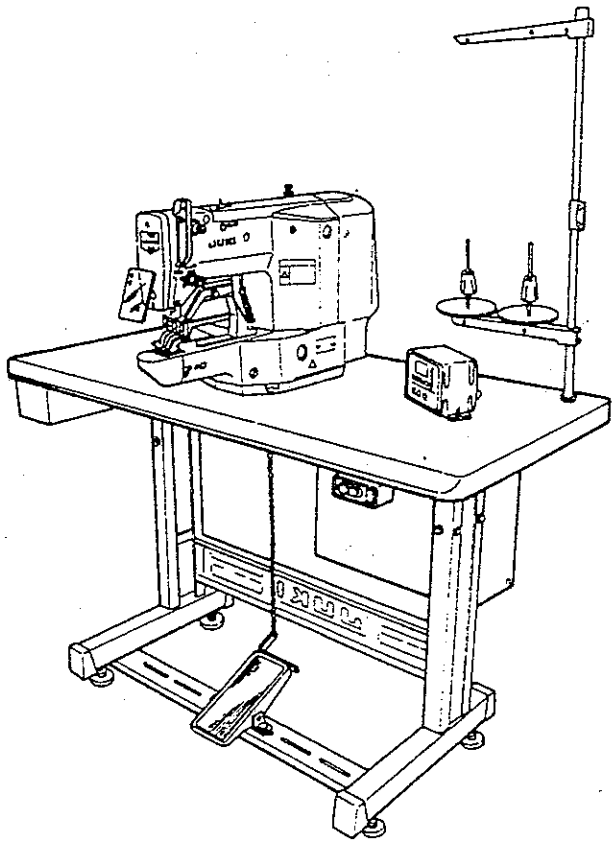
JUKI®

Computer-controlled High Speed
Bar Tacking Industrial Sewing Machine

LK-1900

ENGINEER'S MANUAL



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No.00

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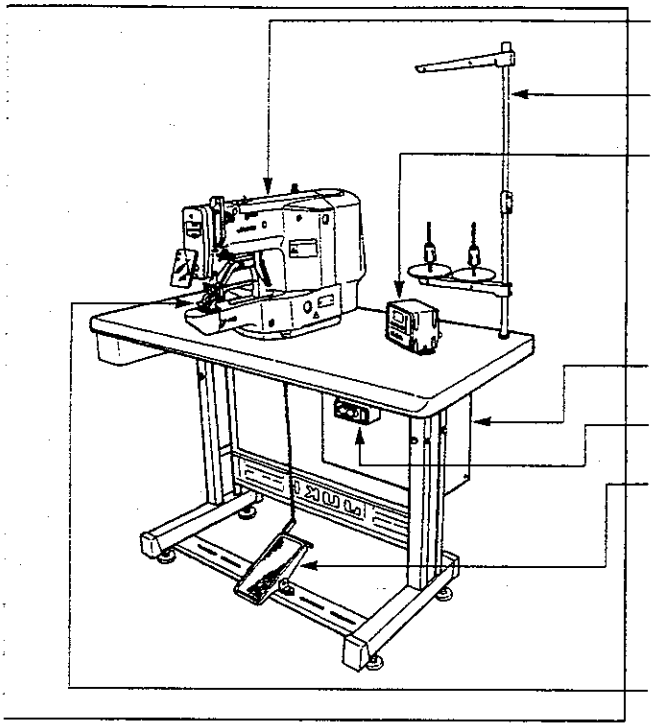
1. SPECIFICATIONS

1)	Sewing area :	X (lateral) direction 40 mm Y (longitudinal) direction 20 mm
2)	Max. sewing speed :	※ 2,700 s.p.m. (When sewing pitches are less than 4.5 mm in X-direction and 3.5 mm in Y -direction.)
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 5, DP x 17 (H type only)
7)	Lift of work clamp foot :	13 mm (standard) Max. 17 mm
8)	Shuttle :	Standard semi-rotary hook (oil wick lubrication)
9)	Lubricating oil :	New Defrix Oil No. 2 (supplied by oiler)
10)	Data recording :	EP-ROM (32kbyte)
11)	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)
12)	Enlarging/Reducing method :	Pattern enlargement/reduction can be done by increasing/decreasing the stitch length
13)	Max. sewing speed limitation :	The max. sewing speed can be set limited to any value within a range of 400 to 2,700 s.p.m. using the up/down key.(100 s.p.m. steps)
14)	Pattern selection :	1 to 99 patterns can be selected by specifying the desired pattern Nos.
15)	Bobbin thread counter :	Tells the time to replace the bobbin by the bobbin thread counter. (Max. 9,999 pcs.)
16)	Memory back-up :	In case of a power interruption, the pattern being used will automatically be stored in memory.
17)	Sewing machine motor :	400W servo motor
18)	Dimensions :	W : 1,200 mm L : 660 mm H : 1,100 mm (Use the standard table and stand.)
19)	Weight :	Machine head 42 kg, Control box 16.5 kg
20)	Power consumption :	500 W
21)	Operating temperature range :	5 °C to 35 °C
22)	Operating humidity range :	35% to 85% (No dew condensation)
23)	Line voltage :	Rated voltage ± 10% 50/60 HZ
24)	Air pressure used :	0.5 to 0.55 MPa (5 to 5.5kgf/cm²) } For pneumatic type only.
25)	Air consumption :	1.3 ℓ /min } For pneumatic type only.
26)	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.

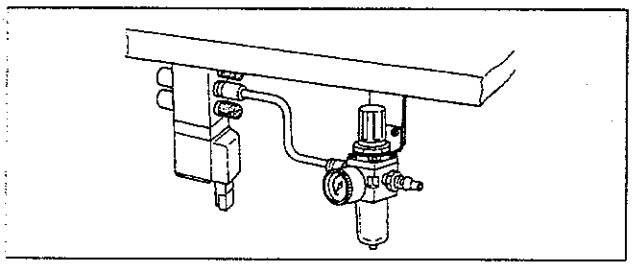
2. CONFIGURATION

(1) Names of main unit

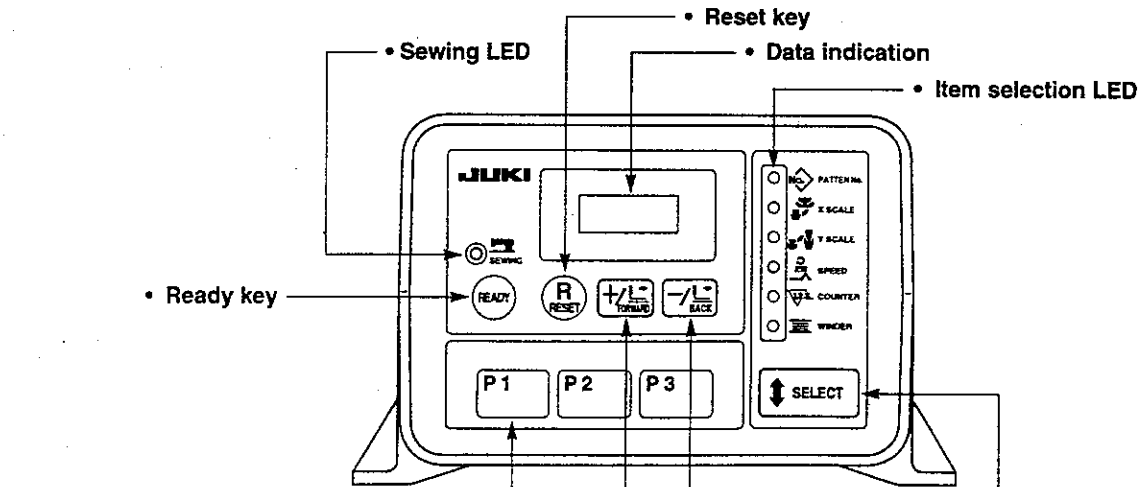


- Machine head
- Thread stand
- Operation box
- Control box
- Power switch
- Pedal switch
  1st step : Work clamp foot switch
  2nd step : Start switch
- Work clamp feet

Air regulator (for pneumatic type only)



(2) Names of switches on the control box



Function of the control panel key

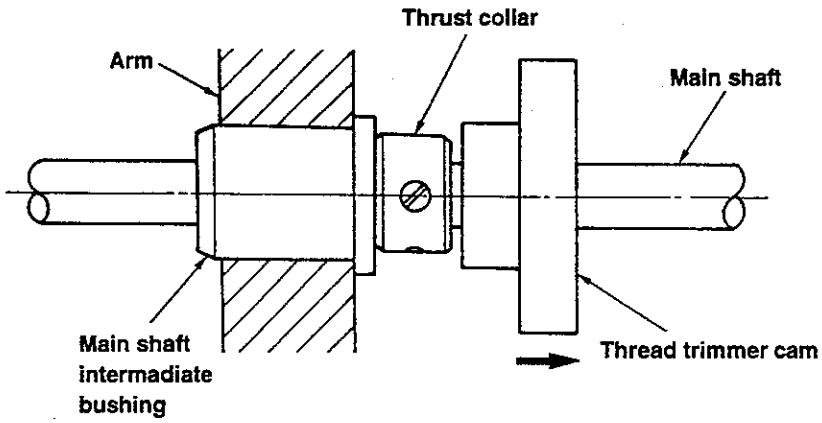
	Ready key	Reset key	Selection key	Feed forwad key, feed backward key	P1, P2, P3 key
Normal	Change-over : Standby state → Sewing state	This key returns the set value to the standard value.	→ Pattern No. → X scale → Y scale → Speed → Counter → Bobbin winder →	Addition or subtraction of the set value	Calling P1 to P7 which have been registered
Memory switch	Change of set value (decided)	This key returns the set value to the standard value.	Set No. → Set value	Addition or subtraction of the set value	Level 1 → Level 2 (move) (Selection + P3)
Registration of P key	Setting → Registration (decided)	This key clears all the set values.	Set No. → Set value	Addition or subtraction of the set value	This key is used to select the P key to be registered.
Registration of combination (C)	Setting → Registration (decided)	This key clears all the set contents.	Set No. → Set value	Addition or subtraction of the set value	This key is used to select P1 to P7 to be registered.
Test mode	–	–	CP-1 → CP-2 → CP-3 → CP-4 →	Addition or subtraction of the set value	Selection 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 the count value	–	Addition or subtraction of the set value	–
Others	–	Temporary stop → Thread trimming (Memory switch : When temporary stop is set.)	–	–	–

3. ADJUSTMENTS

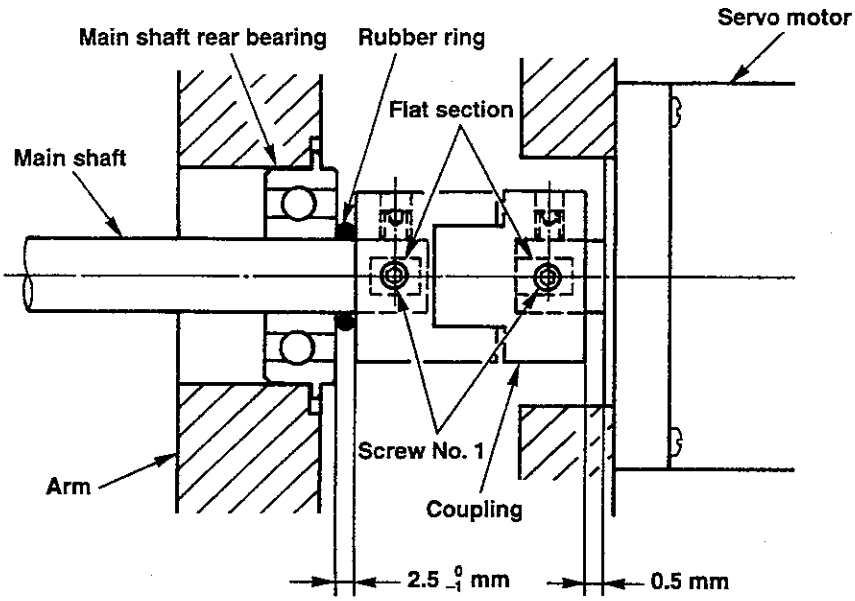
(1) Adjustment of the main shaft components

Standard Adjustment

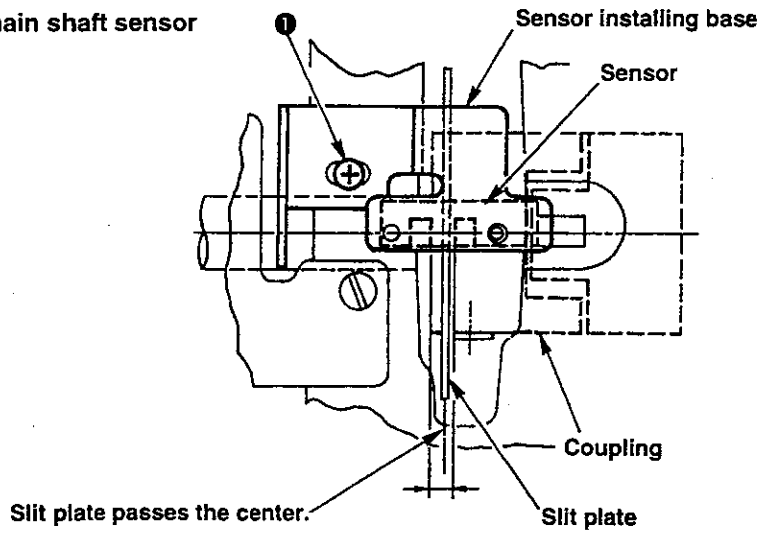
1) Adjusting the play of the main shaft



2) Installing the main shaft coupling



3) Adjusting the main shaft sensor

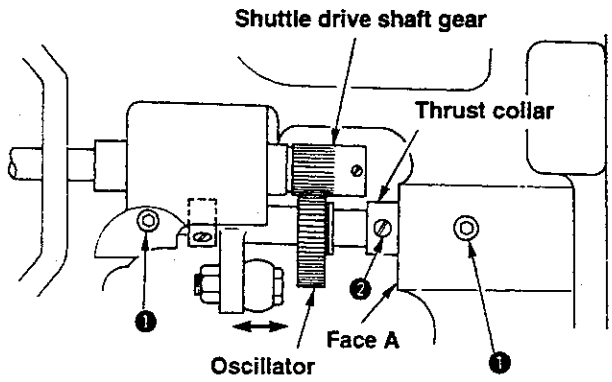


Adjustment Procedures	Results of Improper Adjustment
○ Drawing the thread trimmer cam in the direction of arrow, lightly press the thrust collar to the main shaft intermediate bushing. Then tighten it.	
① Making the clearance between the servo motor and the coupling 0.5 mm, fit the screw No. 1 to the 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 rear bearing and the coupling 2.5 mm, fit the screw No. 1 to the flat section. Then install the coupling. ③ When engaging the respective couplings, be sure to align the two positions of the screws in the direction of rotation.	○ If the position of the couplings is not correct, the main shaft does not stop at the normal angle. ○ 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.
○ Adjust the position of the sensor so that the main shaft slit plate passes nearly the center of the sensor without interfering with each other. Then tighten setscrew ❶.	

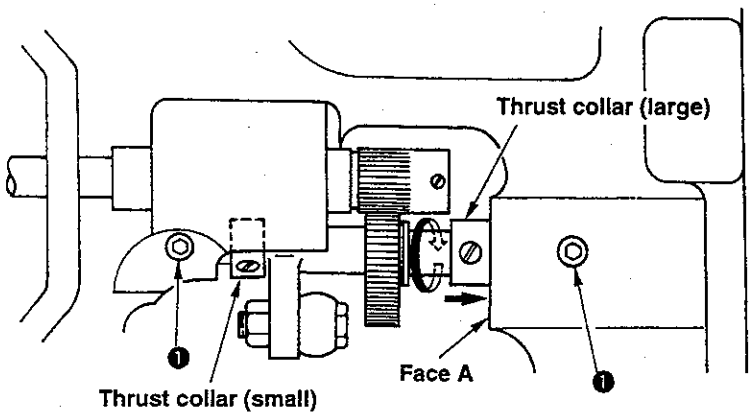
(2) Adjustment of the shuttle driver shaft components

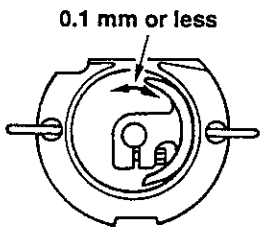
Standard Adjustment

1) Adjusting the longitudinal position of the oscillator

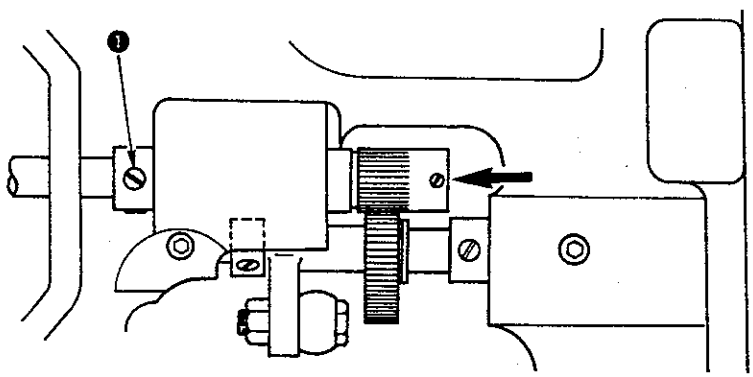


2) Adjusting the backlash of the oscillator gear





3) Removing the play of the shuttle driving shaft



Adjustment Procedures	Results of Improper Adjustment
① Loosen setscrews ❶ and ❷. ② When turning the main shaft several times, the oscillator moves in the direction of arrow, and it moves naturally to the position without the load. ③ Temporarily tighten setscrews ❶. ④ Strike the thrust collar to the face A of the bed, and tighten setscrew ❷.	○ If the longitudinal position of the oscillator is not correct, it will cause the seizure of the oscillator or main shaft crank components.
① Loosen setscrew ❶. ② Closely fitting the thrust collar (large) to the face A of the bed, turn it in the direction of arrow to adjust the backlash. Adjust the backlash so that it is 0.1 mm or less at the tip end of the shuttle driver, and the shuttle driver smoothly rotates. ③ Tighten setscrew ❶. **(Note) Be sure to keep the rotating direction shown in the figure when removing the backlash.**	○ If the backlash is excessive, the shuttle noise wil be increased. ○ If the backlash is too small, it will cause the seizure of the oscillator or main shaft crank components. ○ When adjusting the backlash, if the longitudinal position of the oscillator is not correct, it will cause the seizure of the oscillator or main shaft crank components.
○ Play in the axial direction of the shuttle driver shaft Loosen two thrust collar setscrews ❶ and tighten them while pressing the shuttle driver shaft in the direction of arrow.	

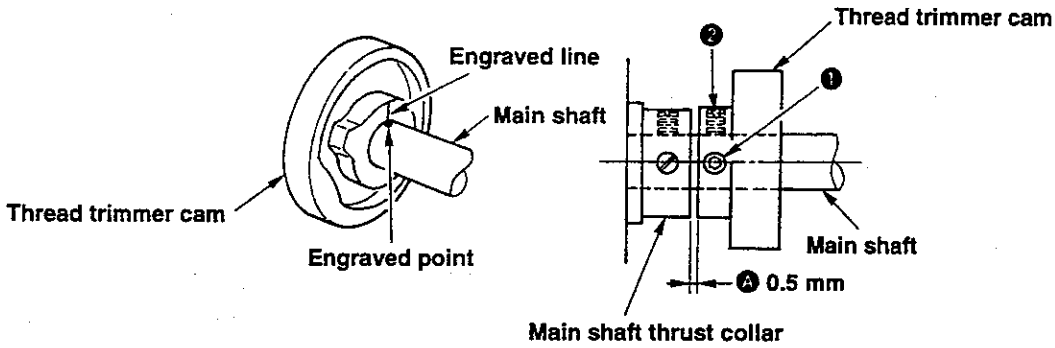
(3) Adjustment of the thread trimmer mechanism components

Standard Adjustment

1) Adjusting the thread trimmer cam

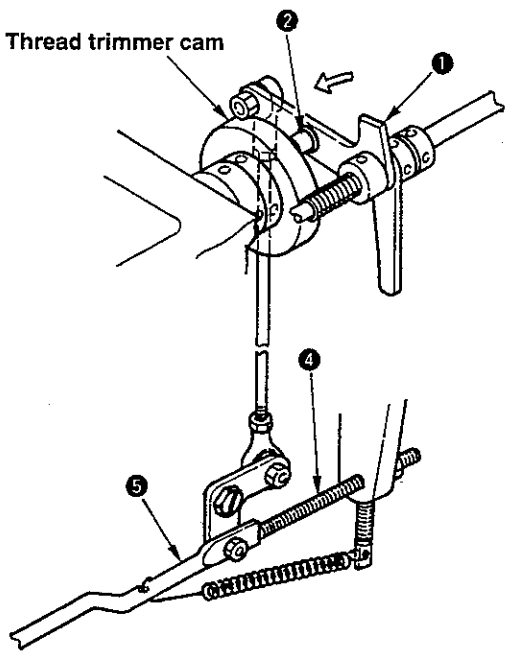
Position of the direction of the main shaft : Adjust the clearance Ⓐ between the thread trimmer cam and the main shaft thrust collar to 0.5 mm.

