

## 1. SPECIFICATIONS

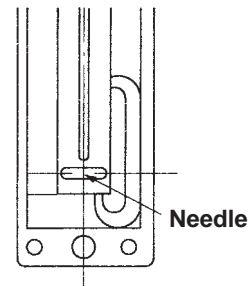
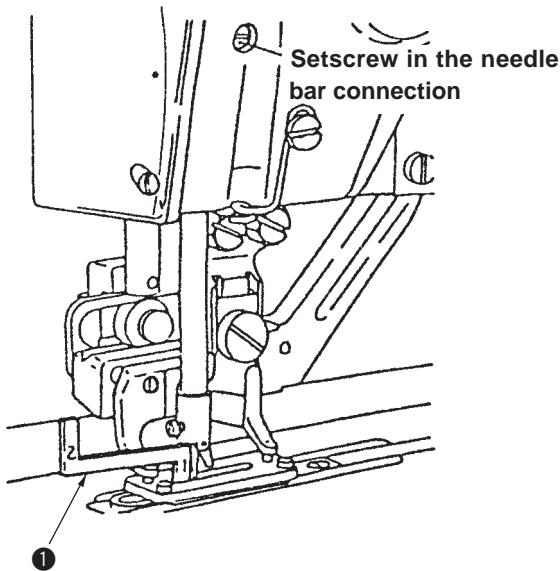
	Model	LBH-1700			LBH-1702
		When presser type 1 is used	When presser type 2 is used	When presser type 3 is used	
	Stitch width (max.)	4 mm	5 mm	5 mm	5 mm
	Length of buttonhole (length of knife)	6.4 to 19.1 mm (1/4" to 3/4")	6.4 to 25.4 mm (1/4" to 1")	6.4 to 31.8 mm (1/4" to 1-1/4")	6.4 to 25.4 mm (1/4" to 1")
	Stitch length (max.)	25 mm	35 mm	41 mm	35 mm
1	Sewing speed	Standard 3,000 rpm (Number of revolution can be controlled.) Max. 3,600 rpm			
2	Needle	DP X 5J (SCHMETZ 134R)			
3	Needle bar stroke	34.6 mm			
4	Thread take-up lever	Link thread take-up lever			
5	Hook	DP type full-rotary automatic lubricating hook			
6	Lift of work clamp check	12 mm			
7	Bobbin winder	Built-in machine head type			
8	Feed drive method	Drive by stepping motor, rack and pinion			
9	Dimensions	Width of machine bed : 185 mm Height (from table top surface to top end of top cover) : 364 mm Length (from front end of machine bed to rear end of motor cover) : 630 mm			
10	Weight of machine head	50 kg			
11	Adjustment of needle thread	Active tension method  Digital setting for each section by means of operation panel (Parallel section tension, bar-tacking section tension)			
12	Data that can be stored in memory	Max. 89 patterns			
13	Bar-tacking shape	Square shape, radial shape, round shape (selection by operation panel) Radial taper bar, Radial straight bar			
14	Change-over of 1/2 stitching	Each pattern can be set.			
15	Input voltage classification	Domestic : 1ø 100V/ 3ø 200V  Export : 1ø 100 to 240V    1ø 220 to 415V 3ø 200 to 240V    3ø 220 to 415V			
16	Motor	Compact AC servo motor 450W  Direct-drive method			
17	Lubrication method	Automatic lubrication method			
18	Lubricating oil	JUKI New Defrix oil No.1 (Equivalent to ISO VG7)			

## 2. STANDARD ADJUSTMENT

### Standard Adjustment

#### (1) Height of the needle bar

Adjust the height of the needle bar so that the distance from the top surface of the throat plate to the lower end face of the needle bar is 11.9 mm (standard) or 11.4 mm (K) when the needle bar is in the lowest dead point.

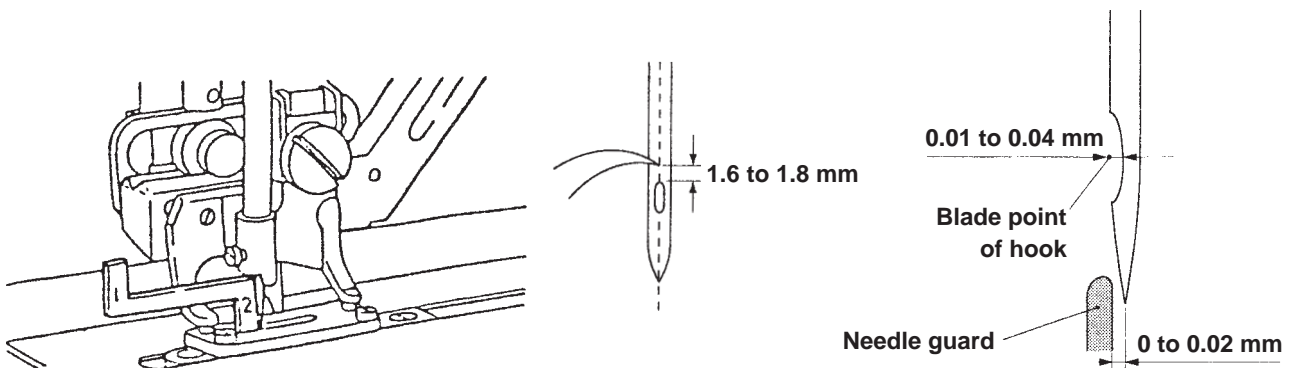


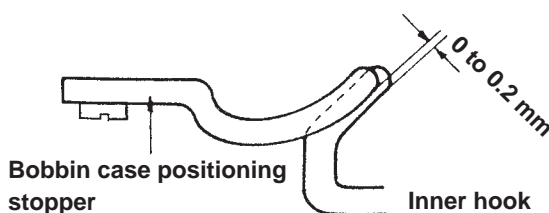
#### (2) Needle-to-hook timing

- 1) Blade point of the hook is aligned with the center of the needle when the needle bar goes up by 2.3 mm (standard) or by 2.8 mm (K) from its lowest dead point.

At this time, the distance from the top end of the needle eyelet to the blade point of the hook is 1.6 to 1.8 mm (needle is in the central section of the hole in the throat plate).

- 2) The clearance provided between the needle and the blade point of the hook is 0.01 to 0.04 mm (needle is rocked to the right of the hole in the throat plate).
- 3) Adjustment value of the needle guard is 0 to 0.02 mm (needle is in the central section of the hole in the throat plate).

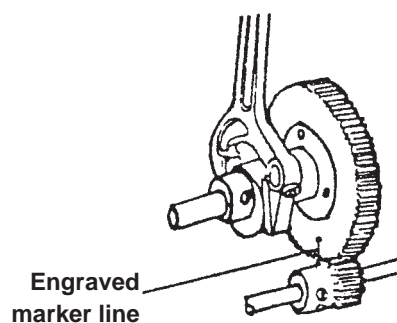
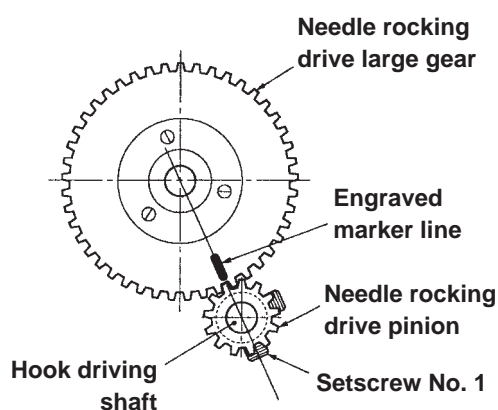


Adjustment Procedures	Results of Improper Adjustment											
<div>1. Enter timing gauge ❶ supplied with the machine as accessories between the throat plate and the lower end of the needle bar as shown in the figure, loosen the setscrew in the needle bar connection, and adjust the height of the needle bar.</div> <div>(Caution) Adjust the height of the needle bar when the needle is positioned in the center of the needle hole in the throat plate.</div> <div>2. Table of timing gauge</div> <table><tr><th rowspan="2">Sub-class type</th><th colspan="2">Timing gauge</th></tr><tr><th>1</th><th>2</th></tr><tr><td>Standard</td><td>11.9 mm</td><td>14.2 mm</td></tr><tr><td>K</td><td>11.4 mm</td><td>14.2 mm</td></tr></table> <div>Part No. of timing gauge : B9101771000 (Standard) D9101771K00 (K)</div>	Sub-class type	Timing gauge		1	2	Standard	11.9 mm	14.2 mm	K	11.4 mm	14.2 mm	<div>○ For the floppy fabrics, it is effective when the needle bar is slightly lowered than the standard value.</div>
Sub-class type		Timing gauge										
	1	2										
Standard	11.9 mm	14.2 mm										
K	11.4 mm	14.2 mm										
<div>1. Make a state that the needle is in the center of the hole in the throat plate and the needle bar starts going up from the lowest dead point. Then, enter the timing gauge 2 between the throat plate and the lower end of the needle bar as shown in the figure and loosen the hook sleeve setscrew to adjust the timing.</div> <div>2. The clearance provided between the needle and the blade point of the hook is 0.01 to 0.04 mm when the needle is rocked to the right of the hole in the throat plate.</div> <div>3. In this state, adjust the relation of the position of the inner hook and the bobbin case positioning stopper to 0 to 0.2 mm as shown in the figure below. Then, securely tighten with the stopper setscrew.</div> <div></div>	<div>○ For the floppy fabrics, it is effective when the hook timing is slightly retarded than the standard value. (Clarance provided between the upper end of the needle eyelet and the blade point of the hook is desired to be approximately 1.0 mm.)</div> <div>○ For the purl stitching, if the hook timing is advanced, crest of seam is likely to be improved. On the contrary, if the hook timing is retarded, stitch skipping is improved, but crest of seam is likely to be slightly deteriorated.</div>											

## Standard Adjustment

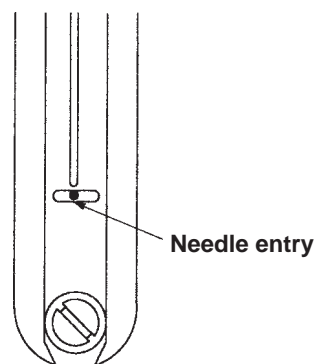
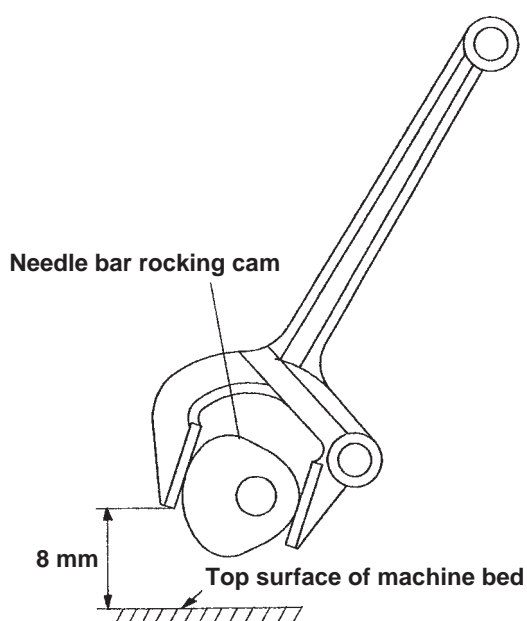
### (3) Needle rocking timing

The engraved marker line on the needle rocking drive large gear is aligned with the center of the hook driving shaft when the needle bar has reached its highest point (needle should complete rocking when the needle comes down and passes the throat plate).



### (4) Height of the needle bar rocking rod (adjusting the reference of needle bar rocking components)

Needle bar rocking cam is located on the stitch base line side and the needle enters in the center of the hole in the throat plate when the clearance provided between the lower end of the needle bar rocking rod and the machine bed is 8 mm.



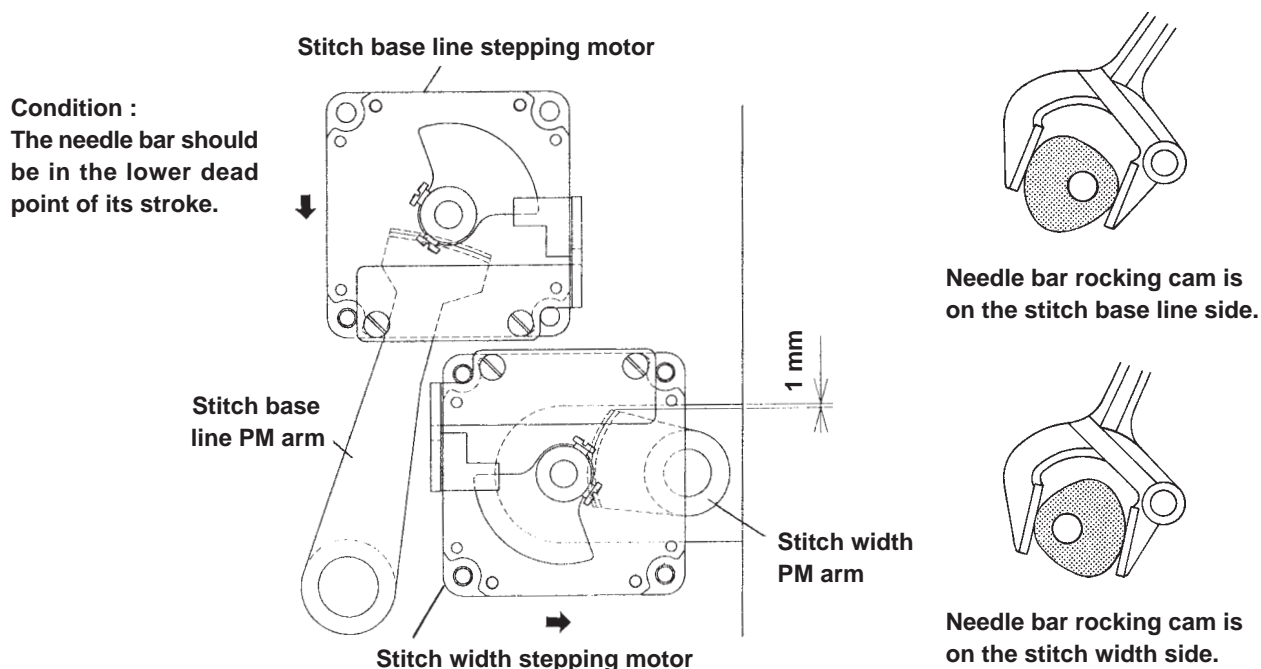
(Figure observed from the front side of the sewing machine)

Adjustment Procedures	Results of Improper Adjustment
<p>1. Adjust the timing by the needle rocking drive pinion.</p> <p><b>&lt;How to check after the adjustment&gt;</b></p> <p>Place a sheet of paper at the needle entry position, turn the hand pulley by hand and make sure that the needle sways in the lateral direction.</p>	<ul style="list-style-type: none"> <li>○ When the engraved marker line is not aligned, needle sways to cause needle breakage, stitch skipping, etc.</li> </ul>
<p>Place a block of 8 mm under the rod and press down the needle bar rocking rod. Then, the rod comes down. In this state, loosen the setscrew in the needle bar rocking arm, rear to adjust the height.</p> <div data-bbox="264 1400 842 1798" data-label="Image"> </div> <p><b>(Caution)</b> When tightening the setscrew in the needle bar rocking arm, rear, tighten it so that there is no thrust play between the needle bar rocking arm, rear and the needle bar rocking shaft bushing.</p>	<ul style="list-style-type: none"> <li>○ When the height of the needle bar rocking rod is improper, stitch width of parallel section of the right and left sides will change.</li> <li>○ If the needle entry position is improper, when the needle stitch width is increased, the other side comes in contact with the needle and the hole in the throat plate. As a result, needle breakage or thread breakage will result.</li> </ul>

## Standard Adjustment

### (5) Adjusting the stitch width PM arm and backlashes of the stitch base line and stitch width gears

- When the stitch width is "0" mm, the clearance provided between the frame and the stitch width PM arm is 1 mm.
- Stitch base line and stitch width stepping motor gears should run smoothly without backlashes.

