1. SPECIFICATIONS

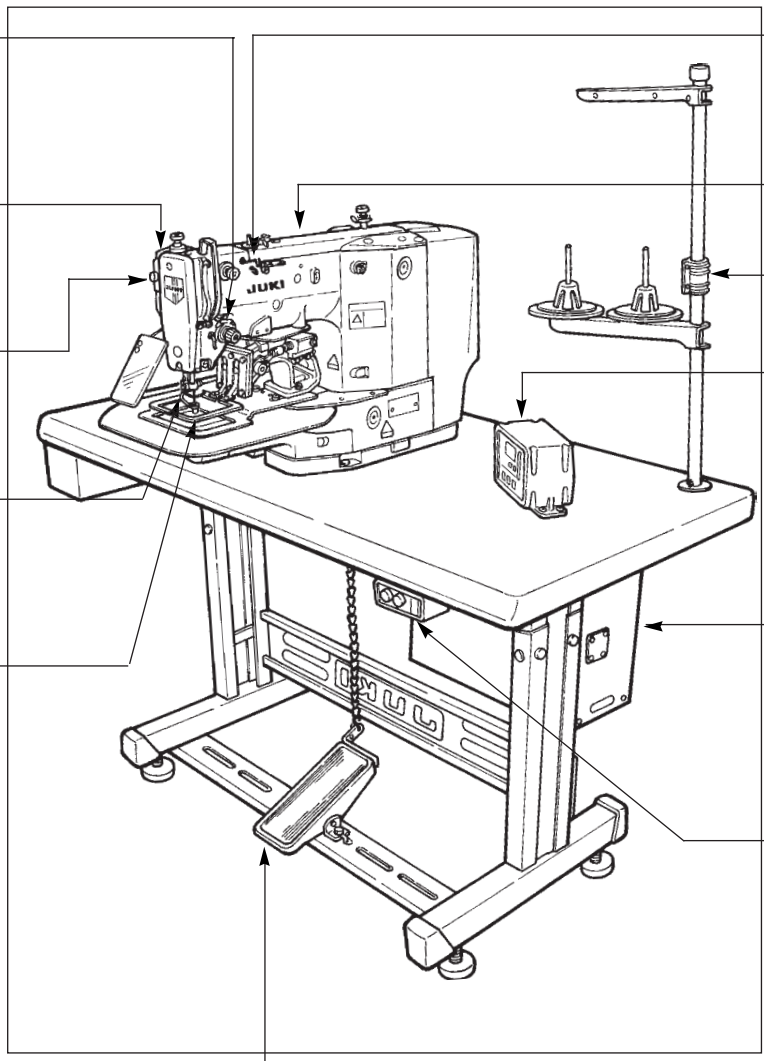
1)	Sewing area :	X (lateral) direction 100 mm Y (longitudinal) direction 60 mm
2)	Max. sewing speed :	∗ 2,200 rpm (When sewing pitch is less than 3 mm.)
3)	Stitch length :	0.1 to 10.0 mm (adjustable in 0.1 mm step)
4)	Feed motion of work clamp foot :	Intermittent feed (2-shaft drive by stepping motor)
5)	Needle bar stroke :	41.2 mm
6)	Needle :	DP x 17, DP x 5 (DP x 17 is attached at the time of delivery.)
7)	Lift of feeding frame :	18 mm (standard) Max. 25 mm
8)	Hook :	Full-rotary three-fold capacity hook
9)	Intermediate presser stroke :	4 mm (standard) (Adjustable in the range of 0 and 4 to 10 mm) (For LK-1942 only)
10)	Lift of intermediate presser :	18 mm (For LK-1942 only)
11)	Lubricating oil :	New Defrix Oil No. 2 (supplied by oiler)
12)	Data recording :	EEP-ROM (32k byte)
13)	Enlarging/Reducing facility :	Allows a pattern to be enlarged or reduced on the X axis and Y axis independently when sewing a pattern
	Scale :	20% to 200% (1% step)
14)	Enlarging/Reducing method :	Pattern enlargement / reduction can be done by increasing/ decreasing the stitch length
15)	Temporary stop function :	Used to stop machine operation during a stitching cycle.
16)	Thread breakage detection function :	Used to detect needle thread breakage to automatically stop machine.
17)	Max. sewing speed limitation :	The max. sewing speed can be set limited to any value within a range of 200 to 2,200 rpm using the up/down key. (100 rpm steps)
18)	Pattern selection :	1 to 99 patterns can be selected by specifying the desired pattern Nos.
19)	Bobbin thread counter :	Tells the time to replace the bobbin by the bobbin thread counter. (Max. 9,999 pcs.)
20)	Production counter :	Displays the number of pieces of production by the production counter. (Max. 9,999 pcs.)
21)	Memory back-up :	In case of a power interruption, the pattern being used will automatically be stored in memory.
22)	Sewing machine motor :	480W servo motor (Direct-drive)
23)	Dimensions :	W : 1,200 mm L : 700 mm H : 1,160 mm (Use the standard table and stand.)
24)	Weight :	Machine head 46 kg, Control box 16.5 kg, Heater unit 3.5 kg
25)	Power consumption :	600 W
26)	Operating temperature range :	5 ˚C to 35 ˚C
27)	Operating humidity range :	35% to 85% (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}
30)	Air consumption :	1.3 ℓ /min
31)	Needle bar reverse rotation stop function :	After the completion of sewing, the needle can be stopped in its upper position by rotating the needle bar in the reverse direction.

∗ Reduce the max. sewing speed in accordance with the sewing conditions.

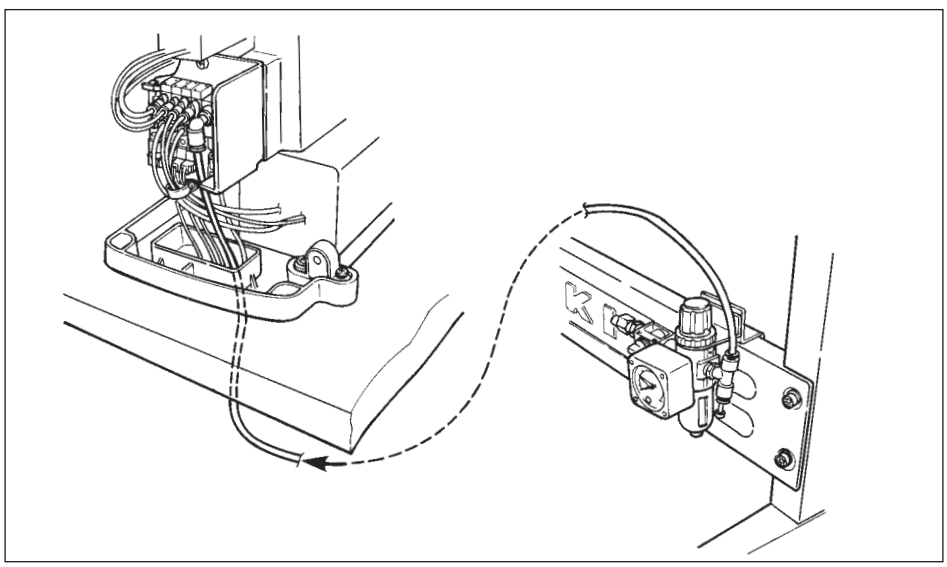
∗ To select and use either the bobbin thread counter or the production counter.

2. CONFIGURATION

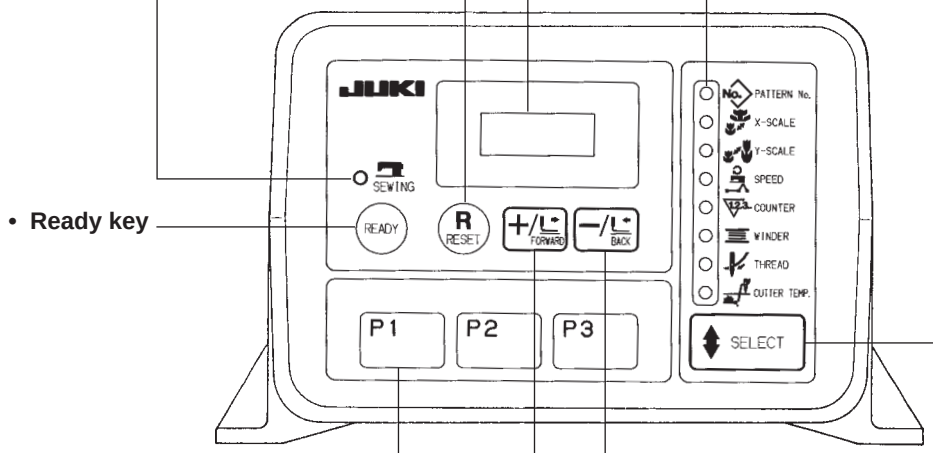
(1) Names of main unit



Air regulator



(2) Names of switches on the control box



- Reset key
- Data indication
- Sewing LED
- Item selection LED
- Ready key
- Function key
- + / Feed forward key
- – / Feed backward key
- Selection key : Every time this key is pressed, the selection will be made as follows.

• Pattern No. → X Scale → Y Scale → Speed → Counter → Bobbin winder → Threading → Heat cutter temperature (For Z type only)

(3) Function of the operation panel key

Switch name / Action (operation) state	Ready key	Reset key	Selection key		+ Forward/- Backward key	P1, P2, P3 keys
Normal	Change-over : Standby state → Sewing state	Returns the set value to the standard value.	Pattern No. ↓ X scale ↓ Y scale ↓ Speed ↓ Counter ↓ Bobbin winder ↓ Threading ↓ Heat cutter temperature	Pattern No. ↑ X scale ↑ Y scale ↑ Speed ↑ Counter ↑ Bobbin winder ↑ Threading ↑ Heat cutter temperature	Addition or subtraction of the set value	Calling P1 to P7 keys which have been registered.
Normal (Preparing sewing)	Release of set-ready state	–	Change-over of selection items	Change-over of selection items	–	Calling P1 to P7 keys which have been registered.
Memory switch	Change of set value (Decided)	Returns the set value to the standard value.	Set No. → Set value	Set No. → Set value	Addition or subtraction of the set value	Move : Level 1 → Level 2 (Selection + P3)
Registration of P key	Setting → Registration (Decided)	Clears all the set values.	Set No. → Set value	Set No. → Set value	Addition or subtraction of the set value	Selection of the P key to be registered
Registration of combination (C)	Setting → Registration (Decided)	Clears all the set values.	Set No. → Set value	Set No. → Set value	Addition or subtraction of the set value	Selection of P1 to P7 keys to be registered
Test mode	Solenoid and solenoid valve action (When checking output)	–	CP-1 ↓ CP-2 ↓ CP-3 ↓ CP-4 ↓ CP-5 ↓ CP-6	–	Addition or subtraction of the set value	Change-over of the input line (P1 or P2 key)
Confirmation of pattern stitching	–	Origin retrieval → Travel to the sewing start	–	–	Feed forward or feed backward	–
Counter	–	Reset of count value	–	–	Addition or subtraction of the set value	–
Bobbin winder	Cjange-over : Standby state → Bobbin thread winding state	Stop of bobbin thread winding	Stop of bobbin thread winding	Stop of bobbin thread winding	Stop of bobbin thread winding	Stop of bobbin thread winding
Threading	Change-over : Standby state → Threading state	–	–	–	–	–

MEMO

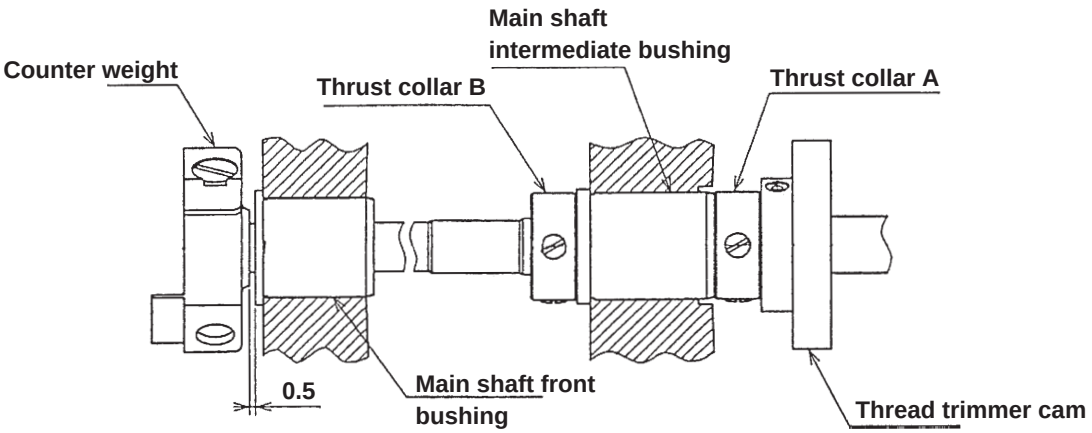
3. ADJUSTMENTS

(1) Adjustment of the main shaft components

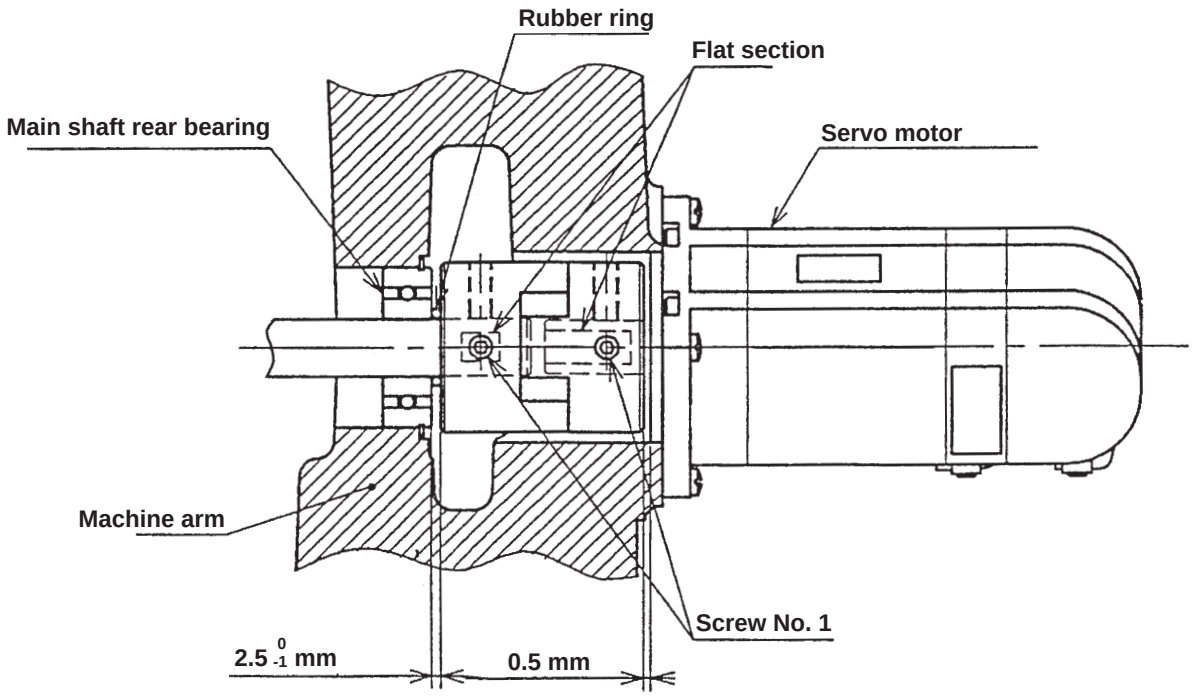
Standard Adjustment

1) Adjusting the play of the main shaft

For the standard adjustment, clearance provided between the counter weight and the main shaft front bushing is 0.5 mm.



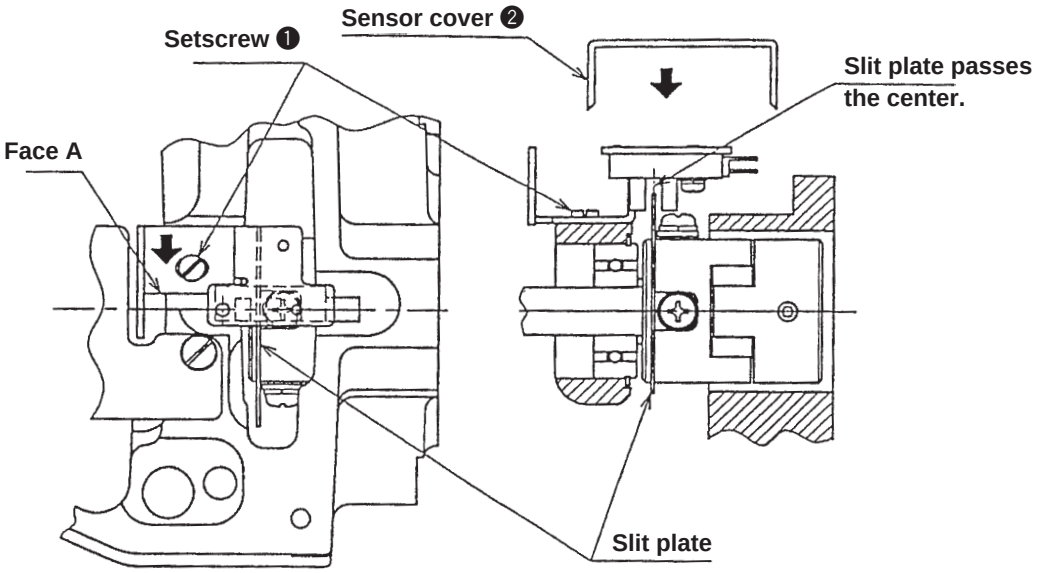
2) Installing the main motor



Adjustment Procedures	Results of Improper Adjustment
① Push the counterweight to the main shaft front bushing, insert a clearance gauge of 0.5 mm between the main shaft intermediate bushing and the thrust collar A and fix the thrust collar A with screw while pressing it to the main shaft intermediate bushing side. ② Remove the clearance gauge and fix the thrust collar B so as to lightly insert the main shaft intermediate bushing between the thrust collars A and B.	
① Making the clearance between the servo motor and the coupling 0.5 mm, fit the screw No. 1 to the flat section. Then install the coupling. ② Insert rubber ring (RO154240100) between the main shaft rear bearing and the coupling. Making the clearance between the main shaft bearing and the coupling 2.5 mm, fit the screw No. 1 to the flat section. Then install the coupling. **Caution : 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. ○ If the installing clearance of the couplings is plus, the moving clearance of the couplings in the axial direction is lost, and a torque is applied to the main shaft.

Standard Adjustment

3) Adjusting the main shaft sensor



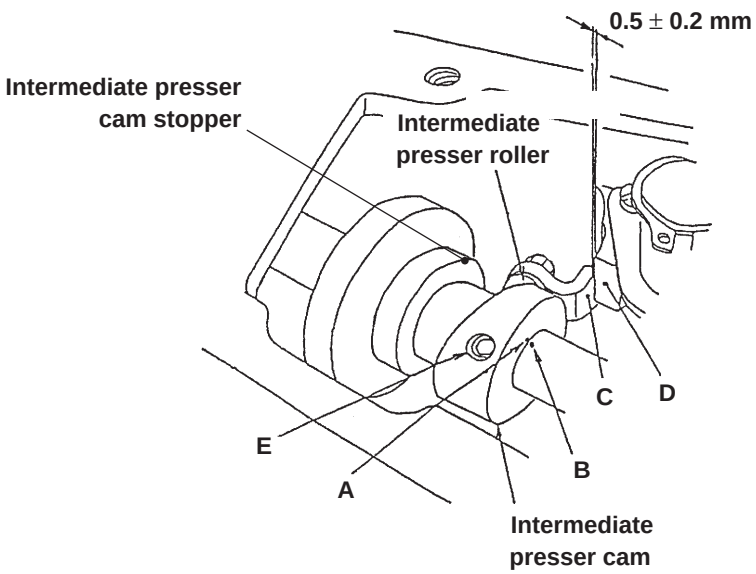
(2) Adjusting the intermediate presser components (LK-1942)

Standard Adjustment

1) Adjusting the position of the intermediate presser cam

① Align engraved dot A of the intermediate presser cam with engraved dot B of the main shaft in the direction of rotation.

② Clearance provided between section C of the intermediate presser driving arm and section D of the machine arm boss is 0.5 ± 0.2 mm in the state that the clearance becomes narrowest (lower dead point of intermediate presser).



Adjustment Procedures	Results of Improper Adjustment
① Remove the sensor cover. ② Fit the sensor installing base to face A. Tighten setscrew ❶ so that the slit plate passes the center of the sensor without interfering with each other and put the sensor cover.	○ If the main shaft sensor is not properly installed, the sensor may be damaged or error may ocur.

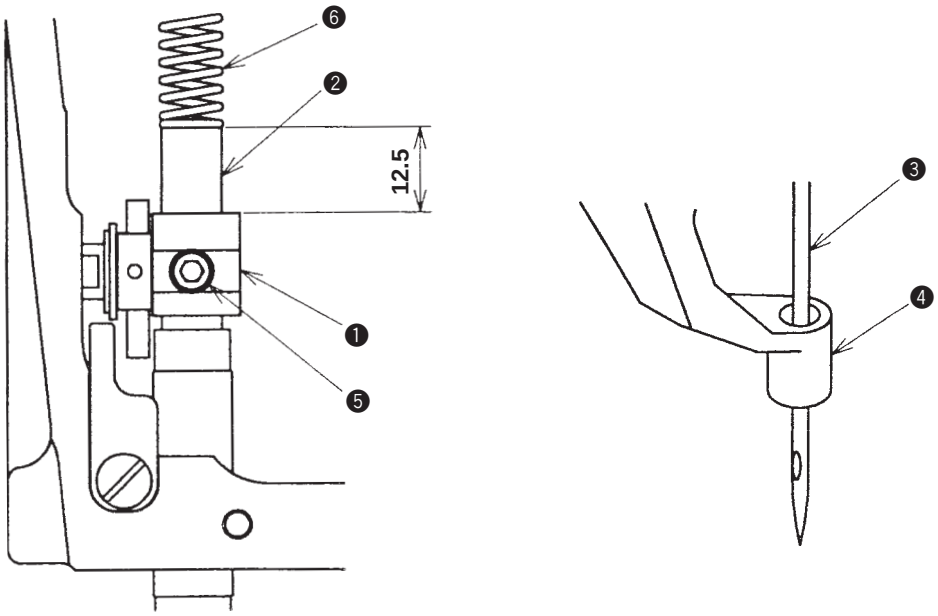
Adjustment Procedures	Results of Improper Adjustment
① Close the air cock of the filter regulator and expel the air. ② Insert a thickness gauge of 0.5 mm between section C of the intermediate presser driving arm and section D of machine arm boss, and make a state that section C of the intermediate presser driving arm, thickness gauge and section D of the machine arm boss come close in contact altogether. ③ Turn the intermediate presser cam and stop it at the position where it has moved nearest to the face plate side. ④ Turn the main shaft so that engraved dot A of the intermediate presser cam is aligned with engraved dot B of the main shaft in the direction of rotation. Then tighten two setscrews E.	○ If the position of the intermediate presser cam in the direction of rotation is not proper, stitch skipping, needle breakage, etc. will occur. ○ If the clearance provided between the intermediate presser driving arm and the machine arm boss is too small, they come in contact with each other during sewing, and noise may occur. If the clearance is too large, pressure of the intermediate presser is increased. As a result, maloperation or trouble will be caused.

Standard Adjustment

2) Position of the intermediate presser bar

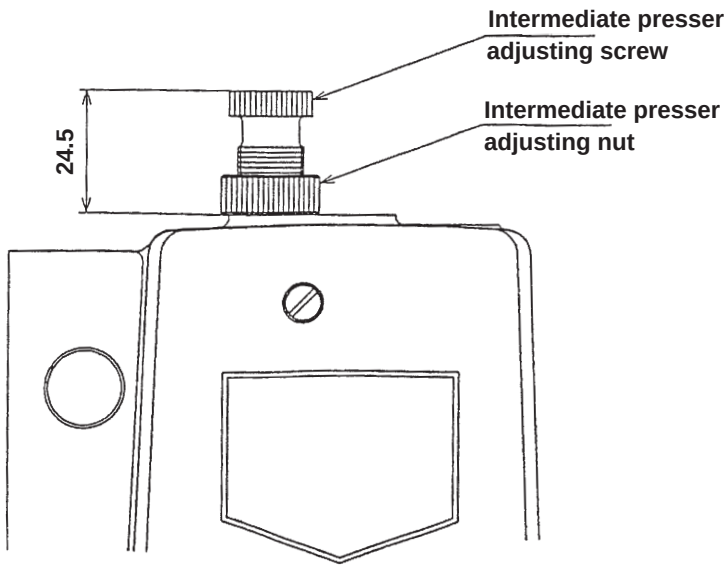
◎ Protruding amount of intermediate presser bar ❷ from intermediate presser bar guide bracket ❶ is 12.5 mm.

◎ Needle ❸ passes the center of intermediate presser ❹.



3) Height of the intermediate presser adjusting screw

Height of the intermediate presser adjusting screw is 24.5 mm for the standard adjustment value.

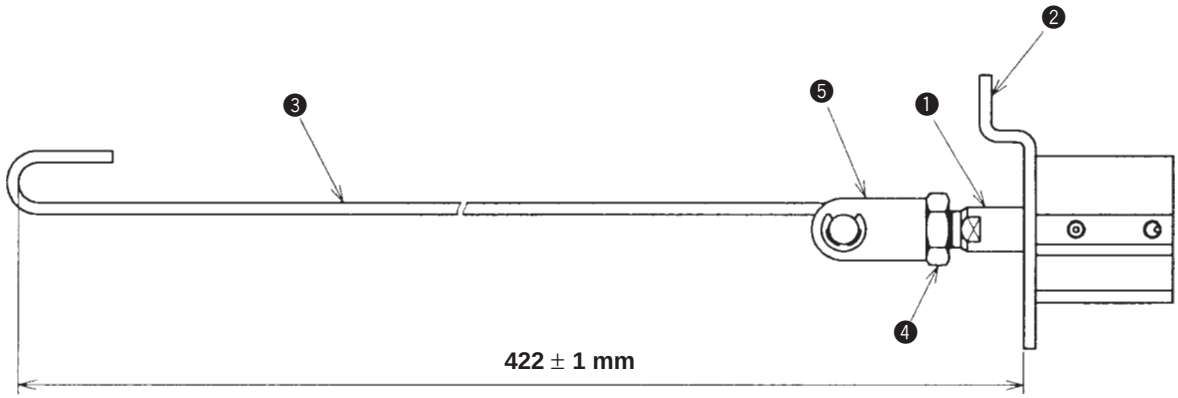


Adjustment Procedures	Results of Improper Adjustment
Tighten setscrew ❺ so that the protruding amount of intermediate presser bar ❷ from intermediate presser bar guide bracket is 12.5 mm and needle ❸ passes the center of intermediate presser ❹. **Caution : Keep the tightening torque of setscrew ❺ at 3.9 to 4.9 N • m (40 to 50 kgf • cm).**	○ If the protruding amount of intermediate presser bar is excessively large, breakage of intermediate presser spring ❻ or intermediate presser lifting failure will occur. ○ If the tightening torque of setscrew ❺ is excessive, intermediate presser bar ❷ is deformed and malfunction will occur.
Turn the intermedite presser adjusting screw to adjust the height and fix it with the intermediate presser adjusting nut. When the height is increased, the pressing pressure is decreased. **Caution : 1. Adjust the height within the range of 24.5 to 40 mm.** **2. When using the intermediate presser stroke with the value other than the standard adjustment value (4 mm), be sure to set the height of the intermediate presser to the minimum (24.5 mm).**	

Standard Adjustment

4) Adjusting the intermediate presser lifting cylinder knuckle

◎ The distance from installing plate ❷ to the inside of the curved section of intermediate presser lifting link ❸ is 422 ± 1 mm when rod ❶ of the intermediate presser lifting cylinder is protruding.



(3) Adjusting the wiper components

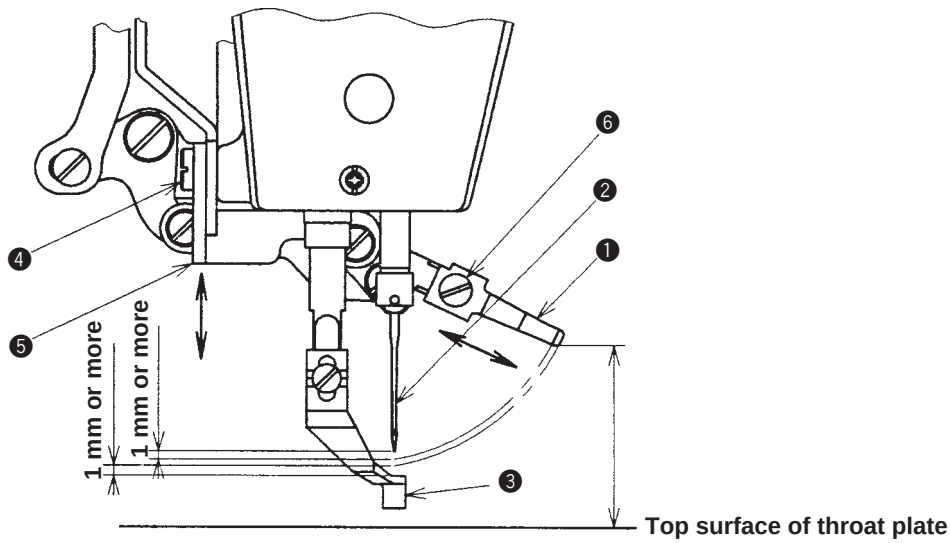
Standard Adjustment

1) Position of the wiper

◎ The standby position of wiper ❶ is approximately 45 ± 2 mm from the top surface of throat plate.

◎ Clearance provided between needle ❷ and wiper ❶ should be 1 mm or more when wiper ❶ passes under needle ❷ after thread trimming.

◎ When the intermediate presser is provided, make the clearance provided between intermediate presser ❸ and the wiper 1 mm or more.



Adjustment Procedures	Results of Improper Adjustment
① Loosen nut ❹ and turn knuckle ❺ for adjustment. ② Tighten nut ❹ after sadjustment.	○ If the adjustment value is excessive, the lifting amount of the intermediate presser is decreased when the sewing machine stops. ○ If the adjustment value is small, noise may occur during operating the sewing machine or intermediate presser lifting link ❸ may be broken.

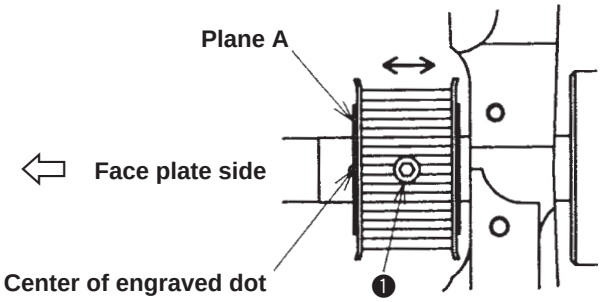
Adjustment Procedures	Results of Improper Adjustment
① Loosen setscrews ❹, move wiper base ❺ up or down, and adjust so that the top end of wiper ❶ is approximately 45 ± 2 mm from the top surface of throat plate. ② Adjust the main shaft to the upper stop position (rotating position where E-3 error is not displayed). ③ Open the air cock and expel the air. ④ Loosen setscrew ❻ and adjust so that the respective clearances provided between the wiper and needle ❷, and the wiper and intermediate presser ❸ should be 1 mm or more when turning wiper ❶ up to just below needle ❶.	○ If the standby position is excessively high, sweeping failure or malfunction occurs. ○ If the standby position is excessively low, interference of wiper mechanism components occurs resulting in the cause of trouble. ○ If the clearance provided between the needle and the intermediate presser is smaller than the specified value, the wiper interferes with them and may be broken.

(4) Adjusting the hook shaft drive components

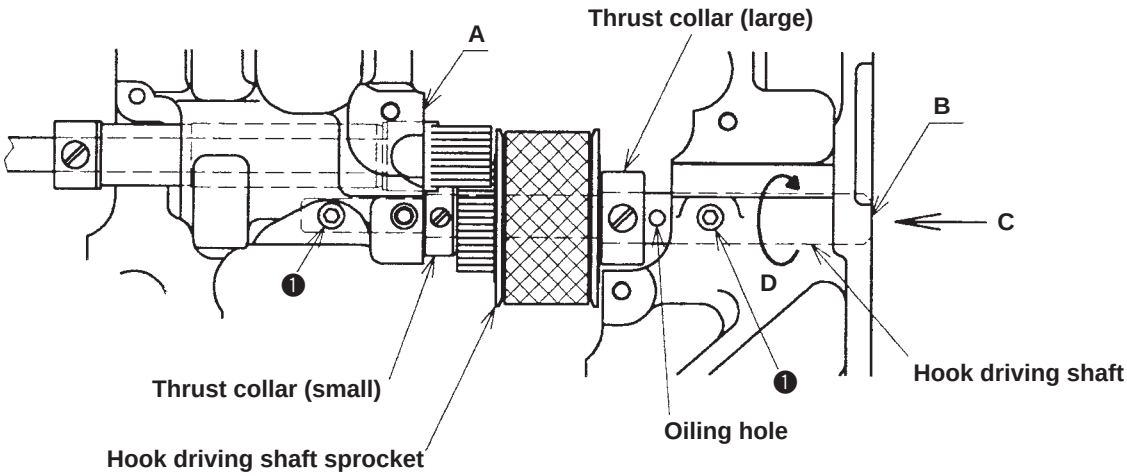
Standard Adjustment

1) Longitudinal position of the main shaft sprocket

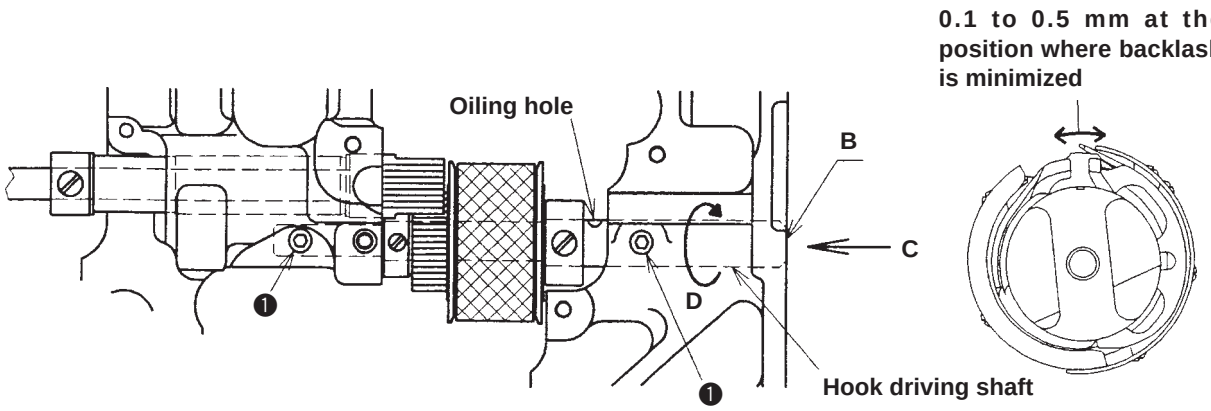
◎ Align plane A of the main shaft sprocket with the center of engraved dot (ø1) on the main shaft.