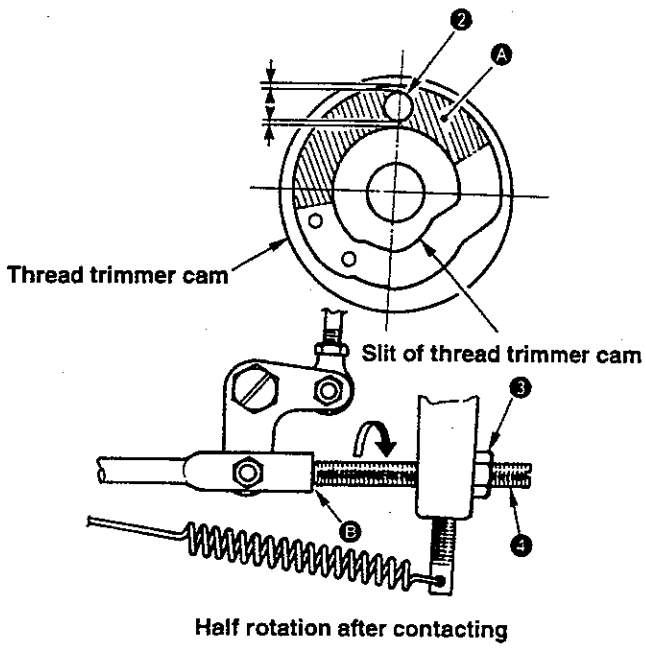
Position of the direction of the rotation : Align the engraved point of the main shaft with the engraved line of the thread trimmer cam.



2) Adjusting the thread trimmer link stopper screw

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



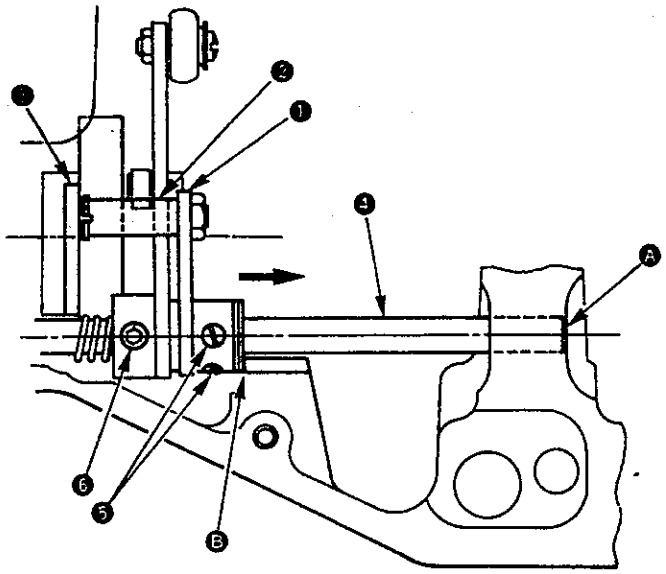


Adjustment Procedures	Results of Improper Adjustment
○ Determine the position of the thread trimmer cam, and tighten screw No. 1 ❶ of the thread trimmer cam from the upper side of the sewing machine. Turn the main shaft by 1/4 rotation in the right direction, and tighten screw No. 2 ❷ of the thread trimmer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

Standard Adjustment

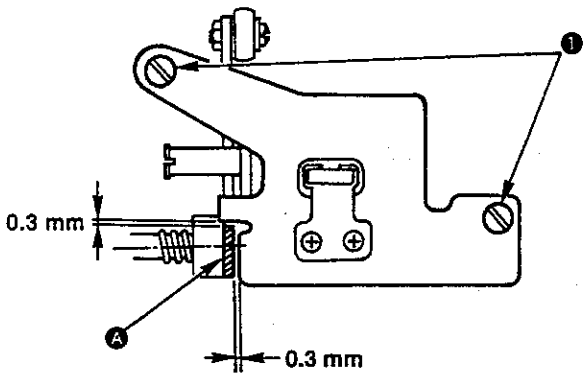
3) Position of the thread trimmer shaft

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



4) Position of the cam installing link stopper

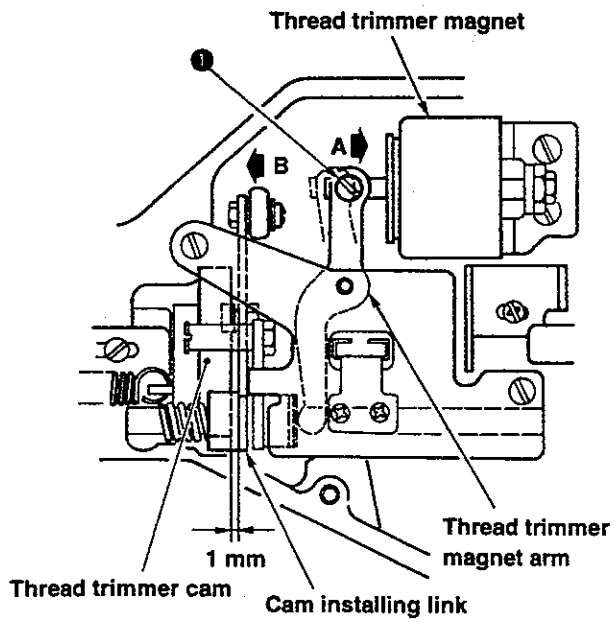
Clearances between the cam installing link stopper and cam installing link notch Ⓐ and between the cam installing link stopper and the 凹 section Ⓒ of the cam installing link stopper are 0.3 mm each in the state that the thread trimmer is separated (thread trimmer stopper support comes in contact with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



5) Position of the thread trimmer magnet

① 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.

② 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.

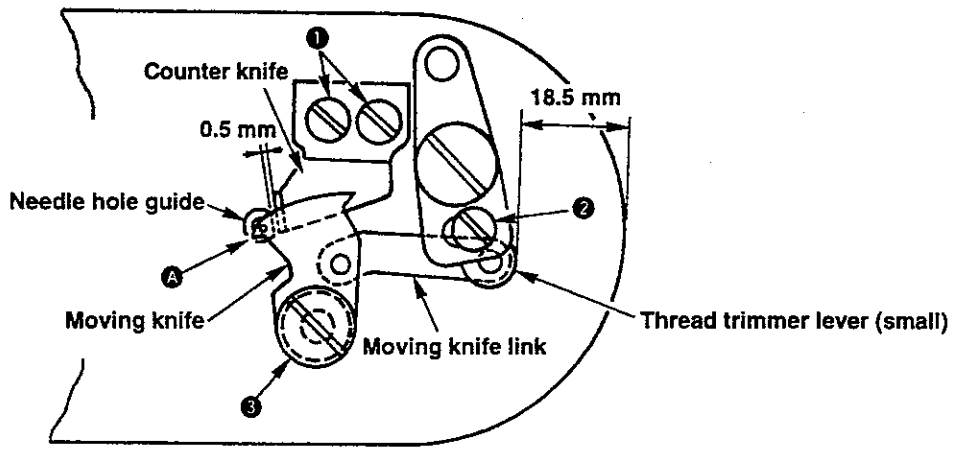


Adjustment Procedures	Results of Improper Adjustment
① Loosen setscrew ❻ in the cam installing link. (The thread trimmer shaft is possible to rotate.) Loosen two setscrews ❺ in the tension release arm thrust collar. ② Align the rear end of thread trimmer shaft ❹ with the processed section Ⓐ of the sewing 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, loosen two setscrews ❶ in the cam installing link stopper, and adjust the respective clearances to 0.3 mm each. Then tighten the setscrews ❶.	○ Sewing machine lock or thread trimmer failure will occur.
○ 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.

Standard Adjustment

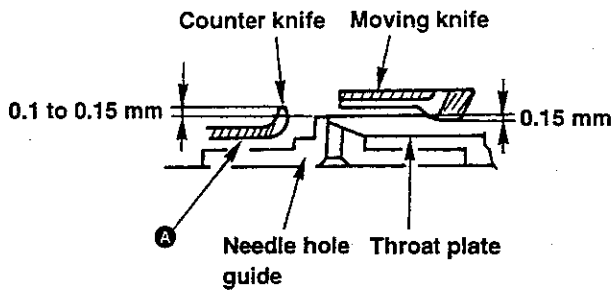
6) Position of the moving and counter knives

Position of the counter knife : Clearance between the counter knife and the needle hole guide is 0.5 mm.
Position of the moving knife : Distance from the front end of the throat plate to the top end of the thread trimmer lever (small) is 18.5 mm before thread trimming action.



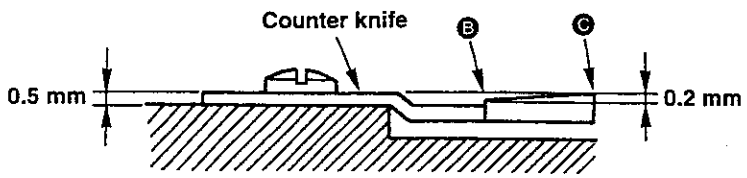
7) Height of the moving and counter knives

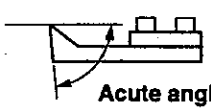
Moving knife : Engagement amount of the needle hole guide with the blade section of the moving knife is 0.15 mm.
Counter knife : Level difference between the needle hole guide and the blade section of the counter knife is 0.1 mm to 0.15 mm.



8) Inclination of the blade point of the counter knife

In order to cut two threads (needle thread and bobbin thread) in uniformity, the blade face of the counter knife is slanting by 0.2 mm.



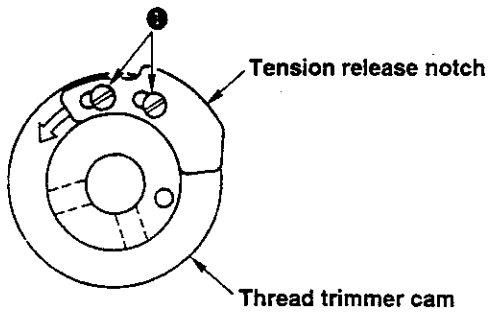
Adjustment Procedures	Results of Improper Adjustment
① Position of the counter knife Loosen counter knife setscrews ❶ to adjust it. ② Position of the moving knife Loosen screw ❷ to adjust it. **(Note) Under the normal operation, the moving knife passes inside the needle hole guide as Ⓐ shown in the figure.**	○ When the clearance is 0.5 mm or less : When the moving knife pulls threads, blade point of the counter knife cuts the threads and needle/ bobbin threads are cut short. ○ When the clearance is 0.5 mm or more : Length of the remaining thread under the cloth after thread trimming is lengthened.
① Adjusting height of the moving knife Adjust the height according to the thickness of washer ❸ illustrated in the figure of 6) Position of the moving and counter knives. Select and use below-mentioned parts when the height is not proper. ② Adjusting height of the counter knife. Adjust the height by forcing section Ⓐ with a screwdriver or the like.	○ If the level difference (0.25 to 0.3 mm) between the moving knife and counter knife is small, it will cause thread trimming failure. ○ If the level difference (0.1 to 0.15 mm) between the needle hole guide and the counter knife is large, when the moving knife pulls threads, blade point of the counter knife cuts the threads and needle/bobbin threads are cut short.
○ Grind side C when the thread on the side B is not cut, and grind side B when the thread on the side C is not cut. **(Note) When grinding the side, make the angle more acuter than 90 degrees.**  **Acute angle**	○ When the slant is less than 0.2 mm : The thread on side C is not cut. ○ When the slant is more than 0.2 mm : The thread on side B is not cut.

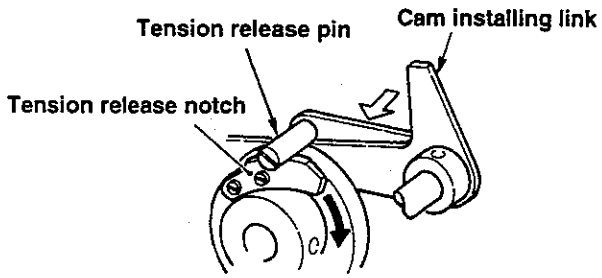
Part No.	Name of part	Thickness
B242328000A	Moving knife washer	0.4 mm
B242328000B	Moving knife washer	0.5 mm
B242328000C	Moving knife washer	0.6 mm
B242328000D	Moving knife washer	0.7 mm

(4) Adjustment of the tension release components

Standard Adjustment

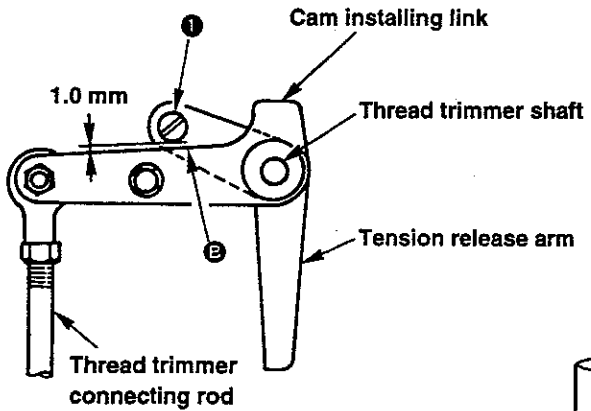
1) Installing position of the tension release notch

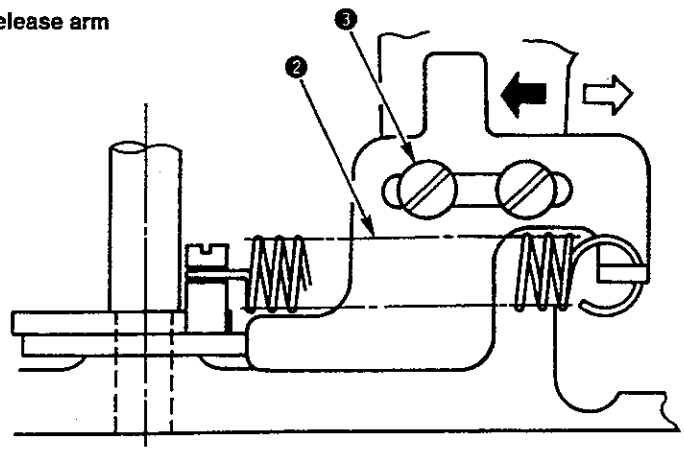




2) Position of the tension release stopper

Adjust the clearance between end face Ⓑ of the cam installing link and tension release arm pin ❶ to 0.1 mm in the state that the thread trimmer is separated.





Adjustment Procedures	Results of Improper Adjustment
① Loosen two setscrews ❶ in the tension release notch, and move the tension release notch to the center of the long slit. Then securely tighten two setscrews ❶ to fix it. ② After the adjustment, pushing the cam installing link in the direction of arrow (⇦) by hand, rotate the main shaft in the normal direction (➡), and ride the tension release pin on the tension release notch. After that, let go of the hand, and make the main shaft rotate in the normal direction. Make sure that the tension release pin separates from the tension release notch at the position where the thread take-up lever has passed the upper dead point.	○ Length of remaining needle thread after thread trimming will be shortened. Also, the length will vary. ○ Needle thread may slip off from the needle at the sewing start.
① Remove tension release return spring ❷. ② Loosen two setscrews ❸. If the tension release stopper with tension release adjusting arm closely contacted is pushed in the direction of arrow (⇨), the clearance between cam installing link and tension release pin will be narrowed. If pushing it in the direction of arrow (⬅), the clearance will be widened. ③ Adjust the clearance to 0.3 mm, and tighten two set screws ❸ to fix it. At this time, closely fit end facr Ⓐ of the tension release stopper to the processed face of the machine arm. ④ After the adjustment, hook the tension release return spring to the spring retainer and the tension release stopper. **(Note) After adjusting the position of the thread trimmer stopper, perform the adjustment of thread tension disk floating amount described in the next item.**	○ 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.

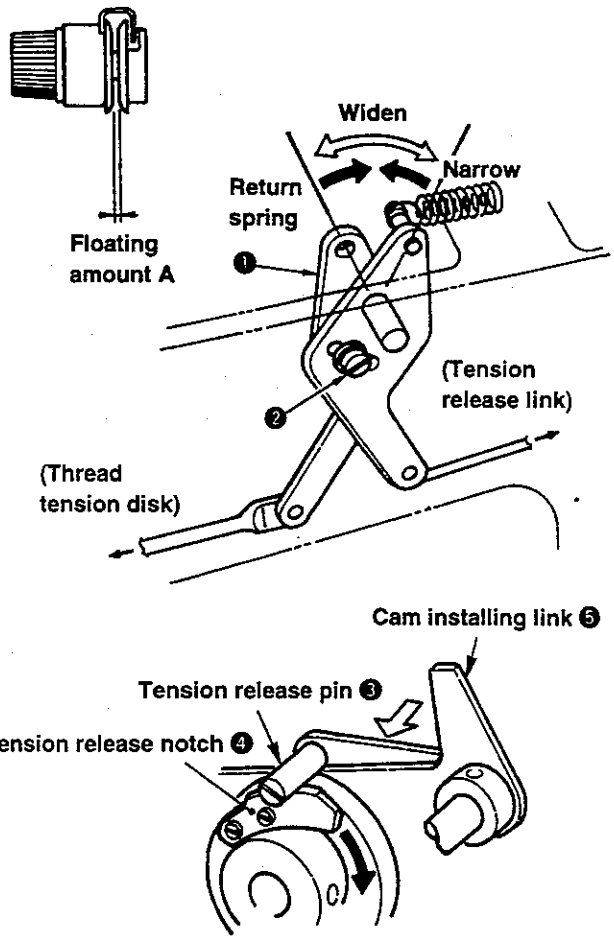
Standard Adjustment

3) Floating amount of the thread tension disk

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

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

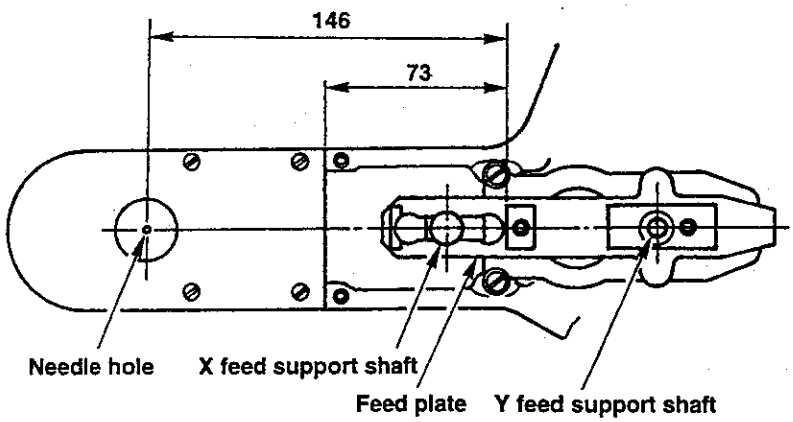
(Note) The floating amount of the thread tension disk will vary to some extent according to the thread count to be used.



(5) Adjustmemt of the sensor components

Standard Adjustment

1) Mechanical origin

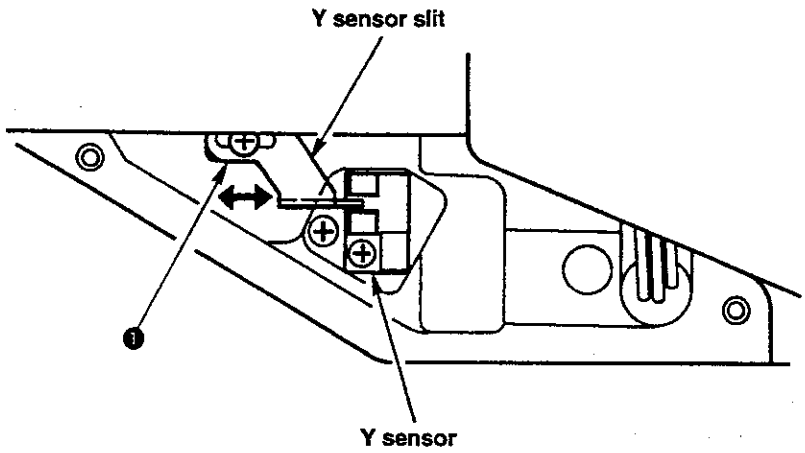


Adjustment Procedures	Results of Improper Adjustment
① Remove the arm cover, and make sure that tension release pin ❸ rides on tension release notch ❹. ② If the pin does not ride on the notch, push cam installing link ❺ by hand in the ⇨ direction, and rotate the main shaft in the normal direction to make the state shown in the figure. ③ Under the state shown in the figure, loosen setscrew ❷ in the tension release adjusting arm. Floating amount of the thread tension disk will vary by moving tension release adjusting arm ❶ to the right or left. S type : 0.6 to 0.8 mm H type : 0.8 to 1.0 mm **(Note) If disk floating amount is too small, the length of remaining thread after thread trimming will vary. If the disk floating amount is excessive, disk closing failure after the release of disk floating will occur.**	○ If the disk floating amount is too samll, the length of remaining needle thread after thread trimming will be shortened or the length will vary to a great extent. ○ If the disk floating amount is excessive, the disk can not close completely after the release of disk floating, causing stitch failure.