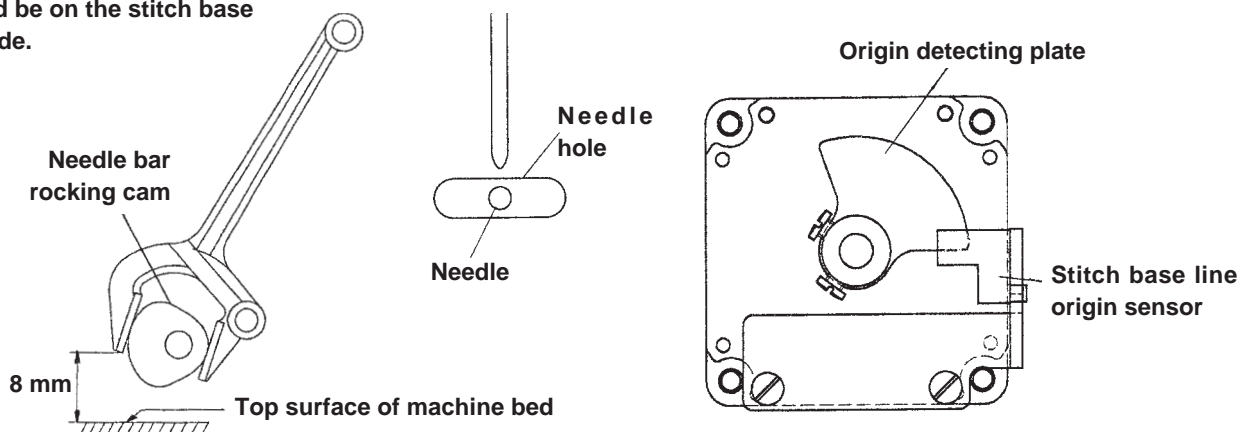


### (6) Detecting the origin of the stitch base line stepping motor

When the needle enters in the center of the needle hole in the throat plate, the stitch base line origin sensor should detect the origin detecting plate.

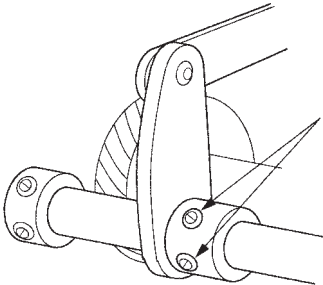
**Condition :**

The needle bar rocking cam should be on the stitch base line side.



(Figure observed from the front side of the sewing machine)

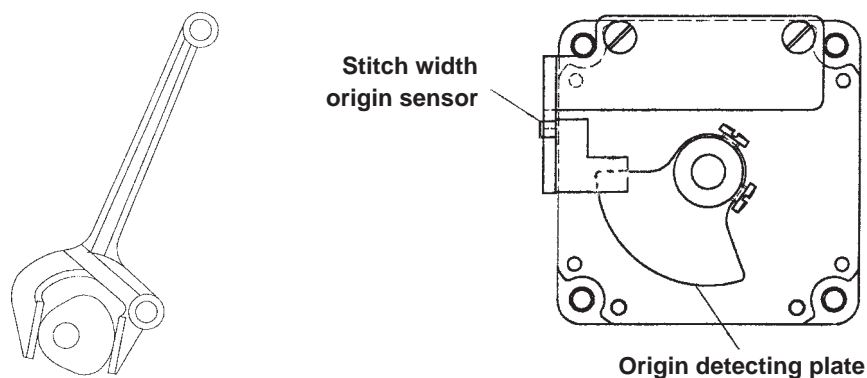
**(Caution)** The stitch base line stepping motor is the one with white connector. (Upper side)

Adjustment Procedures	Results of Improper Adjustment
<p>a) 1. Turn the hand pulley to bring the needle bar rocking cam to the stitch base line side, and confirm the "0" position (center of the needle hole) of the stitch base line.</p> <p>2. Further, turn the hand pulley to bring the needle bar rocking cam to the stitch width side, and set the needle bar to the lower dead point of its stroke.</p> <p>3. Move the needle bar to the right or left to set the needle at the center of the needle hole.</p> <p>4. Provide a clearance of 1 mm between the stitch width PM arm and the frame, and tighten with the setscrews in the stitch width adjusting arm.</p>  <p><b>Setscrews in stitch width adjusting arm</b></p> <p>b) Loosen respective setscrews in the respective stepping motors, lightly preess the motors in the direction of ➡, and adjust the backlashes of the gears.</p>	<ul style="list-style-type: none"> <li>○ If the clearance is smaller than the specified value, when compensating the stitch width amount, the stitch width PM arm comes in contact with the frame.</li> <li>○ If the clearance is larger than the specified value, when retrieving the origin, Er 43 occurs. Or, when the stitch width is maximum, the stitch width PM arm comes in contact with the frame. As a result, the stitch width may not be obtained.</li> <li>○ If the backlash of stepping motor gear is large, needle entry accuracy will be deteriorated.</li> <li>○ If there is no backlash between the stepping motor gears and the gears are excessively pressed, motor torque will occur.</li> </ul>
<ul style="list-style-type: none"> <li>○ Loosen the setscrews in the origin detecting plate to adjust the plate.</li> </ul> <p>How to check</p> <ul style="list-style-type: none"> <li>• Pressing the right (⊖) key, turn ON the power to set the test mode. (Refer to page 73.)</li> <li>• Select No. 1 with the left (⊕) or (⊖) key. (Input check)</li> <li>• Detection of the sensor can be checked by turning ON or OFF of the second LED from the left of the right 4-digit LED. (1, 0)</li> </ul> <ul style="list-style-type: none"> <li>○ Origin compensation procedure by means of the panel (Refer to page 47.) Pressing the (⊕) key, right, turn ON the power. Compensate the needle position with the origin compensation mode No. 52.</li> </ul>	<ul style="list-style-type: none"> <li>○ When the needle is located on the right side from the center of the needle hole, it will cut the stitches. When it is on the left side, the presser may come in contact with the needle.</li> </ul>

## Standard Adjustment

### (7) Detecting the origin of the stitch width stepping motor

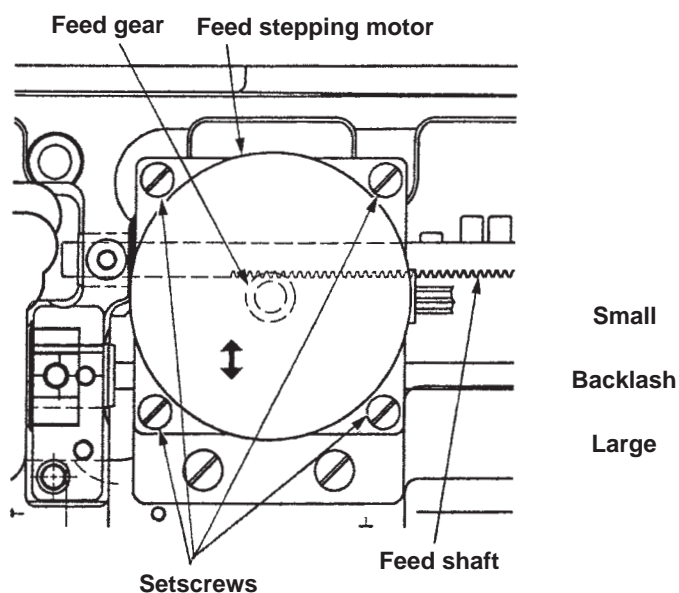
When the needle bar rocking cam is located on the stitch base line side and the needle enters in the center of the needle hole in the throat plate (when stitch width amount is "0" mm), the stitch width origin sensor should detect the origin detecting plate.



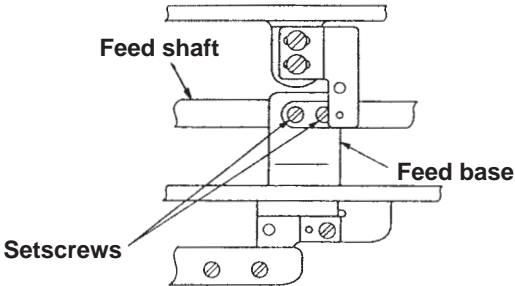
**(Caution)** The stitch width stepping motor is the one with blue connector. (Lower side)  
Perform the adjustment when the stitch base line origin sensor is in the origin.

### (8) Backlash of the feed gear

Backlash : 0 to 0.05 mm



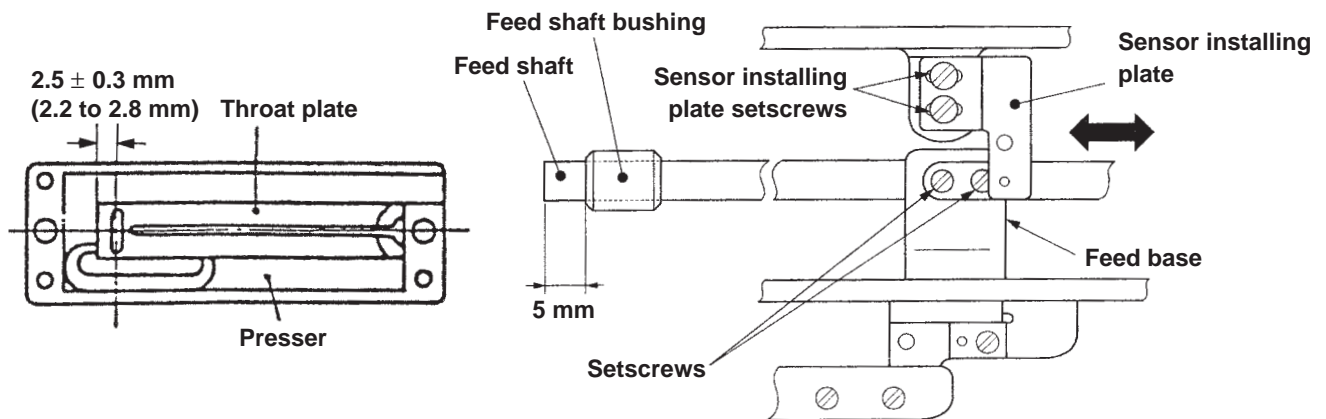


Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> <li>○ Loosen the setscrews in the origin detecting plate to adjust the plate.</li> </ul> <p>How to check</p> <ul style="list-style-type: none"> <li>• Pressing the right <math>\ominus</math> key, turn ON the power to set the test mode. (Refer to page 73.)</li> <li>• Select No. 1 with the left <math>\oplus</math> or <math>\ominus</math> key (input check).</li> <li>• Detection of the sensor can be checked by turning ON or OFF of the third LED from the left of the right 4-digit LED.</li> </ul> <ul style="list-style-type: none"> <li>○ Origin compensation procedure by means of the panel (Refer to page 47.)</li> </ul> <p>Pressing the right <math>\oplus</math> key, turn ON the power. Compensate the needle position with the origin compensating mode No. 53.</p>	<ul style="list-style-type: none"> <li>○ When the needle is on the right side from the center of the needle hole, stitches are increased and the presser comes in contact with the needle. Or, stitches may be cut. When it is on the left side, stitch width is decreased.</li> </ul>
<ol style="list-style-type: none"> <li>1. Loosen the setscrews in the feed base. (To protect the gear sections of the feed gear and feed shaft gear from the end tooth bearing)</li> <li>2. Loosen four setscrews in the feed stepping motor and move the feed stepping motor up or down in the direction of the arrow to adjust the backlash.</li> <li>3. Tighten the setscrews in the feed base so that the end tooth bearing of the gear sections of the feed gear and the feed shaft gear does not occur.</li> </ol> <p><b>(Caution)</b> After the assembling, move the work clamp back and forth by hand to check whether there is any uneven torque.</p>  <p>The diagram illustrates the mechanical components of the feed system. It shows a cross-section of the feed shaft and feed base assembly. The feed shaft is a horizontal shaft with a gear. The feed base is a vertical component that houses the gear and is secured by four setscrews. Labels with leader lines point to the 'Feed shaft', 'Feed base', and 'Setscrews'.</p>	<ul style="list-style-type: none"> <li>○ If the backlash is large, feed pitch shift will occur. Or, if it is too small, defective feed (step-out of stepping motor) will occur.</li> </ul>

## Standard Adjustment

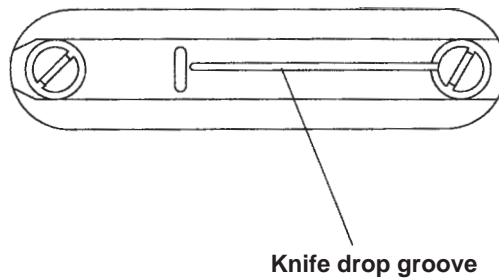
### (9) Longitudinal position of the presser and the feed shaft

- Distance from the center of the needle hole in the throat plate to the end face of the presser is  $2.5 \pm 0.3$  mm (when the feed origin is detected).
- When the feed origin is detected, the distance from the top end of the feed shaft to the end face of the feed shaft bushing is 5 mm.