2) Longitudinal position of the hook driving shaft sprocket

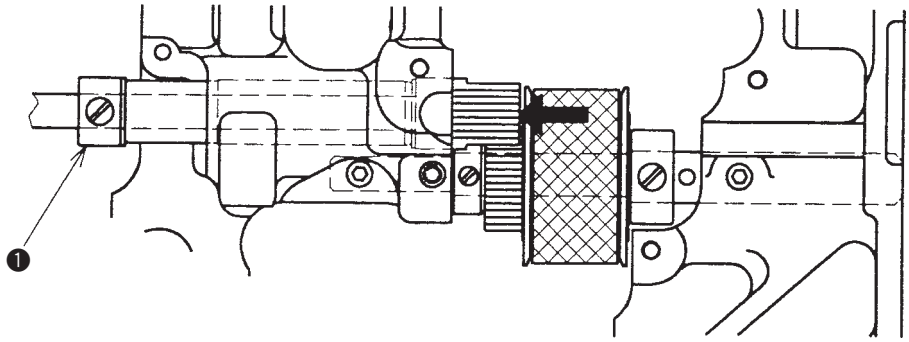


3) Backlash of the hook shaft gear

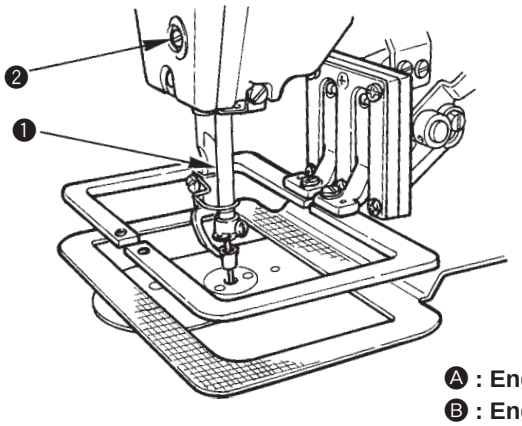


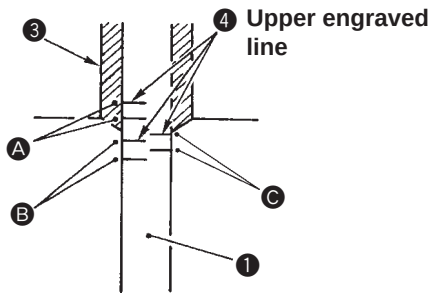
Adjustment Procedures	Results of Improper Adjustment
① Remove the timing belt. ② Loosen two setscrews ❶ in the main shaft sprocket and move the main shaft sprocket in the direction of the arrow mark to adjust the position. ③ After the adjustment, tighten the setscrews. **Caution : If the setscrews are excessively loosened, they come away from the flat positions.**	○ If the position of the main shaft sprocket is improper, the timing belt will be deteriorated or broken.
① Loosen two setscrews ❶, and turning the hook driving shaft, loosen the setscrews of thrust collars (large) and (small). ② Temporarily tighten setscrews ❶ in the state that the oiling hole is located in the position of the figure and the hook driving shaft is pressed in the direction of the arrow mark. **Caution : Adjust so that the end face of the hook driving shaft is aligned with the frame at plane B.** ③ Press the thrust collar (small) to plane A and tighten the setscrew. Then loosen setscrews ❶, turn the hook driving shaft by 90˚with a screwdriver from the direction of arrow mark C to the direction of arrow mark D, and tighten the other setscrew. ④ Turn again the hook driving shaft by 90˚ in the reverse direction, press the hook driving shaft to the thrust collar (small), lightly press the thrust collar (large) to the hook driving shaft sprocket, and tighten the setscrew of the thrust collar (large). ⑤ Turn the hook driving shaft by 90˚ with a screwdriver from the direction of arrow mark C to the direction of arrow mark D and tighten the other setscrew. ⑥ Adjust the backlash and tighten two setscrews ❶. (See the backlash of the hook shaft gear in the next item.)	○ If the position of the hook driving shaft sprocket is improper, the timing belt will be deteriorated or broken.
① Loosen setscrew ❶. ② Pressing the hook driving shaft with a screwdriver from the direction of arrow mark C, turn it to adjust the backlash. Turning in the direction of arrow mark D decreases the backlash, and turning in the reverse direction increases the backlash. Adjust the backlash so that it is 0.1 to 0.5 mm at the blade point of the hook and the hook rotates smoothly. ③ After the adjustment, tighten setscrew ❶. **Caution : The end face of the hook driving shaft should be aligned with the machine frame at plane B.** **The oiling hole should be nearly in the position as shown in the figure.**	○ If the backlash is excessive, the hook noise will be increased. ○ If the backlash is too small, gear noise or seizure of the hook shaft or the hook driving shaft gear will be caused. ○ When adjusting the backlash, if the longitudinal position of the hook driving shaft sprocket is not correct, the timing belt will be deteriorated or broken.

4) Removing the play of the hook shaft



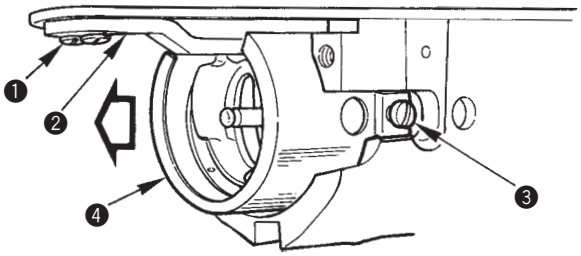
5) Height of the needle bar





Ⓐ : Engraved line for DP x 5
Ⓑ : Engraved line for DP x 17 #18 to #25
Ⓒ : Engraved line for DP x 17 #26

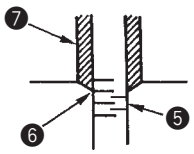
6) Removing the oil shield plate of the hook



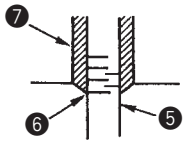
Adjustment Procedures	Results of Improper Adjustment
Loosen two thrust collar setscrews ❶ and tighten them while pressing the hook shaft in the direction of arrow mark.	○ If the play is excessively narrowed, the noise will be caused.
Bring needle bar ❶ to the lowest position of its stroke. Loosen needle bar connection screw ❷ and adjust so that upper marker line ❹ engraved on the needle bar aligns with the bottom end of needle bar bushing, lower ❸. **Note) 1. After the adjustment, be sure to check that there is no uneven torque.** **2. When stitch skipping occurs in accordance with the sewing conditions, adjust the height of the needle bar so as to lower it by 0.5 to 1 mm from the needle bar engraved line ❹.**	
Remove setscrew ❶ and remove inner hook stopper ❷. Further, loosen right and left setscrews ❸ and remove oil shield plate ❹. At this time, do not try to forcibly remove the oil shield plate. Turn the handwheel and remove it at the position near to the up-stop position of the handwheel.	

7) Needle and the engraved lines

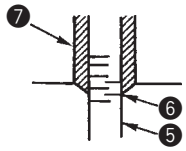
Relation between needle and engraved lines



When DPx5 is used.

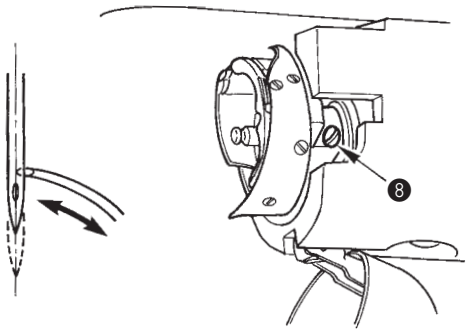


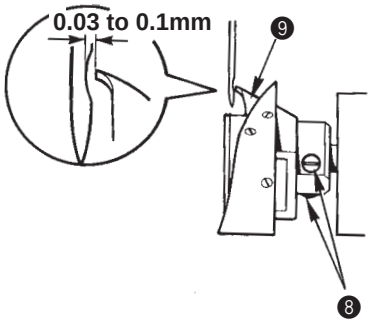
When DPx17 #18 to #25 is used.



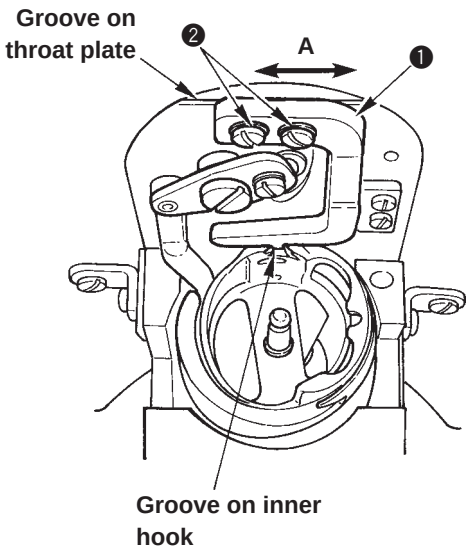
When DPx17 #26 is used.

8) Clearance between the needle and the hook





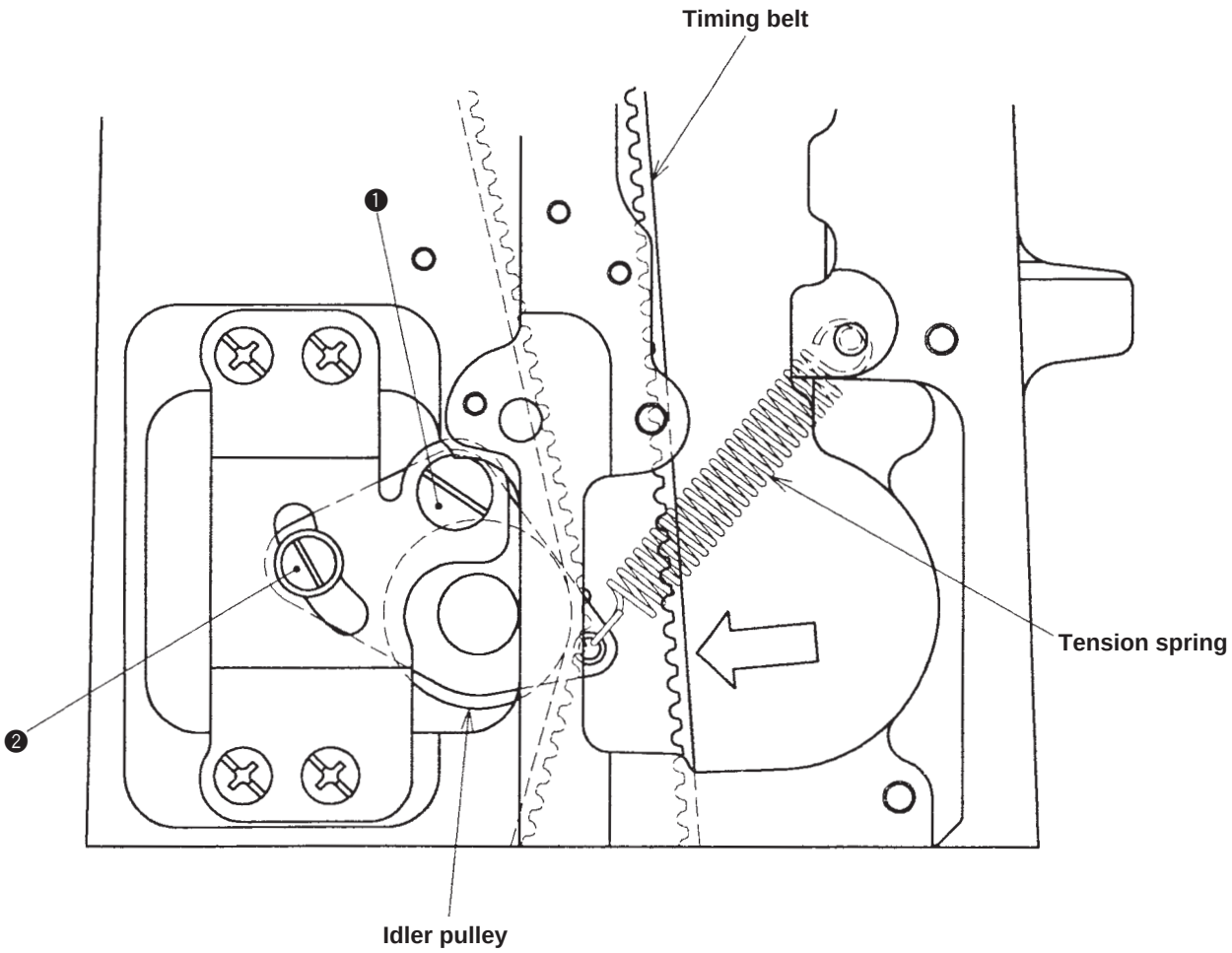
9) Inner hook stopper



Adjustment Procedures	Results of Improper Adjustment
Turn the handwheel by hand in the direction of normal rotation. When needle bar ❺ has gone up, adjust so that lower marker line ❻ engraved on the needle bar aligns with the bottom end of the needle bar bushing ❼, lower.	
① Loosen setscrew ❽ and move the hook to adjust so that the blade point of the hook is aligned with the center of the needle. ② Turn the handwheel and loosen setscrew ❽ to adjust so that the clearance of 0.03 to 0.1 mm is provided between the needle and blade point ❾ of the hook when the blade point of the hook is aligned with the center of the needle. **Caution : Turn the needle guard section of the inner hook to the lower side so that the inner hook does not come in contact with the needle.**	
① Fit the projection at the top end of inner hook stopper ❶ to the groove on the inner hook, and install setscrews ❷. ② There is a slight play between inner hook stopper ❶ and setscrews ❷ in the direction of arrow mark A (lateral direction). Making the projection of inner hook stopper ❶ come in contact with the groove on the throat plate, fix the inner hook stopper with setscrews ❷ so that the setscrews are positioned approximately in the center of the play.	

10) Timing belt tension

◎ The timing belt tension is determined by the tension spring.
(Standard belt tension : 147 to 166 N)



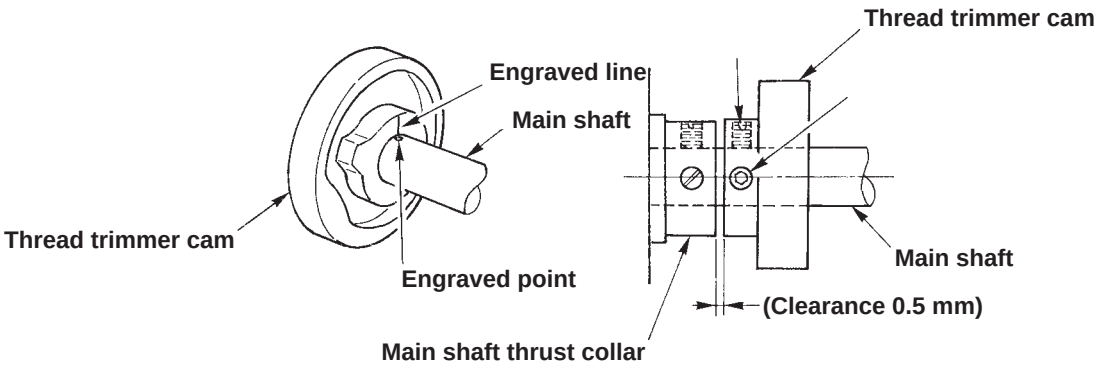
Adjustment Procedures	Results of Improper Adjustment
① When loosening the timing belt, loosen setscrews ❶ and ❷, press the belt in the direction of arrow mark ⇦, tighten setscrew ❶ in the state that the belt is slack, and fix with setscrew ❷. ② When stretching the timing belt, loosen setscrews ❶ and ❷, press the belt in the direction of arrow mark, tighten setscrew ❶ in the state that the belt is slowly returned, and fix with setscrew ❷.	○ If the timing belt tension is excessively low, the belt runs roughly and the noise will be caused. ○ If the timing belt tension is excessively high, wear of main shaft or hook driving shaft will be caused. ○ Note that the time to loosen and stretch again the timing belt is within two hours. If the belt is left in the state of being loosened for a long time, the belt absorbs moisture and the belt tension is deteriorated. So, be careful.

(5) Adjustment of the thread trimmer mechanism components

Standard Adjustment

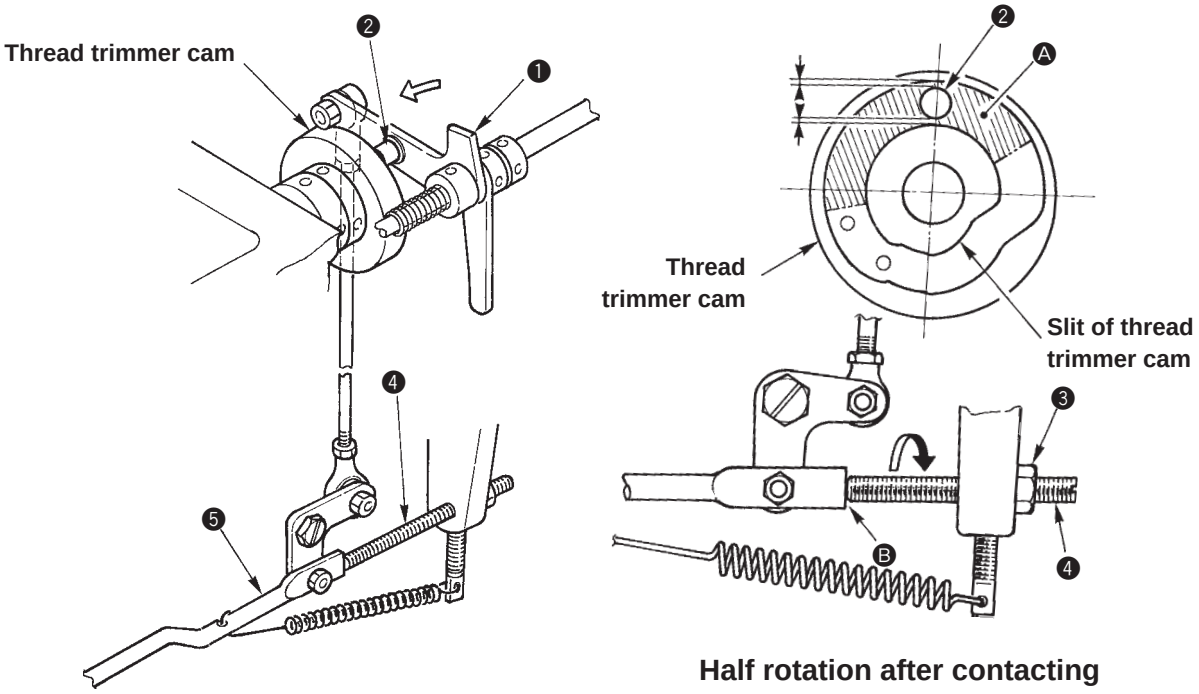
1) Adjusting the thread trimmer cam

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

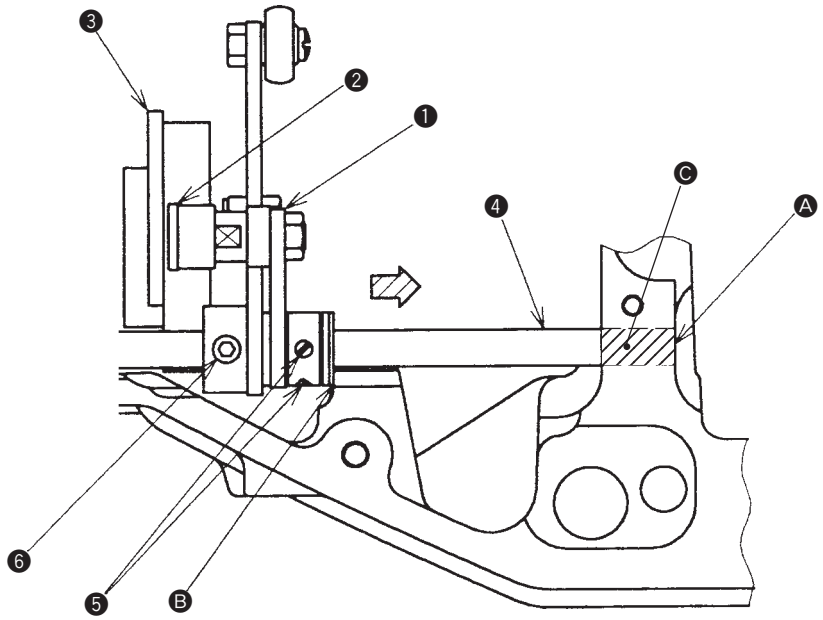
Make sure that thread trimmer roller ❷ has a clearance against the both end faces of the slit of the thread trimmer cam and smoothly enters the slit when pushing cam installing link ❶ in the direction of arrow (⇦) in the running section (in the range of Ⓐ) of the thread trimmer cam.



Adjustment Procedures	Results of Improper Adjustment
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. 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.	○ 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 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 ❷ entered 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 to 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.**

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.).

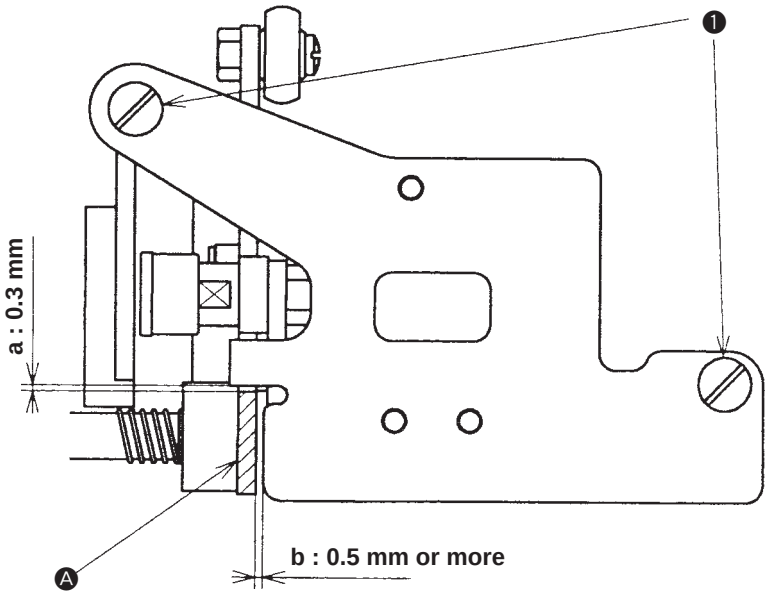


4) Position of the cam installing link stopper

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

a : 0.3 mm

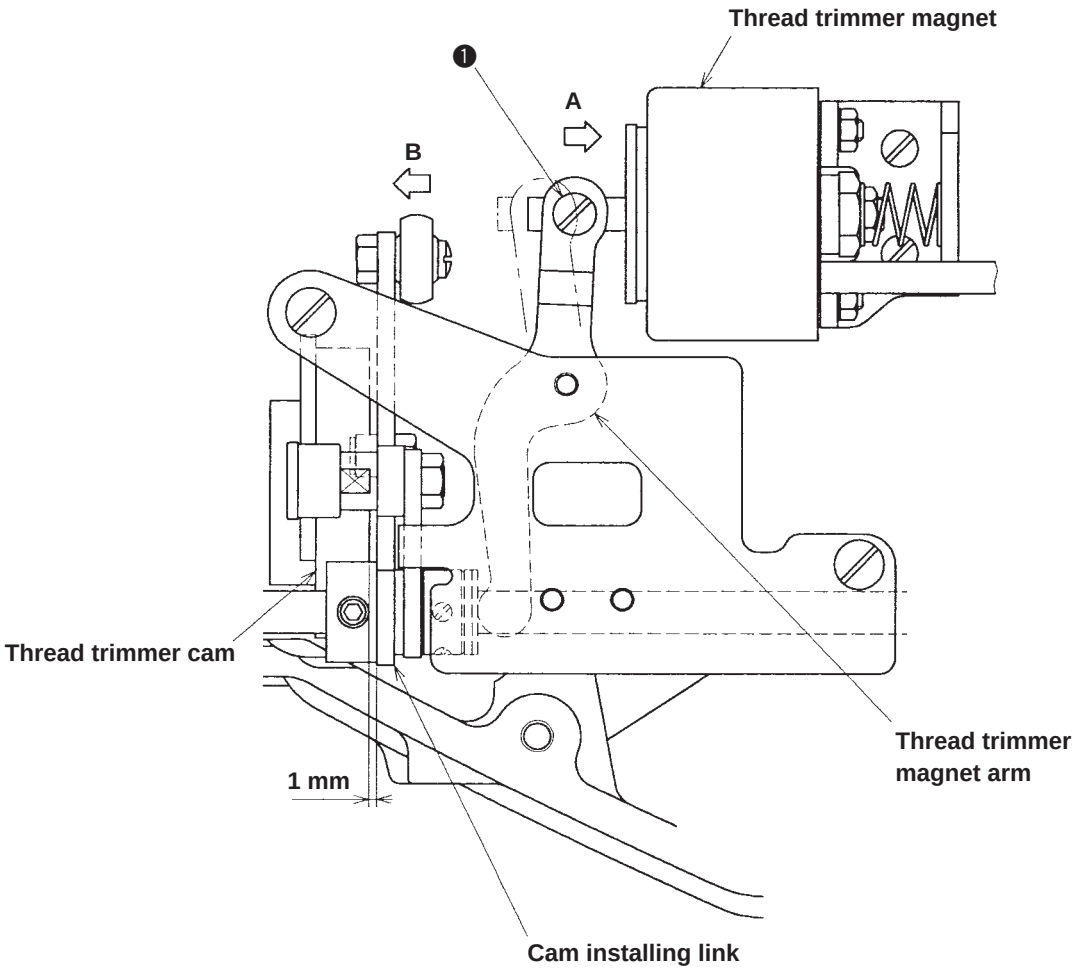
b : 0.5 mm or more



Adjustment Procedures	Results of Improper Adjustment
① Loosen setscrew ❻ in the cam installing link. (The thread trimmer shaft is possible to rotate.) Loosen two setscrews ❺ in the tension release arm thrust collar. ② 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. ③ 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. ○ If a play occurs, it will lead to the defective disk floating.
In the state that the thread trimmer is separated, loosn two setscrews ❶ in the cam installing link stopper, and adjust the respective clearances. Then tighten setscrews ❶.	○ Sewing machine lock or thread trimmer failure will occur.

5) Position of the thread trimmer magnet arm

Turn the main shaft to the running section of the thread trimmer cam (refer to “(2) Adjusting the thread trimmer link stopper screw”) and move the thread trimmer magnet in the direction of arrow A. Then the cam installing link moves in the direction of B.
At this time, a clearance of 1 mm is provided between the roller attaching face of the cam installing link and the cam face of the thread trimmer cam.



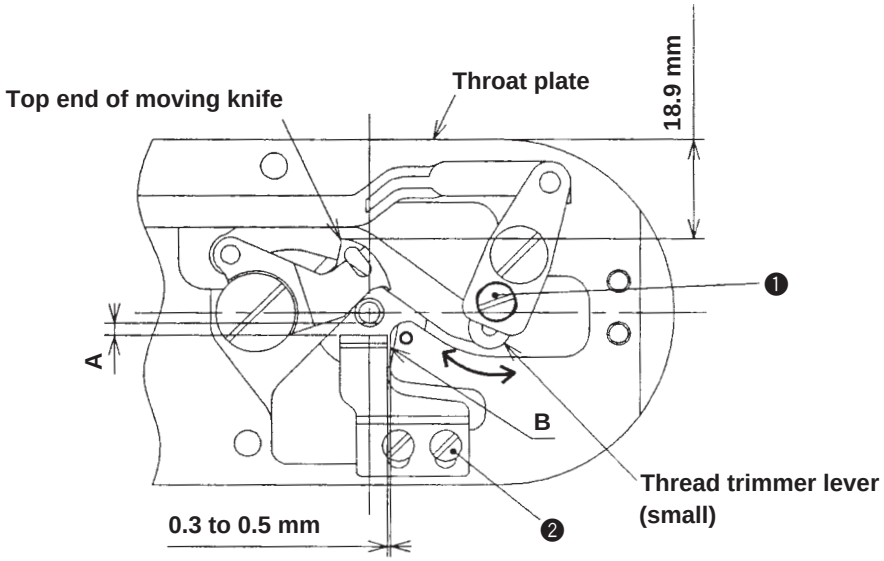
Adjustment Procedures	Results of Improper Adjustment
Loosen adjusting screw ❶ in the thread trimmer magnet and adjust the position of the thread trimmer arm so that a clearance of 1 mm is provided between the cam face of the thread trimmer cam and the roller attaching face of the cam installing link. Then tighten screw ❶.	○ Thread trimmer roller enters 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) Installing position of the moving anf counter knives (For H and G types)

Position of the moving knife : The distance from the end face on the throat plate side to the top end of the moving knife is 18.9 mm when the moving knife travels to the extreme front.
Position of the counter knife : Clearance A provided between the flat work section of the needle hole guide and the counter knife is :

H type : 0.8 to 1.0 mm
G type : 1.4 to 1.6 mm

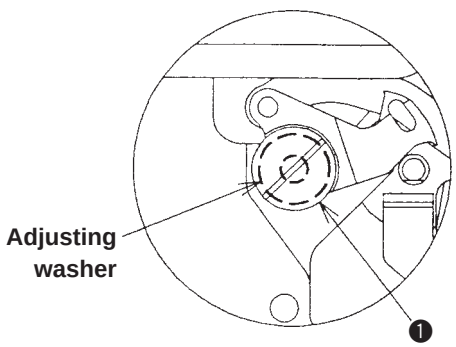
And, the clearance provided between work section B of the throat plate and the counter knife is 0.3 to 0.5 mm.

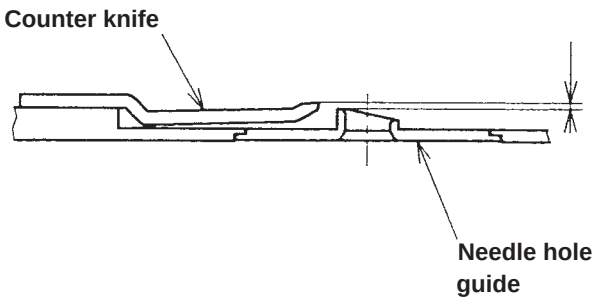


7) Height of the moving and counter knives (For H and G types)

Height of the moving knife : Height of the moving knife is set by the adjusting washer.
Adjust the height when thread is changed and sharpness of the knife is deteriorated.
Height of the counter knife : Level difference A between the counter knife and the needle hole guide is :

H type : 0.25 to 0.35 mm
G type : 0.50 to 0.60 mm

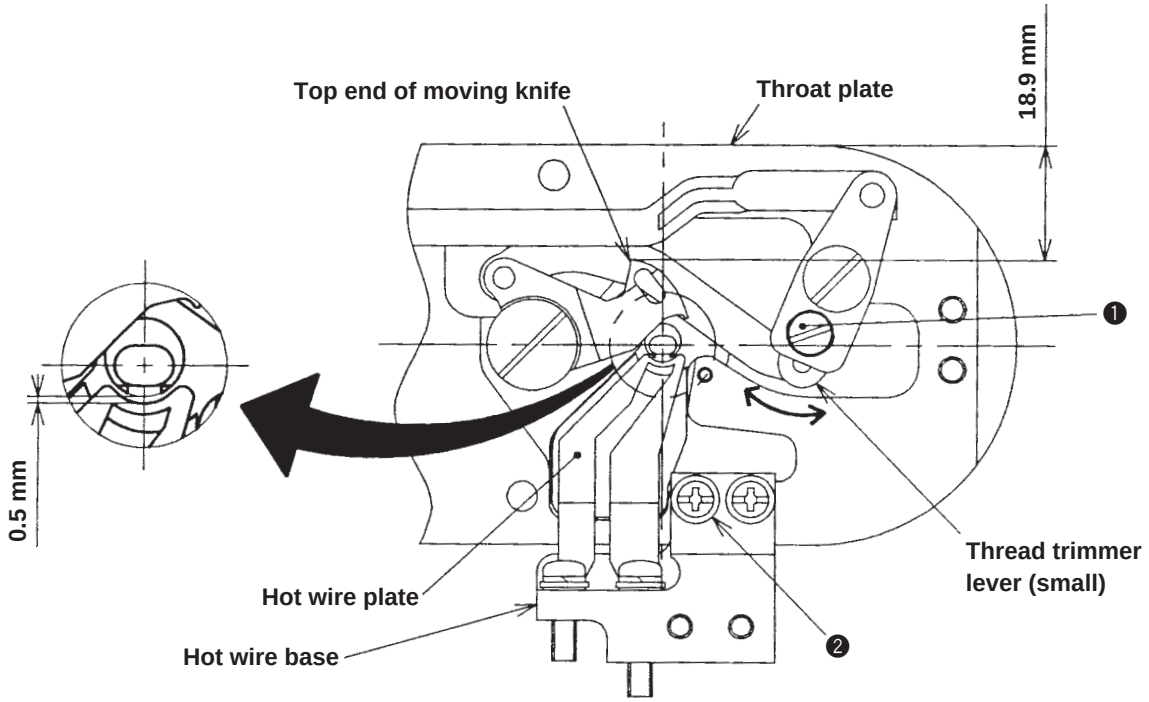




Adjustment Procedures	Results of Improper Adjustment
◎ Adjusting the moving knife ① Fit the cam installing link to the thread trimmer cam, turn the hand pulley in the normal rotating direction, rotate the main shaft, and make the moving knife travel to its extreme front. ② Loosen setscrew ❶ and move the thread trimmer lever (small) in the direction of the arrow mark to adjust the knife.	○ Thread spreading failure or thread trimming failure will be caused.
◎ Adjusting the counter knife ① Loosen setscrews ❷ to adjust the counter knife.	○ If clearance A is smaller than the specified value, length of the remaining thread under the cloth is shortened. ○ If clearance A is larger than the specified value, length of the remaining thread under the cloth is lengthened.
◎ Adjusting the height of the moving knife ① Remove setscrew ❶ and replace the adjusting washer. [Kinds of adjusting washer] Part No. / Name of part / Thickness B242328000A / Moving knife washer / 0.4 mm B242328000B / Moving knife washer / 0.5 mm B242328000C / Moving knife washer / 0.6 mm B242328000D / Moving knife washer / 0.7 mm When decreasing the thickness, blade pressure is increased. When increasing the thickness, blade pressure is decreased.	○ If the blade pressure is increased, malfunction will be caused. ○ If the blade pressure is decreased, thread trimming failure will be cused.
◎ Adjusting the height of the counter knife ① Correct the counter knife to adjust the height.	○ If the level difference is increased, malfunction or short thread trimming of needle thread will be caused. ○ If the level difference is decreased, thread trimming failure will be caused.

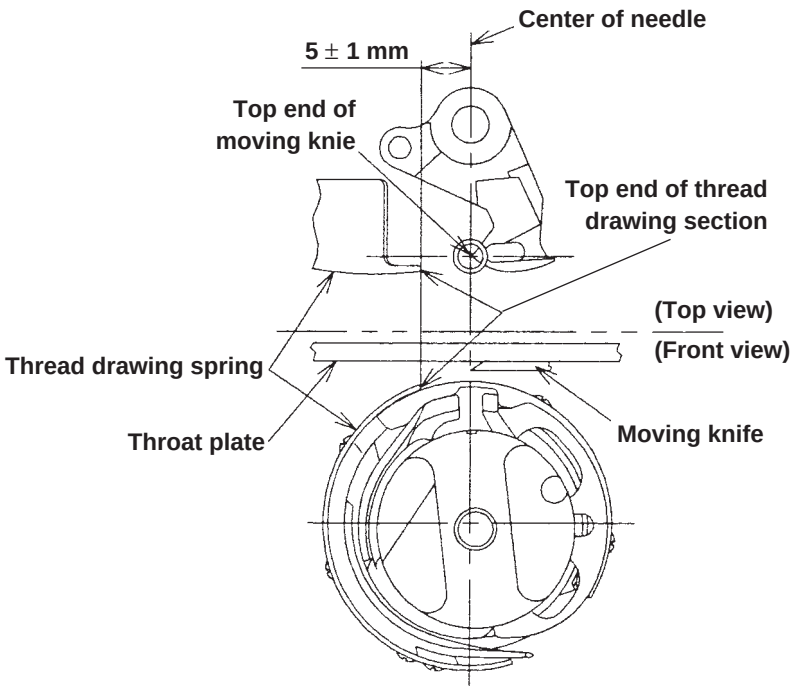
8) Position of the moving knife and the hot wire plate (For Z type)

Position of the moving knife : The distance from the end face of the throat plate side to the top end of the moving knife is 18.9 mm when the moving knife travels to its extreme front.
Position of the counter knife : Clearance provided between the periphery of the needle hole guide and the top end of the hot wire plate is 0.5 mm.