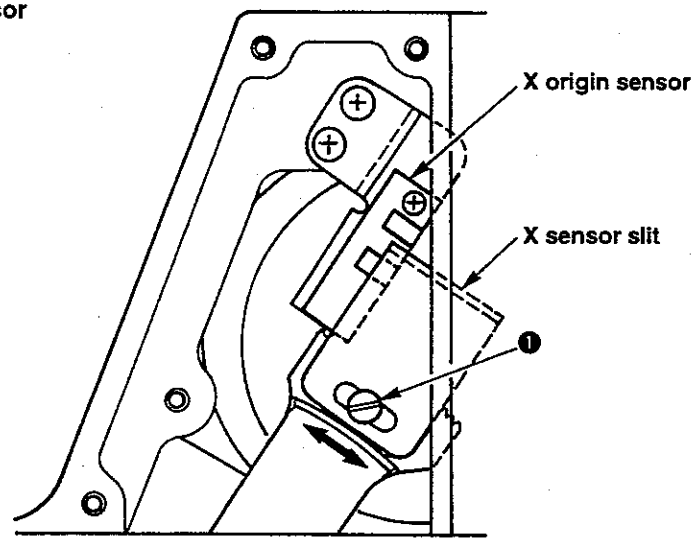
Adjustment Procedures	Results of Improper Adjustment
○ The mechanical origin is as shown in the figure on the left. In the lateral direction, the center of needle hole <center of X feed support shaft> and the center of Y feed support shaft becomes a straight line. Fit the point by adjusting 2) Y origin sensor and 3) X origin sensor.	○ The max. area cannot be secured.

Standard Adjustment

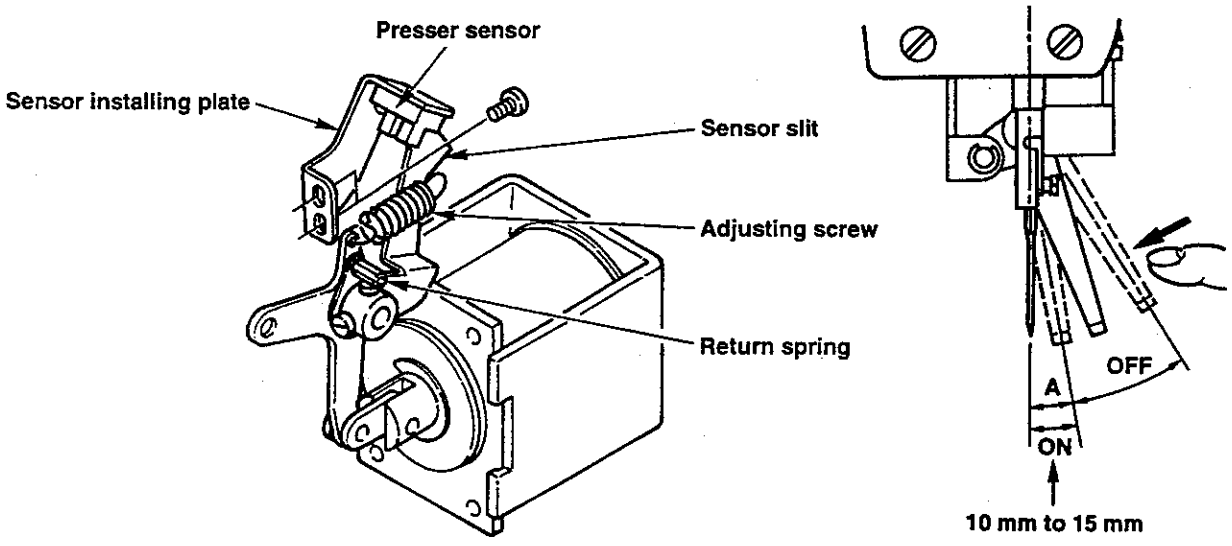
2) Adjusting the Y origin sensor



3) Adjusting the X origin sensor



4) Adjusting the presser sensor

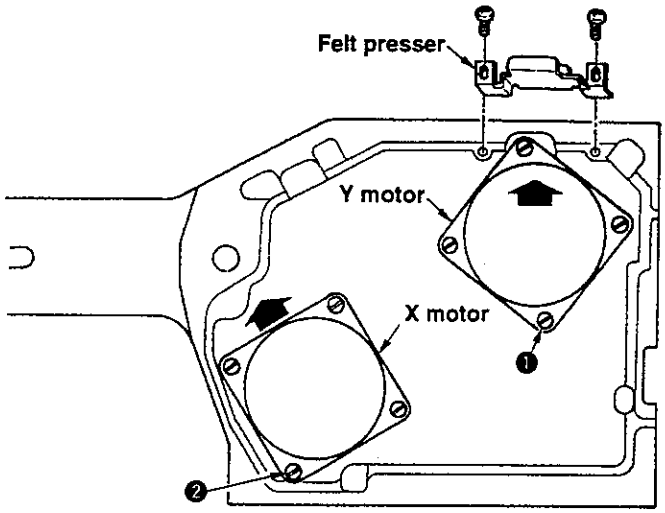


Adjustment Procedures	Results of Improper Adjustment
① Select HOMING of the test mode No. 2. ② Everytime depressing the pedal, the origin is retrieved. Loosen sensor slit setscrew ❶ and shift the position of the sensor slit to set the feed plate to the position of origin. **(Note) After the adjustment, make sure that the slit plate does not interfere with the sensor.**	
① Select HOMING of the test mode No. 2. ② Everytime depressing the pedal, the origin is retrieved. Loosen sensor slit setscrew ❶ and shift the position of the sensor slit to set the feed plate to the position of origin. **(Note) After the adjustment, make sure that the slit plate does not interfere with the sensor.**	
① Set the selection key to "Presser sensor check" of the test mode No. 1. ② Push the top end of the wiper and adjust the position of the sensor installing plate (for fine adjustment) or the sensor slit so that the bobbin winder LED lights and goes off at the position where the needle tip to the wiper is 10 to 15 mm. **(Note) After the adjustment, make sure that the slit plate does not interfere with the sensor.**	○ If dimension A is too small, the needle may interfere with the wiper. ○ If dimension A is excessive, E–A (presser sensor error) will be indicated.

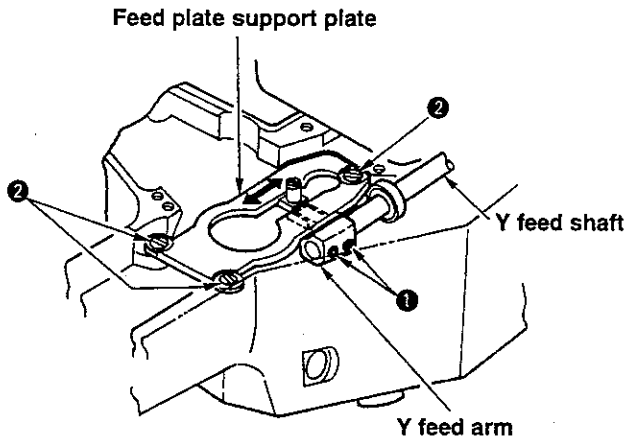
(6) Adjustment of the feed mechanism components

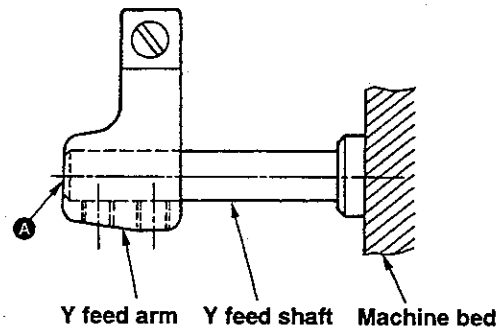
Standard Adjustment

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



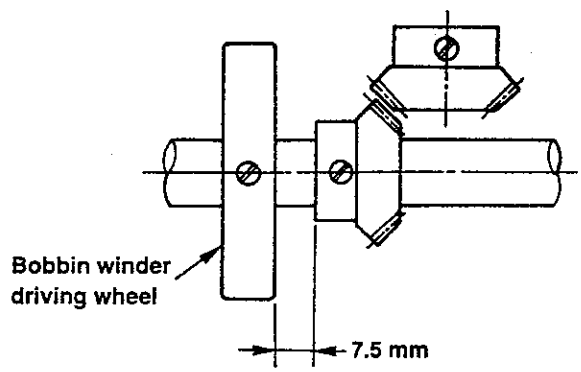
2) Installing the feed plate support plate





(7) Adjustment of the bobbin thread winder components

Standard Adjustment



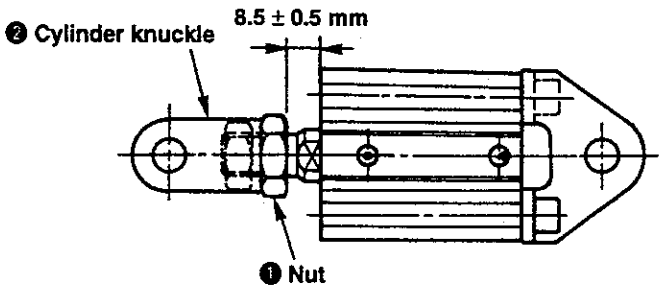
Adjustment Procedures	Results of Improper Adjustment
① Remove the felt presser, and loosen four setscrews ❶. Lightly push the Y motor in the direction of arrow (➡), and tighten setscrews ❶. ② Loosen four setscrews ❷, and lightly push the X motor in the direction of arrow (➡). Then tighten setscrews ❷. ○ 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.	
① Loosen setscrews ❶ in the Y feed arm. ② Push out the Y feed shaft in the ➡ direction. Loosen setscrews ❷ (3 pcs.) in the feed plate support plate. Moving the Y feed arm in the ⟷ direction making the Y feed shaft as a guide, fix the feed plate support plate to the position where there is no torque. ③ Align the Y feed shaft with end face A of the Y feed arm, and securely tighten setscrews ❶ in the Y feed arm.	○ The load of the feed will become large, causing the failure of the feed.

Adjustment Procedures	Results of Improper Adjustment
○ Adjust the position of the bobbin winder driving wheel so that the clearance between the bobbin winder driving wheel and the hand pulley gear should be 7.5 mm. Then tighten setscrews ❶ (2 pcs.). **(Note) Adjust after ascertaining that the shoulders of the hand pulley gears are aligned with each other.**	○ If the clearance is small, it will cause worn-out of the bobbin thread winder components or seizure. ○ If the clearance is excessive, due to slipping of the bobbin thread winder, the worn-out will occur.

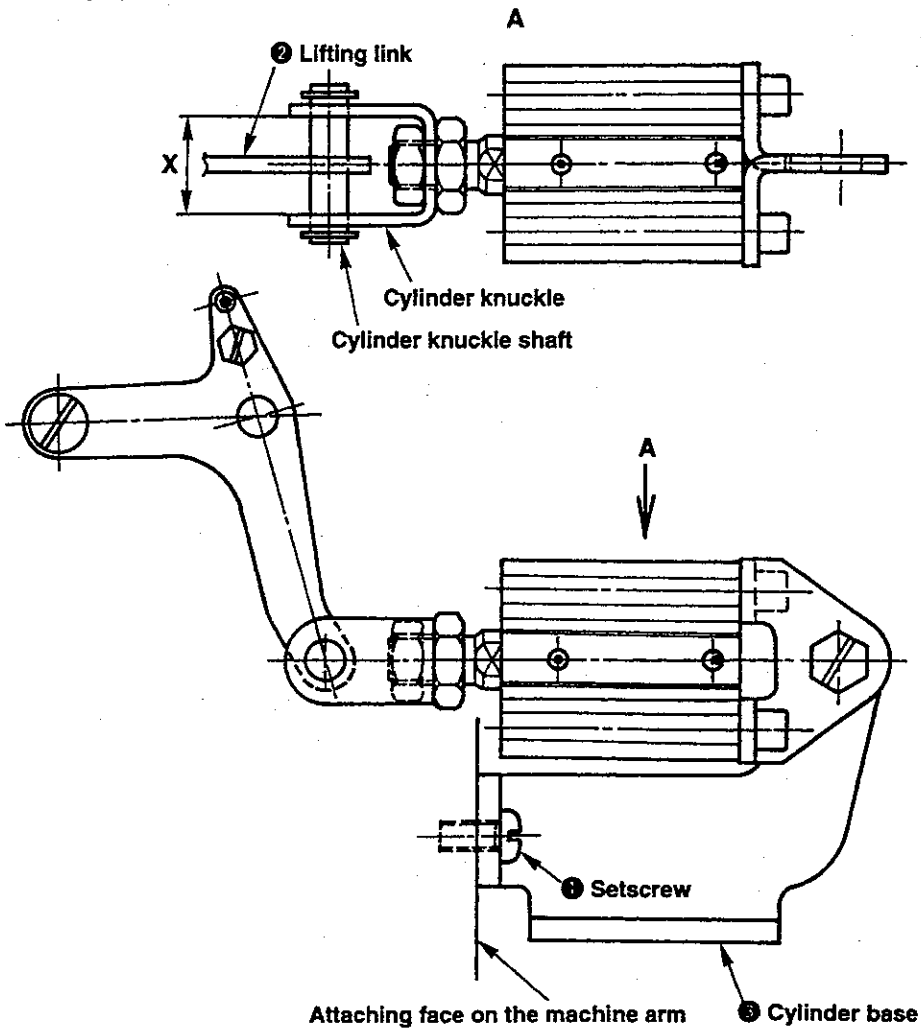
(8) Adjustment of the presser cylinder

Standard Adjustment

1) Adjusting the lifting cylinder knuckle



2) Adjusting the lifting cylinder base B



Adjustment Procedures	Results of Improper Adjustment
① Loosen ❶ nut. ② Adjust so that a clearance of 8.5 ± 0.5 mm should be provided between the end face of ❶ nut and the end face of the cylinder, and tighten ❷ cylinder knuckle. ③ Tighten ❶ nut.	○ If the clearance is less than 8.5 ± 0.5 mm, the presser sensor slit plate may come in contact with the machine arm.
① Loosen two ❶ setscrews. ② Adjust ❸ cylinder base so that ❷ lifting link comes nearly in the center of dimension X of the cylinder knuckle when the cylinder is moved, and tighten ❶ setscrews.	○ If the adjustment is not proper, the presser lifter may not function due to the friction of the link and cylinder knuckle shaft.

(9) Adjustment of the sewing components

Standard Adjustment

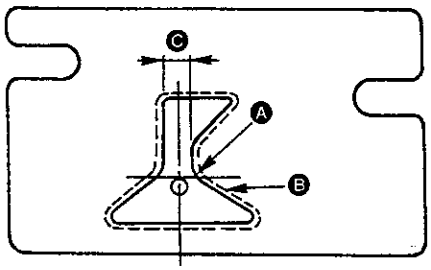
1) Adjusting the position of the shuttle upper spring

Align the center of the needle with the center of slit width Ⓒ for the lateral position. Align the rear end of the needle with angle section Ⓐ for the longitudinal position.

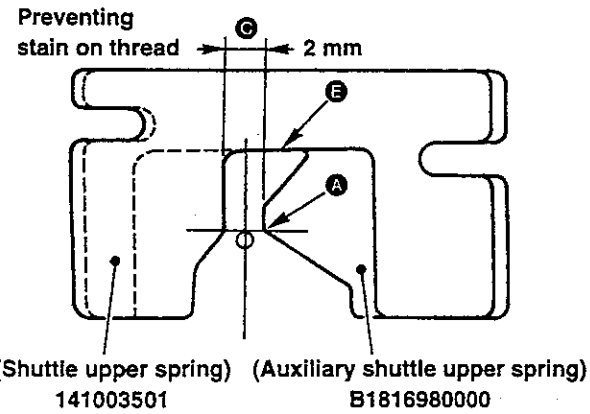
(Caution) If there is a scratch on section Ⓑ polish there with buff or the like as it will cause thread breakage, hangnail of thread, stain on thread, etc. Especially pay attention to the rear side.

S and H types

(Standard) B1815980000

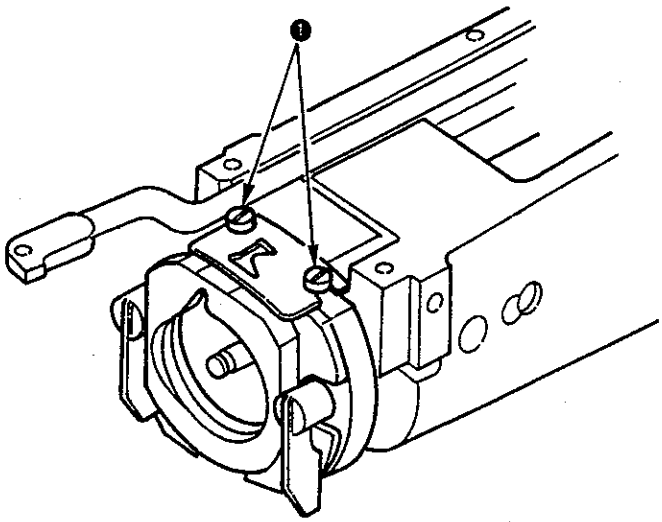


F and M types



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

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

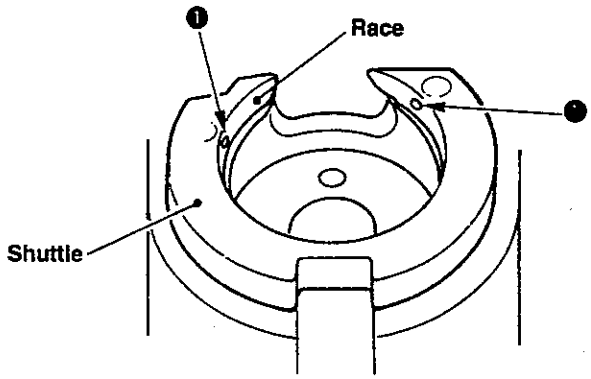
Adjustment Procedures	Results of Improper Adjustment
○ Remove the feed bracket, feed plate and throat plate, and adjust with screws ❶. **(Caution) The lateral position will vary when the shuttle is adjusted. Perform the adjustment of the position of the shuttle upper spring after performing the standard adjustment of the shuttle without fail.**  	○ If the shuttle upper spring is slid laterally or longitudinally, needle thread will be caught in the shuttle. ○ If the spring is excessively placed in the rear, the moving knife may fail to catch needle thread. ○ If the spring moves excessively to the left, the moving knife may fail to catch bobbin thread.

Standard Adjustment

2) Shuttle felt

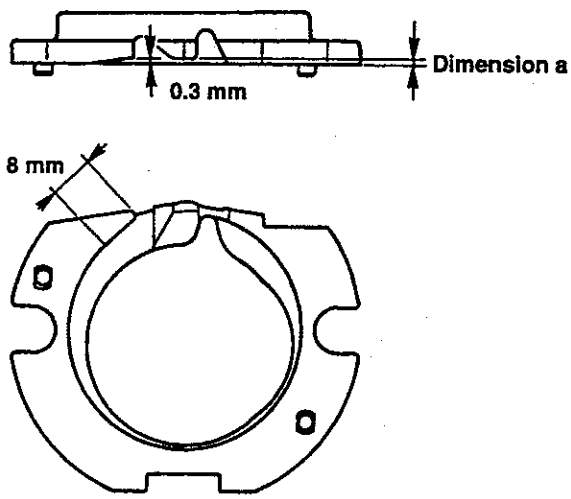
Two pieces of shuttle ❶ felt are inserted into the hole of the shuttle race.

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



3) Shape of the shuttle race ring

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



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

Dimension a	Part No.	Name of part	Remarks
0.8	14103253	Shuttle race ring A	Provided as standard for F and M types.
1.3	14103352	Shuttle race ring B	Provided as standard for S type.
1.7	14103659	Shuttle race ring C	Provided as standard for H type.
1.9	B1817210DA0	Shuttle race ring D	Optional

4. GREASING PARTS

(1) Supply grease when a grease-involving part has been disassembled or once every other year.

