screw

Make sure that thread trimmer roller ❷ has a clearance against the both end faces of the slit of the thread trimmer cam and smoothly enters the slit when pushing cam installing link ❶ in the direction of arrow (←) in the running section (in the range of Ⓐ) of the thread trimmer cam.

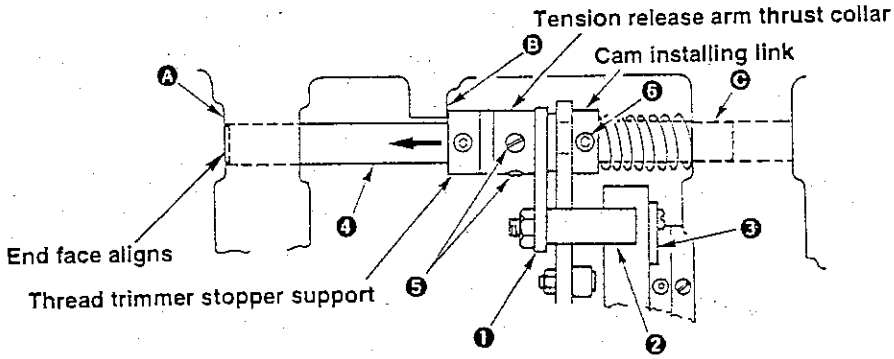


Adjustment Procedures	Results of Improper Adjustment
① Determine the position of the thread trimmer cam, and tighten screw No. 1 ❶ of the thread trimmer cam from the upper side of the sewing machine. ② Turn the main shaft by 1/4 rotation in the right direction, and tighten screw No. 2 ❷ of the thread trimmer cam from the upper side of the sewing machine as well. (When loosening the thread trimmer cam screws, loosen them in the orde of ❷ to ❶.)	○ Thread trimming failure will occur. ○ Lock of the sewing machine will occur at the sewing start or at the time of thread trimming. ○ Returning the initial position of the thread trimmer mechanism is delayed, and poor-tightened stitch of the first stitch at the sewing start will occur. (Caution) **When the lock of the sewing machine has occured, check the play of the axial direction of the main shaft, position and timing of the thread trimmer cam or related components.**
① Tilt the sewing machine head. ② When the intermediate presser comes down (power is OFF.), turn the main shaft and fit thread trimmer roller ❷ to the running section Ⓐ of the slit of the thread trimmer cam. ③ Loosen nut ❸ and loosen thread trimmer link stopper screw ❹ to the position where it separates from section Ⓑ of thread trimmer connecting bar ❺. ④ Pressing cam installing link ❶ in the direction of arrow, lightly fit thread trimmer roller ❷ to the thread trimmer cam. (It does not enter the slit of the cam.) ⑤ Start tightening thread trimmer link stopper screw ❹. The top end of thread trimmer link stopper screw ❹ comes in contact with the section Ⓑ of thread trimmer connecting bar ❺, and when tightening further, cam installing link ❶ turns in the direction of arrow (⇦). Then thread trimmer roller ❷ which was lightly fit to the thread trimmer cam enters the slit of the thread trimmer cam ⑥ Screw further thread trimmer link stopper screw ❹ by half turn from the point where thread trimmer roller ❷entered the slit of the thread trimmer cam. Then tighten nut ❸ to fix it. At this time, tighten nut ❸ after fixing thread trimmer link stopper screw ❹ so that it does not turn further.	○ Thread trimming failure will occur. ○ Lock of the sewing machine will occur at the sewing start or at the time of thread trimming. ○ Returning the initial position of the thread trimmer mechanism is delayed, and poor-tightened stitch of the first stitch at the sewing start will occur. (Caution) **When the lock of the sewing machine has occured, check the play of the axial direction of the main shaft, position and timing of the thread trimmer cam or related components.**

Standard Adjustment

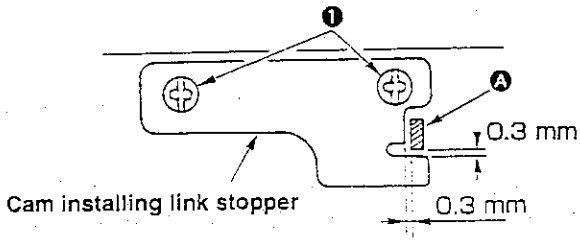
3) Position of the thread trimmer shaft

Make sure that the rear end of thread trimmer shaft ❹ aligns with the processed face Ⓐ of the sewing machine arm in the state that tension release pin ❷ of tension release arm ❶ is separated from tension release notch ❸ (thread trimmer stopper support comes in contact with the section Ⓑ of the sewing machine arm stopper.).



4) Position of the cam installing link stopper

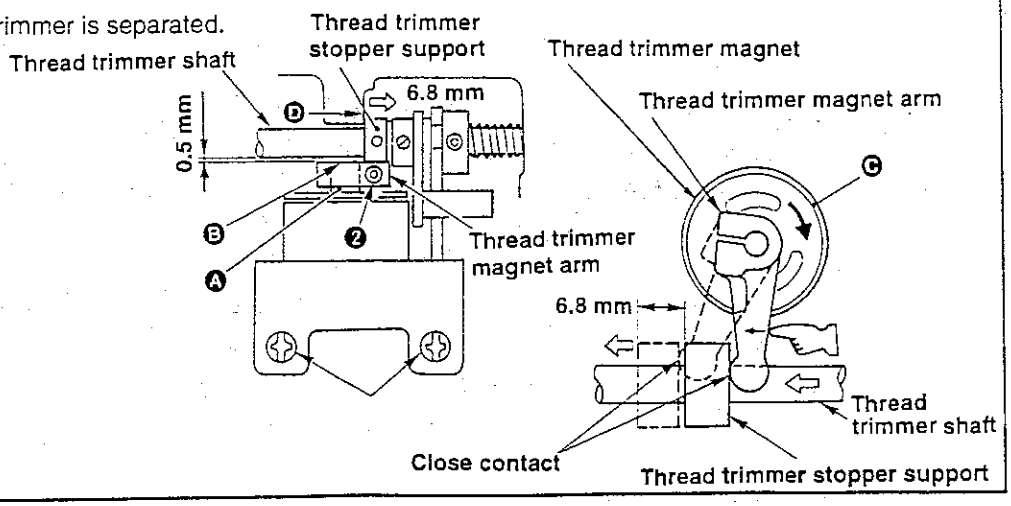
Clearances between the cam installing link stopper and cam installing link notch Ⓐ and between the cam installing link stopper and the 凹 section Ⓒ of the cam installing link stopper are 0.3 mm each in the state that the thread trimmer is separated (thread trimmer stopper support comes in contact with the section Ⓑ of the sewing machine arm stopper.).



5) Position of the thread trimmer magnet

① When actuating the thread trimmer magnet (rotation ➡) by pressing the thread trimmer magnet arm in the state that the thread trimmer is separated, the thread trimmer stopper support moves by 6.8 mm (⇨).

② Clearance between the thread trimmer magnet arm and the thread trimmer shaft is 0.5 mm in the state that the thread trimmer is separated.



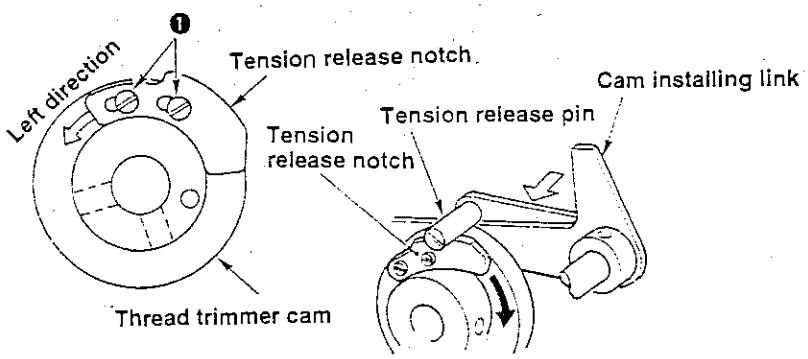
Adjustment Procedures	Results of Improper Adjustment
① Loosen setscrew ❻ in the cam installing link. (The thread trimmer shaft is possible to rotate.) ② Loosen two setscrews ❺ in the tension release arm thrust collar. ③ Align the rear end of thread trimmer shaft ❹ with the processed section Ⓐ of the sewing machine arm, and tighten two setscrews ❺ in the tension release arm thrust collar. ④ Push the cam installing link in the direction of arrow (⬅). Then removing the play, tighten setscrew ❻ in the cam installing link.	○ If thread trimmer shaft ❹ is mistakenly adjusted, the receiving amount of front section Ⓒ of the thread trimmer shaft becomes improper, causing thread trimmer failure or sewing machine lock due to twisting.
○ In the state that the thread trimmer is separated, loosen two setscrews ❶ in the cam installing link stopper, and adjust the respective clearances to 0.3 mm each. Then tighten the setscrews ❶ .	○ Sewing machine lock or thread trimmer failure will occur.
① Loosen two setscrews ❶, and adjust the clearance between the thread trimmer shaft and the thread trimmer magnet arm to 0.5 mm. Then tighten two setscrews ❶ to fix it. ② Loosen screw ❷, and adjust the position of the thread trimmer magnet arm so that a clearance of 6.8 mm is provided between the end face of the thread trimmer stopper support and the section Ⓓ of the arm stopper when turning the rotating section Ⓒ of the thread trimmer magnet in the direction of arrow (➡). Then tighten screw ❷ to fix it. ③ Make sure that the thread trimmer stopper support comes in contact with the section Ⓓ of the arm stopper when returning the rotating section of the thread trimmer magnet. ④ At this time, align the top end of shaft Ⓐ of the thread trimmer magnet with section Ⓑ of the end face of the thread trimmer magnet arm.	○ Thread trimmer roller cannot enter the slit of thread trimmer cam, causing thread trimmer failure or sewing machine lock. ○ Returning to the initial position of the thread trimmer is delayed, and release of the tension release disk floating is also delayed, causing poor-tightened stitches at the sewing start or stitch skipping.

(6) Adjustment of the tension release components

Standard Adjustment

1) Installing position of the tension release notch

Move the tension release notch to the extreme left direction so as to let the right end of the long slit of the tension release notch closely come in contact with the outer diameter of setscrews ❶. Then fix the tension release notch.



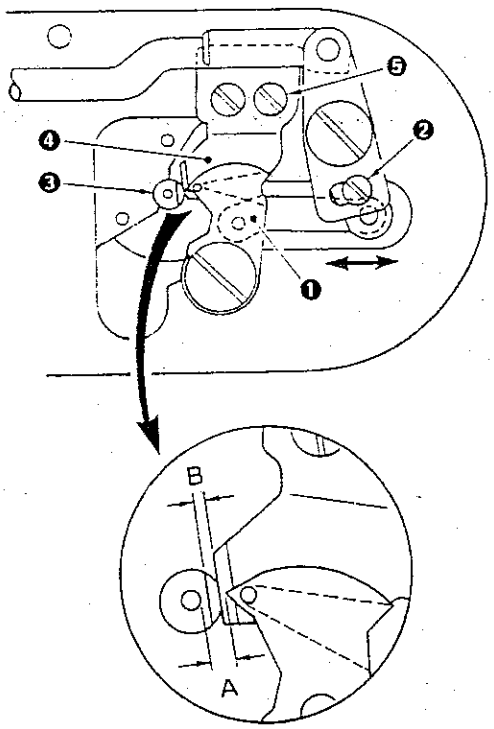
2) Adjusting the throat plate

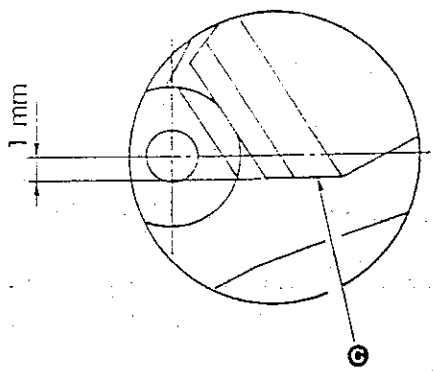
① Adjust the clearance between the top end of moving knife ❶ and the hole end of needle hole guide ❸ to the dimension A.

② Adjust the clearance between counter knife ❹ and needle hole guide ❸ to the dimension B.

③ Adjust the distance between the side face of the counter knife and the center of the hole of needle hole guide ❸ to 1 to 1.2 mm.

Sewing spec. \ Adjusting place	A	B
S	4.5 mm	1 to 1.2 mm
H	5.3 mm	1 to 1.2 mm



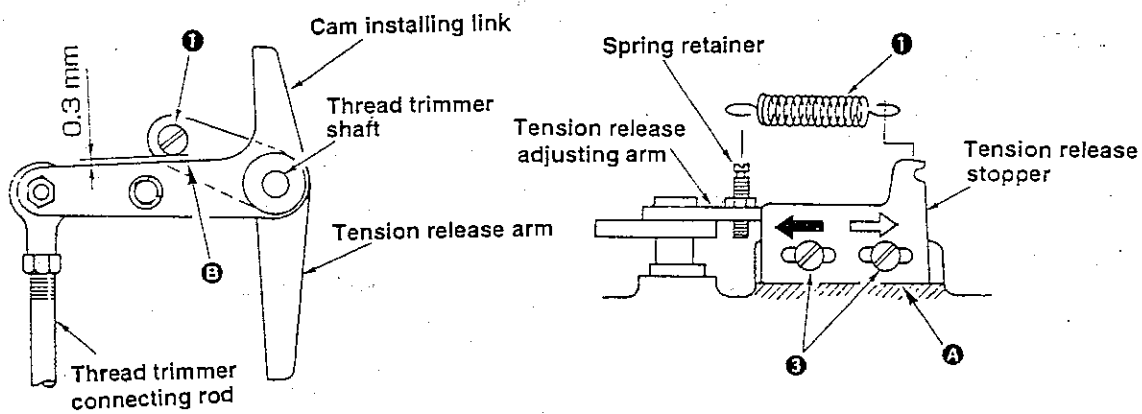


Adjustment Procedures	Results of Improper Adjustment
① Loosen two setscrews ❶ in the tension release notch, and move the tension release notch to the extreme left direction. Then securely tighten two setscrews ❶ to fix it. ② After the adjustment, pushing the cam installing link in the direction of arrow (⇦) by hand, rotate the main shaft in the normal direction (➡), and ride the tension release pin on the tension release notch. After that, let go of the hand, and make the main shaft rotate in the normal direction. Make sure that the tension release pin separates from the tension release notch at the position where the thread take-up lever has passed the upper dead point.	○ Length of remaining needle thread after thread trimming will be shortened. Also, the length will vary. ○ Needle thread may slip off from the needle at the sewing start.
① When the needle stops at its upper stop position, adjust the clearance between the thread handling section of moving knife ❶ and the end of needle hole to the dimension A by loosening adjusting screw ❷. ② After the adjustment, turn by hand to actuate the thread trimmer, and confirm the position. ③ Adjust the clearance between needle hole guide ❸ and counter knife ❹ to the dimension B by loosening setscrew ❺. ④ At the same time, adjust the distance between side face Ⓒ of counter knife ❹ and the center of the needle hole to 1 to 1.2 mm.	○ If the clearance between counter knife and needle hole guide is smaller, the thread is cut at the blade point of counter knife when moving knife pulls the thread, causing to cut the needle and bobbin thread short. ○ If the clearance between counter knife and needle hole guide is excessive, the length of remaining needle thread on the wrong side after thread trimming will be lengthened. Needle thread trimming wil not be made. ○ If the clearance between needle hole guide and moving knife is excessive, thread-handling will become unstable, causing non-thread-trimming. ○ If the clearance between needle hole guide and moving knife is smaller, non-thread-trimming will occur. Needle thread is caught to the top end of moving knife, and normal stitches can not be made. Needle interferes with moving knife, causing needle breakage. Idling amount of the bobbin will become great. ○ The distance of 1 mm between the side face of counter knife and needle hole is not set right, the engagement of moving knife and counter knife becomes improper, causing non-thread-trimming or short thread trimming.

Standard Adjustment

3) Position of the tension release stopper

Adjust the clearance between end face ❽ of the cam installing link and tension release arm pin ❶ to 0.3 mm in the state that the thread trimmer is separated.

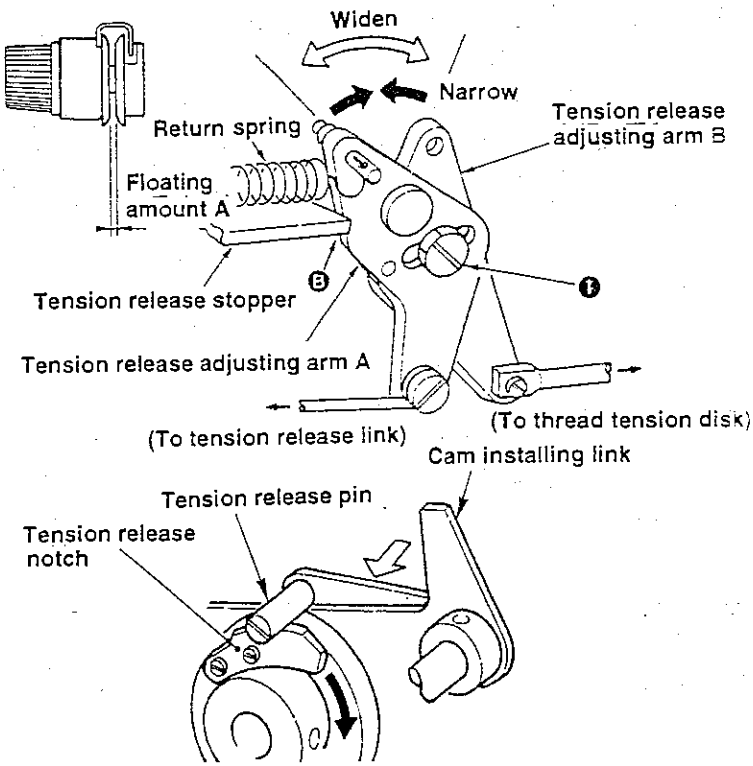


4) Floating amount of the thread tension disk

After turning ON the power, make the thread trimming action (tension releasing action), or when turning OFF the power, pushing the cam installing link in the direction of ⇦, rotate the main shaft in the normal direction to make the thread trimming action so as to let the thread release pin ride on the thread release notch.

At this time, adjust the floating amount A of thread tension disk to 0.6 to 0.8 mm for the standard type (S) machine. Adjust it to 0.8 to 1 mm for the heavy-weight material type (H) machine.

(Note) The floating amount of the thread tension disk wil vary to some extent according to the thread count to be used.



Adjustment Procedures	Results of Improper Adjustment
① Remove tension release return spring ❷. At this time, use the tool such as radio-pliers to remove it. Fingers or the like may be injured due to the strong spring. ② Loosen two setscrews ❸. If the tension release stopper with tension release adjusting arm closely contacted is pushed in the direction of arrow (⇨), the clearance between cam installing link and tension releasing pin will be narrowed. If pushing it in the direction of arrow (⬅), the clearance will be widened. ③ Adjust the clearance to 0.3 mm, and tighten two setscrews ❸ to fix it. At this time, closely fit end face Ⓐ of the tension release stopper to the processed face of the machine arm. ④ After the adjustment, hook the tension release returning spring to the spring retainer and the tension release stopper using a radio-pliers or the like. **(Note) After adjusting the position of the thread trimmer stopper, perform the adjustment of thread tension disc floating amount described in the next item.**	○ If the clearance is excessive, when adjusting the disk floating amount to rather excessive, the disk can not close completely when the disk floating is released, causing stitch failure. ○ If there is no clearance, malfunction of the thread trimmer shaft (a load is produced.) will occur, causing thread trimming failure or machine lock.
① Loosen setscrew ❶. ② Make the disk floating by means of thread trimming action. (Contacting section Ⓑ of tension release stopper and tension release adjusting arm A will open.) ③ If widening (⇦⇨) the V-shaped section located on the upper side of the tension release adjusting arms A and B, disk floating amount A will be increased. If narrowing (➡⬅), disk floating amount will be reduced. ④ Adjust the disk floating amount to 0.6 to 0.8 mm for the standard type, or to 0.8 to 1 mm for the heavy-weight material type. Then slowly tighten setscrew ❶. If you tighten the screw at one time, the adjustment value will vary. ⑤ Release the thread trimmer, and confirm that the disk closes.	○ If the disk floating amount is too samll, the length of remaining needle thread after thread trimming will be shortened or the length will vary to a great extent. ○ If the disk floating amount is excessive, the disk can not close completely after the release of disk floating, causing stitch failure.

(7) Adjustment of the wiper mechanism components

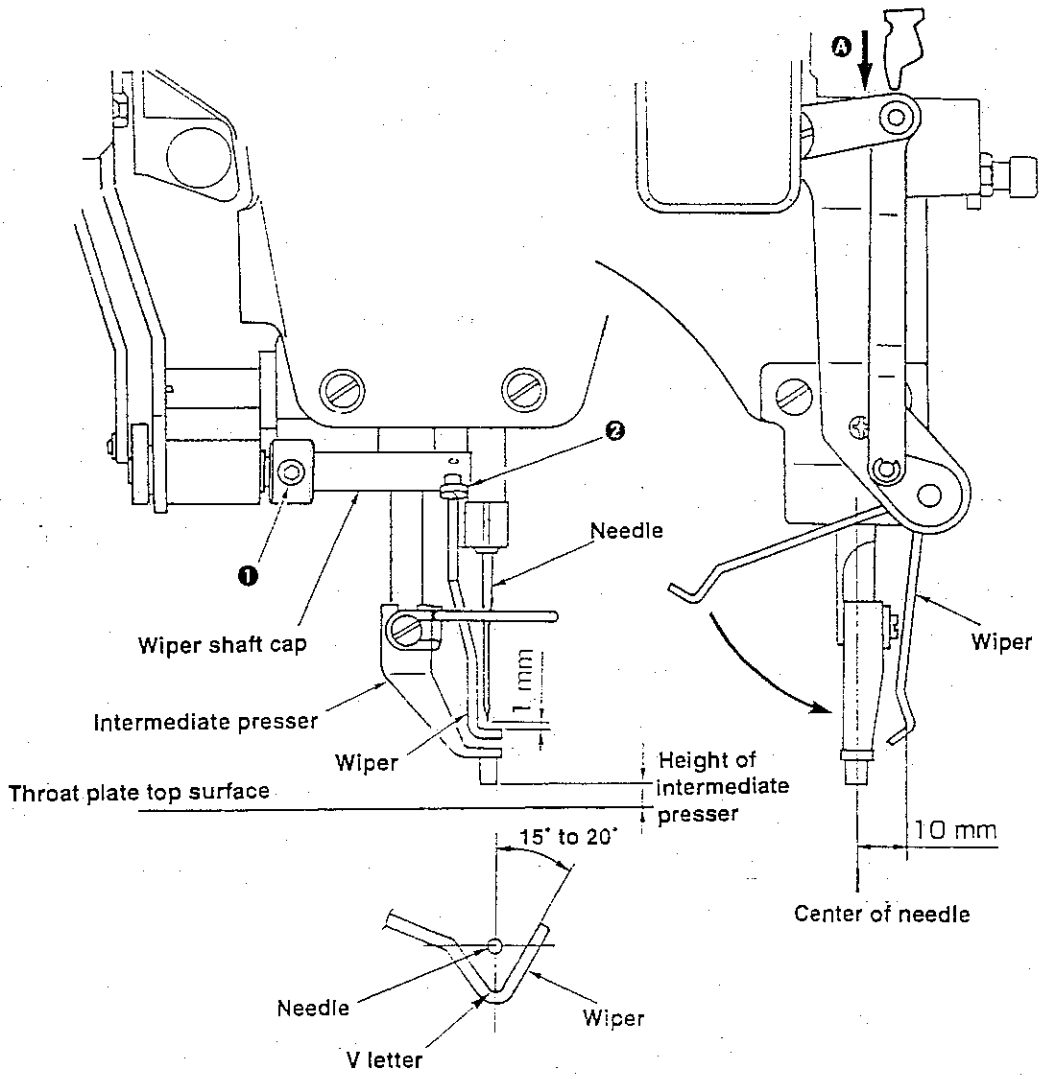
Standard Adjustment

1) Adjusting the wiper

① When lowering the intermediate presser at the stop position after thread trimming (needle height from the top surface of throat plate is 17.7 mm.) and pressing wiper link section ❹, adjust the clearance between the center of needle and the inside of V letter of the wiper to 10 mm.

② Press wiper link section ❹ on the way and when the wiper has come to the underside of needle, adjust the clearance to 1 mm.

③ The opening angle of the top end of the wiper is 15° to 20°.



(Caution) The intermediate presser supplied as standard accessory is available up to 5 mm material thickness.
However, the intermediate presser can not be used for the 3 mm material thickness or more since the wiper can not pass the space between the tip of needle and the intermediate presser.
Turn OFF the wiper switch in case of 3 mm material thickness or more.

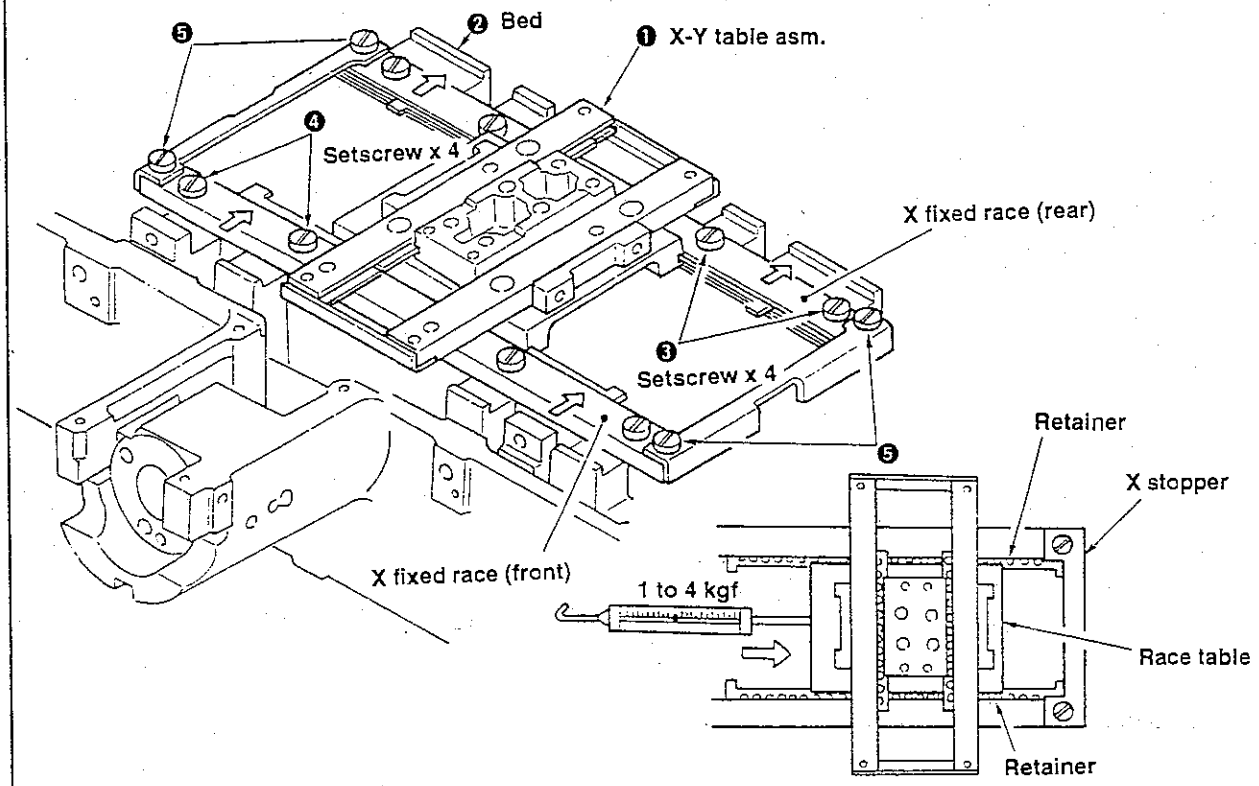
Adjustment Procedures	Results of Improper Adjustment
① Turn OFF the power after stopping the thread trimming, or turn ON the threading switch and lower the intermediate presser. **(Caution) As for the height of needle when adjusting the wiper, set the height when the sewing machine stopped after trimming the thread actually.** ② Push wiper link section ❹ and move the top end of the wiper to the under side of the needle. ③ In the state of the above item ❷, loosen setscrew ❷ and adjust the clearance between the wiper and the tip of the needle should be (1 mm) and the opening angle should be (15° to 20°). Then tighten setscrew ❷. ④ Push wiper link section ❹ to the last and loosen setscrew ❶. ⑤ In the state of the above item ❹, adjust the longitudinal (10 mm) and lateral positions of the wiper. Then tighten setscrew ❶.	○ If the clearance between the wiper and needle is too small, the wiper comes in contact with the needle due to uneven stop position of the main shaft, causing needle breakage. ○ If the clearance between the wiper and needle is excessive, the wiper comes in contact with the intermediate presser and the wiper will damage the intermediate presser. Also, the intermediate presser can not go up. ○ If a clearance of 10 mm between the inside of V letter of the wiper and the center of needle is mistakenly set, the wiper fails to spread the thread. ○ Similarly, If the center of needle does not align with the V letter of the wiper, the wiper fails to spread the thread. ○ If the opening angle is excessive, thread sweeping failure will occur.

(8) Adjustment of the feed mechanism components

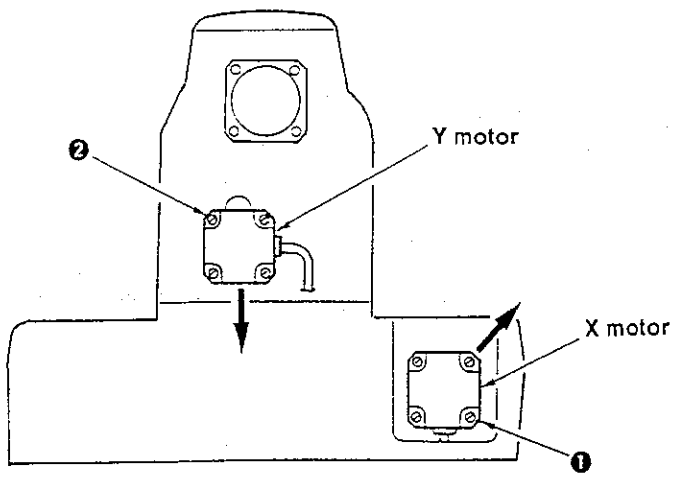
Standard Adjustment

1) Adjusting the pre-load of the X-Y table

When removing the X-Y table from the sewing machine, re-adjustment of the pre-load is necessary for the X axis only.

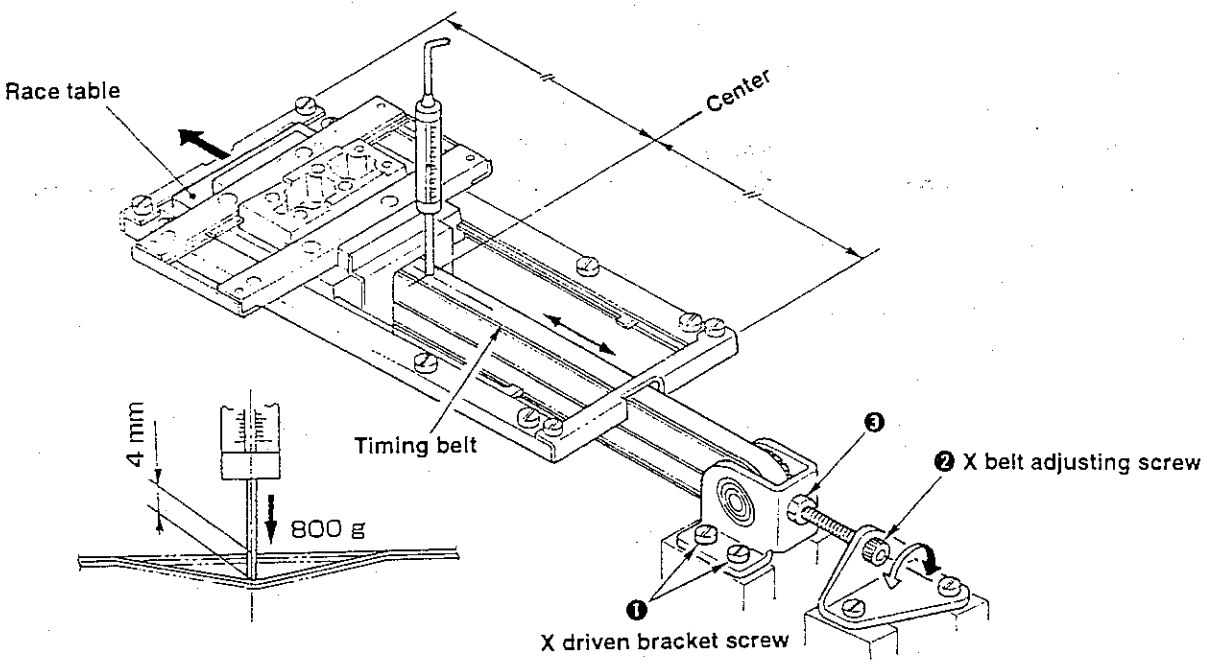


2) Adjusting the positions of the X motor and the Y motor (Adjusting the backlash of the driving gear)

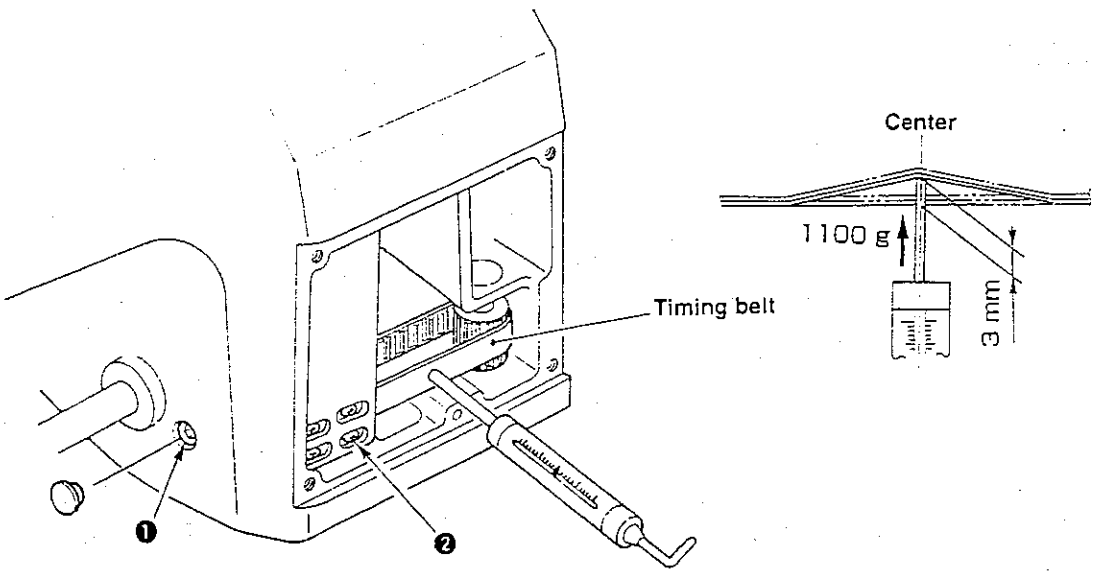


Adjustment Procedures	Results of Improper Adjustment
① Pressing the X fixed race (rear) in the direction of arrow, tighten four setscrews ❸. ② Loosen four setscrews ❺. ③ Pressing the X fixed race (front) in the direction of arrow, tighten four setscrews ❹. *Adjust so that the retainer compensating torque on both right and left sides will be 1 to 4 kgf. ④ Tighten four setscrews ❺. * Retainer compensating torque • This is a load necessary to move further the race table after the retainer has come in contact with the X stopper. Measure the torque in the state that the belt is slackened before installing the stepping motor.	
① lightly push the X motor in the direction of arrow, and tighten setscrews ❶. ② Lightly push the Y motor in the direction of arrow, and tighten setscrews ❷.	○ If the pushing is not sufficient, the backlash of the gear will become large, and the accuracy of the needle entry will be lowered. Also, it will cause the failure of the feed. ○ If the pushing is excessive, the load of the feed will become large, causing the failure of the feed.

3) Adjustment of the tension of the X timing belt



4) Adjustment of the tension of the Y timing belt

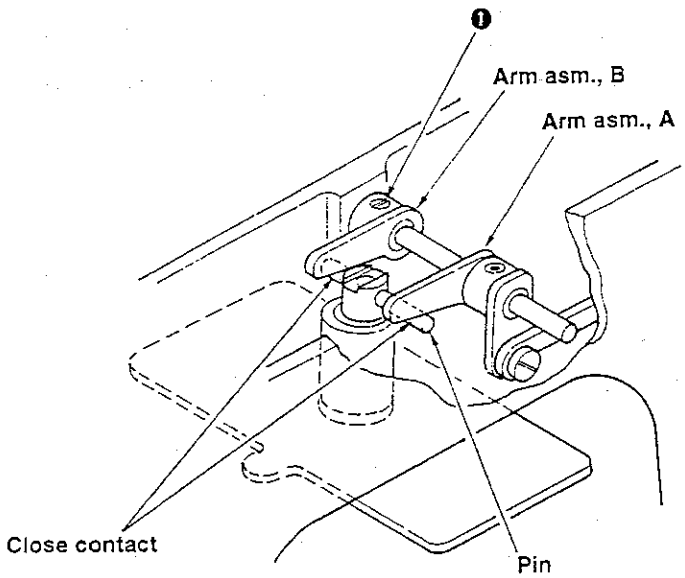


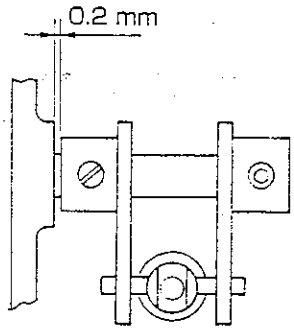
Adjustment Procedures	Results of Improper Adjustment
① Move the race table to the left side. ② Tighten adjusting screw ❸ so that the load point sags 4 mm when a load of 800 g is applied to the timing belt using a spring balance. Then securely tighten nut ❹. ③ Tighten setscrews ❶. Make sure again the sagging amount described in the above ②.	○ If the tension is excessive, it will cause timing belt breakage. ○ If the tension is too low, it will cause failure of the feed.
① Adjust with adjusting screw ❶ so that the load point sags 3 mm when a load of 1,100 g is applied to the center of the timing belt using a spring balance. Then securely tighten setscrew ❷. ② After fixing setscrew ❷, make sure again the sagging amount.	○ If the tension is excessive, it will cause timing belt breakage. ○ If the tension is too low, it will cause failure of the feed.