9) Contirmation of operating timing of the moving knife

∗ Confirm as the reference of the standard adjustment value.

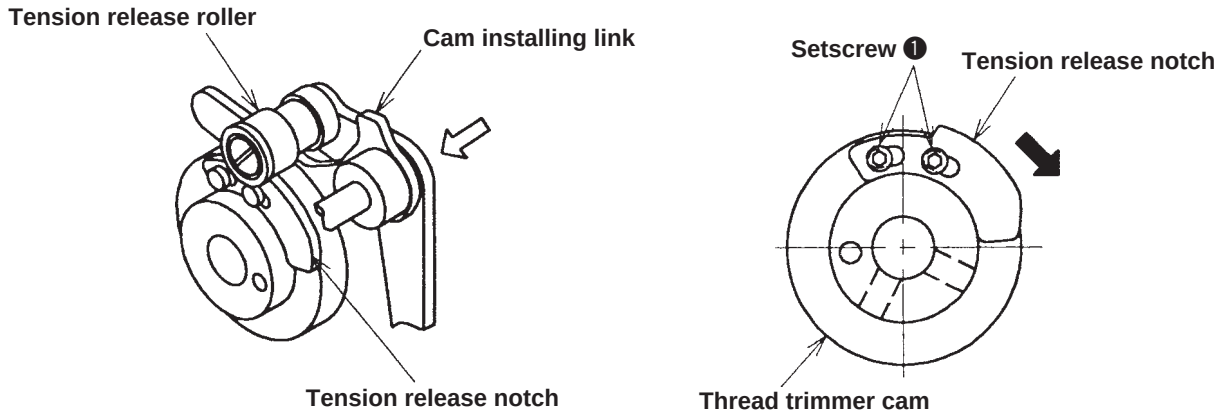


Adjustment Procedures	Results of Improper Adjustment
◎ Adjusting the moving knife ① Remove the machine arm, fit the cam installing link to the thread trimmer cam, turn the hand pulley in the normal rotating direction, rotate the main shaft, and make the moving knife travel to its extreme front. ② Loosen setscrew ❶, and move the thread trimmer lever (small) in the direction of the arrow mark to adjust the knife.	○ Thread spreading failure or thread trimming failure will be caused. ○ If the adjustment value is larger than the specified one, length of the remaining needle thread may be excessively shortened.
◎ Adjusting the hot wire plate ① Loosen setscrew ❷ and move the hot wire base to adjust the plate. ② After adjusting the clearance, check with the tester or the like that there is no electric continuity between the hot wire plate and the needle hole guide, and between the hot wire plate and the throat plate. ③ Adjust the tightening torque of setscrews ❷ to 0.98 to 1.47 N•m (10 to 15 kgf•cm).	○ If the clearance is smaller than the specified value, length of the remaining thread under the cloth is shortened. ○ If the clearance is larger than the specified value, thread does not come in contact with the hot wire plate and the thread trimming failure will be caused. ○ If there is the electric continuity, heating of the hot wire plate is insufficient and the thread trimming failure will be caused.
The operating timing of the moving knife is as described below when performing the hook adjustment, adjusting the position of the thread trimmer cam, and standard adjustment of the aforementioned 6) and 8). ① The top end of the moving knife is positioned nearly to the center of needle when rotating the main shaft with the hand pulley in the normal rotating direction and the top end of the thread drawing section of the thread drawing spring of the lubrication hook (extreme periphery of the hook) is 5 ± 1 mm from the center of needle. ② When the top end of the moving knife is not positioned as shown in the fugure on the left, perform again hook adjustment, adjusting the position of the thread trimmer cam and the position of the moving knife.	○ Thread spreading failure or thread trimming failure will be caused.

(6) Adjustment of the tension release components

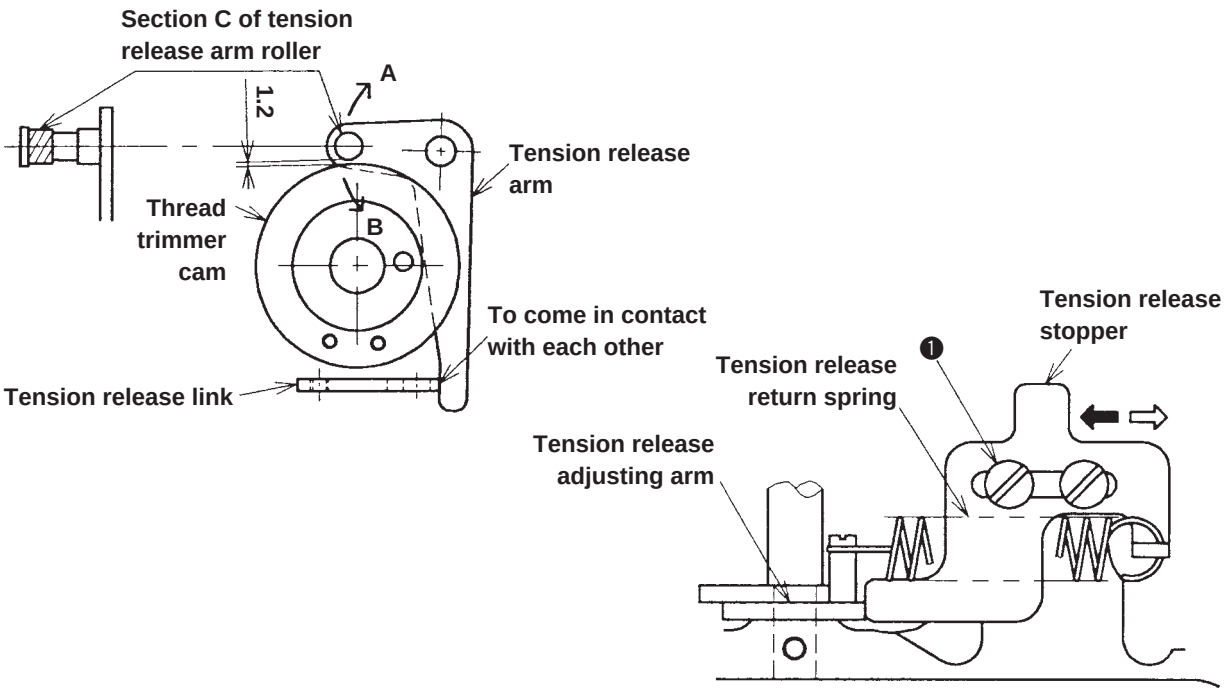
Standard Adjustment

1) Installing position of the tension release notch



2) Position of the tension release stopper

Adjust the clearance provided between the periphery of thread trimmer cam and section C of the tension release arm roller to 1.2 mm when the tension release arm is drawn in the direction of A (state that the tension release arm and the tension release link come in contact with each other) in the state that the cam installing link is separated from the thread trimmer cam.

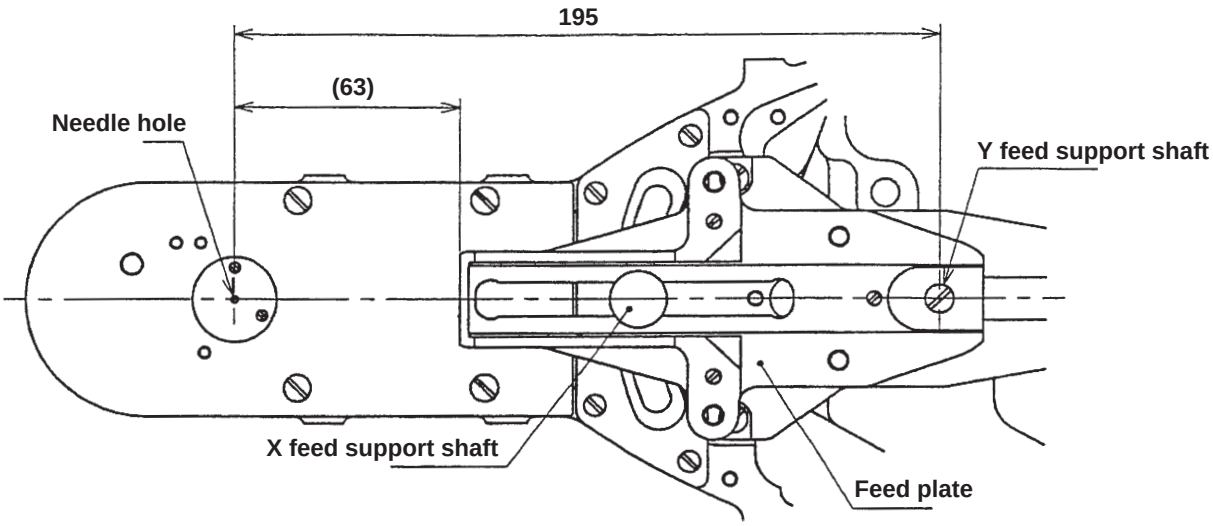


Adjustment Procedures	Results of Improper Adjustment
① Loosen two setscrews ❶ in the tension release notch, and move the tension release notch up to the maximum in the normal rotating direction (➡) of the main shaft. Then securely tighten two setscrews ❶ to fix it. ② After the adjustment, pushing the cam installing link in the direction of arrow mark (⇦) by hand, rotate the main shaft in the normal direction (➡), and ride the tension release roller on the tension release notch. After that, let go from the cam installing link, and make the main shaft rotate in the normal direction. Make sure that the tension release roller separates from the tension release notch after 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 Remove the tension release return spring. ② Loosen two setscrews ❶ and when the thread tension release stopper with the tension release adjusting arm closely contacted is moved in the direction of arrow mark ⇨, the clearance is decreased, and it is moved in the direction of the arrow mark ⇦, the clearance is increased. ③ Adjust the clearance to 1.2 mm, tighten setscrews ❶, and hook the tension release return spring. ④ After the adjustment, the tension release arm slightly comes down by its own weight in the direction of B. Move the tension release arm in the direction of A or B and make sure that there is a play. **Note) After adjusting the position of the tension release stopper, be sure to check the floating amount of the thread tension disk. (For the adjusting procedure, refer to the Instruction Manual.)**	○ If the clearance is excessive, when adjusting the disk floating amount to rather excessive, the disk cannot 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.

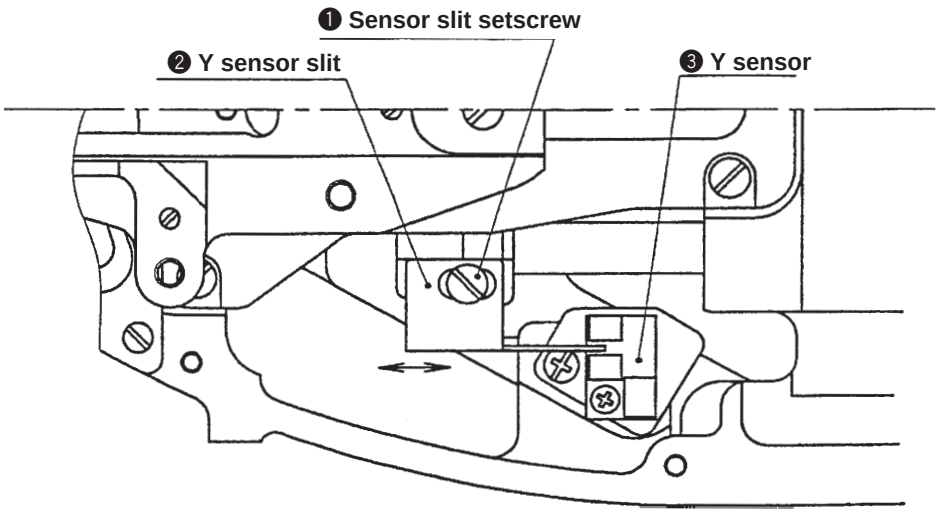
(7) Adjusting the sensor components

Standard Adjustment

1) Mechanical origin

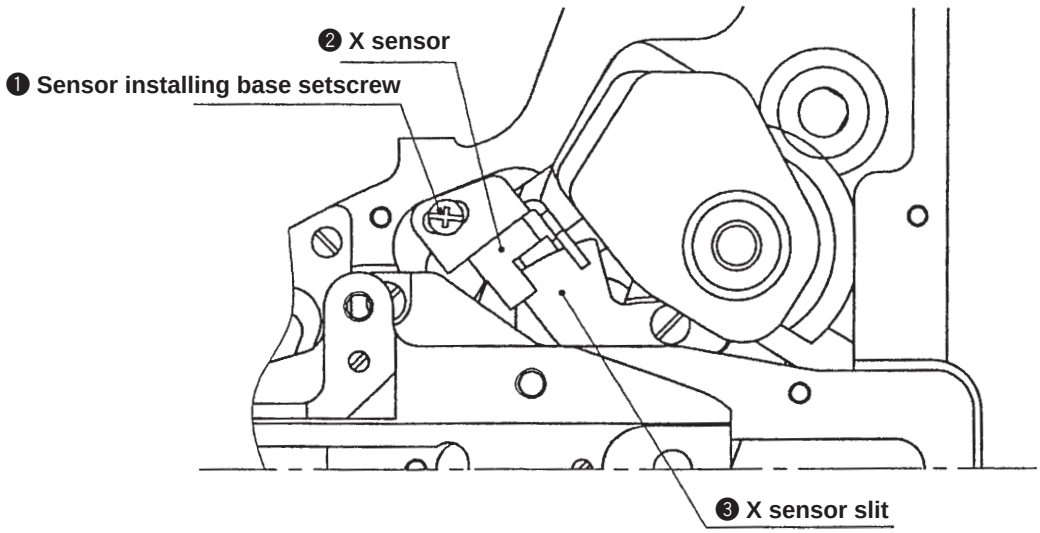


2) Adjusting the Y origin sensor



Adjustment Procedures	Results of Improper Adjustment
Mechanical origin is as shown in the figure on the left side. In the lateral direction, the center of needle hole, the center of X feed support shaft and the center of Y feed support shaft become a straight line. Fit the point by adjusting 2) Y origin sensor and 3) X origin sensor.	○ Maximum area cannot be secured. ○ Distortion of stitching shape will occur.
① Select Test mode No.2, origin retrieval. ② Every time depressing the pedal, the origin is retrieved. Loosen ❶ sensor slit setscrew and shift the position of ❷ Y sensor slit to set the feed plate to the position of origin. **Caution : After the adjustment, make sure that Y sensor slit ❷ does not interfere with Y sensor ❸.**	

3) Adjusting the X origin sensor

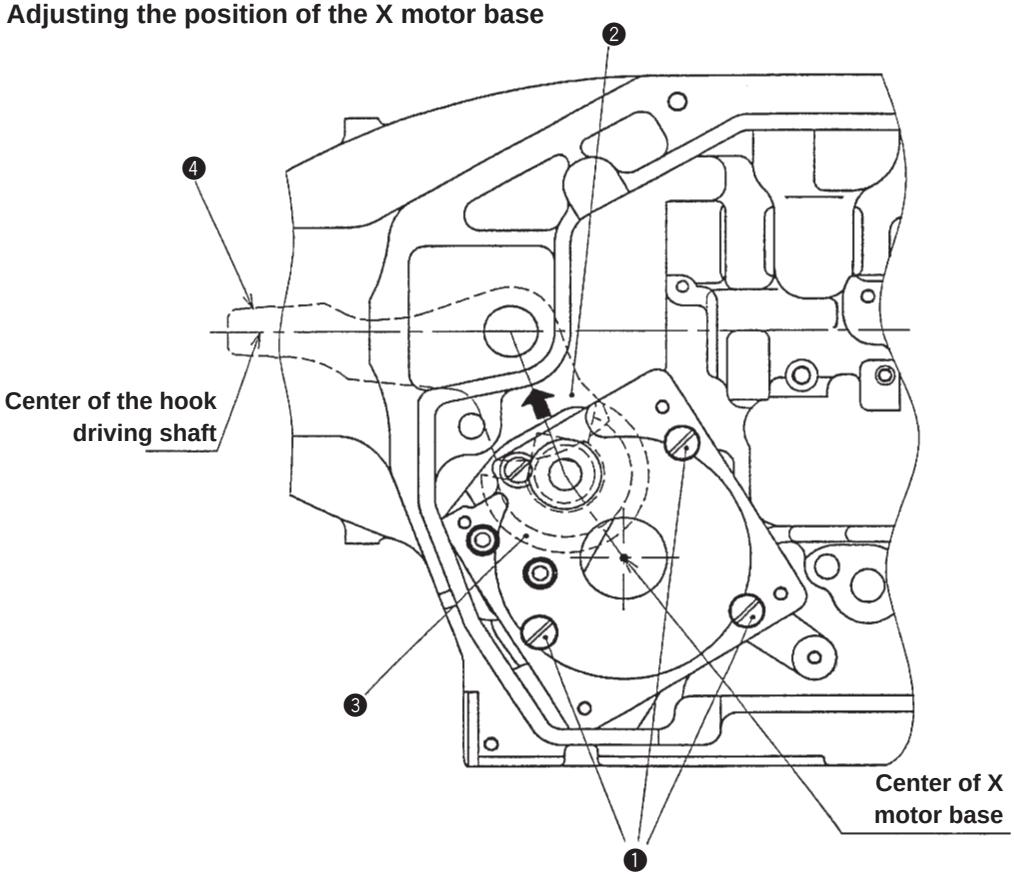


Adjustment Procedures	Results of Improper Adjustment
① Select Test mode No.2, origin retrieval. ② Every time depressing the pedal, the origin is retrieved. Loosen sensor installing base setscrew ❶ and shift the position of X sensor ❷ to set the feed plate to the position of origin. **Caution : After the adjustment, make sure that X sensor slit ❸ does not interfere with X sensor ❷.**	

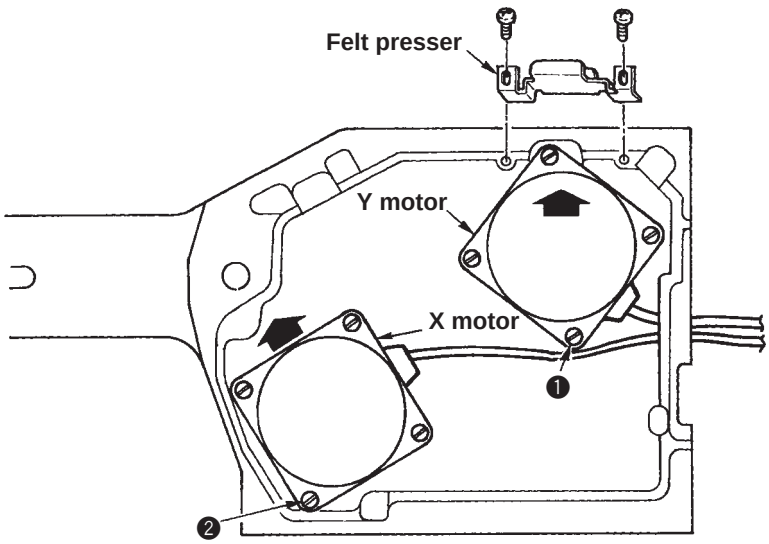
(8) Adjustment of the feed mechanism components

Standard Adjustment

1) Adjusting the position of the X motor base

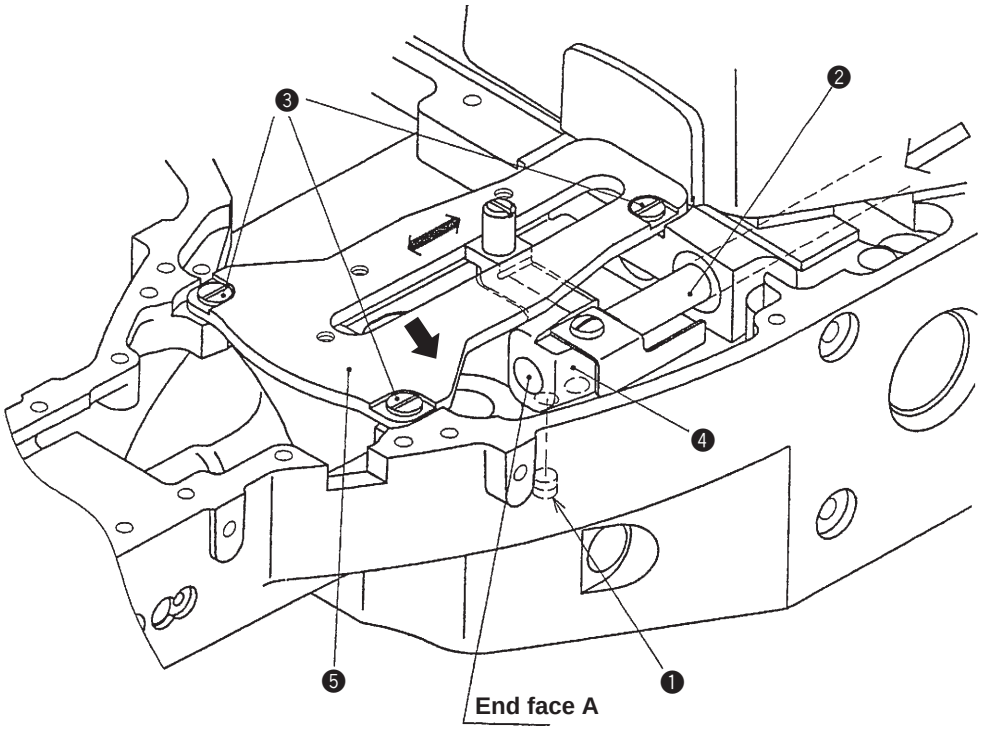


2) Adjusting the positions of the X motor and the Y motor (adjusting the backlash of the driving gear)



Adjustment Procedures	Results of Improper Adjustment
Loosen three setscrews ❶, lightly push the X motor base in the direction of arrow (➡), and tighten again setscrews ❶. **Caution : When removing setscrews ❶ and the X motor base, the position of engagement of X feed arm gear section ❷ and motor base gear section ❸ is shifted. When the position is shifted, install the X motor base so that motor base gear section ❸ is placed almost in the center of the X motor base when X feed arm ❹ is aligned with the center of the hook driving shaft.**	○ 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 position of the engagement of gear is shifted, maximum area cannot be secured.
① Remove the felt presser, and loosen four setscrews ❶. Lightly push the Y motor in the direction of arrow (➡), and tighten setscrews ❶. ② Loosen four setscrews ❷, and lightly push the X motor in the direction of arrow (➡). Then 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.

3) Installing the feed plate support plate



4) Installing the feed plate

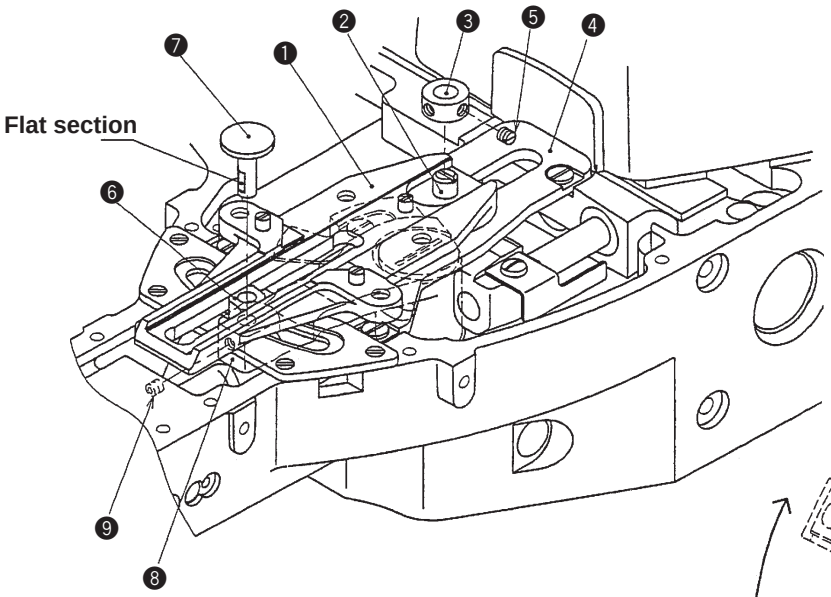
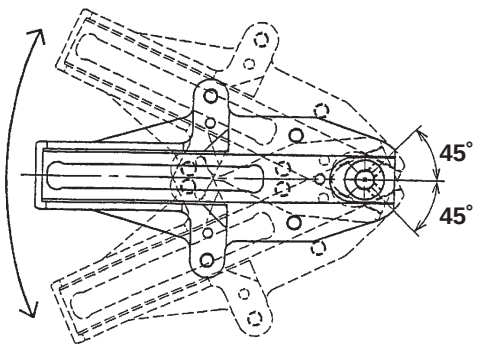
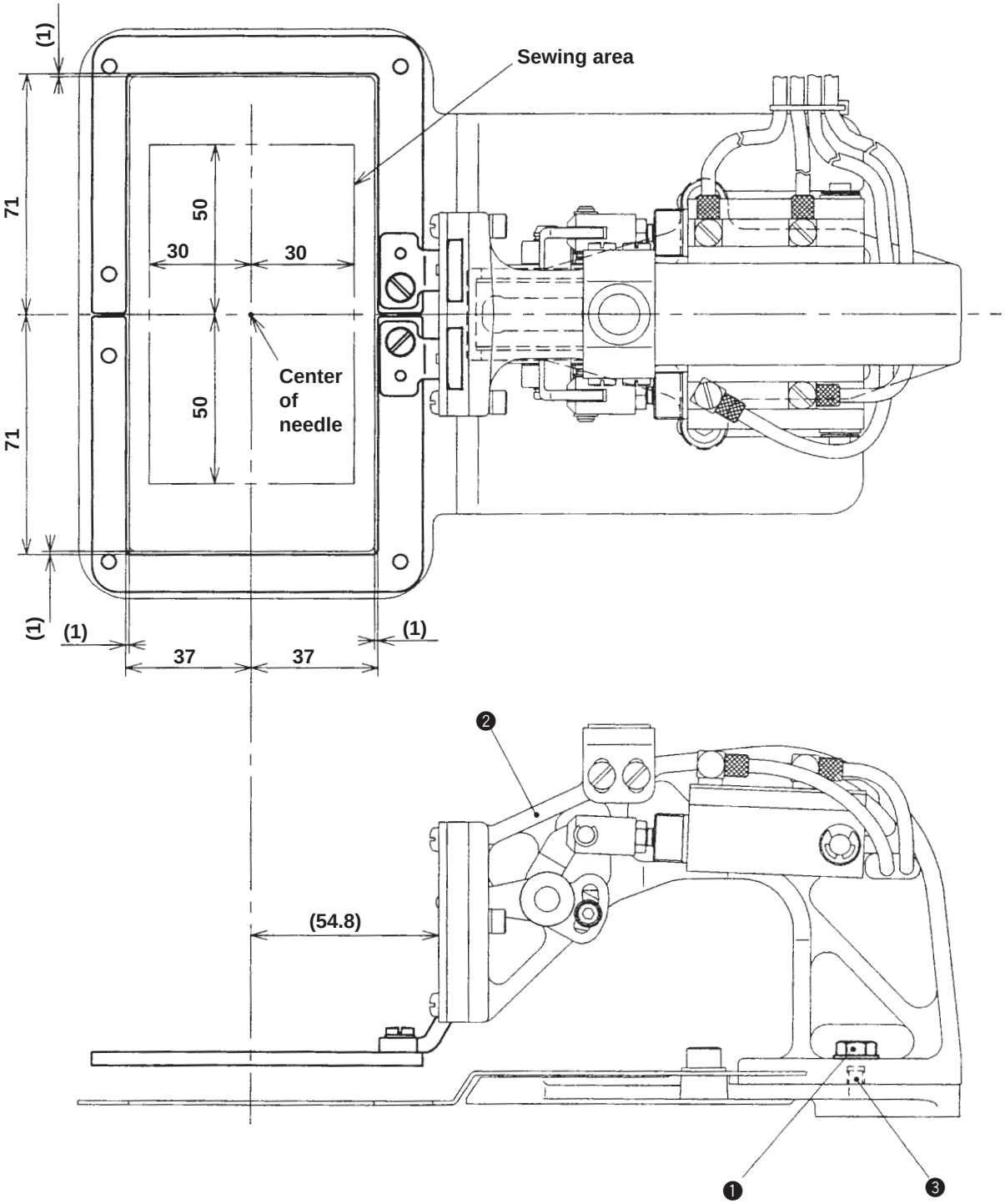


Fig. 1



Adjustment Procedures	Results of Improper Adjustment
① Loosen two Y feed arm setscrews ❶. ② Push Y feed shaft ❷ in the direction of arrow (⇦). ③ Loosen three setscrews ❸ in the feed plate support plate, and press the feed plate support plate in the ➡ direction. Moving Y feed arm ❹ in the ⇦➡ direction making Y feed shaft ❷ as a guide, fix feed plate support plate ❺ to the position where there is no torque. ④ Align Y feed shaft ❷ with end face A of Y feed arm ❹ and securely tighten Y feed arm setscrews ❶.	○ The load of the feed will become large, causing the failure of the feed.
① Insert feed plate ❶ into Y feed support shaft ❷. ② Enter thrust collar ❸ to Y feed support shaft ❷, push feed plate ❶ to feed plate support plate ❹, and remove the thrust. Then tighten two setscrews ❺. **Caution : When tightening setscrews ❺, move feed plate ❶ in the direction of arrow and tighten the setscrews so that the position of the setscrews becomes as shown in Fig. 1.** ③ Place square block ❻ in the slot portion of feed plate ❶ and insert X feed support shaft ❼ into X feed arm ❽. **Note) Adjust the flat section to the position of the screw.** ④ Pushing feed plate ❶ to feed plate support plate ❹ and lightly pushing the flange section of X feed support shaft ❼ to feed plate ❶, tighten setscrew ❾.	○ The load of the feed will become large, causing the failure of the feed or noise.

5) Installing the feed bracket

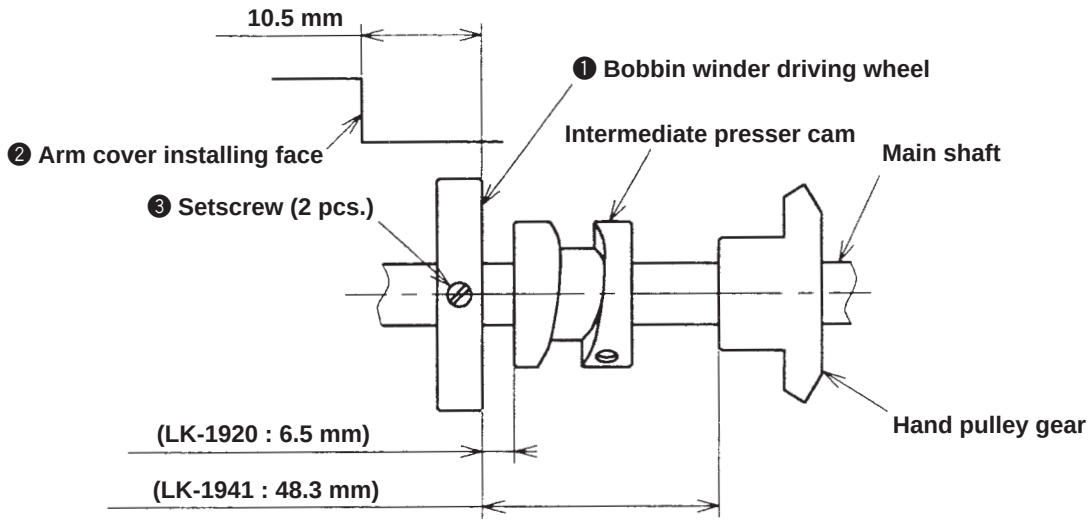


Adjustment Procedures	Results of Improper Adjustment
① Select the test mode No. 2, origin retrieval, and depress the pedal to perform the origin retrieval. ② Tighten two setscrews ❶ and install feed bracket ❷. **Note) When installing, place feed plate pin ❸ in the hole of feed bracket ❷.**	If the installing dimension is not proper, maximum sewing area cannot be secured.

(9) Adjusting the bobbin thread winder components

Standard Adjustment

1) Position of the bobbin winder driving wheel

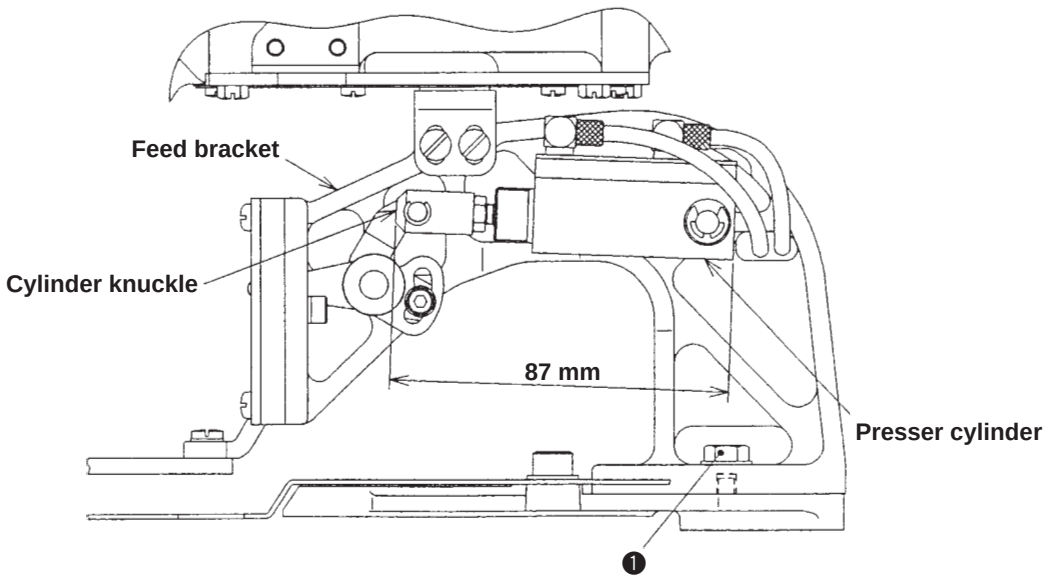


(10) Adjusting the presser components

Standard Adjustment

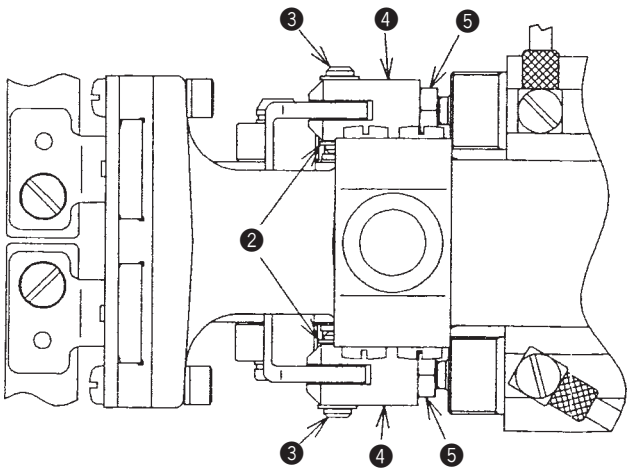
1) Adjusting the presser cylinder knuckle

○ When the presser goes up (when the cylinder shrinks to the utmost.), adjust the length from the rear end of the presser cylinder to the front end of the cylinder knuckle to 87 mm.