(2) Grease to be used

Lithium systems No. 2

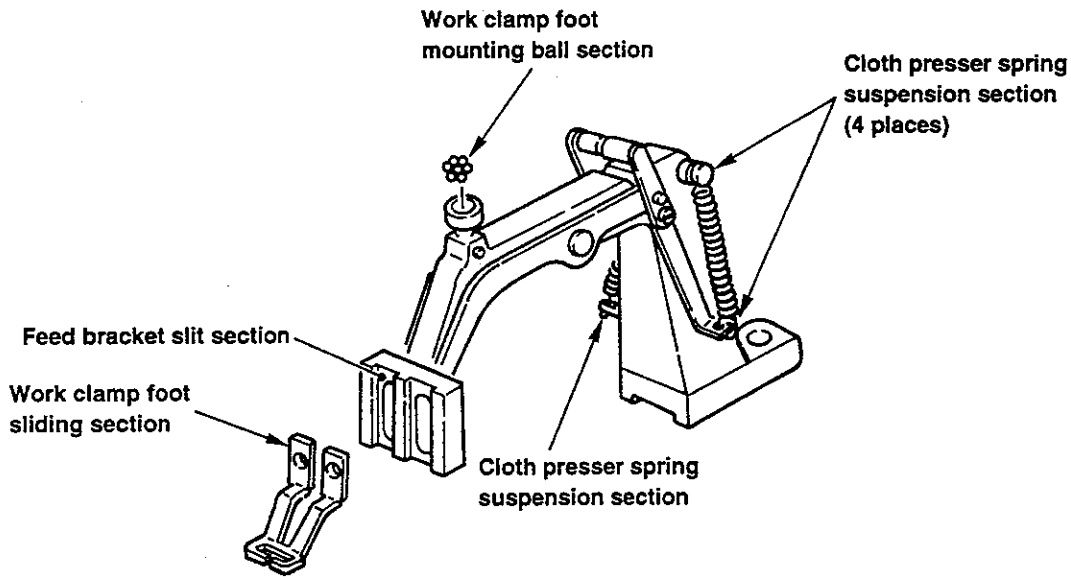
Manufacturers' name	Name of grease
Esso oil	LISTAN 2, BEACON 2
Shell oil	ALBANIA
Nihon oil	MULTINOCK 2, EPINOCK 2
Kyodo oil	LISONICS 2
Idemitsu kosan	CORONEX 2

* Use Esso's TEMPLEX N3 for the pedal pressure decreasing unit components. (Standard accessory)

(3) Parts to be greased

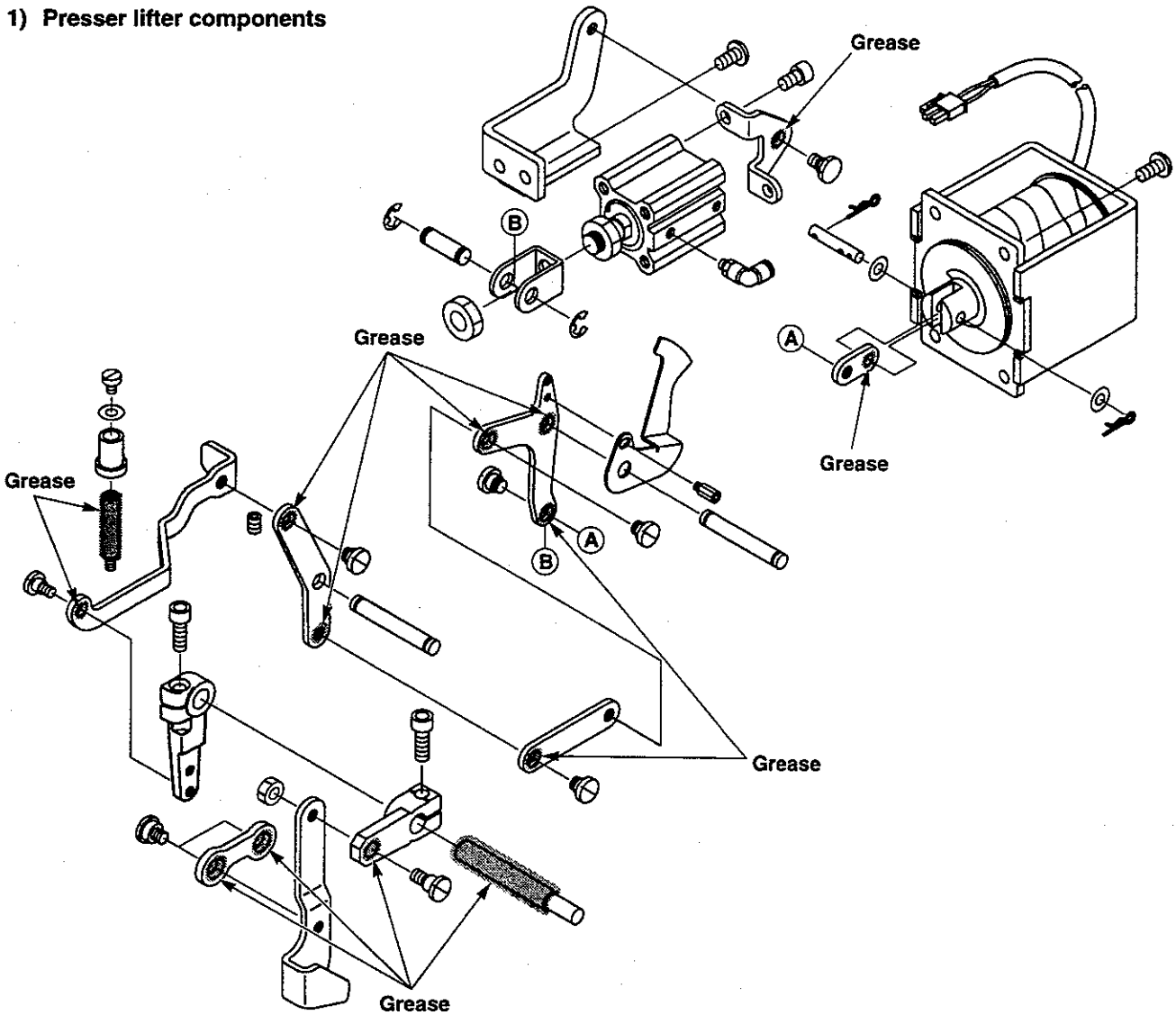
If no grease pump is available, it is convenient to use a plastic oiler filled with grease or an injector with the needle removed.

Feed bracket components

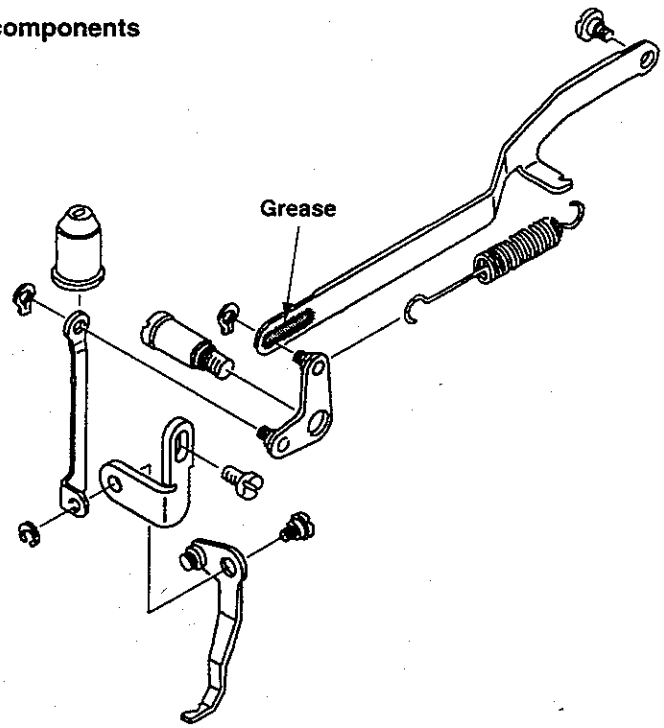


Parts to which grease is applied

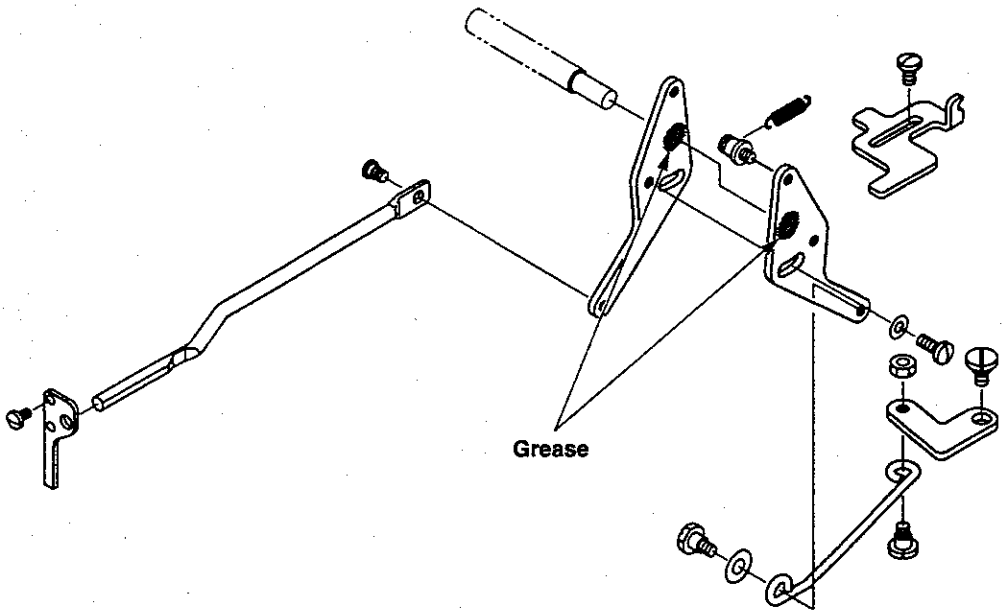
1) Presser lifter components



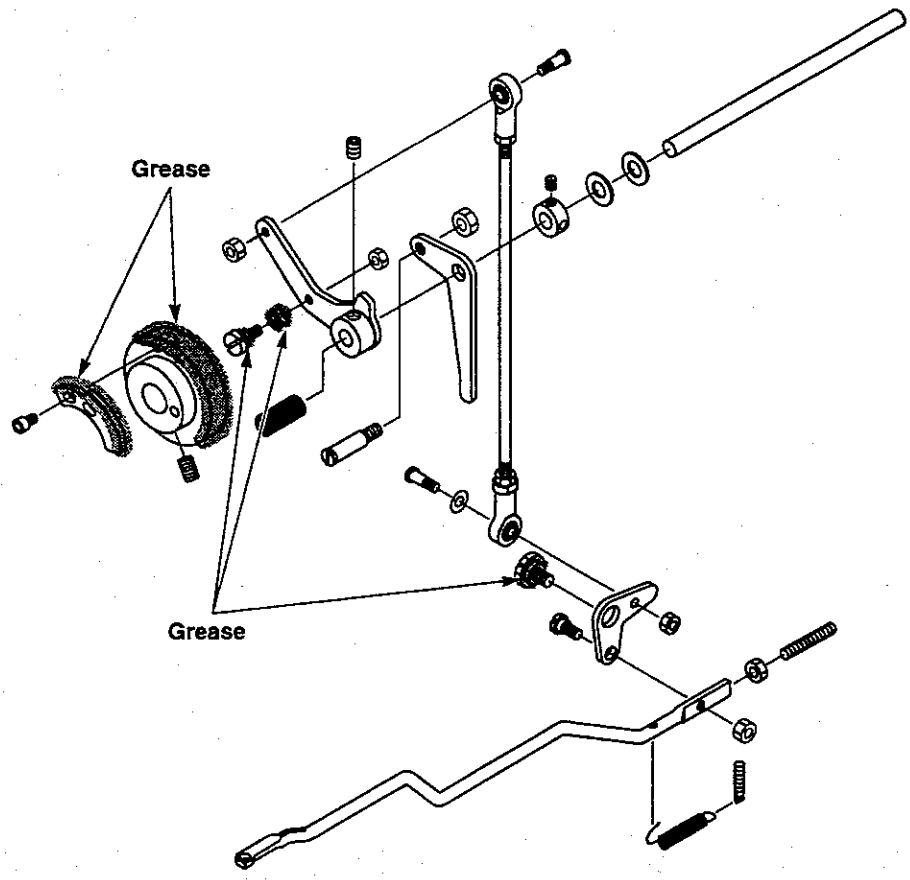
2) Wiper mechanism components



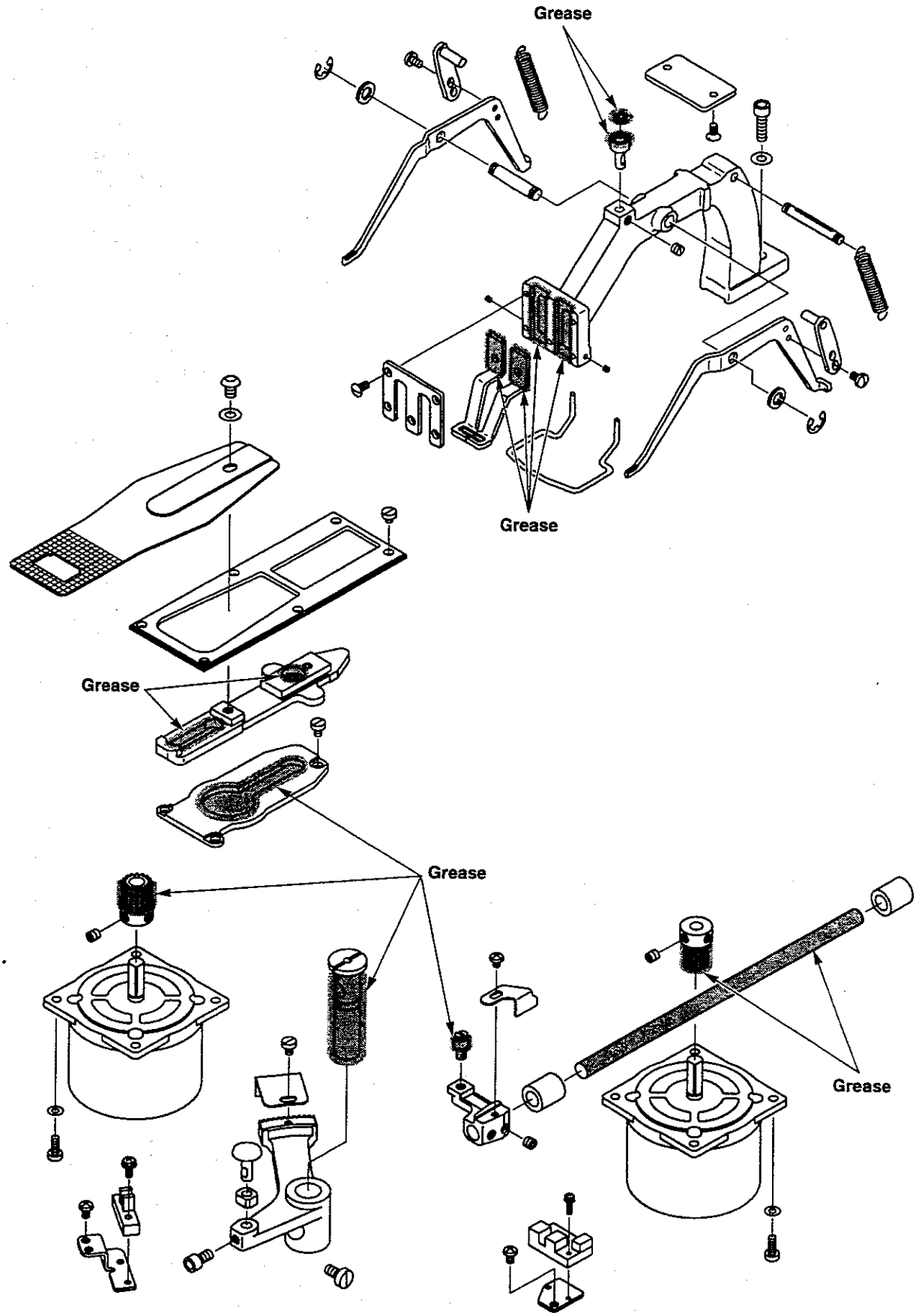
3) Tension release and thread tension components



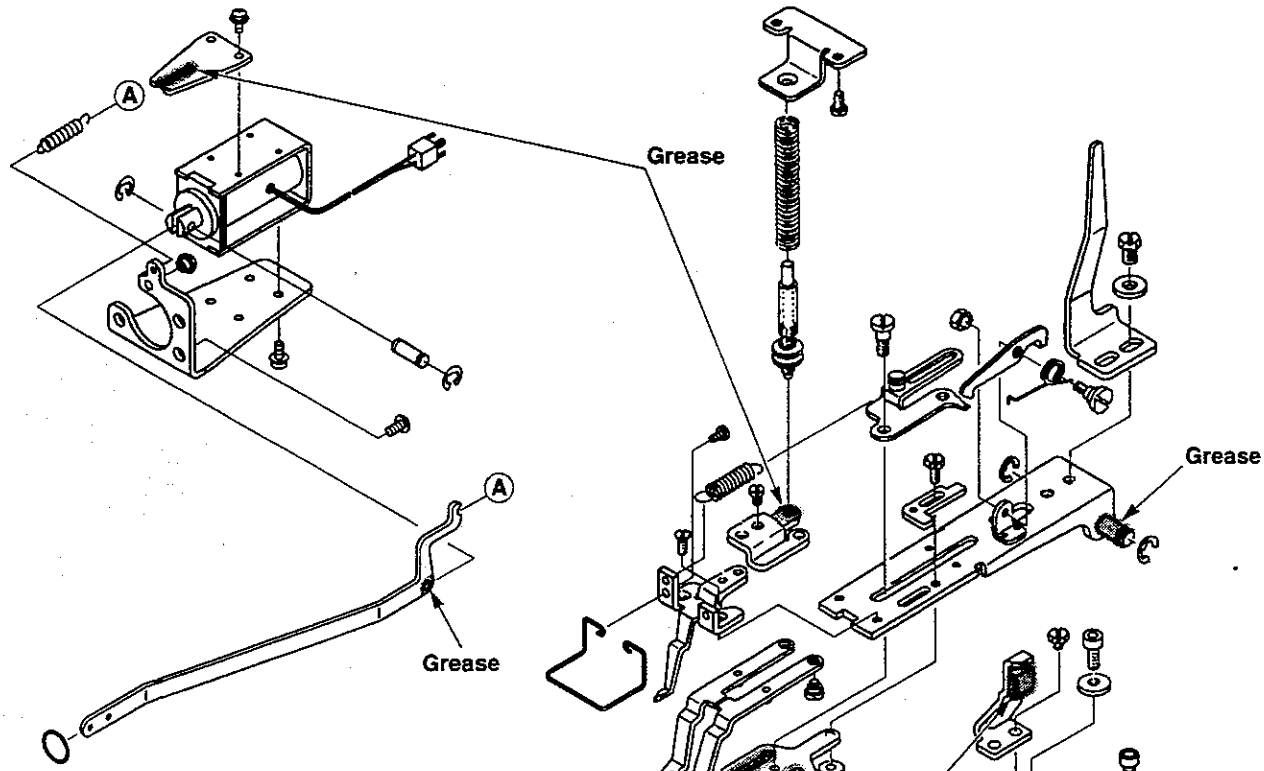
4) Thread trimming components



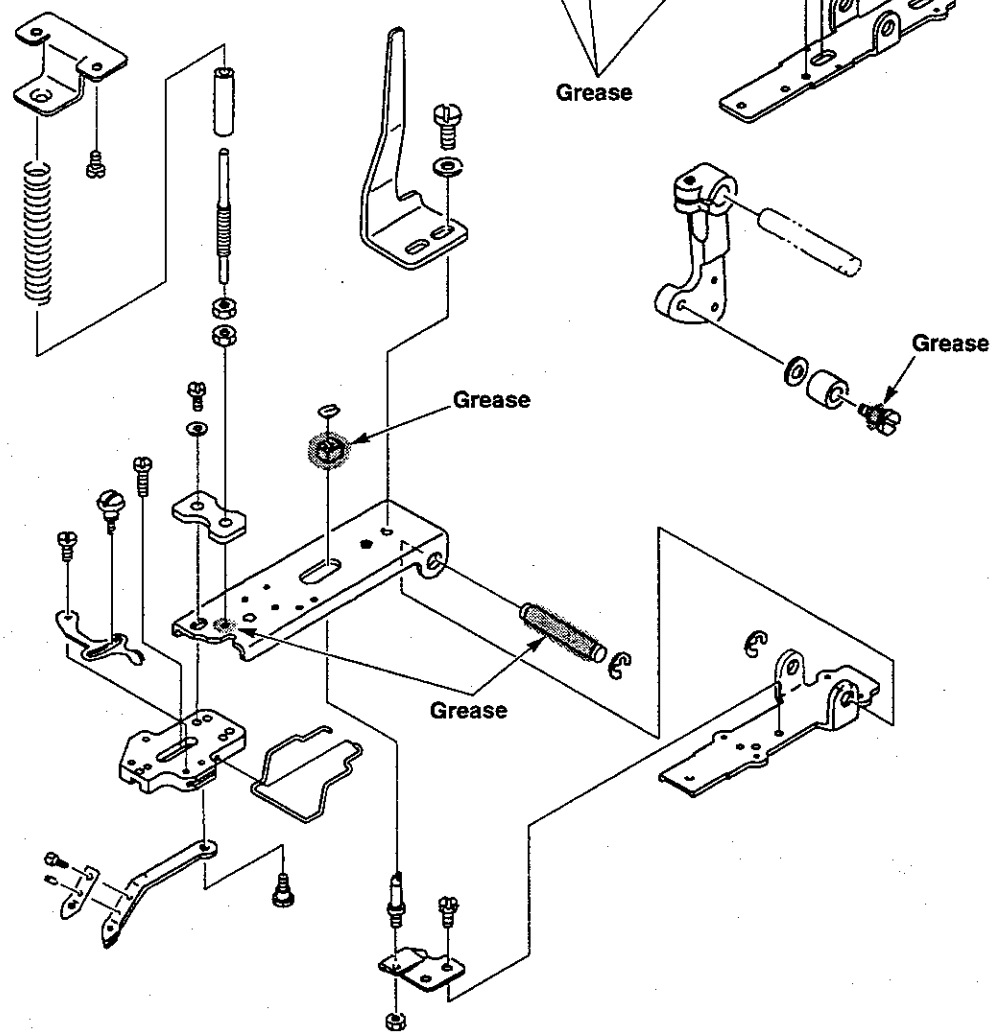
5) Feed mechanism components



6) LK-1901 components



7) LK-1903 components



ERROR INDICATION

No.	Indication	Error name	Error description	How to reset	Remarks
1	E 1	Pattern No. error	Specified pattern No. has not been registered in the data P-ROM.	Make sure of the pattern No.	
2	E 2	Enlargement error	Stitch length is beyond 10 mm.	Make sure of enlargement scale and stitch length.	
3	E 3	Needle bar UP stop position error	Needle bar is shifting the upper position.	Turn hand pulley, and return needle bar to the upper position.	
4	E 4	Area-over error	Sewing area is beyond the limit.	Make sure of pattern and enlargement scale.	
5	E 7	Machine lock error	Main shaft of the sewing machine does not rotate due to some reasons. Or power voltage failure.	Turn OFF the power switch, and remove the causes. Make sure of the power voltage.	
6	E 8	Pattern data error	Pattern data cannot be read from EP-ROM.	Make sure of the EP-ROM mounting (defective contact).	
7	E A	Presser sensor error	Presser fails to work due to some reasons.	Turn OFF the power switch, and remove the causes.	
8	E EE	EEP-ROM writing error	Data cannot be written in EEP-ROM.	Defective EEP-ROM (MAIN circuit board)	

5. MEMORY SWITCH

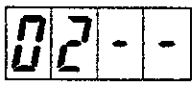
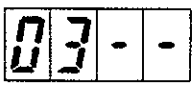
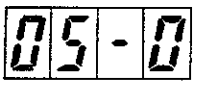
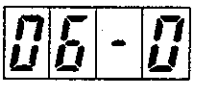
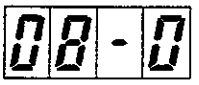
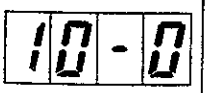
• Purpose of the memory switch

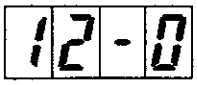
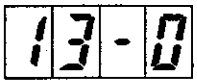
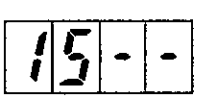
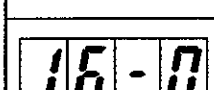
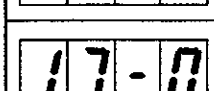
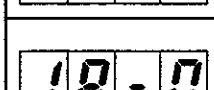
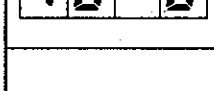
Memory switches can set various operations of the sewing machine in a program.