(9) Adjustment of the presser plate components

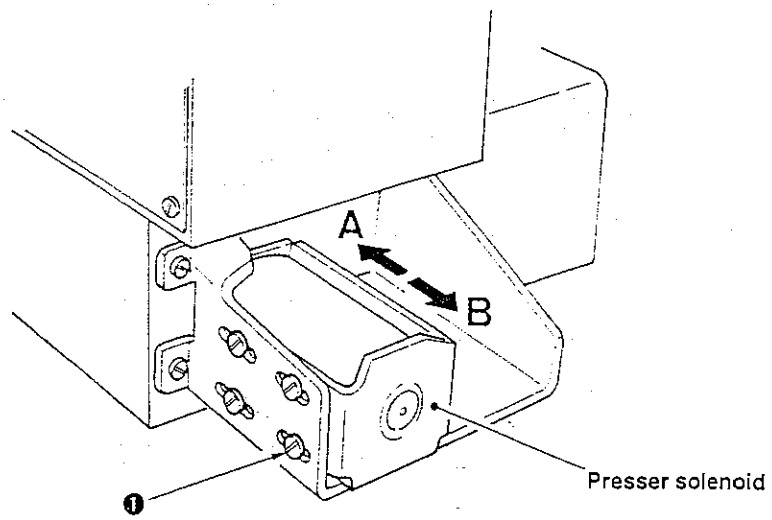
Standard Adjustment

1) **Adjusting the arm asm. (Magnet type only)**



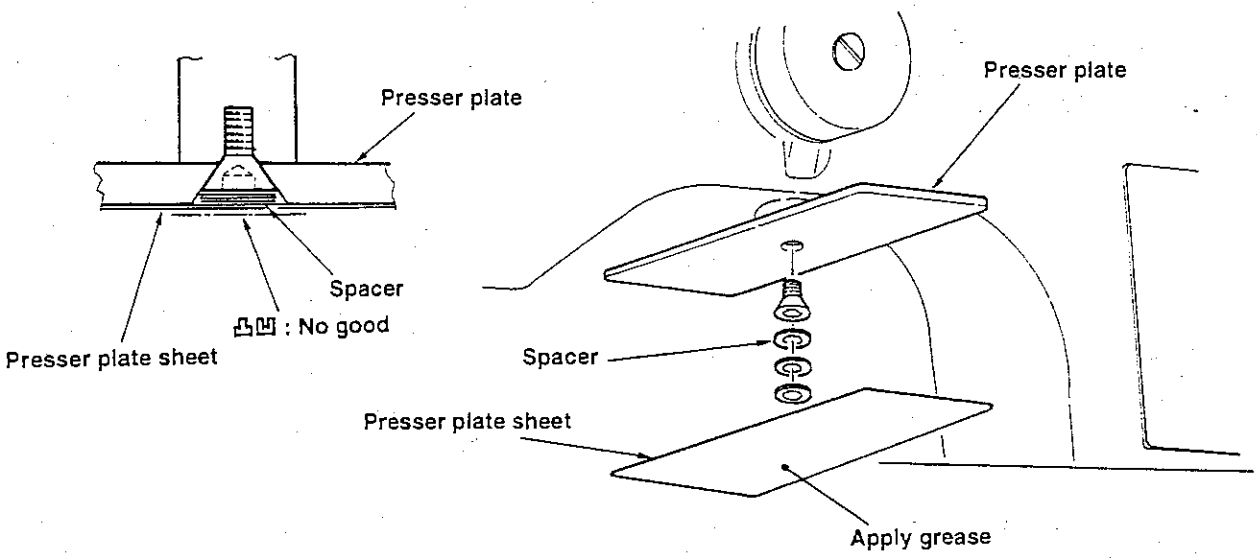


2) **Adjusting the position of the presser solenoid (Magnet type only)**



Adjustment Procedures	Results of Improper Adjustment
○ Let the both arms closely contact with the pin so that the arm asm., A and B can equally press the pin. Then tighten setscrew ❶. (Note) **When tightening setscrew ❶, make a clearance of 0.2 mm between the arm asm., B and the sewing machine arm.**	○ If the angle of the arm asm., A and B is not equal, it will cause loosening the arm asm. screws or the breakage. ○ If the clearance between the arm asm. and the sewing machine arm is small, it will cause malfunction of the presser plate when lowering the presser plate.
① If the material is thick and the beginning of lowering the presser plate is weak, place the presser solenoid in the direction A. Then securely tighten four setscrews ❶. ② If the latch is weak when the material is pressed, and the presser plate returns, place the presser solenoid in the direction B. Then securely tighten four setscrews ❶.	○ If the presser solenoid is placed extremely to the direction A, the presser plate may go up during sewing. ○ If the presser solenoid is placed extremely to the direction B, the force to lower the presser plate in the beginning will become weak. And, the presser plate may return before pressing completely the material.

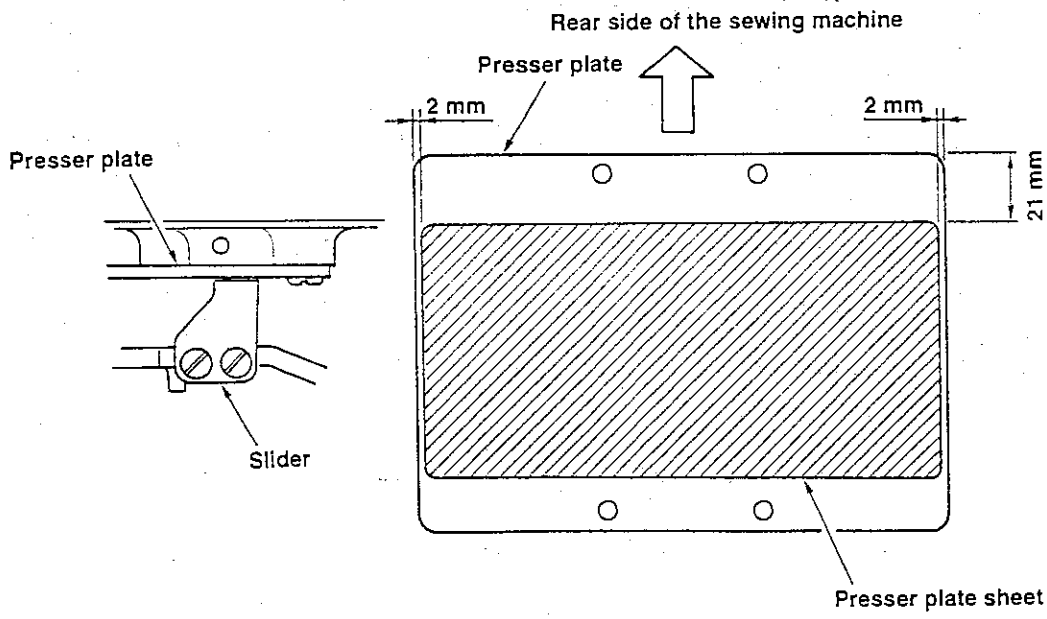
3) Adjustment when the presser plate sheet is replaced (Magnet type only)

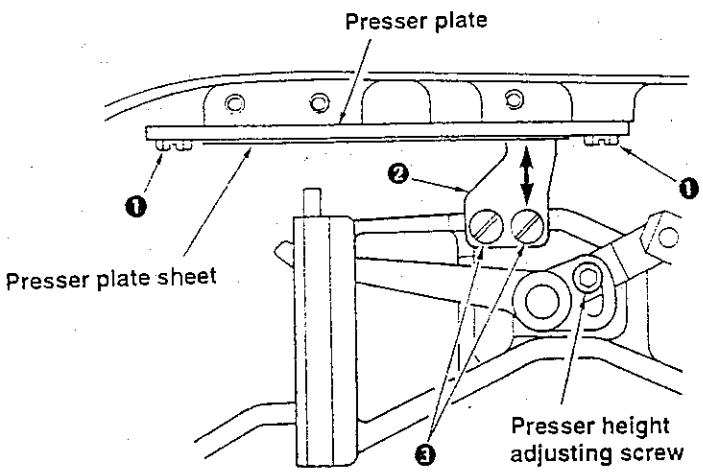


4) Height of the slider and pasting of the presser plate sheet (Pneumatic type only)

① When pasting the presser plate sheet, paste it on the presser plate following the dimensions below. Apply grease after pasting it.

② Let the upper end of the slider closely contact with the presser plate.

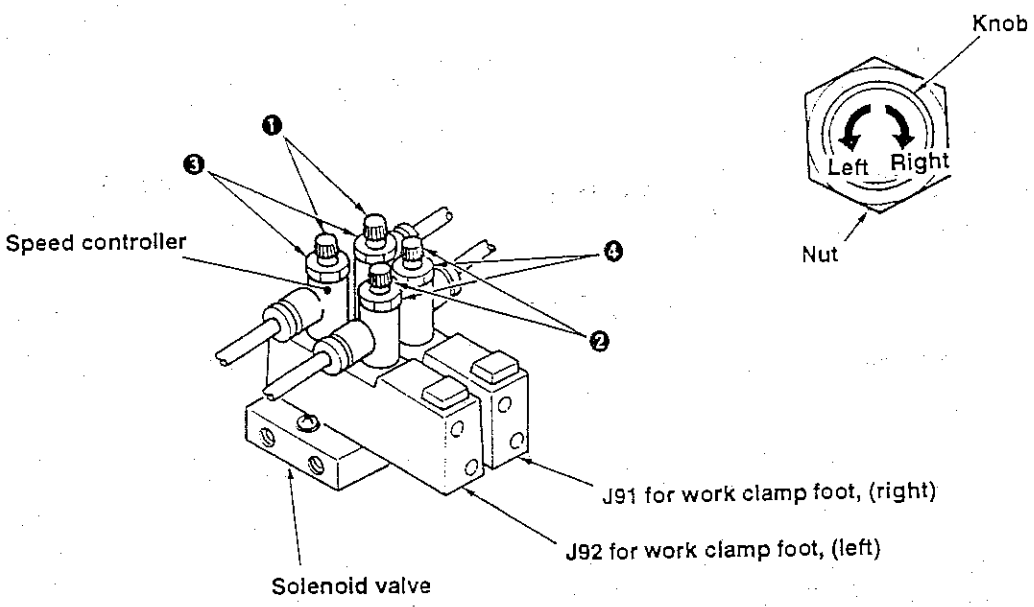


Adjustment Procedures	Results of Improper Adjustment
○ Adjust the number of the spacers which are put in 凹 section so that the step difference can not be made on the presser plate sheet.	○ The step difference will cause malfunction of the feed.
① Remove the presser plate with four setscrews ❶, and replace the presser plate sheet (paste it.). ② After installing the presser plate, adjust the height of the slider ❷ with four setscrews ❸. To position the height, lightly press the slider to the presser plate when the presser goes up.  	○ If the position of pasting the presser plate sheet is incorrect, the slider comes directly in contact with the presser plate. It will cause the worn-out of the related components, or stripping off of the sheet. And, malfunction of the feed will occur. ○ If the height of the slider is incorrect, malfunction of the feed will occur.

5) Adjusting the speed of the work clamp foot (Pneumatic type only)

Adjust the knob of the speed controller mounted on the solenoid valve asm. as described below.

- Raising work clamp foot side : Loosen nut ❸, turn knob ❶ fully to the left, and tighten nut ❸.
- Lowering work clamp foot side : Loosen nut ❹, turn knob ❷ fully to the left once, then turn the knob to the right four times, and tighten nut ❹.

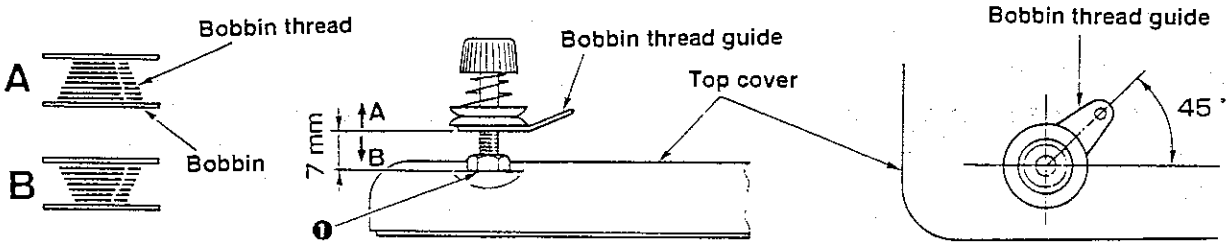


Adjustment Procedures	Results of Improper Adjustment
○ Adjust the speed referring to Standard Adjustment. ○ To increase the speed of lowering/raising the work clamp foot, turn the knob counterclockwise. ○ To decrease the speed, turn the knob clockwise.	○ When the work clamp foot comes down, the noise is big. ○ The work clamp foot fails to go up.

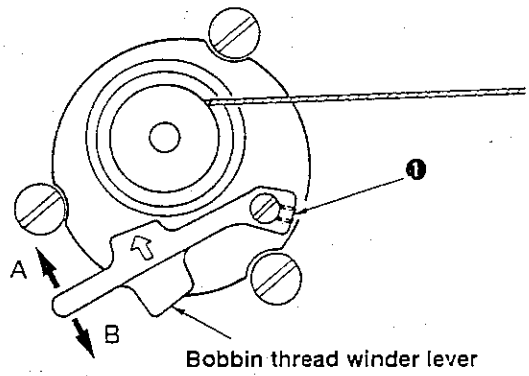
(10) Adjustment of the bobbin thread winder components

Standard Adjustment

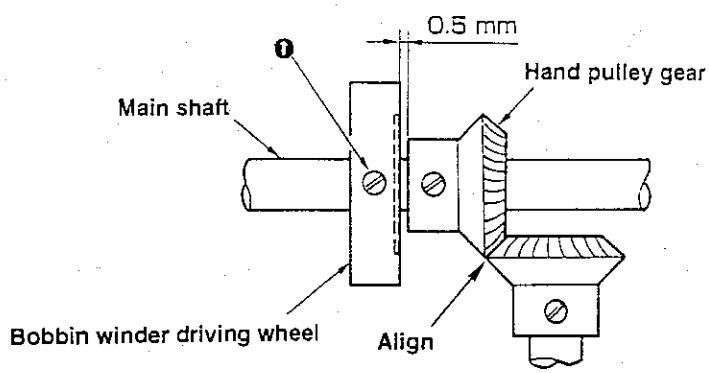
1) **Adjusting the bobbin winder thread tension**



2) **Adjusting the winding amount of the bobbin thread**



3) **Adjusting the position of the bobbin winder driving wheel**

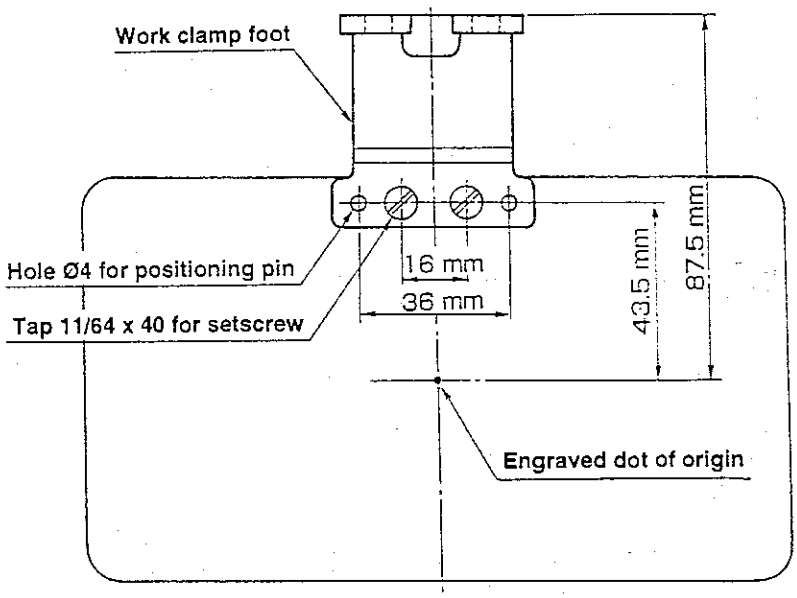


Adjustment Procedures	Results of Improper Adjustment
① Loosen nut ❶, and adjust the height so that the clearance between the bobbin thread guide and the top cover should be approximately 7 mm. ② Adjust the angle of bobbin thread guide to approximately 45°, and tighten nut ❶. If the bobbin thread is wound like A, the height should be higher than 7 mm. If it is like B, the height should be lower than 7 mm.	○ When winding bobbin thread on the bobbin, uneven winding will occur.
① If the winding amount of the bobbin thread is excessive, loosen setscrew ❶, and turn the bobbin thread winder lever in the direction A. Then fix it. ② If the winding amount of the bobbin thread is small, loosen setscrew ❶, and turn the bobbin thread winder lever in the direction B. Then fix it.	
Adjust the position of the bobbin winder driving wheel so that the clearance between the bobbin thread driving wheel and the hand pulley gear should be 0.8 mm. Then tighten two setscrews ❶. **(Note) Adjust after ascertaining that the shoulders of the hand pulley gears are aligned with each other.**	○ If the clearance is small, it will cause worn-out of the bobbin thread winder components or seizure. ○ If the clearance is excessive, due to slipping of the bobbin thread winder, the worn-out will occur.

(11) Adjustment of the sensor components

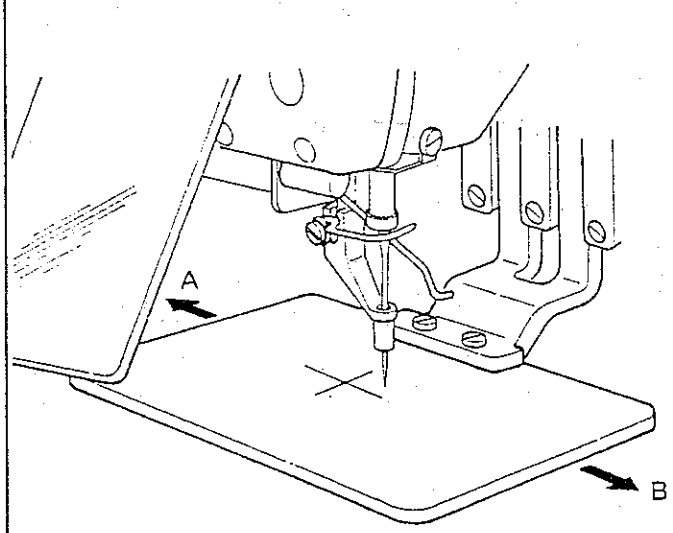
Standard Adjustment

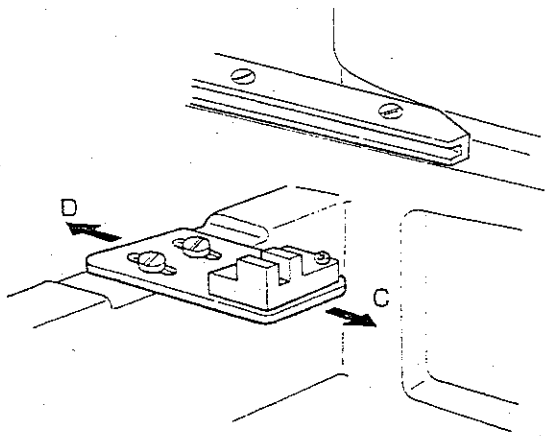
1) Making the origin setting gauge



2) Adjusting the X origin sensor

When the feed is in the mechanical origin, align the tip of the needle with the lateral position of the engraved dot of the origin.

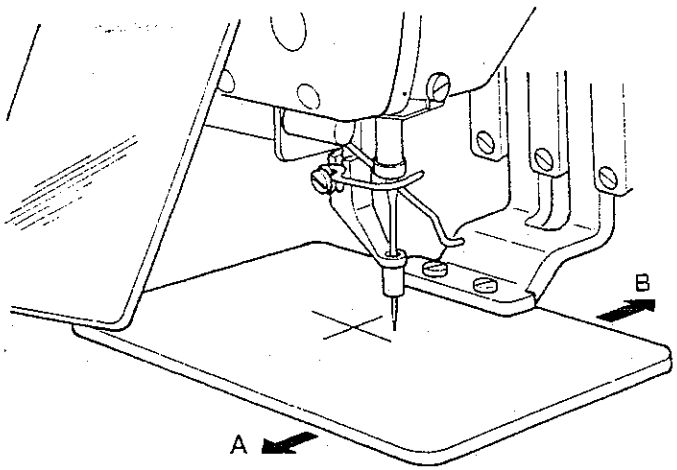


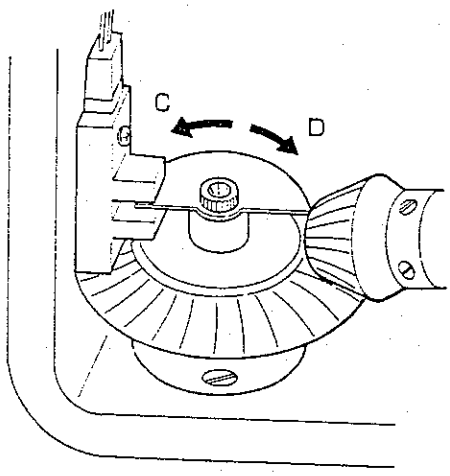


Adjustment Procedures	Results of Improper Adjustment
Make an origin setting gauge as shown in the figure, and attach it to the work clamp foot.	
① Simultaneously pressing [◎] and ⊖ on the operation panel, turn ON the power. ② Press the [①] on the operation panel. ③ Depress the pedal to lower the work clamp foot. ④ When the start pedal is depressed, the feed moves to the mechanical origin and stops ⑤ Lower the needle and make sure of the lateral play of the engraved dot of the origin against the needle. ⑥ If the engraved dot is slid in the direction A in terms of the tip of the needle, adjust the sensor installing plate to the direction C. ⑦ If the engraved dot is slid in the direction B in terms of the tip of the needle, adjust the sensor installing plate to the direction D. **(Note) After the adjustment, make sure that the slit plate does not interfere with the sensor.**	

3) Adjusting the Y origin sensor

When the feed is in the mechanical origin, align the tip of the needle with the longitudinal position of the engraved dot of the origin.





Adjustment Procedures	Results of Improper Adjustment
① Simultaneously pressing [ ] and ⊜ on the operation panel, turn ON the power. ② Press [1] on the operation panel. ③ Depress the pedal to lower the work clam foot. ④ When the start pedal is depressed, the feed moves to the mechanical origin and stops. ⑤ Lower the needle and make sure of the longitudinal play of the engraved dot of the origin against the needle. ⑥ If the engraved dot is slid in the direction A in terms of the tip of the needle, adjust the slit plate to the direction C. ⑦ If the engraved dot is slid in the direction B in terms of the tip of the needle, adjust the slit plate to the direction D.	

(12) Adjustment of the sewing components

Standard Adjustment

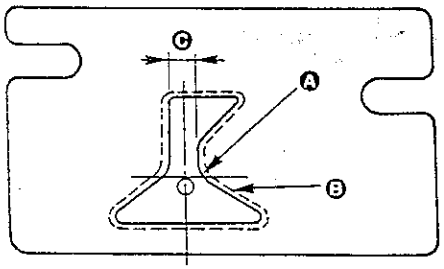
1) Adjusting the position of the shutle upper spring

Align the center of the needle with the center of slit width Ⓒ for the lateral position.

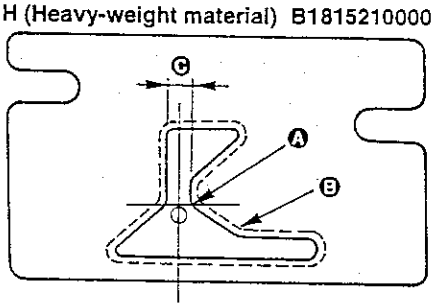
Align the rear end of the needle with angle section Ⓐ for the longitudinal position.

(Caution) If there is a scratch on section Ⓑ, polish there with buff or the like as it will cause thread breakage, hangnail of thread, stain on thread, etc. Especially pay attention to the rear side.

S (Standard) B1815980000



H (Heavy-weight material) B1815210000

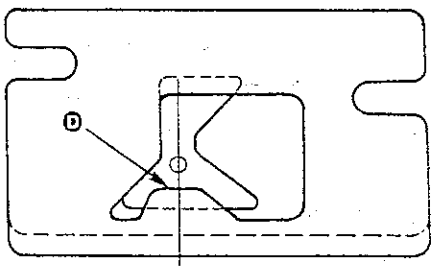


2) Adjusting the position of the optional part components

① For preventing stitch skipping (reverse side loop receiver)

Put the auxiliary shuttle upper spring on the shuttle upper spring of the above described S or H. Then adjust the clearance between section Ⓓ and the needle as small as pcssible.

Stitch skipping prevention B1815210A00

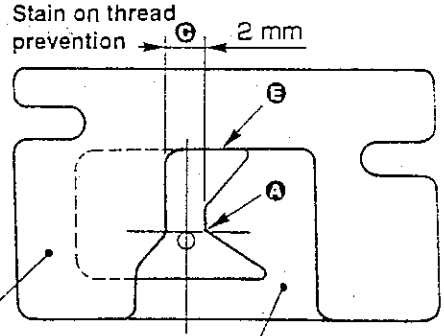


② For preventing stain on thread

Put the shuttle upper spring for preventing stain on thread on the auxiliary shuttle upper spring.

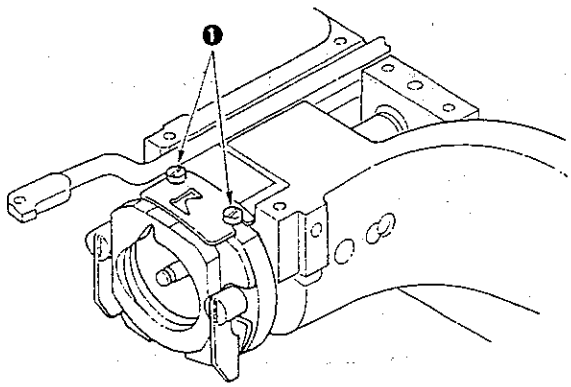
- Position of the two upper springs put together : Dimension Ⓒ is 2 mm for the lateral position. For the longitudinal position, aiign the springs with section Ⓔ.
- Adjusting the position of the two upper springs put together and the needle is the same as the standard adjustment : for the lateral position, align the center of the needle with the center of slit width Ⓒ. For the longitudinal position, align the rear end of the needle with angle section Ⓐ.

Stain on thread prevention



B1816980000
(Shuttle upper spring)

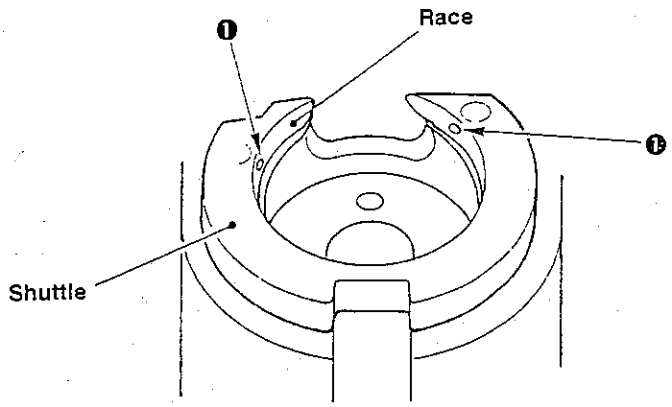
B1815210D00
(Auxiliary shuttle upper spring)

Adjustment Procedures	Results of Improper Adjustment
○ Remove the feeding frame, feed plate and throat plate, and adjust with screw ❶. **(Caution) The lateral position will vary when the shuttle is adjusted. Perform the adjustment of the position of the shuttle upper spring after performing the standard adjustment of the shuttle without fail.**  	○ If the shuttle upper spring is slid laterally or longitudinally, needle thread will be caught in the shuttle. ○ If the spring is excessively placed in the rear, the moving knife may fail to catch needle thread. ○ If the spring moves excessively to the left, the moving knife may fail to catch bobbin thread.
○ Adjust with screw ❶ same as the shuttle upper spring supplied as standard.	○ If section ⓓ of the auxiliary shuttle upper spring for preventing stitch skipping comes excessively near to the needle, interference with the needle will occur. If the needle size is changed, re-adjustment is necessary.

3) Shuttle felt

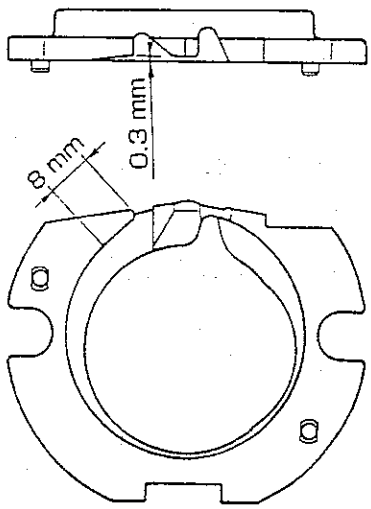
Two pieces of shuttle felt are inserted into the hole of the shuttle race.

When setting the inner hook and rotating it along with the shuttle race, make sure whether the felt is applying a load.



4) Shape of the shuttle race ring

If the blade point of the shuttle race ring is excessively worn out, remove the shuttle race ring, and make sure that the dimension of the slanting section on the reverse side is 0.3 x 8 mm.

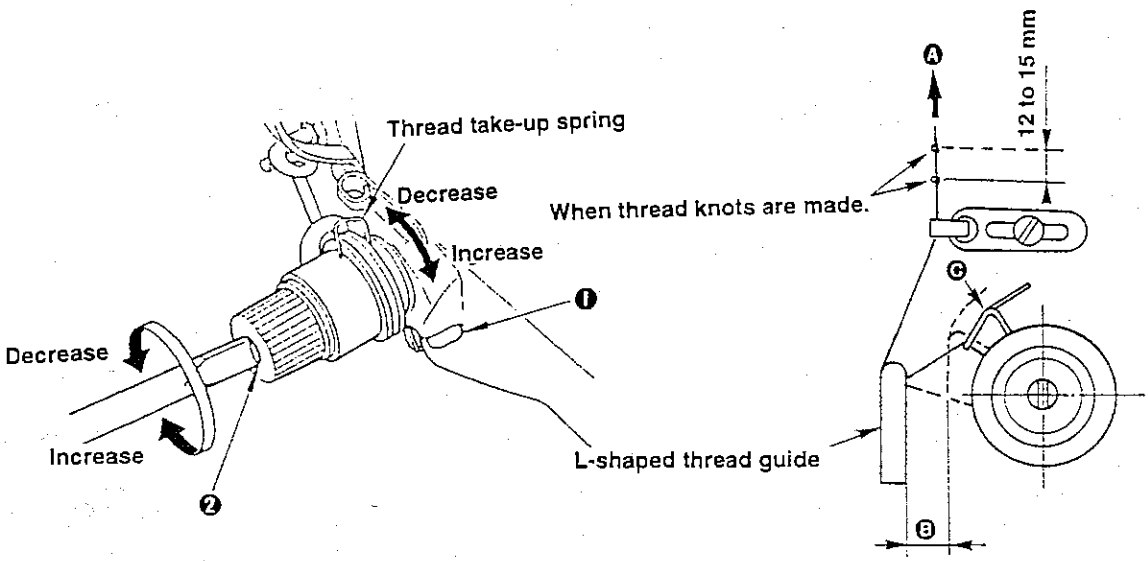


Adjustment Procedures	Results of Improper Adjustment
○ If shuttle felt ❶ is protruding, or is replaced with a new one, push it into the hole with tweezers or the like. **(Caution) Do not put it excessively into the hole. Align the height with the race face.**	○ If the shuttle felt is protruding, a rotating load is applied to the inner hook, causing stitch failure. ○ If the shuttle felt is lacking, or is excessively pushed into the hole, shuttle lubrication will be insufficient, causing shuttle-heating or worn-out of the shuttle.
○ If the dimension of 0.3 x 8 mm is not set right, readjust with oilstone.	

5) Adjusting the thread take-up spring

Stroke : Pull the needle thread in the direction Ⓐ until the thread take-up spring stops. At this time, the needle thread moves by 12 to 15 mm for S type.
The needle thread moves by 12 to 18 mm for H type.

Tension : Adjust the thread take-up spring tension in accordance with the thread tension. (Actually sew a material and adjust the thread take-up spring tension to an appropriate value.)



Adjustment Procedures	Results of Improper Adjustment
○ Adjusting the stroke of thread take-up spring Loosen setscrew ❶, and turn second thread tension ❷ with a screwdriver to adjust. ○ Adjusting the tension of thread take-up spring Securely tighten setscrew ❶, and turn second thread tension ❷ with a screwdriver to adjust. (Fig. 3) (Caution) **When using a thin thread such as thread count #50 or more, adjust the stroke of thread take-up spring to a smaller value.** **The length of remaining needle thread after thread trimming will be stable.**	○ If the stroke of the thread take-up spring is larger than the specified value : Lehgth of remaining needle thread is shortened, causing the needle thread to slip off the needle at the sewing start. ○ If the stroke of the thread take-up spring is smaller than the specified value : Needle thread breakage will occur at the time of thread trimming when using a thin thread. (Caution) **If the thread take-up spring interferes with the L-shaped thread guide, the thread take-up spring may fail to return to the initial position in prior to thread trimming. In this case, the length of remaining needle thread may be shortened. If this trouble arises, bend section Ⓒ of the thread take-up spring, and widen the clearance of section Ⓑ.**

4. HOW TO USE THE MEMORY SWITCH

(1) Memory switch

The memory switchs mean switches which are able to set the various performances of the sewing machine by means of programming.

There are two different start levels, level 1 and level 2, for the memory switches according to the function level as described below.

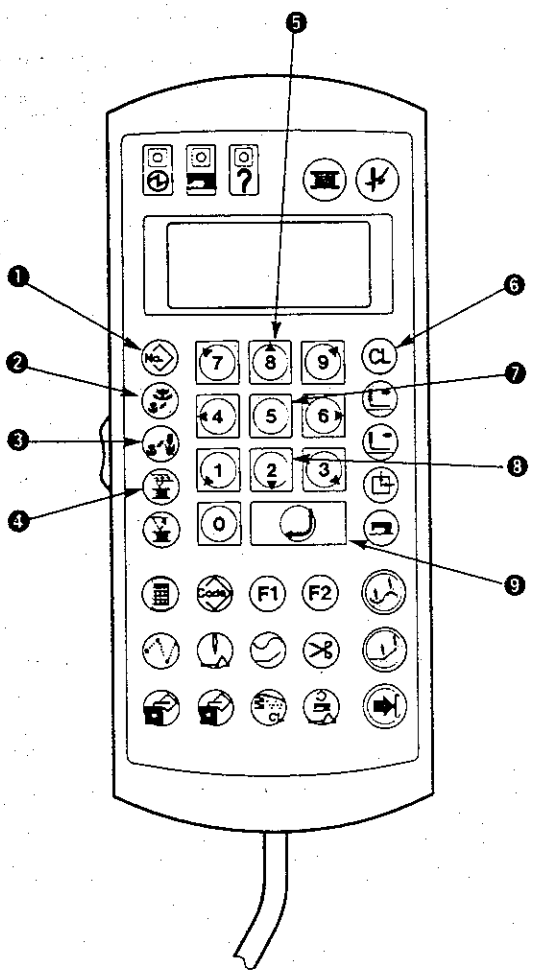
Level 1 : The function that allows selection of performances or change of set values which are supposed to be comparatively frequently changed is actuated. The contents of the function by the level 1 are described in the instruction manual.
(Example : Intermediate presser operation mode, bobbin thread counter mode, etc.)

Level 2 : The function that allows setting of special performances at the time of modification or more detailed operation is actuated. Also, level 2 actuates while including the function that actuates on the level 1.

(2) Explanation of the operation panel to be used

The functions of the operation panel to be used are as described below.

Names of the switches for the memory switches



❶ Key for indication of changing function No.
❷ Key for changing set item 1
❸ Key for changing set item 2
❹ Key for changing set item 3
❺ Key for update (+1) and level 2 starting
❻ Key for memory switch setting mode cancel
❼ Key for update and level 1 starting
❽ Key for update (-1)
❾ Key for memory switch setting mode end

(3) How to start the memory switches

Perform the start of the memory switches as described below.

[How to start the level 1]

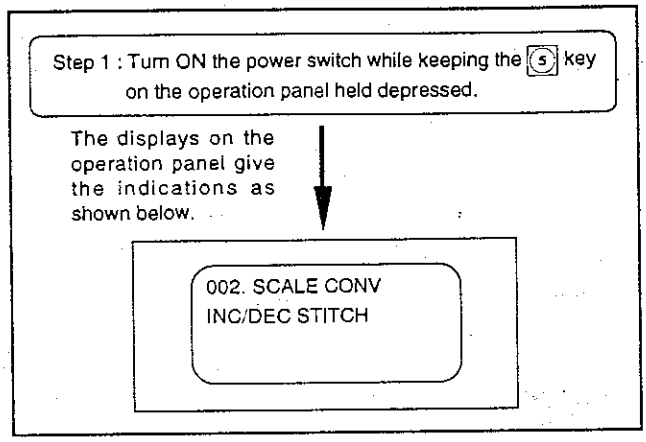


Fig. 2

[How to start the level 2]

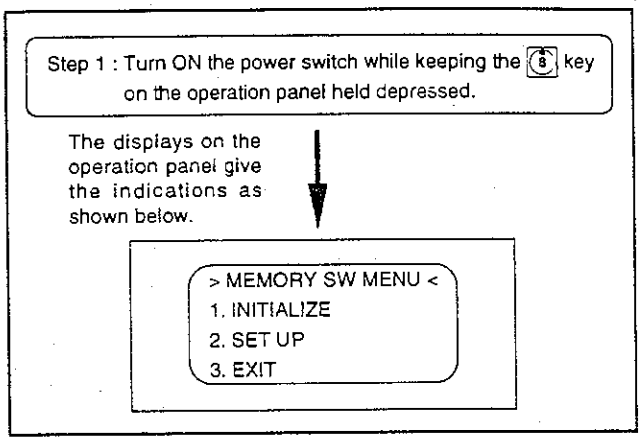


Fig. 3

4) How to change the contents of each setting

The sequence of the way of change when starting level 1 and level 2 is shown in the figures below.