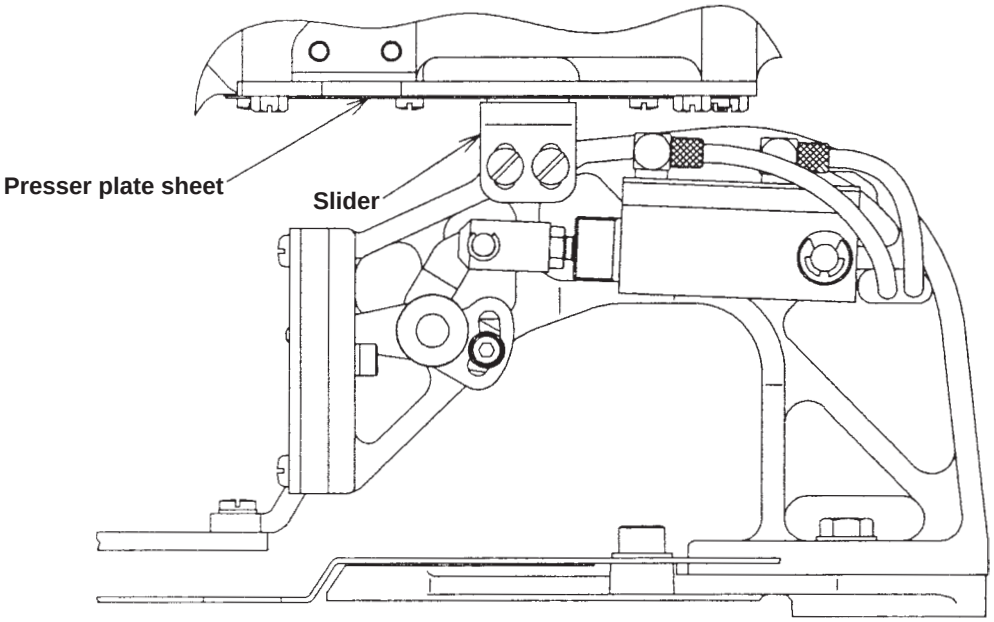
Adjustment Procedures	Results of Improper Adjustment
Loosen setscrews ❸, adjust the position of bobbin winder driving wheel ❶ so that the clearance provided between bobbin winder driving wheel ❶ and arm cover installing face ❷ should be 10.5 mm, and tighten again setscrews ❸.	○ If the clearance is small, 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.

Adjustment Procedures	Results of Improper Adjustment
① Loosen two setscrews ❶ and remove the feed bracket. ② Remove E ring ❷ and remove knuckle pin ❸. ③ Loosen nut ❹ and turn cylinder knuckle ❺ to adjust. ④ After the adjustment, tighten nut ❹, place knuckle pin ❸ and attach E ring ❷. ⑤ Install the feed bracket. (For installing, refer to the item (8) - 5) Installing the feed bracket.)	○ If the adjustment of the cylinder is not correct, the failure of presser lifting or contact of components will occur.



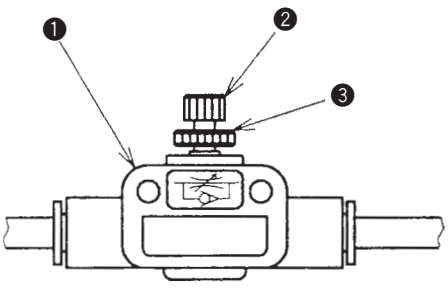
2) Height of the slider

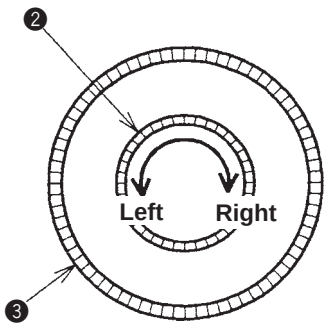
◎ Closely attach the top end of the slider to the presser plate sheet.

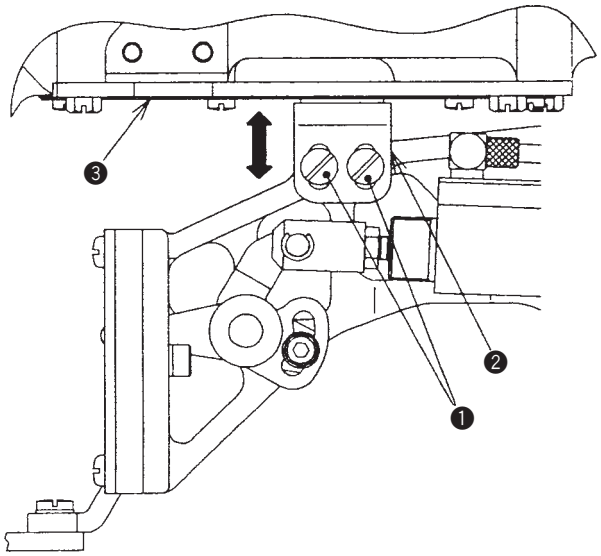


3) Adjusting the speed controller

◎ Lowering speed of the presser can be properly adjusted.
◎ Lowering speed of the left and right of 2-step presser can be adjusted to the same.





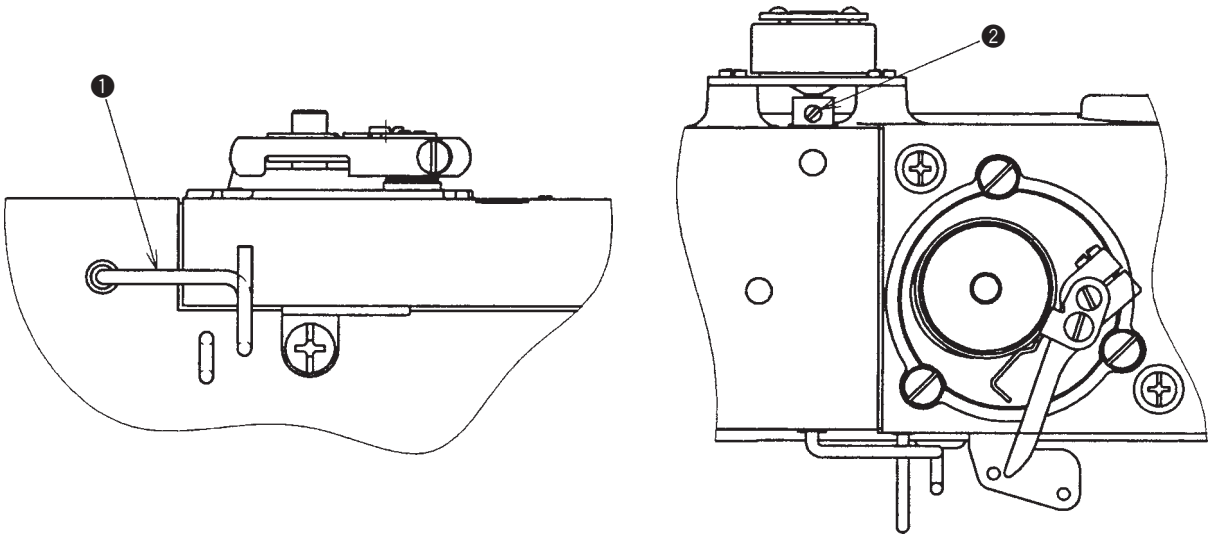
Adjustment Procedures	Results of Improper Adjustment
Adjust the height of slider ❷ using four setscrews ❶. To position the height, lightly press the slider to presser plate sheet ❸ when the presser goes up  	○ If the height of the slider is incorrect, malfunction of the feed will occur.
① Loosen nut ❸ of speed controller ❶ located on the way of the air tube of the feed bracket, and turn knob ❷ counterclockwise once until it goes to the end. ② Turn knob ❷ clockwise four times, and tighten nut ❸. ○ To increase the lowering speed of the presser, turn knob ❷ counterclockwise further than the standard adjustment position. ○ To decrease the lowering speed of the presser, turn knob ❷ clockwise further than the standard adjustment position.	○ The lowering speed of the cloth presser becomes too fast or too slow.

(11) Adjustment of the draw-out device components (For G and Z types)

Standard Adjustment

1) Position of the draw-out lever

◎ When the power is turned OFF, draw-out lever ❶ is level.



Adjustment Procedures	Results of Improper Adjustment
Loosen two setscrews ❷ to adjust the position.	○ If the draw-out lever slants, the draw-out amount of needle thread becomes insufficient, and stitch skipping at the start of sewing or the like occurs.

(12) Adjustment of the sewing components

1) List of the replacement components for the respective types

<< Replacement components for LK-1941 and -1942>>

No	Parts \ Type	Part No.		
		H type (Heavy-weight materials)	G type (Extra-heavy-weight materials)	Z type (Extra-heavy-weight materials)
1	Needle	DPx17#18	DPx17#23	DPx17#25,26
2	Needle bar	14432702	←	←
3	Needle bar thread guide	B1406210000	←	←
4	Needle hole guide (Hole diameter)	14439608 (ø3)	14439707 (ø4)	14440002 (Ellipse 3X4.4)
5	Bobbin	14436406	←	←
6	Bobbin case	14436257	←	←
7	Lubricating hook	14436554	14436307	14436158
8	Link type thread take-up lever asm.	14432157	←	←
9	Counterweight	14431902	←	←
10	Moving knife	14440309 (Knife type)	←	14441208 (Hot wire type)
11	Counter knife	14441000	←	14441505 (Hot wire type)
12	Needle clamp screw	SS7080510TP	←	←
13	Inner hook stopper	14436604	←	←
14	Feeding frame (Pneumatic type)	B2554210D00	←	←
15	Feed plate	14218002	←	←
16	Thread tension No. 2 asm.	B23022050AA	14438659	←
17	Auxiliary thread tension asm.	Not provided.	14438568	←

2) Kinds and application of the hook

There are four kinds of hooks for LK-1940 Series. It is necessary to use the hook properly in accordance with the needle size and sewing conditions.

Use a suitable hook referring to "Correspondence table of needle size" and "Correspondence table of sewing conditions" described below.

In addition, the needle sticking (needle stuck into needle thread or needle stuck into bobbin thread) occurs due to the kind of thread or stitching direction. Then "hangnail", "thread breakage", or "stitch skipping", may occur. In this case, such problem can be solved by making the needle tip round as an emergency measure. However, when replacing the needle with the ball-point one, refer to the table below since the needle guard amount may be changed.

[Correspondence table of needle size]

(Symbols, H, G, and Z in the table denote the combination of the types at the time of delivery.)

ORGAN needle (standard needle point)

Needle size / Kind of hook	#18	#19	#20	#21	#22	#23	#24	#25	#26
Lubricating hook A (14436554)	H ○	○	○						
Lubricating hook B (14436703)			●	○	○	○			
Lubricating hook C (14436307)			●	○	○	G ○			
Lubricating hook D (14436158)					●	●	○	Z Domestic ○	Z Export ●

ORGAN needle (ball-point)

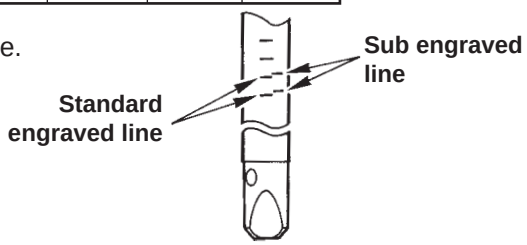
Needle size / Kind of hook	#18	#19	#20	#21	#22	#23	#24	#25
Lubricating hook A (14436554)	○	○	○					
Lubricating hook B (14436703) Lubricating hook C (14436307)			●	○	○	○		
Lubricating hook D (14436158)					●	●	○	○

SCHMETZ needle (standard needle point)

Needle size / Kind of hook	#110 (18)	#120(19)	#125 (20)	#130 (21)	#140 (22)	#160 (23)	#180 (24)	#200 (25)
Lubricating hook A (14436554)	○	○	○	○	○	○		
Lubricating hook B (14436703) Lubricating hook C (14436307)					●	●	●	○
Lubricating hook D (14436158)								●

○ : Perform the hook adjustment with the standard engraved line.

● : Perform the hook adjustment with the sub engraved line.



[Correspondence table of the sewing conditions]

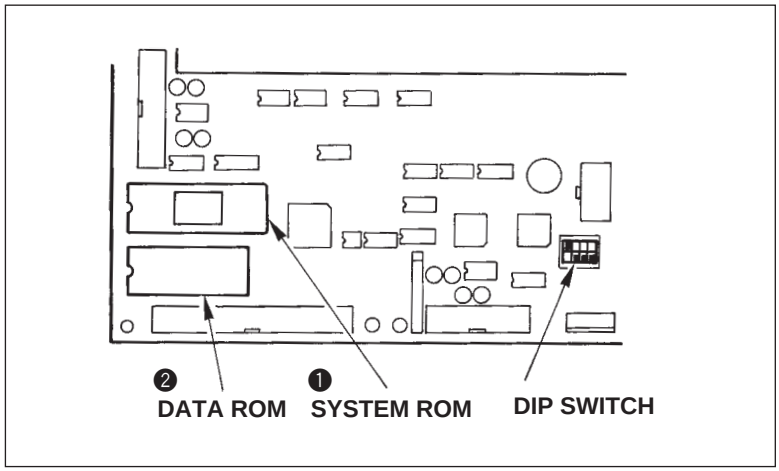
	Feature of hook	Sewing conditions
Lubrication hook A (14436554) Lubrication hook B (14436703)	Thread path presser is long.	When baloon stitches frequently occur due to violent movement of thread at the time of passing the hook in case of thin thread or cotton thread.
Lubrication hook C (14436307) Lubrication hook D (14436158)	Thread path presser is short.	When thick thread is used and thread tightness is required.

Note : The combination of the different kinds of outer and inner hooks can be used under the special sewing conditions.

(Example) Baloon stitch occurs when the lubricating hook D is used under the conditions of ORGAN needle #24 + (plus) cotton thread → Use the outer hook only of lubricating hook A or B.

4. STITCHING PATTERN

(1) Service Pattern



- Five kinds of service patterns (Nos. 51, 52, 53, 54 and 60) are registered in LK-1941/42 beforehand.
- Service patterns are registered in SYSTEM_ROM (005 *) of ❶.
- Patterns in SYSTEM ROM are fixed data and cannot be edited with the input devices (PGM-7 and PGM-20).

(2) Patterns for users

1) ROM for patterns for users (❷ DATA_ROM)
   - No pattern is registered. Create and register the pattern with the input device for use.
   - (The data created with PGM-7 is registered in this ROM as well.)

2) Specifications
   - Available pattern Nos. ... 1 to 99
   - Available number of patterns ... 64 (excluding service patterns)
   - Max. number of stitches ... 10,000 stitches
     - For the pattern No., the number of DATA_ROM is preceded.

     [When the number (51, 52, 53, 54, or 60) is overlapped, the pattern in the DATA ROM is read out.]

3) Input device

   • PGM-7 : Main body input device exclusively used for LK-1941/42

   • PGM -20 : Pattern input device

   ∗ Settings when creating patterns of LK-1941/42 are as follows :

   (For the details, see the Instruction Manual for the input device.)
   - Model setting ... LK-1900
   - Max. sewing area ... X (lateral) direction 100 mm x Y (longitudinal) 60 mm

4) Storage medium

• Standard DATA_ROM (U32)

256k bit EEP-ROM (58C256)

Part No. : HL011940000

• In addition to the standard DATA_ROM, the following ROM is available.

1) DATA ROM of existing AMS-205, 206

64k bit EEP-ROM (58C65)

∗ When using the above ROM, change of DIP switch on MAIN circuit board is required.

SW1-1 : ON 58C256 (Standard ROM set at the time of delivery)

OFF : 58C65 (ROM for AMS-205, -206)

Note) 1. When changing DATA ROM, make sure of setting of SW1-1 on MAIN circuit board. If it is mitaken, correct data cannot be read and the error may occur.
(E-1, E-2, E-8)

2. The standard bar tacking pattern data (30 patterns) of LK-1900 are stored in SYSTEM ROM.
When desiring to use the data, set the memory switch No.3 to "Calling effective" for use.

3. When desiring to use the data of LK-1900 (including button attaching pattern) other than the standard 30 patterns, write the data in the standard DATA ROM by means of the input device (PGM-20).
∗ DATA ROM (EP-ROM, 27C256) of LK-1900 cannot be used as it is.

4. The setting of SW1-1 on MAIN circuit board is "ON" when the pattern data used for AMS-205 or -206 is written in 58C256 for use.
(Set SW1-1 to "OFF" only when using DATA ROM "58C65" by all means.)

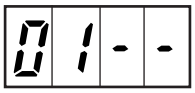
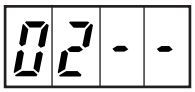
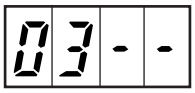
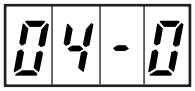
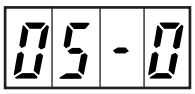
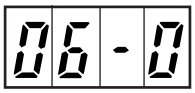
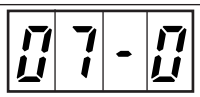
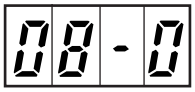
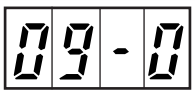
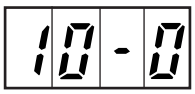
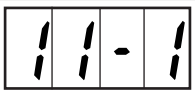
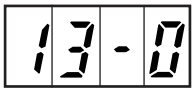
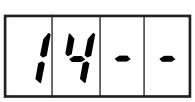
5. MEMORY SWITCH

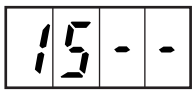
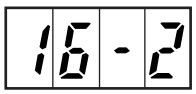
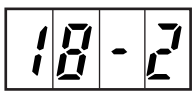
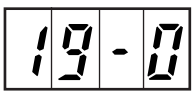
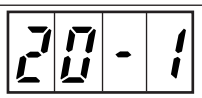
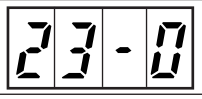
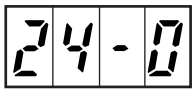
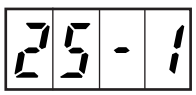
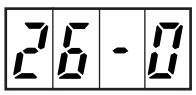
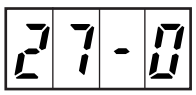
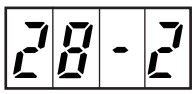
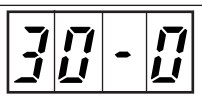
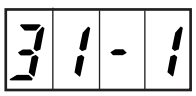
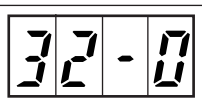
- Purpose of the memory switch

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

  The contents are separated in the user level (U) and the service level (S).

Note : The contents of the memory switches may vary in accordance with the revision of SYSTEM ROM. (The following contents are in case of "005".)

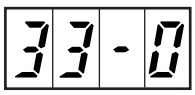
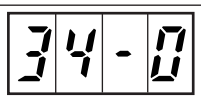
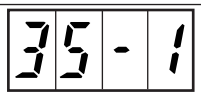
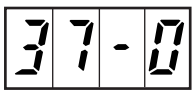
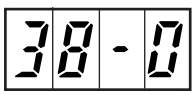
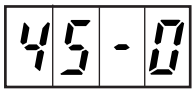
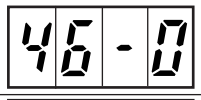
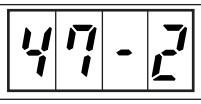
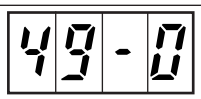
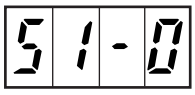
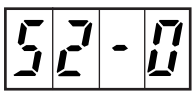
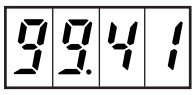
Display	Function	Setting range	State at the time of delivery	Remarks
	Setting of the max. sewing speed limitation (in a unit of 100 rpm)	200 to 2,200 r.p.m.	2,200 rpm	
	Start-up speed of 1st to 5th stitch at sewing start is set in unit of 100 r.p.m.	1st stitch : 200 to 900 2nd stitch : 200 to 2,200 3rd stitch : 200 to 2,200 4th stitch : 200 to 2,200 5th stitch : 200 to 2,200	200 rpm 600 rpm 1,000 rpm 2,200 rpm 2,200 rpm	
	This function sets whether or not the calling of the service pattern data is acceptable.	Pattern Nos. 1 to 64 can be individually set. 0 : Calling not possible 1 : Calling possible	51 : 1 52 : 1 53 : 1 54 : 1 60 : 1	Nos. 1 to 30 mount bar tacking patterns of LK-1900.
	Display of change of pattern No., X/Y scale, max. speed limitation, and heat cutter temperature and whether or not to change these items can be set. (Prevention of maloperation)	0 : OFF 1 : ON (key-lock)	0	
	Setting of the counter operation Production counter : Adding counter Bobbin thread counter : Subtracting counter	0 : Addition 1 : Subtraction	0	
	Needle bar stop position is set. After up-position stop, needle bar rotates reversely and stops in case of needle up stop mode. (The needle top position is high at the time of stop.)	0 : Up-position stop (H and G types : 53˚) (Z type : 40˚) 1 : Needle up stop (22˚)	0	
	This function sets the base point of enlargement/ reduction.	0 : Origin 1 : 2nd origin (sewing start point)	0	
	Whether to execute origin retrieval after completion of sewing is selected. (When sewing with normal pattern No., or P1 to P7)	0 : Ineffective 1 : Effective	0	
	Whether to execute origin retrieval after completion of sewing is selected. (When sewing with combination pattern)	0 : Ineffective 1 : Effective	0	
	This function selects the pedal specifications.	0 : Standard 1-pedal 1 : 2-step pedal 2 : 1-pedal (PK-57) 3 : 3-step pedal (priority to the right) 4 : 3-step pedal (priority to the left) 5 : 3-step pedal (no priority)	0	
	Whether to output wiper is selected.	0 : Ineffective 1 : Effective	1	
	State of feeding frame after completion of sewing (lifting or lowering) is selected.	0 : Lifting 1 : Kept lowered	0	
	Confirmation of contents of total counter (8 digits) (Latter 4 digits and former 4 digits are separately displayed.)	+/Forward : Upper digits are displayed. -/Backward : Lower digits are displayed.	0 (At the time of assembling)	

	Display	Function	Setting range	State at the time of delivery	Remarks
		Travel limit of X-feed or Y-feed is set. (Setting separated in domains of +X, -X, +Y and -Y is possible.)	X : 0 to ± 50 X : 0 to ± 30 (unit : 1 mm)	+X : 50 –X : 50 +X : 30 –X : 30	
		Input of temporary stop switch is selected. (When selecting panel reset, input of temporary stop is performed only during sewing operation.)	0 : Ineffective 1 : Panel reset key 2 : Switch on the machine head	2	
Note 1)		Feed timing is selected. When thread is not well-tightened, set 1 or 0 to increase effect.	0 : 161° Slow 1 : 149° 2 : 137° 3 : 125° Fast	2	Start of feeding is set by the angle of main shaft.
		Selection of control of simultaneous jump feed with thread trimming	0 : Yes 1 : Not defined 2 : Not defined 3 : No	H, G : 3 Z : 0	Control starts when "1" or "2" is set.
		Effective/ineffective of needle thread breakage detection function is selected. (Detected at 8 stitches at sewing start and 3 stitches in midway)	0 : No 1 : Yes 2 : Not adjusted	1	Do not use setting "2".
Note 2)		Selection of effective/ineffective of intermediate presser control	0 : No 1 : Yes	0	LK-1942 only
		Wiper sweeping position is set.	0 : Wiper sweeps above the intermediate presser. 1 : Wiper sweeps below the intermediate presser.	0	LK-1942 only
		Whether to perform air pressure detection is selected.	0 : Ineffective 1 : Effective	1	
		Origin is corrected when using presser of AMS-206.	0 : No correction 1 : Correction is performed.	0	Automatic shift of Y = –12 mm immediately after origin retrieval
		This function selects the basting mode. Pattern sewing data is read to "jump feed" and curved point to "sewing" respectively and the function is actuated.	0 : Normal 1 : Basting	0	Optional tension disk floating solenoid is required at the time of basting. (Memory switch No. 28-1 setting ; H type only)
		Tension disk No. 2 floating function (H type optional), or thread draw-out function (G and Z types) is selected.	0 : Ineffective 1 : Disk floating 2 : Thread draw-out	2	In either function, connect to P59 on MAIN circuit board. (Simultaneous use is not possible.)
		Effective/ineffective of execution of automatic preparation action after turning ON the power is selected.	0 : Ineffective 1 : Effective	0	
Note 3)		This function controls thread tension controller No. 3 and inverting clamp using the inverting pattern.	0 : When using the inverting clamp device 1 : When using the thread tension controller No. 3 2 : When using both thread tension controller No. 3 and inverting clamp device	1	
		Selection of needle bar up-position stop holding mode	0 : No 1 : Yes	0	

Note) 1. If the feed timing is set to slow, danger of needle breakage may occur when the cloth is excessively thick. So, be careful.

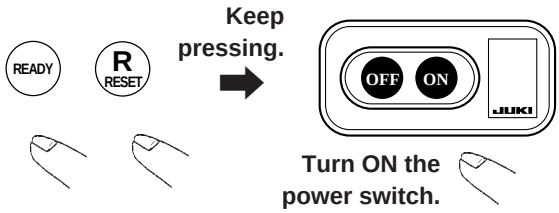
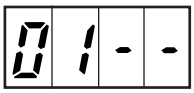
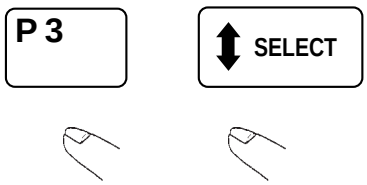
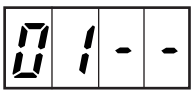
2. When ineffective of intermediate presser control is selected, "lifting is fixed". Be sure to remove the intermediate presser since it comes in contact with needle bar.
In addition, the intermediate presser cam and roller may interfere with each other. Move the intermediate presser cam to the position where it does not interfere and fix it.

3. The presser with the inverting clamp is made to special order. For the details, refer to the respective items "Thread tension controller No. 3 and the inverting clamp device", "How to use the optional thread tension controller No. 3" and "Solenoid valve circuit diagram".

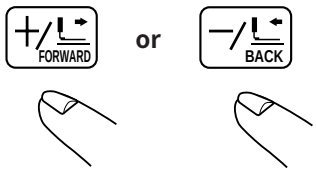
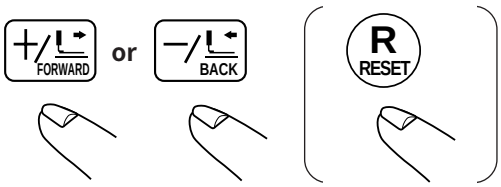
Display	Function	Setting range	State at the time of delivery	Remarks
	This function selects timing of presser lifting after completion of sewing.	0 : Presser goes up after thread trimming and return to origin. 1 : Presser goes up immediatly after thread trimming.	0	When "1" is set, presser goes up immediately after thread trimming and the cloth can be immediately taken out.
	This function is not used with LK-1941/42. Do not change the setting.	–	0	
	Ouput of needle cooler is selected.	0 : Ineffective 1 : Effective	1	
	Effective/ineffective of control of thread trimming command of pattern data is selected.	0 : Effective 1 : Ineffective	0	It becomes effective at the time of temporary stop or the like even at the time of ineffective.
	Effective/ineffective of control of thread trimming device is selected.	0 : Effective 1 : Ineffective	0	When ineffective is set, thread trimming is not possible in any case.
	Setting of delay time of wiper ON after heat cutter OFF Timing from heat cutter output OFF to wiper ON is changed. Set the delay time longer especially when thick thread is used. (Possible to set in unit of 50ms)	0 to 200ms	100	For Z type only
	Effective/ineffective of control of optional thread clamp device is selected.	0 : Ineffective 1 : Effective	0	
	OFF timing of guide cylinder of optional thread clamp device is set by the number of stitches from the start of sewing.	2 to 5 stitches	2	
	Speed of revolution of bobbin winder is set.	0 : High speed (1,600 r.p.m.) 1 : Low speed (800 r.p.m.)	0	
	Wiper operating timing at the time of needle up-position stop (No. 6-1) is set.	0 : Needle-up stop position 1 : Upper position	0	
	Selection of returning route to the sewing start point When effective is set, the machine returns to the sewing start point taking the route tracing the sewing pattern reversely.	0 : Ineffective 1 : Effective	0	Set to effective when linear move is not possible due to the limitation of shape of presser or the like.
	Initialization of model specifications is executed.	41 : LK-1941ZA 42 : LK-1942H (G) A 43 : When LK-1941ZA is changed to the thread trimming with knife type 44 : When LK-1942H(G)A is changed to the hot wire thread trimming type	41	When setting is changed, all the contents of memory switch are initialized to the default values.

(1) Operating method

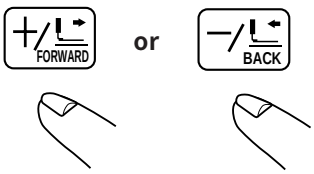
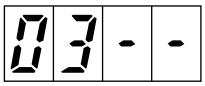
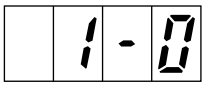
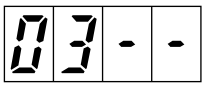
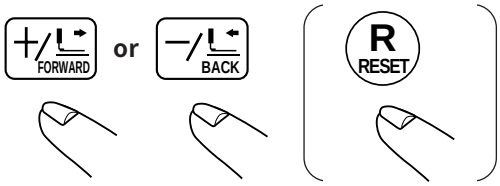
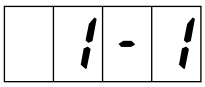
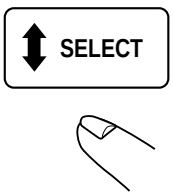
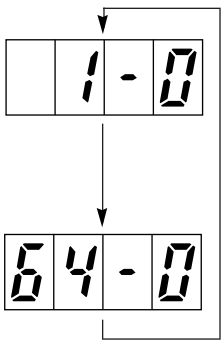
1) How to start the memory switches

Step	Operation method	Indication	Explanation
1			Pressing (READY) key and (R RESET) key, turn ON the power switch. (Start of the user level)
2			Immediately after turning ON the power switch, simultaneously press [P 3] key and [SELECT] key. (The level moves to the service level.)

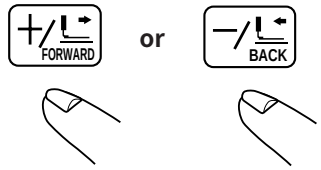
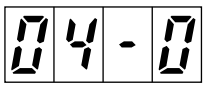
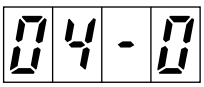
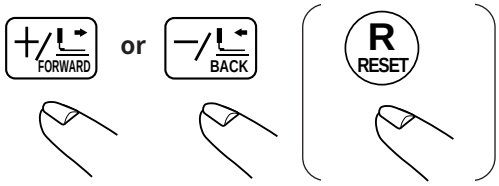
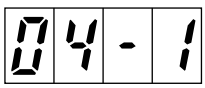
① Operation when both the latter first digit and second digit on the indication are "– –".

Step	Operation method	Indication	Explanation
①-1		[Ex.] When No. 01 is indicated. 	Press down +/FORWARD and −/BACK keys to select the indication No. desired to change.
②-2		SEWING Sewing LED Lights up. 	Press down READY key to light up the sewing LED.
			In step ① -2, if pressing down READY key again, the indication returns to the indication No.
③-3		[Ex.] When the max. speed limitation is 1,500 r.p.m. 	Press down +/FORWARD and −/BACK keys to change and check the contents. (The setting returns to the initial setting by pressing down R/RESET key.)
④-4		SEWING Sewing LED Put out.	After setting, press down READY key and put out the sewing LED. Then register the contents.

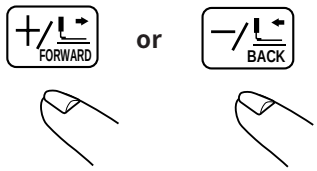
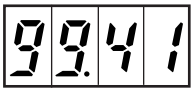
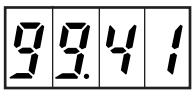
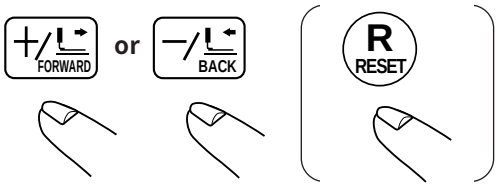
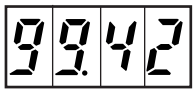
② Operation when the indication is “0 3 – –”.

Step	Operation method	Indication	Explanation
② -1			Press down [+/L FORWARD] or [−/L BACK] key to select the indication No. 3.
② -2		SEWING Sewing LED Lights up. 	Press down (READY) key to light up Sewing LED.
		SEWING Sewing LED Put out. 	When the step is ② - 2, if (READY) key is pressed twice, Sewing LED is put out and the indication returns to No. 03.
② -3		[Ex.] Calling of the standard pattern data to pattern No. 1 is possible. 	Press down [+/L FORWARD] or [−/L BACK] key to change whether or not to call the standard pattern data. (The setting returns to the initial value by pressing down (R RESET) key.)
② -4			Every time [SELECT] key is pressed, the pattern No. increases by one. (Pattern Nos. : 1 to 64) When the pattern No. is changed to the No. desired, change whether or not to call the standard pattern by operating the step ② - 3. After the pattern No. 64, the pattern No. returns to the Pattern No. 1.
7		SEWING Sewing LED Put out.	After setting, press down (READY) key to put out Sewing LED and register.

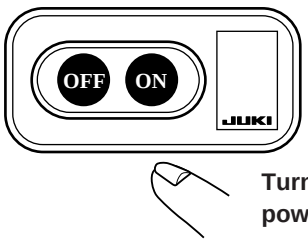
③ Operation when the latter second digit is “–” and first digit is “Numeral”

Step	Operation method	Indication	Explanation
③ -1		[Ex.] When the indication No. is No. 04. 	Press down (+/FORWARD) or (−/BACK) key to select the indication No. 04.
③ -2		SEWING Sewing LED Lights up. 	Press down (READY) key to light up Sewing LED.
③ -3			Press down (+/FORWARD) or (−/BACK) key to change the set value. (The setting returns to the initial value by pressing down (R/RESET) key.)
③ -4		SEWING Sewing LED Put out.	After setting, press down (READY) key to put out Sewing LED and register.

④ Operation when the indication section is “99.”

Step	Operation method	Indication	Explanation
④-1		[Ex.] When the indication No. is No. 99. 	Press down +/FORWARD or −/BACK key to select the indication No. 99.
④-2		SEWING Sewing LED Lights up. 	Press down READY key to light up Sewing LED.
④-3			Press down +/FORWARD or −/BACK key to change the set value. (The setting returns to the initial value by pressing down R/RESET key.)
④-4		SEWING Sewing LED Put out.	After setting, press down READY key to put out Sewing LED and register.

2) How to finish the memory switches

Step	Operation method	Indication	Explanation
1	 **Turn OFF the power switch.**		Turn OFF the power.

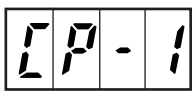
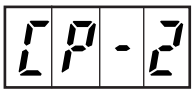
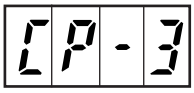
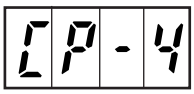
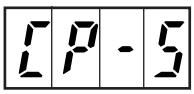
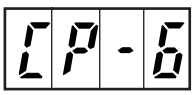
6. TEST MODE

• Purpose of the test mode

This mode is set to facilitate the electrical check for the maintenance work.