### (10) Knife drop position

Knife should drop in the center of the knife drop groove in the throat plate.

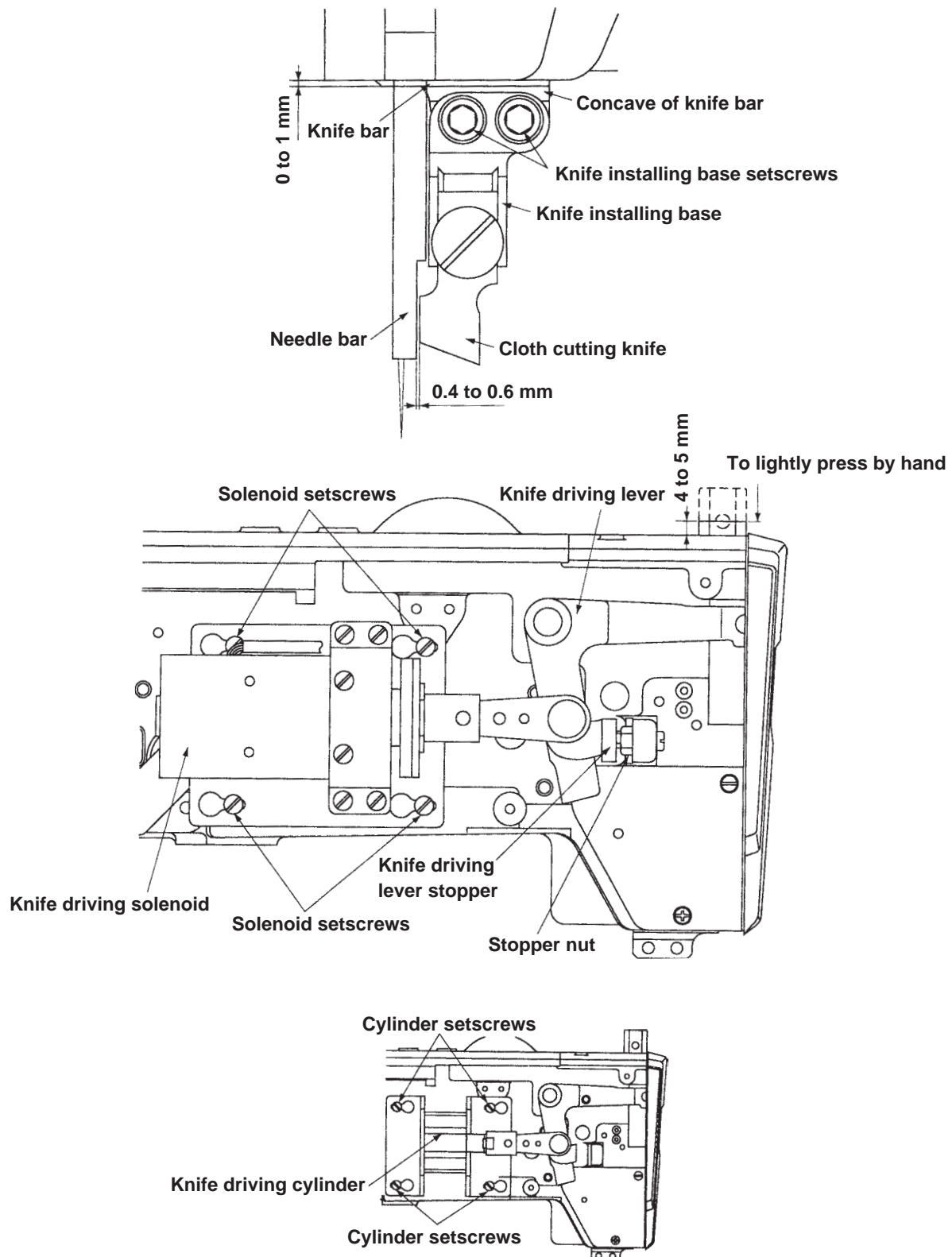


Adjustment Procedures	Results of Improper Adjustment
<p>1. Tighten the setscrews so that the distance from the presser to the needle hole is 2.5 mm and so that the feed shaft protrudes by 5 mm from the feed shaft bushing.</p> <p><b>(Caution) When tightening the setscrews, turn the feed shaft and tighten the setscrews in the center of the backlash in the rotating direction so that the feed stepping motor gear and the feed shaft gear do not produce the end tooth bearing.</b></p> <p>2. When the feed origin is detected, adjust the distance from the presser to the needle hole to <math>2.5 \pm 0.3</math> mm, and fix the position of the sensor installing plate with the sensor installing plate setscrews.</p> <ul style="list-style-type: none"> <li>○ How to check <ul style="list-style-type: none"> <li>• Pressing the right <math>\ominus</math> key, turn ON the power to set the test mode. (Refer to page 73.)</li> <li>• Select No. 1 with the left <math>\oplus</math> or <math>\ominus</math> key. (Input check)</li> <li>• Detection of the sensor can be checked by turning ON or OFF of the leftmost LED of the right 4-digit LED.</li> </ul> </li> <li>○ Origin compensation procedure by means of the panel (Refer to page 47.) <ul style="list-style-type: none"> <li>• Pressing the right <math>\oplus</math> key, turn ON the power. Compensate the feed position with the origin compensation mode No. 51</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ If the position of the presser is improper (longitudinal position of the work clamp is also improper), opening/closing of the needle thread trimmer will be affected.</li> <li>○ When the feed origin is detected, if the distance from the needle hole to the presser is excessively narrow, the presser comes in contact with the needle at the overlapped section resulting in thread breakage or needle breakage.</li> <li>○ Improper position of the feed shaft is related to the maladjustment of the bobbin thread trimmer driving cam resulting in defective bobbin thread winding.</li> </ul>
<p>Adjust the position at the installing position of the throat plate base.</p> <div data-bbox="268 1444 798 1805" data-label="Image"> <p>The diagram illustrates the assembly of the throat plate. It shows a 'Throat plate' which is a long, narrow metal piece with a screw at one end. Below it is the 'Throat plate base', a larger, more complex metal plate with several circular holes. A dashed line indicates the throat plate being positioned to fit into the throat plate base.</p> </div>	

## Standard Adjustment

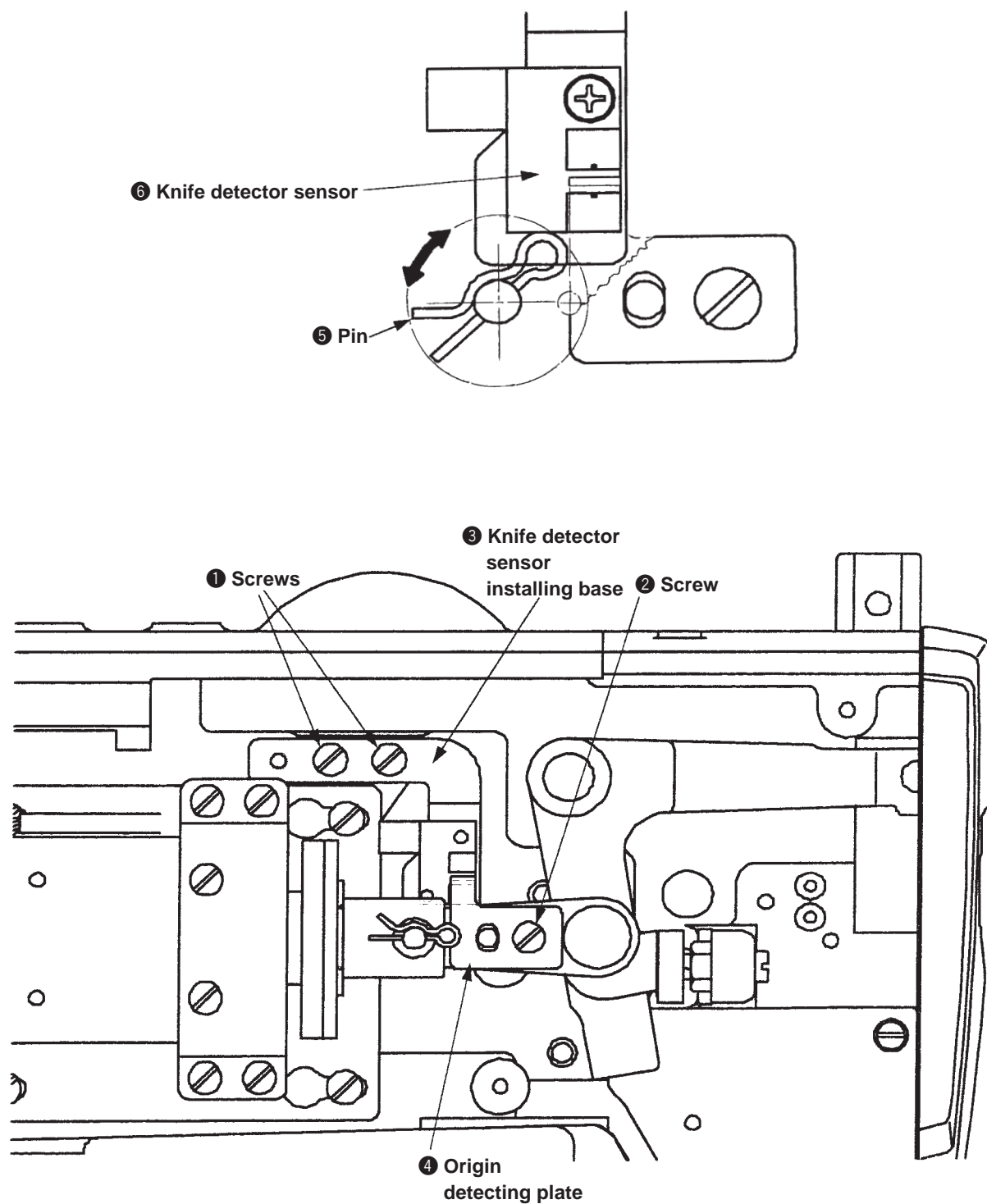
### (11) Knife bar/position of the knife installing base/knife bar stroke

- Clearance provided between the cloth cutting knife and the needle bar is 0.4 to 0.6 mm.
- When the knife bar is at the stop position, the distance from the jaw section of the machine arm to the top end of the concave of the knife bar is 0 to 1 mm.
- For the solenoid type, the distance from the top surface of the machine arm to the top end of the knife bar is 4 to 5 mm when lightly pressing down the knife bar by hand.



Adjustment Procedures	Results of Improper Adjustment
<p>a) Lower the needle bar, loosen the knife installing base setscrews, and move the knife installing base to the right or left to adjust the clearance.</p> <p>b) For the solenoid type, loosen the stopper nut and adjust the position of the knife driving lever stopper.</p> <ul style="list-style-type: none"> <li>○ For the air cylinder type, loosen the cylinder setscrews and adjust the position of the knife driving cylinder.</li> </ul> <p><b>(Caution) For the air cylinder type, when the cylinder is positioned on the way, the adjustment becomes improper. Perform the adjustment with the air connected.</b></p> <p>c) Loosen the solenoid setscrews and adjust the position of the knife driving solenoid.</p>	<ul style="list-style-type: none"> <li>○ If the distance from the cloth cutting knife to the needle bar is smaller than the specified value, the knife comes in contact with the needle bar. As a result, noise will occur, the knife will wear out, or cloth will be stained.</li> <li>○ If the distance from the cloth cutting knife to the needle bar is larger than the specified value, the distance from the front bar-tacking and the knife hole is increased and the rear bar-tacking may be cut.</li> <li>○ If the distance is excessively small, the knife installing base comes in contact with the jaw section of the machine arm and a big noise occurs.</li> <li>○ If the distance is excessively large, the knife may come out under the presser when the presser is lifted.</li> <li>○ If the distance is large, cloth may not be cut.</li> <li>○ If the distance is small, the knife driving lever may come in contact with the machine arm.</li> </ul>

(12) Knife detector sensor

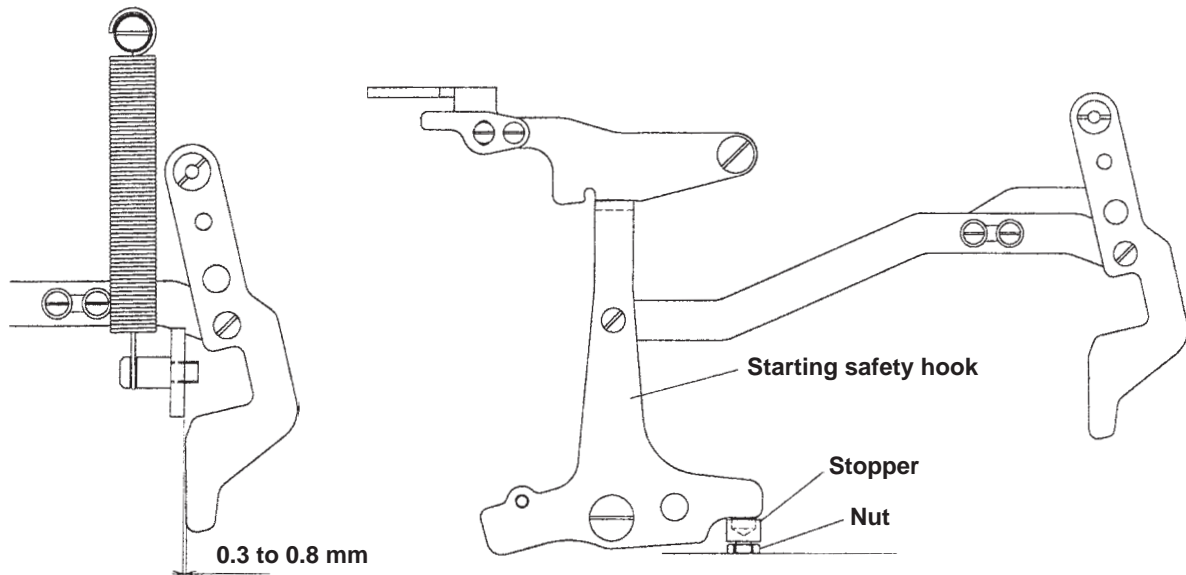


Adjustment Procedures	Results of Improper Adjustment
<p>Adjust and fix knife detector sensor installing base ③ and origin detecting plate ④ with screws ① and ② so that the detecting plate enters upper/lower, right/left and center sections of the sensor detecting section when the knife bar returns to the upper side.</p> <p><b>Caution :</b> When the knife bar returns to the upper side, turn pin ⑤ and make sure that it does not come in contact with knife detector sensor ⑥.</p>	