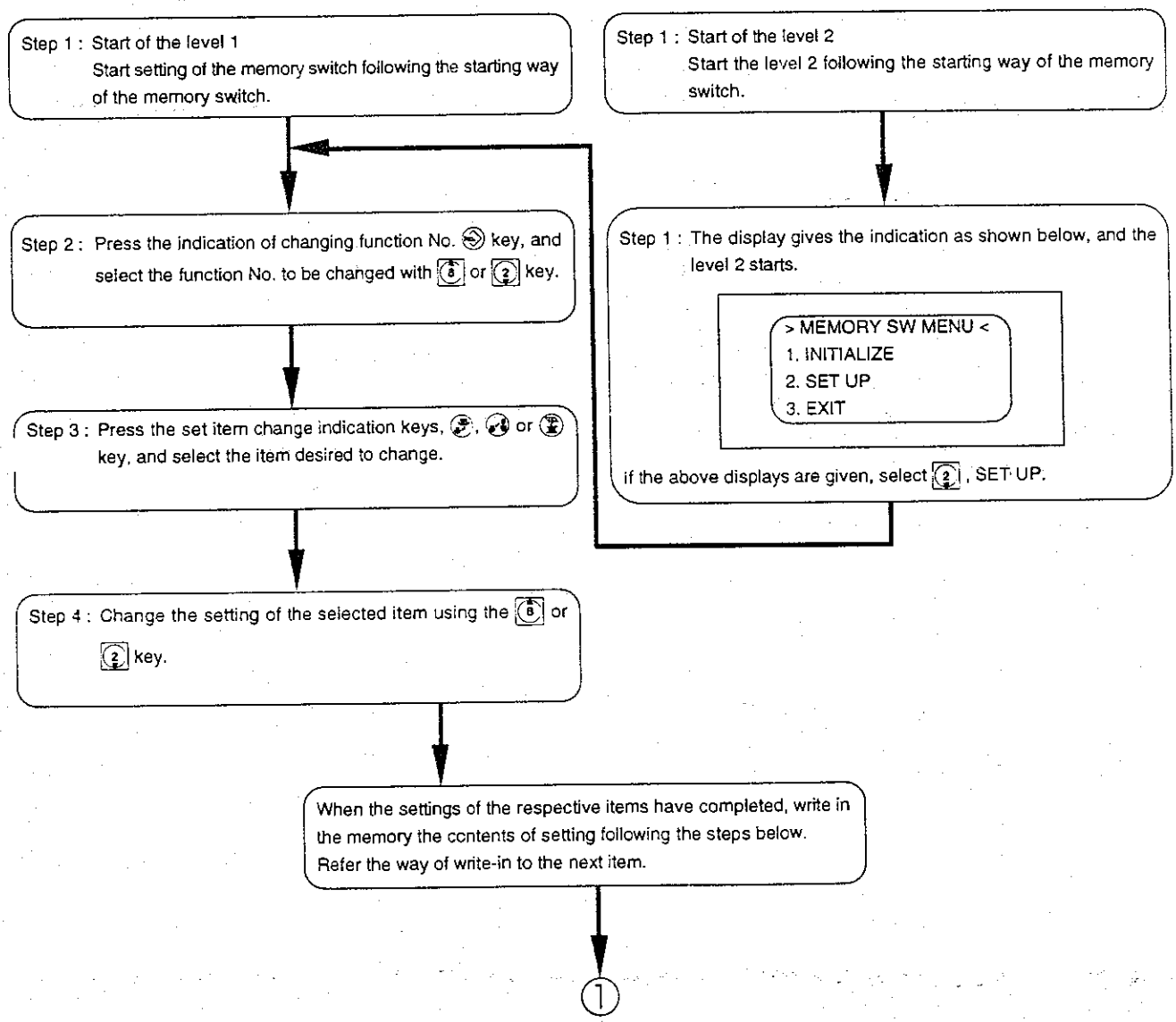


Fig. 4

(5) Write-in of the contents of setting

After setting the respective items, write in the memory the contents of setting following the way of operation as described below.

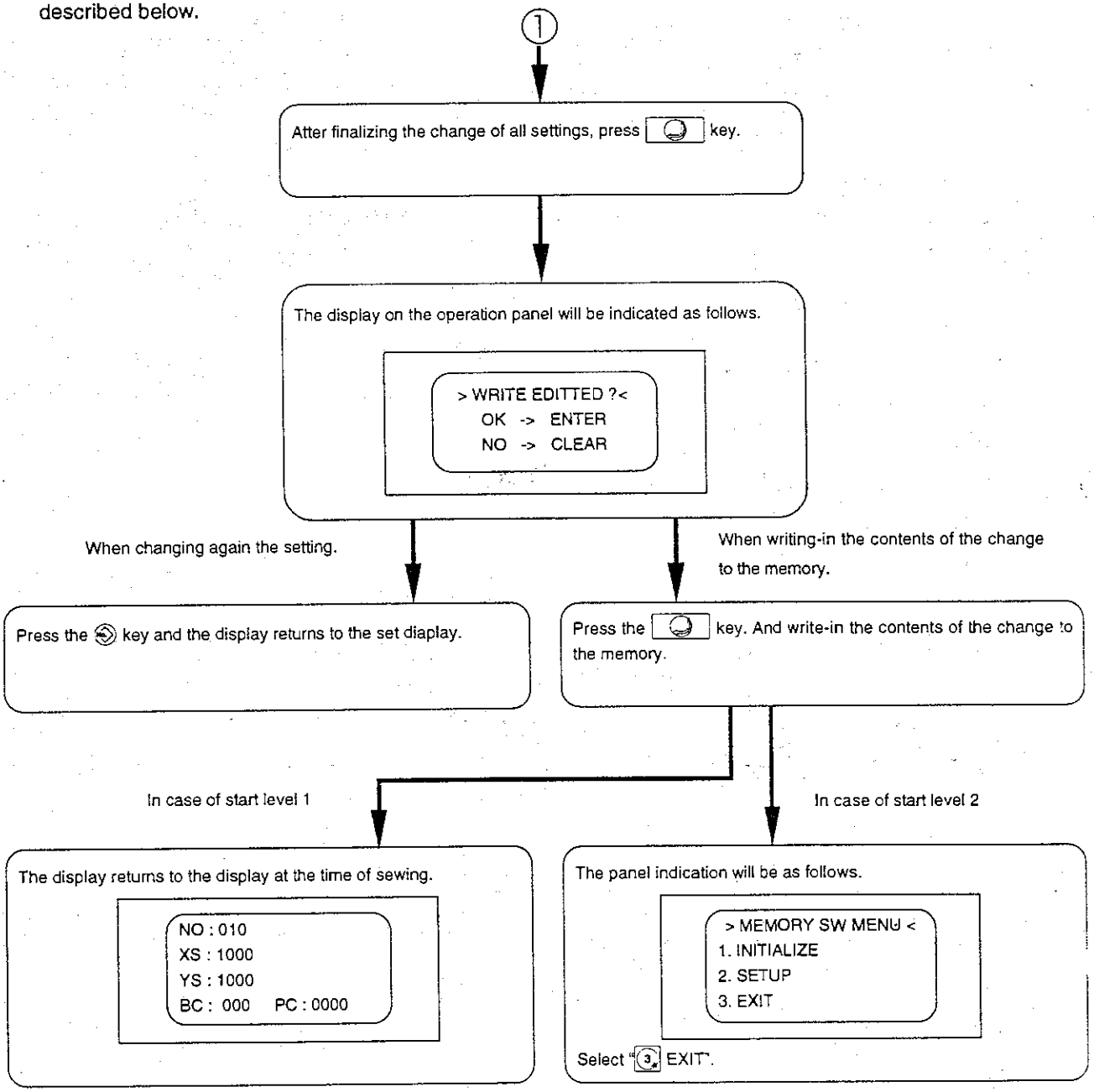


Fig. 5

5. DESCRIPTION OF THE MEMORY SWITCHES

NOTE : The contents of the memory switches may vary due to the revision of the system ROM.
(Following contents are applied to the Revision 005C of the System ROM.)

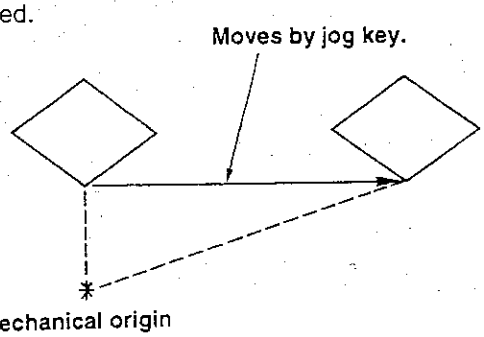
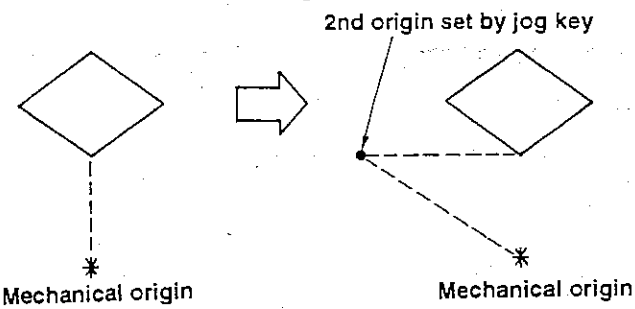
(1) Setting of the language indication		
Function No. : 001		Function : Specifies the language indication on the panel dispaly.
Item : 1 Language specification		(Set level 2)
Indication	JPN (Katakana)	[Contents] Japanese (Katakana indication)
	ENG (English)	[Contents] English

(2) Setting of the enlargement/reduction function		
Function No. : 002		Function : Pattern enlargement/reduction mode setting
Item : 1 Selection of increase/decrease method		(Set level 1)
Indication	OFF	[Contents] Prohibition of enlargement/reduction
	STITCH	[Contents] Increase/decrease of the number of stitches (Pitch fixed) : Initial setting
	PITCH	[Contents] Increase/decrease of the stitching pitch (Number of stitches fixed)

(3) Jog function setting

Function No. : 003	Function : Jog mode is set.

Item : 1 Mode specification

Indication	OFF	[Contents] Moving of the feeding frame cannot be made with jog keys, 1, 2, 3, 4, 6, 7, 8 and 9.
	PARA	[Contents] A sewing pattern can be moved to a specified position by using jog keys 1, 2, 3, 4, 6, 7, 8 and 9 → the return-to-origin key. If the 2nd origin is set in the sewing pattern, the 2nd origin also moves. If pressing the key two times or reading another sewing pattern, this function is released. <Example> 
	2ND	[Contents] The 2nd origin is set to the place specified by the jog keys, 1, 2, 3, 4, 6, 7, 8 and 9 → the return-to-origin key. If the 2nd origin is set in the sewing pattern, the machine does not stop at the 2nd origin in the sewing pattern. If pressing the key two times or reading another sewing pattern, this function is released. : Initial setting <Example> 

Item : 2 Use of the fixed turn-out position Complementary explanation → P82

Indication	OFF	[Contents] The fixed turn-out position is not used. : Initial setting
	ON	[Contents] Based on the coordinate set in the EEP-ROM, the 2nd origin common to each sewing pattern is used. The machine does not stop at the 2nd origin in the sewing pattern. Also, the movememt of the feeding frame cannot be made by the jog key. Refer the setting way of the fixed turn-out position to P82.

(4) Retainer compensation operation.		
Function No. : 004		Function : ※ This function sets whether the retainer compensation is operative or not.
Item : 1 Selection of operation		(Set level 1)
Indication	OFF	[Contents] Prohibited (No movement) : Initial setting
	ON	[Contents] Operative

※ The feeding frame goes and back within the limit of move after it has been lowered when turning ON the preparation switch for the first time after turning ON the power switch. This operation is not made after turning ON the preparation switch for the second time or more.

(5) Mechanical origin retrieval		
Function No. : 007		Function : This function sets the operation of the mechanical origin retrieval.
Item : 1 Setting the operation of each sewing cycle		(Set level 2)
Indication	OFF	[Contents] Not operative : Initial setting
	ON	[Contents] Origin retrieval is made for each sewing cycle.
Item : 2 Operation setting at the time of the moving limit error		
Indication	ON	[Contents] Origin retrieval is made when returning from the moving limit. (Initial setting)
	OFF	[Contents] No operation

(6) Return to origin operation		
Function No. : 008		Function : This function sets the returning route to the sewing start when pressing the return to origin switch.
Item : 1 Operation mode setting		(Set level 1)
Indication	ROUTE	[Contents] The machine returns to the sewing start point through the shortest distance. : Initial setting
	ORGN	[Contents] The machine moves to the sewing start point along the pattern data after the origin is retrieved.
	TRACE	[Contents] The machine moves to the sewing start along the pattern data in the reverse direction. : Inversion specification • Initial setting
Item : 2 Setting of the return to the upper dead point only at the time of origin retrieval and return to origin (Needle UP in the reverse rotation)		(Set level 1)
Indication	OFF	[Contents] Without stopping at the upper dead point : Initial setting
	ON	[Contents] With stopping at the upper dead point : Inversion specification initial value

(7) Counter indication setting		
Function NO. : 009		Function : Counter indication setting
Item : 1 Bobbin thread counter indication setting		(Set level 1)
Indication	UP	[Contents] UP counter setting (When one cycle stitching completes, the value shown on the bobbin thread counter increases by 1 count. The counter counts the bobbin thread from 000 to 999.) If the counter set value other than "000" is set, when the set value has come equal to the counter set value, the sewing machine stops. : Initial setting
	DOWN	[Contents] DOWN counter setting (When one cycle stitching completes, the value shown on the bobbin thread counter decreases by 1 count. The counter counts the bobbin thread from 999 to 000.) If the counter set value other than "000" is set, the counter starts counting down from the set value and if the counter value has become "0000", the sewing machine stops.
Item : 2 Production counter indication setting		(Set level 1)
Indication	OFF	[Contents] Does not indicate the production counter.
	ON	[Contents] Indicates the production counter. : Initial setting

(8) Setting of pattern data reading operation		
Function No. : 010		Function : Pattern data reading operation mode is set.
Item : 1 Pattern data reading operation setting		(Set level 2)
Indication	SETUP	[Contents] Pattern data can be read under the sewing setting state. (the sewing LED goes out.) : Initial setting
	READY	[Contents] Pattern data can be read under the sewing ready state. (the sewing LED lights up.)
Item : 2 Constant pattern data reading mode setting		(Set level 2)
Indication	OFF	[Contents] Constant pattern data reading function is inoperative. (The backup data becomes effective, and if the pattern No. desired is the same, the pattern data is not read from the floppy disk.) : Initial setting
	ON	[Contents] Constand pattern data reading function is operative. (Pattern data is constantly read from the floppy disk.)
Item : 3 Automatic pattern data reading setting		(Set level 2)
Indication	OFF	[Contents] Automatic reading is ineffective : Initial setting
	ON	[Contents] Automatic reading is effective. (After completing the sewing, the subsequent pattern data is read from the floppy disk. If the pattern numbers are not consecutive, the machine will enter the standby state to allow a pattern No. to be set.)

(9) Pattern read-in order setting		
Function No. : 011		Function : ※ This function sets the reading-in order of the SATRA data and the floppy disk.
Item : 1 Reading-in order setting		(Set level 2)
Indication	FD > STR	[Contents] Retrieval is made in the order of sewing machine data floppy → Satra data. : Initial setting
	STR > FD	[Contents] Retrieval is made in the order of Satra data → sewing machine data floppy.
By this setting, the reading speed is increased when using sewing machine data or Satra data.		

※ Standard data specifications of the numerical controlled sewing machines for the shoe industry.

(10) Speed change in idling operation		
Function No. : 012		Function : This function sets the speed change of the jump speed when the machine runs idle.
Item : 1 Jump speed changing function		(Set level 2)
Indication	OFF	[Contents] The machine performs jumping at a constant speed at all times. : Initial setting
	ON	[Contents] 2-step speed changing function is possible. While the machine performs jumping of the sewing data, the jump speed can be decreased by turning ON the pedal switch.

(11) Selection of thread trimming after turning ON the temporary stop switch		
Function No. : 013		Function : This function sets the thread trimming operation when operating the temporary stop switch.
Item : 1 Thread trimming setting		(Set level 1)
Indication	AUTO	[Contents] Thread trimmer automatically actuates. (When the temporary stop switch is pressed, the sewing machine temporarily stops as well as the thread trimmer actuates.)
	NDL	[Contents] Manual 1 (When the temporary stop switch is pressed, the sewing machine temporarily stops. In this state, the thread trimmer is actuated by turning ON "needle threading switch".)
	STOP	[Contents] Manual 2 (When the temporary stop switch is pressed, the sewing machine temporarily stops. In this state, the thread trimmer is again actuated by pressing "the temporary stop switch". At this time, the thread trimmer can also be actuated by operating "needle threading switch") : Initial setting

(12) Input command time out		
Function No. : 016		Function : This function sets the length of time of the external input command time out (time to wait for input).
Item : 1 Setting of the length of time to wait for external input		(Set level 2)
Indication	0	[Contents] There is no time-out. (Time-out of the external input command is not valid, and the input is being waited forever. It is possible for the sewing machine to be in the temporary stop state by operating the temporary stop switch.) : Initial setting
	0 to 655	[Contents] Setting of length of time to wait for input (the input is being waited for the time of this set value x 100 mse. If there is no input, the sewing machine is in the temporary stop state.)

(13) Thread trimming command control		
Function No. : 018		Function : Setting of effective/ineffective thread trimming command in the sewing pattern.
Item : 1 Setting of effective thread trimming command or ineffective thread trimming command (Set level 2)		
Indication	OFF	[Contents] Thread trimming command is rendered effective.
	ON	[Contents] Thread trimming command is rendered ineffective. (In this case, when the machine temporarily stops, and the needle thread is broken, the thread trimmer is actuated.) : Initial setting

(14) Stop control at the time of the sewing end		
Function No. : 019		Function : The machine is temporarily stopped at the end of a sewing pattern.
Item : 1 Stop control setting (Set level 2)		
Indication	OFF	[Contents] Temporary stop operation at the end of a sewing pattern is rendered ineffective. : Initial setting
	ON	[Contents] Temporary stop operation at the end of a sewing pattern is rendered effective. At this time, closing/opening of the feeding frame is not possible. However, tracing of the sewing pattern is possible by the feed forward/ backward key. The sewing is in the state of the end by depressing the start pedal at the position of the end.

(15) Bank function setting Complementary explanation → P83		
Function No. : 021		Function : This function sets bank operation.
Item 1 : With/without the bank operation and setting of the number of banks (Set level 2)		
Indication	0	[Contents] Bank function is ineffective. (Bank function does not work.) : Initial setting
	1 to 16	[Contents] This function sets the number of banks to be used.
Item : 2 Pattern data read-in method setting (Set level 2)		
Indication	SEQ	[Contents] Consecutive-number reading (From the specified pattern No., as many as patterns specified in the item 1 are read in bank consecutively.) : Initial setting
	PANEL	[Contents] Specified-number reading (From the operation panel, bank Nos. and pattern Nos. are specified and read in the bank. However, the bank numbers are from 0 to 9.)
Item : 3 Selection setting (Set level 2)		
Indication	EXT	[Contents] Setting by an external input terminal (A bank pattern corresponding to the bank No: (0 to F binary) selected by the external input terminal is sewn. Initial setting
	PANEL	[Contents] The bank is specified from the operation panel. (By combination of [PATTERN NO.] key + [NUMERIC] key, the bank number can be specified.)
	ROT	[Contents] Specifying the bank + Automatic update from the operation panel (Bank No. is automatically updated from the bank number set in the set value 1 whenever one cycle of sewing is completed, and the sewing is made.)

(16) Combination function setting		Complementary explanation → P88
Function No. : 022		Function : Mode selection of the combination function
Item : 1 This function sets the operation mode of combination function		(Set level 2)
Indication	NO USE	[Contents] Combination mode is ineffective. : Initial setting
	OVERLAP	[Contents] Patterns are combined at the center of the origin. Refer to P88 <Example 1>.
	O + PAUSE	[Contents] Patterns are combined at the center of the origin, and a temporary stop is added. Refer to P88 <Example 2>.
	APPEND	[Contents] Patterns are combined at the sewing end and sewing start. Refer to P88 <Example 3>.
	A + PAUSE	[Contents] Patterns are combined at the sewing end and sewing start, and a temporary stop is added. Refer to P88 <Example 4>.

(17) Setting of F1 . F2 keys		
Function No. : 023		Function : Setting of F1 and F2 keys on the operation panel can be made. This function can set the keys which are used often during inputting.
Item : 1 Setting of F1 key		(Set level 1)
Indication	-1	[Contents] Not registered.
	1 to 999	[Contents] Register the desired function No. The function No. is the "Function No. described in the instruction manual at page 49. : Initial setting 2
Item : 2 Setting of F2 key		
Indication	-1	[Contents] Not registered
	1 to 999	[Contents] Register the desired function No. The function No. is the "Function No." described in the instruction manual at page 49. : Initila setting 25

(18) Setting of the stopping position of main shaft		
Function No. : 027		Function : This function selects whether the main shaft is stopped at the upper dead point of the needle UP in the reverse rotation or the upper position.
Item : 2 Setting of the upper position or the upper dead point stop		(Set level 1)
Indication	OFF	[Contents] Main shaft stops at the upper position. : Initial setting
	ON	[Contents] Main shaft stops at the upper dead point.

(19) Selection of the sewing speed		
Function No. : 028		Function : The start-up speed, lowest speed and highest speed of the sewing machine can be set.
Item : 1 The start-up speed of the sewing machine is specified.		(Set level 1)
Indication	0	[Contents] Standard start-up speed 200 → 600 → 1,000 (s.p.m.) : Initial setting
	1	[Contents] Medium speed mode 1 300 → 600 → 1,000 (s.p.m.)
	2	[Contents] Medium speed mode 2 400 → 600 → 1,000 (s.p.m.)
	3	[Contents] Medium speed mode 3 500 → 600 → 1,000 (s.p.m.)
	4	[Contents] Medium speed mode 4 600 → 600 → 1,000 (s.p.m.)
	5	[Contents] Low speed mode (Set value for embroidering, etc.) 200 → 200 → 200 → 600 → 1,000 (s.p.m.)

(20) Feed control

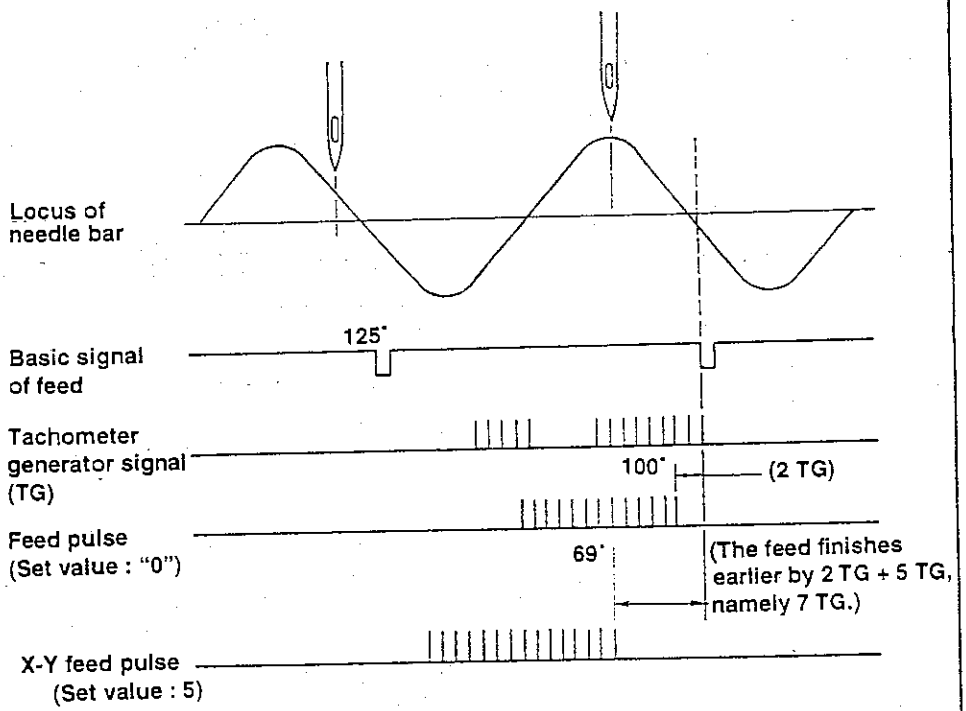
Function No. : 029	Function : Setting of the synchronized control of the sewing machine and the X-Y feed

Item : 1 Setting of the sewing pitch to the sewing speed (Set level 1)

Indication	0	[Contents] 2500 s.p.m. / 3.0 mm : Initial setting
	1	[Contents] 2000 s.p.m. / 3.0 mm
	2	[Contents] 1700 s.p.m. / 3.0 mm
	3	[Contents] 1300 s.p.m. / 3.0 mm

Item : 2 Selection of the feed timing (Set value 1)

Indication	0 to 9	[Contents] The feed start timing can be advanced by 0 to 9 TG pulses (in a unit of 8°) so as to adapt to the maerial thickness. 0 : Retards (Initial setting) (Thin materials) ⟷ 9 : Advances (Thick materials)



[Explanation]

The X-Y feed is controlled on the basis of the basic signal of feed and the tachometer generator signal (TG). In case of the feed pulse, the feed finishes feeding earlier by 2 pulses of TG signal of the next feed base pulse.

By this set value, the finish of the feed can be set so as to finish earlier. Accordingly, the feed can finish the feeding when the needle is in a higher position than the standard state.

However, when the time of the feed moving is full such as 2,500 s.p.m. / 3.00 mm or excessive sewing pitch, this setting will be ineffective.To make this setting effective, it is necessary to reduce the sewing speed in the item 1 : setting of the sewing pitch to the sewing speed.

(21) Feeding frame control 1		Complementary explanation → P91
Function No. : 030		Function : Feeding frame device setting
Item : 1 Setting at the automatic opening/closing		(Set level 2)
Indication	0 to 99	[Contents] Action sequence is set when the feeding frame automatically opens/closes in case of operating the preparation key, threading key, etc. Initial setting "0"

(22) Feeding frame control 1		Complementary explanation → P91
Function No. : 030		Function : Feeding frame device setting
Item : 2 Setting of opening/closing control at the time of pedal operation		(Set level 1)
Indication	0 to 99	[Contents] Action sequence is set when opening/closing the feeding frame at the time of pedal operation. (Set level 1) 0 : Monolithic feeding frame 1 : Separate-type feeding frame Feeding frame can be lowered from either right- or left-side. 2 : Separate-type feeding frame The right-side is prior. Feeding frame can be lowered in the order of right- to left-side. 3 : Separate-type feeding frame The left-side is prior. Feeding frame can be lowered in the order of the left- to right-side. 4 to 99 : Monolithic feeding frame
Item : 3 Setting of opening/closing control at the time of pedal operation when temporary stopping		(Set level 1)
Indication	0 to 99	[Contents] Action sequence is set when opening/closing the feeding frame at the time of pedal operation when temporary stopping. 0 : Monolithic feeding frame 1 : Separate-type feeding frame Feeding frame can be lowered from either right- or left-side. 2 : Separate-type feeding frame The right-side is prior. Feeding frame can be lowered in the order of right- to left-side. 3 : Separate-type feeding frame The left-side is prior. Feeding frame can be lowered from left- to right-side. 4 to 99 : Monolithic feeding frame
As for details of this item, refer to "7-(4) How to set the sequence of the feeding frame operation".		

(23) Feeding frame control 2		Complementary explanation → P91
Function No. : 031		Function : Feeding frame setting
Item : 1 Setting of the order of the feeding frame at the completion of the sewing		(Set level 2)
Indication	0 to 99	[Contents] Initial setting 0 (release at all times)
Item : 2 Setting of the action of the feeding frame at the completion of the sewing		(Set level 1)
Indication	ATSTART	[Contents] Feeding frame is opened after the completion of the sewing. (After moving to the sewing start point, the feeding frame is opened and waits.) : Initial setting
	HOLD	[Contents] Feeding frame is not opened after the completion of the sewing. (After moving the sewing start point, the feeding frame is kept lowered and waits. It is opened by pedal operation.)
	ATEND	[Contents] Feeding frame is opened immediately after the completion of the sewing. (After the completion of the sewing, the feeding frame is opened and moves to the sewing start point.)
Item : 3 Setting of the constant lowering of the feeding frame		(Set level 1)
Indication	OFF	[Contents] Constant lowering action is rendered ineffective. : Initial setting
	ON	[Contents] Constant lowering action is rendered effective. Feeding frame is in the lowering state at all times, and is not operative by the pedal operation.
As for the details of this item, refer to "7-(4) How to set the sequence of the feeding frame operation"		

(24) Pedal control 1		Complementary explanation → P91
Function No. : 032		Function : Setting of the pedal operation mode
Item : 1 Setting of the latch operation of the pedal 1 Setting of the operation mode of the pedal 1 (right-side pedal when using the PK-47 device)		(Set level 1)
Indication	FLIP ※1	[Contents] No latch operation (The feeding frame is lowered while depressing the pedal.)
	LATCH ※2	[Contents] Latch operation is made. (The feeding frame comes down by the first depress of the pedal, and it goes up by the second depress of the pedal.) : Initial setting
Item : 2 Setting of the latch operation of the pedal 2 Setting of the operation mode of the pedal 2 (left-side pedal when using the PK-47 device)		(Set level 1)
Indication	FLIP	[Contents] No latch operation (The feeding frame is lowered while depressing the pedal.)
	LATCH	[Contents] Latch operation is made. (The feeding frame comes down by the first depress of the pedal, and it goes up by the second depress of the pedal.) : Initial setting
Item : 3 Setting of the latch operation of the pedal 3 Setting of the operation mode of the pedal 2 (Second-step of the left-side of the pedal when using the PK-47 device)		(Set level 1)
Indication	FLIP	[Contents] No latch operation (The feeding frame is lowered while depressing the pedal.)
	LATCH	[Contents] Latch operation is made. (The feeding frame comes down by the first depress of the pedal, and it goes up by the second depress of the pedal.) : Initial setting

AS for the ※1 and ※2, refer to page 88.

(25) Pedal control 2		Complementary explanation → P91
Function No. : 033		Pedal 4 is not used with the AMS-210D.
Item : 1 Setting of the latch operation of the pedal 4 Setting of the operation mode of the pedal 4 (input of the optional pedal)		(Set level 1)
Indication	FLIP	[Contents] No latch operation (The feeding frame is lowered while depressing the pedal.)
	LATCH	[Contents] Latch operation is made. (The feeding frame comes down by the first depress of the pedal, and it goes up by the second depress of the pedal.) : Initial setting

(26) Chuck error detection control 2		
Function No. : 034		This function is not used with the AMS-210D.
Item : 1 Check sensor setting		
Indication	OFF	[Contents] Without chucking error detection control : Initial setting
	ON	[Contents] With chucking error detection control

(27) Intermediate presser control		
Function No. : 035		Function : Setting of the intermediate presser operation mode
Item : 1 Intermediate presser control		(Set level 1)
Indication	OFF	[Contents] The intermediate presser is made inoperative. (Fixed at the lowest position of its stroke.)
	SEW	[Contents] Intermediate presser is operative. (The intermediate presser comes down by the sewing data when the machine runs.) : Initial setting
	TRIAL	[Contents] Intermediate presser is operative. (The intermediate presser comes down by the sewing data both when the feed goes forward and backward.)
Item : 2 Lowering timing		(Set level 1)
Indication	START	[Contents] The intermediate presser is lowered immeadiately before the sewing machine starts. (The intermediate presser is lowered when the sewing machine starts rotating.) : Initial setting
	PRSR	[Contents] The intermediate presser is lowered simultaneously with the feeding frame. (The intermediate presser comes down simultaneously when the last feeding frame of the sequence of feeding frame is lowered.)

(28) Wiper control		
Function No. : 036		Function : Wiper operation mode setting
Item : 1 Operation mode setting : Normally, use at the standard setting.		(Set level 2)
Indication	OFF	[Contents] Wiper operation is rendered ineffective.
	Mg	[Contents] Signal of the magnet type wiper is rendered effective. : Initial setting
	AIR	[Contents] Signal of the pneumatic type wiper is rendered effective.
Item : 2 Sweeping position setting		(Set level 2)
Indication	UNDER	[Contents] Below-sweeping (Wiper sweeps below the intermediate presser.) : This function is operative when the optional side-sweeping wiper is used.
	BETWEEN	[Contents] Above-sweeping (Wiper sweeps above the intermediate presser.) : Initial setting

(29) Thread clamp control : This function is not used with the standard AMS-210D.		
Function No. : 037	Function : Wiper operation mode setting	
Item : 1 Thread clamp control		(Set level 2)
Indication	OFF	[Contens] The thread clamp is made inoperative. : Initial setting
	ON	[Contens] The thread clamp is made operative.
Item : 2 Thread clamp release operation timing		(Set level 2)
Indication	0 to 15	[Contens] The number of stitches to be sewn, from the state where the thread clamp retains the needle thread to the point at which it releases the thread, is specified. : Initial setting

(30) Thread breakage detector control		
Function No. 038	Function : Thread breakage detector operation mode setting	
Item : 1 Device control		(Set level 1)
Indication	OFF	[Contents] The thread breakage detecting device is ineffective.
	ON	[Contents] The thread breakage detecting deviceon effective. Initial setting
Item : 2 Setting the number of stitches required to stop the machine (at the sewing start)		(Set level 2)
Indication	0 to 15	[Contents] When thread breakage or slip-off of the thread occurred at the sewing start, the number of stitches required to stop the sewing machine from the detection to the stop is set. : Initial setting 8
Item : 3 Setting the number of stitches required to stop the machine (during normal operation)		(Set level 2)
Indication	0 to 15	[Contents] The number of stitches required to stop the sewing machine after the detection of thread breakage during normal operation is specified. : Initial setting 3

(31) Air pressure drop detecting control		
Function No. : 039	Function : Air pressure drop detector setting	
Item : 1 Detecting operation mode setting		
Indication	OFF	[Contents] The air pressure drop detecting function is rendered ineffective. (Magnet type initial setting)
	ON	[Contents] The air pressure drop detecting function is rendered effective. (Pneumatic type initial setting)

(32) Material end detection control : This function is not used with the standard machine.		
Function No. : 040	Function : Material end detector setting	
Item : 1 Detection control		(Set level 2)
Indication	OFF	[Contents] The material end detection function is rendered ineffective. : Initial setting
	ON	[Contents] The material end detection function is rendered effective.
Remarks : Input terminal number is set with the function No. 74.		

(33) Tension controller No. 3 opticnal control		
Function No. : 041	Function : Setting of the tension controller No. 3	
Item : 1 Device control		(Set level 2)
Indication	OFF	[Contents] The tension controller No. 3 control is rendered ineffective.
	ON	[Contents] The tension controller No. 3 control is rendered effective. : Initial setting

(34) Milling unit lift control : This function is not used with the AMS-210D.		
Function No. : 042		Function : Milling unit lift setting
Item : 1 Retracting position dedetecting control		(Set level 2)
Indication	OFF	[Contents] Whether the drill is at the retarcted position or not is not detected. : Initial setting
	ON	[Contents] Whether the drill is at the retracted position is detected.

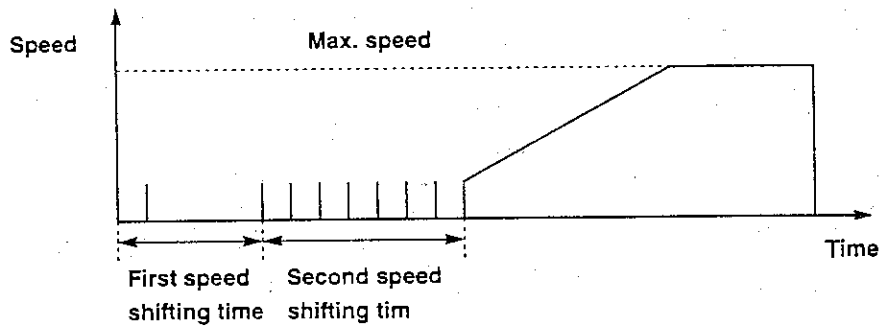
(35) Thread trimming control		
Function No. : 044		Function : Thread trimmer setting
Item : 1 Device control		(Set level 2)
Indication	OFF	[Contents] Thread trimming operation is not made in any case. (Thread trimming operation is not made at the time of temporary stop and thread breakage.)
	ON	[Contents] Thread trimming operation is made. : Initila setting

(36) Inverting mechanism control : It is effective when using the inverting device (FU01S, FU01L).		
Function No. 045		Function : Inverting mechanism setting
Item : 1 Device control		(Set level 2)
Indication	OFF	[Contents] The inverting mechanism control is rendered ineffective. (Even when an inversion pattern is used, the inverting mechanism control is not performed.)
	ON	[Contents] The inverting mechanism control is performed. : Initial setting
Item : 2 Automatic inversion Y coordinate setting		(Set level 2)
Indication	0 to 999 (x 0.1 mm)	[Contents] nverting position (coordinate of Y direction) is set when the inversion is made automatically. (Initial set value is 170.)

(37) Bobbin thread replacing device control : It is effective only when the bobbin thread replacing device is attached.		
Function No. : 047		Function : Bobbin thread replacing device setting
Item : 1 Device control		(Set level 2)
Indication	OFF	[Contents] Bobbin thread replacing device control is not made. : Initial setting
	ON	[Contents] Bobbin thread replacing device control is made.