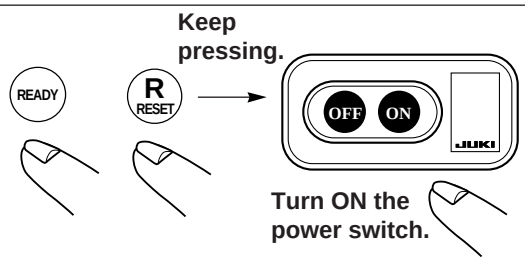
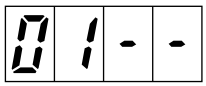
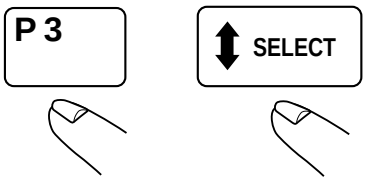
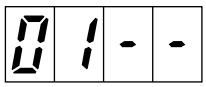
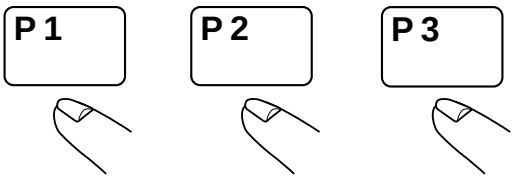
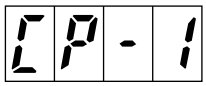
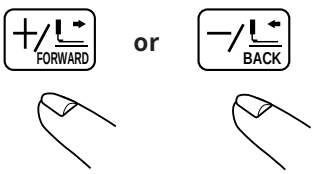
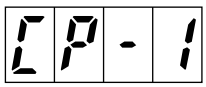
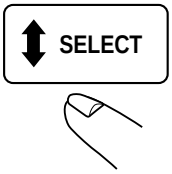
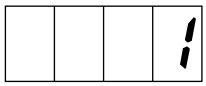
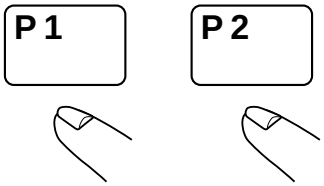
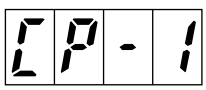
• Items of the test mode

Test mode can check the items as shown in the list below.

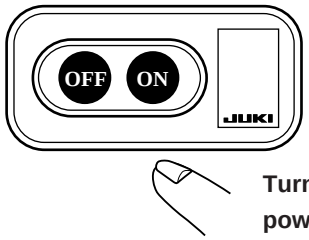
Indication No.	Item	Description
	Input signal check	State of input of the switch and the sensor will be indicated by 9 LEDs.
	Origin retrieval and feeding operation check	For origin adjustment, JOG movement and origin sensor will be indicated.
	Continuous operation (Do not use for sewing.)	Initial setting of the operation conditions will be performed, and the mode will move to the continuous aging mode.
	Number of revolutions of main shaft check	Output of the specified number of revolutions will be made and the actual number of revolutions will be indicated.
	Solenoid, solenoid valve, status output and hot wire output	Solenoid, solenoid valve, status output and hot wire output will be checked.
	Hot wire output (For test and valuation)	Hot wire output time can be set longer than that usually used. (This is a mode to tentatively heat the wire for a long time. Hot wire plate may be fused. Normally, use CP-5 mode.)

(1) Operating method

1) How to start the test mode

Step	Operation method	Indication	Explanation
1			Pressing (READY) key and (R RESET) key, turn ON the power switch. (Starting of the user level of memory switch)
2			Immediately after turning ON the power switch, simultaneously press [P3] key and [SELECT] key. (Moving to the service level of memory switch)
3		LEDs are indicated in order.	Further, simultaneously press down [P1] key, [P2] key and [P3] key. Then the mode will move to the test mode, and the indicating output test will be immediately started.
4	Press either key of the above ones. 		By operation of either key, the indication will move to the selection of other test function.
5		(Example) If the test program No. to be selected is “CP-1” . 	Test program No. will be changed by pressing down [+/L CANCEL] or [−/L BACK] keys.
6			Test program No. will be decided by pressing down [SELECT] key.
7			When [P1] key and [P3] key are simultaneously pressed down, the step will return to the step 5. However, when test No. CP-3 is selected, it cannot be returned to the step 5. At this time, turn OFF the power switch.

2) How to finish test mode

Step	Operation method	Indication	Explanation
1	 **Turn OFF the power switch.**		Turn OFF the power.

3) How to check each test program No.

① CP-1 (Input signal check)

State of input of switches and sensors is indicated on the 8 LEDs.

The table below is the list of LED indication, and you can understand to which LED each switch or each sensor is assigned.

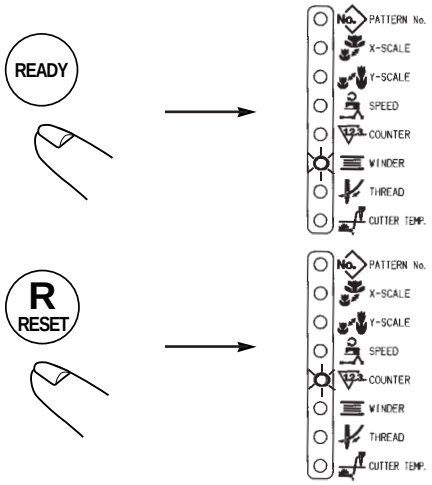
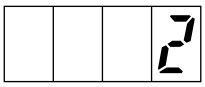
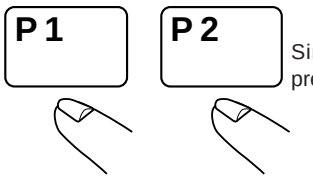
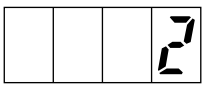
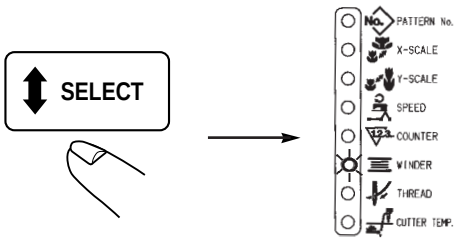
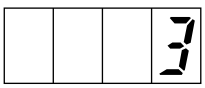
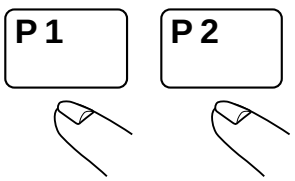
Input line No.	Item which LED lights up							
	WINDER	COUNTER	SPEED	Y SCALE	X SCALE	PATTERN NO.	SEWING	THREADING
1	READY	RESET	FORWARD	BACK	P1	P2	P3	
2	SELECT (↓)				SAFETY SW			
3	EMS	PRESSER (R)	START	PRESSER (L)				
4						AIR PRESSURE SW	X ORIGIN	Y ORIGIN
5		PDET	TG	UDET	DDET	AUDET		
6					THERMOSTAT			
7			BOBBIN TAKE OUT	BOBBIN WIND	EMPTY BOBBIN	AIR KEY	SELECT (↑)	
8								
9								THREAD BREAK
10								

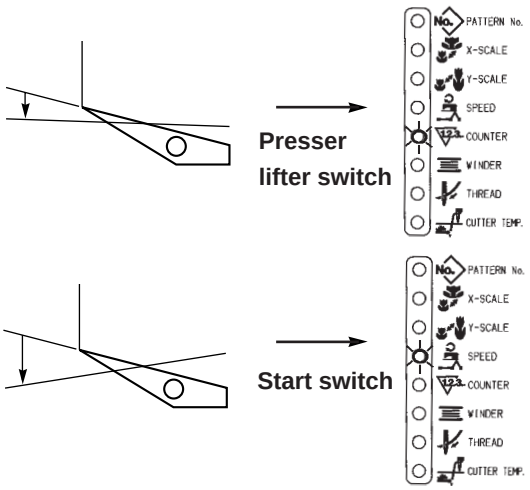
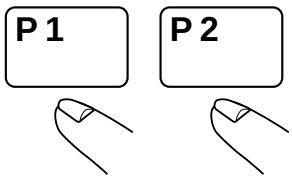
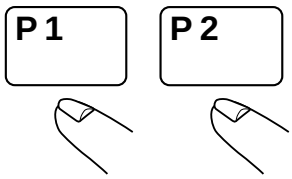
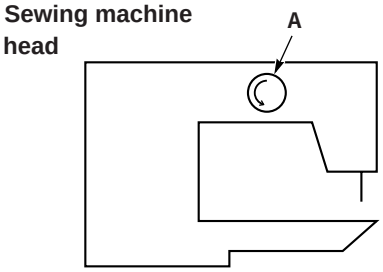
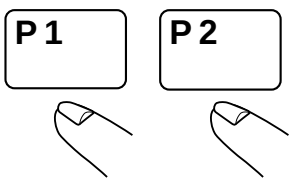
Letters in the table of LED indication

- EMS .....Temporary stop switch
- PDET .....Feed reference signal The signal occurs one time during one rotation of the sewing machine when the needle bar angle is between 125˚ and 155˚.
- TG .....TG signal The signal occurs 45 times (an interval of 8˚) during one rotation of the sewing machine.
- UDET .....Sewing machine up-position signal The signal occurs one time during one rotation of the sewing machine when the needle bar angle is between 34˚ and 48˚.
- DDET .....Sewing machine down-position signal The signal occurs one time during rotation of the sewing machine when the needle bar angle is between 80˚ and 123˚.
- AUDET.....Sewing machine upper dead point position signal The signal occurs one time during one rotation of the sewing machine when the needle bar angle is between 5˚ and 30˚.

∗ The aforementioned needle bar angles are those detected from the encoder of the main motor.

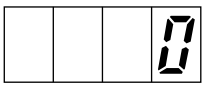
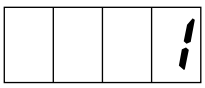
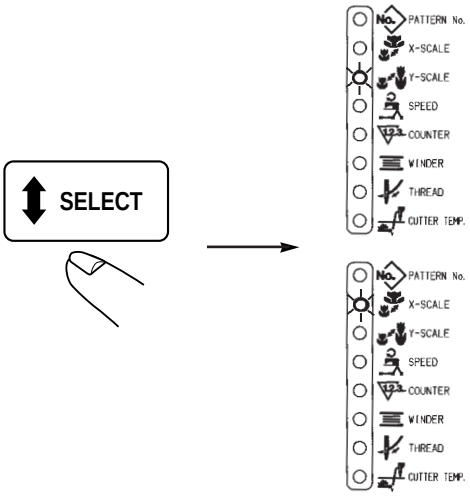
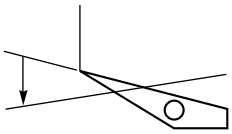
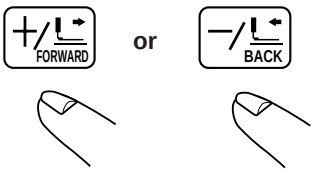
∗ Input line Nos, 7 and 8 correspond to the key switch of the operation box provided with AW-2D and PGM -7.

Indicating section (input line No.)	Checking measure	Explanation
		State of the input line No. 1 key will be indicated on LED. [Example] Check the (READY) key. [Example] Check the (R RESET) key. As for the other keys, refer to the input line No. 1 of the above table.
	 Simultaneously press.	Update of the input line No. 1 to 2
		State of the input line No. 2 key will be indicated on LED. [Example] Check the (SELECT) key.
	 Simultaneously press.	Update of the input line No. 2 to 3

Indicating section (input line No.)	Checking measure	Explanation
3		State of the input line No. 3 switch will be indicated on LED. [Example] C eck the presser lifter switch. [Example] Check the start switch.
4	 Simultaneously press.	Update of the input line No. 3 to 4 (Refer to the adjustment of the sensor components.)
5	 Simultaneously press.	Update of the input line No. 4 to 5
5		Turn the hand pulley (A in the left figure) by one revolution in the direction of arrow. Feed start 1 time TG 45 times Upper dead point 1 time Lower dead point 1 time Needle upper position 1 time } Light up
1	 Simultaneously press.	Update of the input line No. 5 to 1

② CP-2 (Origin retrieval)

For origin adjustment, JOG movement and state of origin sensor will be indicated.

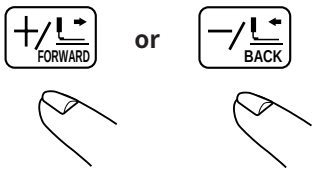
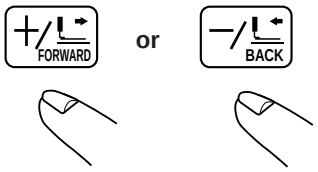
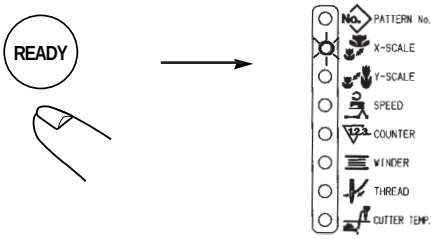
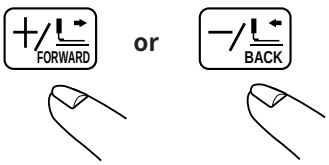
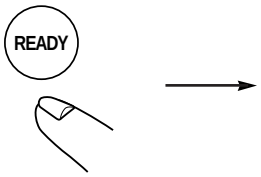
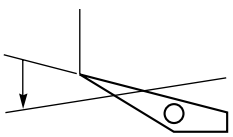
Step	Indicating section	Checking measure	Explanation
1	 or  "0" or "1" will be indicated according to the state of the sensor.		JOG movement of the X/Y axes can be changed by pressing down the SELECT key.
2			Depress the pedal switch, and the sensor will execute the origin retrieval.
3			[JOG movement] Makes the selected axis move in the direction of +/- one by one pulse.

∗ Set the presser lifting control to ineffective. (Presser lifter is kept lowered.)

∗ Except for upper position (or upper dead point), error "E 3" will be indicated, and the origin retrieval will be not executed even when the pedal switch is depressed. At this time, return the position to the upper position using the hand pulley.

③ CP-3 (continuous operation)

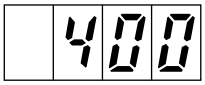
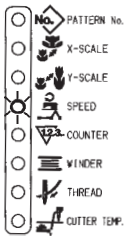
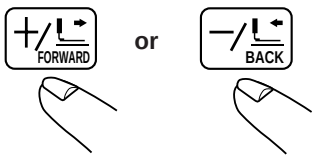
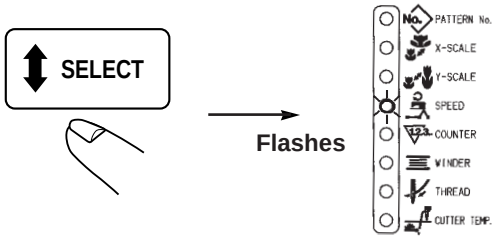
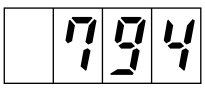
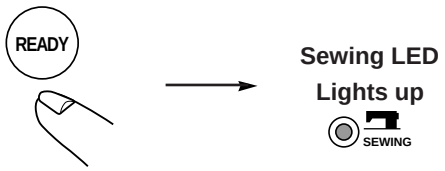
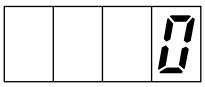
Performs the initial setting of the operation conditions, and moves to the continuous operation mode.

Step	Indicating section	Checking measure	Explanation
1	C 10		A time of pause is set by pressing down [+/L FORWARD] or [−/L BACK] key Setting range : 0 to 9,900 ms (in a unit of 100 ms)
2	C A0		By pressing down [READY] key, the time of pause is updated and the setting moves to the automatic origin retrieual setting
3	C A2		Setting moves to automatic origin retrieval setting by pressing down [+/L FORWARD] or [−/L BACK] key. Setting range : A0 ... Ineffective (initial setting) A1 ... Every 100 times A2 ... Every time
4	0		Automatic origin retrieval is updated and setting moves to pattern No. setting by pressing down [READY] key. (When setting for the first time, “0” is indicated. In other cases, pattern No. that was previously set is indicated.)
5	10		Pattern No. will be set by pressing down [+/L FORWARD] or [−/L BACK] key.
6	10		Pattern No. is updated and the mode moves to the continuous operation mode by pressing down [READY] key.
7	10		Continuous operation can be stopped at the time of pause by depressing the pedal switch.

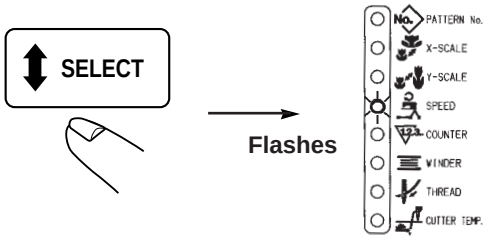
∗ When “CP-3” is selected, it is not possible to return to the other test modes. Turn OFF the power and turn ON the power again in accordance with the starting way of the test mode.

④ CP-4 (Revolution movement)

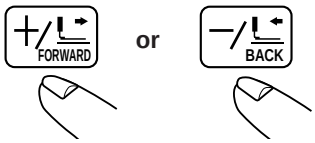
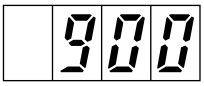
Output of the specified number of revolutions is made and the actual number of revolutions is indicated.

Step	Indicating section	Checking measure	Explanation
1		**Lights up** 	[Initial state] “SPEED” LED of the setting item lights up. If there is no change, move to the step 3.
2	(Example) When the number of revolutions is set to 800 r.p.m. 		Set value of the number of revolutions is set by pressing down [+/FORWARD] or [−/BACK] key.
3			The indication is changed to the indication of the actual value by pressing down [SELECT] key. “SPEED” LED of the setting item flashes on and off.
4			The sewing machine rotates and the actual value of the number of revolutions is indicated by pressing down (READY) key. “SPEED” LED of the setting item is kept flashing.
5			The sewing machine stops by pressing down (R RESET) key.

If following operation is made when the step is above-mentioned “step 4”, the indication can be changed to the indication of the specified number of revolutions.

Indicating section	Checking measure	Explanation
		The output is changed to the output of the specified number of revolutions by pressing down [SELECT] key. “SPEED” LED of the setting item lights up.

Further, when following operation is made in the abovementioned state, the specified number of revolutions can be changed as well.

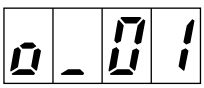
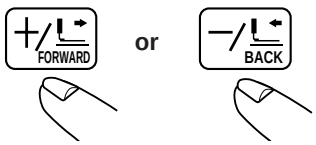
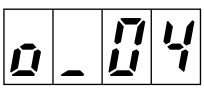
Indicating section	Checking measure	Explanation
		Even while the sewing machine is rotating, the number of revolutions is changed by pressing down [FORWARD] or [BACK] key.
		The specified number of revolutions is updated by pressing down (READY) key.

⑤ CP-5 (Solenoid, solenoid valve, status output and hot wire output)

Checks the respective outputs.

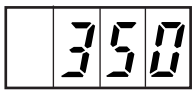
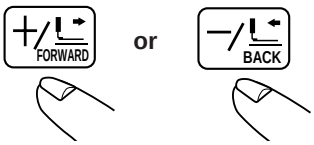
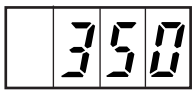
Output No. Table

No.	Solenoid, solenoid valve, hot wire output, status output	
01	Feeding frame valve right/left (AIR_1, _2) : Depending on pedal specifications	
02	Presser valve, right (AIR_1)	
03	Presser valve, left (AIR_2)	
04	Intermediate presser valve (AIR_3)	
05	Thread controller No. 3 valve ① (AIR_5)	: P95 output
06	Thread trimmer solenoid	
07	Wiper valve (AIR_7)	
08	Thread draw-out (disk floating) solenoid	
09	–	
10	–	
11	Heat cutter output (hot wire)	
12	Needle cooler valve (AIR_4)	
13	Thread clamp guide valve (AIR_6)	
14	Thread clamp wire valve (AIR_8)	
15	Thread controller No. 3 valve ② (AIR_9)	: P99 output
16	Presser waiting signal	External I/F
17	Start waiting signal	External I/F
18	Bobbin thread counter over signal	External I/F
19	Needle thread breakage detection error	External I/F
20	Temporary stop error	External I/F
21	Thread trimming signal at the time of completion of a cycle	External I/F

Step	Indicating section	Checking measure	Explanation
1			Output No. is increased or decreased by pressing down +/FORWARD or −/BACK key.
2			Output is ON while READY key is being pressed down. (However, output is automatically turned OFF when the key is continuously being pressed for 1 to 7 seconds.) In addition, ineffective out put is not output depending on machine model setting.

⑥ CP-6 (Hot wire output)

- This mode is purposed to use for valuation and test by setting hot wire output time longer than that of normal setting.
- Setting range is 350 ms to 1,000 ms. (In a uint of 50 ms)
- Duty = 100%

Step	Indicating section	Checking measure	Explanation
1			Output time is increased or decreased by pressing down +/FORWARD or −/BACK key.
2			Output of the specified time is performed by pressing down READY key. (Possible continuous pressing down)

∗ Use CP-5 for normal hot wire output check.

∗ The function of CP-6 is for valuation and test.

- **<u>When it is normally used, the load applied to the hot wire plate is large and the plate may be fused. So, do not operate this function for the normal use.</u>**

7. EXTERNAL INPUT/OUTPUT

(1) Purpose of the external I/F

For LK-1941/42, exclusive I/F specifications purposed to perform interface with the external device (mainly sequencer) should be cleared.

(2) Output signal

1) [Main shaft status output]

Signals of main shaft status are output as mentioned below. ACTIVE is LOW.

① Sewing machine status (M-STAT)

② DOWN position (D-DET)

③ UP position (U-DET)

(3) Sewing machine status output

This output is signals that can output the operating state of the sewing machine to the external device by 8 bit signals.

ACTIVE is LOW.

1) [Time chart]

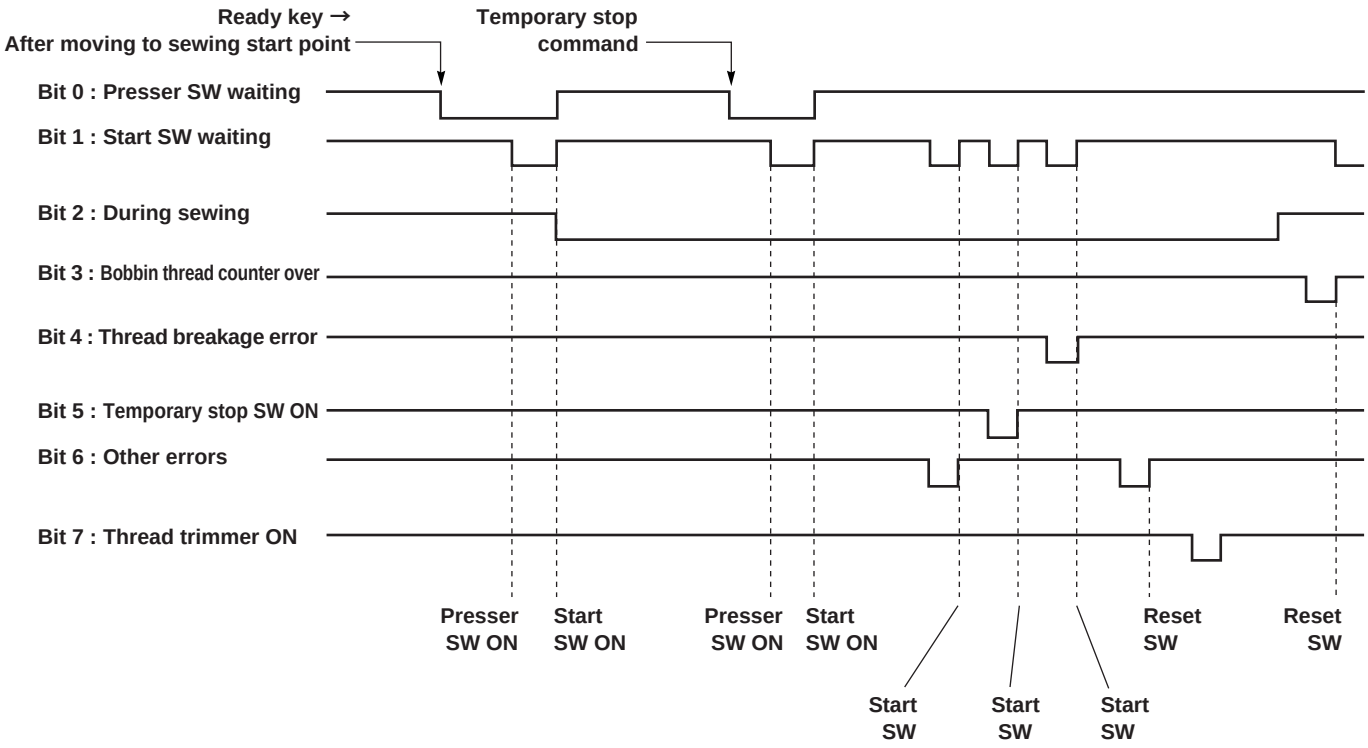


Fig. 1

2) [Explanation of output signal of each status]

① Bit 0 : Presser SW input waiting

The signal becomes ACTIVE when the presser SW is in the state that input is possible. Plural presser SWs can receive. However, when either SW is in the state that receiving is possible, the signal becomes ACTIVE.

The presser moves to the sewing start point after pressing down the ready key, and the signal becomes ACTIVE after the presser has lifted.

② Bit 1 : Start SW input waiting

The signal becomes ACTIVE when the start SW is in the state that input is possible. When the start SW is in the state that input is possible after receiving the presser SW, the signal becomes ACTIVE, and is reset after receiving the start SW.

The signal becomes ACTIVE at the temporary stop command on the stitching pattern and when the start SW is in the state that receiving is possible after error processing during sewing.

③ Bit 2 : During sewing (Including jump feed)

The signal becomes ACTIVE after the start SW has been received, and is reset after completion of sewing (after the presser moved to the sewing start point and has lifted).

④ Bit 3 : Bobbin thread counter over

The signal becomes ACTIVE when the bobbin thread counter is over and is reset when the reset key is received.

⑤ Bit 4 : Error signal 1

The signal becomes ACTIVE when needle thread breakage error is detected. The signal is reset after removing the cause of error.

⑥ Bit 5 : Error signal 2

The signal becomes ACTIVE when temporary stop SW ON is detected. The signal is reset in case of the start SW ON.

⑦ Bit 6 : Error signal 3

The signal becomes ACTIVE when errors such as travel limit error, air pressure down, up-position error, machine-lock, thermal protect, etc.have occurred.

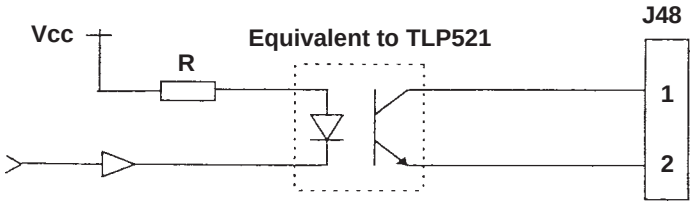
⑧ Bit 7 : During thread trimming

The signal becomes ACTIVE synchronizing with thread trimmer solenoid ON at the time of the last thread trimming of stitching pattern (in one cycle). The signal is released when the solenoid is OFF.

(4) INPUT/OUTPUT CIRCUIT

Output performs isolation with photocoupler and input does not perform isolation at C-MOS level.

Output circuit (71055 PORT B)



Input circuit (71055 PORT C)

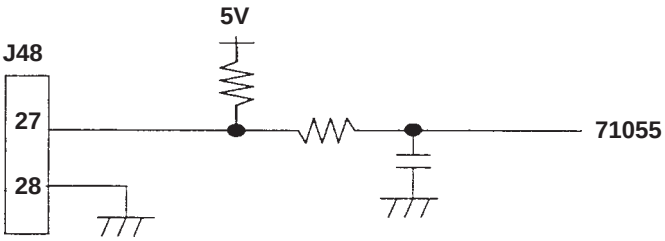


Fig. 2

* The following parts are necessary when using the external I/F.
Connector used : Straight header 34P (Blue) of Yamaichi Denki

Name	JUKI Part No.	Maker Part No.	Maker	Remarks
Socket	HK014820340	UFS-34B-04	Yamaichi Denki	
Connector pin	HP000100260	Contact 66 type for VFS	Yamaichi Denki	
Pin with red lead wire	M90325800A0	–		
Pin with black lead wire	M90335800A0	–		
Header (mounted on circuit board)	HK01480034A	FAP-34-07 #4 without screw	Yamaichi Denki	Reference

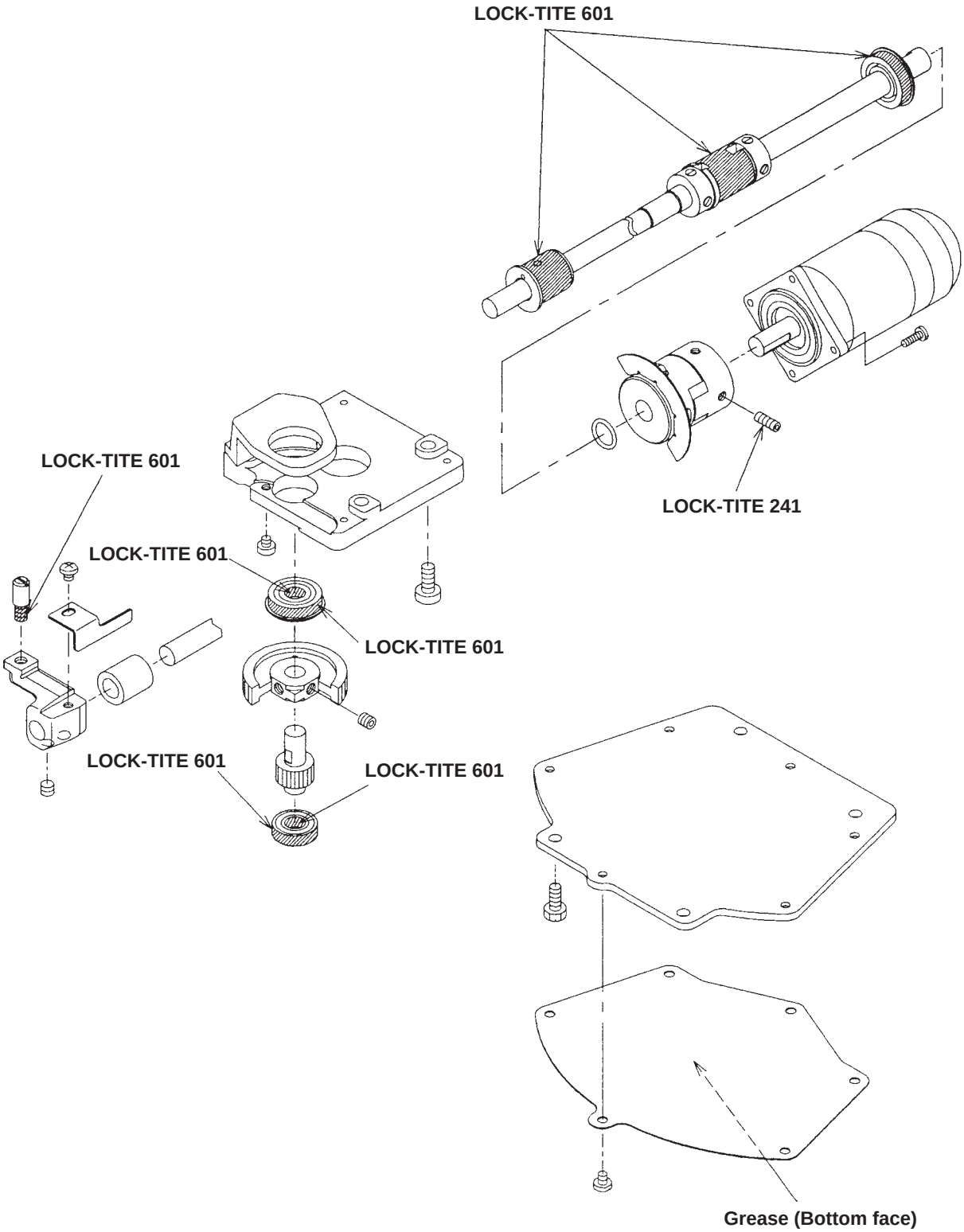
(5) DETAILS OF I/F CONNECTORS

J48-	Internal Circuit	Signal name	I/O	Remarks
1 2	PC-C PC-E	Sewing machine status	O	
3 4	PC-C PC-E	DOWN position	O	
5 6	PC-C PC-E	UP position	O	
7 8	PC-C PC-E	Presser SW input waiting	O	
9 10	PC-C PC-E	Start SW input waiting	O	
11 12	PC-C PC-E	During sewing (including jump feed)	O	
13 14	PC-C PC-E	Bobbin thread counter over	O	
15 16	PC-C PC-E	Thread breakage detection error	O	
17 18	PC-C PC-E	Temporary stop SW ON	O	
19 20	PC-C PC-E	Other errors	O	
21 22	PC-C PC-E	Thread trimmer solenoid ON (During thread trimming)	O	
23 24	–	INPUT 1 (Not defined)	i	
25 26	–	INPUT 2 (Not defined)	i	
27 28	IN GND	Presser SW input	i	
29 30	IN GND	Start SW input	i	
31,32,33,34	–	N.C	–	

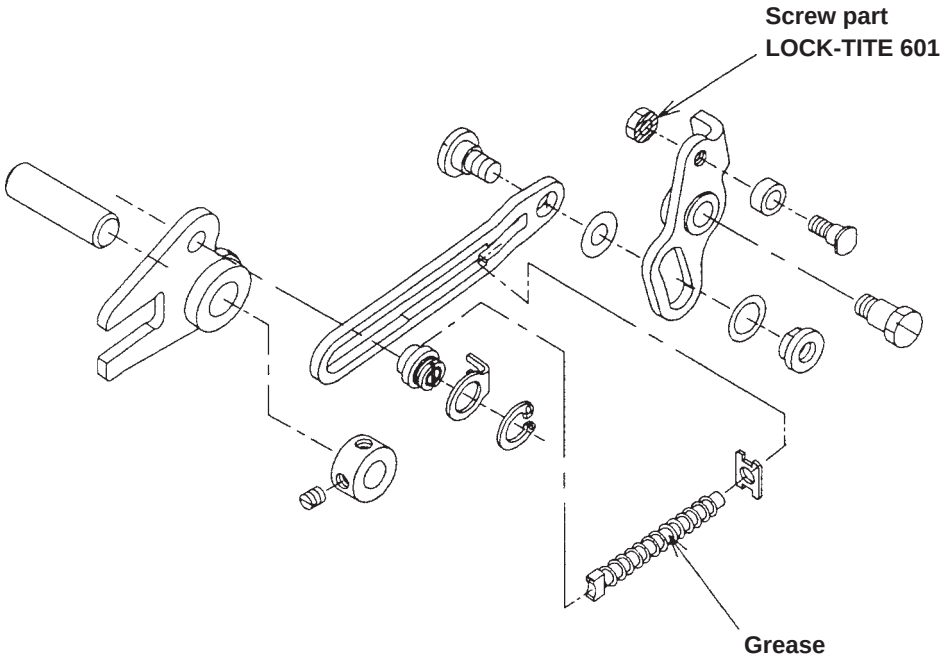
Note) PC-C means the photocoupler corrector, and PC-E the emitter.