There are two different start levels for the memory switches, i.e., level 1 and level 2. (Level 1 : for the users and level 2 : for the maintenance)

• Items of the memory switches

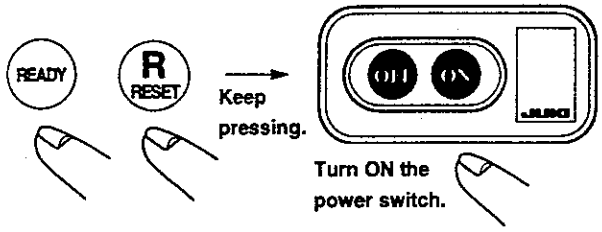
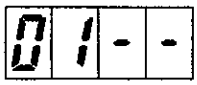
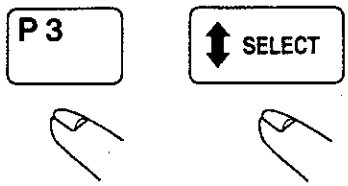
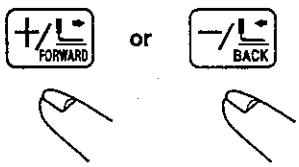
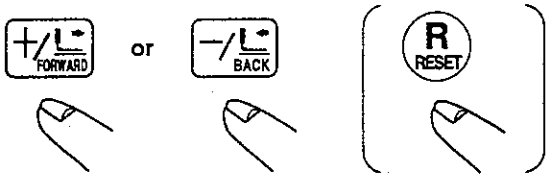
Memory switches have following indication Nos. as described in the table below.

No.	Level	Function	Setting range	State at the time of delivery
	1	Setting upper limit of the sewing speed (set in a unit of 100 s.p.m.)	400 to 2,700 s.p.m.	2,700 s.p.m.
	1	The start-up speed of 1st to 5th stitch at the sewing start can be set in a unit of 100 s.p.m.	1st stitch : 400 to 900 2nd stitch : 400 to 2,700 3rd stitch : 400 to 2,700 4th stitch : 400 to 2,700 5th stitch : 400 to 2,700	400 s.p.m. 900 s.p.m. 2,700 s.p.m. 2,700 s.p.m. 2,700 s.p.m.
	1	Effective/ineffective calling of the standard 30 pattern data can be set. (Prohibiting to call the sewing pattern bigger than the feeding frame can prevent the interference of the needle with the feeding frame.)	This function can set pattern No. 1 to 64 indivisually. 1 : Calling effective 0 : Calling ineffective	
	1	This function sets whether indication or change of the XY scale or limit of max. speed is effective or ineffective.	0 : Effective 1 : Ineffective	0
	1	This function sets counter operation. Production counter : Adding counter Bobbin thread counter : Subtracting counter	0 1	0
	1	This function sets stop position of the needle bar. Needle bar rotates in the normal direction by 70°and rotates in the reverse direction after shifting the thread trimmer cam to make the upper dead point stop.	0 : Upper position stop (53°) 1 : Upper dead point stop (0°)	
	1	This function sets the basic point of enlargement/ reduction.	0 : Origin 1 : Sewing start point	0
	1	Whether origin retrieval is executed after completion of the sewing or not. (When sewing is performed with the normal pattern No.)	0 : No 1 : Yes	0
	1	Whether origin retrieval is executed after completion of the sewing or not. (When sewing is performed with the combination function.)	0 : No 1 : Yes	0
	1	This function sets the pedal specification.	0 : Standard 1-step pedal 1 : Optional 2-step pedal 2 : Optional PK-57 (for standing work)	0
	1	Whether output of the wiper solenoid installed later is operative or not. ("1" is set for LK-1903 at the time of delivery.)	0 : No 1 : Yes	0

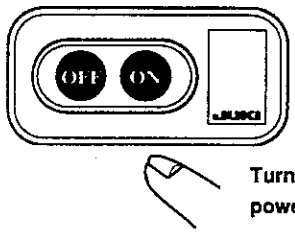
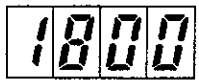
No.	Level	Function	Setting range	State at the time of delivery
	1	Whether output of the work clamp solenoid is operative or not. ("1" is set for LK-1901 at the time of delivery.)	0 : No 1 : Yes	0
	2	This function selects the operation of presser lifter after completion of the sewing.	0 : Goes up 1 : Prohibited	0
	2	Check of the contents of total counter (8 figures) (Indication is devided into lower 4 figures and upper 4 figures.)	Total counter is cleared when simultaneously turning ON the P1, P2 and P3 keys.	0 (When assembled.)
	2	Setting of the range of the feed travel limit (Setting by separating the territories of +X, –X, +Y and –Y)	X : 0 to ±20 Y : 0 to ±10 (Unit : 1 mm)	+X : 20 –X : 20 +Y : 10 –X : 10
	2	Selection of input of the temporary stop	0 : Ineffective 1 : Control panel reset key 2 : Not used.	0
	2	Whether the presser sensor is provided or not.	0 : Provided 1 : Not provided	0
	2	This function is used to advance the feed timing. (Feed start is set by the angle of main shaft.)	0 : 0° 1 : –12° 2 : –20° 3 : –32°	0
	2	This function decides the model name at the time of delivery. (Automatic setting of the pattern No. which can be called.)	0 : LK-1900S, H, F 1 : LK-1901 for eyelet buttonhole 2 : LK-1902 for belt loop attaching 3 : LK-1903 for button sewing 4 : LK-1900 for knit 5 : LK-1903 for shank button	0

(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 level 1)
2			Immediately after turning ON the power switch, simultaneously press [P 3] key and [SELECT] key. (The level moves to the level 2.)
3			Press down [+/L FORWARD] and [−/L BACK] keys to select the indication No. desired to change.
4		SEWING Sewing LED Lights up.	Press down (READY) key to light up the sewing LED.
5		(Example) When the max. speed limit is 1,800 s.p.m. 	Press down [+/L FORWARD] and [−/L BACK] keys to change and check the contents. (The setting returns to the initial setting by pressing down (R RESET) key.)
6		SEWING Sewing LED Lights up.	After setting, press down (READY) key and put out the sewing LED. Then register the contents.

2) How to finish the memory switches

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

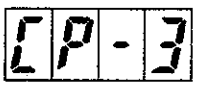
6. TEST MODE

• Purpose of the test mode

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

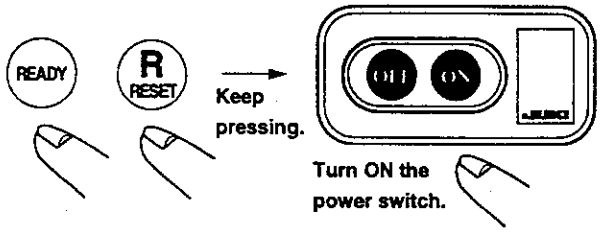
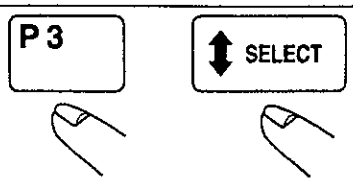
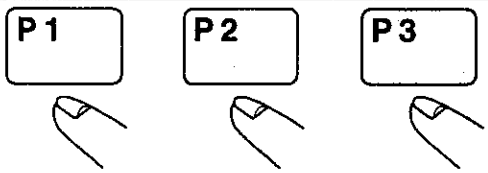
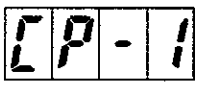
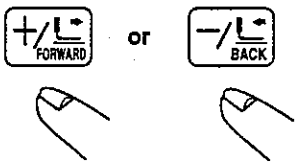
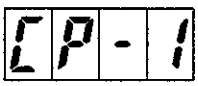
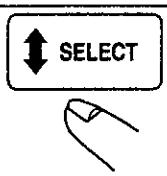
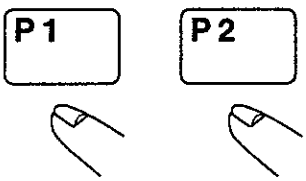
• Item of the test mode

Following items described in the table below can be checked under the test mode.

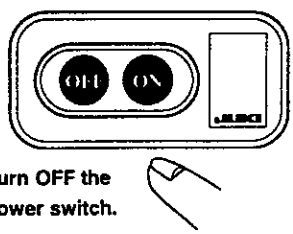
Indication No.	Item	Description
	Input signal check	The state of input of the switch and sensor will be indicated by the 7 LEDs.
	Origin retrieval	JOG operation and the origin sensor will be indicated for adjusting the origin.
	Continuous sewing	Initial setting of the operation conditions will be performed, and the mode will move to the continuous sewing 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.

(1) Operating method

1) How to start the test mode

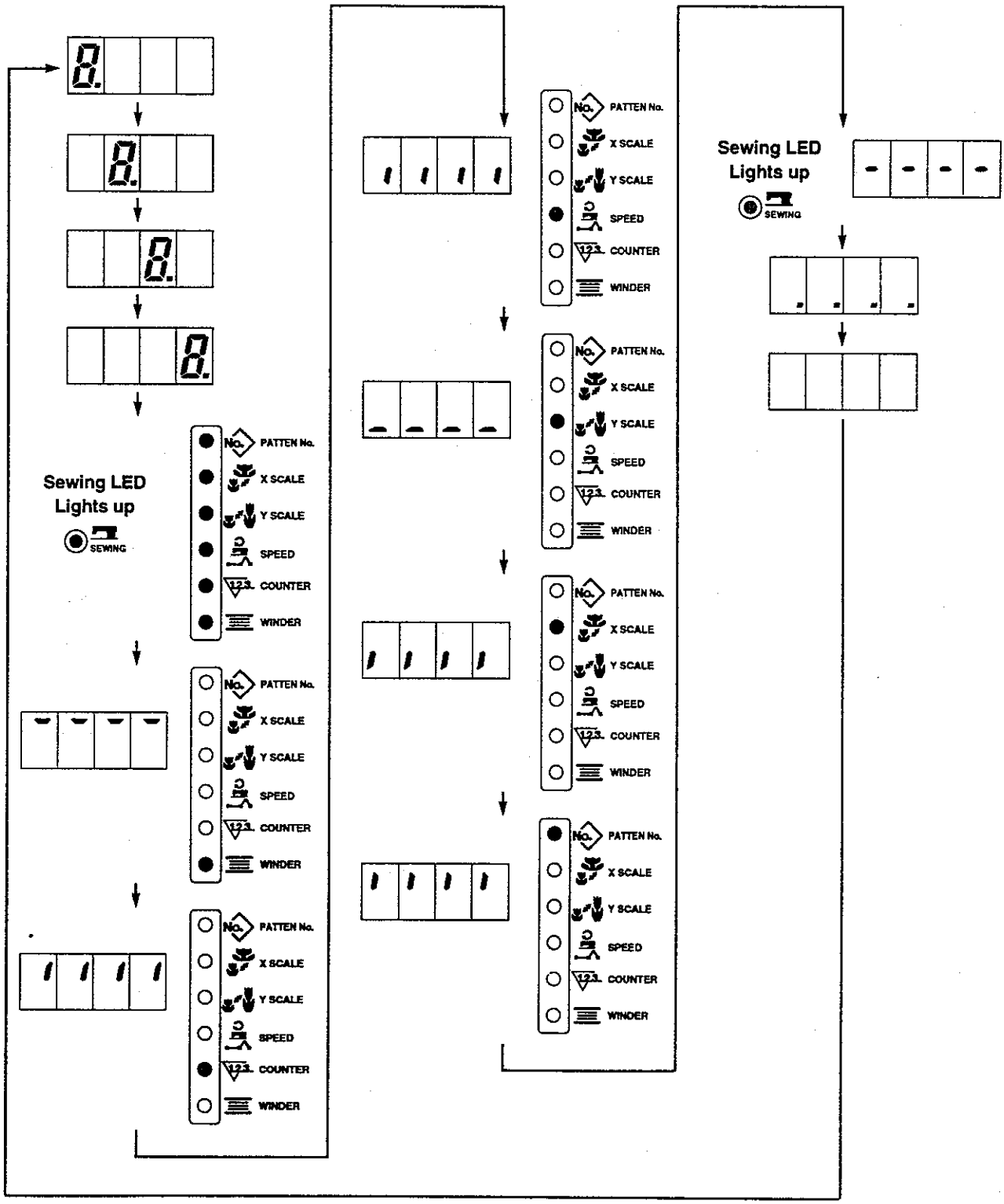
Step	Operation method	Indication	Explanation
1			Pressing (READY) key and (R RESET) key, turn ON the power switch.
2			Immediately after turning ON the power switch, simultaneously press [P3] key and [SELECT] key.
3		Refer to the separate page.	Further, simultaneously press down [P1] key, [P2] key and [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] or [−/L] 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 the test mode

Step	Operation method	Indication	Explanation
1			Turn OFF the power.

Indicating output test

Order of the indicating output test after moving to the test mode is shown as follows.



(2) How to check each test program No.

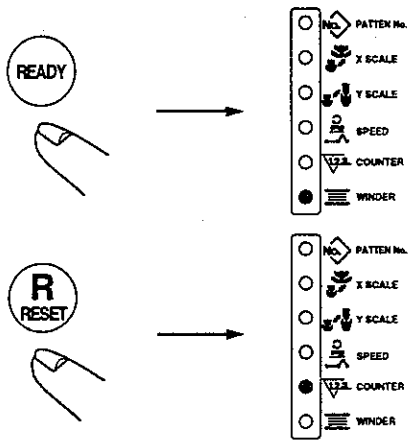
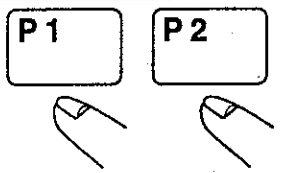
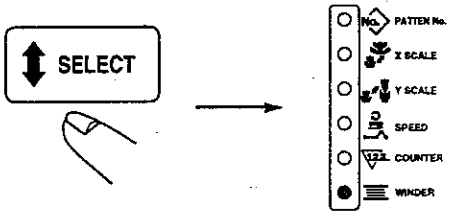
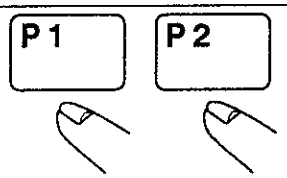
1) CP-1 (input signal check)

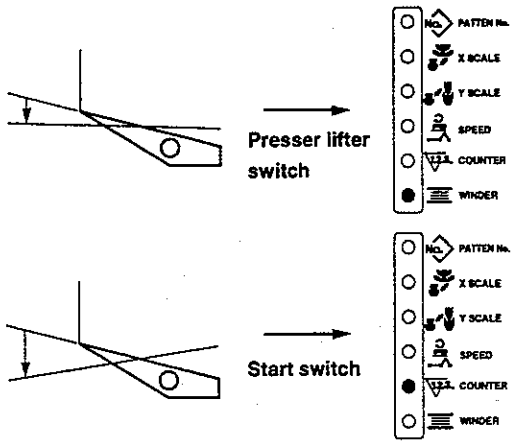
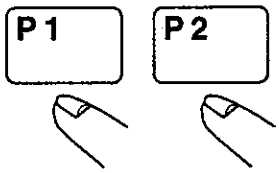
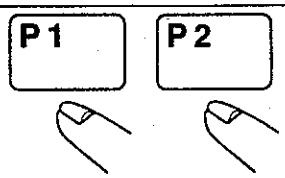
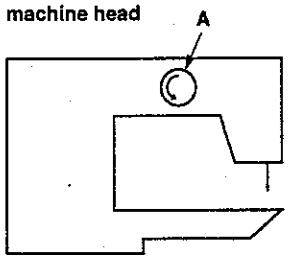
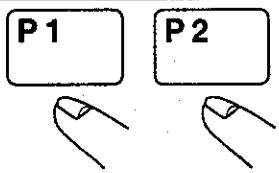
State of input of switches and sensors is indicated on the 7 LEDs.

Following table is the table of LED indication. From the table we can understand to which LED each switch or sensor is assigned.

Input line No.	Kind of LED						
	WINDER	COUNTER	SPEED	Y SCALE	X SCALE	PATTERN NO.	SEWING
1	READY	RESET	+/FORWARD	-/BACK	P1	P2	P3
2	SELECT	–	–	–	–	–	–
3	TEMPORARY STOP	PRESSER LIFTER	START	OPTION	–	–	–
4	PRESSER LIFTER SENSOR	X ORIGIN	Y ORIGIN	* BRAKE	–	–	–
5	FEED START	TG	UP DEAD POINT	DOWN DEAD POINT	NEEDLE UP	* STOP STATE	* SERVO ERROR

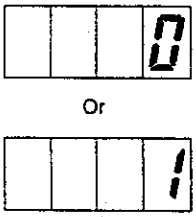
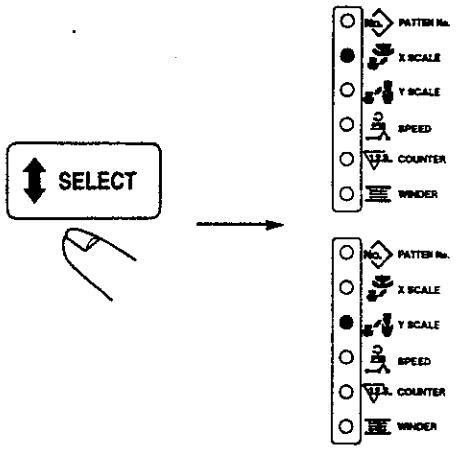
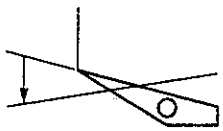
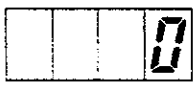
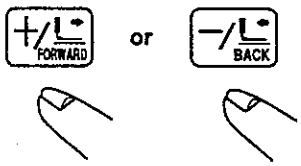
Signals with * mark in the table are those on the SERVO circuit board.

indicating section (input line No.)	Checking measure	Explanation
1		State of the input line No. 1 key will be indicated on LED. **Check the (READY) key.** **Check the (R RESET) key.** As for the other keys, refer to the input line No. 1 of the above table.
2	 Simultaneously press.	Update of the input line No. 1 to 2
2		State of the input line No. 2 key will be indicated on LED. **Check the (SELECT) key.**
3	 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. **Check the presser lifter switch.** **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	**Sewing machine head** 	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)

State of JOG movement or origin sensor will be indicated for adjusting the origin.

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		 Start switch	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.

* Presser lifter control is 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)

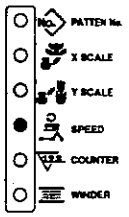
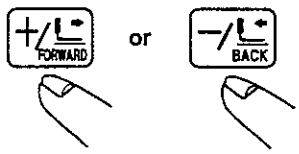
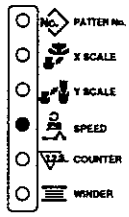
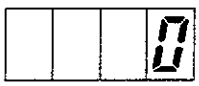
Perform the initial setting of the operation condition, and move to the continuous operation mode.