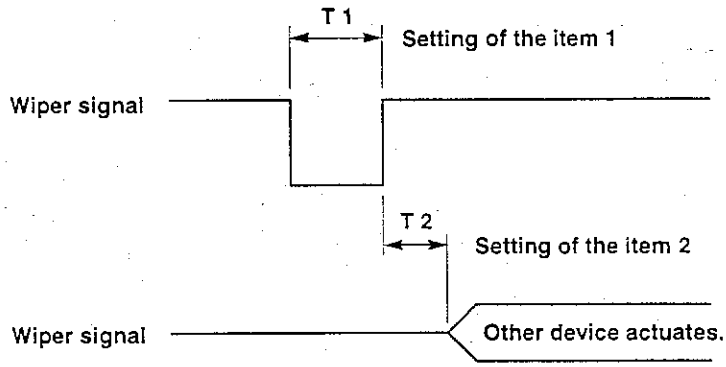
(38) X-Y JOG feed speed shifting time : Normally use this function without changing the standard setting.		
Function No. : 052		Function : The accelerating time is set when the key is consecutively pressed for the consecutive forward/backward of the feed or the like.
Item : 1 First speed shifting time of JOG mode		(Set level 2)
Indication	1 to 99 x 100 ms	[Contents] Setting of the length of time from the JOG speed to the medium speed : Initial setting 4
Item : 2 Second speed shifting time of JOG mode		(Set level 2)
indication	1 to 99 x 100 ms	[Contents] Setting of the length of time from the medium speed to the start of acceleration to the maximum speed : Initial setting 12
Item : 3 Third speed shifting time of JOG mode		(Set level 2)
Indication	5 to 99 x 100 ms	[Contents] Setting of the length of time to the maximum speed : Initial setting 50

Outline of X-Y JOG feed

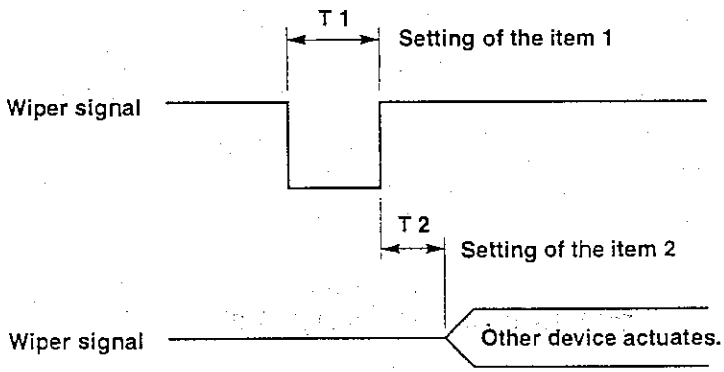


(39) Key input time function		
Function No. : 053		Function : Setting the interval of the time that a consecutively pressed key reads in repeatedly
Item : 1 First interval time : Normally use this function without changing the standard setting.		(Set level 2)
Indication	1 to 99 x 100 ms	[Contents] Setting of the interval time between the time when the first key is ON and the second one. : Initial setting 4
Item : 2 Second interval time : Normally use this function without changiing the standard setting.		(Set value 2)
Indication	1 to 99 x 100 ms	[Contents] Setting of the interval time after the third time of the read-in of the key : Initial setting 1
Item : 3 Third interval time		(Set level 2)
Indication	1 to 99 x 100 ms	[Contents] The length of time until the action is consecutively made at the time of forward/backward of the feed (the case where forward/backward of the feed is made even when the key is released.). : Initial setting 30

(40) Magnet type wiper operation time function		
Function No. : 054		Function : Time setting of the magnet type wiper operation
Item : 1 Wiper-on time		(Set level 2)
Indication	0 to 999 ms	[Contents] Setting of the wiper ON time : Initial setting 50
Item : 2 Wiper return waiting time		(Set level 2)
Indication	0 to 999 ms	[Contents] Setting of the length of time between the completion of wiper operation and the operation of the next device : Initial setting 100



(41) Pneumatic type wiper operation time function : This function is not used with the standard machine.		
Function No. : 055		Function : Time setting of the pneumatic type wiper operation
Item : 1 Wiper-on time		(Set level 2)
Indication	0 to 999 ms	[Contents] Setting of the wiper ON time : Initial setting 100
Item : 2 Wiper return waiting time		(Set level 2)
Indication	0 to 999 ms	[Contents] Setting of the length of time between the completion of the wiper operation and the operation of the next device : Initial setting 100



(42) Intermediate presser operation time function : Use this function without changing the standard setting.		
Function No. : 056		Function : Time setting of the intermediate presser operation
Item : 1 Setting the length of waiting time after the intermediate presser has come down. (Set level 2)		
Indication	0 to 999 ms	[Contents] If the sewing machine starts running immediately after the intermediate presser has operated, the intermediate presser is likely to interfere with the needle bar since the intermediate presser has a mechanical delay. To prevent this, the sewing machine starts to run after the length of time specified for this item has passed. : Initial setting 150
Item : 2 Setting the length of waiting time after the intermediate pesser has gone up. (Set level 2)		
Indication	0 to 999 ms	[Contents] After the intermediate presser has gone up, and after the specified time in this item has passed, the next operation is made. : Initial setting 150

(43) Feeding frame connection setting 1 : This function is not used with the standard machine.		
Function No. : 063		Function : Setting of the output device of the drive signal of feeding frame
Item : 1 Setting of the feeding frame 1 (Set level 2)		
Indication	0	[Contents] No connection
	1 to 16	[Contents] Output of the feeding frame is set to the terminal number. By this setting, the signal output device of the feeding frame 1 can be freely changed. : Initial setting 1
Item : 2 Setting of the feeding frame 2 (Set level 2)		
Indication	0	[Contents] No connection
	1 to 16	[Contents] Output of the feeding frame is set to the terminal number. By this setting, the signal output device of the feeding frame 2 can be freely changed. : Initial value 2
Item : 3 Setting of the feeding frame 3 (Set level 2)		
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] Output of the feeding frame is set to the terminal number. By this setting, the signal output device of the feeding frame 2 can be freely changed.

(44) Feeding frame connection setting 2 : This function is not used with the standard machine.		
Function No. : 064		Function : Setting of the output device of the drive signal of feeding frame
Item : 1 Setting of the feeding frame 4		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] Output of the feeding frame is set to the terminal number. By this setting, the signal output device of the feeding frame 4 can be freely changed.
Item : 2 Chuck sensor setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] Set to the chuck sensor input terminal number. By this setting, the signal input device of the chuck sensor can be freely changed.
Item : 3 Setting of the output at the time of start		(Set level 2)
Indication	LOW	[Contents] Active LOW output (When the power is ON, the feeding frame goes up when the feeding frame signal is in the low level.) : Initial setting for the magnet type
	HIGH	[Contents] Active HIGH output (When the power is ON, the feeding frame goes up when the feeding signal is in the high level.) : Initial setting for the pneumatic type

(45) Intermediate presser connection setting : This function is not used with the standard machine.		
Function No. : 065		Function : Setting of the output device of the drive signal of intermediate presser lifter
Item : 1 Intermediate presser lifter setting		(Set level 2)
Indication	0	[Contents] No connection
	1 to 16	[Contents] Output of the intermediate presser lifter is set to the terminal number. By this setting, the signal output device of the intermediate presser lifter can be freely changed. : Initial setting 3
Item : 2 Setting of the actuator of adjusting the height of intermediate presser (Set level 2)		
Indication	0	[Contents] No connection
	1 to 16	[Contents] Output of the device for adjusting the height of intermediate presser is set to the terminal number. By this setting, the signal output device of the device for adjusting the height of intermediate presser can be freely changed. : Initial setting 4
Item : 3 Setting of the output at the time of start		(Set level 2)
Indication	LOW	[Contents] Active LOW output (When the power is ON, the presser goes up when the presser signal is in the low level.)
	HIGH	[Contents] Active HIGH output (When the power is ON, the presser goes up when the presser signal is in the high level.) : Initial setting

(46) Wiper and thread clamp connection setting : This function is not used with the standard machine.		
Function No. : 066	Function : Setting of the output device of the drive signal of wiper and thread clamp	
Item : 2 Wiper setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] Output of the feeding frame is set to the terminal number. By this setting, the signal output device of the wiper can be freely changed.
Item : 3 Thread clamp setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] Output of the thread clamp is set to the terminal number. By this setting, the output device of output signal of the thread clamp can be freely changed.

(47) Inverting clamp connection setting : Use this function without changing the standard setting.		
Function No. : 069	Function : Setting of the output device of the drive signal of the inverting clamp	
Item : 1 Inverting device setting		(Set level 2)
Indication	0	[Contents] No connection
	1 to 16	[Contents] Output of the inverting clamp is set to the terminal number. By this setting, the signal output device of the inverting clamp can be freely changed. : Initial setting 5

(48) Milling unit connection setting : This function is not used with the standard machine.		
Function No. : 070	Function : Setting of the signal input device of the milling unit	
Item : 1 Retracted position sensor setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] Input of the retracted position sensor is set to the terminal number. By this setting, signal input device of the retracted position sensor can be freely changed.

(49) Bobbin thread replacing device connection setting : It is effective only when the bobbin thread replacing device is attached.		
Function No. : 072		Function : Setting of the output/input devices of the bobbin thread replacing device
Item : 1 Setting of the signal output of the start of replacement		(Set level 2)
Indication	0	[Contents] No connection : Inititial setting
	1 to 16	[Contents] Output device of the signal of the start of replacement is set to the terminal number. By this setting, output signal device of the signal of the start of replacement can be freely changed.
Item : 2 Setting of the input of the signal during the replacement		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] Input device of the signal during the replacement is set to the terminal number. By this setting, the input device of the signal during the replacement can be freely changed.
Item : 3 Setting of the error detection signal input		(Set level 2)
Indication	0	[Contents] No connection (Error detection is not made.) : Initial setting
	1 to 16	[Contents] Input device of the signal of error occurring is set to the terminal number. By this setting, the input device of the signal of error occurring can be freely changed.

(50) Tension controller No. 3 connection setting : Use this function without changing the standard setting.		
Function No. : 073		Function : Setting of the output device of the drive signal of tension controller No. 3
Item : 1 Setting of the drive device (Set level 2)		
Indication	0	[Contents] No connection
	1 to 16	[Contents] The output device of tension controller No. 3 is set to the terminal number. By this setting, the signal output device of the tension controiler No. 3 can be freely changed. : Initial setting 6

(51) Material end detection device connection setting : This function is not used with the standard machine.		
Function No. : 074		Function : Setting of the input device of the signal of material end detection device.
Item : 1 Material end detection sensor		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of material end detection signal is set to the terminal number. By this setting, the signal input device of the material end detection device can be freely changed.

(52) Bank selection connection setting : This function is not used with the stndard machine.		
Function No. : 075		Function : Setting of the number of terminals when the bank selection is made by the external signal.
Item : 1 Setting of the number of terminals for bank selection		(Set level 2)
Indication	1	[Contents] Can be used up to 2 patterns. : Initial setting
	2	[Contents] Can be used up to 4 patterns.
	3	[Contents] Can be used up to 8 patterns.
	4	[Contents] Can be used up to 16 patterns.
Item : 2 Setting of the starting position of the terminal for bank selection		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The starting position of the terminal for bank selection is set. By this setting, only the number of the terminals specified in the item 1 can be used as the terminal for bank selection.

(53) External output terminal connection setting 1 : This function is not used with the standard machine.		
Function No. : 076		Function : Setting of the output device of the external output terminal
Item : 1 Output terminal 0 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 0 is set to the terminal number. By this setting, the signal output device of the external output 0 can be freely changed.
Item : 2 Output terminal 1 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 1 is set to the terminal number. By this setting, the signal output device of the external output 1 can be freely changed.
Item : 3 Output terminal 2 setting		(Set level 2)
'ndication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 2 is set to the terminal number. By this setting, the signal output device of the external output 2 can be freely changed.

(54) External output terminal connection setting 2 : This function is not used with the standard machine.		
Function No. : 077		Function : Setting of the output device of the external output terminal
Item : 1 Output terminal 3 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 3 is set to the terminal number. By this setting, the signal output device of the external output 3 can be freely changed.
Item : 2 Output terminal 4 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 4 is set to the terminal number. By this setting, the signal output device of the external output 4 can be freely changed.
Item : 3 Output terminal 5 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 5 is set to the terminal number. By this setting, the signal output device of the external output 5 can be freely changed.

(55) External output terminal connection setting 3 : This function is not used with the standard machine.		
Function No. : 078		Function : Setting of the output device of the external output terminal
Item : 1 Output terminal 6 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 6 is set to the terminal number. By this setting, the signal signal device of the external output 6 can be freely changed.
Item : 2 Output terminal 7 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 7 is set to the terminal number. By this setting, the signal output device of the external output 7 can be freely changed.
Item : 3 Output terminal 8 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 8 is set to the terminal number. By this setting, the signal output device of the external output 8 can be freely changed.

(56) External output terminal connection setting 4 : This function is not used with the standard machine.		
Function No. : 079	Function : Setting of the output device of the external output terminal	
Item : 1 Output terminal 9 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 9 is set to the terminal number. By this setting, the signal output device of the external output 9 can be freely changed.
Item : 2 Output terminal 10 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 10 is set to the terminal number. By this setting, the signal output device of the external output 10 can be freely changed.
Item : 3 Output terminal 11 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 11 is set to the terminal number. By this setting, the signal output device of the external output 11 can be freely chnged.

(57) External output terminal connection setting 5 : This function is not used with the standard machine.		
Function No. : 080	Function : Setting of the output device of the external output terminal	
Item : 1 Output terminal 12 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 12 is set to the terminal number. By this setting, the signal output device of the external output 12 can be freely changed.
Item : 2 Output terminal 13 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 13 is set to the terminal number. By this setting, the signal output device of the external output 13 can be freely changed.
Item : 3 Output terminal 14 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 14 is set to the terminal number. By this setting, the signal output device of the external output 14 can be freely changed.

(58) External output terminal connection setting 6 : This function is not used with the standard machine.		
Function No. : 081	Function : Setting of the output device of the external output terminal	
Item : 1 Output terminal 15 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The output device of the external output 15 is set to the terminal number. By this setting, the signal output device of the external output 15 can be freely changed.

(59) External input terminal connection setting 1 : This function is not used with the standard machine.		
Function No. : 082		Function : Setting of the input device of the external input terminal
Item : 1 Input terminal 0 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 0 is set to the terminal number. By this setting, the signal input device of the external input 0 can be freely changed.
Item : 2 Input terminal 1 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 1 is set to the terminal number. By this setting, the signal input device of the external input 1 can be freely changed.
Item : 3 Input terminal 2 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 2 is set to the terminal number. By this setting, the signal input device of the external input 2 can be freely changed.

(60) External input terminal connection setting 2 : This function is not used with the standard machine.		
Function No. : 083		Function : Setting of the external input terminal
Item : 1 Input terminal 3 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 3 is set to the terminal number. By this setting, the signal input device of the external input 3 can be freely changed.
Item : 2 Input terminal 4 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 4 is set to the terminal number. By this setting, the signal input device of the external input 4 can be freely changed.
Item : 3 Input terminal 5 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 5 is set to the terminal number. By this setting, the signal input device of the external input 5 can be freely changed.

(61) External input terminal connection setting 3 : This function is not used with the standard machine.		
Function No. : 084	Function : Setting of the input device of the external input terminal	
Item : 1 Input terminal 6 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 6 is set to the terminal number. By this setting, the signal input device of the external input 6 can be freely changed.
Item : 2 Input terminal 7 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 7 is set to the terminal number. By this setting, the signal input device of the external input 7 can be freely changed.
Item : 3 Input terminal 8 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 8 is set to the terminal number. By this setting, the signal input device of the external input 8 can be freely changed.

(62) External input terminal connection setting 4 : This function is not used with the standard machine.		
Function No. : 085	Function : Setting of the input device of the external input terminal	
Item : 1 Input terminal 9 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 9 is set to the terminal number. By this setting, the signal input device of the external input 9 can be freely changed.
Item : 2 Input terminal 10 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 10 is set to the terminal number. By this setting, the signal input device of the external input 10 can be freely changed.
Item : 3 Input terminal 11 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 11 is set to the terminal number. By this setting, the signal input device of the external input 11 can be freely changed.

(63) External input terminal connection setting 5 : This function is not used with the standard machine.		
Function No. : 086		Function : Setting of the input device of the external input terminal
Item : 1 Input terminal 12 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 12 is set to the terminal number. By this setting, the signal input device of the external input 12 can be freely changed.
Item : 2 Input terminal 13 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 13 is set to the terminal number. By this setting, the signal input device of the external input 13 can be freely changed.
Item : 3 Input terminal 14 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 14 is set to the terminal number. By this setting, the signal input device of the external input 14 can be freely changed.

(64) External input terminal connection setting 6 : This function is not used with the standard machine.		
Function No. : 087		Function : Setting of the input device of the external input terminal
Item : 1 Input terminal 15 setting		(Set level 2)
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the external input 15 is set to the terminal number. By this setting, the signal input device of the external input 15 can be freely changed.

(65) Needle thread for embroidery replacement device control : This function is not used with the standard machine.		
Function No. : 106		Function : Setting of the needle thread for embroidery replacement device control
Item : 1 Device control		
Indication	ON	[Contents] Needle thread for embroidery replacement device control is operative.
	OFF	[Contents] Needle thread for embroidery replacement device control is inoperative. : Initial setting

(66) Connection setting of the needle thread for embroidery replacement device : This function is not used with the standard machine.		
Function No. : 107		Function : Setting of the input device of the needle thread replacement device
Item : 2 Setting of signal input of the state		
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of the signal during replacing the needle thread is set to the terminal number. By this setting, the input device of the signal during replacing the needle thread can be freely changed.
Item : 3 Setting of the signal input of the error detection		
Indication	0	[Contents] No connection : Initial setting
	1 to 16	[Contents] The input device of error occurring signal is set to the terminal number. By this setting, the input device of error occurring signal can be freely changed.

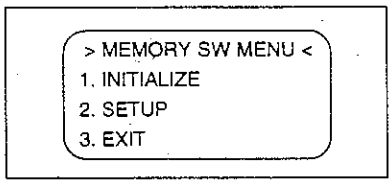
6. INITIALIZATION OF THE MEMORY SWITCH

(1) How to initialize

When the first setting state of the memory switch is not known, or the sewing machine fails to operate well, the contents set in the memory switch can be restored to the state at the time of delivery by means of the following operation.

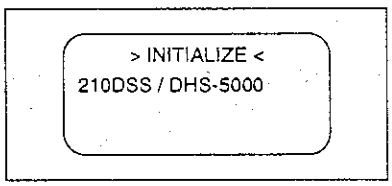
Step 1 : Pressing the [8] key on the operation panel, turn ON the power switch.

Step 2 : The panel indication will be as follows :



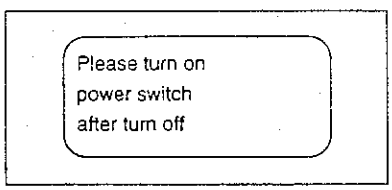
Press "[1] Initialize" key.

Step 3 : The panel indication will be as follows :



Press the [8] or [2] key to indicate the model name used. Then press the [ ] key.

Step 4 : The panel indication will be as follows :



If turning ON the power, the panel indication will be back to the indication at the time of sewing.

(2) Table of the initial setting

The initial value of the memory switch is as shown in the following table.

Function No.	Function	Item	Start level	Initial setting			
				210 DSS/DHS -5000	210DSL /DHL -5000	210DSS /DHS -FU01S	210DSL /DHL -FU01L
001	Indicating language setting	1. Language specification	2	JPN (katakana)	←	←	←
002	Scale function setting	1. Selection of enlargement/reduction method	1	Increase/ decrease of number of stitches	←	←	←
003	Jog function setting	1. Mode specification	1	Retracted position	←	←	←
		2. Use of fixed retracted position	2	No	←	←	←
004	Retainer compensation operation	1. Operation selection	1	No	←	←	←
007	Mechanical origin retrieval	1. Operation of each sewing cycle	2	No	←	←	←
		2. Operation at the time of move limit error	2	Yes	←	←	←
008	Return-to-origin operation	1. Mode setting	1	Route	←	←	←
		2. Return at needle bar upper dead point	1	No	←	←	←
009	Counter indication setting	1. Bobbin thread counter indication	1	Up	←	←	←
		2. Production counter indication	1	Yes	←	←	←
010	Pattern read-in operation	1. Read-in operation setting	2	Set state	←	←	←
		2. Constant read-in	2	No	←	←	←
		3. Automatic read-in of consecutive pattern numbers	2	No	←	←	←
011	Order of pattern read-in	1. Order of read-in	2	FD>SATRA	←	←	←
012	Idling operation	1. Speed changing function	2	No	←	←	←
013	Thread trimming after temporary stop	1. Thread trimming operation after temporary stop	1	Temporary stop switch	←	←	←
016	External input command	1. Length of time-out	2	"0"	←	←	←
018	Thread trimming command	1. Thread trimming in sewing pattern	2	Yes	←	←	←
019	Termination command	1. Temporary stop after completion of sewing	2	No	←	←	←
021	Bank function	1. Number of banks	2	"0"	←	←	←
		2. Read-in (memory) method	2	Consecutive number	←	←	←
		3. Selection method	2	External input	←	←	←
022	Pattern combination function	1. Mode	2	Not used.	←	←	←
023	F1, F2 key setting	1. F1 key	1	"2"	←	←	←
		2. F2 key	1	"25"	←	←	←

Function No.	Function	Item	Start level	Initial setting			
				210 DSS/DHS -5000	210DSL /DHL -5000	210DSS /DHS -FU01S	210DSL /DHL -FU01L
027	Upper position control of main motor	2. Change-over of upper position, upper dead point	1	Upper position	←	←	←
028	Speed control of main motor	1. Acceleration mode	1	0	←	←	←
029	XY synchronized control of main motor	1. Sewing pitch to sewing speed	1	0	←	←	←
		2. Timing delay setting	1	0	←	←	←
030	Feeding frame control 1	1. Order at the time of automatic opening/closing	2	0	←	←	←
		2. Order of opening/closing at the time of pedal operation	1	0	1	0	2
		3. Order of closing/opening at the time of temporary stop	1	0	1	0	2
031	Feeding frame control 2	1. Opening order at the completion of sewing	2	0	←	←	←
		2. Opening control at the completion of sewing	1	Open	←	←	←
		3. Constant holding	1	No	←	←	←
032	Pedal input control 1	1. Pedal 1	1	Latch	←	←	←
		2. Pedal 2	1	Latch	←	←	←
		3. Pedal 3	1	Latch	←	←	←
033	Pedal input control 2	1. Pedal 4	1	Latch	←	←	←
034	Chuck error detection	1. Control	2	No	←	←	←
035	Intermediate presser control	1. Control	1	Operation	←	←	←
		2. Lowering timing	1	When starting	←	←	←
036	Wiper device control	1. Setting of operation device	1	Magnet	←	←	←
		2. Sweeping position	2	Up	←	←	←
037	Thread clamp device control	1. With/without control	2	No	←	←	←
		2. Opening operation timing	2	"0" (stitch)	←	←	←
038	Thread breakage detection	1. With/without control	1	Yes	←	←	←
		2. Number of stitches required to stop the machine at the sewing start	2	"8" (stitches)	←	←	←
		3. Number of stitches required to stop the machine during normal operation	2	"3" (stitches)	←	←	←
039	Air pressure detection	1. With/without detection	1	No	Yes	←	←
040	Material end detection	1. With/without detection	2	No	←	←	←
041	Tension controller No. 3	1. With/without control	2	Yes	←	←	←
042	Milling unit lift devive	1. Retracting position detection	2	No	←	←	←
044	Thread trimming device	1. With/without control	2	Yes	←	←	←

Function No.	Function	Item	Start level	Initial setting			
				210 DSS/DHS -5000	210DSL /DHL -5000	210DSS /DHS -FU01S	210DSL /DHL -FU01L
045	Inverting mechanism	1. With/without control	2	Yes	←	←	←
		2. Automatic inverting Y coordinate	2	170 (pulses)	←	←	←
047	Bobbin thread replacement device	1. With/without control	2	No	←	←	←
052	XY jog feed control	1. First step time	2	4 (x 100 ms)	←	←	←
		2. Second step time	2	12 (x 100 ms)	←	←	←
		3. Third step time	2	50 (x 100 ms)	←	←	←
053	Key input time setting	1. First interval time	2	4 (x 100 ms)	←	←	←
		2. Second interval time	2	1 (x 100 ms)		←	←
		3. Third interval time	2	30 (x 100 ms)		←	←
054	Magnet type wiper Setting of operation time	1. Energized time	2	50 (ms)		←	←
		2. Time to wait for return	2	100 (ms)		←	←
055	Pneumatic type wiper Setting of operation time	1. Energized time	2	100 (ms)		←	←
		2. Time to wait for return	2	100 (ms)		←	←
056	Setting of operation time of intermediate presser	1. Time to wait for lowering	2	150 (ms)		←	←
		2. Time to wait for raising	2	150 (ms)		←	←
063	Feeding frame device connection 1	1. Output terminal number of feeding frame device 1	2	1	←	←	←
		2. Output terminal number of feeding frame device 2	2	2	←	←	←
		3. Output terminal number of feeding frame device 3	2	0	←	←	←
064	Feeding frame device connection 2	1. Output terminal number of feeding frame device 4	2	0	←	←	←
		2. Input terminal number of chuck sensor	2	0	←	←	←
		3. Output when the power is ON.	2	LOW	HIGH	LOW	HIGH
065	Intermediate presser device connection	1. Output terminal number of intermediate presser device	2	3	←	←	←
		2. Output terminal number of height adjusting device	2	4	←	←	←
		3. Output when the power is ON.	2	HIGH	←	←	←
066	Wiper device connection	2. Output terminal number of pneumatic type wiper	2	0	←	←	←
		3. Output terminal number of thread clamp device	2	0	←	←	←
069	Inverting device connection	1. Output terminal number of inverting device	2	5	←	←	←
070	Milling unit connection	1. Input terminal number of retracted position sensor	2	0	←	←	←

Function No.	Function	Item	Start level	Initial setting			
				210 DSS/DHS -5000	210DSL /DHL -5000	210DSS /DHS -FU01S	210DSL /DHL -FU01L
072	Bobbin thread replacement device connection	1. Output terminal number of replacement start signal	2	0	←	←	←
		2. Input terminal number of replacement being made signal	2	0	←	←	←
		3. Input terminal number of error signal	2	0	←	←	←
073	Tension controller No. 3 connection	1. Output terminal number to drive unit	2	6	←	←	←
074	Material end detection device connection	1. Input terminal number of sensor signal	2	0	←	←	←
075	Bank selection connection	1. Number of selection terminals	2	2	←	←	←
		2. Terminal number of start of selection	2	0	←	←	←
076	External output connection 1	1. Output terminal number of external output 0	2	0	←	←	←
		2. Output terminal number of external output 1	2	0	←	←	←
		3. Output terminal number of external output 2	2	0	←	←	←
077	External output connection 2	1. Output terminal number of external output 3	2	0	←	←	←
		2. Output terminal number of external output 4	2	0	←	←	←
		3. Output terminal number of external output 5	2	0	←	←	←
078	External output connection 3	1. Output terminal number of external output 6	2	0	←	←	←
		2. Output terminal number of external output 7	2	0	←	←	←
		3. Output terminal number of external output 8	2	0	←	←	←
079	External output connection 4	1. Output terminal number of external output 9	2	0	←	←	←
		2. Output terminal number of external output 10	2	0	←	←	←
		3. Output external number of external output 11	2	0	←	←	←
080	External output connection 5	1. Output terminal number of external output 12	2	0	←	←	←
		2. Output terminal number of external output 13	2	0	←	←	←
		3. Output terminal number of external output 14	2	0	←	←	←
081	External output connection 6	1. Output terminal number of external output 15	2	0	←	←	←
082	External input connection 1	1. Input terminal number of external input 0	2	0	←	←	←
		2. Input terminal number of external input 1	2	0	←	←	←
		3. Input terminal number of external input 2	2	0	←	←	←
083	External input connection 2	1. Input terminal number of external input 3	2	0	←	←	←
		2. Input terminal number of external input 4	2	0	←	←	←
		3. Input terminal number of external input 5	2	0	←	←	←
084	External input connection 3	1. Input terminal number of external input 6	2	0	←	←	←
		2. Input terminal number of external input 7	2	0	←	←	←
		3. Input terminal number of external input 8	2	0	←	←	←
85	External input connection 4	1. Input terminal number of external input 9	2	0	←	←	←
		2. Input terminal number of external input 10	2	0	←	←	←
		3. Input terminal number of external input 11	2	0	←	←	←
86	Ecxternal input connection 5	1. Input terminal number of external input 12	2	0	←	←	←
		2. Input terminal number of external input 13	2	0	←	←	←
		3. Input terminal number of external input 14	2	0	←	←	←

Function No.	Function	Item	Start level	Initial setting			
				210 DSS/DHS -5000	210DSL /DHL -5000	210DSS /DHS -FU01S	210DSL /DHL -FU01L
087	External input connection 6	1. Input terminal number of external input 15	2	0	←	←	←
106	Thread for embroidery replacement device	1. With/without control	2	No	←	←	←
107	Thread for embroidery replacement device connection	2. Input terminal number of replacement being made signal	2	0	←	←	←
		3. Input terminal number of error signal	2	0	←	←	←

(Caution) 1. For the subclasses not described in the above table, the setting may vary.
2. The contents of setting may vary according to the revision of System ROM.
(The above table is for System ROM Revision 005C.)

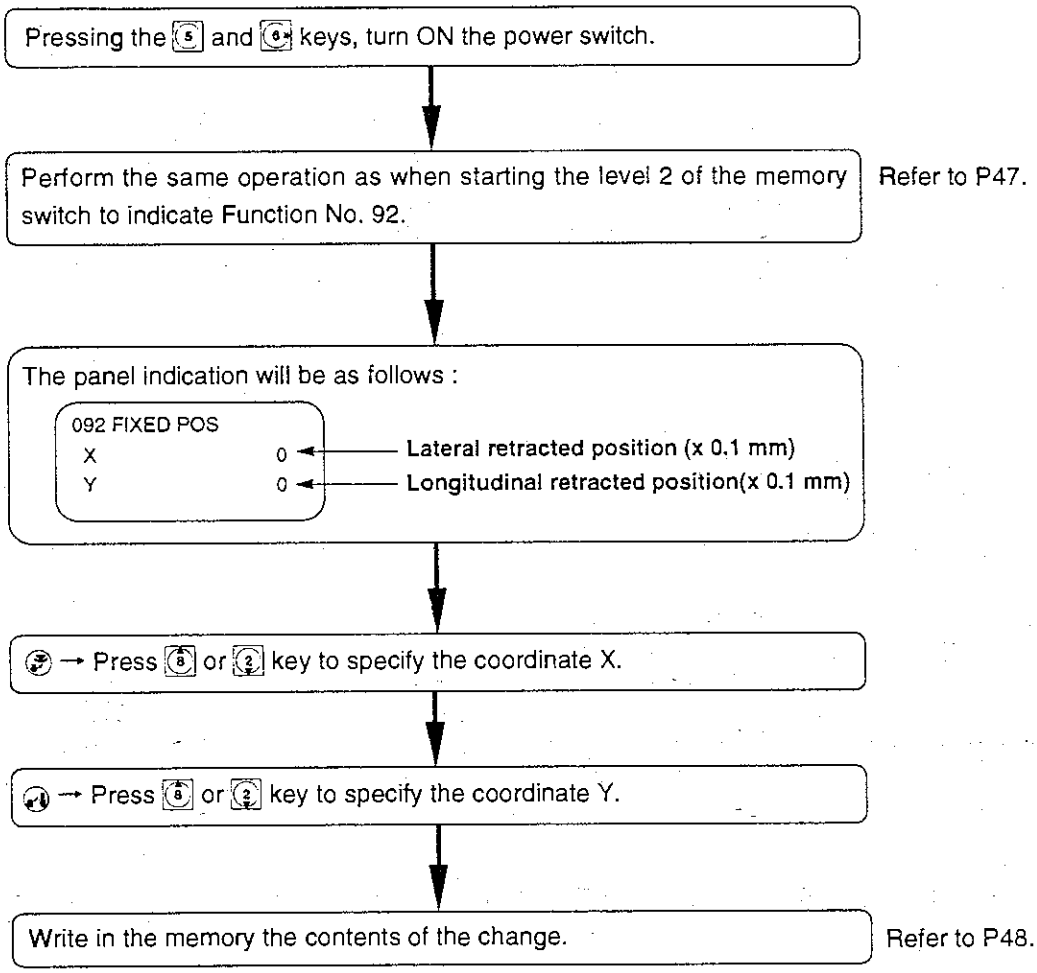
7. COMPLEMENTARY EXPLANATION OF FUNCTION NOS.

(1) Fixed retracted position setting (Function No. 003)

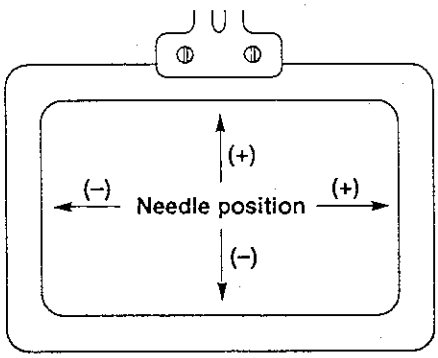
Regardless of the 2nd origin in the sewing pattern, a 2nd origin (fixed retracted position) common to each sewing pattern can be set with the memory switch.

When the item 2 "Fixed retracted position setting" of the function No. 003 of the memory switch is set to "ON", the newly set fixed retracted position will become effective, and even if any sewing pattern is read in, the feeding frame waits at the same position.

Setting of the fixed retracted position



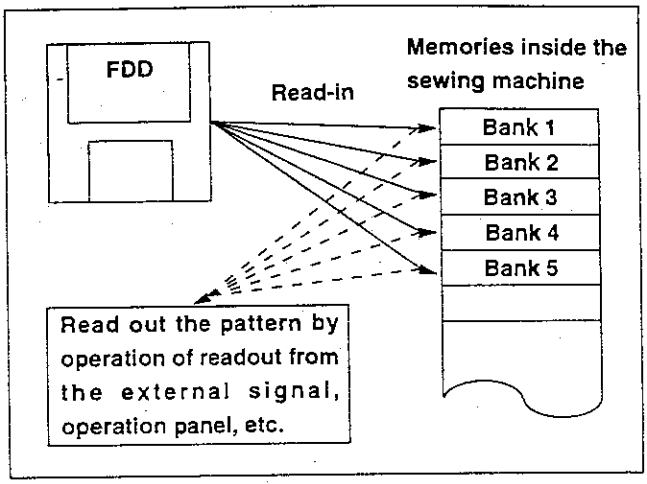
(Note) The coordinate X, when the needle position is on the right side of the origin, is (+), and, on the left side of it, (-).
The coordinate Y, when the needle position is in the rear of the origin, is (+), and , in front of it, (-).



(2) How to use the bank function (Function No. 21 and 75)

Bank function

The bank function means that plural patterns in the floppy disk can be stored in the memory of the sewing machine main unit and instantly change the patterns from the external signal or operation panel and that plural patterns can be sewn. (Refer to the right figure.)



[Setting to use the bank function]

To use the bank function, it is necessary to set some of the contents of the memory switch.
The necessary contents to be set are described as follows :

[Setting item when using the bank function]

When using the bank function, following setting of the memory switch is necessary :
As for the way of change of the memory switch, refer to the item "How to use the memory switch" P46.
Function No. of the memory switch which is necessary for setting.

Function No.	Function	Item	Remarks
21	Bank function	1	Number of banks Effective/ineffective setting
		2	Read-in method setting
		3	Selection method setting
75	Bank selection connection setting	1	Number of selectable patterns
3	Jog function	2	Start terminal number of signal for selection
92	Coordinate of fixed retracted position (Note)	2	Fixed retracted position setting
		1	X fixed retracted position
		2	Y fixed retracted position

Table 1

(Note) Be careful as the start level of the function No. 92 is different from that of the other function Nos. The way of starting is given in the explanation of each function.

[Explanation of the contents of setting]

Function No. 21 Bank function setting

In these items, setting of the bank function operation is made.
The contents of setting for each item is described as follows :

Item 1 : Setting of with/without bank operation and number of banks

In this item, with/without bank function and number of banks are set.The number of banks used means to set the number of patterns desired to be read in the memory of the sewing machine side.

Set values are 1 to 16. If "0" is set, the bank function does not work.

Item 2 : Setting of read-in method

[Consecutive number read-in] (SEQ)

Patterns are read in the memory of the sewing machine side from bank No. 0 by turns in the order of the specified pattern numbers

At this time, the pattern desired to be read in should be stored in the floppy disk with consecutive pattern numbers.

Perform the read-in method same as the normal pattern read-in operation.

[Read-in from panel] (PANEL)

Specify the bank No. from the panel and any pattern data in the floppy disk can be read in the bank at random.

(How to operate)

Press the ⓢ key and input the desired pattern number using the numeric keys from 0 to 9.

Next, specify the pattern No. desired to read in using the "ⓢ key + Numeric keys from 0 to 9".

By this operation, any pattern data can be read in the desired bank.

However, the maximum bank numbers are 10 as the numeric keys are from 0 to 9.

Item 3 : Setting of selection method

[Read-in from external signal] (EXT)

Selection of bank can be possible by the external signal input.

The numbers of banks possible to select are up to 16 banks.

For the standard machine, as shown in the table 2, there are only two input lines. Therefore, the maximum 4 banks can be selected.

The connection device and connecting way will be explained in a separate item.

[Operation panel] (PANEL)

Specify the desired bank number from the operation panel, and the sewing can be made.

In a state that the sewing LED is lit up, select using the "ⓢ key + Numeric keys from 0 to 9"

In this case, 10 bank selections can be made as the numeric keys are from 0 to 9.

[Automatic update] (ROT)

Specify the desired bank number from the operation panel, and the sewing can be made. Also, the bank number is automatically updated every cycle.

Same as the [operation panel] mode, it is possible to directly specify the bank using the "ⓢ key + Numeric keys from 0 to 9"

In this case, the bank number is updated from the directly specified bank number.

Function No. 75 Bank selection connection setting

[Read-in from the external signal] This setting is made when (EXT) is specified .

Item 1 : Selection of the number of terminals for bank selection

This function sets the number of signal lines to be used for changing the bank numbers.

For the standard machine, the signals to be input are only two. Therefore, the set value is 1 or 2 only.

If more input signals are necessary, an optional input/output expansion circuit board is necessary.

Item 2 : Start number of the selection terminal

This setting specifies the terminal number to be used for input signal.

The input terminal numbers are controlled from No. 1 in order.

The numbers to be used for bank selection are from No. 1 to No. 16.

For the standard machine, input terminals are only two. 1 or 2 can be specified.

The relation with the item 1 is as follows :

In case the set value is 1 in the item 1

In this case, if "1" is set in the item 2, use the signal from the input terminal 1 and two bank numbers can be used by turning ON/OFF.

Also, if "2" is set, use the signal from the input terminal 2 and two bank numbers can be used by turning ON/OFF.

In case the set value is 2 in the item 1

In this case, if "1" is set in the item 2, use the signals from the input terminals 1 and 2 (binary code) and up tp 4 patterns can be used.