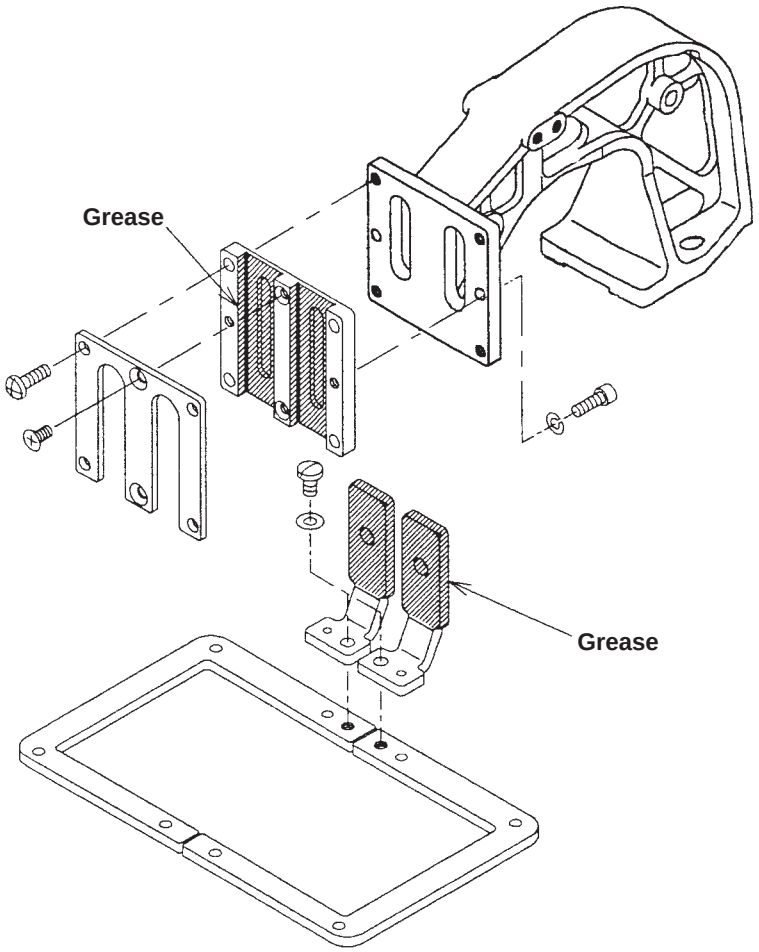
8. PARTS GREASE OR LOCK-TITE PAINT IS APPLIED

◎ Apply grease to the parts shown in the figure periodically (one time/half yearly).
Be sure to apply grease or LOCK-TITE to the respective sliding parts which are not shown in the figure when overhauling or reassembling.

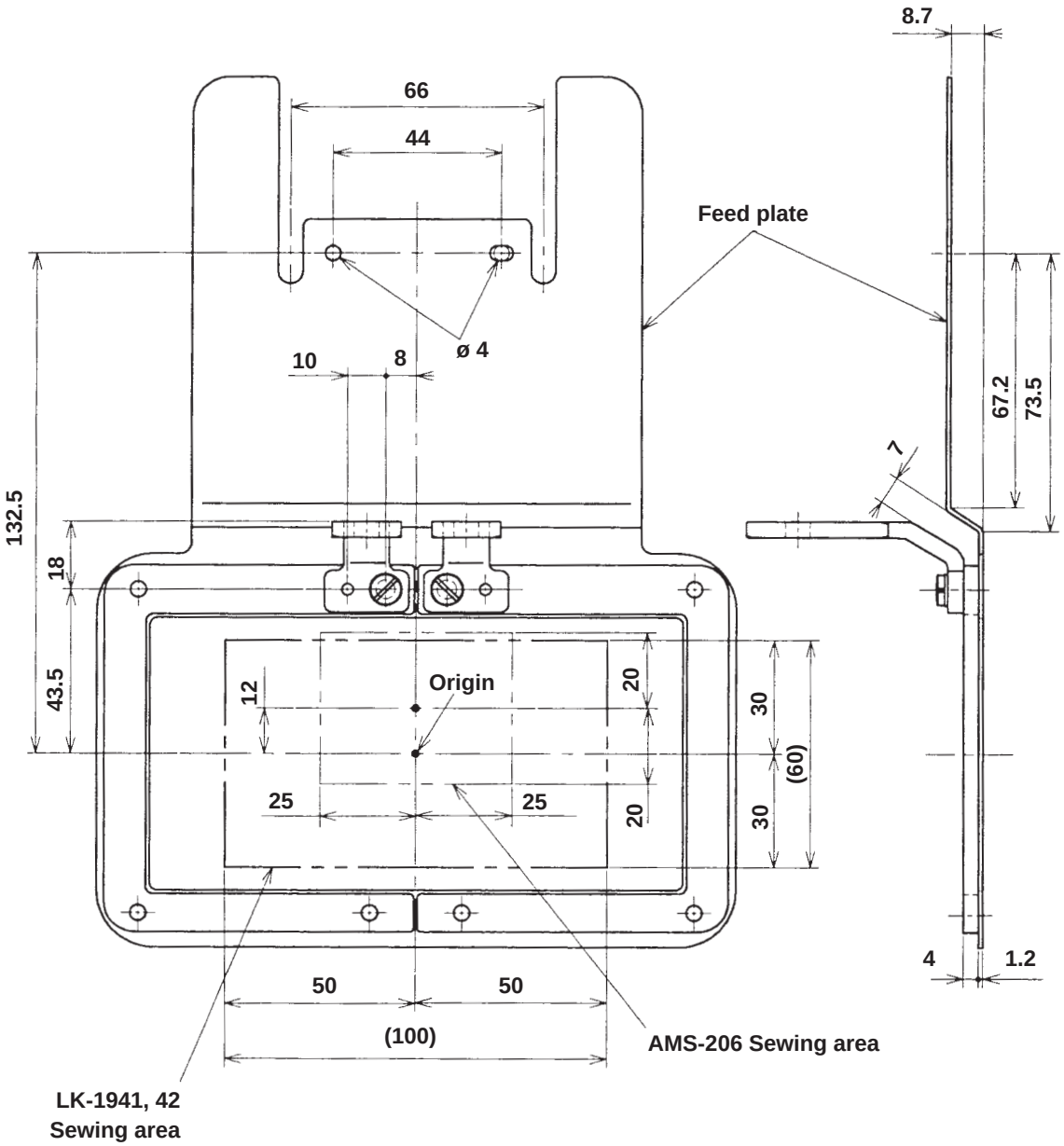


◎ Apply grease to the parts shown in the figure periodically (one time/half yearly).
Be sure to apply grease or LOCK-TITE to the respective sliding parts which are not shown in the figure when overhauling or reassembling.





9. PRESSER DIMENSIONS



10. HOW TO USE OPTIONALS

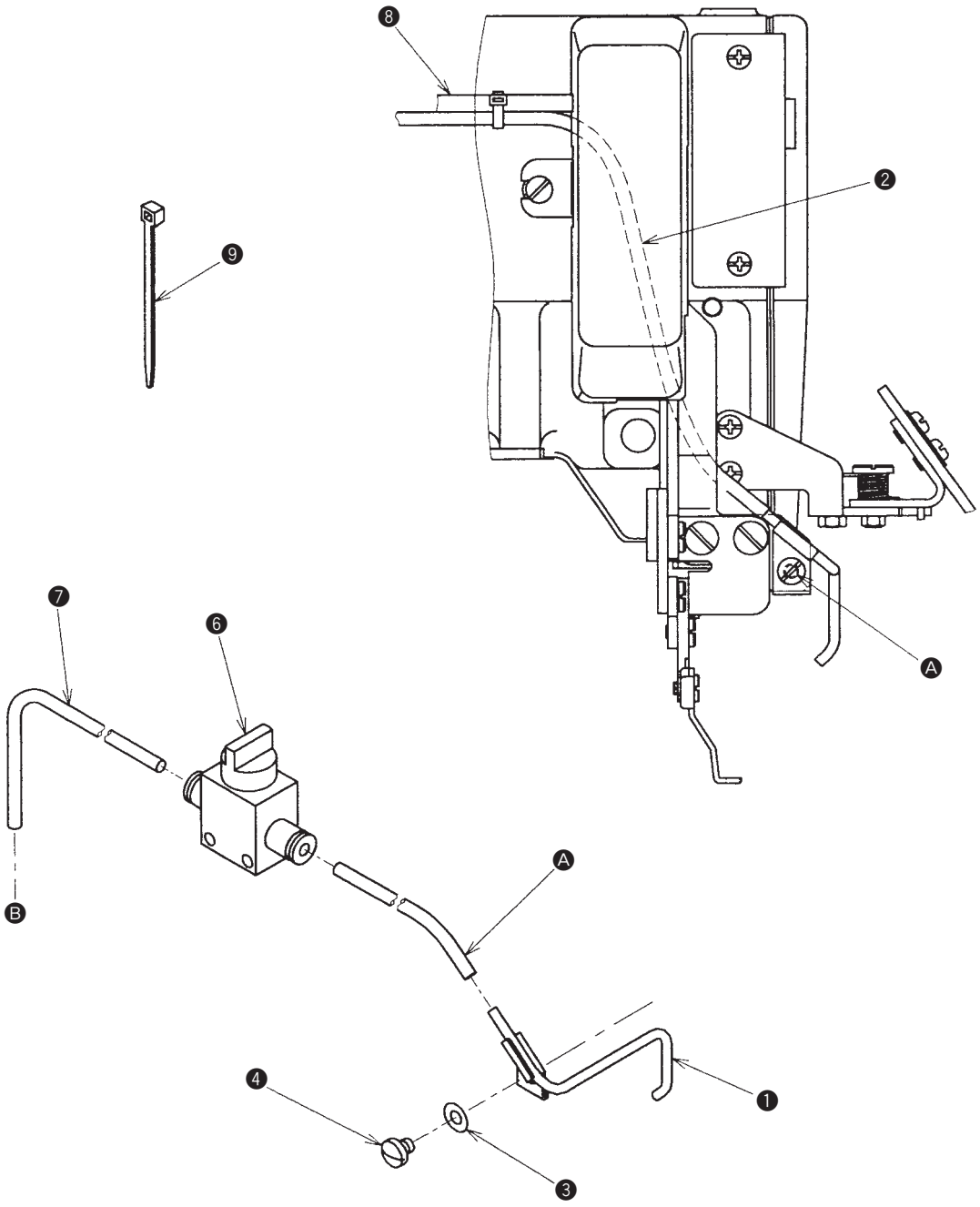
(1) Needle cooler

Standard Adjustment

When synthetic thread is used and thread breakage or stitch skipping due to needle heat occurs, use the needle cooler to cool needle.

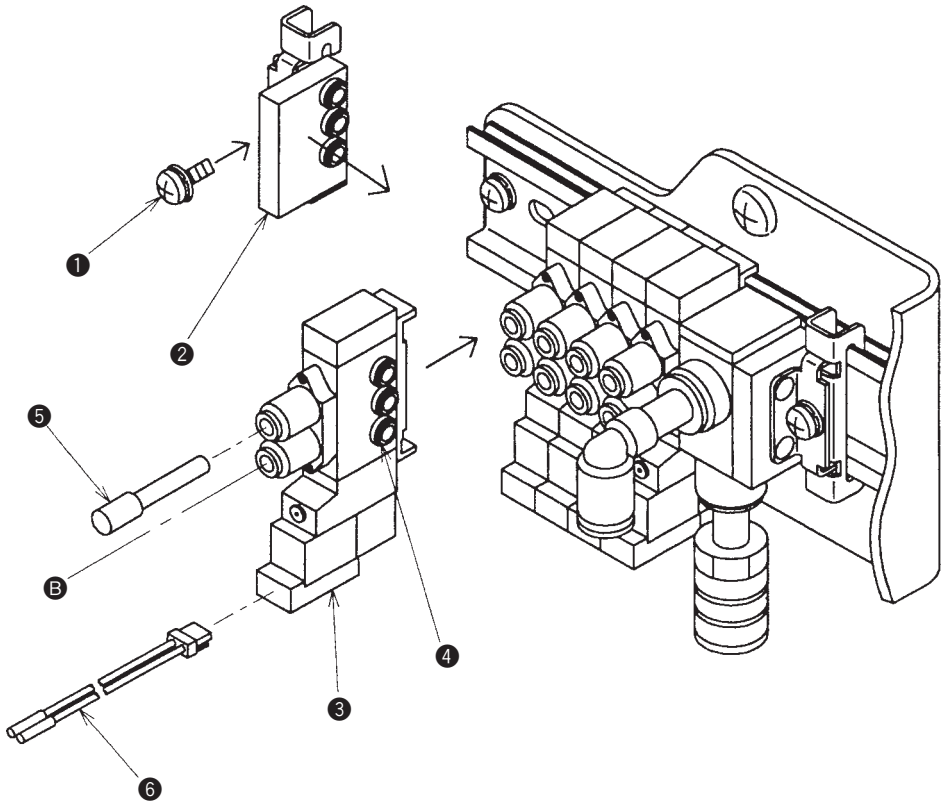
1) Installing the needle cooler compl.

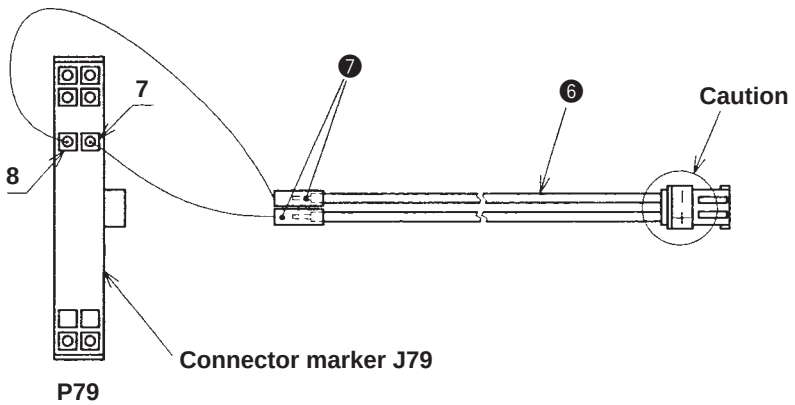
Fig. 1



Adjustment Procedures	Results of Improper Adjustment
① Insert air tube ❷ into needle cooler compl.❶. ② As shown in Fig. 1, handle air tube ❷ and install needle cooler compl. ❶ to tap A in the wiper base through washer ❸ with setscrew ❹. ③ Install hand valve ❻ to air tube ❷ and install air tube ❼. ④ Install air tubes ❷ and ❼ to wiper cord ❽ with three wire clip bands ❾. **Note) ❶, ❷, ❸, ❹, ❻, ❼ and ❾, and ❸, ❹, ❺, ❻ and ❼ described on the next page are included in needle cooler asm. (14225056).**	

2) Installing the solenoid valve





Adjustment Procedures	Results of Improper Adjustment
① Remove the motor cover. ② Loosen setscrew ❶ and remove end block ❷. ③ Install solenoid valve ❸, install end block ❷ again, and tighten setscrew ❶. **Caution : When installing the solenoid valve and the end block, be sure to securely insert bushings ❹ so that they are not fallen. In addition, be careful so that there is no clearance in respective parts since air leakage occurs from the clearance.** ④ Insert plug ❺ into the upper joint of solenoid valve ❸ and insert air tube (previously described ❼) of the needle cooler into the lower joint. ⑤ Insert solenoid valve connector asm. ❻ into solenoid valve ❸. ⑥ Insert pin contact ❼ of solenoid valve connector asm. ❻ into the connector (connector marker J79) of solenoid valve ❸ cable asm. **Caution : When inserting the pin contact into the connector, insert "+" side (red) of solenoid valve connector asm. ❻ into No. 7 and "–" side (black) into No. 8.**	

Standard Adjustment

3) How to use the needle cooler

○ Needle cooler blows air while the main shaft is rotating.

(2) Thread tension controller No. 3 / inverting clamp device

Setting of memory switch No. 31 and allocation of the output port, when using the thread tension controller No. 3 and the inverting clamp, are as follows :

Set the switch in accordance with the operating conditions.

: The following three controls are possible by making use of the inverting pattern (automatic inverting pattern/optional inverting pattern) and two air output ports.

① Use only the thread tension controller No. 3.

② Use only the inverting clamp device.

③ Use both the thread tension controller No. 3 and the inverting clamp device.

Purpose	Sewing pattern type	Memory switch	Air output port	Remarks
① Thread tension controller No. 3 only	Optional inverting	31-1	: P95	State at the time of delivery
② Inverting only	Automatic inverting or optional inverting	31-0	: P95	
③ Thread tension controller No. 3 + inverting	Optional inverting	31-2	Thread tension controller No. 3 : P99 Inverting : P95	

Note 1 : Inverting clamp device is made to special order.

Adjustment Procedures	Results of Improper Adjustment
When installing of the needle cooler is completed, set No. 35 (with/ without needle cooler output) of the memory switch to “1” (0 : Ineffective, 1 : effective). ∗ Normally, it is not necessary to change the setting since the setting at the time of delivery is "1". ∗ Refer to Instruction Manual for setting the memory switch. **Caution : At the time of bobbin thread winding, close the hand valve.**	

In case thread-tightness is partially not good due to difference in cloth thickness, hitch stitch, etc., needle thread tension can be increased at desired position by using the tension controller No. 3.

1) Installing the tension controller No. 3 (B50192220B0)

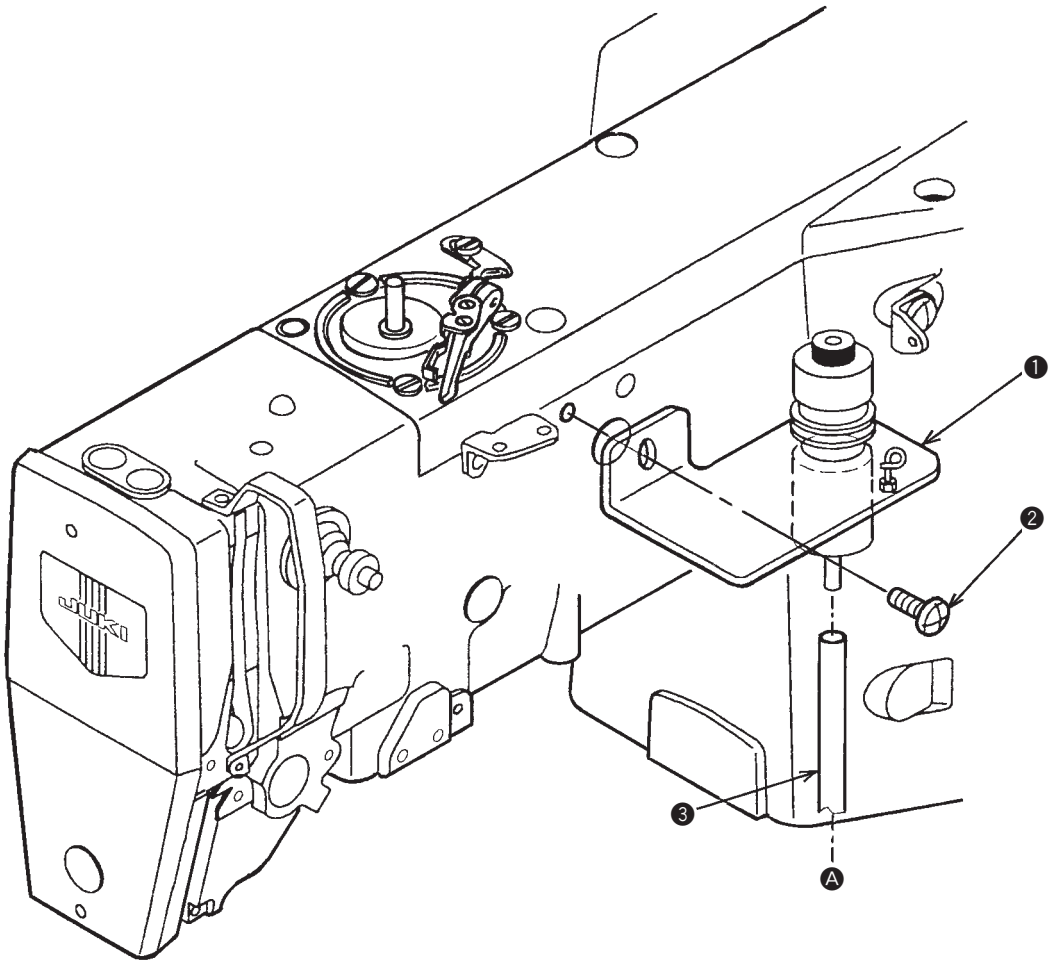
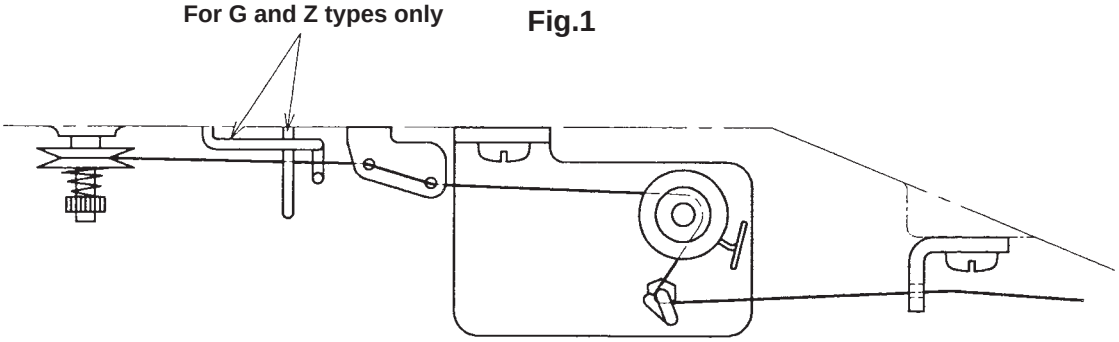


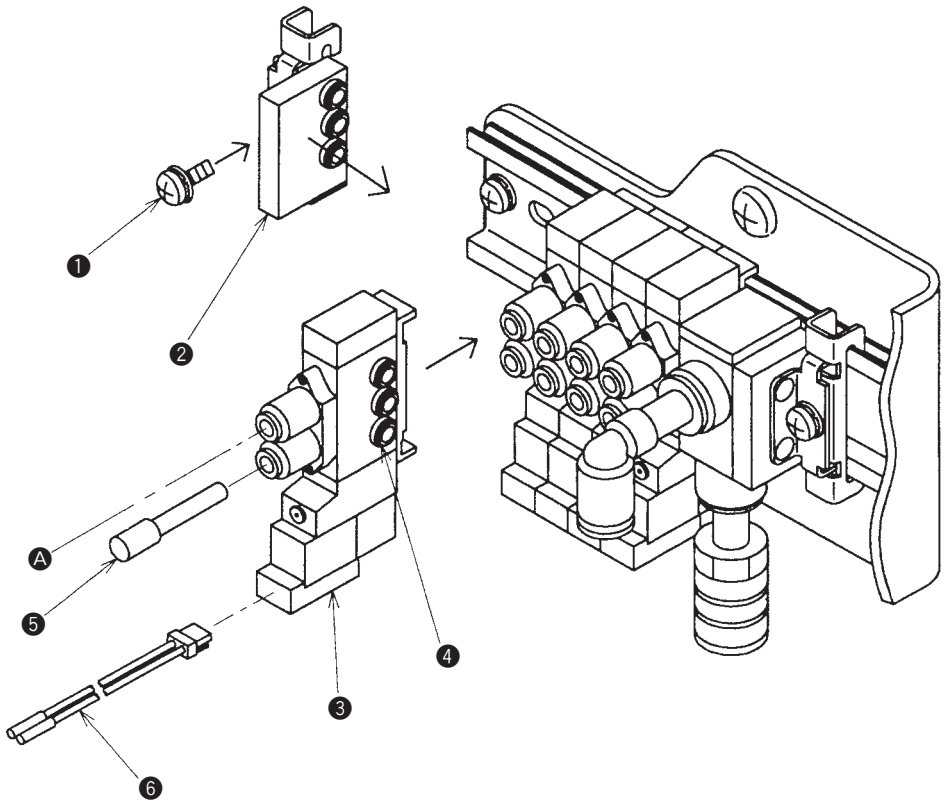
Fig.1

For G and Z types only



Adjustment Procedures	Results of Improper Adjustment
① Install tension controller No. 3 ❶ with setscrew ❷ attached to the machine arm. ② Install air tube ❸ to tension controller No. 3 ❶. ✳ Refer to Fig. 1 for threading. **Note) ❶ and ❸ only are included in tension controller No. 3 asm. (B50192220B0).** **Prepare separately ❸ (solenoid valve : PV150209000), ❺ (plug : PX500014000) and ❻ (solenoid valve connector asm. : 14204754) described on the next page.**	

2) Installing the solenoid valve



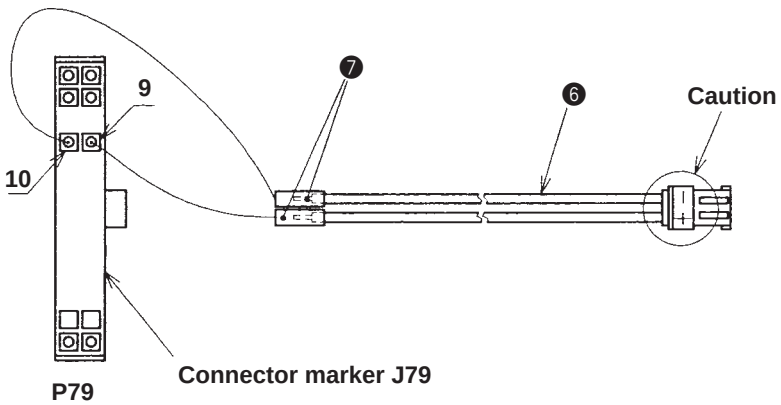


Fig. 2

Adjustment Procedures	Results of Improper Adjustment
① Remove the motor cover. ② Loosen setscrew ❶ and remove end block ❷. ③ Install solenoid valve ❸, again install end block ❷, and tighten setscrew ❶. **Caution : When installing the solenoid valve and the end block, be sure to securely insert bushings ❹ so that they are not fallen. In addition, be careful so that there is no clearance in respective parts since air leakage occurs from the clearance.** ④ Insert plug ❺ into the lower joint of solenoid valve ❸ and insert air tube (previously described ❸) of the tension controller No. 3 into the upper joint. ⑤ Insert solenoid valve connector asm. ❻ into solenoid valve ❸. ⑥ Insert pin contact ❼ of solenoid valve connector asm. ❻ into connector (connector marker J79) of the solenoid valve cable asm. **Caution : When inserting the pin contact into the connector, insert + side (red) of solenoid valve connector asm. ❻ to No. 9 and - side (black) to No. 10.**	

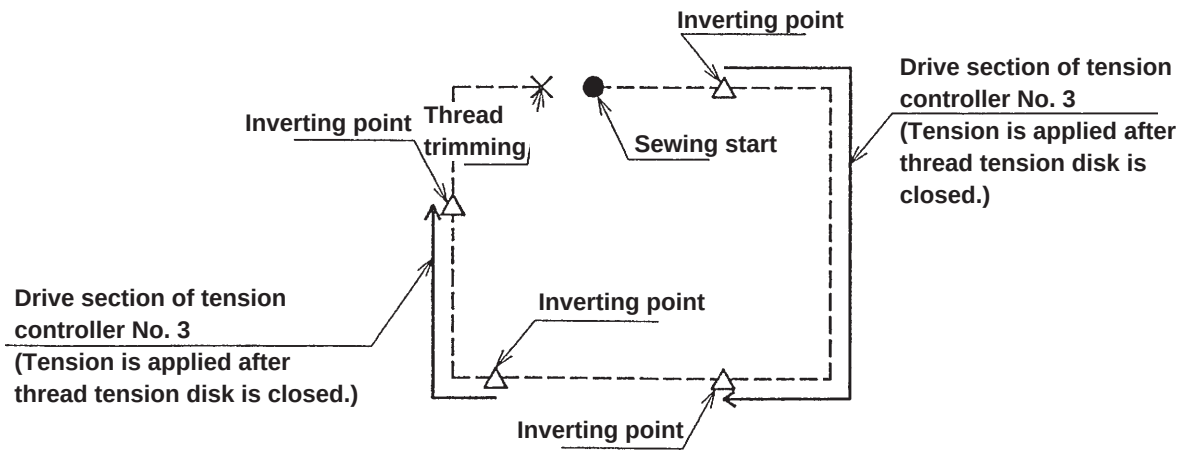
3) How to use the tension controller No. 3

① Confirmation of the memory switch

② Creation of the pattern

○ To drive the tension controller No. 3, it is required to input an inverting point in the stitching pattern.

∗ For inputting the inverting point, input device PGM-7 or PGM-20 which is separately available is required. In addition, when using PGM-20, the ROM writer is required.



∗ Disk of tension controller No. 3 always rises at the sewing start and sewing end, and there is no limit of number of inverting points.

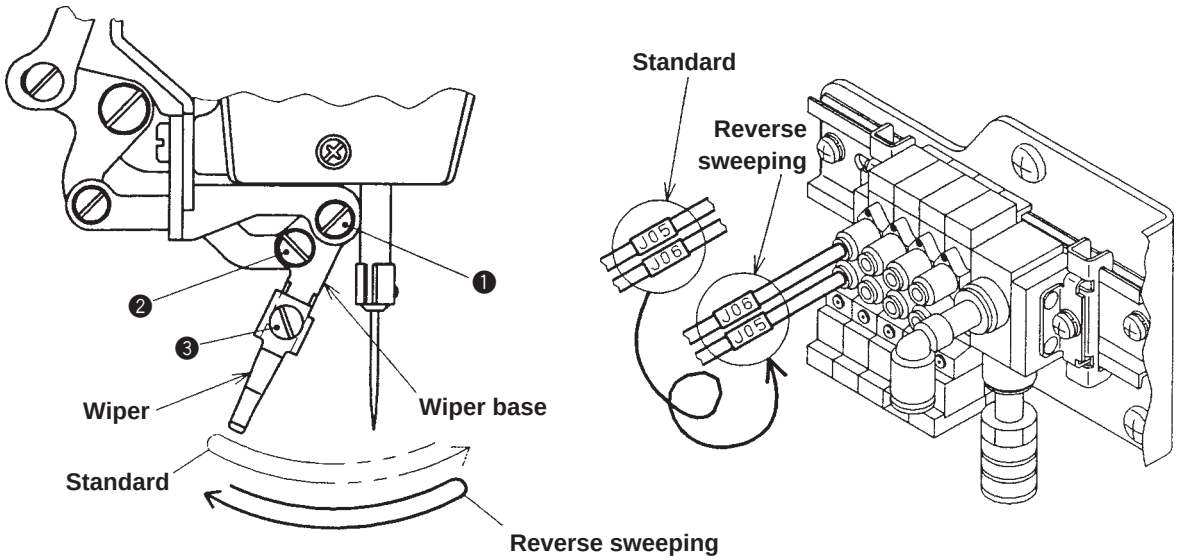
Adjustment Procedures	Results of Improper Adjustment
○ When installing of the tension controller No. 3 is completed, set No. 31 of memory switch to "1". * Normally, it is not necessary to change the setting since the setting at the time of delivery is "1". * Refer to Instruction Manual for setting of the memory switch. ○ Refer to the Instruction Manual for each input device for input, change, etc. of the pattern.	

(3) Reverse sweeping wiper

Standard Adjustment

1) Installing the reverse sweeping wiper

◎ By using the wiper base and the wiper of the optional parts, the wiper sweeping action can be changed to the reverse sweeping.



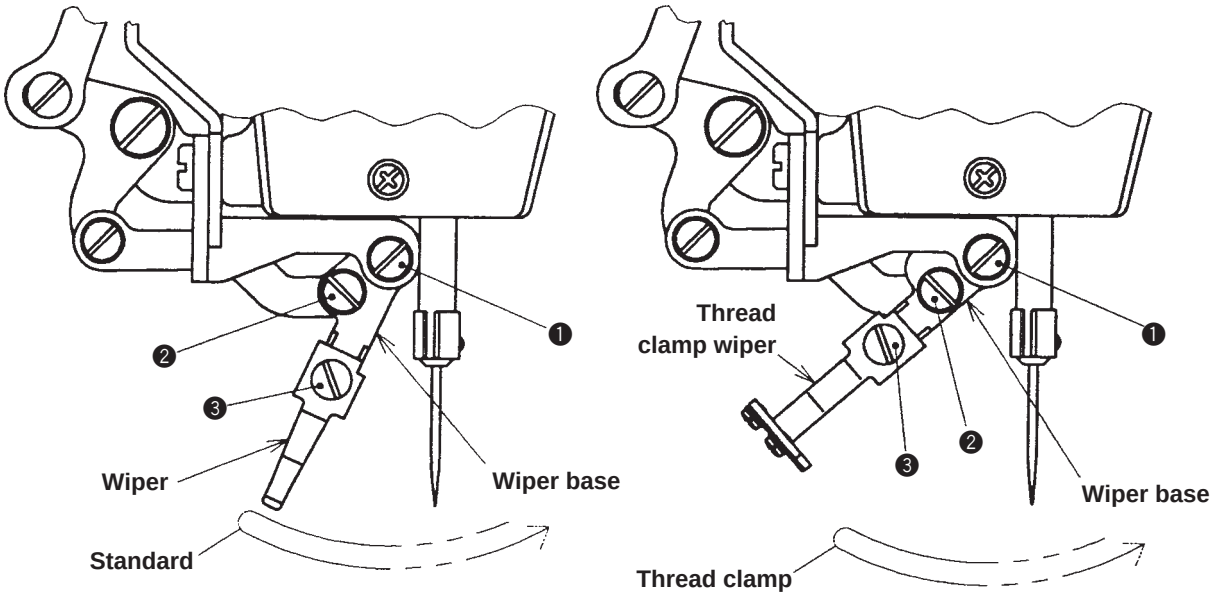
Adjustment Procedures	Results of Improper Adjustment
Caution : Be sure to cut off air supply and start the work when replacing the wiper. ① Replace the wiper base and the wiper with the optional parts. For the setscrews, use setscrews ❶, ❷ and ❸ without replacing them. (Part No.) Wiper base : 14445902 Wiper : 14446009 ② Remove the motor cover, and install reversely the air tube connected to the solenoid valve from the wiper device. Standard : J05 is on the upper side. J06 is on the lower side Reverse sweeping : J05 is on the lower side. J06 is on the upper side. ③ Adjust the position of the wiper to the same as that of standard adjustment as described below. • Clearance provided between the wiper and the needle is 1 mm or more. • Adjust the wiper to 40 mm from the top surface of the throat plate. (Refer to the Instruction Manual for LK-1941/42.)	