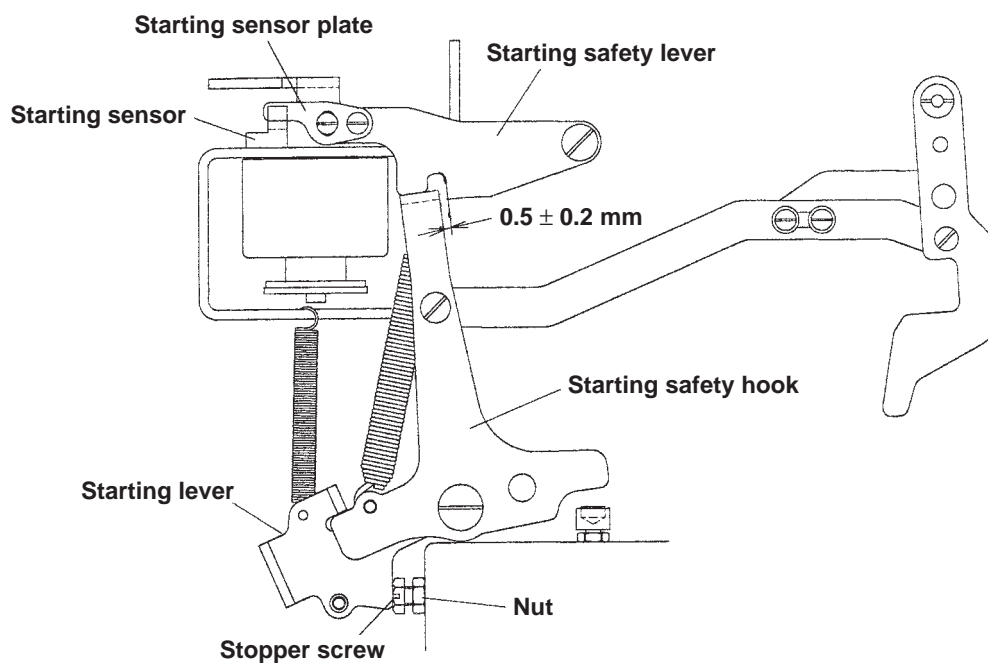
## Standard Adjustment

### (13) Position of the starting safety arm

Clearance provided between the starting safety arm and the presser bar lever is 0.3 to 0.8 mm.



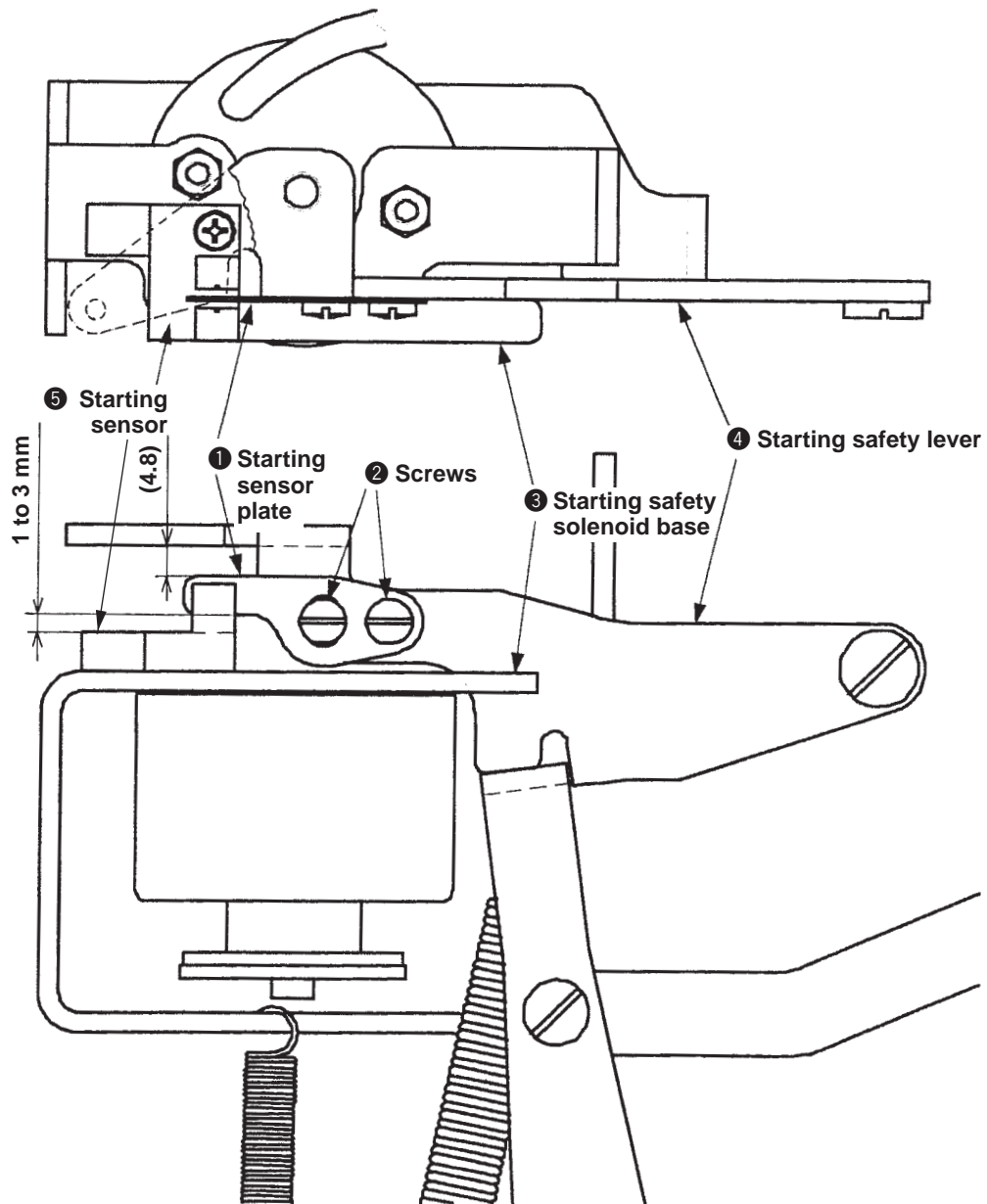
### (14) Adjusting the starting safety hook





Adjustment Procedures	Results of Improper Adjustment
<p>Loosen the nut and adjust the position of the stopper so that the clearance provided between the starting safety arm and the presser bar lever is 0.3 to 0.8 mm.</p>	<ul style="list-style-type: none"> <li>○ When there is no clearance between the starting safety arm and the presser bar lever, both parts interfere with each other and the presser may not be lifted.</li> </ul>
<p>Adjust the stopper screw and the nut so that the clearance provided between the starting safety lever and the starting safety hook is <math>0.5 \pm 0.2</math> mm (0.3 to 0.7 mm) when the starting lever is fully depressed</p>	<ul style="list-style-type: none"> <li>○ If the clearance is excessively small, starting may not function.</li> <li>○ If the clearance is excessively large, starting pedal becomes heavy due to the needle thread trimmer control lever.</li> </ul>

(15) Adjusting the starting sensor

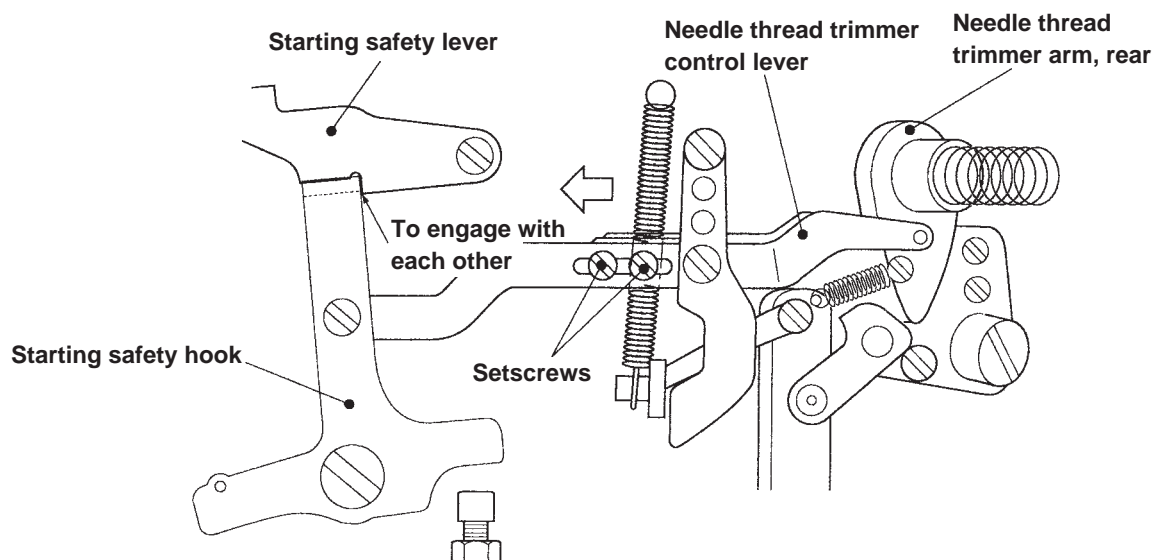


Adjustment Procedures	Results of Improper Adjustment
<p>Adjust and fix with screws ❷ so that starting sensor plate ❶ enters in the center of the detecting section of starting sensor ❺ when the starting has functioned. The dimension from starting sensor ❺ to the bottom end of starting sensor plate ❶ is 1 to 3 mm.</p> <p><b>Caution :</b> Make sure that starting sensor plate ❶ does not come in contact with starting sensor ❺ when starting has functioned.</p> <p>In addition, do not perform the adjustment of the position of the sensor with starting safety solenoid base ❸ since the play of starting safety lever ❹ is adjusted with starting safety solenoid base ❸.</p>	

## Standard Adjustment

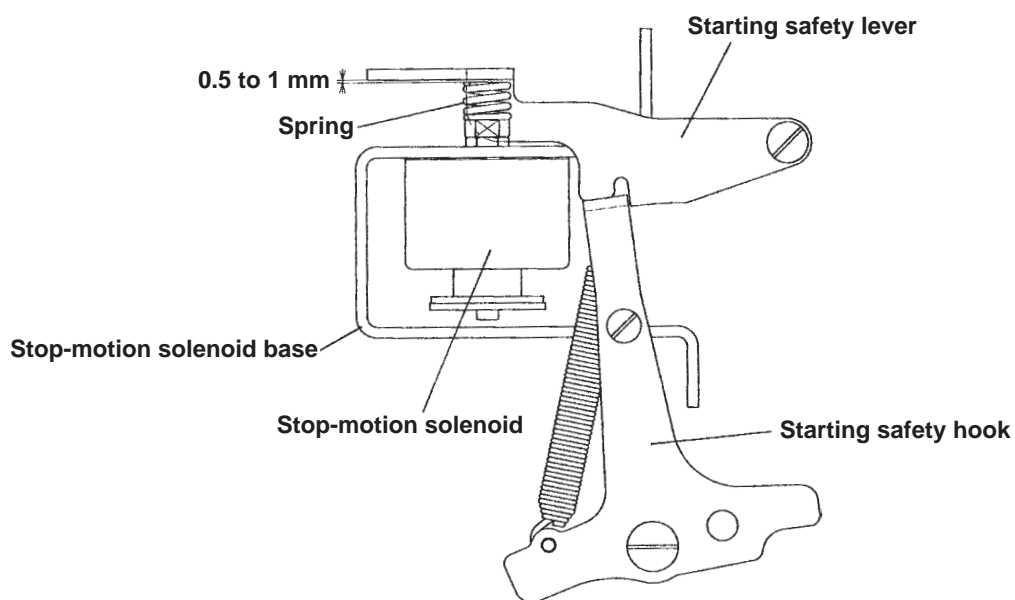
### (16) Adjusting the needle thread trimmer control lever

Clearance provided between the needle thread trimmer control lever and the needle thread trimmer arm, rear is "0" mm when the starting safety hook engages with the starting safety lever.



### (17) Adjusting the stop-motion solenoid

Clearance provided between the stop-motion pressing plate and the stop-motion bar spring is 0.5 to 1 mm when the starting safety hook engages with the starting safety lever.

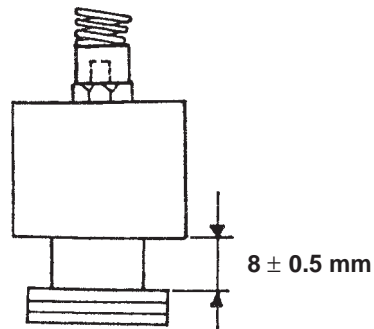


Adjustment Procedures	Results of Improper Adjustment
<p>Lightly press the needle thread trimmer control lever to the needle thread trimmer arm, rear (pressing in the direction of ⇐) in the state that the starting safety hook engages with the starting lever and fix it with two setscrews.</p>	<ul style="list-style-type: none"> <li>○ If the pressing amount is large, the needle thread trimmer control lever is deflected and the pedal becomes heavy.</li> <li>○ If the pressing amount is small (if there is a clearance), the needle thread trimmer arm comes out to the front and the needle thread trimmer may interfere with the needle.</li> </ul>
<p>Move the stop-motion solenoid base up or down to adjust so that the clearance provided between the stop-motion solenoid spring and the starting safety lever is 0.5 to 1 mm.</p>	<ul style="list-style-type: none"> <li>○ If the clearance is small, starting may not function.</li> <li>○ If the clearance is large, the starting safety lever may not return at the stop-motion.</li> </ul>

## Standard Adjustment

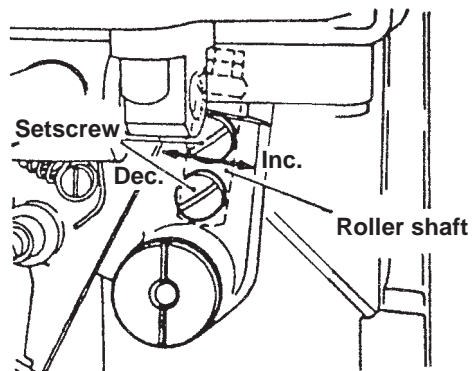
### (18) Stroke of the stop-motion solenoid