Also, if "2" is set, the result is same as using the signal from the input terminal 2 only. Two bank numbers can be used by turning ON/OFF.

Function No. 003 Jog function setting

Fixed retracted position setting

Be sure to use this fixed retracted position when using the bank function.

The reason is as follows :

In case of AMS, the machine under normal operation stops at the sewing start position when turning ON the power.

However, this is possible only when the sewing pattern is one. As in the case of the bank function, the sewing start point of the pattern to be sewn next does not always corespond with that of the previously sewn pattern. Accordingly, the waiting position at the sewing start should be the same position by all means using this fixed retracted position.

Fot this purpose, use the fixed retracted position.

Item 2 : Fixed retracted position setting (ON)

By this setting, the machine always moves to the position of X and Y coordinates set by the memory switch function No. 92 after completion of the sewing and enters in a standby state.

Setting of the memory switch function No. 92 will be explained in the next item (P86).

Normally, the memory switch of No. 92 is set to X : 0 and Y : 0. And, the machine stops at the origin.

Function No. 092 Jog function, Coordinate of the fixed retracted position

When the item 2 of the memory switch function No. 003 Jog function is effective, the set value of X and Y coordinates is set as the fixed retracted position. And the feeding frame stops always at the specified position after completion of the sewing and enters in a stanby state.

Item 1 : X coordinate setting Actual setting position -32767 to +32767 (X0.1 mm)

When selecting the fixed retracted position in the item 2 of function No. 003, the read-in pattern is set so that the set coordinate becomes the X coordinate value of the fixed retracted position.

(Initial setting 0)

Item 2 : Y coordinate setting Actual setting position -32767 to +32767 (X0.1 mm)

When selecting the fixed retracted position in the item 2 of function No. 003, the read-in pattern is set so that the set coordinate becomes the Y coordinate value of the fixed retracted position.

(Note) Start level of the coordinate of the fixed retracted position of function No. 092 Jog function is different. Start as follows :

[How to start Function No. 92]

Pressing [5] + [6] keys, turn ON the power switch.

After then, operate same as "How to start the level 2" of "How to start the memory switch" P47.

Explanation of the input terminal for selection

Here, input of the two lines which are possible for input with the standard AMS is explained.

[Pin arrangement]

Bank number selection signal from the external is input through J16 mounted on MAIN circuit board in the control box.

Pin arrangement is as follows :

MAIN circuit board J16		
Pin No.	Signal name	Function
7	+ 5 V	Power source + 5 V
8	OP_INPUT 1	Input signal 1 (+ 5 V)
9	GND	Ground
10	+ 5 V	Power source + 5 V
11	OP_INPUT 2	Input signal 2 (+ 5 V)
12	GND	Ground

Table 2

[Logic of signal]

All input of signal is +5V signal. Logic is the positive logic (Effective, Active) when the input signal is OFF (OV, Low level).

The input signal is pulled up in the inside of circuit board,and becomes ON (+5V) state when released.

[Relation between the combination of input signal and bank numbers]

The relation between two input terminals and bank numbers is shown by the binary as shown in the table below.

Bank No.	Input signal 2	Input signal 1
0	ON	ON
1	ON	OFF
2	OFF	ON
3	OFF	OFF

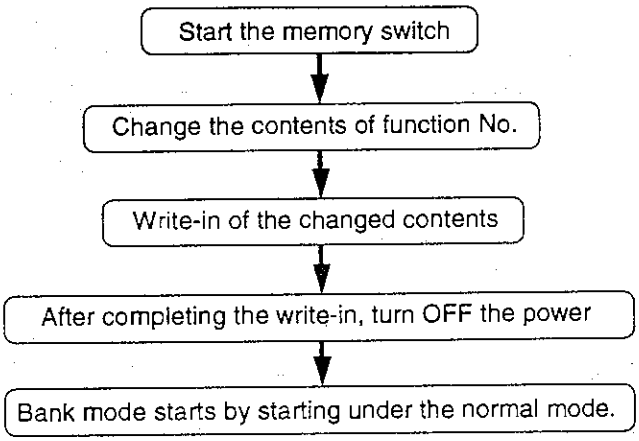
Table 3

[Form of connector for signal input]

Connector forms used for the input connectors are as follows :

Manufacturer name	Name	Manufacturer form	JUKI Part No.
MOREX	Receptacle	5557-24R	HK034610024
MOREX	Female terminal	5556T2L	HK03464000A

[Setting flow chart when using the bank function]



Flow chart until the bank function is set is as shown in the figure left.

[Panel indication after setting the bank function]

After setting the memory switch, when the machine is started under the bank mode, the panel indication will be as follows :

No : 000	BNK-BLK
XS : 000	EXT
YS : 000	
BC : 000	PC : 0000

By this panel indication, the bank function is effective and the bank mode is actuated.

[Explanation of panel indication under the bank mode]

No : 000	BNK-BLK
XS : 000	EXT
YS : 000	
BC : 000	PC : 0000

According to the contents of the setting of the item 3 of Function No. 21 of the memory switch, following indications are given :

When "EXT" is set :

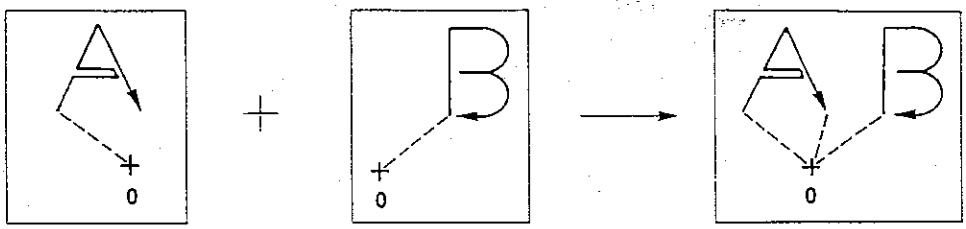
When "PANEL" is set :

When "ROT" is set :

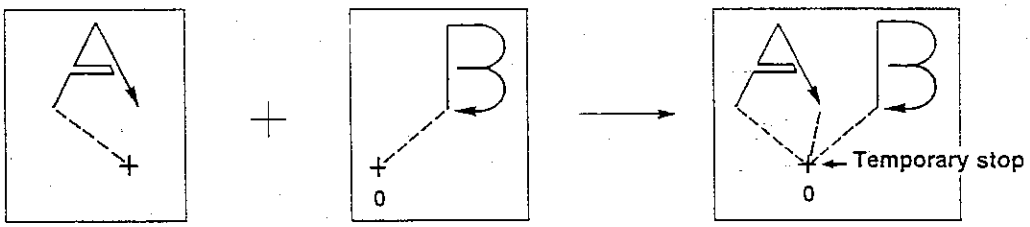
(3) Combination function

Reading plural patterns from the floppy disk and sewing in a combined state using the combination function can be made.

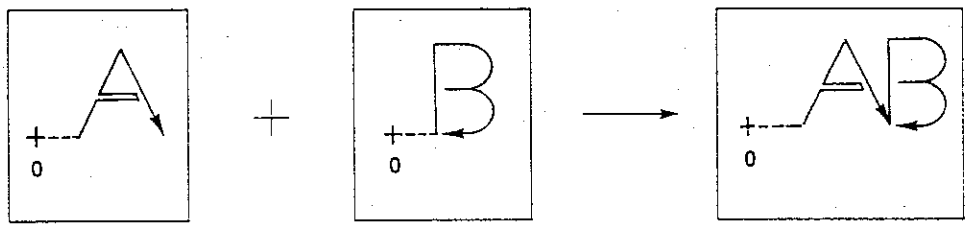
<Example 1> Correspond the origins of both patterns with each other and combine the two patterns.



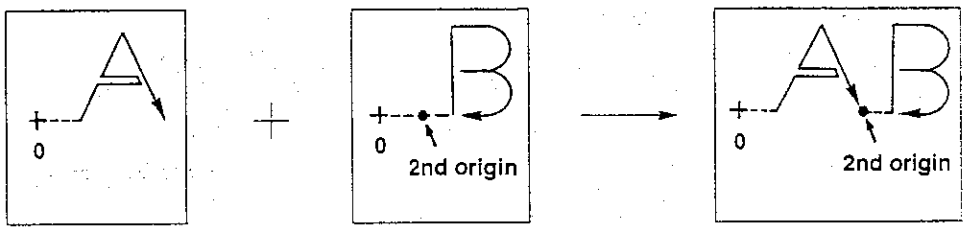
<Example 2> Correspond the origins of both patterns with each other including inserting a temporary stop and combine the two patterns.



<Example 3> Correspond the sewing start with the sewing end and combine the two patterns.

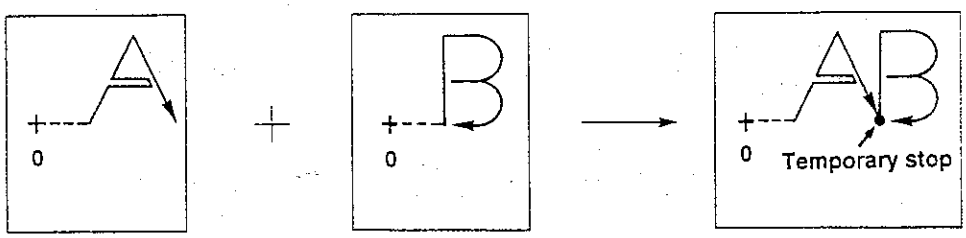


(Note) Jump feed to the sewing start after the second pattern is neglected.



(Note) Jump feed to the 2nd origin after the second pattern is neglected.
Also, the machine does not stop at the 2nd origin.

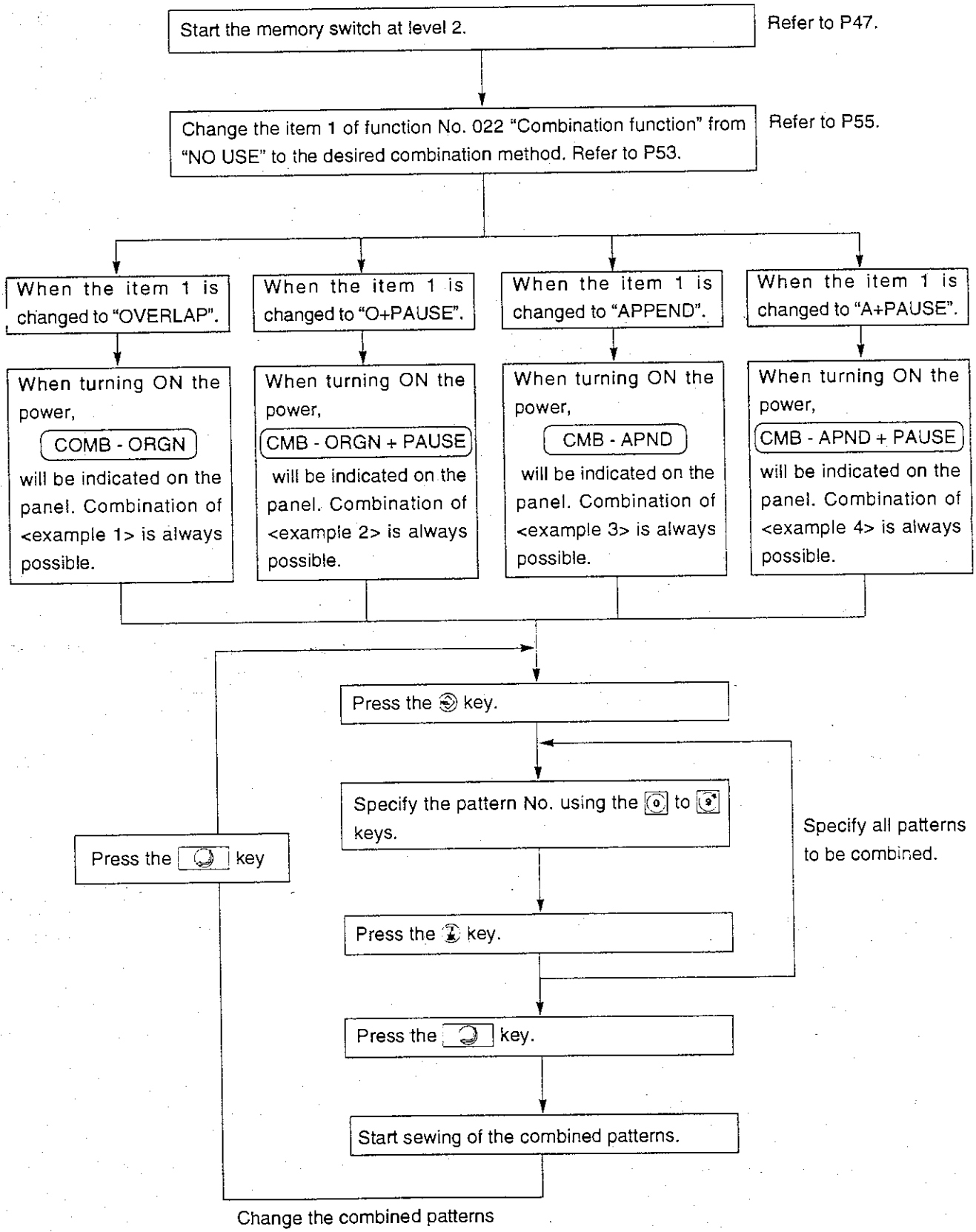
<Example 4> Correspond the sewing start and the sewing end including inserting a temporary stop and combine the two patterns.



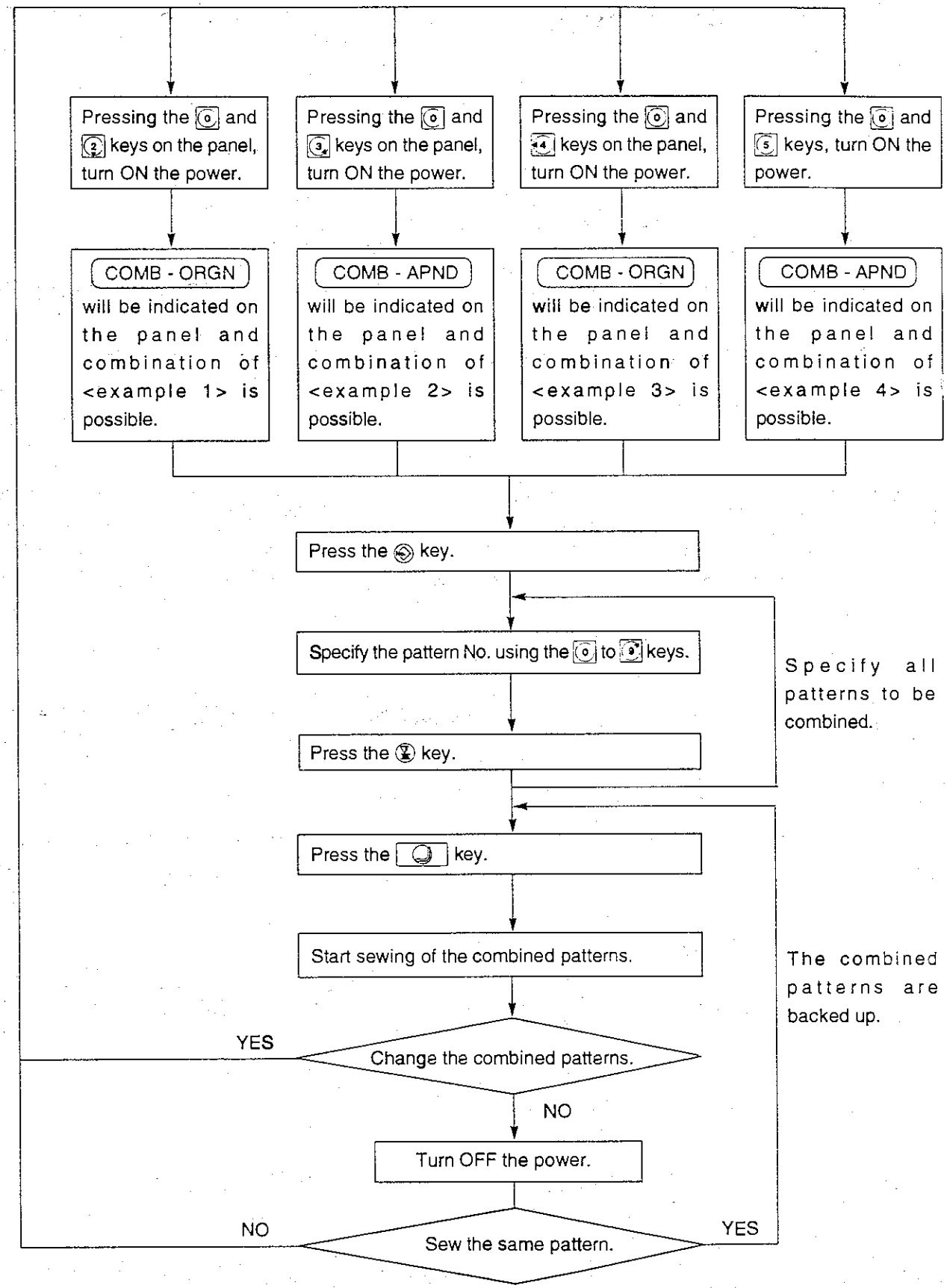
Starting method of the combination function

There are two starting methods of the combination function. Use the starting methods according to the sewing condition.

<Starting method 1> In case the change of combination pattern is frequently made, change the setting of memory switch so that the combination function always actuates.



<Starting method 2> In case of sewing the same combined patterns for a long period of time, start the combination function using the operation panel.



(4) HOW TO SET THE SEQUENCE OF THE FEEDING FRAME OPERATION (Function Nos. 030 to 033)

The AMS-210D can change the operating way of the feeding frame and pedal using the memory switch.
The setting of the desired operation of the feeding frame and pedal can be made by changing the function Nos. 30 to 33 of the memory switch.

Function No. 30 Feeding frame control (1)

This memory switch can specify the operation order of the feeding frame when the feeding frame automatically operates and when it operates by means of the pedal.

Item 1 : Can set the operation order of the feeding frame when the work clamp foot works regardless of the pedal operation when using the preparation key, threading key, etc. Set value : 0 to 99
(However, at the time of the initial setting, all release or all clamp only.)

Item 2 : Selects the operation order of the feeding frame at the time of opening / closing by means of the pedal. (Refer to the table 1.)

[Memory switch setting level table 1]

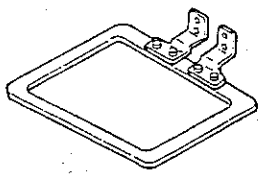
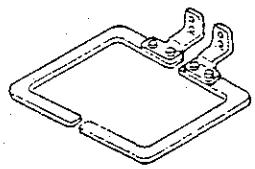
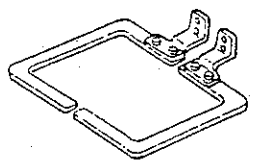
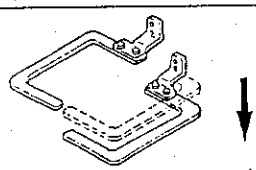
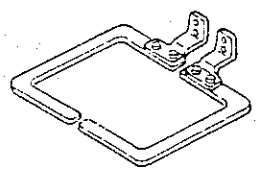
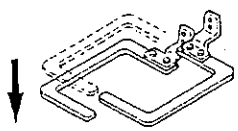
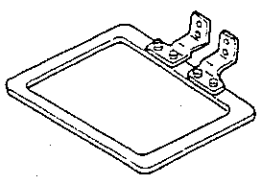
Setting	Contents	Priority order	Description
0	 Monolithic feeding frame	None	
1	 Separate type feeding frame	Coming down either from the right- or left-side is possible.	The feeding frame, right, comes down by the right-side pedal, and left, comes down by the left-side pedal.
2	 Separate type feeding frame	 Comes down from the right side	The feeding frame, right, comes down by the right-side pedal, and left, comes down by the left-side pedal. However, the feeding frame, left, does not come down if the feeding frame, right, has not come down.
3	 Separate type feeding frame	 Comes down from the left side.	The feeding frame, right, comes down by the right-side pedal, and left, comes down by the left-side pedal. However, the feeding frame, right, does not come down if the feeding frame, left, has not come down.
4 to 99	 Monolithic feeding frame	None	Same as the setting "0". Set these set values when special operations are necessary for special orders. In this case, modification of the program is necessary.

Table 1

Item 3 : Selects the operation order of the feeding frame when opening / closing by the pedal after the temporary stop by the temporary stop command. Refer to the table 2.

[Memory switch setting level table 2]

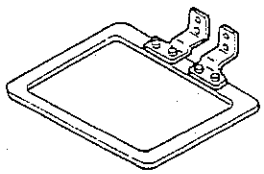
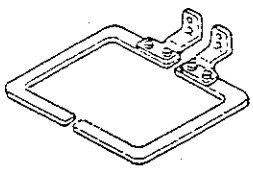
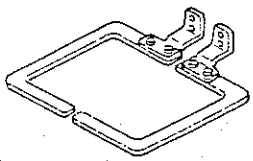
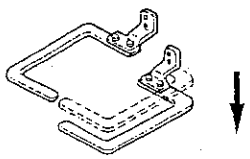
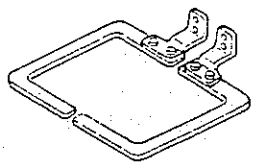
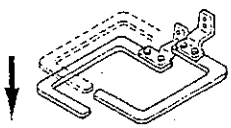
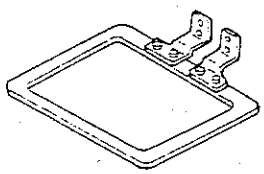
Setting	Contents	Priority order	Description
0	 Monolithic feeding frame	None	
1	 Separate type feeding frame	Coming down either from the feeding frame, right, or left, is possible.	When temporary stopping, the feeding frame, right, comes down by the right-side pedal, and left, comes down by the left-side pedal.
2	 Separate type feeding frame	 Comes down from the right side.	When temporary stopping, the feeding frame, right, comes down by the right-side pedal, and left, comes down by the left-side pedal. However, the feeding frame, left, does not come down if the feeding frame, right, has not come down.
3	 Separate type feeding frame	 Comes down from the left side.	When temporary stopping, the feeding frame, right, comes down by the right-side pedal, and left, comes down by the left-side pedal. However, the feeding frame, right, does not come down if the feeding frame, left, has not come down.
4 to 99	 Monolithic feeding frame	None	Same as the setting "0". Set these set values when special operations are necessary for special order. Modification of program is necessary.

Table 2

Function No. 31 Feeding frame control (2)

This function sets the release of the feeding frame when the sewing is completed.

Item 1 : Control of the release of the feeding frame at the time of completion of the sewing.
This function sets the operation order when the feeding frame goes up after completing the sewing.
Set value 0 to 99 (Standard state is all release only.)

Item 2 : This function sets the operation of the feeding frame at the time of completion of the sewing.
(Refer to the table 3 below.)

[Memory switch setting level table 3]

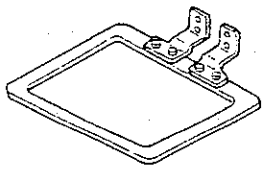
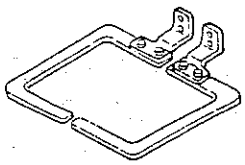
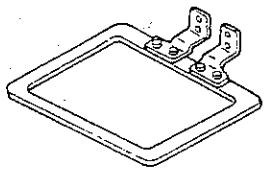
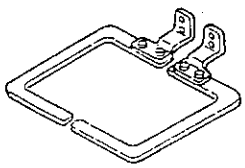
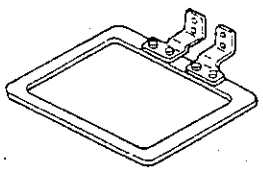
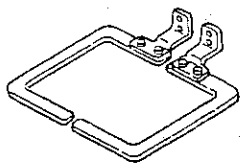
Setting	Kinds of applicable feeding frames	Description
ATSTART	 Monolithic feeding frame  Separate type feeding frame	After completing the sewing, the feeding frame moves to the point of the sewing start, and wait in the state that the feeding frame is kept up.
HOLD	 Monolithic feeding frame  Separate type feeding frame	After completing the sewing, the feeding frame moves to the point of the sewing start, and wait in the state that the feeding frame is kept down. The feeding frame is released by the pedal.
ATEND	 Monolithic feeding frame  Separate type feeding frame	After completing the sewing, the feeding frame is released. From the sewing end to the sewing start, the feeding frame moves while keeping the feeding frame held released. After moving to thd sewing start, wait while keeping the feeding frame held released.

Table 3

Item 3 : Constant lowering function
This function can constantly keep the feeding frame held lowered.
Setting OFF : Standard set value Up/down of the feeding frame is possible.
Setting ON : At the time of the origin retrieval, after moving to the point of the sewing start, or in other cases, the feeding frame is kept lowered. Opening/closing by pedal is not possible.

Function No. 32 Pedal input control (1)

This function sets the way of pedal operation.

Item 1 : Sets the pedal operation of the pedal 1 (feeding frame, right).
Set value FLIP or LATCH (Refer to the table 4.) Initial setting : LATCH

Item 2 : Sets the pedal operation of the pedal 2 (feeding frame, left).
Set value FLIP or LATCH (Refer to the table 4.) Initial setting : LATCH

Item 3 : Sets the pedal operation of the pedal 3 (stroke presser 1).
Set value FLIP or LATCH (Refer to the table 4.) Initial setting : LATCH
(However, this function is not used with the AMS-210D.)

Function No. 33 Pedal input control (2)

This function sets the way of pedal operation. (This function sets the continuation of the function No. 32.)

Item 1 : Sets the pedal operation of the pedal 4 (stroke presser 2).
Set value 0 or 1 (Refer to the table 4.) Initial setting : LATCH
(However, this function is not used with the AMS-210D.)

[Explanation of the operations of the respective settings]

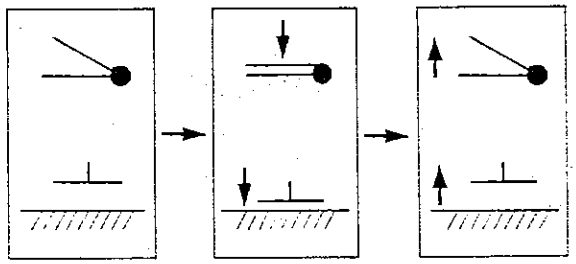
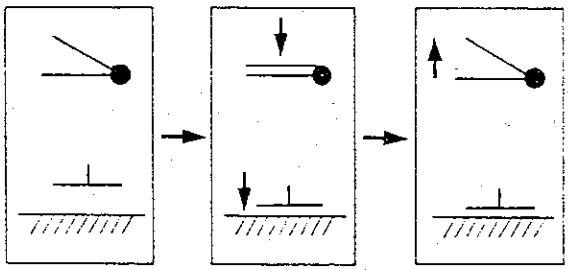
Setting	Description	Remarks
FLIP	The feeding frame is lowered only when the pedal is depressed.	
LATCH	If the pedal is depressed for the first time, the feeding frame is lowered, and kept lowered even when the pedal is released. If the pedal is depressed for the second, the feeding frame will be raised.	

Table 4

8. TEST MODE

(1) How to start the test mode

1) Pressing the ⊖ and [ ] keys, turn ON the power.

```
TEST MODE
1 XY SNS      4 AGING
2 INPUT
3 OUTPUT
```

Display of test mode selection

2) If the display is shown, input the function Nos. ([1] to [14]) of the test mode from the operation panel.

3) When the power is turned OFF, the test mode finishes.

(2) Test mode function

(2)-1 Function No. 1 : Origin check function

The position of the origin of the sewing machine can be confirmed.
When replacing the components relating to the origin (XY sensor, slit plate, etc.), be sure to adjust.
As for the adjustment, refer to P36 to P39.

(2)-2 Function No. 2 : Input check function

Signal of the respective switches and sensor can be confirmed.

1) When the test mode is selected on the display, select the [2] key.

   The indication will be shown as follows.

```
INPUT CHECK
00   104    10111111
1110          110111
11111111
```

[Indication on the display]

```
INPUT CHECK
**   ***  ********
①    ②    ③
****  ******
④     ⑤
********
⑥
```

① : Key code from operation panel
② : Value of variable registor
③ : Input of switch
④ : X, Y sensors and external input signal
⑤ : Signal from Servo circuit board
⑥ : Signal from external input circuit board (Optional)

[Explanation of the indication]

Indication ① Indication of key code from operation panel

Two digits of the number corresponding to the key will be shown when operation panel is pressed.

Codes corresponding to each key are as shown in the following table.

Switch name	Code	Switch name	Code	Switch name	Code	Switch name	Code	Switch name	Code
Bobbin thread winder	01	0 key	10	Pattern No.	20	Input selection	25	Data deletion	35
		1 key	11	X scale	21	Code	26	Speed change	36
Threading	02	2 key	12	Y scale	22	F1	27	Curve point	37
Clear	03	3 key	13	Bobbin thread set	23	F2	28	End point	38
Advance	04	4 key	14			Jump	29	Execution/End	39
Retract	05	5 key	15	Bobbin thread replacement	24	Point sewing	30		
Return-to-origin	06	6 key	16			Linear sewing	31		
Test	07	7 key	17			Thread trimming	32		
	08	8 key	18			Read-out	33		
		9 key	19			Write-in	34		

Indication ② Value of variable resistor

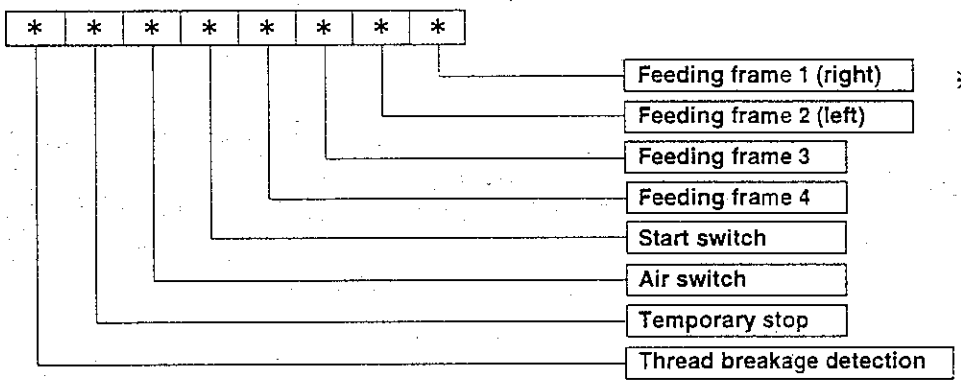
Value of the variable resistor located on the left side of operation panel is shown.

The value indicated is from 0 to 255.(However, in some cases, "0" or "255" will not be shown because of the unstable work of the variable resistor.)

Indication ③ Switch input

Pedal, temporary stop switch, etc. are shown.

The indication will be as follows.

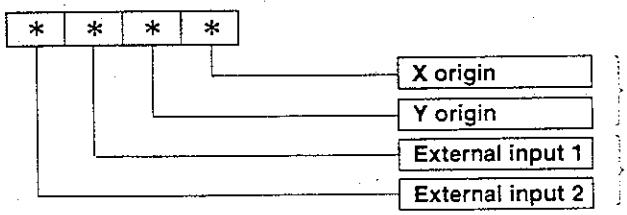


※ Normally, when the "1" switch is ON, "0" is shown.
For the temporary stop switch, when the "0" switch is ON, "1" is shown.

Indication ④ Sensor input

X and Y sensors, and external input signal are shown.

The indication is as follows.

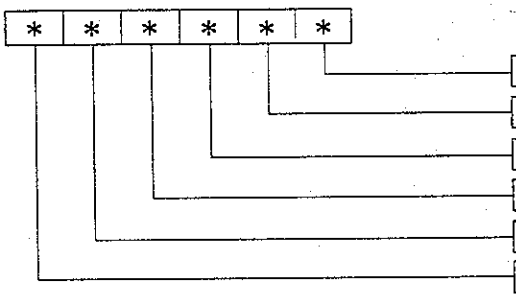


"0" will be indicated when the sensor is covered.

"1" will be indicated when the signal is entered.

Indication ⑤ Sensor input

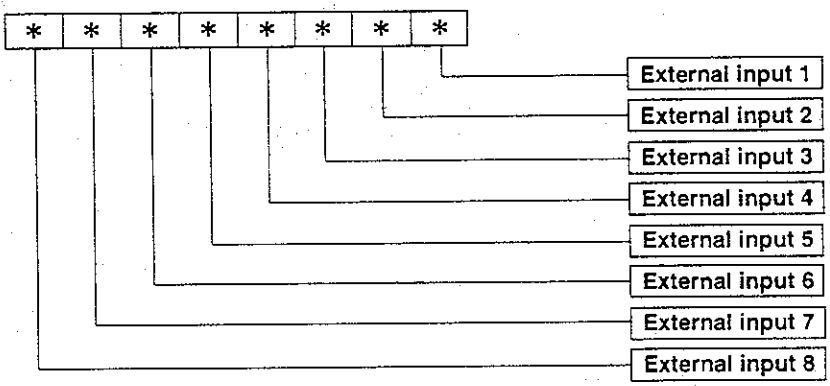
Input signal from SERVO circuit board is shown.



※ The siganl cannot be changed from outside as the signal comes out from SERVO circuit board.

Indication ⑥ External input terminal (Only when Optional circuit board is attached.)

External input signal, when the option is attached, is shown.



※ When the optional circuit board is not attached, always "1" is shown.

(2)-3 Function No. 3 : Output check function

Operation of the devices can be confirmed by outputting signals to the respective outputs from operation panel.

1) Select the [3] key when selection of the test mode is shown.

OUTPUT CHECK	
0	00000000

[Display indication]

OUTPUT CHECK	
0	00000000
①	②

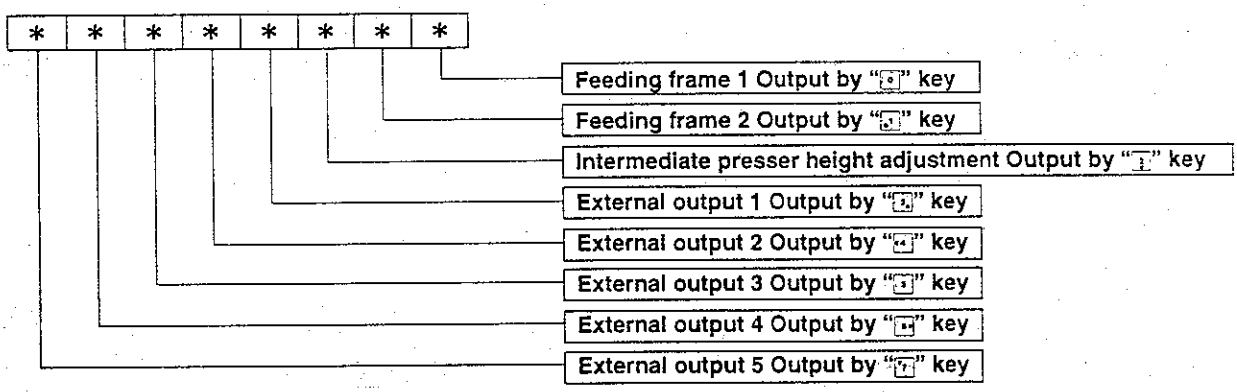
① Step indication Output check is composed of four steps from 0 to 3.
The current step is shown.

② Input state is shown "0" or "1".
Indication digit changes according to the respective steps.
When the indication is "1", the signal is being output.

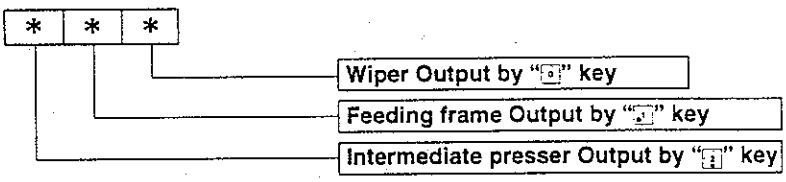
2) When depressing the feeding frame switch, the step indication of indication ① is updated.
By pressing the keys from [0] to [7], the keys output signals to the respective output terminals.

[Indication on the dispaly]

- Step "0"
  Output check of air system (No output with the magnet type machine head)



- Step "1"
  Output signal of magnet components is output.



- Step "2"
- Step "3"
  Output when the optional is attached (Standard type machine does not work.)

(2)-4 Function No. 4 : Aging function

This function actuates under continuous operation mode of the sewing machine.

1) Input the [◀◀] key when the test mode selection is shown on the display.

No. 000	AGING
XS : 1000	
YS : 1000	
BC : 000	PC : 0000

2) Set the pattern No. same as the normal operation, and press the [▶] key

3) When the sewing machine is started, the continuous mode begins.

※ Every finish of one cycle, there is an interval of approximate 5 seconds.