Step	Indicating section	Checking measure	Explanation
1	C 5	+/L FORWARD or −/L BACK	A time of pause is set by pressing down +/L or −/L key Setting range : 0 to 9,900 ms (in a unit of 100 ms)
2	C A0	READY	Update the time of pause by pressing down READY key.
3	C A0	+/L FORWARD or −/L BACK	Automatic origin retrieval is set by pressing down +/L or −/L key. Setting range : A0 .... Ineffective A1 .... Every 100 times A2 .... Every time
4	0	READY → PATTERN No. / X SCALE / Y SCALE / SPEED / COUNTER / WINDER	Pattern No. will be indicated by pressing down READY key. (When setting for the first time, "0" will be indicated. In other cases, the pattern No. previously set will be indicated.)
5	10	+/L FORWARD or −/L BACK	Pattern No. will be set by pressing down +/L or −/L key.
6	10	READY → Sewing LED Lights up (SEWING)	The mode will move to the continuous operation mode by pressing down READY key.
7	10	Start switch	Continuous operation can be stopped at the time of pause by depressing the pedal switch.

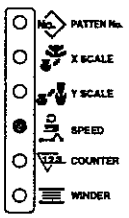
* When "CP-3" is selected, it is not able to return to the other test modes. Turn OFF the power and turn ON the power again in accordance with the starting way of the test mode.

4) CP-4 (revolution movement)

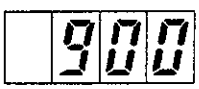
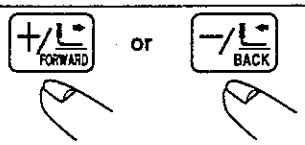
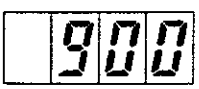
Output of the specified number of revolutions is made and the actual number of revolutions is indicated.

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 s.p.m. 		Set value of the number of revolutions is set by pressing down +/L FORWARD or −/L BACK key.
3		SELECT → Flashes 	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		READY → Sewing LED Lights up 	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		R RESET	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
	SELECT → Flashes 	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, 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 +/L FORWARD or −/L BACK key.
	R RESET	The specified number of revolutions is updated by pressing down READY key.

7. TROUBLES AND CORRECTIVE MEASURES

1) Troubles and corrective measures (mechanical parts)

Troubles	Cause (1)	Cause (2)	Corrective measures
1. Machine lock	Inaccurate longitudinal positioning of the oscillator		Correct the position of the oscillator.
	Defective returning of the thread trimmer cam shaft	Contact between the installing link stopper and the cam installing link.	Correct the clearance between the installing link stopper and the cam installing link.
	Inaccurate positioning of the thread trimmer cam.	Engraved lines of the thread trimmer cam and the main shaft are not aligned with each other.	Adjust the thread trimmer cam.
	Movement of the moving knife is heavy.		Adjust the blade pressure of the moving knife.
	Inaccurate positioning of the initial position of the moving knife.		Correct the initial position of the moving knife.
2. Abnormal noise occurs from the face plate section.	Clearance between the inner hook and the shuttle driver is excessive.		Correct the clearance between the inner hook and the shuttle driver.
3. Wiper cannot spread a thread.	Wiper interferes with the needle.	Inaccurate positioning of the presser lifter sensor slit plate.	Correct the position of the presser lifter sensor slit plate.
		Inaccurate positioning of the wiper	Correct the position of the wiper.
4. Severe vibration	Grounding of the sewing machine is improper.		Securely fix the sewing machine using the level adjuster.
5. Abnormal noise	Backlash between the oscillator and the shuttle driver shaft is large.		Adjust the oscillator shaft.

Troubles	Cause (1)	Cause (2)	Corrective measures
6. Deformation in sewn patterns	Backlash in X feed gear is not properly adjusted.		Properly adjust the backlash in the X feed gear.
	Backlash in Y feed gear is not properly adjusted.		Properly adjust the backlash in the Y feed gear.
	Travelling torque in X direction is excessive.	Backlash between the stepping motor gear and the X feed arm is not properly adjusted.	Properly adjust the backlash in the X feed gear.
		Friction between the feed plate and the feed plate support plate	Properly adjust the attaching position of the slide block stud.
	Travelling torque in Y direction is excessive.	Backlash between the stepping motor gear and the Y feed shaft is not properly adjusted.	Properly adjust the Y feed and the backlash.
		Friction between the Y feed arm and the feed plate support plate.	Properly adjust the position of the feed plate support plate.
		Friction between the feed plate and the feed plate support plate.	Properly adjust the attaching position of the slide block stud.
	Pressing pressure is low.	The regulator is not properly adjusted.	Properly adjust the regulator.
		The supply air pressure is low.	Properly adjust the supply air pressure.
	X slit plate is not properly adjusted.		Properly adjust the position of the X slit plate.
	Y slit plate is not properly adjusted.		Properly adjust the position of the Y slit plate.

Troubles	Cause (1)	Cause (2)	Corrective measures
7. Work clamp foot does not go up.	The supply air pressure is low.		Properly adjust the supply air pressure.
	The regulator is not properly adjusted.		Properly adjust the regulator.
	Contact between the feed bracket and the link or the work clamp foot face plate.		Refer to the item "Parts to be greased".
			The whole part of the feeding frame is not pressing the material to be sewn. (Pressing partially.)
	The presser lifter solenoid fails to work.		Check the connector connection.
			Replace the solenoid.
8. Work clamp foot does not come down.	The supply air pressure is low.		Properly adjust the supply air pressure.
	Contact between the feed bracket and the link.		Refer to the item "Parts to be greased".
	Solenoid valve fails to work.		Replace the solenoid valve.

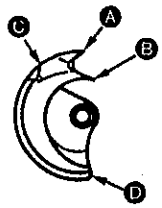
2) Troubles and corrective measures (sewing conditions)

Troubles	Cause (1)	Cause (2)	Corrective measures
1. Thread comes off at the start of sewing.	Stitch skipping at the 1st stitch	Needle stitching is not proper.	Decrease the stitch length at the start of sewing. (Change of the stitch length)
			Decrease the sewing speed at the start of sewing.
			Change the direction and position of the needle stitching.
		Cloth feed timing is defective.	Change of the feed timing using the memory switch (Refer to the item "Electrical parts".
		Penetration registance of the thread against the cloth is small.	Use a thinner needle. (Lower the needle count to be used.)
	Length of 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 tension release timing.
		Rising amount of the tension disk No. 2 is small.	Properly adjust the tension release.
		Stroke of the thread take-up spring is large.	Properly adjust the thread take-up spring.
		Tension of the thread take-up spring is low.	Properly adjust the thread take-up spring.
		Level difference between the needle hole guide and the counter knife is excessively high.	Properly adjust the height of the counter knife.
		Needle thread tension is high and the thread is excessively stretched.	Properly adjust the needle thread tension.
		Thread spreading section of the moving knife has scratches.	Polish the thread spreading section of the moving knife with buff or replace the knife.

To the next page

Troubles	Cause (1)	Cause (2)	Corrective measures
From the previous page			
	Length of bobbin thread remaining is not sufficient.	Level difference between the needle hole guide and the counter knife is excessively high.	Properly adjust the height of the counter knife.
		Clearance between the needle hole guide and the counter knife is small.	Properly adjust the position of the counter knife.
		Lower face of the needle hole guide has scratches.	Polish the needle hole guide or replace it.
		Thread spreading section of the moving knife has scratches.	Polish the thread spreading section of the moving knife with buff or replace the knife.
		Shuttle upper spring has scratches.	Remove the scratches or replace the spring.
		Bobbin thread tension is too strong.	Properly adjust the bobbin thread tension.
	Material to be sewn is not properly stretched.		Remove the slack of the material to be sewn.
	Threading the needle bar thread guide is wrong.		Refer to the item "Threading the needle bar thread guide".
	Bobbin runs idle and the bobbin thread is drawn out.		Use the exclusive bobbin and bobbin case for LK-1900.
			Strengthen the idle prevention spring.

Troubles	Cause (1)	Cause (2)	Corrective measures
2. Needle breakage	Clearance between the needle receiving section of the shuttle driver and the needle is defective.		Properly adjust the clearance between the needle and the shuttle driver.
	Clearance between the needle and the inner hook is defective.		Properly adjust the clearance between the needle and the inner hook.
	Feed timing is defective.		Change the feed timing using the memory switch (refer to the item "electrical components".).
	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.		Replace the needle.
	Needle is too thin.		Change the needle No. to the suitable one to the material.
	Thickness of the material to be sewn is beyond the specification.		Possible thickness of the material to be sewn is 5 mm or less.
	Needle hole guide has scratches.		Remove the scratches or replace the needle hole guide.
3. Stitch skipping	Clearance between the needle and the inner hook is excessive.		Properly adjust the clearance between the needle and the inner hook.
	Maladjustment of the needle to the inner hook timing		Properly adjust the needle to the inner hook timing.
	Clearance between the needle receiving section of the shuttle driver and the needle is defective.		Properly adjust the clearance between the needle and the shuttle driver.
	Material to be sewn is not properly stretched.		Remove the slack of the material to be sewn.
	Needle is bent or blunt.		Replace the needle.
	Loop of the needle thread falls down.		Attach the needle with the long groove orienting slightly to the right (approximately 20°).
	Cloth feed timing is defective.		Change the feed timing using the memory switch (refer to the item "electrical components".).

Troubles	Cause (1)	Cause (2)	Corrective measures
4. Thread breakage	Scratches on the inner hook 	Scratches on section Ⓐ (Contact of the inner hook with the needle)	After polishing the blade point of the inner hook with oilstone, polish it with polishing powder. Properly adjust the clearance between the needle and the inner hook.
		Scratches on section Ⓑ (Scratches occur when the needle is bent or broken.)	After polishing the blade point of the inner hook, polish it with polishing powder.
		Scratches on section Ⓒ (Needle scratches the inner hook when removing the inner hook.)	After polishing the blade point of the inner hook, polish it with polishing powder.
		Scratches on section Ⓓ	After polishing the blade point of the inner hook, polish it with polishing powder.
	Thread enters into the shuttle.	Position of the shuttle upper spring is wrong.	Properly adjust the position of the shuttle upper spring.
		Blade point section Ⓐ of the shuttle is round. 	Replace the inner hook.
		Position of the shuttle is wrong.	Properly adjust the position of the shuttle.
		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 adjsut the tension controller No. 1.
		Needle stitching is not proper.	Needle stitching at the sewing start is too narrow.
			Decrease the sewing speed at the start of sewing.
			Change the direction and position of the needle stitching.
	Scratches on the shuttle driver		Remove the scratches and polish with buff, or replace the shuttle driver.
	Clearance between the shuttle driver and the inner hook is too small.		Properly adjust the clearance between the shuttle driver and the inner hook.
	Scratches on the needle hole guide		Remove the scratches, or replace the needle hole guide.
	Finish of the needle hole guide is rough.		Replace the needle.

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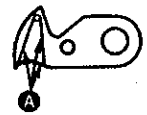
Troubles	Cause (1)	Cause (2)	Corrective measures
From the previous page			
	Thread take-up spring is maladjusted.	Stroke of the thread take-up spring is too large.	Properly adjsut the thread take-up spring.
		Thread take-up spring tension is too high.	Properly adjust the thread take-up spring.
	Rotation of the inner hook is defective.	Race face of the shuttle is clogged with thread waste.	Remove the inner hook and remove the thread waste.
		Oil amount is insufficient.	Supply oil to the shuttle components.
5. Thread breakage at the time of thread trimming	Thread release timing is defective.	Thread release timing is delayed.	Properly adjust the thread release timing.
		Floating amount of the thread tension disk No. 2 is small.	Properly adjust the thread release.
	Thread spreading section of the moving knife has scratches.		Paying attention to the blade section, polish with polishing powder.
	Shuttle upper spring has scratches.		Remove the scratches.
	Level difference between the needle hole guide and the counter knife is too high.	Thread is cut before trimming with the blade section of the moving knife.	Properly adjust the height of counter knife.
	Clearance between the needle hole guide and the counter knife is too small.	Thread is cut before trimming with the blade section of the moving knife.	Properly adjust the position of counter knife.
	Lower face of the needle hole guide has scratches.	Thread is cut with the needle hole guide.	Polish the needle hole guide, or replace it.
	Thread spreading timing of the moving knife is defective.		Properly adjust the initial position of the thread trimmer cam and the moving knife.
	Needle thread tension is too high.		Properly adjust the needle thread tension.
	Stroke of the thread take-up spring is too small.		Properly adjust the thread take-up spring.
	Thread take-up spring tension is excessive.		Properly adjust the thread take-up spring.

Troubles	Cause (1)	Cause (2)	Corrective measures
6. Defective thread trimming	Sharpness of the knife is defective.	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.
	Thread waste remains inside the cylinder arm cap.	There is a burr on thread spreading section Ⓐ of the moving knife. The shape of the thread trimmed becomes ⊃ and thread waste remains. 	Paying attention to the blade section, polish with polishing power, or replace the moving knife.
		Shuttle upper spring has scratches. (The shape of the thread trimmed becomes ⊃ and thread waste remains.)	Remove the scratches.
	Moving knife does not spread threads.	Initial position of the moving knife is maladjusted.	Properly adjust the initial position of moving knife.
		Locus of the moving knife is defective.	Replace the moving knife, or the throat plate.
		Position of the thread trimmer cam is defective.	Properly adjust the position of thread trimmer cam.
		Position of the shuttle upper spring is defective.	Properly adjust the position of shuttle upper spring.
	Stitch skipping at the final stitch.	Timing of the needle to the inner hook and the clearance between them are defective.	Properly adjust the timing or clearance.
		Height of the intermediate presser is defective.	Properly adjust the height of intermediate presser.
		Loop of the needle thread falls down.	Attach the needle with the long groove orienting slightly to the right (approximately 20°).

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Troubles	Cause (1)	Cause (2)	Corrective measures
From the previous page			
	Bobbin thread cannot be cut.	Needle stitching at the final stitching is too narrow.	Make the stitch length at the final stitch 1 mm or more.
		Bobbin thread tension is low.	Strengthen the bobbin thread tension.
		Needle hole of the needle hole guide is large.	Replace the needle hole guide with a new one having a smaller hole diameter.
7. Poorly tense stitches	Tension controller No. 2 is maladjusted.	Tension of the tension controller No. 2 is low.	Properly adjust the tension of tension controller No. 2.
	Tension controller No. 2 is floating.		Properly adjust the thread release mechanism.
	Thread take-up spring is maladjusted.	Thread take-up spring tension is low.	Properly adjust the thread take-up spring tension.
		Stroke of the thread take-up spring is large.	Properly adjust the stroke of thread take-up spring.
	Clearance between the inner hook and the shuttle driver is defective.		Properly adjust the clearance of inner hook and shuttle driver.
	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.
	Shape of the feed plate is defective.	Material to be sewn is stiff and closely contacted 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 contacted 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.
	Feed timing is defective.		Change the feed timing using the memory switch (refer to the item "electrical components".).

Troubles	Cause (1)	Cause (2)	Corrective measures
8. Defective stitches with the synthetic thread	Thread breakage due to the heat.	Sewing speed is too fast.	Delay the maximum speed.
		Needle is too thick.	Use a thinner needle or a super needle for the synthetic thread.
			Apply silicon.
	Thread makes burrs.	Thread path is defective.	Polish the thread path of each component with polishing powder.
		Finish of the needle hole is defective.	Replace the needle.
			Move the thread guide A to the left.
	Thread floating occurs at the sewing start.	Needle stitching is improper.	Make the needle stitching at the sewing start narrow.
			Delay the sewing speed at the sewing start.
			Change the direction and position of needle stitching at the sewing start.
		Penetration registance of the thread against the cloth is too small.	Use a thinner needle. (Lower the number of needle to be used.)
		Feed timing is defective.	
	Stitch skipping due to the heat.	Sewing speed is too fast.	Change the maximum speed (electrical components).
		Needle is too thin.	Use a thicker needle. (Raise the number of needle to be used.)
		Loop of the needle thread falls down.	Attach the needle with the long groove orienting slightly to the right (approximately 20°).
	Uneven stitch tightness due to the stretch of thread.	Sewing speed is too fast.	Reduce the speed by means of the speed variable resistor.
		Tension of the tension controller No. 2 is excessive.	Decrease the tension of tension controller No. 2.

(Electrical components)

Troubles	Cause (1)	Cause (2)	Corrective measures
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) Voltage of +5V 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. (10A)
	1-3) Operation panel ⟷ MAIN circuit board are not connected.	3-A) Disconnected J23 connector. (Main circuit board)	Securely connect the connector.
2. A key switch on the operation panel fails to work.	2-1) Failure with the switch		Execute the input check program to identify the defective switch and replace the operation circuit board.
	2-2) Failure with the circuit board		Replace the operation circuit board.
3. After the READY switch is turned ON, the feeding frame comes down but fails to move.	3-1) Voltage of +85V is not supplied to the MAIN circuit board.	1-A) Fuse F4 has blown.	Replace the fuse after removing the cause. (5A)
	3-2) MAIN circuit board ⟷ X side stepping motor are not connected.	2-A) Disconnected J14 connector	Securely connect the connector.
	3-3) Failure with the circuit board		Replace the MAIN circuit board.
	3-4) MAIN circuit board ⟷ Y side stepping motor are not connected.	4-A) Disconnected J15 connector	Securely connect the connector.
4. Presser lifter fails to work.	4-1) Pedal switch ⟷ MAIN circuit board are not connected.	1-A) Disconnected J18 connector (MAIN circuit board)	Securely connect the connector.
	4-2) Failure with the pedal switch.		Execute the input check program to identify the defective switch, and replace the switch.
	4-3) Failure with the circuit board		Replace the MAIN circuit board.

Troubles	Cause (1)	Cause (2)	Corrective measures
5. Error No. E1 is indicated.	5-1) Pattern No. has not been registered.		Check the pattern No.
	5-2) Defective data ROM (U21)		Replace the data ROM.
	5-3) Defective circuit board		Replace the MAIN circuit board.
	5-4) Setting of the sewing machine model is different.		Execute the initialization according to the model set in the memory switch.
6. Error No. "E7 Machine motor error" is indicated.	6-1) Driving power has not been supplied to the machine motor.	1-A) Disconnected J8 connector Disconnected J28 connector	Securely connect the connectors.
	6-2) Driving power has not been supplied.	2-A) Disconnected J9 connector Disconnected J33 connector	
	6-3) Power for the control has not been supplied.	3-A) Disconnected J6 connector Disconnected J36 connector	
	6-4) Encoder signal from the machine motor has not been supplied.	4-A) Disconnected J2 connector Disconnected J29 connector	
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 connectors.
8. Main shaft rotates at a low speed for approximately two seconds and stops.	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 board.
9. EA cannot be cleared.	9-1) Presser sensor ⟷ MAIN circuit board are not connected.	1-A) Disconnected J19 connector	Securely connect the connector.
	9-2) Air pressure is insufficient.		Make the air pressure to the specified one.

Troubles	Cause (1)	Cause (2)	Corrective measures
10. Origin retrieval is made but the feeding frame does not go up.(Magnet type)	10-1) Presser magnet ⟷ MAIN circuit board are not connected.	1-A) Disconnected J13 connector	Securely connect the connector.
	10-2) Failure with the circuit board		Replace the MAIN circuit board.
11. Origin retrieval is made but the feeding frame does not go up.(Pneumatic type)	11-1) Solenoid valve ⟷ MAIN circuit board are not connected.	1-A) Disconnected J17 connector	Securely connect the connector.
	11-2) Failure with the circuit board		Replace the MAIN circuit board.
12. After turning ON the power, at the first origin retrieval, the machine moves to the unexpected direction.	12-1) MAIN circuit board ⟷ X, Y sensors are not correctly connected.	1-A) Mistakenly connected J20 and J21 connectors	Check the connection of connectors.
	12-2) MAIN circuit board ⟷ X, Y motors are not correctly connected.	2-A) Mistakenly connected J14 and J15 connectors	Check the connection of connectors.
13. Thread trimming does not work.	13-1) Thread trimmer solenoid does not work.	1-A) Disconnected J12 connector	Securely connect the connector.
	13-2) Failure with the circuit board		Replace the MAIN circuit board.

8. SUB-CLASSES

(1) Specifications

Different specifications from those of the LK-1900 only are described.