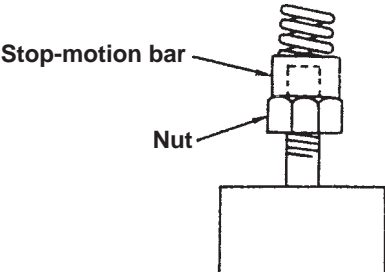
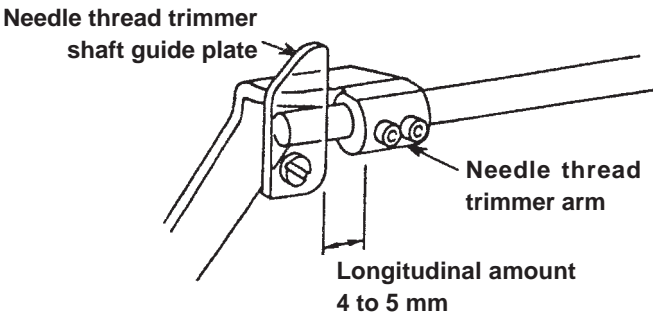
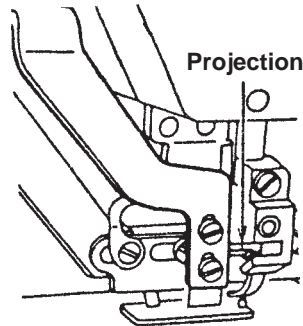
Stroke of the stop-motion solenoid is  $8 \pm 0.5$  mm. (7.5 to 8.5 mm)



### (19) Longitudinal amount of the needle thread trimmer

Longitudinal amount : 4 to 5 mm

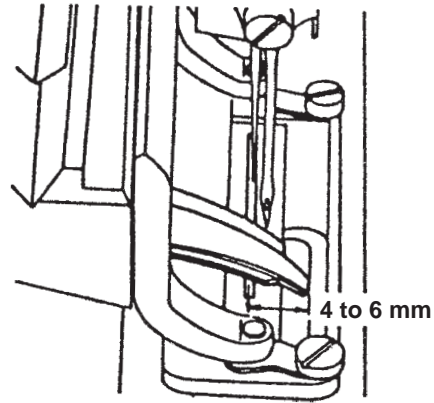
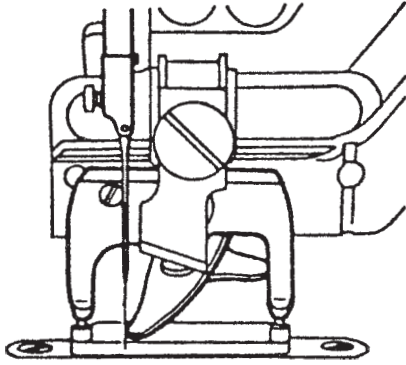


Adjustment Procedures	Results of Improper Adjustment
<p>○ Adjust the amount of the stroke by moving the stop-motion bar and the nut.</p> 	<p>○ If the stroke is small, the starting safety lever cannot be lifted up at the stop-motion, and the presser does not go up even when the stop-motion has functioned. If the stroke is large, the starting safety lever may not be lifted up due to the lack of force.</p>
<ol style="list-style-type: none"> <li>1. Loosen the setscrew attached to the top end of the presser bar lifting lever, move the roller shaft to the right or left to adjust the longitudinal amount of the needle thread trimmer. Moving the roller shaft clockwise will increase the amount, or counterclockwise to decrease it.</li> <li>2. This adjustment is a slight fine adjustment. Take care not to excessively move the roller shaft.</li> </ol> <p><b>&lt;Check&gt;</b></p> <p>The longitudinal amount of the needle thread trimmer is the difference of movement amount of the needle thread trimmer shaft between when the presser lifting is performed and when it is not performed. Measure the distance between the needle thread trimmer shaft guide plate and the end face of the needle thread trimmer arm.</p> 	<p>○ When the longitudinal amount is excessively moved, the projection of the needle thread trimmer arm (front) may come off from the groove in the slide roller bracket when the needle thread trimmer moves to the right or left.</p> <p>If it comes off from the groove, the presser may not go up or defective feed will result. So, be careful.</p> 

## Standard Adjustment

### (20) Lateral position of the needle thread trimmer

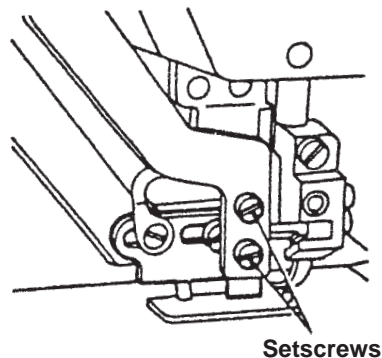
- 1) Adjust the position so that when the needle thread trimmer has advanced most, it is aligned with the center of the needle and the top end of the trimmer comes out to the right by 4 to 6 mm from the center of the knife groove.



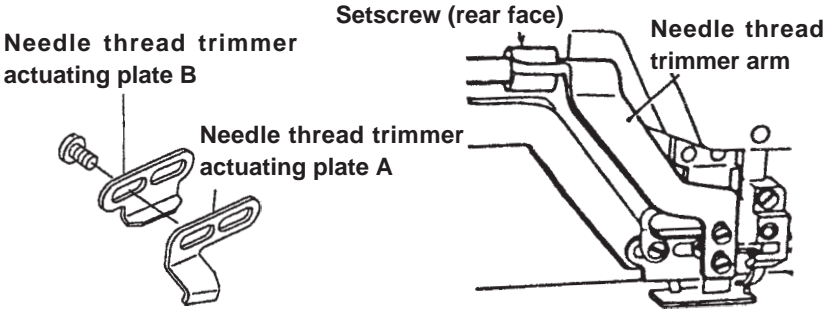
- 2) End of closing of the needle thread trimmer (upper knife is overlapped with lower knife by 0.5 to 0.8 mm.)

### (21) Height of the needle thread trimmer

Install the needle thread trimmer as low as possible to such an extent that it does not come in contact with the presser.



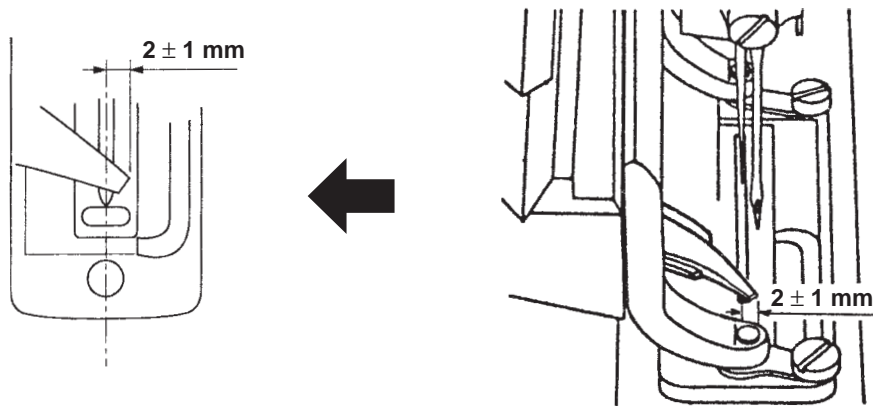


Adjustment Procedures	Results of Improper Adjustment
<p>1. Depress the presser lifting pedal, loosen the setscrew in the needle thread trimmer arm (front) with hexagonal wrenck key when the needle thread trimmer has advanced most, and adjust the longitudinal and lateral positions of the needle thread trimmer arm (front).</p> <p>2. Loosen the setscrew in the needle thread trimmer actuating plate A and adjust the overlapping amount of the upper knife and the lower knife.</p> <p>3. Adjust relatively the longitudinal position of the needle thread trimmer and the longitudinal position of the needle thread trimmer actuating plate A.</p> <p>When the trimmer closes too early or the overlapping amount of the upper knife and the lower knife exceeds 1 mm or more, slightly move the position of the needle thread trimmer actuating plate A to this side.</p> 	<ul style="list-style-type: none"> <li>○ If the longitudinal or lateral position is improper, the needle thread trimmer is caught with the presser bar lifting lever and may not move smoothly when performing presser lifting.</li> <li>○ When the position of the trimmer actuating plate A is placed excessively in the front ----- needle thread cannot be trimmed. (Trimmer does not close.)</li> <li>○ When the position of the trimmer actuating plate A is placed excessively in the rear ----- the trimmer closes before catching the needle thread.</li> </ul>
<p>Loosen the setscrews in the needle thread trimmer and move the trimmer up or down to adjust the height.</p> <p><b>&lt;Check after the adjustment&gt;</b></p> <p>The presser should not come in contact with the trimmer when inserting something of approximately 4 mm in thickness under the presser and moving the presser lifting lever up or down.</p>	<ul style="list-style-type: none"> <li>○ If the position of the trimmer is high, needle thread may remain on the bar-tacking section.</li> </ul>

## Standard Adjustment

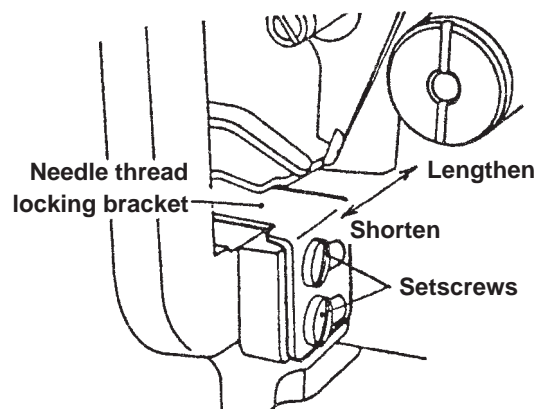
### (22) Position of winding the needle thread at the start of sewing

Position where the top end of the needle thread trimmer is located on the right side by  $2 \pm 1$  mm (1 to 3 mm) from the center of the knife groove at the start of sewing



### (23) Opening timing of the needle thread trimmer

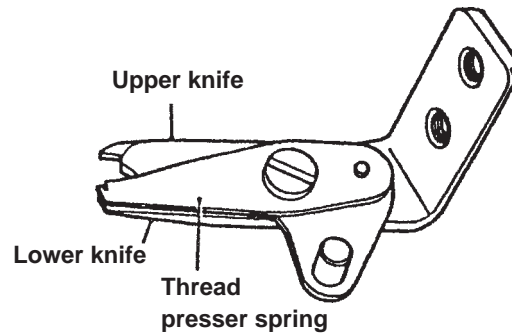
The period of retaining the needle thread is 1 to 3 mm from the start of sewing. (Then, adjust the timing so that the trimmer gradually opens.)



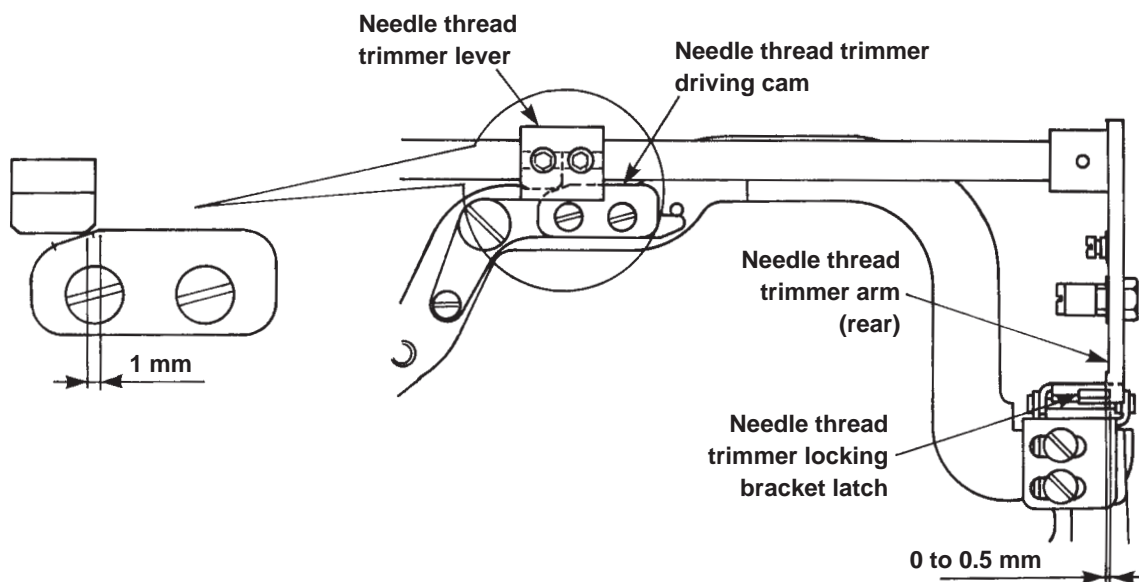
Adjustment Procedures	Results of Improper Adjustment
<p>Adjust the position by increasing or decreasing the number of pieces of the needle thread trimmer locking bracket latch spacer (B2023761000).</p> <div data-bbox="242 416 810 772" data-label="Image"> </div> <p><b>(Caution)</b> Make sure of the relative position of the needle thread trimmer and the needle thread trimmer actuating plate since the position is related to the position where the needle thread trimmer holds the needle thread. Then, increase or decrease the number of pieces of the spacer.</p>	<ul style="list-style-type: none"> <li>○ When the locking bracket latch is located excessively to the right ----- needle thread protrudes on the right side of stitches.</li> <li>○ On the contrary, when it is located excessively to the left ----- needle thread protrudes on the left side of stitches.</li> </ul>
<ol style="list-style-type: none"> <li>1. Loosen the setscrews in the needle thread locking bracket latch and move the latch back and forth to adjust the timing.</li> <li>2. Moving the latch to this side will shorten the period of retaining the needle thread. On the contrary, moving it to the rear will lengthen the period of retaining the needle thread.</li> </ol> <p><b>&lt;Check after the adjustment&gt;</b> After adjusting the trimmer, move the feed and make sure that the trimmer does not come in contact with the presser foot or needle when the trimmer opens.</p>	<ul style="list-style-type: none"> <li>○ If the opening timing of the needle thread trimmer is too early, defective winding of the needle thread or slip-off of thread at the start of sewing will occur.</li> <li>○ On the contrary, the opening timing is too retarded, crest of seam at the start of sewing will be deteriorated.</li> </ul>