(4) Thread retaining wiper

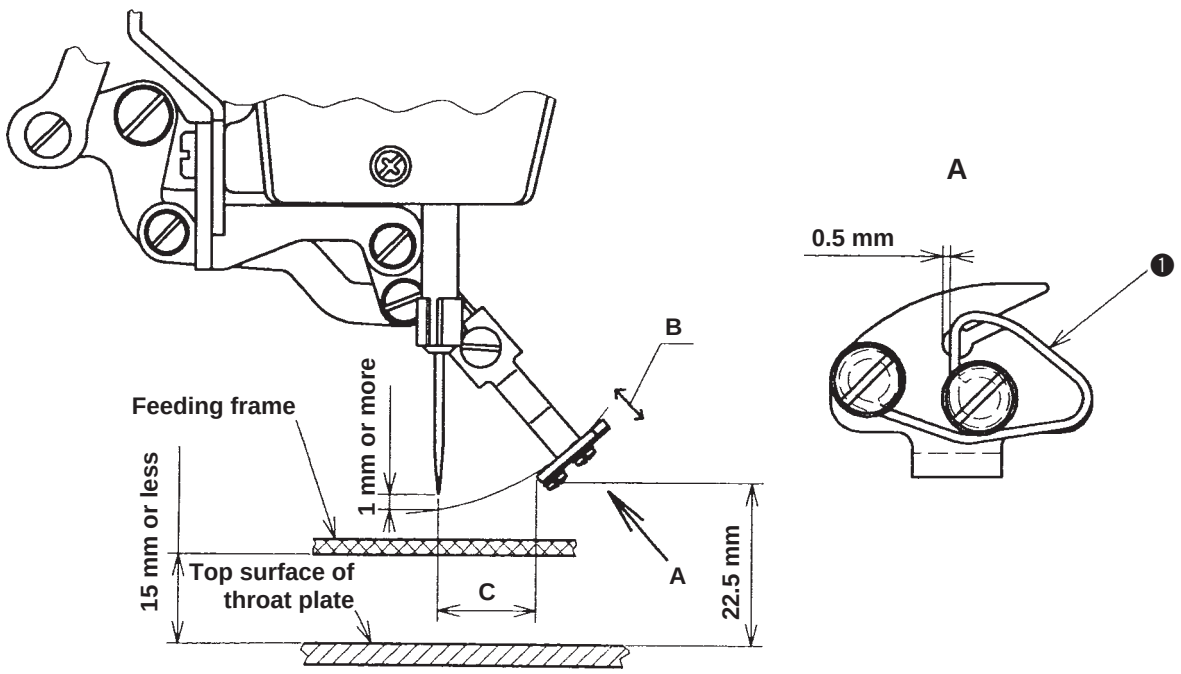
Standard Adjustment

1) Installing the thread retaining wiper

◎ By using the wiper base and the thread clamp wiper of the optional parts, the wiper retains thread.



2) Adjusting the thread retaining wiper



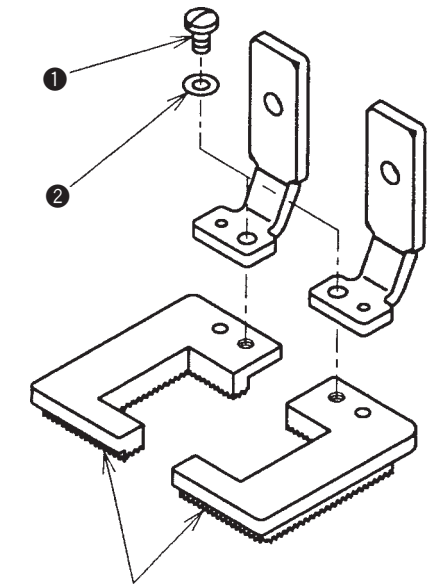
Adjustment Procedures	Results of Improper Adjustment
Caution : Be sure to cut off air supply and start the work when replacing the wiper. ① Replace the wiper base and the wiper with the optional parts. For the setscrews, use setscrews ❶, ❷ and ❸ without replacing them. (Part No.) Wiper base : 14445902 Thread clamp wiper asm. : 14446157 * Wiper action direction is the same as that of the standard.	
① Adjust the position of the wiper, at the stop position, to the following places. • Clearance provided between the wiper and the needle is 1 mm or more. • Adjust the wiper to 22.5 mm from the top surface of the throat plate. (For adjusting procedure, refer to the Instruction Manual for LK-1941/42.) ② Clearance C provided between the needle and the wiper becomes smaller than the tandard adjustment value, and the height of the top end of the wiper is lowered since the wiper retains the thread. Accordingly, the feeding frame may interfere with the wiper when the feeding frame goes up. Adjust the height of the feeding frame to 15 mm or less from the top surface of the throat plate. (For adjusting procedure, refer to the Instruction Manual for LK-1941/42.) ③ When the thread is hard to slip or easy to slip from the wiper at the start of sewing, adjust the wiper by correcting thread clamp spring ❶ in the direction of arrow mark B.	○ When the position of the wiper is improper, thread retaining failure will be caused. ○ When the height of the feeding frame is excessively high, it interferes with the wiper and wiper malfunction will be caused. ○ When adjustment of the thread clamp spring is improper, the spring causes thread not to be retained or needle thread to remain on the sewing product.

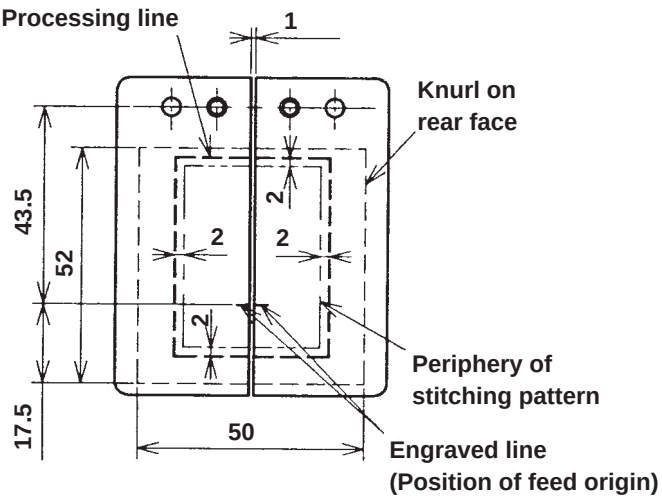
(5) Feeding frame components for belt (LK-1941)

Standard Adjustment

1) How to use the feeding frame blank for belt

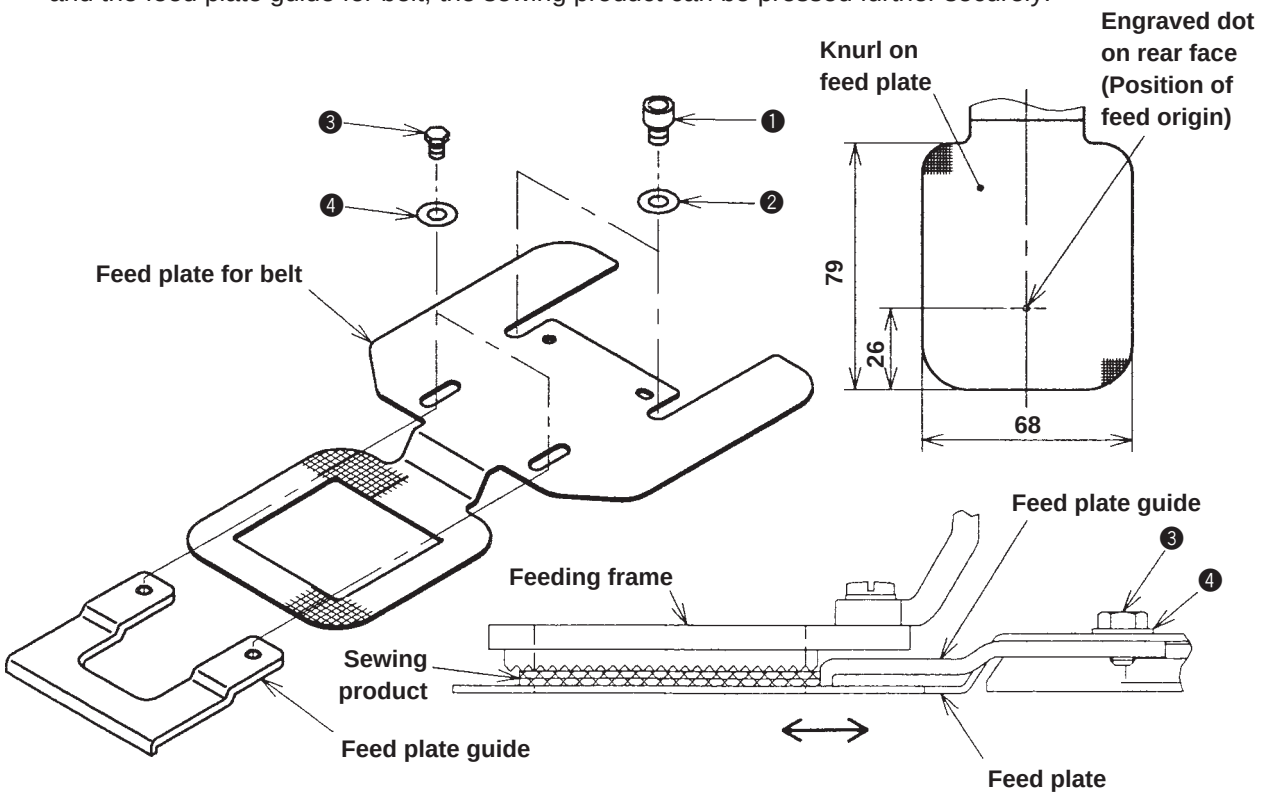
◎ By using the feeding frame blank for belt of the optional part, the sewing product can be pressed more securely than the ordinary blank material.





2) How to use the feed plate blank and the feed plate guide for belt

◎ In addition to the feeding frame for belt of the optional part, by jointly using the feed plate blank for belt and the feed plate guide for belt, the sewing product can be pressed further securely.



Adjustment Procedures	Results of Improper Adjustment
Caution : Be sure to cut off the air supply and start the work when replacing the feeding frame. ① Optional parts Feeding frame (right) blank for belt (Part No.) 14444004 Feeding frame (left) blank for belt (Part No.) 14444103 Make additional processing of these parts and install them on the machine in accordance with the stitching pattern. "Caution on additional processing" • Make the processing based on the engraved line. • Make the processing line larger by 2mm than the periphery of the stitching pattern. • Make the additional processing of the area of the gnarled section on the rear face as small as possible to further securely press the sewing product. ② When installing the parts, use setscrews ❶ and washers ❷ without replacing them.	○ If the processing line is smaller than the specified value, it will cause the needle and the feeding framme to interfere with each other.
Caution : Be sure to cut off the air supply and start the work when replacing the feeding frame. ① Install the optional parts. Feed plate blank for belt : (Part No.) 14444202 Feed plate guide : (Part No.) 14444301 • Make additional processing of the feed plate blank for belt and install it on the machine in accordance with the stitching pattern. "Caution on additional processing" • Make the processing of the same shape as that of the feeding frame based on the engraved dot. ② To install the feed plate, use setscrews ❶ and washers ❷ without replacing them. Install the feed plate guide with the following setscrews and washers. Optional parts Setrscrew ❸ : (Part No.) SM9040603SC 2 pcs. Washer ❹ : (Part No.) WP0450826SC 2 pcs. ③ The feed plate guide is the stopper guide for the sewing product. After installing it, move it in the direction of the arrow mark to adjust.	

11. TABLE OF ERROR INDICATION

Error indication	Name of error	Description	Corrective measure	Remarks
E 1	Pattern No. error	The specified pattern No. has not been registered in the data ROM.	Check the pattern No.	The service pattern is registered in SYSTEM ROM.
E 2	Enlargement error Pattern reading error	• The sewing pitch is beyond 10 mm. • Data ROM which is used is different from setting of DIP switch.	• Check the scale rate and sewing pitch. • Make sure of setting of SW1-1.	If the setting of SW1-1 is different from Data ROM, reading becomes unstable.
E 3	Needle bar upper position error	The needle bar is shifted from the upper position.	Turn the hand pulley, and return the needle bar to the upper position.	
E 4	Sewing area over	The sewing area is beyond the limit.	Press the reset switch and check the pattern and scale rate.	
E 5	Stop on the way	Stop on the way while the sewing machine is running.	• Re-sewing by retreat of the feed → start • Thread trimming action using the temporary stop switch or reset • Return-to-origin action by reset after thread trimming action	
E 6	Safety switch error	Safety switch is turned OFF. (When the sewing machine head is tilted or the like.)	• Turn OFF the power switch and raise the machine head. • Check the safety switch.	
E 7	Machine lock error Abnormal voltage error	The main shaft of the sewing machine does not rotate due to some troubles.	• Turn OFF the power switch, and remove the cause of trouble. • Check the power source voltage.	
E 8	Pattern data error	The pattern data reading from the data ROM cannot be made.	• Turn OFF the power switch and remove the cause. • Check the mounting of EEP-ROM (contact failure, direction of mounting, etc.). • Check the setting of SW1-1.	If the setting of SW1-1 is different from Data ROM, reading becomes unstable.
E 9	Needle thread breakage detection error	The needle thread has been broken during sewing.	• Retreat of the feed after threading and re-sewing • Return-to-origin action by reset	
E 10	PGM-7 communication error	Communication with the PGM-7 cannot be performed due to some troubles.	• Turn OFF the power switch. (Contact failure, disconnection of cord, or trouble of circuit board is considered.)	
E AA	Air pressure drop error	The air pressure is dropped.	Turn OFF the power switch, and check the air pressure.	
E EE	Memory write-in error	The data writing to the memory for the back-up cannot be made.	• Turn OFF the power switch. • Defective memory (Replace the MAIN circuit board.)	
E	Time-out error	MAIN circuit board is uncontrollable due to some troubles.	• Turn OFF the power switch. • Defective MAIN circuit board (Replace the MAIN circuit board.)	
E H	Overheat error	Temperature in the control box is abnormally high.	Turn OFF the power switch, and check whether the fan filter is clogged, and the power source voltage. Turn ON the power after the temperature has dropped properly.	

12. TROUBLES AND CORRECTIVE MEASURES

(1) Troubles and corrective measures (Mechanical parts)

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
1. Wiper cannot spread a thread.	Wiper interferes with the needle.	Inaccurate positioning of the wiper	Correct the position of the wiper.
	Wiper interferes with the intermediate presser.	Inaccurate positioning of the wiper	Correct the position of the wiper.
	Wiper spreads thread before thread has been trimmed. (Z type)	Length of wiper ON delay time is short.	Lengthen the wiper ON delay time. (Memory switch No. 45)
	Spreading force of wiper is too weak.	Supply air pressure is low.	Adjust the supply air pressure.
2. Abnormal noise	Backlash in the hook shaft is large.		Adjust the eccentric direction of hook driving shaft.
	Backlash in the hook shaft is small.		Adjust the eccentric direction of hook driving shaft.
	Oil amount in the hook is small.		Adjust the oil amount in the hook.
3. Deformation in sewn pattern	Backlash in X feed gear is large.	Backlash between the X feed arm and the motor base is excessive.	Properly adjust the backlash in the motor base.
		Backlash between the X stepping motor and the motor base is excessive.	Properly adjust the backlash in the X stepping motor.
	Backlash in Y feed gear is large.		Properly adjust the backlash in the Y feed gear.
	Travelling torque in X direction is excessive.	Motor base is excessively pressed to the X feed arm.	Properly adjust the backlash in the motor base.
		X stepping motor is excessively pressed to the motor base.	Properly adjust the backlash in the X stepping motor.
		Friction between the X slide plate and the feed plate	Properly adjust the attaching position of the slide block stud.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
	Travelling torque in Y direction is excessive.	Stepping motor is excessively pressed to the Y feed shaft.	Properly adjust the backlash in the Y stepping motor.
		Friction between the Y feed arm and the feed plate support plate	Properly adjust the position of the feed plate support plate.
	Pressing pressure is high or low.	Regulator is not properly adjusted.	Properly adjust the regulator.
		Supply air pressure is low.	Properly adjust the supply air pressure.
	Defective adjustment of the X sensor position		Properly adjust the position of the X sensor.
	Defective adjustment of the Y slit plate		Properly adjust the position of the Y sensor slit plate.
4. Feeding frame does not go up or come down.	Supply air pressure is low.		Properly adjust the supply air pressure.
	Contact between the feeding frame and the presser foot	Solid type feeding frame is installed to the separate type presser foot.	Replace the separate type presser foot with the solid type presser foot (optional).
		Whole part of the feeding frame is not pressing the material to be sewn.	Make the pressing shape so as to press uniformly.
	Presser lifter solenoid valve fails to work properly.	Trouble of the presser lifter solenoid	Replace the presser lifting solenoid.
		Defective connection of the presser lifter solenoid cable	Check the connection of the connector.
5. Intermediate presser does not go up. (LK-1942)	Presser lifter solenoid valve fails to work properly.	Trouble of the solenoid valve	Replace the solenoid valve.
		Defective connecion of the solenoid valve cable	Check the connection of the connector.
6. Intermediate presser fails to work during sewing. (LK-1942)	Defective adjustment of the position of the intermediate presser cam		Properly adjust the position of the intermediate presser cam.

(2) Troubles and corrective measures (With regard to sewing)

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
1. Thread comes off at the start of sewing	Stitch skipping at the 1st stitch		Decrease the sewing speed at the start of sewing.
		Penetration registance of the thread against the cloth is small.	Lower the needle count to be used.
	Length of needle thread remaining at the needle is not sufficient. (∗)	Tension controller No. 1 provides an excessive tension.	Properly adjust the tension controller No. 1.
		Tension release timing is excessively retarded.	Properly adjust the position of the tension release notch.
		Rising amount of tension disk N0. 2 or auxiliary thread tension (G and Z types) is small.	Properly adjust the rising amount of the tension disk No. 2.
		Stroke of the thread take-up spring is large.	Properly adjust the stroke of the thread take-up spring.
		Tension of the thread take-up spring is low.	Properly adjust the tension of the thread take-up spring.
		Needle thread tension is too high and thread is extremely stretched.	Properly adjust the needle thread tension.
		Resistance of thread draw-out from thread stand is large. (Coating thread or the like)	Use the thread draw-out device. (Provided as standard for G and Z types)
	Length of remaining bobbin thread is not sufficient.	Bobbin thread tension is too high.	Properly adjust the bobbin thread tension.
	Material to be sewn is apt to flop.		Remove the slack of the material to be sewn.
		Clearance between the intermediate presser and the material to be sewn is large. (LK-1942)	Properly adjust the height of the intermediate presser.
		Stroke of the intermediate presser is large.	Properly adjust the stroke of the intermediate presser.
		Working timing of the intermediate presser is not adjusted properly.	Properly adjust the intermediate presser cam.

∗ Excluding in the case where thread is excessively trimmed short.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
	Threading the thread guide is wrong.		Perform threading again.
	Bobbin runs idle and the bobbin thread is drawn out.		Strengthen the idle prevention spring.
		Defective initial position of the moving knife	Properly adjust the initial position of the moving knife.
		Sharpness of moving knife at the time of thread trimming is defective.	Properly adjust the knife components.
2. Needle breakage	Clearance between the needle and the hook is improper.		Properly adjust the clearance between the needle and the hook.
	Feed timing is defective.	Feed timing against cloth thickness is retarded.	Change the feed timing using the memory switch.
	Needle strikes the moving knife.		Properly adjust the position of the moving knife.
	Needle strikes the intermediate presser.		Properly adjust the holding position of the intermediate presser bar.
	Needle strikes the wiper.		Properly adjust the installing position of the wiper.
	Needle is bent.	Needle thread tension is too high.	Properly adjust the tension.
	Needle is too thin.		Change the needle No. to the suitable one to the material.
	Clearance between the needle guard section of the hook and the needle is defective.		Make a proper combination of the hook and the needle.
3. Stitch skipping	Clearance between the needle and the hook is excessive.		Properly adjust the clearance between the needle and the hook.
	Maladjustment of the needle to hook timing		Properly adjust the needle-to-hook timing.
	Clearance between the needle guard section of the hook and the needle is defective.	Needle is too thin as against the kind of hook.	Make a proper combination of the hook and the needle.
	Material to be sewn is apt to flop.	Clearance between the intermediate presser and the material to be sewn is large.	Properly adjust the height of the intermediate presser.
			Remove the slack of the material to be sewn.
		Hole diameter of the needle hole guide is large.	Replace the needle hole guide with a new one with small hole diameter.
	Needle sticking		Use a ball-point needle.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
	Loop fall occurs.		Use the ellipse needle hole guide for seat belt.
			Attach the needle with the long groove orienting to the right by approximately 20˚.
	Needle sways.	Feed timing is too fast.	Change the feed timing using the memory switch.
4. Thread breakage	Scratches on the hook		After polishing scratches on the hookwith oil stone, polish it with polishing powder. Properly adjust the clearance between the needle and the hook.
	Thread enters into the hook.	Scratches on blade point section Ⓐ of the hook 	Replace the hook with a new one.
		Hook timing is defective.	Properly adjust the needle-to-hook timing.
		Needle thread tension is too low.	Properly adjust the needle thread tension.
		Thread take-up spring tension is too low.	Properly adjust the thread take-up spring.
		Length of the remaining needle thread is too long.	Properly adjust the tension controller No. 1.
	Scratches on the needle hole guide		Remove the scratch and polish it with buff, or replace it with a new one.
	Finish of needle eyelet is rough.		Replace the needle.
	Thread take-up spring is maladjusted.	Stroke of the thread take-up spring is too large.	Properly adjust the thread take-up spring.
		Thread take-up spring tension is too high.	Properly adjust the thread take-up spring.
	Thread is entangled on the moving knife during sewing.	Oil shield plate is not installed.	Install the oil shield plate.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
	Partial catch of needle thread loop by hook	Clearance between the needle and the hook is too large.	Properly adjust the clearance between the needle and the hook.
		Clearance between the needle guard section of the hook and the needle is defective.	Make a proper combination of the hook and the needle.
		Fall of the loop	Use the ellipse needle hole guide for seat belt.
			Attach the needle with the long groove orienting to the right by approximately 20°.
		Needle sticking	Use a ball-point needle.
5. Needle thread comes off due to short thread trimming at the time of thread trimming.	Thread spreading section of the moving knife has scratches.		Pay attention to the blade section and polish the scratch with polishing powder.
	Thread is cut before trimming with the blade section of the moving knife. (G and H types)	Level difference between the needle hole guide and the counter knife is too high.	Properly adjust the height of the counter knife.
	Thread is cut before trimming with the blade section of the moving knife. (G and H types)	Clearance between the needle hole guide and the counter knife is too small.	Properly adjust the position of the counter knife.
	Bottom face of the needle hole guide has scratches.	Thread is cut with the needle hole guide.	Remove the scratches and polish with buff, or replace the needle hole guide with a new one.
	Thread spreading timing of the moving knife is defective.		Properly adjust the initial position of the thread trimmer cam and the moving knife.
	Thread trimming timing is too fast. (G and H types)	Moving knife timing is defective.	Properly adjust the position of the moving knife.
		Thread trimmer cam timing is defective.	Properly adjust the position of the thread trimmer cam.
	Double step trimming (Z type)	Position of the moving knife at the time of stop is defective. (Short thread remains near the moving knife.)	Properly adjust the position of the moving knife.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
6. Thread is not trimmed.	Sharpness of the knife is defective. (G and H types)	Worn-out of the moving and counter knives	Replace the moving and counter knives.
		Engagement of the moving and counter knives is defective.	Properly adjust the height and position of the moving and counter knives.
		Parallel of the blade section of counter knife is defective.	Properly adjust the parallel of the blade section of counter knife.
		Attaching position of the counter knife is defective.	Properly adjust the attaching position of counter knife.
	Sharpness is defective. (Z type)	Level of the heat cutter temperature is low.	Raise the level of heat cutter temperature.
		Hot wire plate is far from the needle hole.	Properly adjust the position of the hot wire plate.
		Hot wire plate comes in contact with a metallic section.	Properly adjust the position of the hot wire plate.
		Point of contact of hot wire plate or cable is defective.	Check the state of connection.
	Hot wire plate is fused. (Z type)		Replace the hot wire plate with a new one.
	Moving knife does not spread threads.	Initial position of the moving knife is maladjusted.	Properly adjust the initial position of moving knife.
		Position of the thread trimmer cam is defective.	Properly adjust the position of thread trimmer cam.
	Stitch skipping at the final stitch.	Clearance between the needle and the inner hook, and timing of the needle to the inner hook are defective.	Properly adjust the timing abd clearance.
		Height of the intermediate presser is too high.	Properly adjust the height of intermediate presser.
		Needle thread loop falls down.	Attach the needle with the long groove orienting slightly to the right by approximately 20˚.
			Replace the needle hole guide with the ellipse needle hole guide for seat belt.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
	Moving knife does not spread bobbin thread.	Bobbin thread tension is too low.	Stengthen the bobbin thread tension.
		Needle hole of the needle hole guide is too large.	Replace the needle hole guide with a new one having a smaller hole diameter.
		Pitch at the final stitch is small.	Increase the pitch at the final stitch.
		Flopping of cloth	Control the flopping of cloth.
7. Poor tense stitches	Defective adjustment of the tension controller No. 2	Tension of the tension controller No. 2 is low.	Properly adjust the tension of tension controller No. 2.
	Tension controller No. 2 or auxiliary thread tension is floating.		Properly adjust the thread release mechanism.
	Thread take-up spring is maladjusted.		Properly adjust the tension and stroke of thread take-up spring.
	Selection of the needle to be used is improper.	Needle to be used is thin.	Replace the needle with a thicker one.
	Selection of the needle hole guide is improper.	Hole diameter of the needle hole guide to the needle to be used and thread is small.	Replace the needle hole guide with a new one having a larger needle hole diameter.
	Shape of the feed plate is defective.	Material to be sewn is stiff and closely comes in contact with the throat plate, and there is no clearance between them to pass the thread.	Raise the material to be sewn by means of the feed plate.
		Material to be sewn is highly elastic and closely comes in contact with the throat plate, and there is no clearance between them to pass the thread.	Raise the material to be sewn by means of the feed plate.
	Thread slips from the thread guide wheel of the auxiliary thread tension. (G and Z types)	Balance of tension of tension controller No. 2 and that of auxiliary thread tension is defective.	Increase the tension of tension controller No. 2, or decrease the tension of auxiliary thread tension.
	Feed timing is defective.	Feed timing is too fast.	Change the feed timing using the memory switch.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
8. Defective stitches with the synthetic thread	Thread breakage due to heat	Sewing speed is too fast.	Decrease the maximum speed.
		Needle is too thick.	Use a thinner needle or a super needle for the synthetic thread.
			Apply silicon.
			Use the needle cooler.
	Thread makes burrs.	Thread path is defective.	Polish the thread path of each component with polishing powder.
		Finish of needle eyelet is defective.	Replace the needle.
		Needle thread loop falls down.	Move the thread guide A to the left.
			Use the ellipse needle hole guide for seat belt.
		Needle sticking	Use a ball-point needle.
	Thread floating occurs at the sewing start.	Penetration resistance of the thread against the cloth is too small.	Use a thinner needle.
	Stitch skipping due to the heat	Sewing speed is too fast.	Change the maximum speed.
		Needle is too thin.	Use a thicker needle.
		Needle thread loop falls down.	Attach the needle with the long groove orienting slightly to the right by approximately 20˚.
			Use the ellipse needle hole guide for seat belt.
			Use the needle cooler.
	Uneven stitch tightness due to the stretch of thread	Sewing speed is too fast.	Change the maximum speed.
		Tension of the tension controller No. 2 is too high.	Decrease the tension of the tension controller No. 2.

(3) Electrical components

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
1. The display fails to light.	1-1) The power is not supplied to the POWER circuit board.	1-A) Disconnected J30 connector	Securely connect the connector.
		1-B) Fuse F1 or F2 has blown.	Replace the fuse after removing the cause. (10A)
	1-2) The power is not supplied to the MAIN circuit board.	2-A) Disconnected J37 connector (POWER circuit board)	Securely connect the connector.
		2-B) Disconnected J16 connector (MAIN circuit board)	
		2-C) Fuse F3 has blown.	Replace the fuse after removing the cause. (F3 = 10A), F6 = 3A)
		2-D) Fuse F6 has blown.	
	1-3) Operation panel ⟷ Main circuit board are not connected.	3-A) Disconnected J23 connector (MAIN circuit board)	Securely connect the connector.
	1-4) Trouble on the MAIN circuit board	4-A) Direction of the system ROM is reverse.	Correctly insert it.
		4-B) System ROM is not correctly inserted.	
		4-C) Wiring pattern near the data ROM has broken.	Replace the MAIN circuit board.
2. A key switch on the operation panel fails to work.	2-1) Failure with the switch		Look for the defective switch using the input check mode CP-1 and replace the operation box or the operation circuit board.
	2-2) Failure with the circuit board		Replace the operation box or the operation circuit board.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
3. Error No. E1 is indicated.	3-1) Pattern No. has not been registered.		Check the pattern No.
	3-2) Defective data ROM (U32)		Replace the data ROM.
	3-3) Setting of DIP switch SW1-1 is wrong.		Check SW1-1 on the MAIN circuit board.
	3-4) Defective circuit board		Replace the MAIN circuit board.
4. E5 (temporary stop) is not released.	4-1) Temporary stop switch ⟷ MAIN circuit board are not connected.	1-A) Disconnected J22 connector	Securely connect the connector.
5. EH (overheat error) is not released.	5-1) MAIN circuit board ⟷ thermostat are not connected.	1-A) Disconnected J27 connector	Securely connect the connector.
6. Error No. E7 is indicated although main shaft is not locked.	6-1) Rated power is not supplied.	1-A) Power is out of ±10% of rating.	Check the power and supply correct voltage.
	6-2) Driving power has not been supplied to the machine motor.	2-A) Disconnected J8 connector (SERVO circuit board) Disconnected J28 connector (Servo motor)	Securely connect the connector.
	6-3) Driving power has not been supplied.	3-A) Disconnected J9 connector (SERVO circuit board) Disconnected J33 connector (POWER circuit board)	
	6-4) Power for the control has not beeb supplied.	4-A) Disconnected J6 connector (SERVO circuit board) Disconnected J36 connector (POWER circuit board)	
	6-5) Encoder signal from the machine motor has not been supplied.	5-A) Disconnected J2 connector (SERVO circuit board) Disconnected J29 connector (Servo motor)	
7. Error No. “E3 Needle-up stop error” cannot be cleared.	7-1) MAIN and SERVO circuit boards are not connected.	1-A) Disconnected J11 connector Disconnected J1 connector	Securely connect the connector.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
8. Main shaft rotates at a low speed for approximately two seconds and stops at Error No. E7.	8-1) Signal from the main shaft sensor is not transmitted.	1-A) Disconnected J4 connector	Securely connect the connector.
		1-B) Defective main shaft sensor	Replace the sensor.
		1-C) Defective SERVO circuit board	Replace the circuit bosrd.
9. After the READY key is turned ON, the feeding frame comes down but fails to move. The machine does not be put in the sewing state.	9-1) Voltage of +85V is not supplied to the MAIN circuit board.	1-A) Fuse F4 has blown.	Replace the fuse after removing the cause. (8A)
	9-2) MAIN circuit board ⟷ stepping motor are not connected.	2-A) Disconnected J14 connector (X feed) Disconnected J15 connector (Y feed)	Securely connect the connector.
	9-3) Failure with the circuit board		Replace the MAIN circuit board.
10. Feeding frame pedal switch fails to work.	10-1) Pedal switch ⟷ MAIN circuit board are not connected.	1-A) Disconnected J18 or J26 connector (MAIN circuit board)	Securely connect the connector.
	10-2) Failure with the pedal switch		Check the pedal switch using the input check mode CP-1.
	10-3) Failure with the circuit board		Replace the MAIN circuit board.
	10-4) Pedal used does not correspond with the memory switch.		Check the memory switch No. 10.
11. AA error cannot be released.	11-1) Air sensor ⟷ MAIN circuit board are not connected.	1-A) Disconnected J78 connector	Securely connect the connector.
	11-2) Defective air sensor	2-A) Setting of the detection pressure is too high.	Set the proper value.
		2-B) Sensor cannot detect.	Replace the filter regulator.

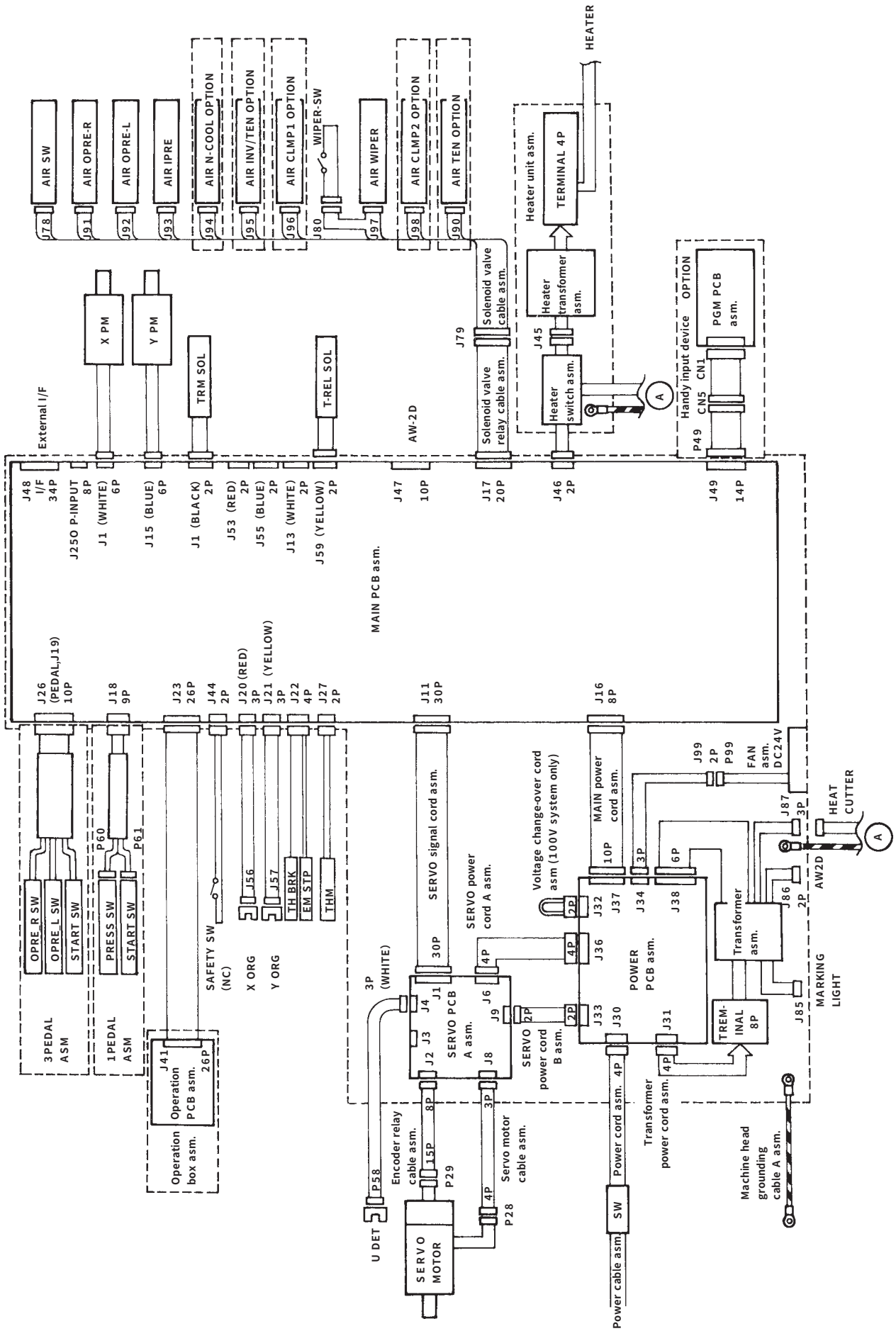
Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
12. E9 error : Thread breakage detection fails to work. (Detection within 8 stitches at the sewing start and 3 stitches at midway of sewing is not possible.)	12-1) Thread breakage detection ineffective mode is set.	1-A) Memory switch No. 20 is set to “0”.	Set the memory switch No. 20 to “1”.
	12-2) Head grounding is not performed.		Connect the head grounding wire to the control box.
	12-3) Thread breakage detection plate does not come in contact the thread take-up spring when the machine head is not threaded.		Properly adjust the position of thread breakage detection plate.
	12-4) Failure with the circuit board		Replace the MAIN circuit board.
13. Origin retrieval is made while the feeding frame is held raised.	13-1) Solenoid valve ⟷ MAIN circuit board are not connected.	1-A) Disconnected P91 and P92 connectors	Securely connect the connector.
	13-2) Failure with the solenoid valve		Check the output of test mode CP-5 and replace the solenoid valve.
	13-3) Failure with the circuit board		Check the output of test mode CP-5 and replace the MAIN circuit board.
14. After turning ON the power, at the first origin retrieval, the machine moves to the unexpected direction.	14-1) MAIN circuit board ⟷ X/Y sensors are not correctly connected.	1-A) Mistakenly connected J20 and J21 connectors	Check the connection of the connectors.
	14-2) MAIN circuit board ⟷ X/Y motors are not correctly connected.	2-A) Mistakenly connected J14 and J15 connectors	Check the connection of the connectors.
15. Thread trimming does not work.	15-1) Thread trimmer solenoid does not work.	1-A) Disconnected J12 connector	Securely connect the connector.
	15-2) Thread trimming ineffective mode is set.	2-A) Memory switch No. 37 or No. 38 is set to ineffective 1.	Set the memory switch No. 37 or 38 to effective "0".
	15-3) Failure with the circuit board		Check the output of test mode CP-5 and replace the MAIN circuit board.
	15-4) Wiring of the solenoid has broken.		Measure the resistance and if the value is immense, replace the solenoid.

Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
16. Thread trimming solenod cannot be turned OFF.	16-1) Shortcircuit of solenoid driving transistor		Replace the MAIN circuit board. Replace the transistor.
17. Thread cannot be trimmed. (H and G types)	17-1) Model setting memory switch No. 99 is wrong.		Correctly set the memory switch.
18. Thread cannot be trimmed. (Z type)	18-1) Hot wire plate is not heated at all.	1-A) Model setting memory switch No. 99 is wrong.	Correctly set the memory switch.
		1-B) Heater unit and control box are not connected. (J46, J45, and J87)	Securely connect them.
		1-C) Fuse of the heater unit has blown.	Remove the cause and replace the fuse (5A).
		1-D) Hot wire plate has fused.	Replace the hot wire plate (setting level is too high).
	18-2) Temperature of the hot wire plate is not raised.	2-A) Terminal board and screw of heater unit and heater cord asm. are loosened.	Correctly adjust and fix them.
		2-B) Screw and nut of heater cord asm. and element are loosened.	
		2-C) Shortcircuit between heater element and throat plate	
	∗ **If the screw is loosened between the hot wire plate and the heater unit, temperature of the hot wire plate is not raised. Properly tighten the screw.**		
19. Intermediate presser does not come down.	19-1) Solenoid valve cannot be turned ON.	1-A) Disconnected J93 connector	Securely connect the connector.
		1-B) Memory switch No. 23 is set to "0" (ineffective).	Set the memory switch No. 23 to "1" (effective).
		1-C) Memory switch No. 23 cannot be indicated.	Check the memory switch No. 99. (1942 ; 99-42, and 99-44 are with intermediate presser.)

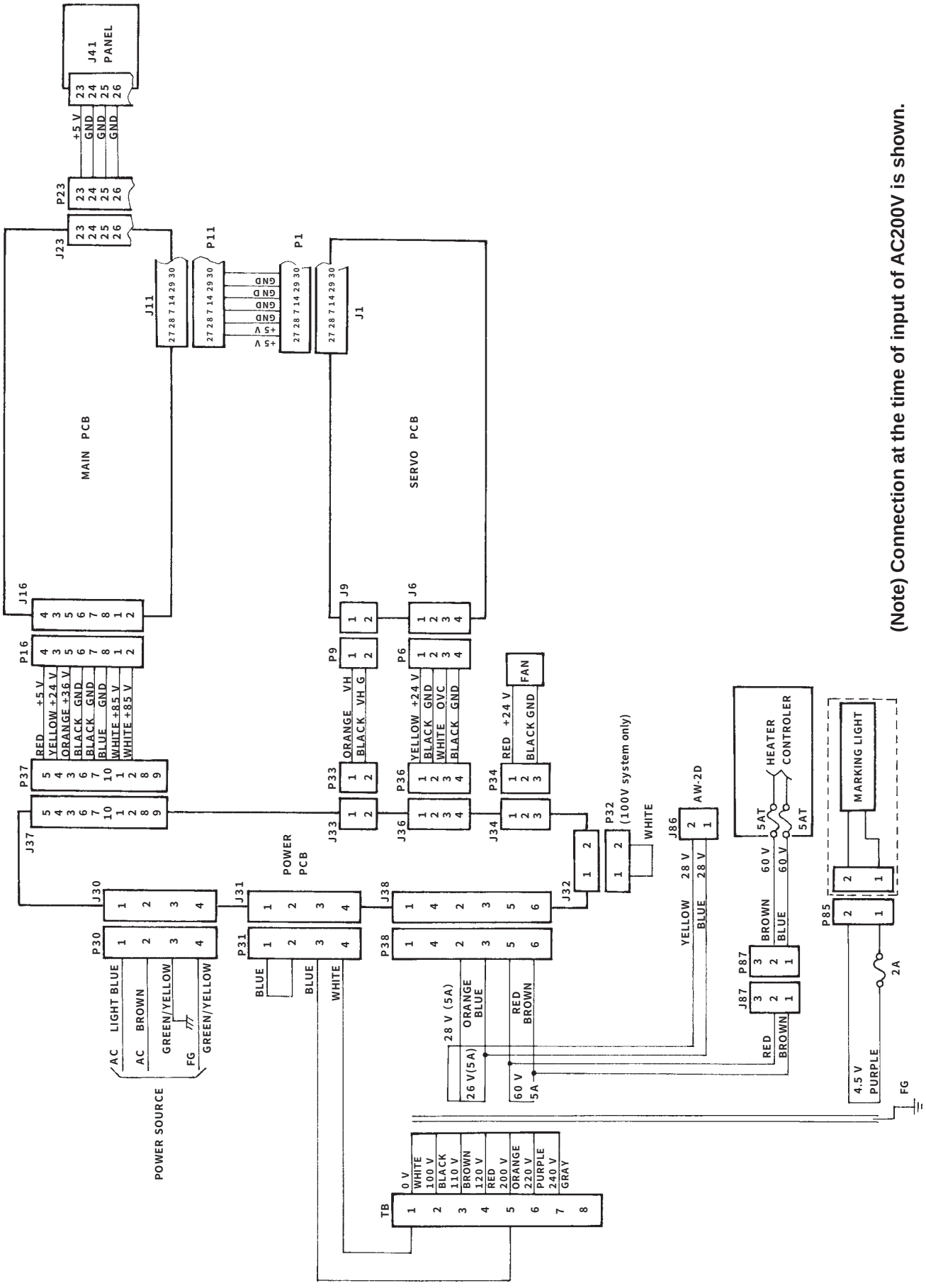
Troubles	Cause (1)	Cause (2)	Checking order and adjusting method
20. Wiper fails to work.	20-1) Wiper operation mode is incorrect.	1-A) Memory switch No. 11 is set to "0".	Set the memory switch No. 11 to "1" (effective).
		1-B) Machine head wiper switch is turned OFF.	Turn ON the machine head wiper switch.
	20-2) Solenoid valve, wiper switch ⟷ MAIN circuit board are not connected.	2-A) Disconnected J80 and J97 connectors	Securely insert the connectors.
	20-3) Failure with the circuit board		Check the output of test mode CP-5. Replace the MAIN circuit board.
21. E2 or E8 is occasionally indicated.	21-1) Setting of SW1-1 of the MAIN circuit board is wrong.		Change the setting of SW1-1 (ON ⟷ OFF).
	21-2) Defective pattern data		Check the data ROM or replace it.
22. E6 cannot be released.	22-1) MAIN circuit board ⟷ safety switch are not connected.	1-A) Disconnected J44 connector	Securely connect the connector.
	22-2) Safety switch lever is not turned ON.	2-A) The switch was not installed on the proper position at the time of setup.	Refer to the item of setting the safety switch in the Instruction Manual.

13. CIRCUIT DIAGRAM

(1) Block diagram

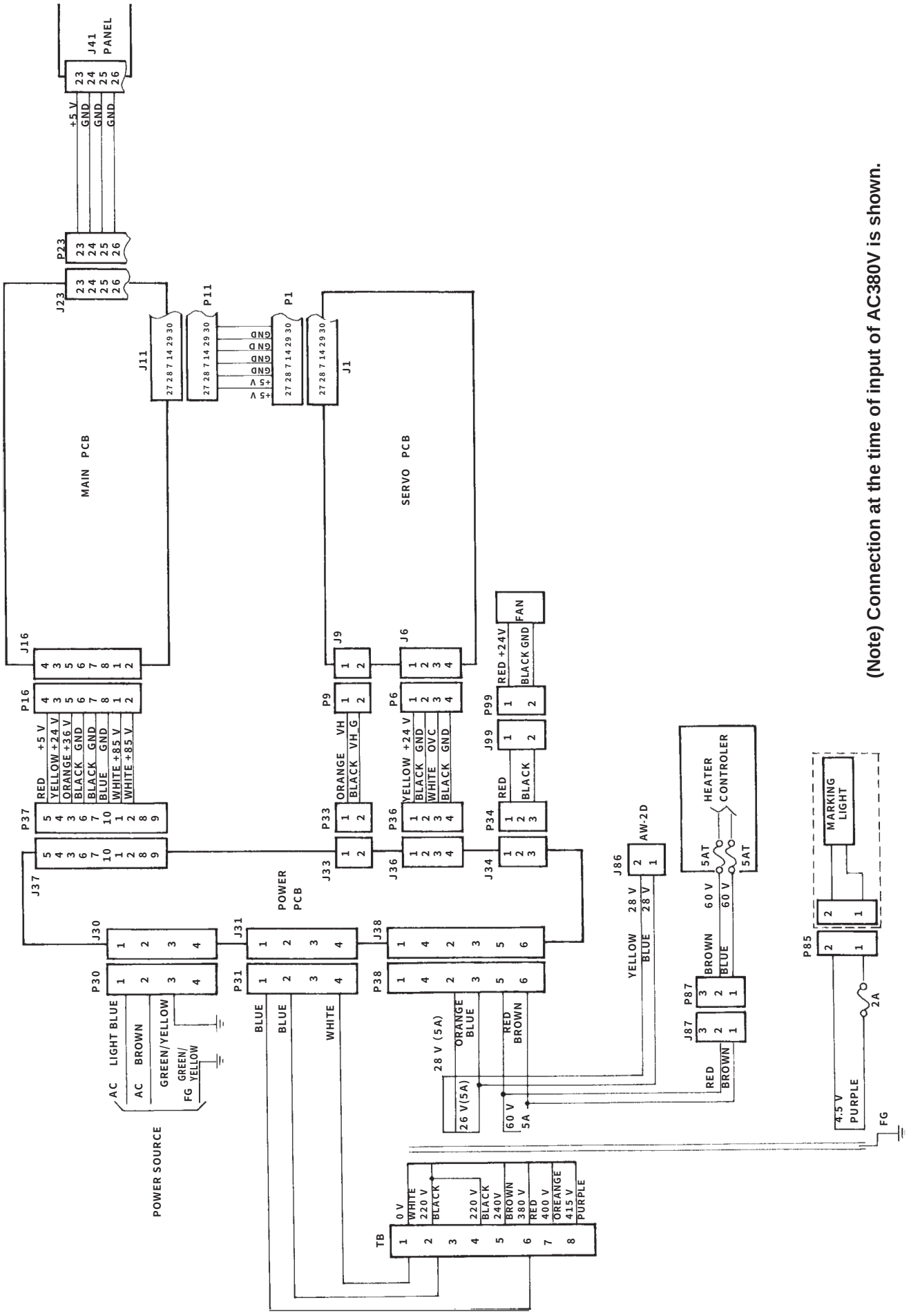


(2) POWER circuit diagram A

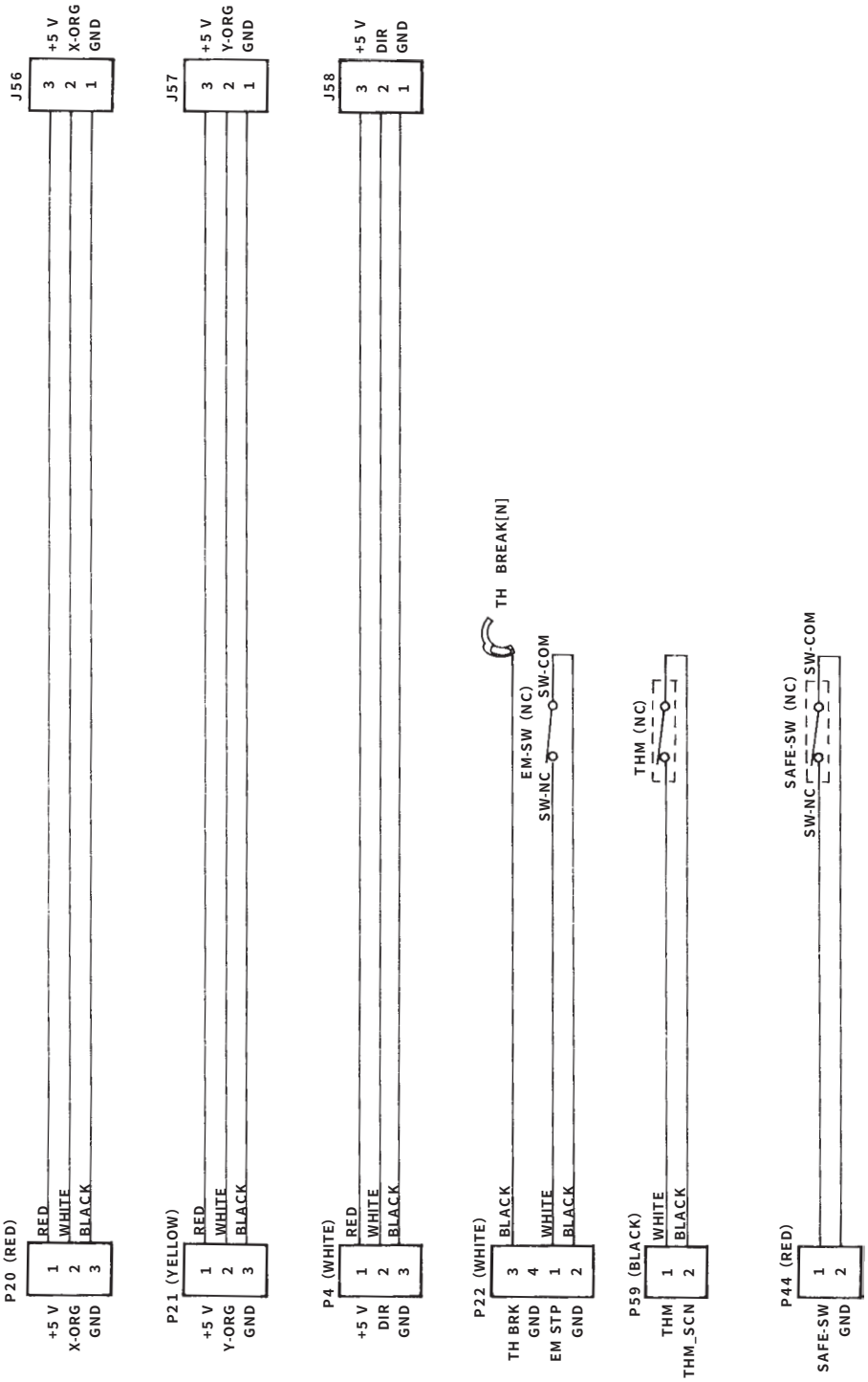


(Note) Connection at the time of input of AC200V is shown.

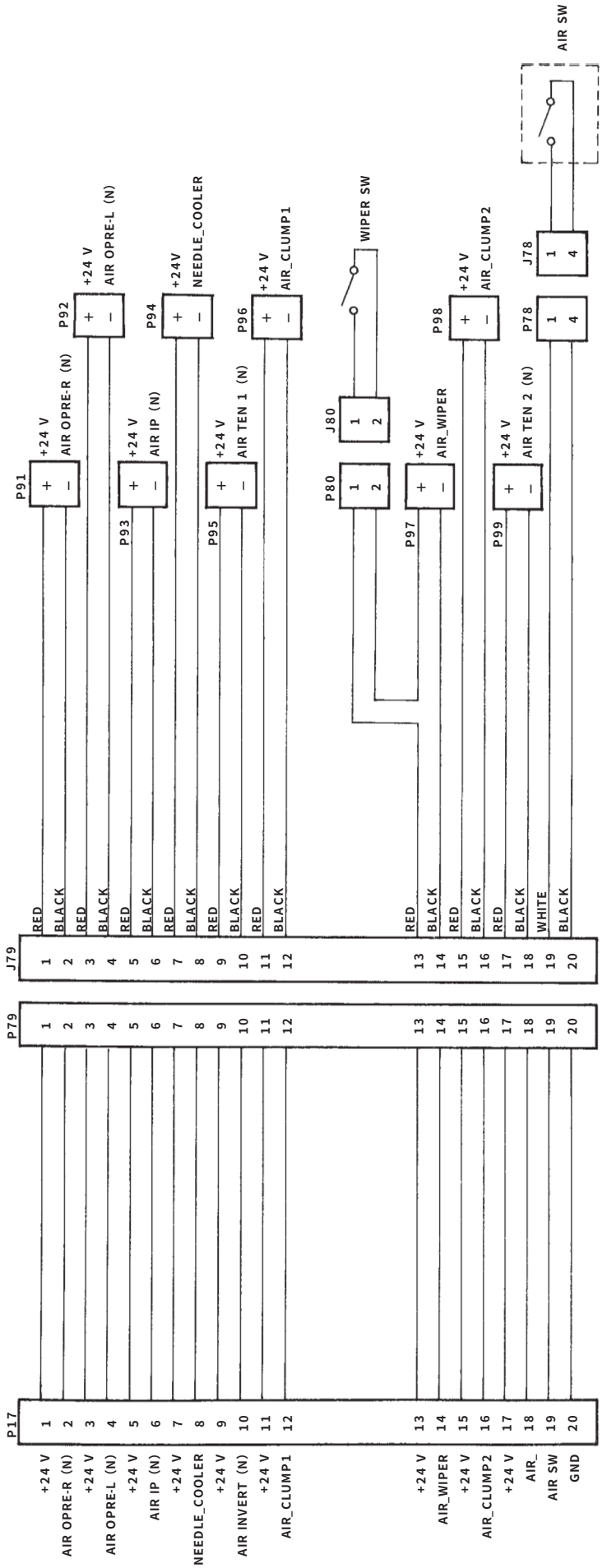
(3) POWER circuit diagram B



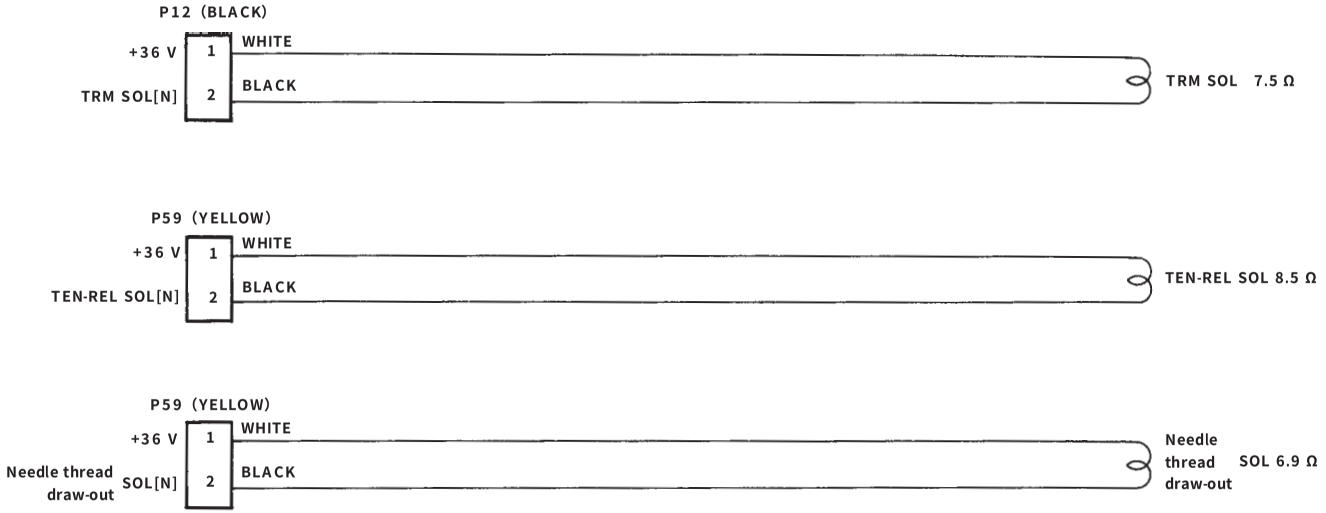
(4) Machine head sensor circuit diagram



(5) Solenoid valve circuit diagram

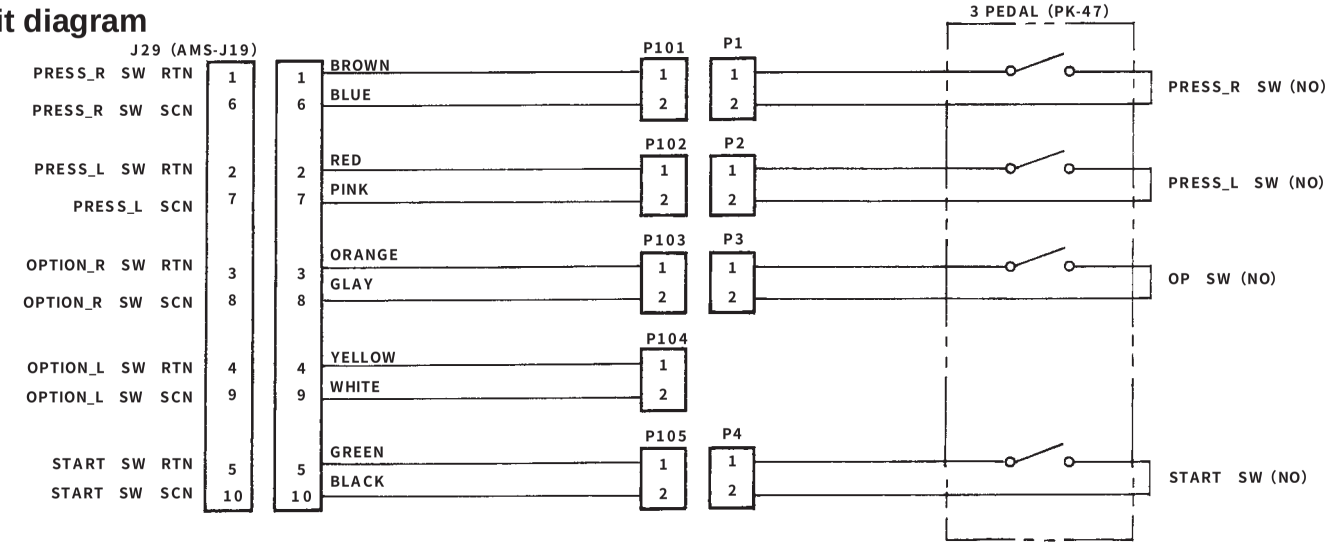


(6) Solenoid circuit diagram

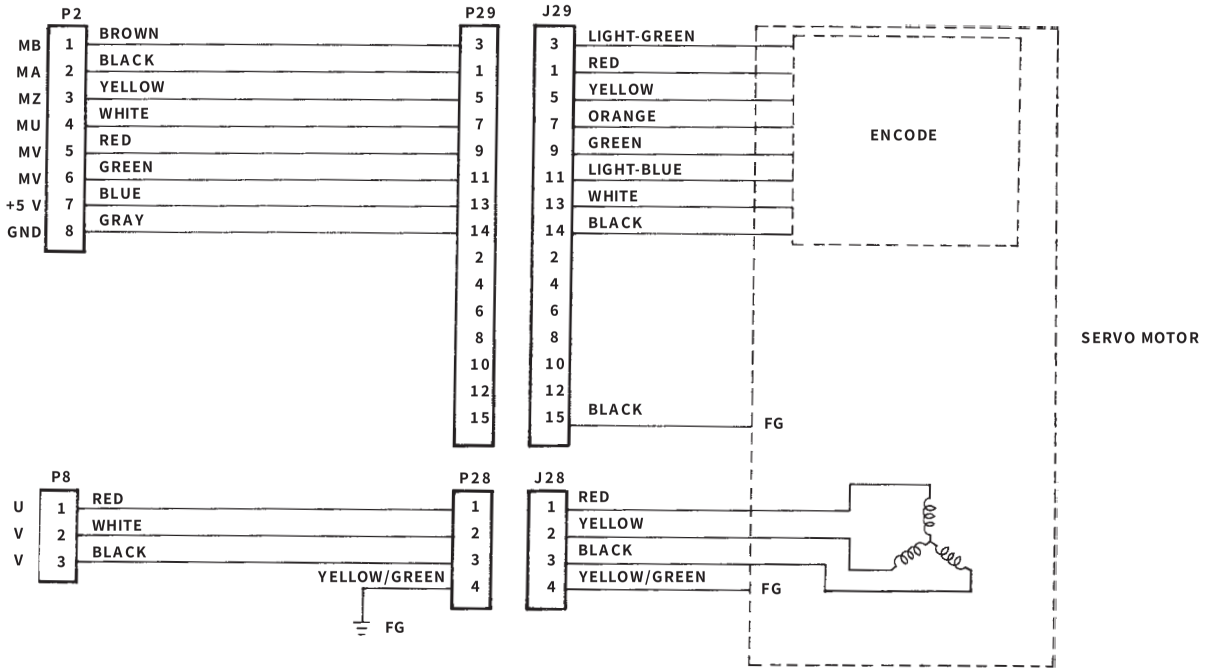


(Note) Needle thread draw-out SOL is the standard for G and Z types. TEN-REL-SOL is optional.

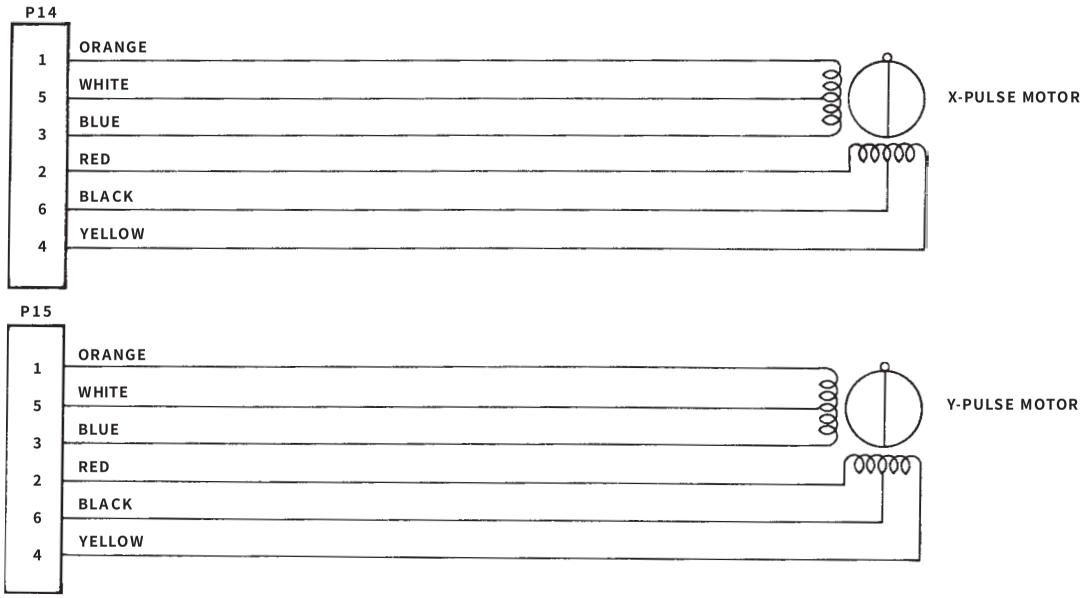
(7) 3-step PK pedal circuit diagram



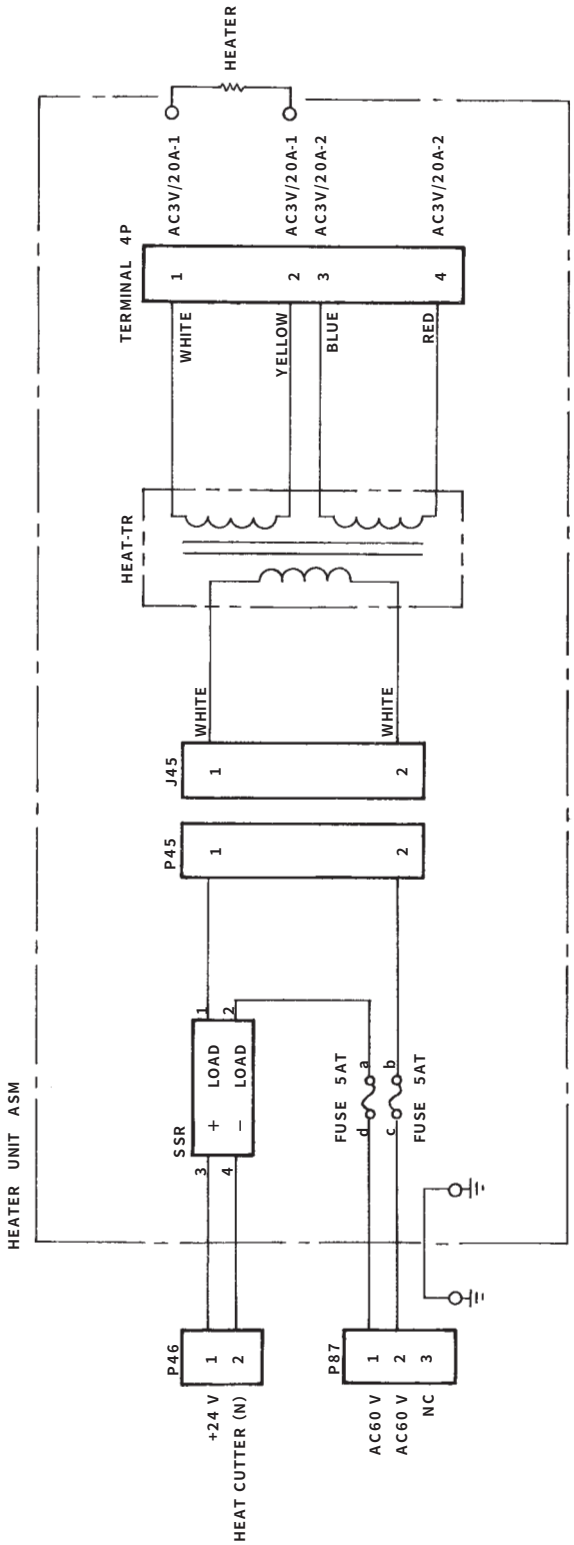
(8) Servo motor circuit diagram



(9) Stepping motor circuit diagram



(10) Heat cutter circuit diagram

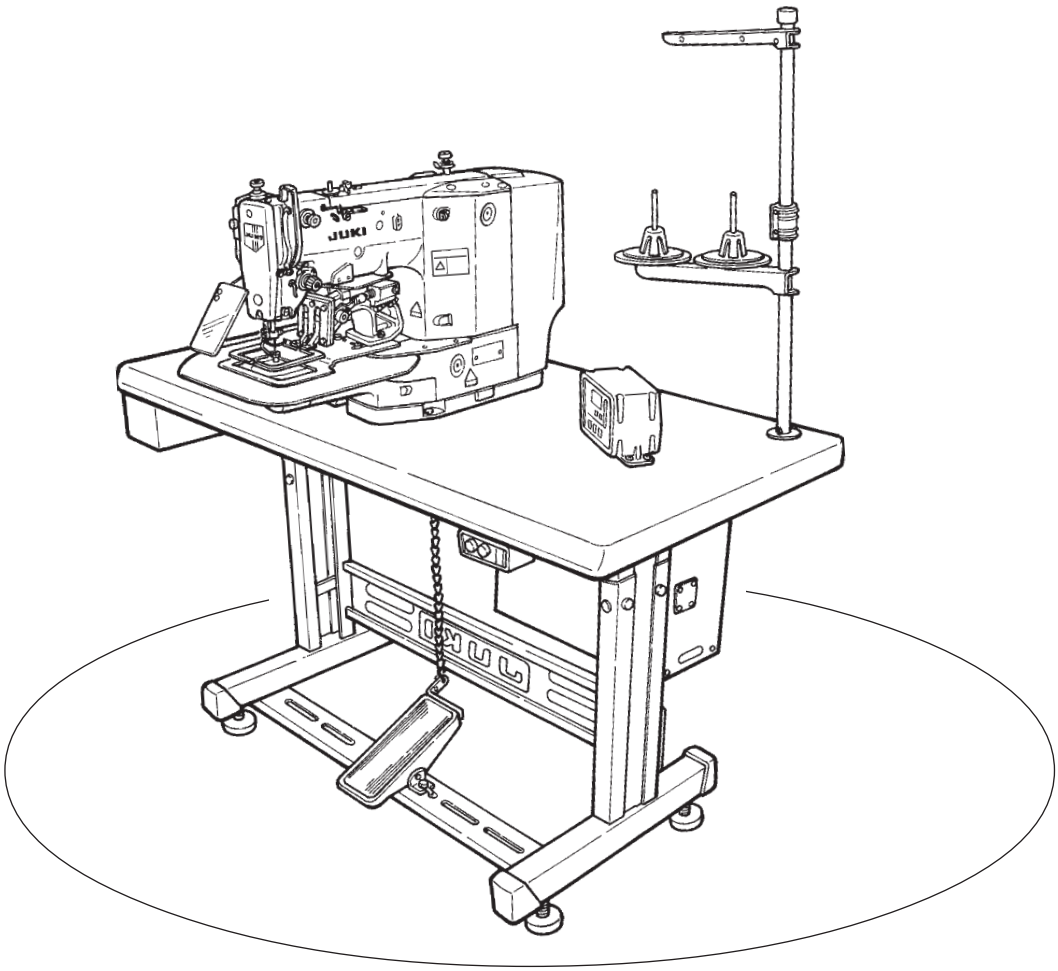


JUKI

Computer-controlled High Speed Shape-tacking Industrial Sewing Machine with Full-rotary Three-fold Capacity Hook

LK-1941/LK-1942

ENGINEER'S MANUAL



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PREFACE

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the sewing machine. This manual describes "Adjustment Procedure", "Results of Improper Adjustment", and other functions which are not covered by the Instruction Book intended for the maintenance personnel and sewing operators at a sewing factory.

All personnel engaged in repair of LK-1941/LK-1942 are required to carefully read Section 2 "Standard Adjustment" which contains important information on the maintenance of LK-1941/LK-1942.

The "Standard Adjustment" consists of two parts; the former part presents illustration and simplified explanation for the convenience of reconfirmation of the required adjustment values in carrying out actual adjustment after reading this manual once; and the latter part provides "Results of Improper Adjustment" in which sewing and/or mechanical failures, and the correcting procedures are explained for those persons who perform such adjustment for the first time.

It is advisable to use "LK-1941/LK-1942 Parts Book" together with this Engineer's Manual.

CONTENTS

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✳ **The description covered in this engineer's manual is subject to change for improvement of the commodity without notice.**

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