Model	LK-1901	LK-1902	LK-1903
Sewing speed	Max. 2,700 s.p.m.	Max. 2,700 s.p.m.	Max. 2,500 s.p.m.
Needle	DP x 5 #14 #16	DP x 5 #14 #16	DP x 17 #14
Lifting method of the work clamp foot	Electromagnetic solenoid type / Air Cylinder type		
Lift of the work clamp foot	Max. 17 mm	Max. 17 mm	Max. 13 mm
Number of standard patterns	3 patterns	6 patterns	33 patterns
Wiper method	Actuates with presser lifter	Actuates with presser lifter	Driven by solenoid

(2) LK-1903

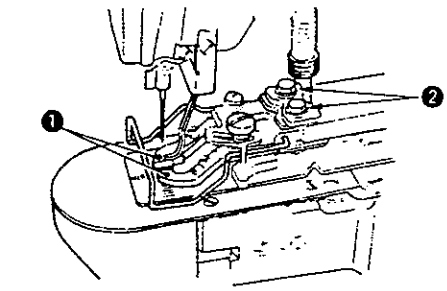
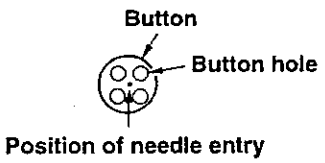
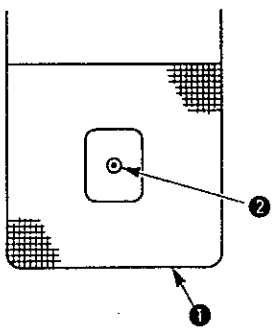
Model classification according to the button size

Model			LK-1903-301		LK-1903-302		LK-1903-303		LK-1903-304		
Button size classification			For small-sized button		For medium-sized button		For large-sized button		For extra small-sized button		
Outside diameter of applicable button (mm)			ø10 to ø20		ø10 to ø20		ø15 to ø32		ø8 to ø9	ø9 to ø10	ø10 to ø15
Sewing size (mm)	Length		0 to 3.5		0 to 4.5		0 to 6.5		0 to 2.5	0 to 3	0 to 3.5
	Width		0 to 3.5		0 to 4.5		0 to 6.5		2.5 or less	3 or less	3.5 or less
Button clamp jaw lever	Thickness (mm)		2.2 (2.7)	※	2.7 (2.2)	※	2.7 (3.2)	※	2.2 (1.7)		※
	Part No.	Right	MAZ155070B0	B	MAZ156070B0	C	MAZ157070BB	D	MAZ158070BA		F
			(MAZ156070B0)	C	(MAZ155070B0)	B	(MAZ157070BA)	E	(MAZ158070BB)		G
		Left	MAZ155080B0	B	MAZ156080B0	C	MAZ157080BB	D	MAZ158080BA		F
			(MAZ156080B0)	C	(MAZ155080B0)	B	(MAZ157080BA)	E	(MAZ158080BB)		G
Needle hole guide			MAZ15501000		MAZ15601000		MAZ15701000		MAZ15801000		
Feed plate			MAZ15502000		MAZ15602000		MAZ15702000		MAZ15502000		

※ Engraved marker

The parts in parentheses are those to be specially ordered.

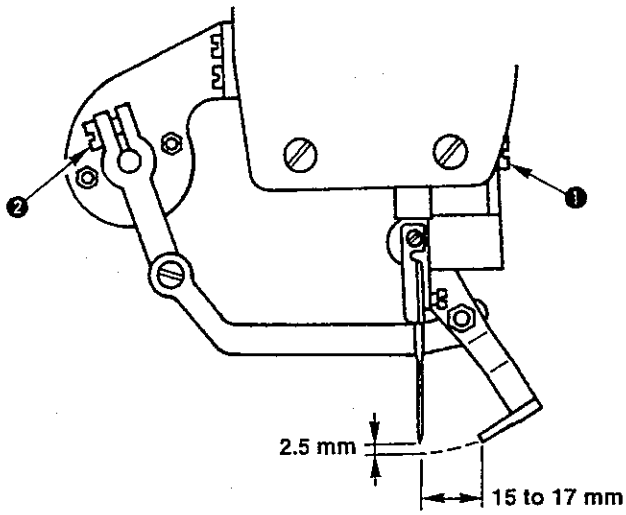
(3) LK-1903 (button sewing) components

Standard Adjustment
1) Position of the button clamp jaw lever (Adjustment of the origin)    
2) Adjusting the feed plate 

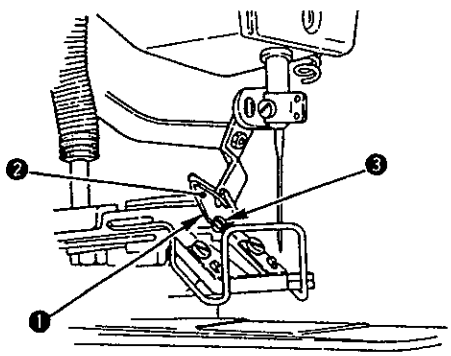
Adjustment Procedures	Results of Improper Adjustment
① Select pattern No. 99 using the operation panel. ② Press the READY button. The button clamp unit goes up and comes to the position of the origin. ③ Place a button in button clamp jaw levers ❶. ④ Depress the pedal to the first step. When the button clamp unit comes down, turn the hand pulley until the digital indication on the operation panel becomes E3. ⑤ Detach the foot from the pedal. ⑥ Turn the hand pulley, and make sure that the center of the needle is located in the center of the button. ⑦ When the center of the needle is not located in the center of the button, loosen setscrews ❷ in the button clamp jaw lever base and adjust so that the center of the needle comes to the center of the button. ⑧ After the adjustment, check the contour of the pattern and that the needle securely enters in the button hole.	○ If the center of the button is not the position of the origin, the needle will interfere with the button hole, causing needle breakage or button breakage. Also, a secure thread knotting may not be made.
① Select pattern No. 99 using the operation panel. ② Press the READY button. The button clamp unit goes up and comes to the position of the origin. ③ Adjust feed plate ❶ so that needle hole guide ❷ comes to the center of the recess part of feed plate ❶.	○ Even when the needle hole guide is in the center of the recess part of the feed plate, the needle may come in contact with the feed plate if the sewing size becomes large.

Standard Adjustment

3) Adjusting the wiper



4) Adjusting the wiper spring



Adjustment Procedures	Results of Improper Adjustment
① Loosen screw ❶ and adjust so that a clearance of 2.5 mm or more is provided between the wiper and the needle. ② Loosen screw ❷ and adjust so that the distance between the end face of the wiper and the center of the needle is 15 to 17 mm. After the adjustment, securely tighten the screw. * Position of the needle is when the machine stops after completing the sewing.	○ If the distance of 15 to 17 mm is excessive or too small, thread retaining with the wiper and the wiper spring cannot be made.
○ Wiper spring ❶ retains needle thread after thread trimming between the spring and wiper ❷. Properly adjust wiper spring ❶ so that the force is 20 to 30g when retaining the needle thread (the force is a little stronger than the force of bobbin thread coming from the bobbin case). ① Remove screw ❸, and remove wiper spring ❶ from wiper ❷. ② Properly adjust wiper spring ❶ and attach it to wiper ❷ again using screw ❸.	○ If the retaining force is excessive, thread may protrude from the upper side of the button. ○ If the retaining force is too low, it will cause the needle thread slip. ○ If the position of the wiper spring is improper, the thread is not retained, causing needle breakage.

(4) LK-1901 (Eyelet buttonhole bartacking) only

Troubles	Cause (1)	Cause (2)	Corrective measures
Cloth drawing fails to work.	Work clamp unit solenoid fails to work.	Disconnected work clamp unit solenoid connector or disconnected pin	Check the connector inside the control box.
		Defective work clamp unit solenoid (Broken wire)	Replace the related parts.
		Failure with the work clamp unit solenoid	Replace the related parts.
	Setting of cloth drawing action is not turned ON.		Turn ON the setting of cloth drawing action using the memory switch.

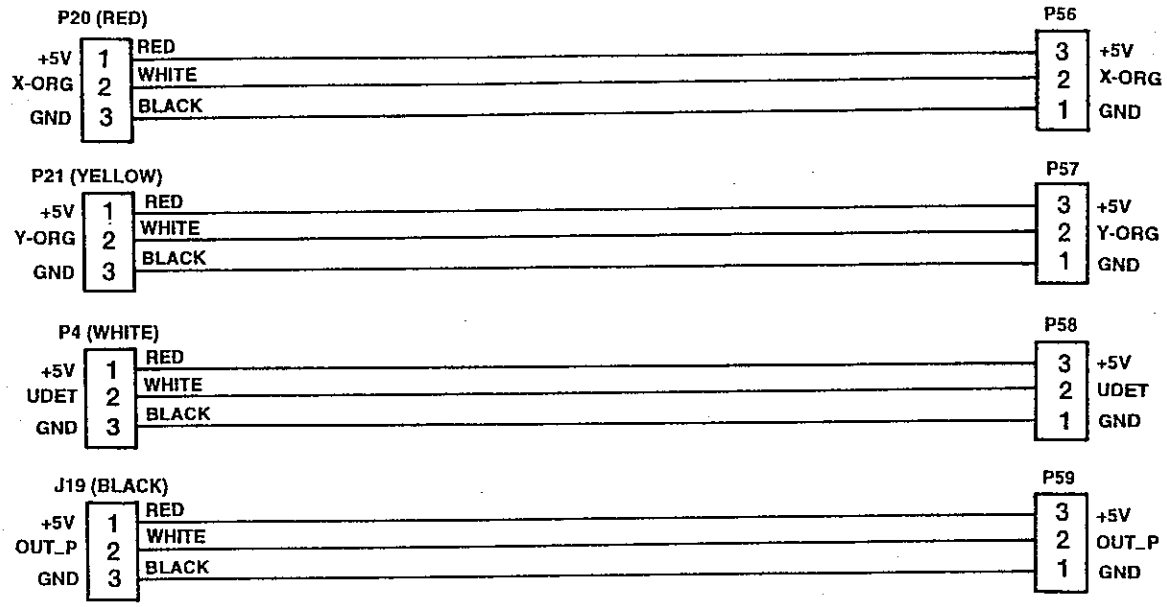
(5) LK-1903 (Button sewing) only

Troubles	Cause (1)	Cause (2)	Corrective measures
Needle breakage	Needle contacts with other components.	Needle hits the button hole.	Correctly adjust the origin.
		Boss section of the needle hole guide hits the window section of the feed plate.	Correctly adjust the feed plate.
Thread comes off at the start of sewing or sewing starts on the way.	Length of needle thread remaining is too short.		Decrease the tension of tension controller No. 1.
			Correctly adjust the disk floating timing of tension controller No. 2.
	Cloth becomes uneven.		Use a needle hole guide with high boss.
			Use a button clamp jaw lever with thin thickness of the lever.
	Wiper does not retain thread.	Position of the wiper spring is not correct.	Correctly adjust the position.
			Properly correct the wiper spring or replace it.
Thread knotting is not sure.	Needle hits the button hole.		Correctly adjust the position of button clamp jaw lever. (Adjustment of the origin)
	Tension of the tension controller No. 1 is excessive.		Decrease the tension of tension controller No. 1.
	For the cloth with interlining, lifting is improper.		Increase the tension of tension controller No. 2.
			Use a thinner needle.

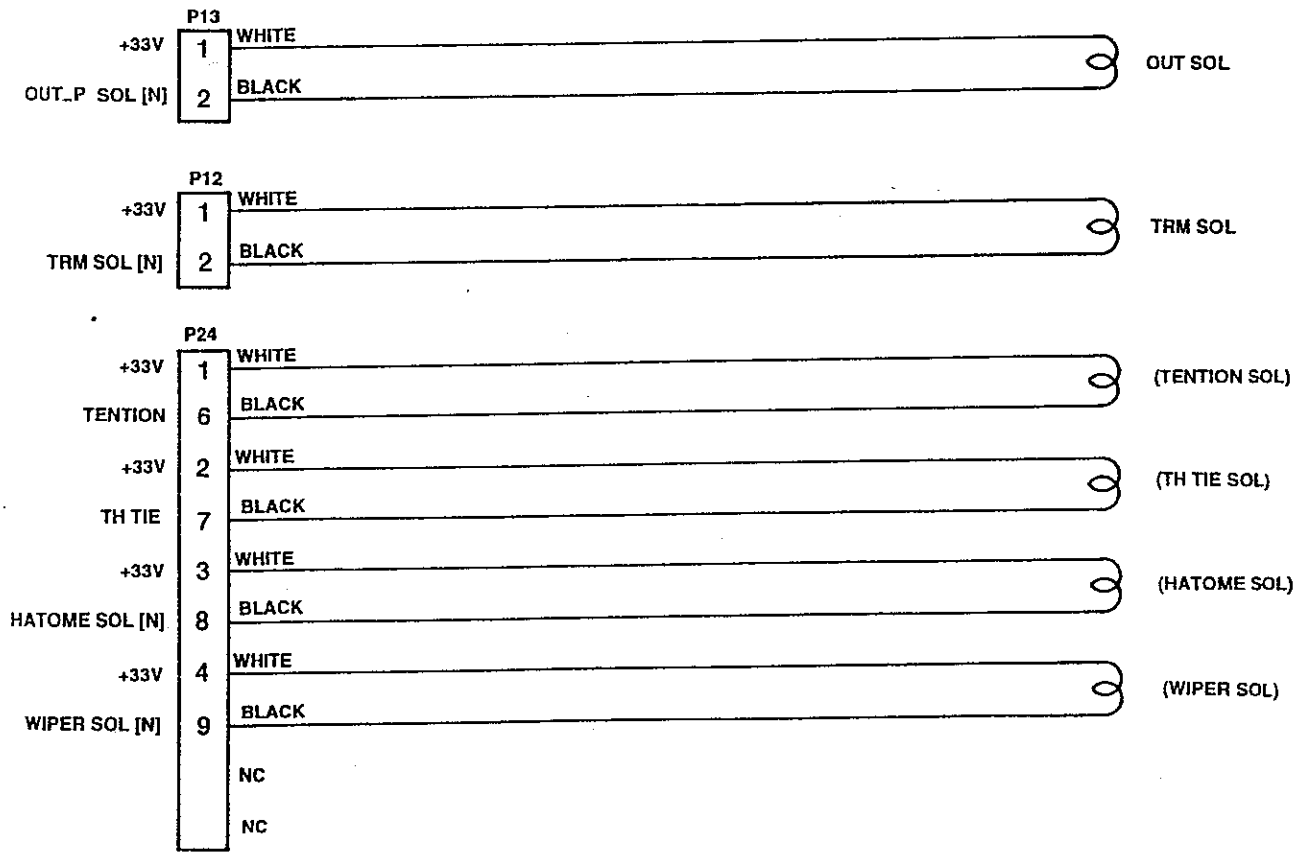
Troubles	Cause (1)	Cause (2)	Corrective measures
Wrong side of the material is excessively dirty.	Length of needle thread remaining is too short.		Increase the tension of tension controller No. 1.
			Properly adjust the disk floating timing of tension controller No. 2.
	Retaining force of the wiper is excessive.		Properly adjust the wiper spring.
	Idling amount of the bobbin thread is excessive.		Strengthen the idle prevention spring.
	For the button with round bottom, wrong side of the material becomes like dumpling.		Replace the button clamp jaw lever with a new one having thick plate.
Button sewing shifts.	Retaining the button is weak.	Action of the button clamp jaw lever is defective.	Improve the action of the button clamp jaw lever.
	Contact of the button clamp spring is excessive.		Properly correct the button clamp spring and decrease the contact.
	Thread enters between the button and the boss of needle hole guide, and the button does not move smoothly.		Replace the button clamp jaw lever with a new one having thick plate.
Wiper fails to work.	Wiper solenoid fails to work.	Disconnected wiper solenoid connector or disconnected pin.	Check the connector inside the control box.
		Defective wiper solenoid cord (Broken wire)	Replace the related parts.
		Failure with the wiper solenoid	Replace the related parts.
	Setting of the wiper action is not turned ON.		Turn ON the setting of the wiper action using the memory switch.

9. CIRCUIT DIAGRAM

(1) Machine head sensor circuit diagram



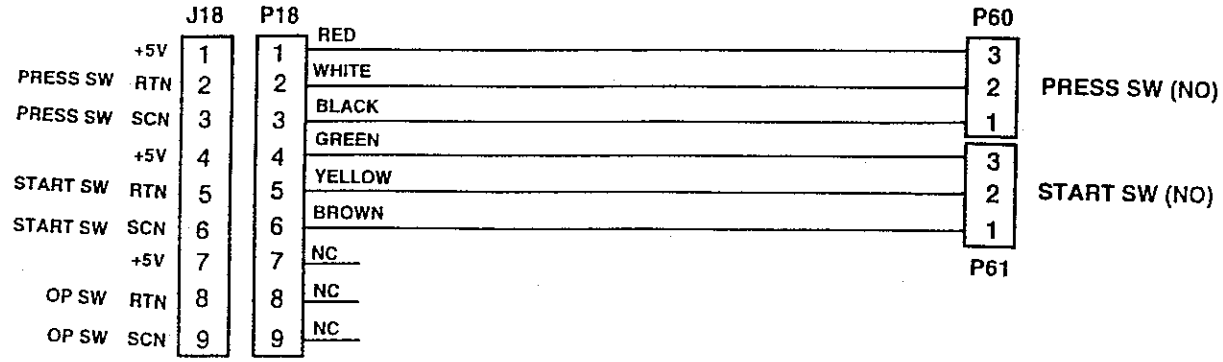
(2) Solenoid circuit diagram



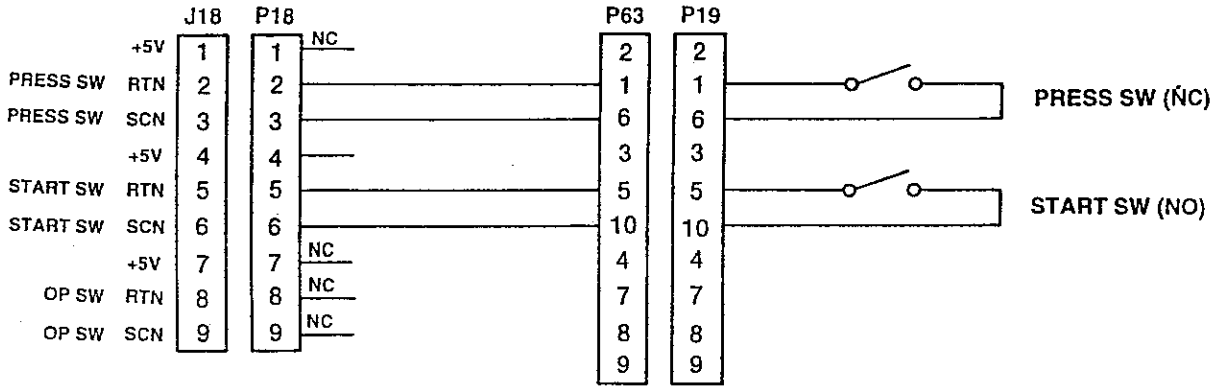
(Note) 1. For the standard specifications, there are two outputs, OUT SOL and TRM SOL, only.