## Standard Adjustment

### (24) Spring pressure of the needle thread trimmer



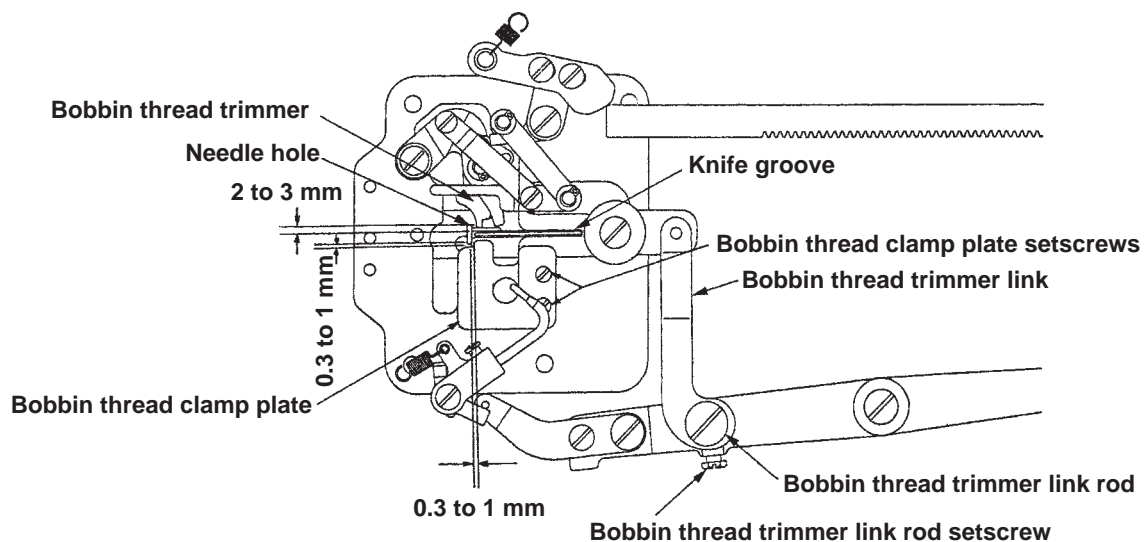
### (25) Adjusting the needle thread trimmer lever



Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> <li>1. When the thread grasping force of the needle thread trimmer has reduced, slightly bend the top end of the thread presser spring so that it comes in contact with the thread trimming blade of the upper knife over the length with no clearance and so that the needle thread trimmer securely holds the thread regardless of the position of the thread trimming blade at which the thread is trimmed.</li> <li>2. When the needle thread trimmer fails to cut the thread sharp, grind the thread trimming blades at the top end of the upper and lower knives with an oil-stone.</li> </ol>	<ul style="list-style-type: none"> <li>○ If the pressure of the thread presser spring is low, slip-off of thread at the start of sewing will occur.</li> </ul>
<p>Move forward the feed mechanism and adjust so that the needle thread trimmer lever comes in light contact by 1 mm with the slope of the needle thread trimmer driving cam when the needle thread trimmer locking bracket latch engages by 0 to 0.5 mm with the needle thread trimmer arm (rear).</p> <p><b>(Caution) When sewing the thick materials or overlapped section, set the sewing material to the machine, use the forward key and confirm that the needle thread trimmer knife does not move to this side at the start of sewing. In the case where the needle thread trimmer moves to this side, perform again the aforementioned adjustment while the sewing material is set to the machine.</b></p> <p>In case of type A, refer to the item “(16) Adjusting the needle thread trimmer control lever (P.20)” as well.</p>	<p>If the needle thread trimmer lever does not come in contact with the slope of the needle thread trimmer driving cam when the needle thread trimmer arm (rear) comes off the needle thread trimmer locking bracket latch, opening of trimmer will be deteriorated.</p> <p><b>(Caution) If the driving arm comes in strong contact with the cam, the needle thread trimmer moves to this side at the start of sewing and comes in contact with the needle. As a result, needle breakage may occur. (Particularly, in case of B and C types)</b></p>

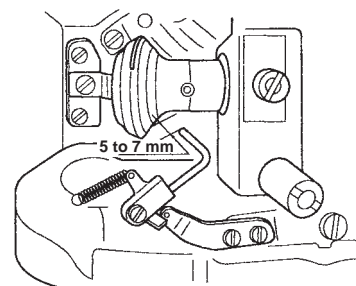
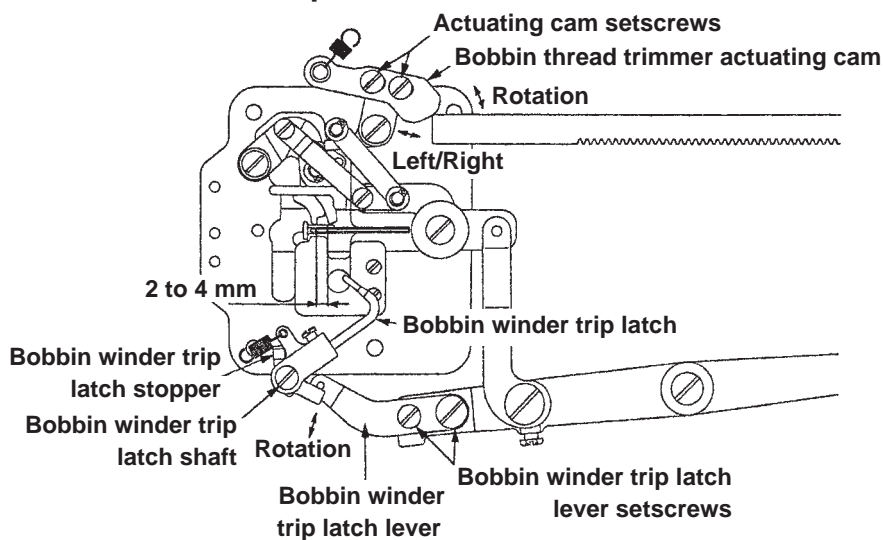
## Standard Adjustment

### (26) Position of the bobbin thread trimmer/position of bobbin thread clamp plate

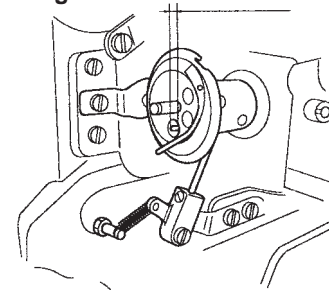


- The distance from the top end of the bobbin thread trimmer to the center in the knife groove is 2 to 3 mm in the state that the presser lifting lever has returned.
- Distance from the bobbin thread clamp plate to the needle hole in the vertical and lateral directions is 0.3 to 1 mm.

### (27) Timing to open the bobbin thread trimmer and the opening amount / adjusting the bobbin winder trip latch



Protruding amount : 1 to 2 mm



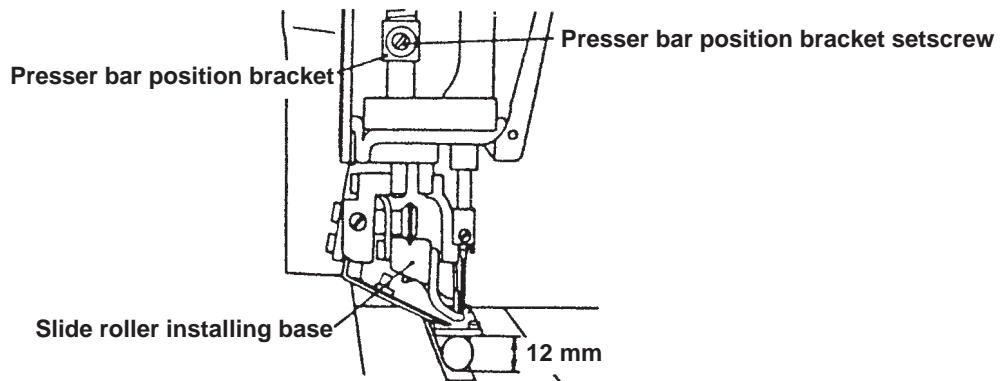
- Opening amount of the trimmer is 2 to 4 mm at the top end of the trimmer.
- Move the bobbin thread trimmer actuating cam to its right end.
- Distance from the top end of the bobbin winder trip latch to the hook sleeve is 5 to 7 mm in the state that the presser lifting lever has returned.
- The protruding amount of the inner hook at the top end of the bobbin winder trip latch is 1 to 2 mm when the bobbin case is not placed in the hook and the presser is raised.

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> <li>1. Loosen the setscrew in the bobbin thread trimmer link rod in the state that the presser lifting lever has returned, turn the bobbin thread trimmer link rod and adjust the distance from the bobbin thread trimmer to the center of the knife groove to 2 to 3 mm to securely trim the bobbin thread.</li> <li>2. After trimming the bobbin thread, when the bobbin thread is not retained, adjust the position of the clamp plate to such an extent that the plate does not overlap with the needle hole.</li> </ol> <p><b>&lt;Check after the adjustment&gt;</b></p> <ul style="list-style-type: none"> <li>○ Make sure that the bobbin thread trimmer securely trims the bobbin thread and retains it when the presser lifting lever comes down.</li> <li>○ For the sewing machine equipped with the auto-lifter, open the trimmer after the adjustment, and re-check the closing amount of the bobbin thread trimmer by presser lifting action.</li> </ul>	<ul style="list-style-type: none"> <li>○ When the distance from the bobbin thread trimmer to the knife groove is excessively large, the trimmer may not fully close.</li> <li>○ When the distance from the bobbin thread trimmer to the knife groove is excessively small, the trimmer and the cloth cutting knife may come in contact with each other.</li> </ul>
<ul style="list-style-type: none"> <li>○ Adjust the opening amount of the trimmer so that you turn the bobbin thread trimmer actuating cam.</li> <li>○ Adjust the opening timing of the trimmer by moving the bobbin thread trimmer actuating cam to the right or left.</li> <li>○ Adjust the distance from the bobbin winder trip latch to the hook sleeve so that you turn the bobbin winder trip latch lever.</li> <li>○ Loosen the bobbin winder trip latch shaft and adjust the bobbin winder trip latch stopper for the protruding amount of the inner hook of bobbin winder trip latch when lifting the presser.</li> </ul> <p><b>(Caution) If opening timing of the bobbin thread trimmer is too early and the opening amount is large, the trimmer may open when the presser lifting lever has returned. Lower the presser lifting lever by hand, release your hand in this state, and make sure that the trimmer does not open.</b></p>	<ul style="list-style-type: none"> <li>○ If the opening amount of the bobbin thread trimmer is small, the bobbin thread may not be trimmed.</li> <li>○ If the opening amount of the bobbin thread trimmer is large, the trimmer overlaps with the needle hole and it may come in contact with the needle.</li> <li>○ If the opening timing of the bobbin thread trimmer is excessively advanced, slip-off of thread at the start of sewing may occur.</li> <li>○ If the opening timing of the bobbin thread trimmer is excessively retarded, the fabric may be drawn.</li> <li>○ If the distance from the bobbin winder trip latch to the hook sleeve is small, the latch comes in contact with the hook sleeve when the sewing machine is running. As a result, the latch will be deformed.</li> <li>○ If the adjustment of the bobbin winder trip latch stopper is improper, bobbin may run idle when performing thread trimming.</li> </ul>

## Standard Adjustment

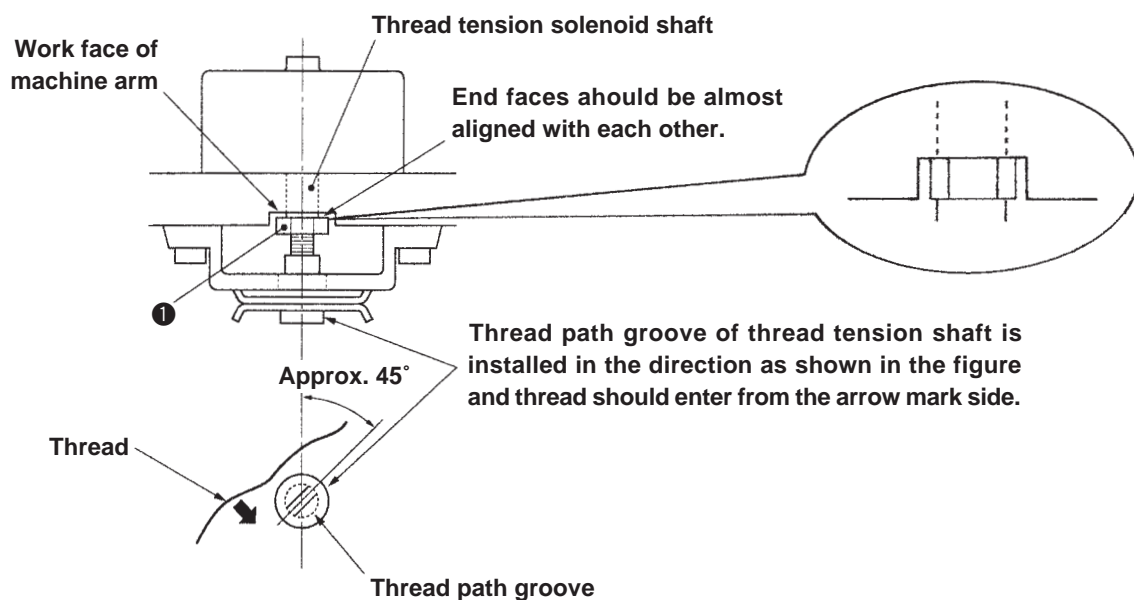
### (28) Height of the presser

Lifting amount of the presser is 12 mm.



### (29) Adjusting the thread tension solenoid

Top end of the thread tension solenoid shaft should be almost aligned with the work face of the machine arm when the thread tension disk closes.