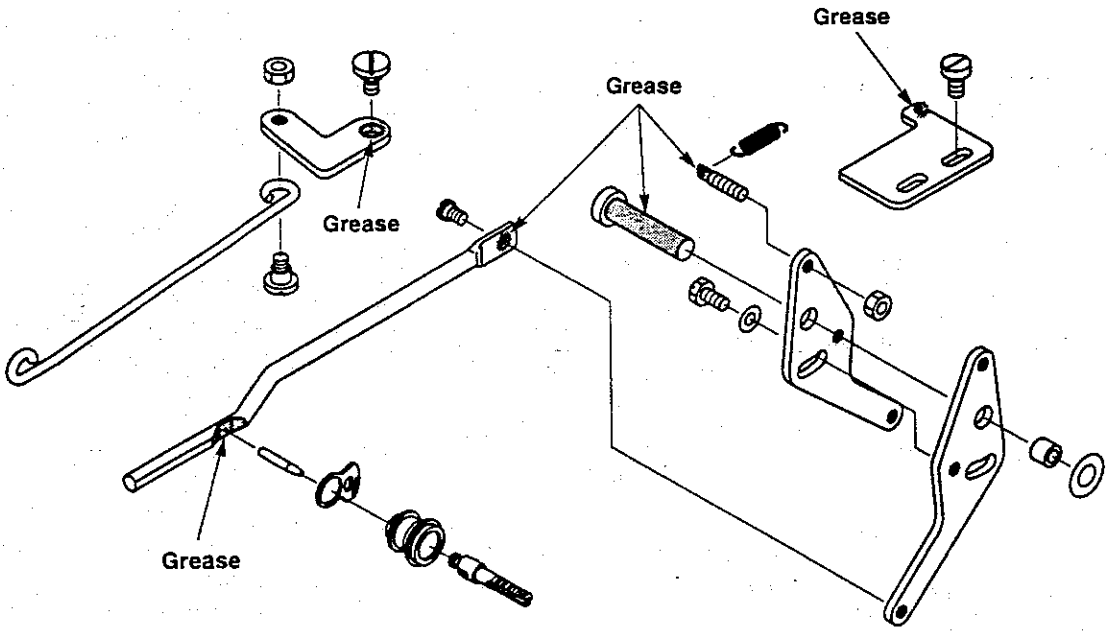
9. ERROR MESSAGE TABLE

Error No.	Indicator lamp	Error description	How to reset
E3	ServoMotor Alert	Main shaft motor failure	After turning OFF the switch, remove the trouble.
E4	ServoMotor feeder Sync error	Timing of main shaft and feed is not correct.	After turning OFF the switch, remove the trouble.
E10	Not found The pattern	The pattern is not found in the floppy disk.	Set again the correct pattern.
E11	The FD has not been loaded	The floppy disk has not been loaded.	Set the floppy disk.
E12	Err has occurred When reading	Error has occurred due to some reasons when reading.	Read again with the ready switch.
E13	Err has occurred When writing	Error has occurred due to some reasons when writing.	Write again with the ready switch.
E14	The write-ptct Tab is locked	The write-protect key of the floppy disk is locked.	Release the write-protect key of floppy disk, and write again.
E15	Formatting error	Initializing of the floppy disk cannot be made.	Release the write-protect key of floppy disk,and write again. Or the floppy disk is broken.
E16	The FD is full	The floppy disk is full.	Replace with a new initialized floppy disk, write again.
E20	Scaling range 10 through 4000	Scaling range of X, Y is beyond the setting range.	Change to the correct set value, and read again with the ready switch.
E21	Processing Aborted	During data computation temporary stop key is pressed or computation failure has occurred.	Read again with the ready switch.
E22	Processing Too Many Stitches	Due to too many data, computation is impossible.	The pattern is too large, and cannot be used.
E25	Reset Counter	Bobbin thread counter has reached to the set value.	Reset the bobbin thread counter with the bobbin thread replacement key.
E26	Cut Speed Range 01 through 40	Set value of the feeding speed of milling is not correct.	Change to the correct set value.
E27	Combination No data stored	Under combination mode, no data is read in.	After specifying pattern No., read the pattern data.
E30	Needle Pos Err	Main shaft is not at the upper dead point or upper position.	Return to the upper position by ON/OFF of the threading key.
E31	Air Pressure Drop	Air pressure dropped. Air is not supplied. Air relay cable is removed.	After turning OFF of the power, set the air pressure to 0.5 to 0.55 MPa, or insert the connector.
E32	Air Pressure OK	Air pressure is OK.	Automatically indicated when the air is returned.
E33	Feeder Cross limit line	Feeding frame is beyond the sewing range.	During sewing : Release with the return-to-origin switch.
E34	Travel End Correct pattern	After computation in case of offset, 2-line sewing, etc., this occurs when the travel limit is over.	Correct the pattern while it is input.
E35	Wait For Input Timeout	External input signal is not input within the set time.	Make sure the external input signal. Return to the sewing start point with the return-to-origin switch.
E40	Feeding frame Lifted	When a pattern is input, feed forward/backward key is operated while the feeding frame is lifted.	After the feeding frame has come down, operate the forward/backward key.

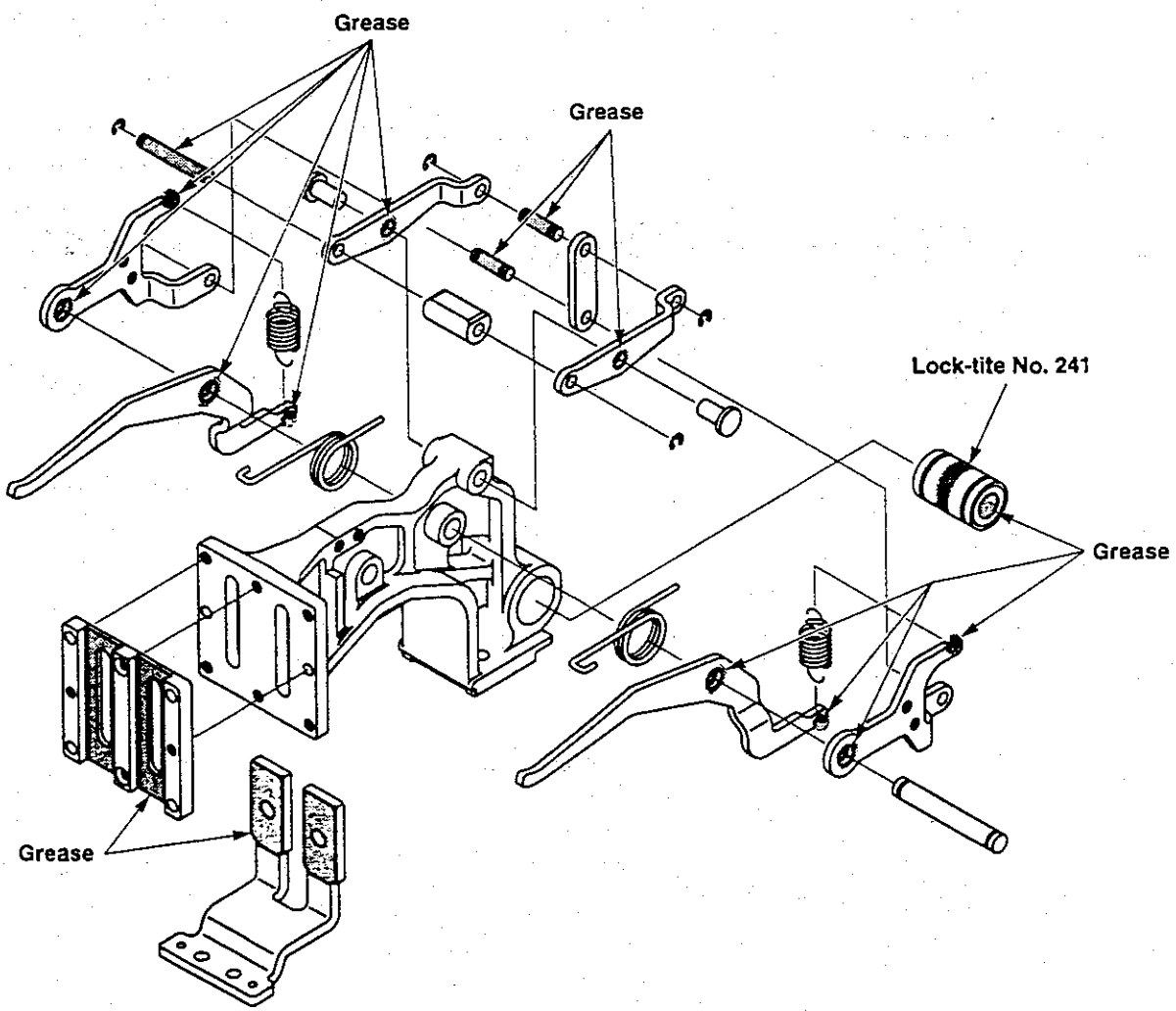
Error No.	Indicator lamp	Error description	How to reset
E41	Due to a misoperation	Indicated when operation on the program is not operative.	Usually, this error does not occur.
E42	Comput Imposs	In case of circle sewing, arc sewing, etc., input of turning point is input to the linear or the like.	Input again.
E43	The data contain the max stch lg	Read-in data contain data beyond the max. stitch length.	Read again the correct data.
E44	Stitch No. limit process intrpt	Dut to too many input data, memory range is over.	The input pattern should be input by separating in small division. Or, if the input pattern is too big, separate the number of stitches into the limit of stitches.
E45	The data read contain an error	Pattern data read is broken.	Floppy disk is broken or error at the time of read is considered. Read again.
E46	A hardware err has occurred	Error occurred when the sewing machine is operated at the time that feed forward/backward key does not operate properly.	Failure of the electrical components. Turn OFF the power, and contact our business office or dealers.
E50	Stopkey Accepted Not trimmed yet	Temporary stop key is pressed, and the machine is in a state of stopping.	Re-start with start switch, or move to the sewing start point using return-to-origin key, and start again the sewing.
E51	Stopkey Accepted Not trimmed yet	Temporary stop key is pressed, and the machine is in a state of stopping without thread trimming.	Make thread trimming using threading or temporary stop switch. Then, the machine is in a state of temporary stop.
E52	Thread Broken	Needle thread breakage is detected, and the machine stopped.	Thread the needle thread, and start again.
E70	Bobbin Thread Close to empty	Indicated when bobbin thread remaining is not enough by means of the bobbin thread remaining detection device.	Replace the bobbin thread, and start again.
E71	Bobbin Thread Status error	Failure of the bobbin thread remaining detection device has occurred, and the device does not operate.	Remove the trouble of bobbin thread remaining detection device.
E73	Bobbin Changer	Malfunction of the bobbin thread change device, and the device does not operate properly.	Remove the trouble of bobbin thread change device.
E76	Needle Thread Changing now	Indicates that needle thread for embroidery change device is operating.	
E100 to E107	AMS-Panel Connection Error	Connection error of operation panel and MAIN circuit board	There are troubles in operation panel or MAIN circuit board.

10. PARTS GREASE OR LOCK-TIGHT PAINT IS APPLIED

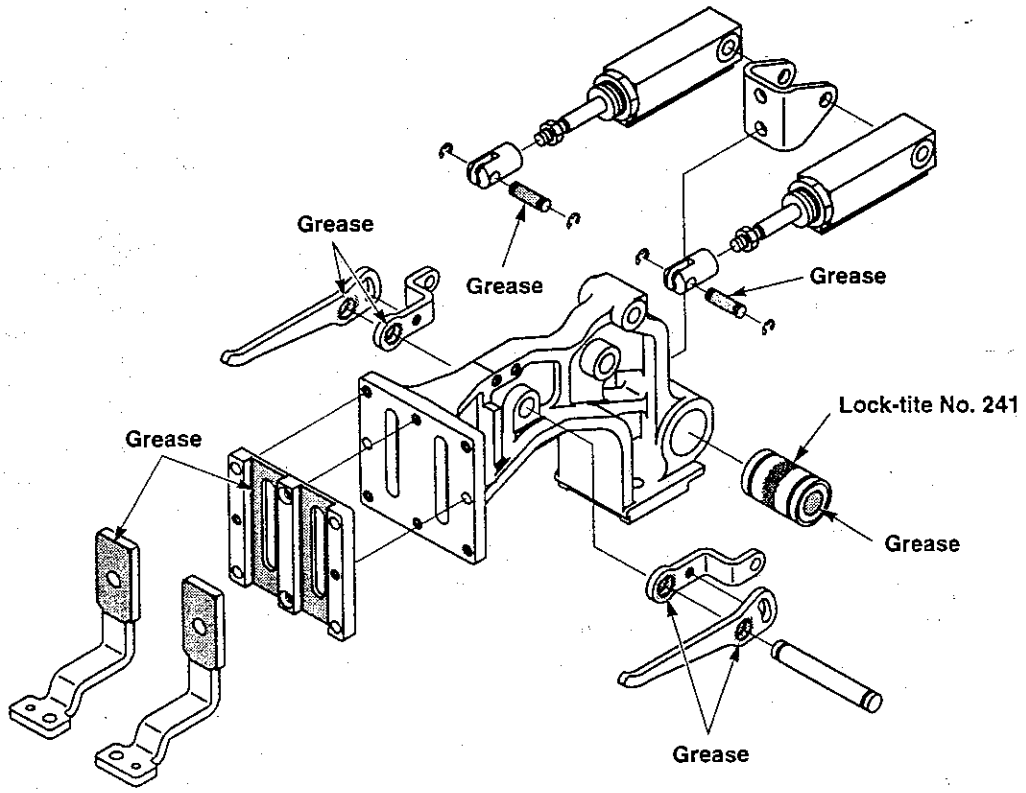
1) **Thread release and thread tension components**



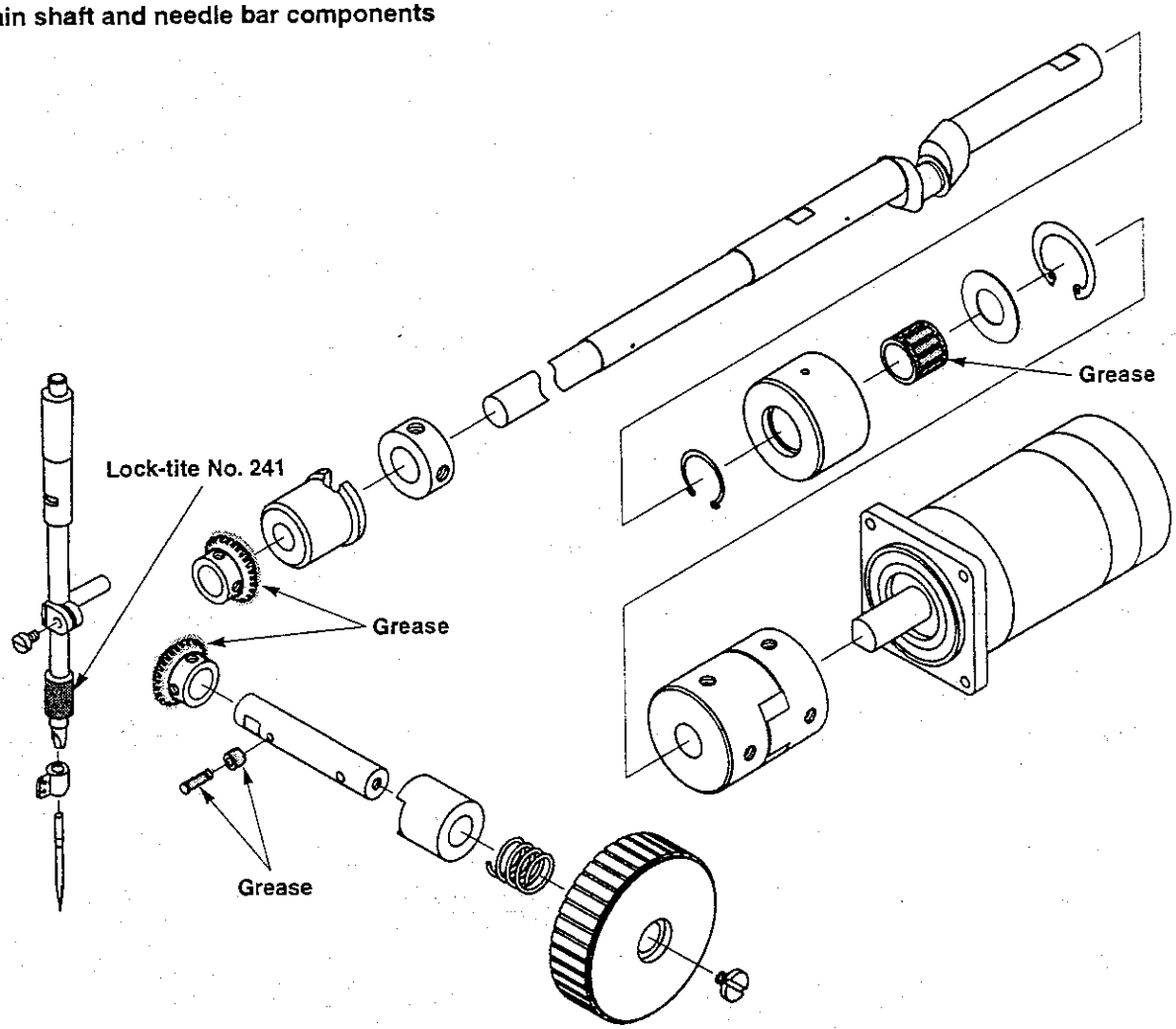
2) **Feed bracket components (for 210DSS and 210DHS)**



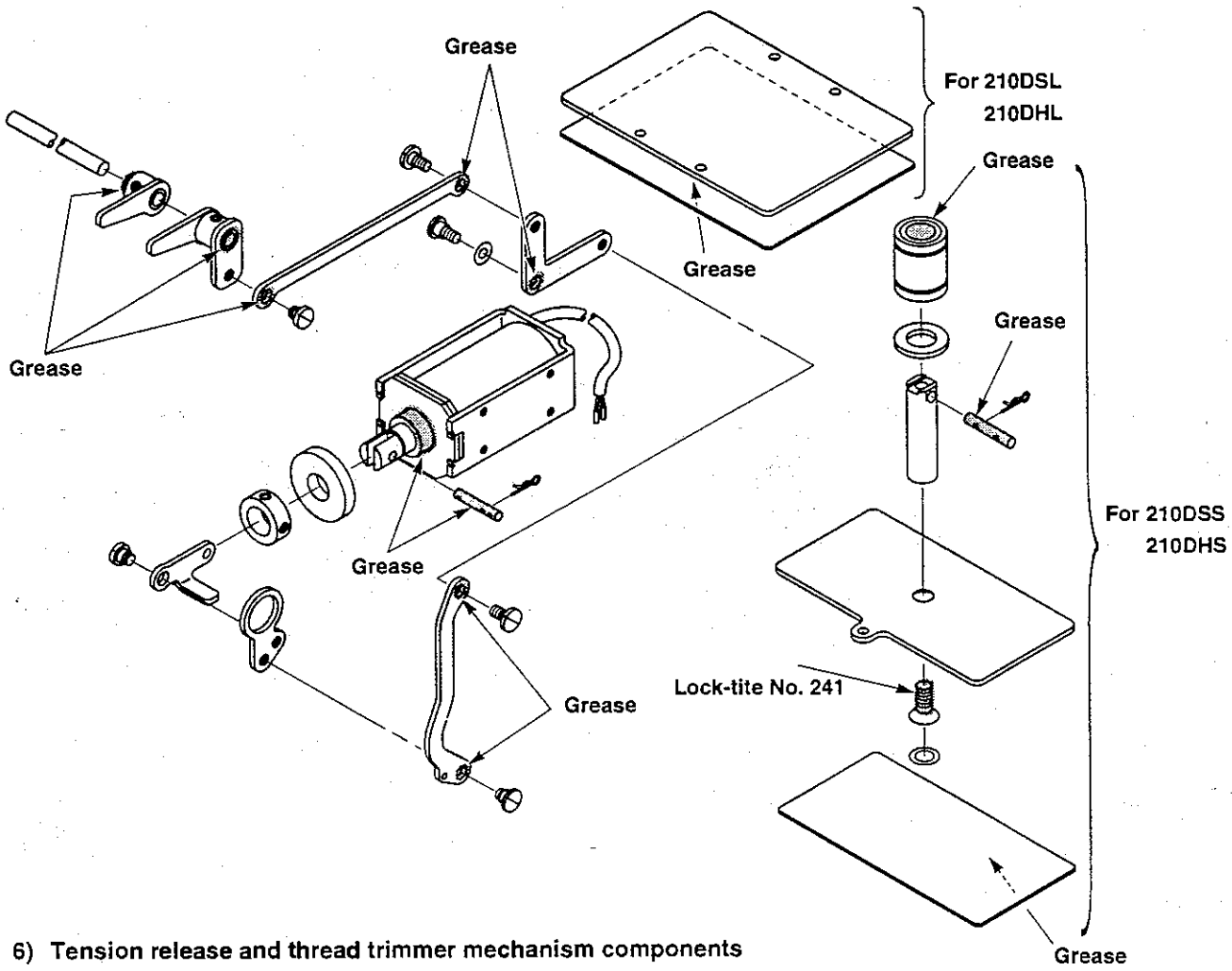
3) **Feed bracket components (for 210DSL and 210DHL)**



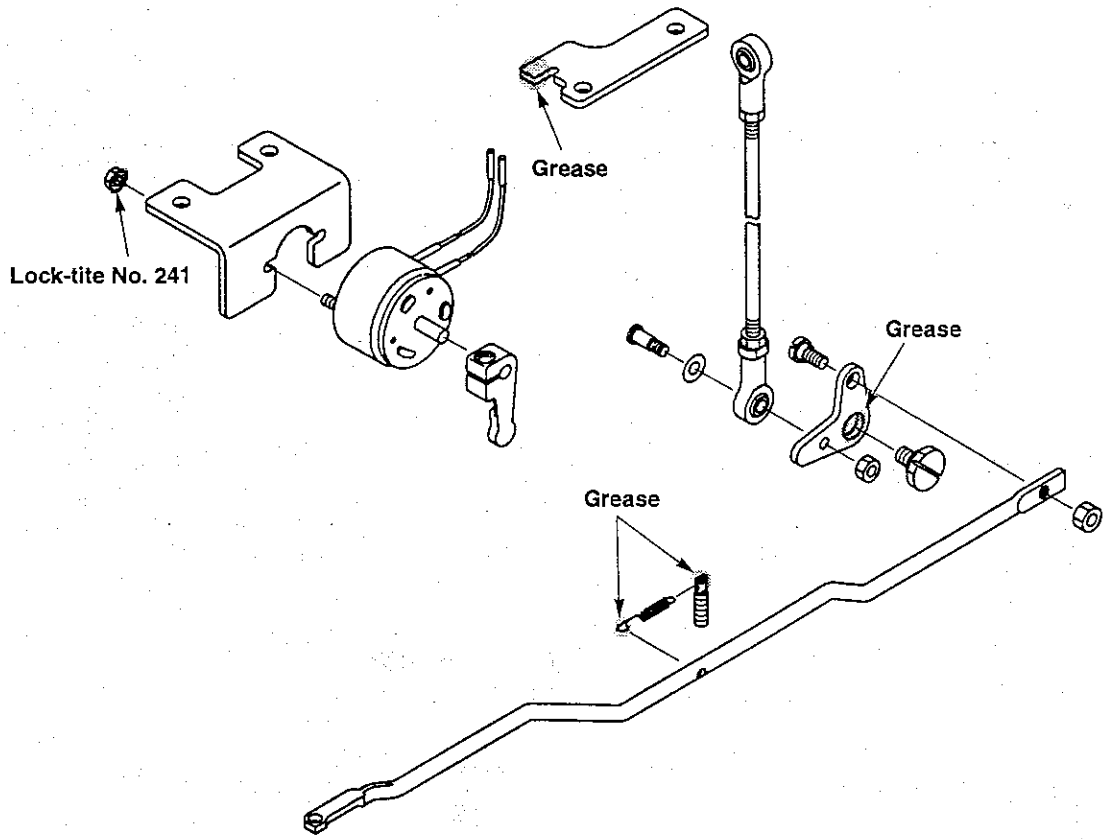
4) **Main shaft and needle bar components**



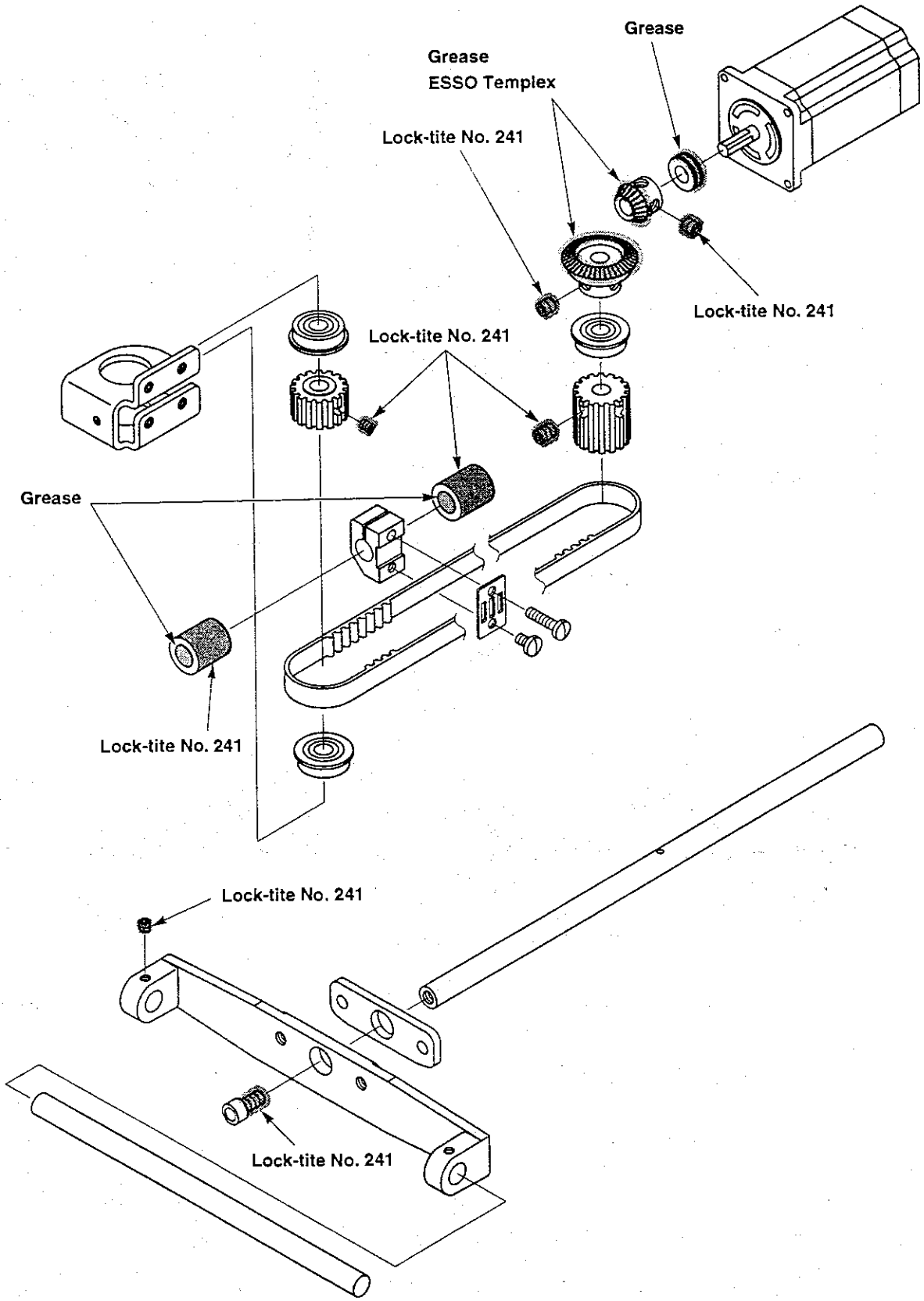
5) **Presser plate and manual presser mechanism components**



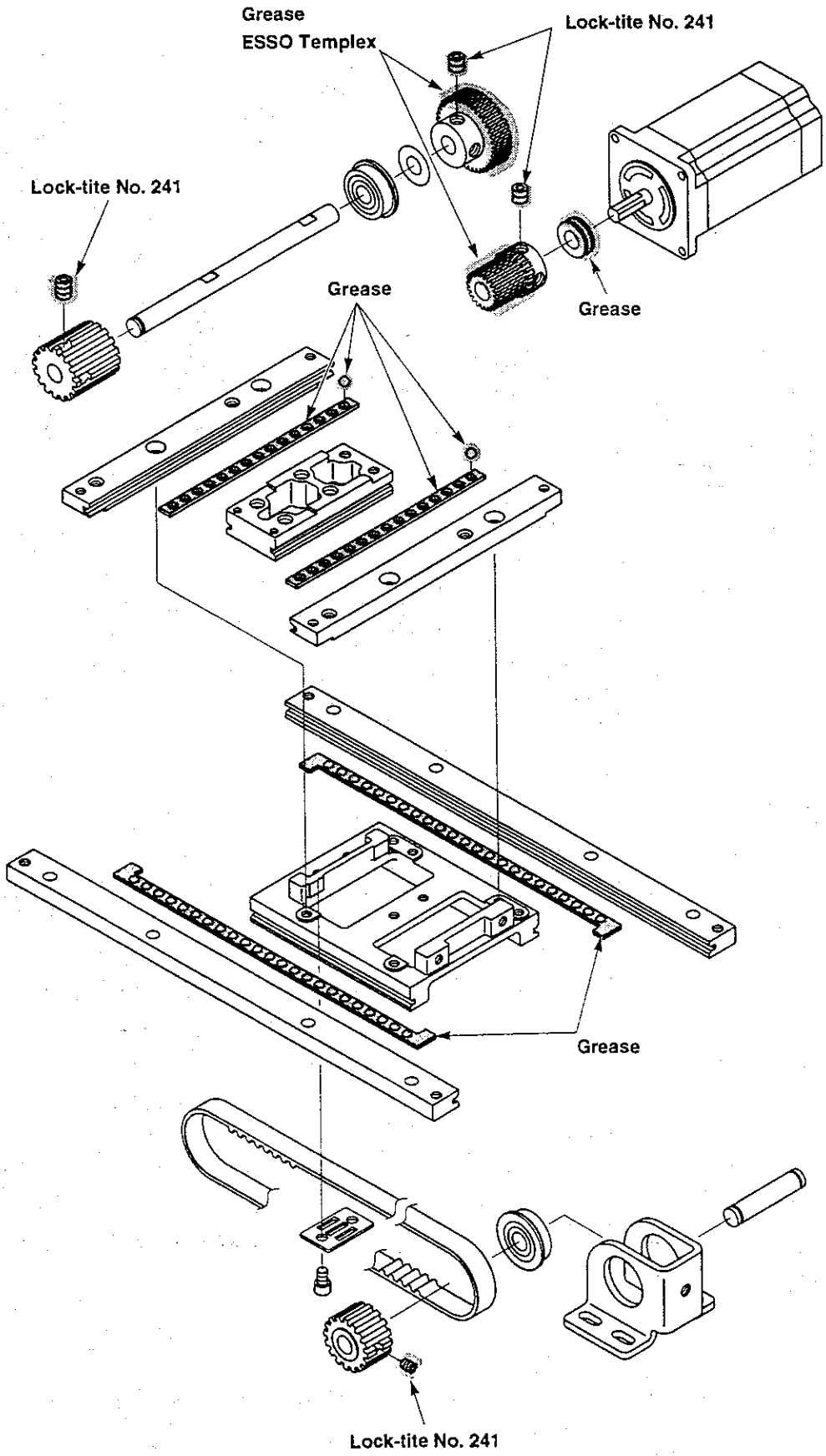
6) **Tension release and thread trimmer mechanism components**



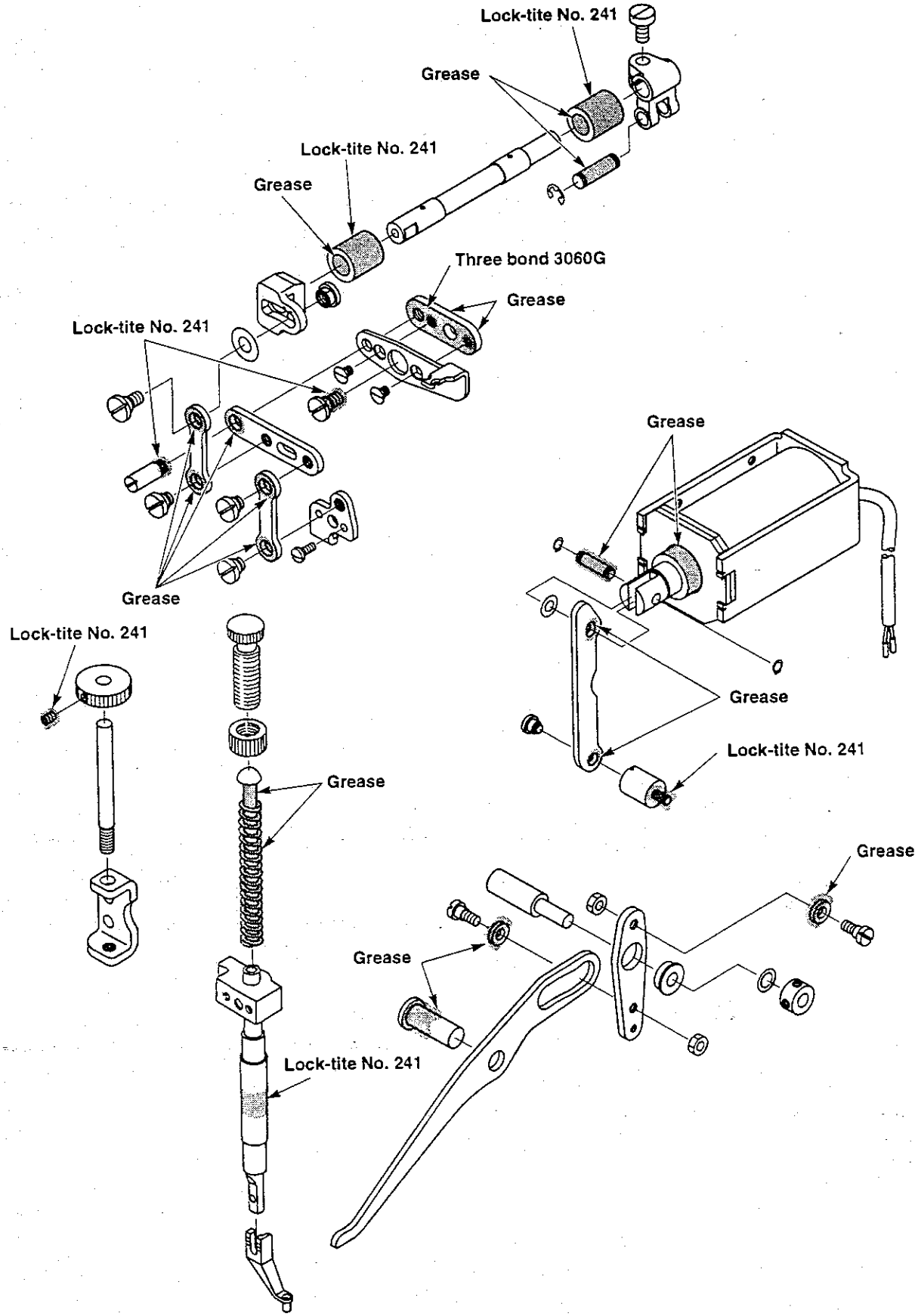
7) X-Y components (2)



8) X-Y components (1)

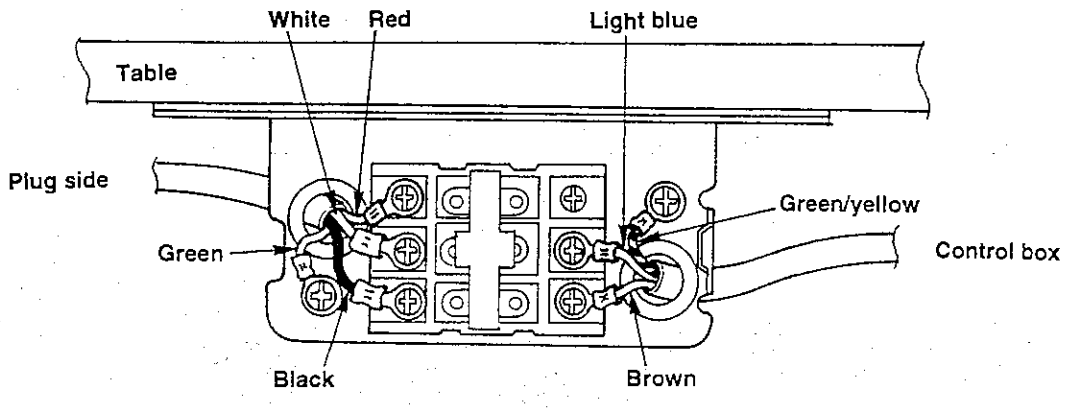


9) Presser mechanism components

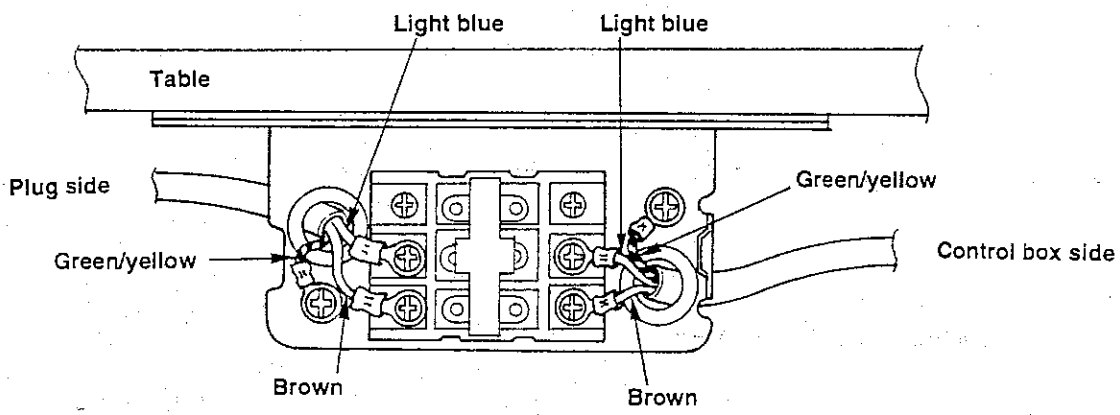


11. POWER SWITCH CONNECTION DIAGRAM FOR AMS-210D

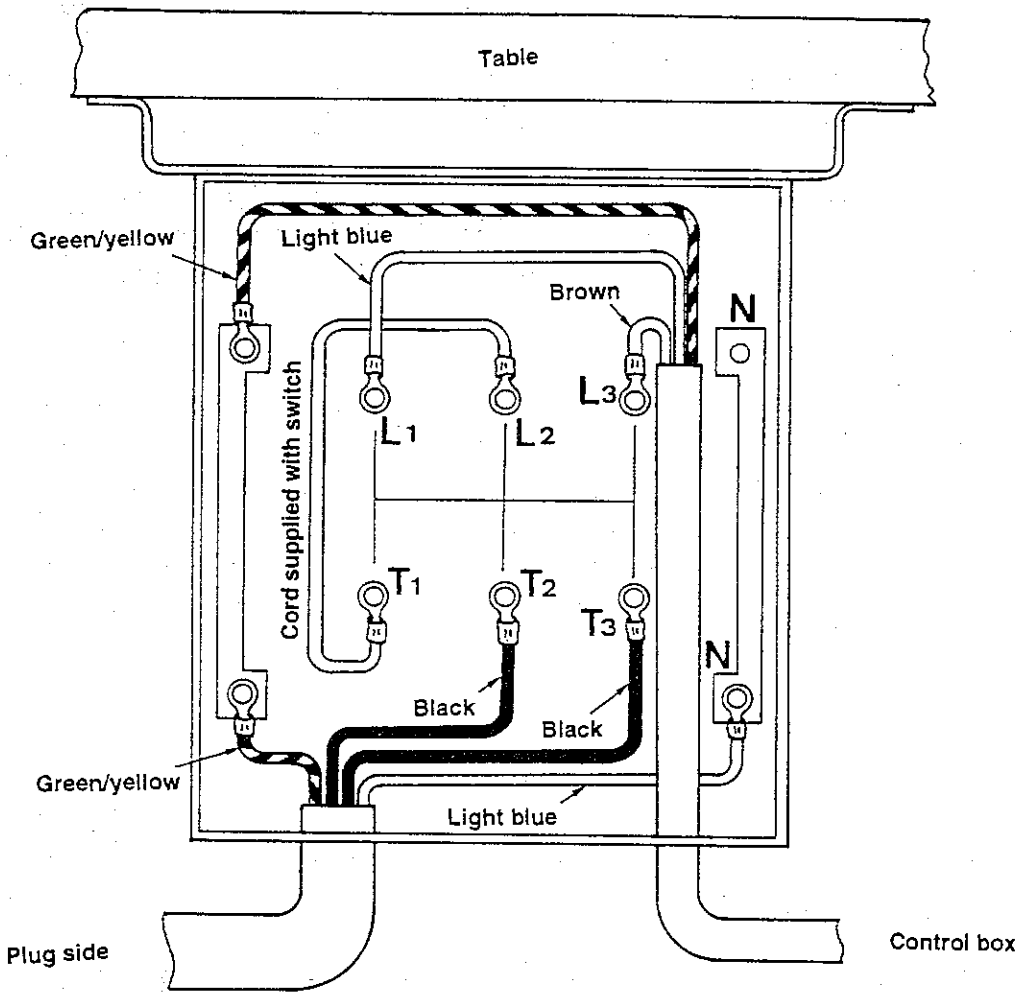
(1) For 3-phase 200, 220 and 240V



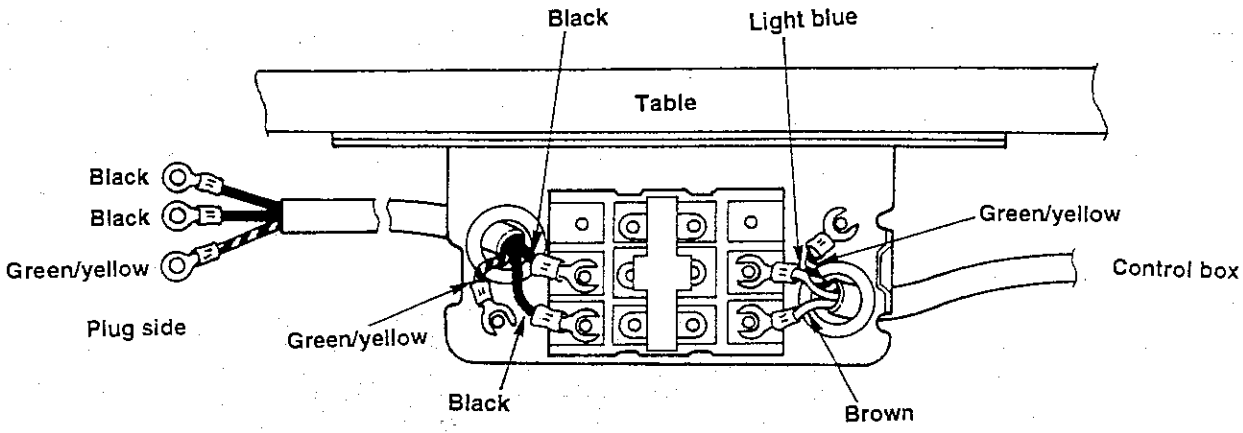
(2) For single-phase 100V, 110V and 120V
200V, 220V and 240V