(3) Pedal switch circuit diagram

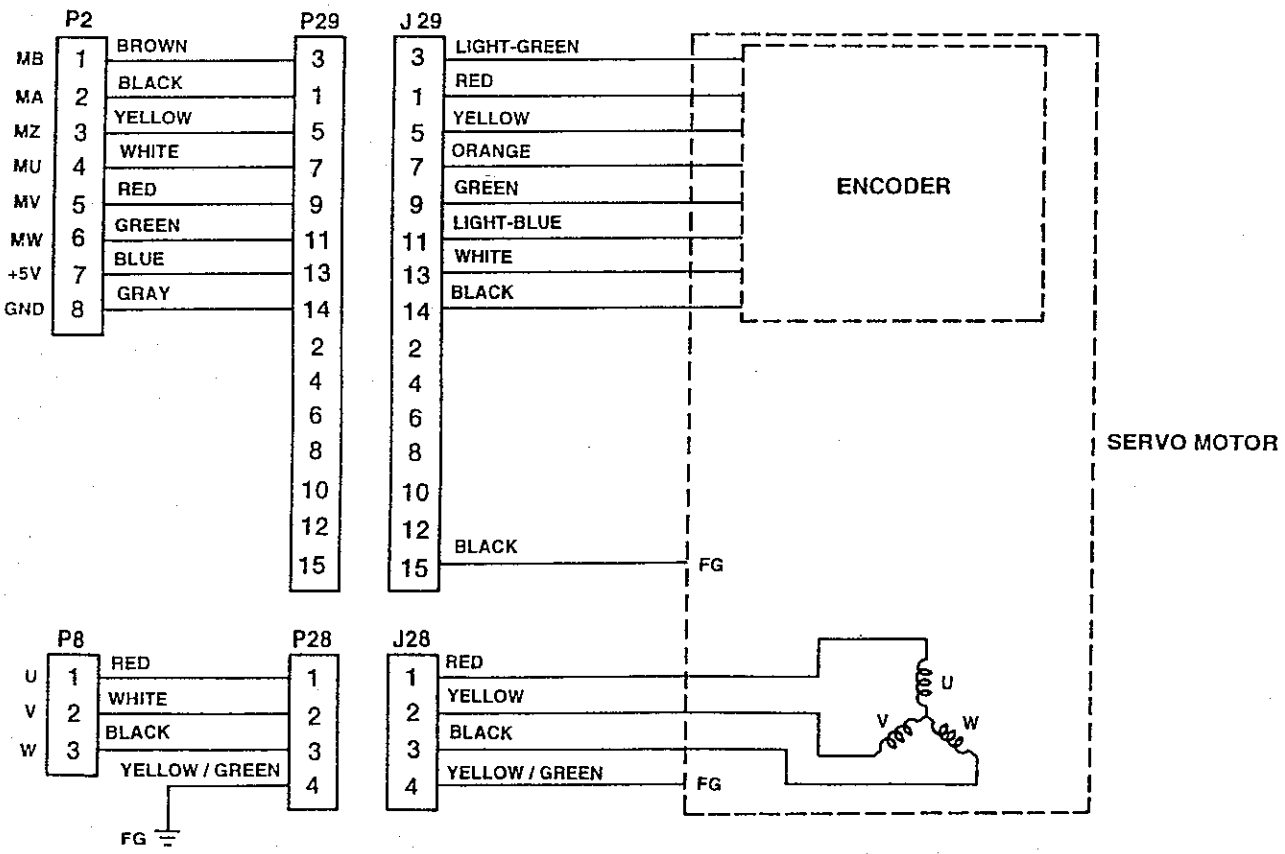
1 PEDAL



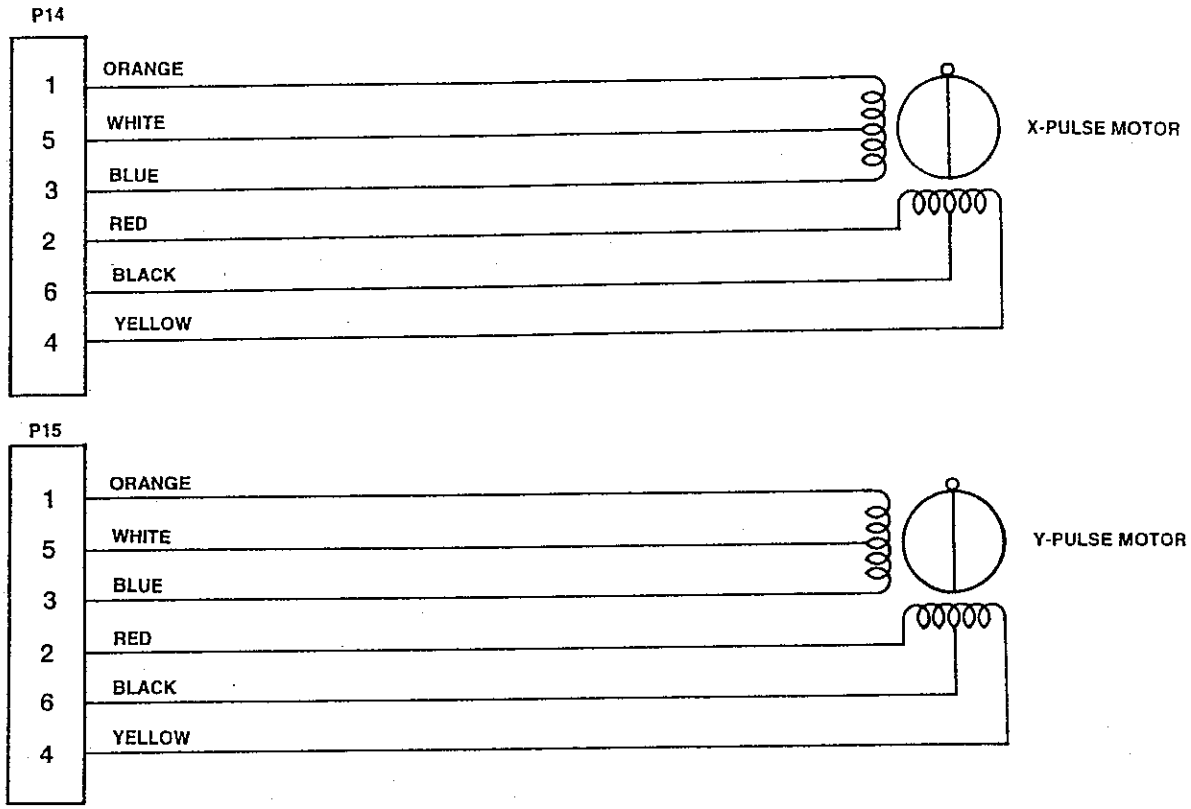
2 PEDAL



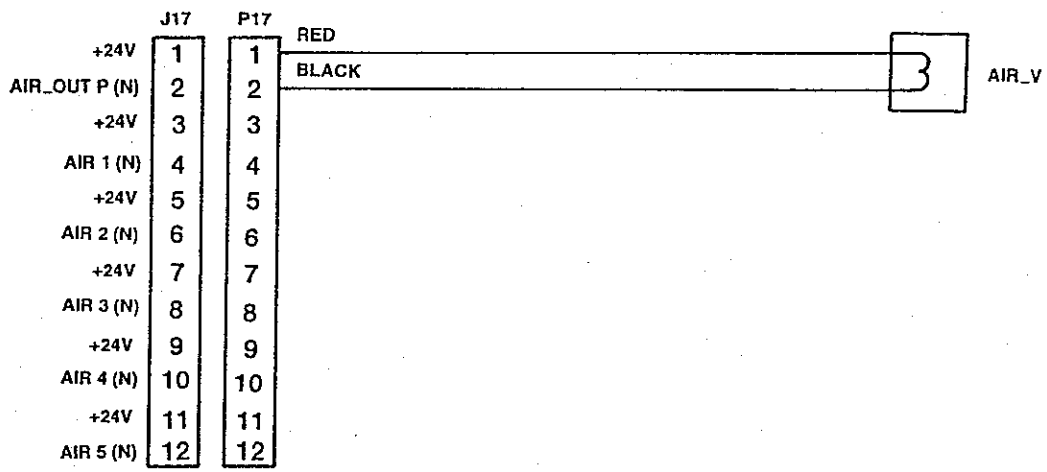
(4) Servo motor circuit diagram



(5) Stepping motor circuit diagram

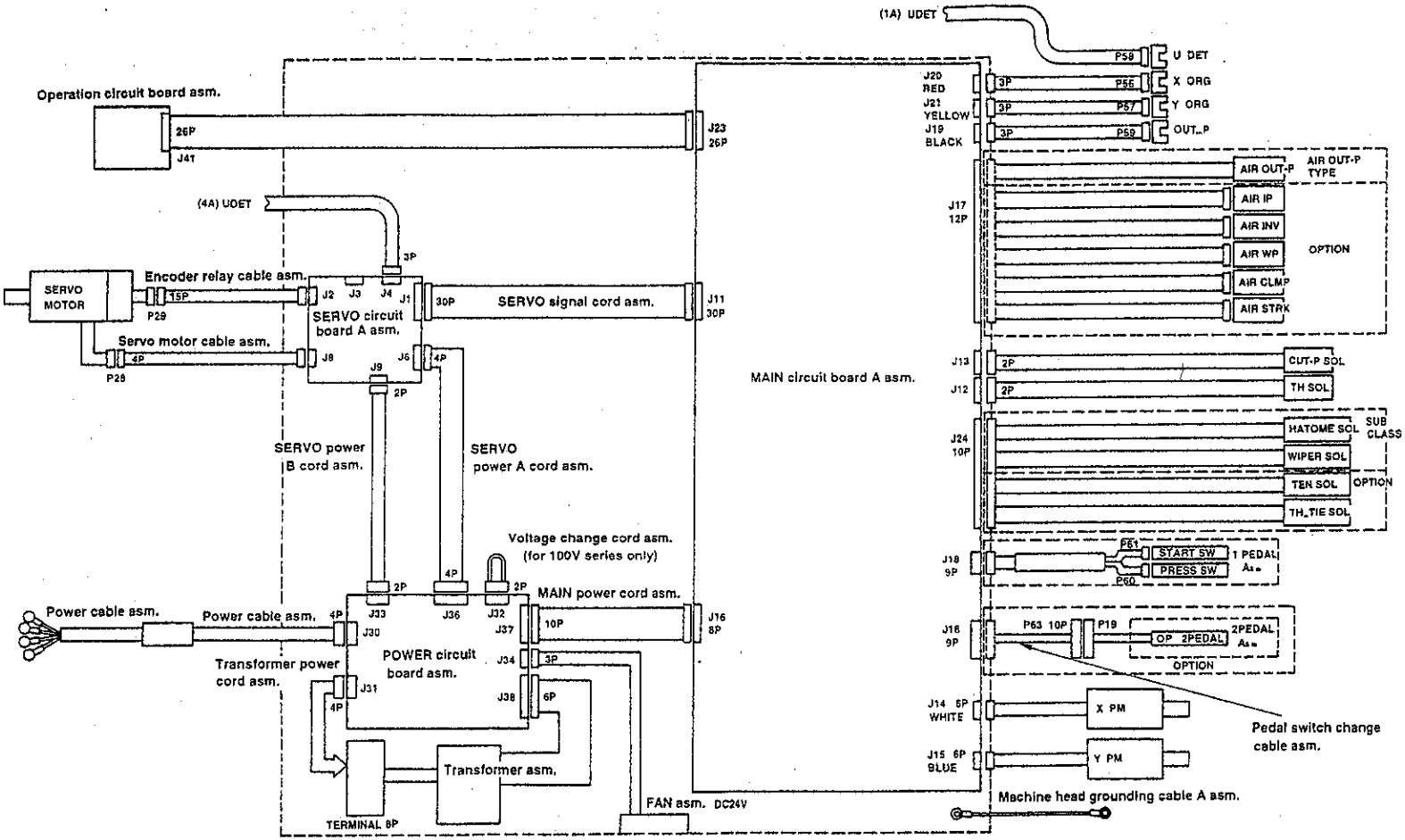


(6) Solenoid valve circuit diagram

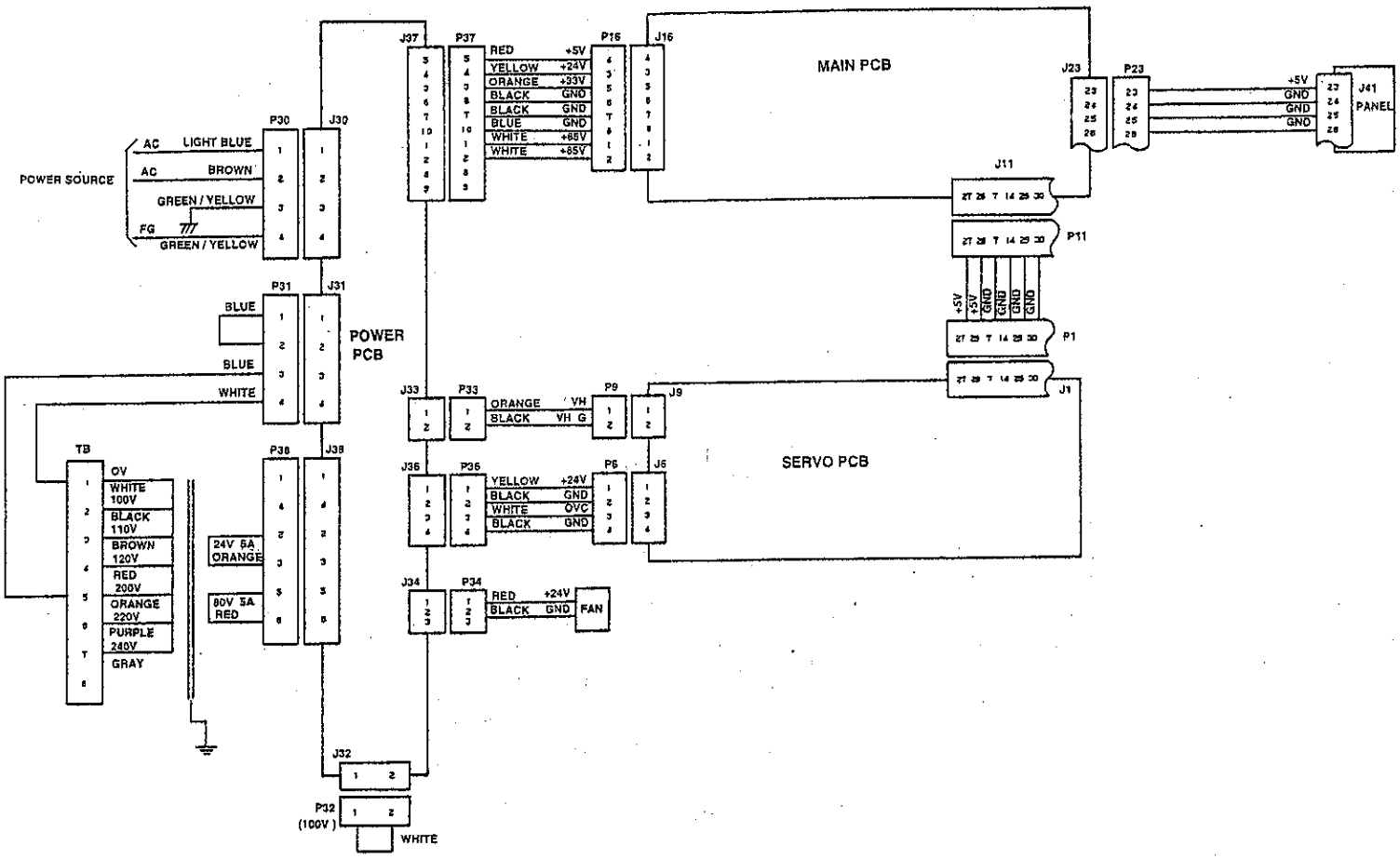


MEMO

(7) Block diagram

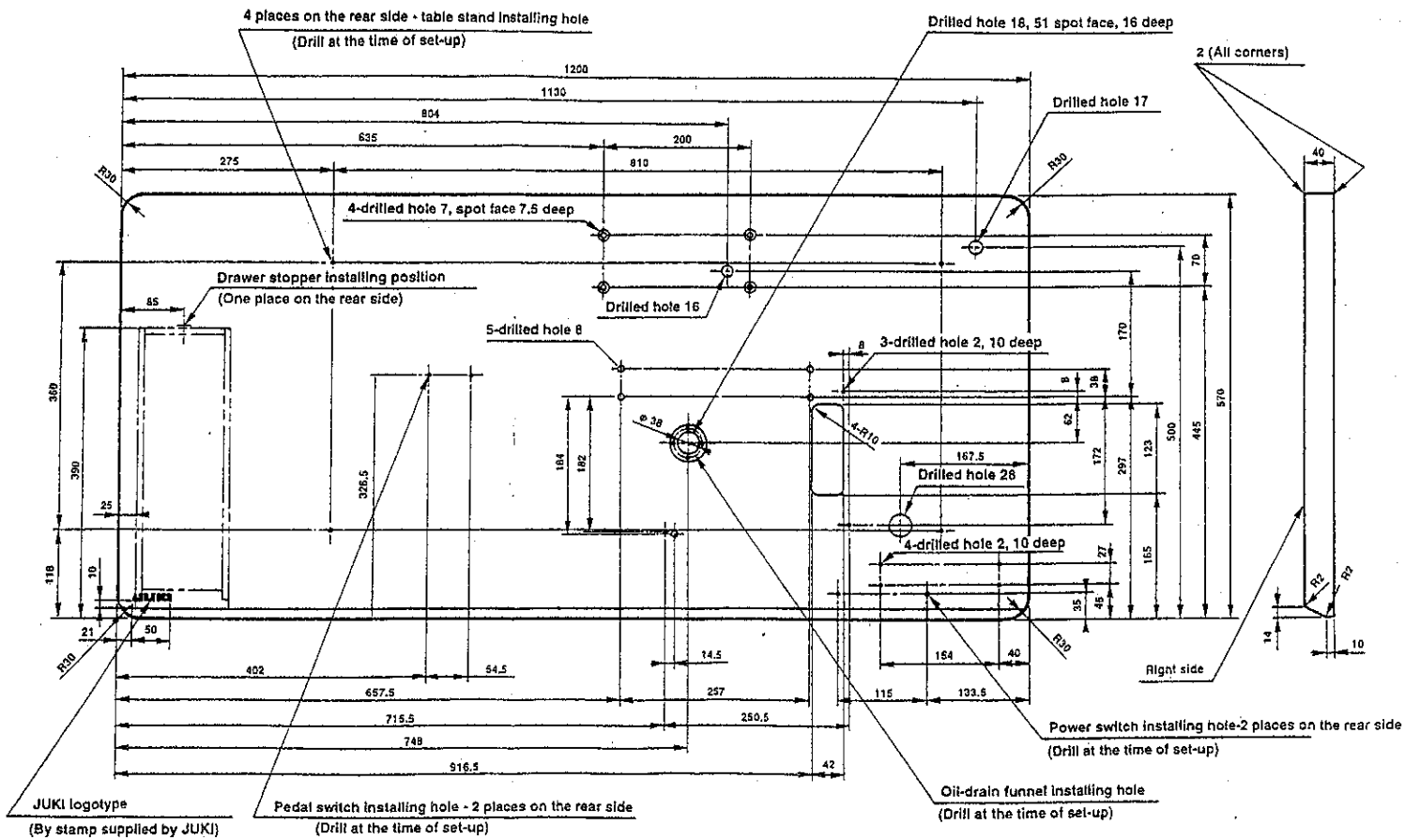


(8) POWER circuit diagram A
M86045900A0 (100 to 200V spec.)

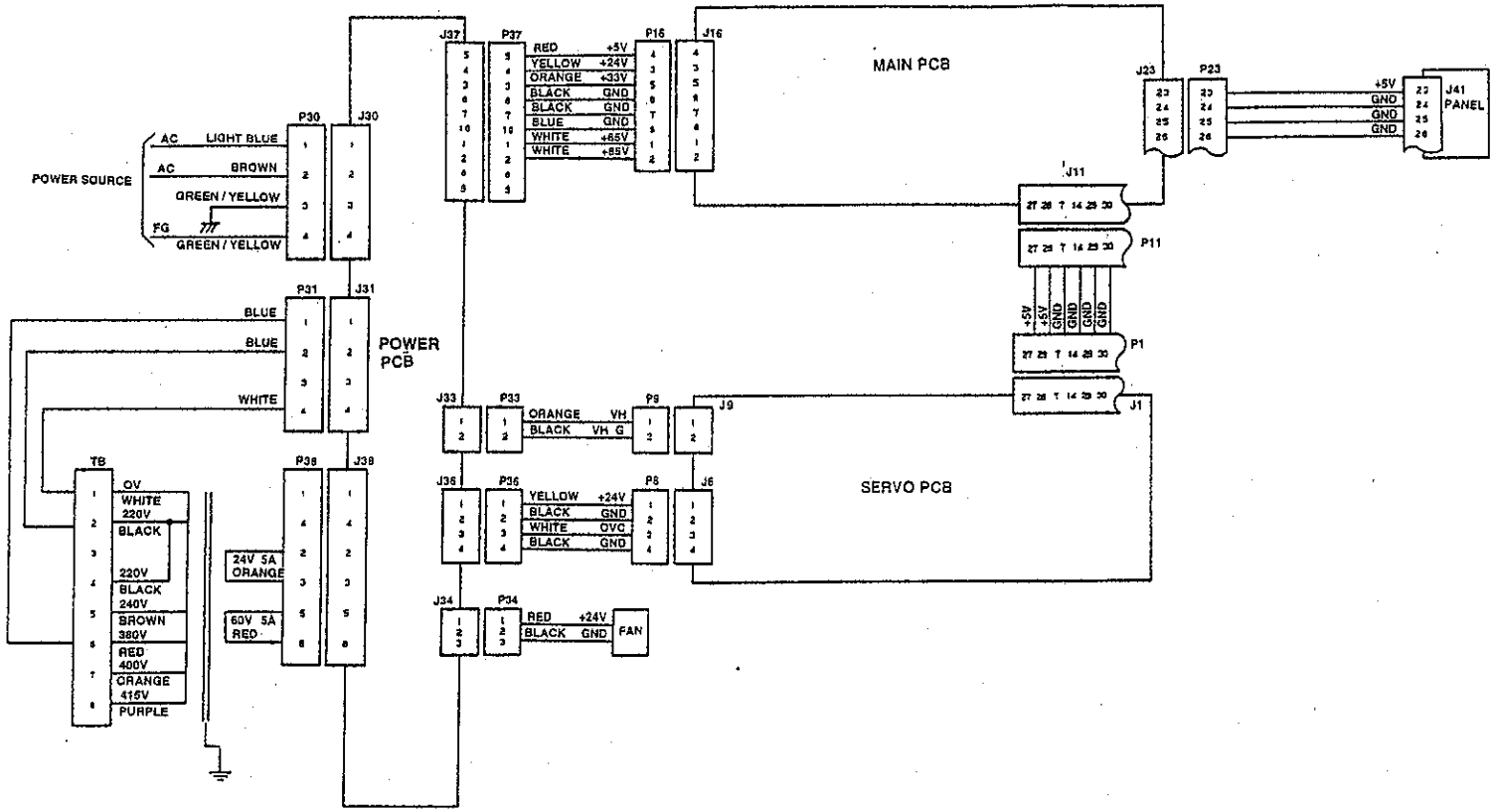


(Note) 1. The above diagram shows the wiring when AC 200V is input.

10. DRAWING OF THE LATERAL INSTALLATION TYPE TABLE



(9) POWER circuit diagram B
M3804590AA0 (380V spec.)



(Note) 1. Following diagram shows the wiring when AC 380V is input.