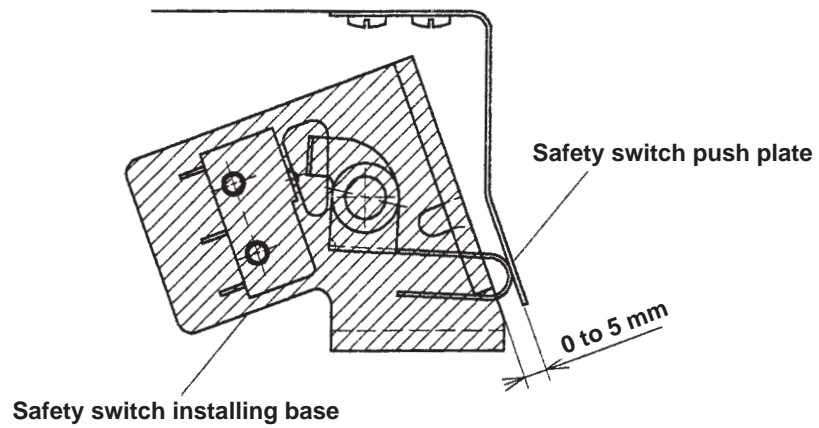




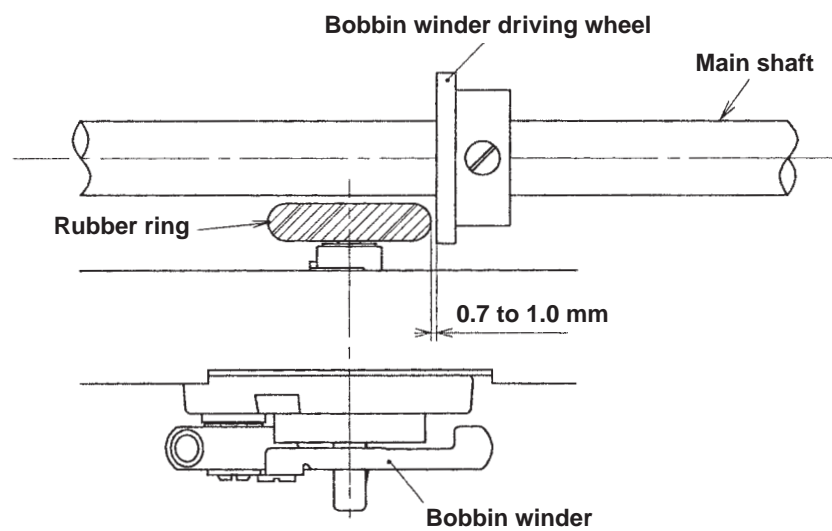
Adjustment Procedures	Results of Improper Adjustment
<p>Place an appropriate round wood of 12 mm in height between the presser and the throat plate, loosen the setscrew in the presser bar position bracket, press down the presser bar position bracket and the slide roller installing base while fully depressing the presser lifting pedal. Then, tighten the setscrew in the presser bar position bracket.</p> <p><b>&lt;Check after the adjustment&gt;</b></p> <p>After the adjustment, make sure that the presser functions completely.</p>	<ul style="list-style-type: none"> <li>○ If the presser lifting amount is excessively increased, the presser starts going up before the bobbin thread is trimmed.</li> <li>○ If the slide roller installing base is bent when installing, it will come in contact with the projection of the needle thread trimmer arm or the projection comes off. Refer to “(19) Longitudinal amount of the needle thread trimmer”.</li> </ul>
<p>Loosen nut ❶ to adjust the solenoid.</p>	<ul style="list-style-type: none"> <li>○ If the position of the solenoid is excessively protruded or drawn back, thread tension value is affected.</li> <li>○ If the angle (45°) of the thread tension shaft is not proper, the proper thread tension cannot be obtained.</li> </ul>

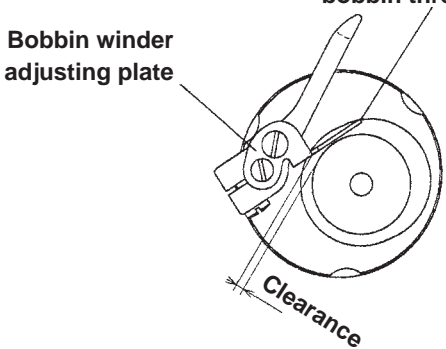
## Standard Adjustment

### (30) Adjusting the safety switch



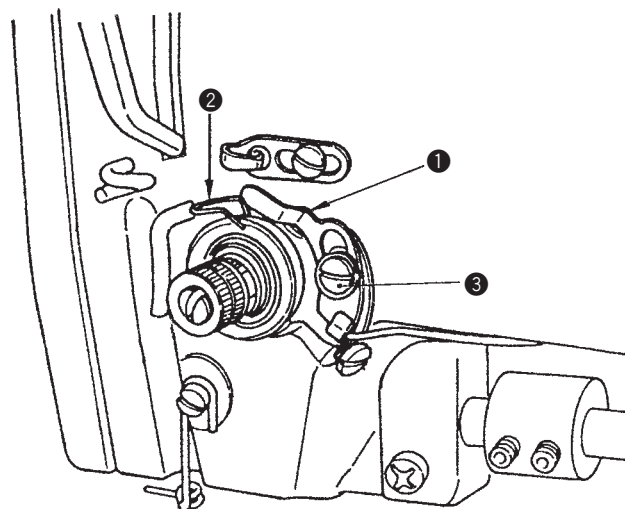
### (31) Adjusting the bobbin winder



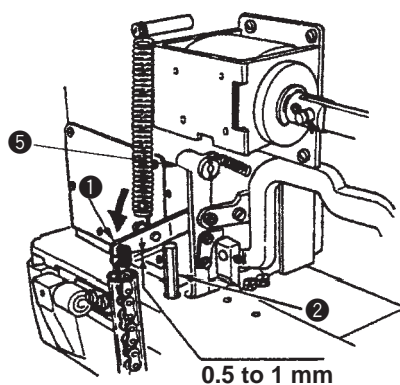
Adjustment Procedures	Results of Improper Adjustment
<p>Fix the safety switch base so that a clearance of 0 to 5 mm is provided between the safety switch installing base and the safety switch push plate when the sewing machine main body rides on the frame base (when the sewing machine head is not tilted).</p>	<ul style="list-style-type: none"> <li>○ If the clearance is small, the safety switch push plate may be damaged.</li> <li>○ If the clearance is large, Er 9 is displayed and the sewing machine does not run even when the sewing machine starts with the starting pedal.</li> </ul>
<p>Adjust and fix the position of the bobbin winder driving wheel so that a clearance of 0.7 to 1 mm is provided between the rubber ring and the bobbin winder driving wheel in the state that the bobbin thread is not wound.</p> <p><b>(Caution) When using the bobbin winder for a long period of time, the rubber ring will wear down and slip. As a result, bobbin thread may not be wound. At this time, adjust and fix the position of the bobbin winder driving wheel.</b></p> <p>Make sure that there is a clearance between the bobbin winder adjusting plate and the bobbin in the state that bobbin thread is wound.</p> <p><b>Bobbin winder adjusting plate</b></p>  <p>The diagram shows a cross-section of the bobbin winder assembly. A circular bobbin is positioned on a central shaft. To the left of the bobbin is a rectangular adjusting plate. A line points from the text 'Bobbin winder adjusting plate' to this plate. Another line points from the text 'Make sure that there is a clearance between the bobbin winder adjusting plate and the bobbin in the state that bobbin thread is wound.' to the gap between the plate and the bobbin. A dimension line at the bottom indicates this gap, labeled 'Clearance'.</p>	<ul style="list-style-type: none"> <li>○ If the pressing pressure is low, the rubber ring slips and bobbin thread may be not wound.</li> <li>○ If the pressing pressure is high, wear of the rubber ring is increased.</li> </ul>

## Standard Adjustment

### (32) Adjusting the thread breakage detecting plate

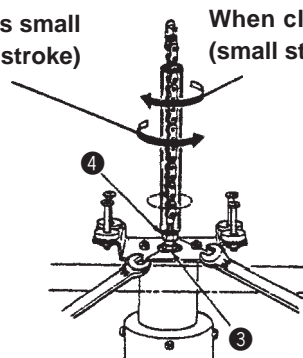


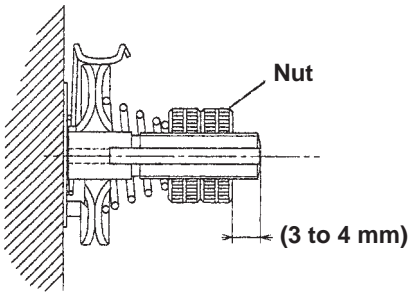
### (33) Adjusting the presser lifting solenoid



When clearance is small  
(large stroke)

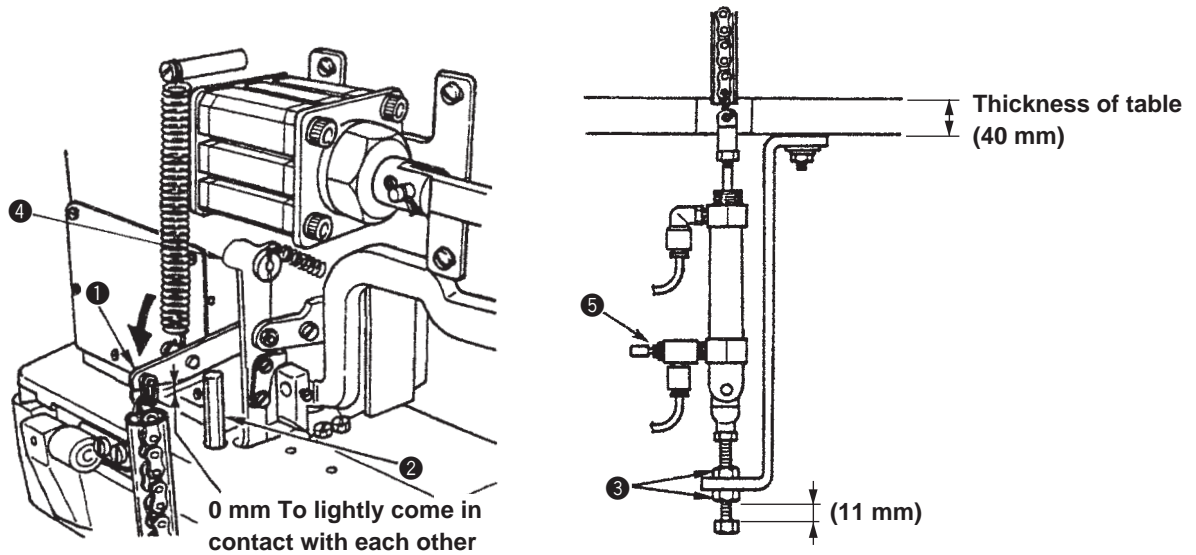
When clearance is large  
(small stroke)



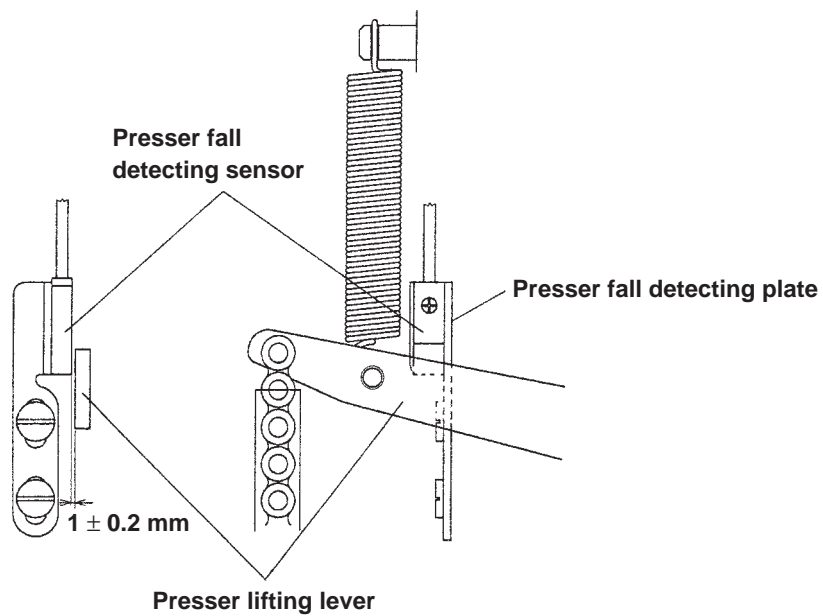
Adjustment Procedures	Results of Improper Adjustment
<p>1. Adjust so that thread breakage detecting plate ❶ comes in contact with thread take-up spring ❷ without fail when the machine head is not threaded. (Slack of the thread take-up spring has to be 0.5 mm.)</p> <p>2. When the stroke of thread take-up spring ❷ has been changed, loosen screw ❸ and be sure to adjust thread breakage detecting plate ❶.</p> <p><b>(Caution) Adjust so that thread breakage detecting plate ❶ does not come in contact with any metallic part other than thread take-up spring ❷.</b></p> <p><b>Assemble the nuts of the thread tension asm. as shown in the figure.</b></p> <p><b>(Assembling thread tension asm.)</b></p> 	<ul style="list-style-type: none"> <li>○ If the detecting plate does not come in contact with the spring, the needle thread breakage cannot be detected and the cloth cutting knife works.</li> <li>○ If the contacting force is too strong, early breakage of the thread take-up spring will occur.</li> </ul>
<p>1. Adjust so that a clearance of 0.5 to 1 mm is provided between presser lifting lever ❶ and stopper ❷ when the presser lifting solenoid works.</p> <p>2. Loosen nut ❹ in the presser lifting solenoid, turn the chain to adjust the position, and securely fix the solenoid with shaft section ❸ of the presser lifting solenoid and nut ❹.</p> <p>(Make sure that presser lifting lever ❶ comes in contact with boss ❺ of the bobbin thread trimmer driving arm when presser lifting lever ❶ has returned.</p> <p><b>(Caution) When the needle thread trimer bounds even with the aforementioned dimensions, adjust so that the chain does not slacken when presser lifting lever ❶ has returned.</b></p>	<ul style="list-style-type: none"> <li>○ If the clearance is small, presser lifting lever ❶ does not return to the initial position and presser lifting error will occur.</li> <li>○ If the clearance is large, the needle thread trimmer may bound when presser lifting lever ❶ has returned.</li> </ul>