(3) For 3-phase 220V, 240V, 380V, 400V and 415V

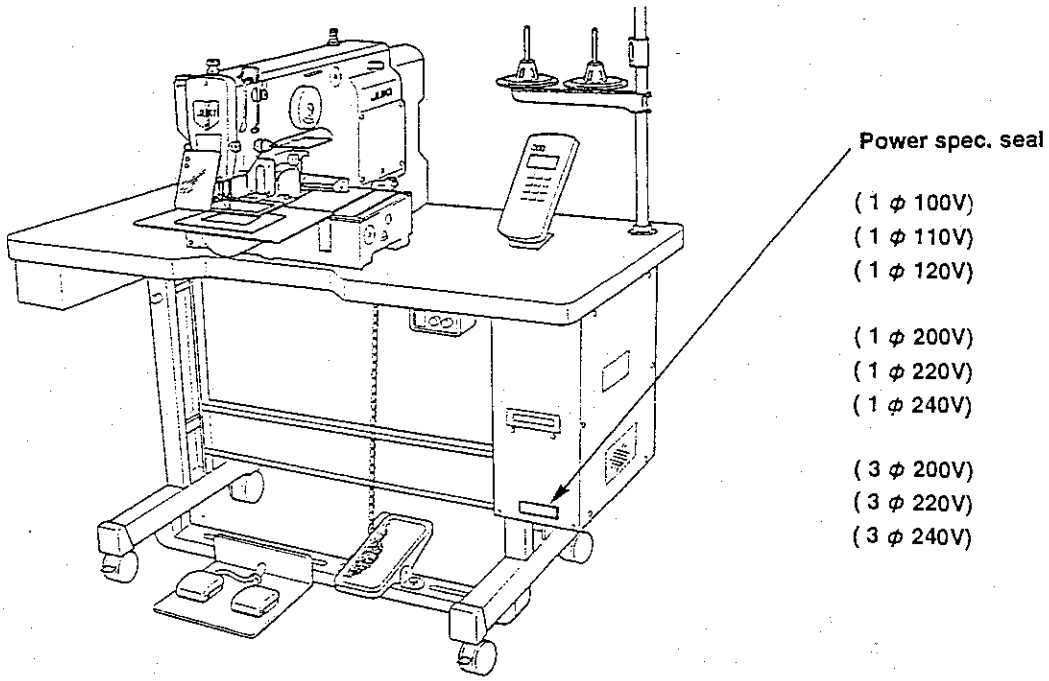


(4) For single-phase 220V, 240V, 380V, 400V and 415V



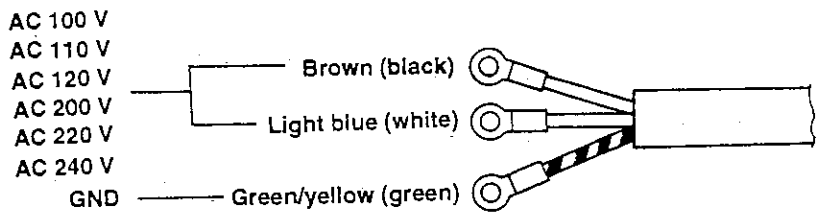
12. CONNECTION OF THE POWER PLUG

(1) Overseas market : 100V series
200V series



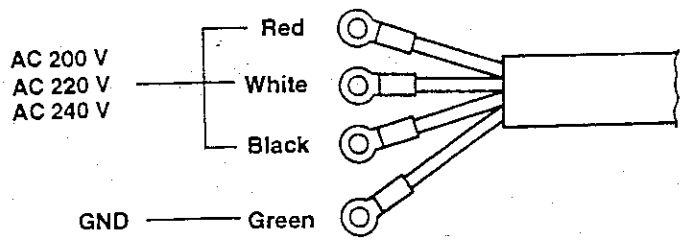
1) 1 φ 100V (Single phase 100V) , 1 φ 200V (Single phase 200V)
1 φ 110V (Single phase 110V) , 1 φ 220V (Single phase 220V)
1 φ 120V (Single phase 120V) , 1 φ 240V (Single phase 240V)

When changing the voltage used, it is nessary to change the wiring of the terminal board and connecting/disconnecting of the voltage change-over cord. Refer to "voltage change-over of 100 to 240V".

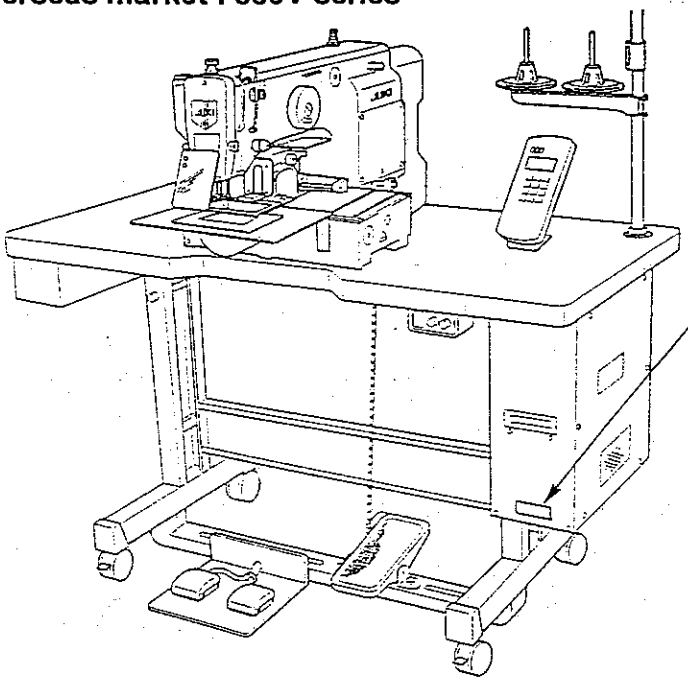


2) 3 φ 200V (3-phase 200V)
3 φ 220V (3-phase 220V)
3 φ 240V (3-phase 240V)

When changing the voltage used, it is nessary to change the wiring of the terminal board.
Refer to "voltage change-over of 100 to 240V".



(2) Overseas market : 380V series



Powrer spec. seal

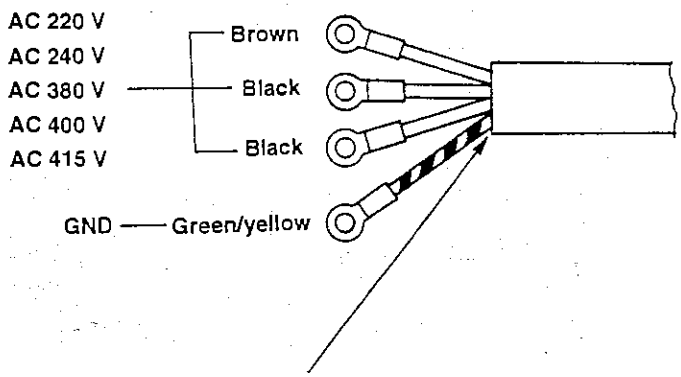
(3 φ 220V)
(3 φ 240V)
(3 φ 380V)
(3 φ 400V)
(3 φ 415V)

(1 φ 220V)
(1 φ 240V)
(1 φ 380V)
(1 φ 400V)
(1 φ 415V)

1) 3-phase

3 φ 220V	(3-phase 220V)
3 φ 240V	(3-phase 240V)
3 φ 380V	(3-phase 380V)
3 φ 400V	(3-phase 400V)
3 φ 415V	(3-phase 415V)

When changing the voltage used, it is necessary to change the wiring of the terminal board. Refer to "voltage change-over of 220 to 415V".

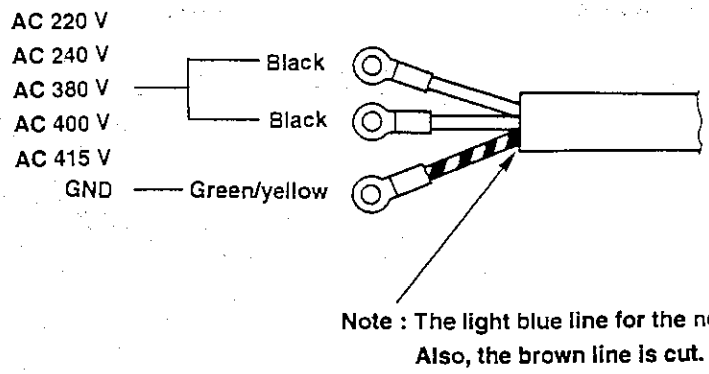


Note : The light blue line for the neutral line is cut.

2) Single phase

1 φ 220V	(Single phase 220V)
1 φ 240V	(Single phase 240V)
1 φ 380V	(Single phase 380V)
1 φ 400V	(Single phase 400V)
1 φ 415V	(Single phase 415V)

When changing the voltage used, it is necessary to change the wiring of the terminal board. Refer to "voltage change-over of 220 to 415V".



Note : The light blue line for the neutral line is cut.
Also, the brown line is cut.

13. CHANGE OF THE POWER VOLTAGE

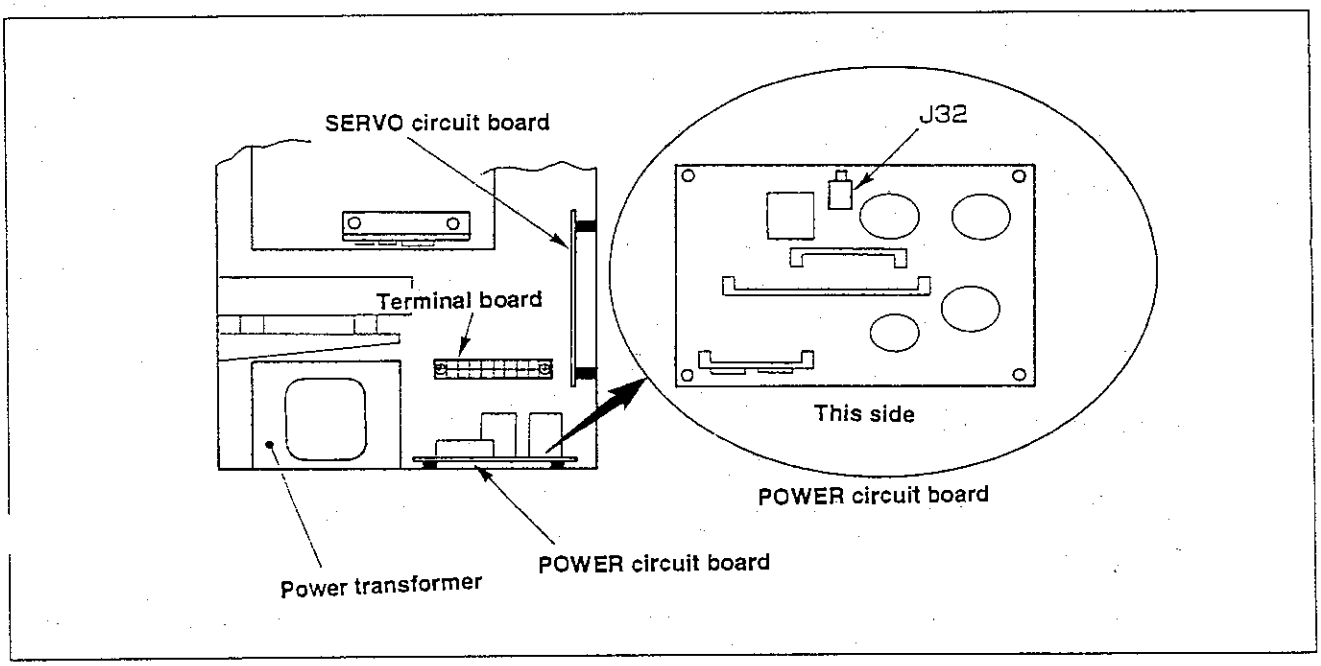
- **Change of the voltage from 100 to 240 V**

For the 100 and 200 V specifications, power voltages as shown on the right table can be used.
However, when 100, 110 and 120 V are used, "voltage-change cord" is necessary. Refer to the below-stated "Change of voltage for 100 V".

Green (White)	Green (Blue)	Input voltage	Remarks
Terminal No.			
1	2	100	Refer to (Note 1)
1	3	110	Refer to (Note 1)
1	4	120	Refer to (Note 1)
1	5	200	Refer to (Note 2)
1	6	220	Refer to (Note 2)
1	7	240	Refer to (Note 2)

(Note 1) Change of voltage for 100 V
When the power voltage 100 V is used, it is necessary to insert "voltage-change cord" (M90215800A0) into J32 on POWER circuit board.

(Note 2) **When the 100V spec. is used for 200V, 220V or 240V, be sure to disconnect the "voltage-change cord" of J32 on the POWER circuit board.**



- **Change of the voltage from 220 to 415 V**

Green (White)	Green (Black)	Green (Blue)	Input voltage	Remarks
Terminal No.				
1	2	4	220	
1	2	5	240	
1	2	6	380	
1	2	7	400	
1	2	8	415	

(Note) **White and black lines connected to "1" and "2" on the terminal board are not necessary to change the connection. Change the blue line only.**

14. MAINTENANCE AND INSPECTION

• Replacing the printed circuit boards

Types of printed circuit boards

① MAIN circuit board (Control box)
② SERVO circuit board (Control box)
③ PMDC circuit board (Control box)
④ POWER circuit board (Control box)

1) MAIN circuit board

Acts as the brain of this machine and outputs the control signals to control the floppy disk driver unit, and to follow the program to operate the sewing machine head and the operation panel.

① Turn OFF the power switch, and open the control box cover.
② Remove all connectors (J10 to J24) from the MAIN circuit board.
③ Remove four fixing screws from the circuit board and replace the circuit board with a new one.
④ Install the new MAIN circuit board by reversing the above disassembly order. Connect the connectors matching the numbers indicated on the circuit board and the numbers attached to the connectors.

(Caution) The battery for the data back-up is mounted on the MAIN circuit board. Be sure not to place the circuit board on metal plate or the like. Never wrap the MAIN circuit board with a sheet of aluminum foil.

2) SERVO circuit board

The SERVO circuit board receives the control signals from the MAIN circuit board, and actuates the servo motor for main shaft of the sewing machine.

① Turn OFF the power switch, and open the control box cover.
② Remove all connectors (J1 to J5) from the SERVO circuit board.
③ Remove four fixing screws (fixed from outside of the control box) from radiating plate, and replace with a new circuit board.
④ Install the new circuit board by reversing the above disassembly order.

3) PMDC circuit board

The PMDC circuit board receives the stepping motor driving signals from the MAIN circuit board, and acts to drive the X and Y stepping motors.

① Turn OFF the power switch,and open the control box cover.
② Remove all connectors (J60 to J62) from the PMDC circuit board.
③ Remove four fixing screws on the radiating plate, and remove four studs attaching the MAIN circuit board. Then replace with a new circuit board.
④ Install the new circuit board by reversing the above disassembly order. Install the circuit board so that the connector J60 is positioned on the left side.

(Caution) Be sure to securely tighten the fixing screws. The tightening torque has been specified to 14 kg at the time of delivery.

4) POWER circuit board

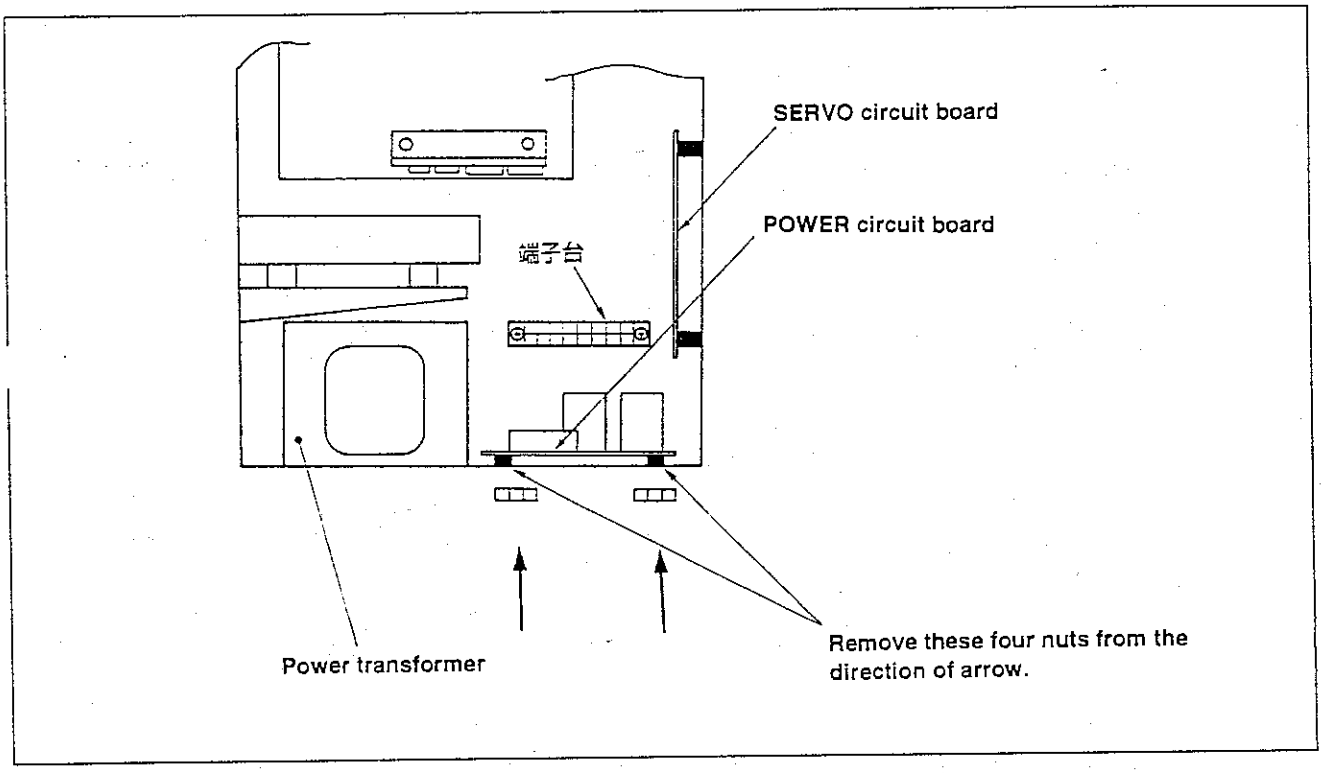
This circuit board supplies voltage to each unit in the control box.

① Turn OFF the power switch, and open the control box cover.

② Remove all connectors (J30 to J38) from the POWER circuit board.

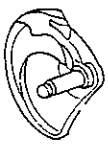
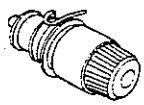
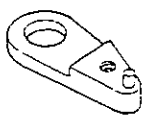
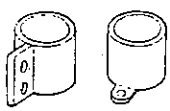
③ Remove four nuts from the underside of the control box and remove the circuit board as shown in the figure below.

To remove the POWER circuit board, remove the nuts located underside of the control box, and remove the circuit board as shown in the figure 7 below.

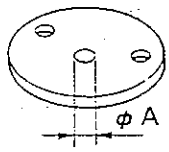
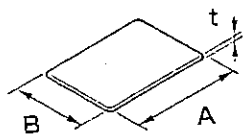
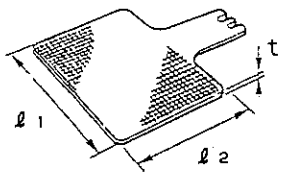
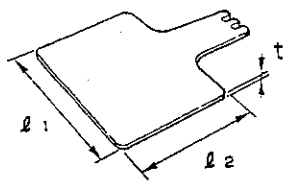


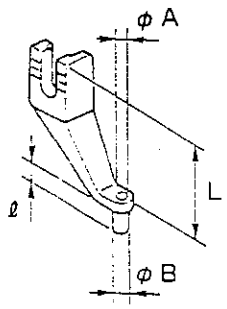
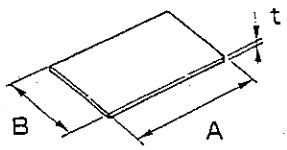
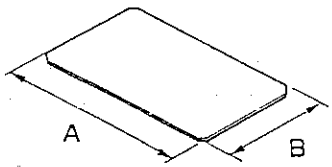
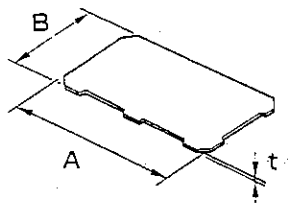
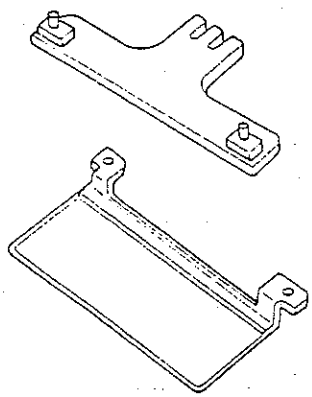
15. TABLE OF EXCHANGING GAUGE PARTS ACCORDING TO SEWING SPECIFICATIONS AND NEEDLE SIZE USED

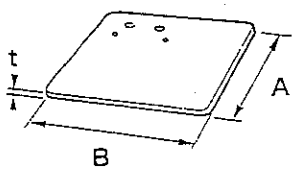
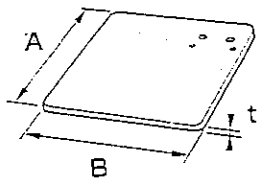
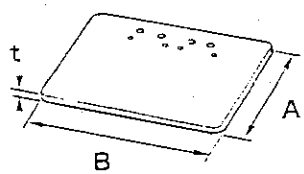
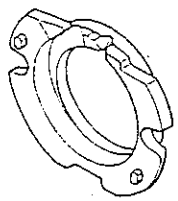
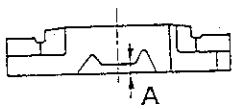
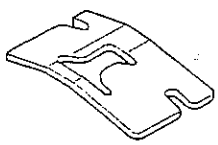
In accordance with the sewing condition, exchange the gauges referring to the following table.

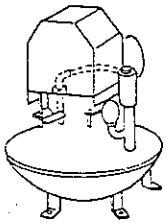
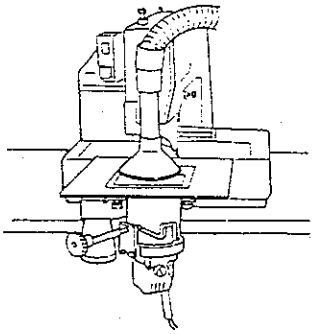
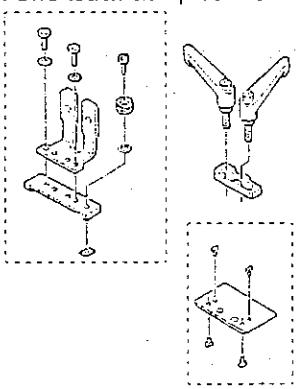
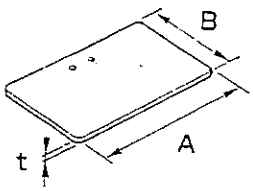
Gauge \ Sewing spec. and needle size used	S type when delivered. #11 to #14	Knit • foundation garment	H type when delivered #16 to #20	#21 to #22	#23 to #26	When thick needle like MR type is used.
Needle hole guide	B242621000A ϕ 1.6	B242621000C ϕ 1.6 (For knit)	B242621000B ϕ 2.0	B242621000D ϕ 2.4	B242621000F ϕ 3.0 B242621000G ϕ 3.0 (With counter bore)	
Shuttle race ring	B1817210DAB Needle guard 1.3 mm				B817210DAC Needle guard 1.7 mm	B1817210DAD Needle guard 1.9 mm
Shuttle 	B1818210D0A		B1818210D0B			
Intermediate presser	B1601210D00 ϕ 2.2			B1601210D0B ϕ 2.7	B1601210D0C ϕ 3.5	
Tension controller No. 2 asm. 	B230228C0A0		B23022050AA			
Thread trimmer lever (small) asm. 	B24152800A0		B24162100A0 Large stroke moving knife			
Thread guide 	B1405210CC0 2-holes		B1406210000 One hole			
Shuttle upper spring	B1815980000 For thin thread	B1815210D00 + B1816980000 For preventing oil-stain	B1815210000 For thick thread			

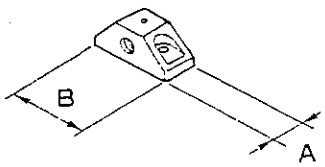
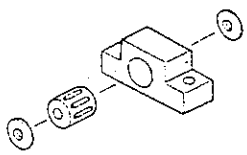
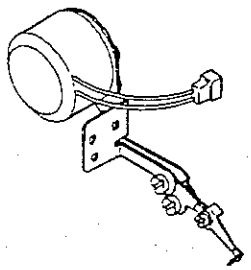
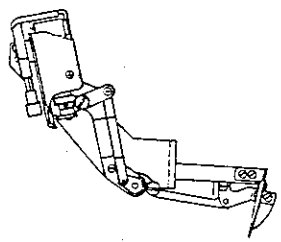
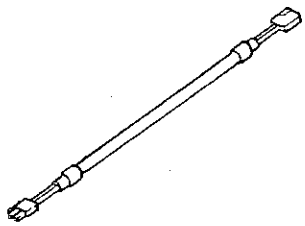
16. TABLE OF OPTIONS

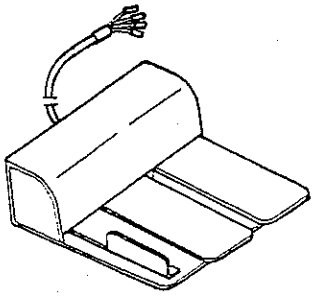
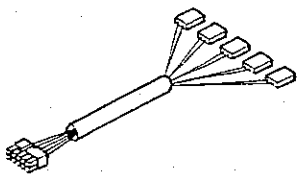
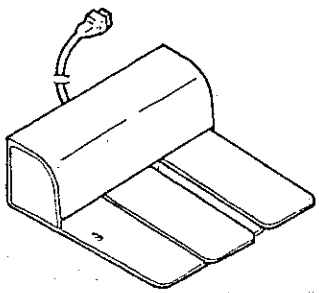
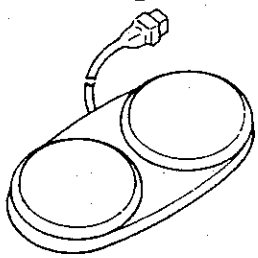
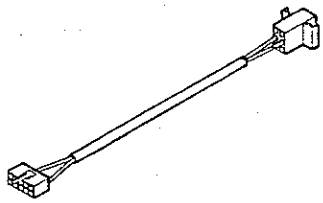
Name of parts	Type	Part No.	Size (mm)
1. Needle hole guide 	Needle hole guide (A) for light-weight material	B242621000A	φ A = 1.6
	Needle hole guide (B) for medium-weight material	B242621000B	φ A = 2.0
	Needle hole guide (C) for knitwear	B242621000C	φ A = 1.6
	Needle hole guide (D) for heavy-weight material	B242621000D	φ A = 2.4
	Needle hole guide (F) for heavy-weight material	B242621000F	φ A = 3.0
	Needle hole guide (G) for heavy-weight material	B242621000G	φ A = 3.0 (With counter bore)
	Needle hole guide (H) for heavy-weight material	B242621000H	φ A = 3.0 (Eccentric)
	Needle hole guide (H) The needle hole has an eccentric center of 0.5 mm in the rear side of the center to make the clearance in front of the needle narrow and widen the rear side so that the loop can be made with ease.		
2. Work clamp blank for preventing slipping 	Rubber sheet for work clamp	B2591220000	A x B x t 250 x 200 x 1.5
	Sponge sheet for work clamp	B2564215000	A x B x t 300 x 200 x 1.5
	Work clamp material (A)	B2587220000	A x B x t 380 x 240 x 1
	Work clamp material (B)	B2588220000	A x B x t 380 x 240 x 1.5
3. Feed plate blank for processing 	Feed plate blank with knurl	B2556210D0A	ℓ 1 x ℓ 2 x t 168 x 131 x 1.2
	Feed plate without knurl	B2556210D0B	ℓ 1 x ℓ 2 x t 168 x 131 x 1.2

Name of parts	Type	Part No.	Size (mm)
4. Intermediate presser 	Intermediate presser (A)	B1601210D00	φ A x φ B x ℓ x L 2.2 x 3.6 x 6 x 29.5
	Intermediate presser (B)	B1601210D0B	φ A x φ B x ℓ x L 2.7 x 4.1 x 6 x 29.5
	Intermediate presser (C)	B1601210D0C	φ A x φ B x ℓ x L 3.5 x 5.5 x 6 x 29.5
	Intermediate presser (E)	B1601210D0E	φ A x φ B x ℓ x L 1.6 x 2.6 x 6 x 29.5
	Intermediate presser (F)	B1601210D0F	φ A x φ B x ℓ x L 2.2 x 3.6 x 9 x 29.5
5. Feed plate blank 	Sheet A for work clamp (Velboren)	B259522000A	A x B x t 1,000 x 675 x 1
	Sheet B for work clamp (Velboren)	B259522000B	A x B x t 1,000 x 675 x 3
	Sheet C for work clamp (Velboren)	B259522000C	A x B x t 1,000 x 675 x 2
	Plastic feed plate inner plate	GMU12038000	A x B x t 140.8 x 72.5 x 1
	Aluminum feed plate inner plate	GMU12037000	A x B x t 140.6 x 72.5 x 1
6. Cassette holder 	Cassette holder installing base	B2593210DA0	
	Cassette holder	B2594210DA0	
7. Feeding frame blank	Plastic blank	B2557210DA0	
	Aluminum blank	GMU120350A0	

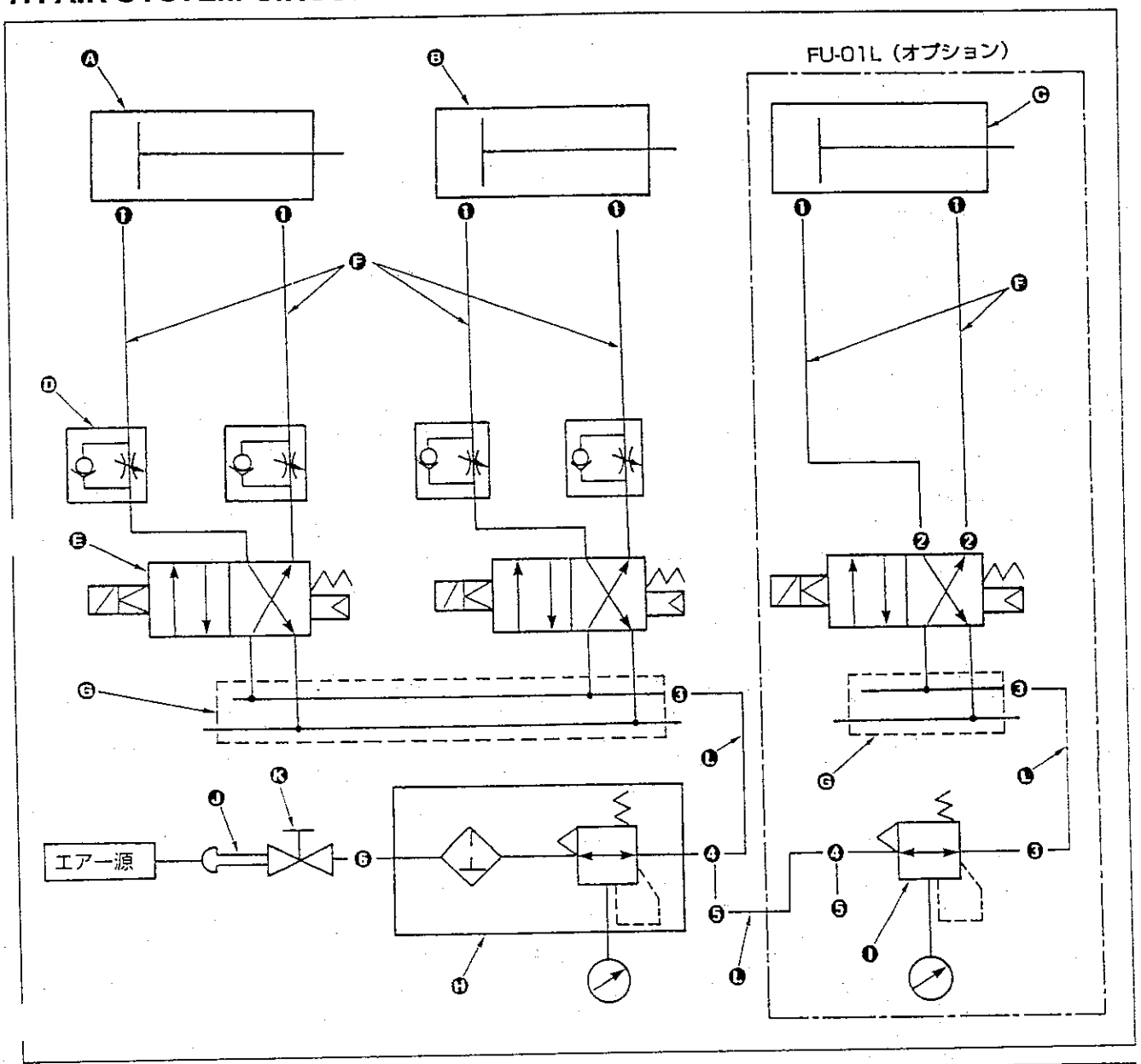
Name of parts	Type	Part No.	Size (mm)
8. Blank for processing 	Feeding frame, right, blank with knurl Blank for double step without knurl (Left and right are common.)	B2554210D0B B2554210D0A	A x B x t 97 x 81.5 x 4 A x B x t 97 x 81.5 x 4
	Feeding frame, left, blank with knurl	B2554210D0C	A x B x t 97 x 81.5 x 4
	Separate type feeding frame blank with knurl Separate type feeding frame blank without knurl	B2553210D0A B2553210D0B	A x B x t 97 x 164 x 4 A x B x t 97 x 164 x 4
9. Shuttle race ring compl.  		B1817210DAA B1817210DAB B1817210DAC B1817210DAD	A=0.8 A=1.3 A=1.7 A=1.9
10. Shuttle upper spring 	For thin thread For thick thread For preventing oil-stain For stitch skipping prevention	B1815980000 B1815210000 B1815210D00 + B1816980000 B1815210A00 + B1815210D00	

Name of parts	Type	Part No.	Size (mm)
11. Compresser unit 		CU-01	
12. Economy type presser milling unit 		MU-12	
13. Inverting clamp unit	For S type For L type	FU-01S FU-01L	
14. One-touch clamp device 	For S type For L type	B2585210DB0 B2586210DB0	
15. Inverting intermediate presser blank 	Metal Plastic	B43172100X0 162371T3	A x B x t 135 x 58 x 3.2 A x B x t 100 x 50 x

Name of parts	Type	Part No.	Size (mm)
16. Inverting intermediate presser installing base 	Without bearing	D431421WJ0B	A x B 5 x 24
		D430121XB00	A x B 7 x 20
		D431421WZ00	A x B 7 x 24
		D431421WK00	A x B 8 x 24
		D431421YF00	A x B 10 x 20
		D4314210000	A x B 10 x 24
	With bearing	Installing base B4314210A00 Bearing SB304000200 Washer B4328210000	
17. Wiper 	Side-sweeping wiper	B21012200A0	
	Needle thread clamp wiper	B21202150A0	
	Relay cable for side-sweeping wiper and needle thread clamp wiper	B4150210DA0	

Name of parts	Type	Part No.	Size (mm)
18. Pedal switch			
	3-step pedal	GPK4700110AB	
	Relay cable for 3-step pedal	M90255800A0	
	2-step pedal	M859051300AA	
	2-step pedal	M85905120A0	
	Relay cable for 2-step pedal	M90315800A0	

17. AIR SYSTEM CIRCUIT DIAGRAM

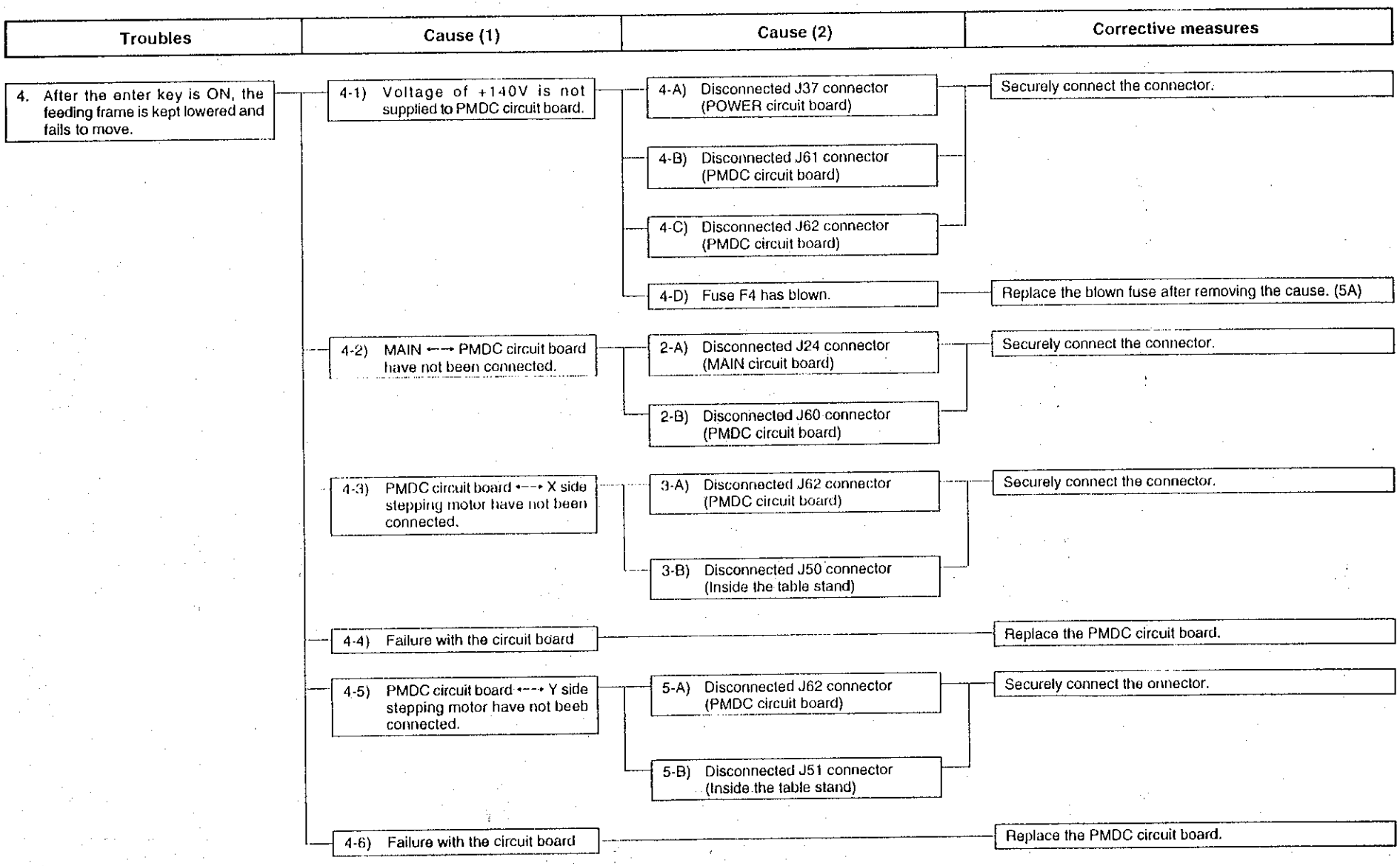


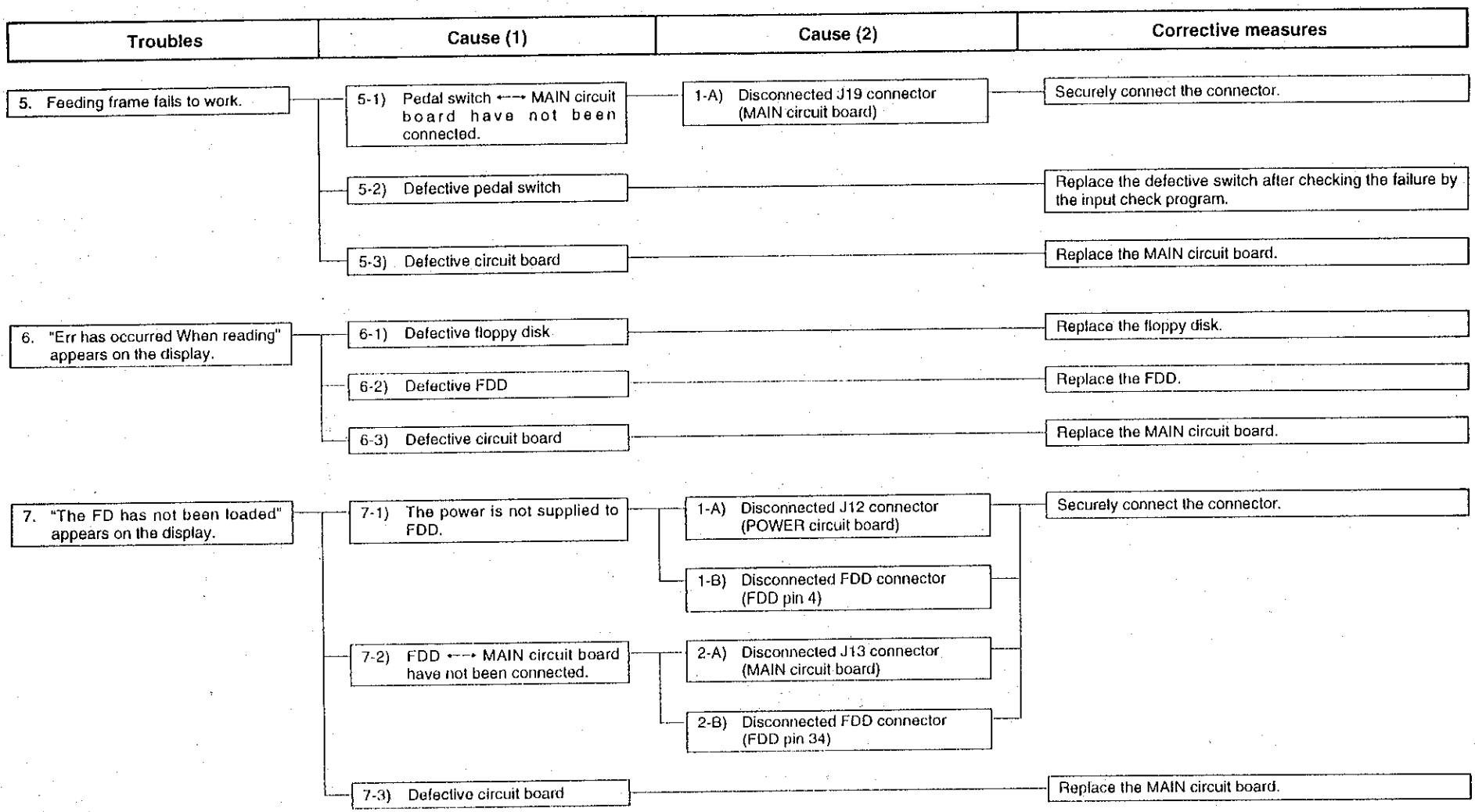
Ⓐ	Feeding frame cylinder (left)
Ⓑ	Feeding frame cylinder (right)
Ⓒ	Inverting cylinder
Ⓓ	Speed controller
Ⓔ	Solenoid valve
Ⓕ	ϕ 4 Air tube
Ⓖ	Manifold
Ⓗ	Filter regulator
Ⓘ	Regulator
Ⓙ	One-touch joint plug One-touch joint socket
Ⓚ	air cock
Ⓛ	ϕ 6 Air tube

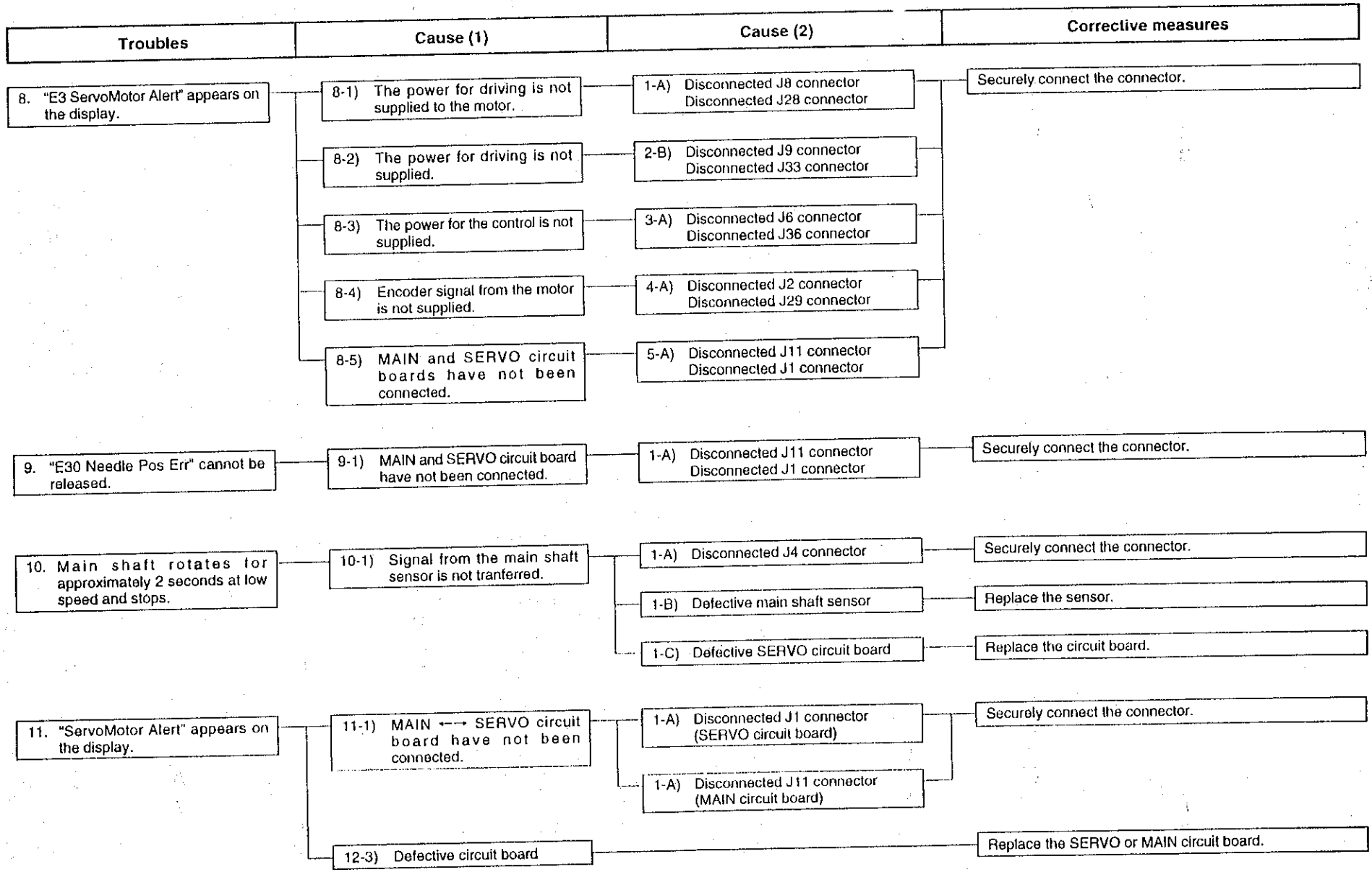
❶	Hose elbow
❷	Hose nipple
❸	Elbow union
❹	T type tee
❺	Plug
❻	Barrel nipple

18. TROUBLES AND CORRECTIVE MEASURES (ELECTRICAL PARTS) (Also, refer to Block diagram.)

Troubles	Cause (1)	Cause (2)	Corrective measures
1. The display fails to light.	1-1) The power is not supplied to POWER circuit board.	1-A) Disconnected J30 connector	Securely connect the connector.
		1-B) Fuse F1 has blown.	Replace the blown fuse after removing the cause. (5A)
	1-2) Voltage of + 5 is not supplied to MAIN circuit board.	2-A) Disconnected J37 connector POWER circuit board	Securely connect the connector.
		2-B) Disconnected J10 connector MAIN circuit board	
		2-C) Fuse F5 has blown.	Replace the blown fuse after removing the cause. (5A)
	1-3) Operation panel ←→ MAIN circuit board has not been connected.	3-A) Disconnected J14 connector (MAIN circuit board)	Securely connect the connector.
2. Connection error of operation panel occurs.	2-1) Operation panel ←→ Connection failure of MAIN circuit board	2-A) Disconnectud J14 connector (MAIN circuit board)	Chuck or replace the connector.
		2-B) Failure with MAIN circuit board	Operate or replace the MAIN circuit board.
3. Key of operation panel fails to work.	3-1) Failure with the switch		Execute the input check program to identify the defective switch, and replace the switch or the operation circuit board.
	3-2) Failure with the circuit board		Replace the operation circuit board.


Troubles
Cause (1)
Cause (2)
Corrective measures
4. After the enter key is ON, the feeding frame is kept lowered and fails to move.
4-1) Voltage of +140V is not supplied to PMDC circuit board.
4-A) Disconnected J37 connector (POWER circuit board)
4-B) Disconnected J61 connector (PMDC circuit board)
4-C) Disconnected J62 connector (PMDC circuit board)
Securely connect the connector.
4-D) Fuse F4 has blown.
Replace the blown fuse after removing the cause. (5A)
4-2) MAIN ←→ PMDC circuit board have not been connected.
2-A) Disconnected J24 connector (MAIN circuit board)
2-B) Disconnected J60 connector (PMDC circuit board)
Securely connect the connector.
4-3) PMDC circuit board ←→ X side stepping motor have not been connected.
3-A) Disconnected J62 connector (PMDC circuit board)
3-B) Disconnected J50 connector (Inside the table stand)
Securely connect the connector.
4-4) Failure with the circuit board
Replace the PMDC circuit board.
4-5) PMDC circuit board ←→ Y side stepping motor have not beeb connected.
5-A) Disconnected J62 connector (PMDC circuit board)
5-B) Disconnected J51 connector (Inside the table stand)
Securely connect the connector.
4-6) Failure with the circuit board
Replace the PMDC circuit board.


Troubles
Cause (1)
Cause (2)
Corrective measures
5. Feeding frame fails to work.
5-1) Pedal switch ←→ MAIN circuit board have not been connected.
1-A) Disconnected J19 connector (MAIN circuit board)
Securely connect the connector.
5-2) Defective pedal switch
Replace the defective switch after checking the failure by the input check program.
5-3) Defective circuit board
Replace the MAIN circuit board.
6. "Err has occurred When reading" appears on the display.
6-1) Defective floppy disk
Replace the floppy disk.
6-2) Defective FDD
Replace the FDD.
6-3) Defective circuit board
Replace the MAIN circuit board.
7. "The FD has not been loaded" appears on the display.
7-1) The power is not supplied to FDD.
1-A) Disconnected J12 connector (POWER circuit board)
Securely connect the connector.
1-B) Disconnected FDD connector (FDD pin 4)
7-2) FDD ←→ MAIN circuit board have not been connected.
2-A) Disconnected J13 connector (MAIN circuit board)
2-B) Disconnected FDD connector (FDD pin 34)
7-3) Defective circuit board
Replace the MAIN circuit board.

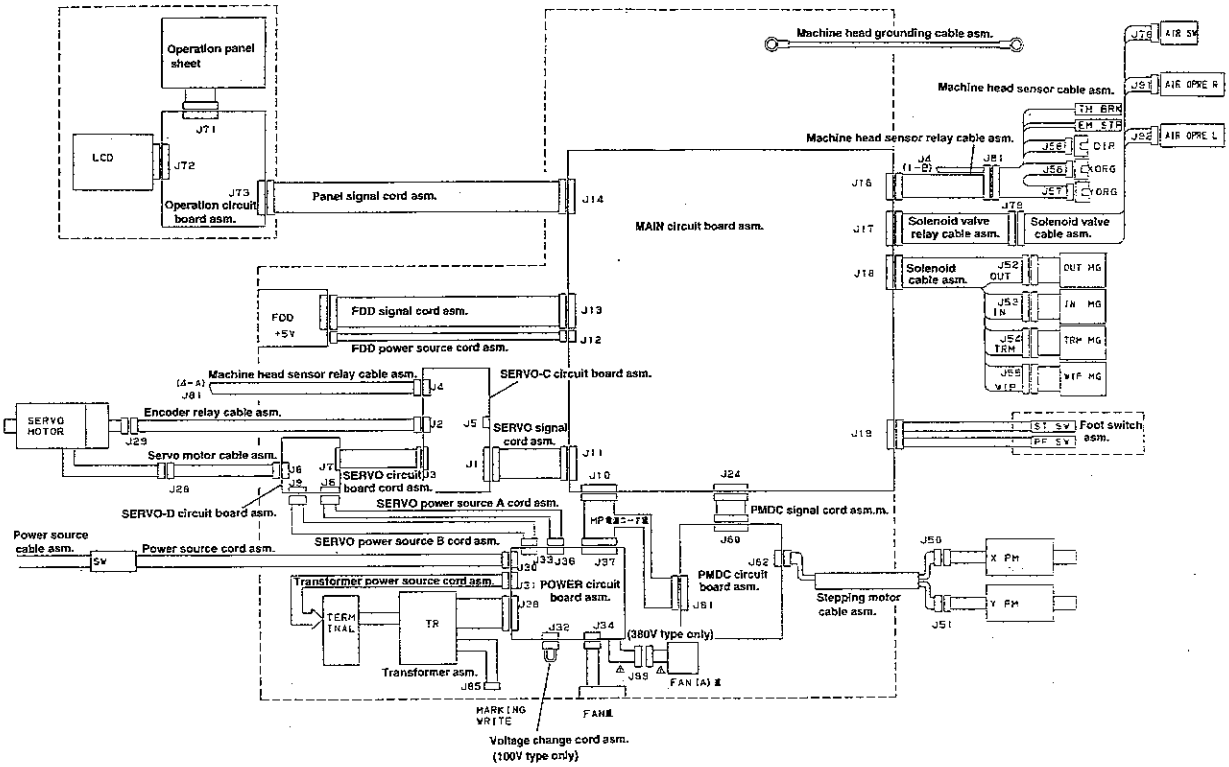

Troubles
Cause (1)
Cause (2)
Corrective measures
8. "E3 ServoMotor Alert" appears on the display.
8-1) The power for driving is not supplied to the motor.
8-2) The power for driving is not supplied.
8-3) The power for the control is not supplied.
8-4) Encoder signal from the motor is not supplied.
8-5) MAIN and SERVO circuit boards have not been connected.
1-A) Disconnected J8 connector
Disconnected J28 connector
2-B) Disconnected J9 connector
Disconnected J33 connector
3-A) Disconnected J6 connector
Disconnected J36 connector
4-A) Disconnected J2 connector
Disconnected J29 connector
5-A) Disconnected J11 connector
Disconnected J1 connector
Securely connect the connector.
9. "E30 Needle Pos Err" cannot be released.
9-1) MAIN and SERVO circuit board have not been connected.
1-A) Disconnected J11 connector
Disconnected J1 connector
Securely connect the connector.
10. Main shaft rotates for approximately 2 seconds at low speed and stops.
10-1) Signal from the main shaft sensor is not tranferred.
1-A) Disconnected J4 connector
1-B) Defective main shaft sensor
1-C) Defective SERVO circuit board
Securely connect the connector.
Replace the sensor.
Replace the circuit board.
11. "ServoMotor Alert" appears on the display.
11-1) MAIN ←→ SERVO circuit board have not been connected.
1-A) Disconnected J1 connector
(SERVO circuit board)
1-A) Disconnected J11 connector
(MAIN circuit board)
Securely connect the connector.
12-3) Defective circuit board
Replace the SERVO or MAIN circuit board.

Troubles	Cause (1)	Cause (2)	Corrective measures
12. "Stopkey Accepted Not trimmed yet" cannot be released.	12-1) Temporary stop switch ←→ MAIN circuit board have not been connected.	1-A) Disconnected J16 connector	Securely connect the connector.
		1-B) Disconnected J81 connector	
13. Thread breakage detection fails to work (Detection within 8 stitches at the sewing start and 3 stitches during sewing cannot be detected.)	13-1) Thread breakage detection mode is rendered ineffective.	1-A) Item 1 of memory switch No. 38 is set to "NO".	Set the item 1 of memory switch No.38 to "ON".
	13-2) The machine head has not be grounded.		Check the grounding conductor of the machine head, and connect it.
	13-3) Thread breakage detecting plate and thread take-up spring is separated when stopping.		Adjust correctly the position of thread breakage detecting plate.
	13-4) Defective circuit board		Replace the MAIN circuit board.
14. "AirPressure Drop" cannot be released.	14-1) Air sensor ←→ MAIN circuit board have not been connected.	1-A) Disconnected J17 connector	Securely connect the connector.
		1-B) Disconnected J79 connector	Securely connect the connector.
15. Origin retrieval is made, but the feeding frame does not come down. (Magnet type only)	15-1) Presser magnet ←→ MAIN circuit board have not been connected.	1-A) Disconnected J18 connector	Securely connect the connector.
		1-A) Disconnected J52 connector	Securely connect the connector.
	15-2) The power for driving magnet is not supplied.	1-A) Fuse F3 has blown.	Replace the blown fuse after removing the cause. (5A)
	15-3) Defective circuit board		Replace the MAIN circuit board.

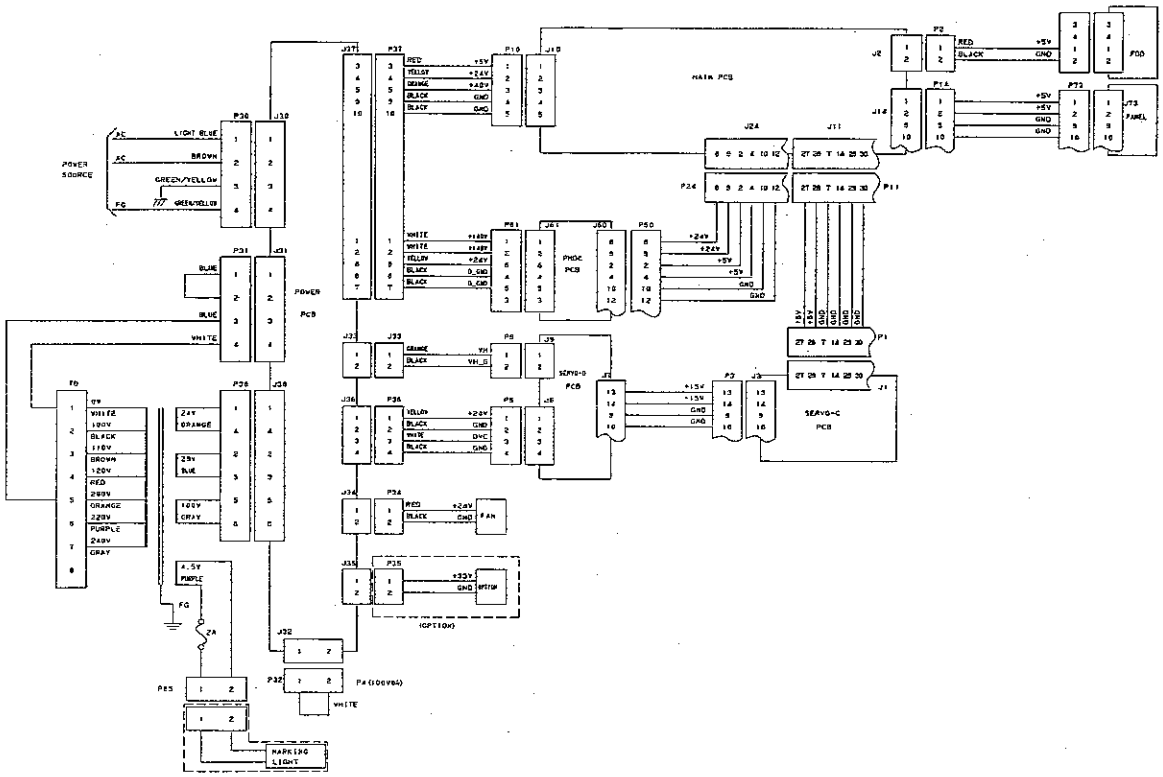
Troubles	Cause (1)	Cause (2)	Corrective measures
16. Origin retrieval is made, but the feeding frame does not come down. (Pneumatic type only)	16-1) Solenoid magnet ←→ MAIN circuit board have not been connected.	1-A) Disconnected J17 connector	Securely connect the connector.
		1-A) Disconnected J79 connector	Securely connect the connector.
	16-2) The power for air drive is not supplied. (+ 24 V)	1-A) Defective POWER circuit board	Replace the POWER circuit board.
	16-3) Defective circuit board		Replace the MAIN circuit board.
17. Thread trimmer fails to work.	17-1) Thread trimming mode is rendered ineffective.	1-A) The item 1 of memory switch No. 18 is set to "NO".	1-A) Set the item 1 of memory switch No. 18 to "ON".
		1-B) The item 1 of memory switch No. 44 is set to "NO".	1-A) Set the item 1 of memory switch No. 44 to "ON".
	17-2) The power for magnet drive is not supplied.	1-A) Fuse F3 has blown.	Replace the blown fuse after removing the cause. (5A)
	17-3) Defective circuit board		Replace the circuit board.
18. Wiper fails to work.	18-1) Wiper mode is not correct.	(In case of the magnet type) 1-A) The item 1 of memory switch No. 36 is set to "Air" or "OFF".	1-A) Set the item 1 of memory switch No. 36 to "Magnet".
		(In case of the pneumatic type) 1-A) The item 1 of memory switch No. 36 is set to "Magnet" or "OFF".	1-A) Set the item 1 of memory switch No. 36 to "Air".
	18-2) The power for magnet drive is not supplied.	1-A) Fuse F3 has blown.	Replace the blown fuse after removing the cause. (5A)
	18-3) Defective circuit board		Replace the MAIN circuit board.

Troubles	Cause (1)	Cause (2)	Corrective measures
19. After turning ON the power, the machine moves in a wrong direction at the first origin retrieval.	19-1) Sewing machine model setting is improper.		Return the memory switch to the initial condition.
20. Even when turning ON the power, the machine entirely fails to work.	20-1) Sewing machine model setting is improper.		Return the memory switch to the initial condition.
	20-2) The main power is not supplied.	2-A) Fuse F1 or F2 has blown.	Replace the blown fuse after removing the cause. (10A)
	20-3) Defective circuit board		Replace the MAIN, POWER or PMDC circuit board.
21. Others	21-1) The machine operation mode is improper.		Return the memory switch to the initial condition.
	21-3) Defective circuit board		Replace the PMDC, MAIN, POWER or SERVO circuit board.
22. In case of the magnet type, the origin retrieval is made while the feedin frame is kept raised. After the origin retrieval is made, the feeding frame comes down.	Memory switch setting is for the pneumatic type.		Set the memory switch to the magnet type by initializing the memory switch.

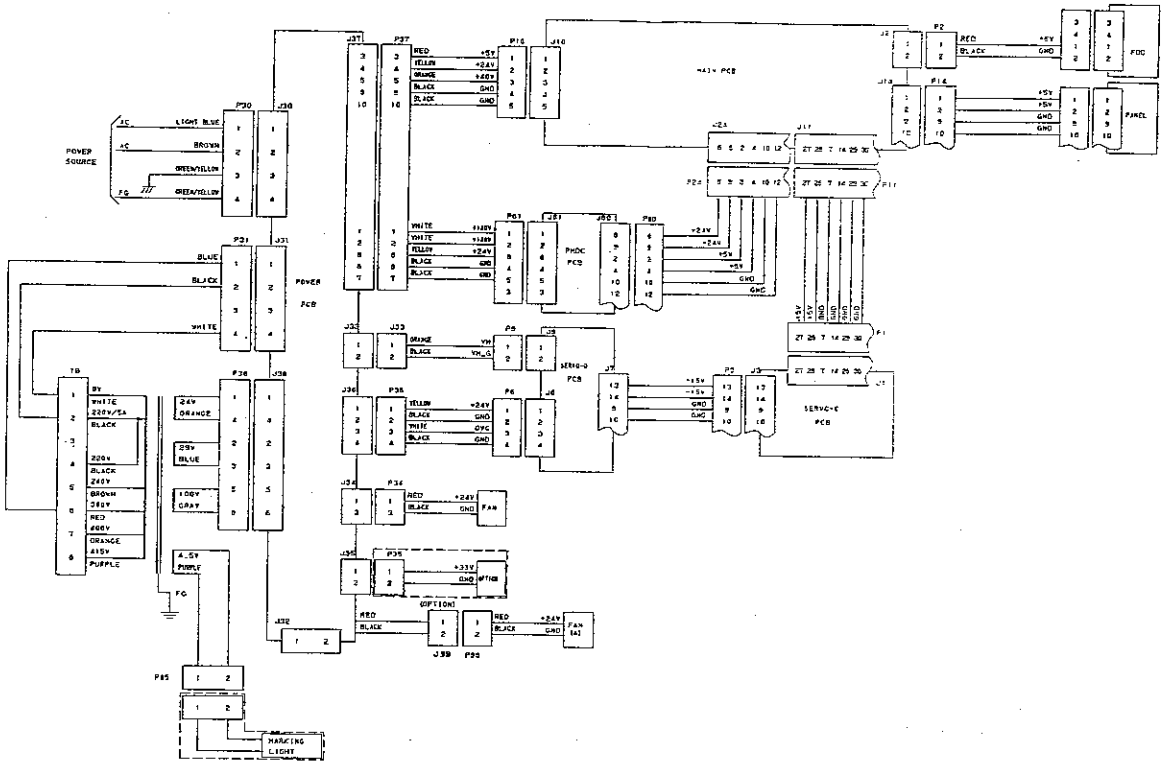
19. BLOCK DIAGRAM



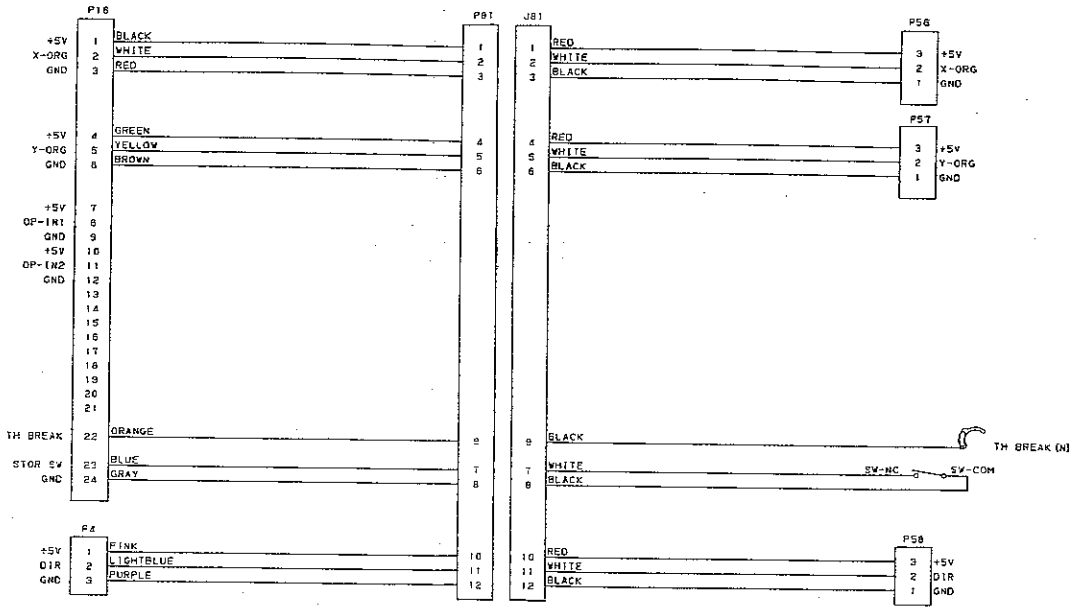
20. POWER CIRCUIT DIAGRAM (A) 100V AND 200V SERIES



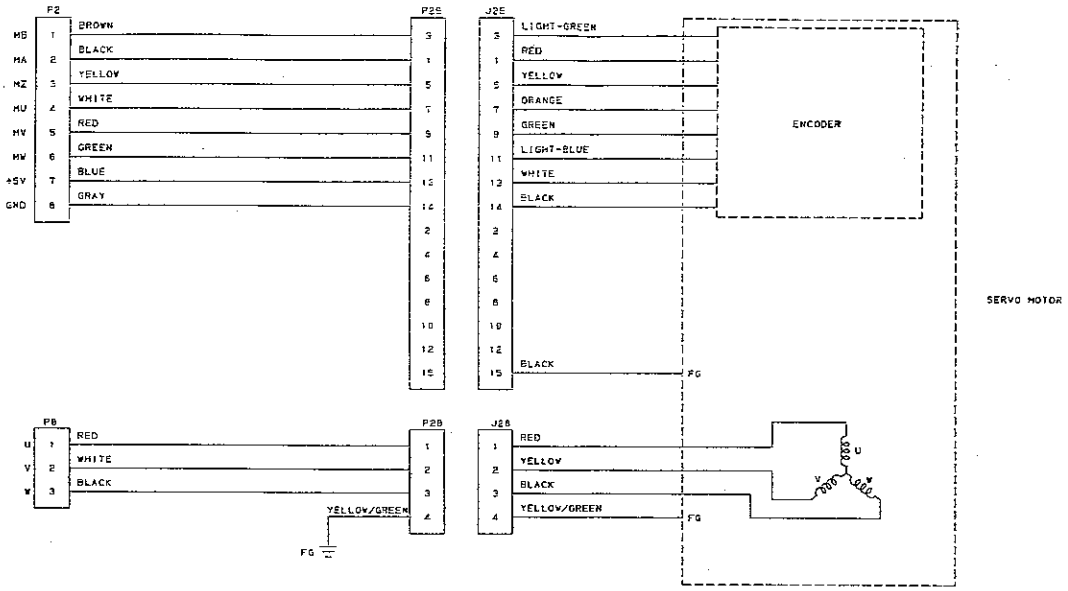
21. POWER CIRCUIT DIAGRAM (B) 380V SERIES



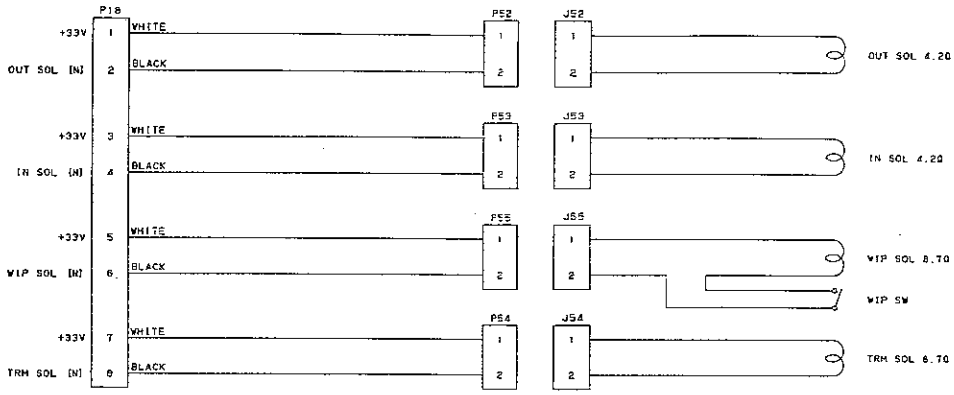
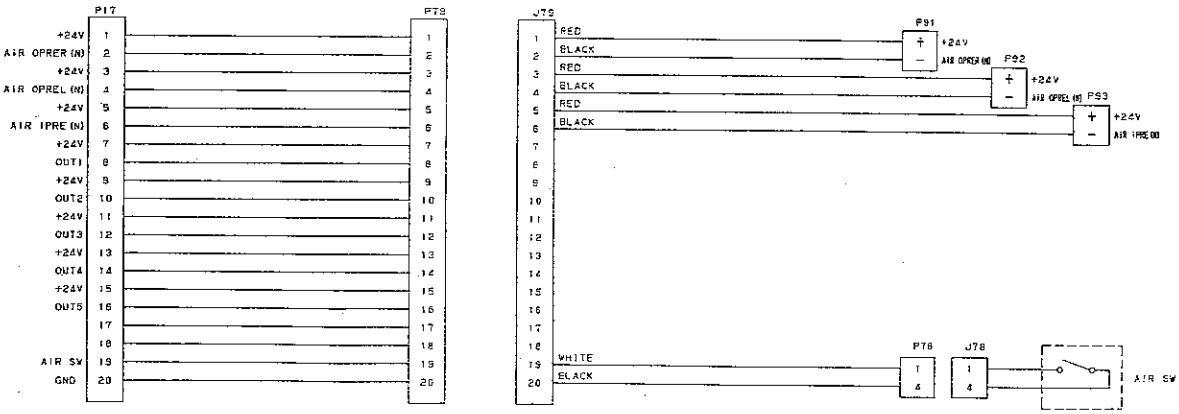
22. SENSOR CIRCUIT DIAGRAM



23. SERVO MOTOR CIRCUIT DIAGRAM



24. SOLENOID CIRCUIT DIAGRAM



25. AIR VALVE SWITCH CIRCUIT DIAGRAM