## Standard Adjustment

### (34) Adjusting the presser lifting air cylinder



### (35) Adjusting the presser fall detecting plate

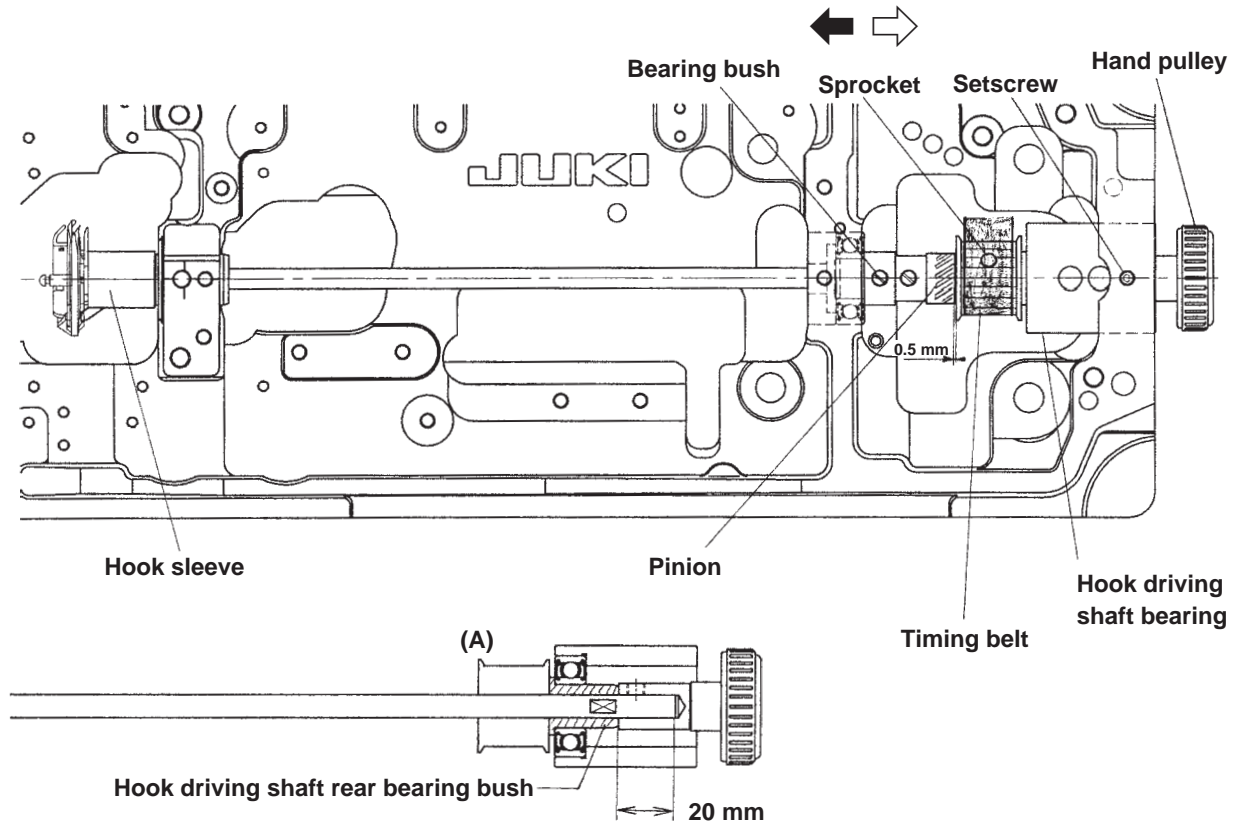


Adjustment Procedures	Results of Improper Adjustment
<p>1. Adjust stroke adjusting nut ❸ so that the chain slightly slackens in the state that presser lifting lever ❶ has been lifted. (Make sure that presser lifting lever ❶ comes in contact with boss ❹ of the bobbin thread trimmer driving arm when presser lifting lever ❶ has been lifted.)</p> <p>2. Adjust speed controller ❺ so that presser lifting lever ❶ lightly comes in contact with stopper ❷ when presser lifting air cylinder works.</p> <p><b>(Caution) Stroke adjustment value (11 mm) is when the thickness of table is 40 mm. The adjustment value will change when the thickness of table is varied.</b></p>	<ul style="list-style-type: none"> <li>○ If the adjustment of the speed controller is not completed, presser lifting lever ❶ comes strongly in contact with stopper ❷ and may be damaged.</li> <li>○ If the stroke adjustment value is smaller than 16 mm, the chain runs around and interferes with the frame. As a result, noise will occur.</li> <li>○ If the stroke adjustment value is larger than 16 mm, the presser cannot secure enough height.</li> <li>○ If the thickness of table is less than 40 mm, the adjustment value is increased.</li> </ul>
<ul style="list-style-type: none"> <li>○ Adjust the presser fall detecting plate so that the presser fall detecting sensor comes to the position where it can detect (LED lights up when turning ON the power) when the presser lifting lever has returned.</li> <li>○ Fix the presser fall detecting plate so that a clearance of <math>1 \pm 0.2</math> mm is provided between the presser lifting lever and the presser fall detecting sensor.</li> </ul> <p><b>(Caution) Install the presser fall detecting plate as high as possible. The main shaft rotates after the sensor has detected. The main shaft rotates before the presser lifting lever returns and the bobbin winder trip latch may be damaged if the plate is installed in the lower position.</b></p>	<ul style="list-style-type: none"> <li>○ If the clearance provided between the presser lifting lever and the presser fall detecting sensor is improper, detection may not be performed.</li> </ul>

### 3. DISASSEMBLING/ASSEMBLING PROCEDURE

#### Standard Adjustment

#### (1) Disassembling/assembling the hook driving shaft



#### -Removing procedure of the hook driving shaft-

1. Tilt the machine head, and remove the inner hook stopper and the hook sleeve.
2. Loosen two setscrews each in the bearing bush and in the pinion.
3. Refer to page 44 and loosen the timing belt.
4. Remove the timing belt from the sprocket.
5. Loosen one setscrew in the hook driving shaft bearing.
6. Hold the hand pulley by hand and draw it out in the direction of ➡.

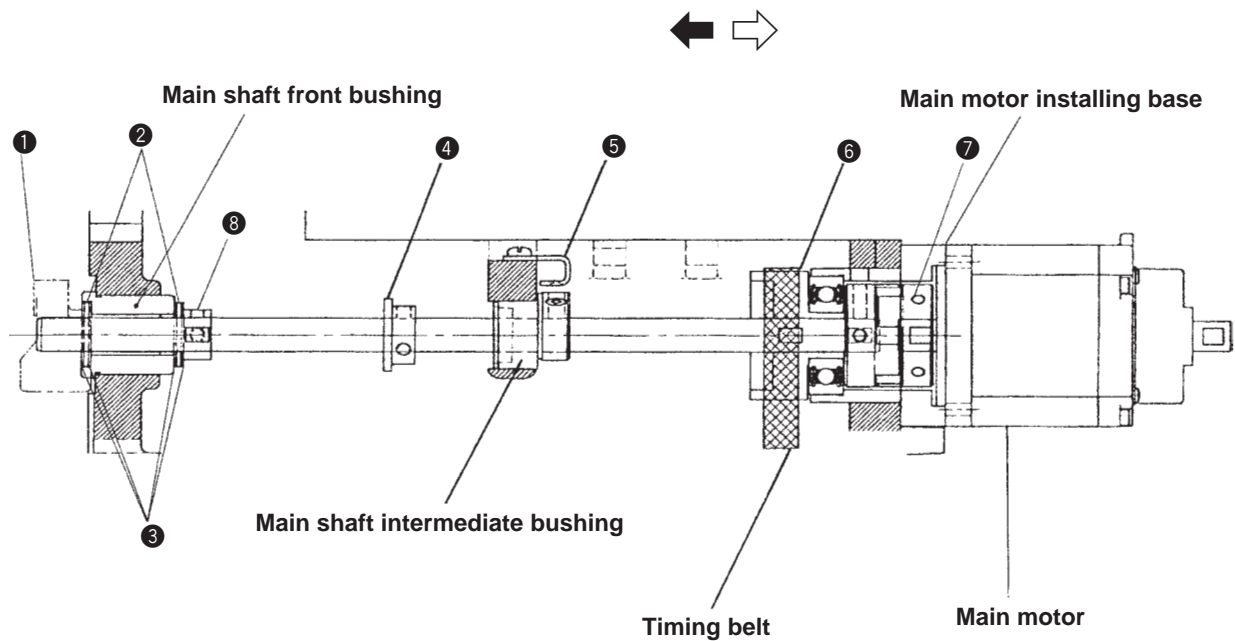
#### -Assembling procedure of the hook driving shaft-

1. Insert (A) in the direction of ◀ mark.  
(At this time, pass the timing belt and the pinion through the hook driving shaft.)
2. Provide a clearance of 0.5 mm between the sprocket and the pinion, and tighten setscrews in the bearing bush.
3. Remove the play of inner ring and outer ring of the two bearings by pressing the hook driving shaft bearing in the direction of ◀ mark, and tighten the setscrew in the hook driving shaft bearing.
4. Refer to page 44 and stretch the timing belt.
5. Tighten two setscrews in the pinion. (Refer to page 4.)
6. Fix the hook sleeve and the inner hook stopper.



Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> <li>○ Make sure whether there is any play in the hook driving shaft before stretching the timing belt.</li> <li>○ When inserting the hook driving shaft into the pinion, adjust so that the screw No. 1 in the pinion is aligned with the engraved marker line on the large gear. (Refer to “(3) Needle rocking timing” on page 4.)</li> <li>○ Assembling dimension of the hook driving shaft and the hook driving shaft rear bearing bush is 20 mm.</li> </ul>	<ul style="list-style-type: none"> <li>○ When drawing out the hook driving shaft, take care so that the hook driving shaft intermediate bearing is not drawn out.</li> </ul>

## (2) Disassembling/assembling the main shaft

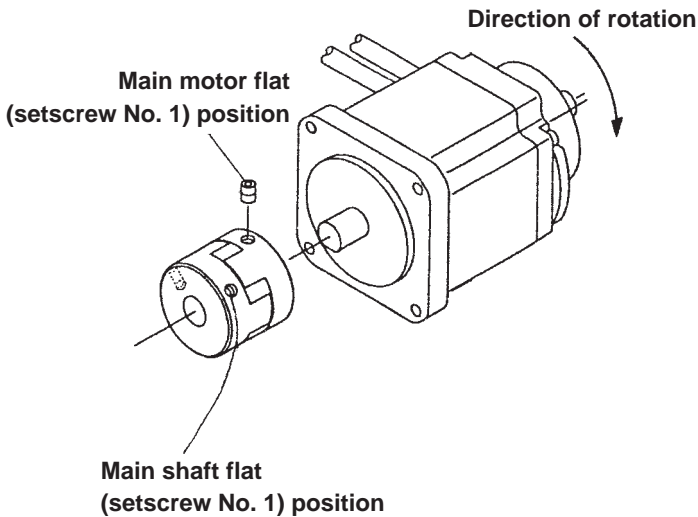


### -Removing procedure of the main shaft-

1. Loosen two setscrews in coupling ⑦. (Main shaft side)
2. Remove plunger spring bracket ⑤, and take out the plunger and the spring.
3. Loosen two setscrews each in bobbin winder driving wheel ④ and in thrust collar ⑧.
4. Refer to page 44 and loosen the timing belt.
5. Remove the timing belt and loosen two setscrews in sprocket ⑥.
6. Draw out counterweight ① in the direction of ← mark.

### -Assembling procedure of the main shaft-

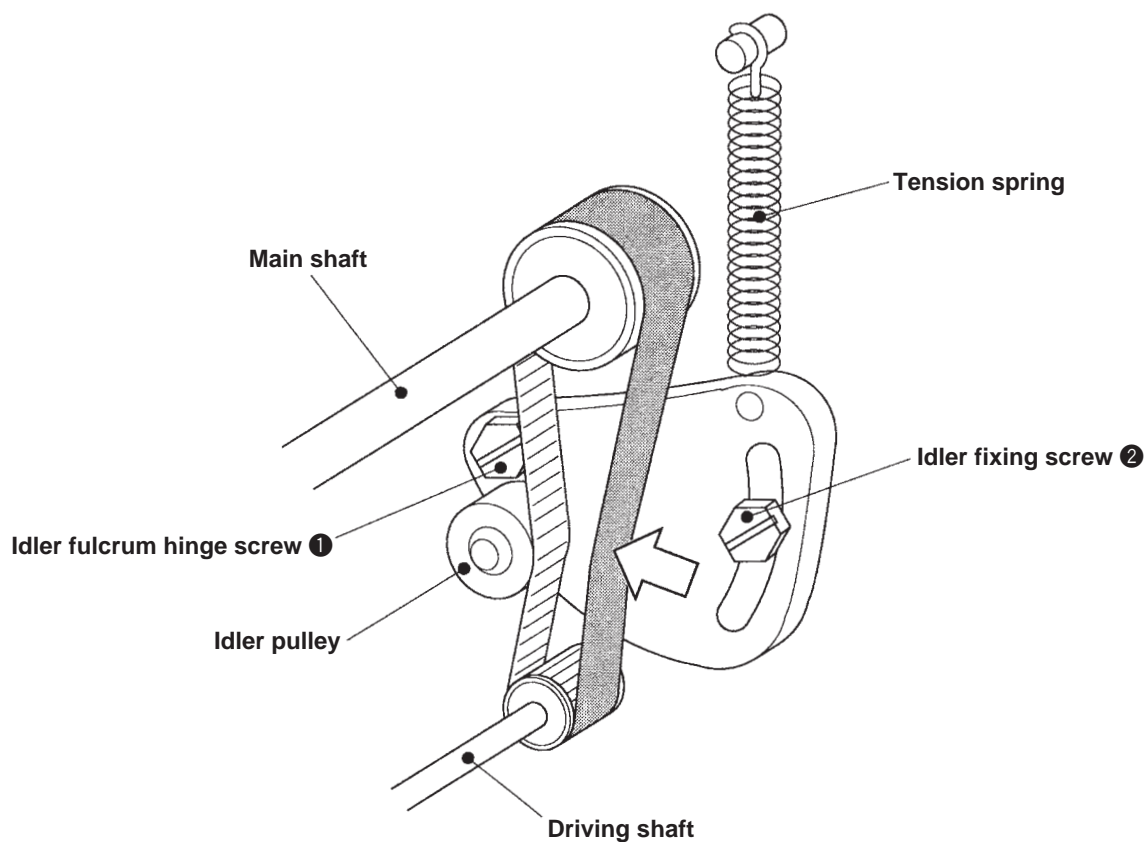
1. Insert counterweight ① in the direction of ⇨ mark. Adjust so that two pieces each of thrust bearing ② and thrust washer ③ are located in the front and rear of the main shaft front bushing and there is no thrust in the main shaft, and fix thrust collar setscrew ⑧.
2. Make sure that the groove in the plunger is properly set, and place the plunger and the spring. Then, attach plunger spring bracket ⑤.
3. Tighten two setscrews each in coupling ⑦ and in sprocket ⑥.
4. Fix bobbin winder driving wheel ④ as shown on page 34.
5. Refer to page 44 and stretch the timing belt.

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> <li>○ When fixing two setscrews in coupling ⑦, deoil the setscrews using a paint thinner and fix them with LOCKTITE 242.</li> <li>○ Make sure whether there is any play in the main shaft before stretching the belt.</li> <li>○ Make sure whether the position of the thread take-up lever is located in the center of the frame groove.</li> <li>○ Make sure that the plunger moves up or down when turninh the main shaft by hand.</li> <li>○ Take care of the engagement of the coupling.</li> </ul> 	<ul style="list-style-type: none"> <li>○ When drawing out the main shaft from the front, remove the components inside the face side plate in advance.</li> <li>○ The main shaft can be drawn out from the rear (direction of ⇐) when drawing out main motor and main motor installing base and removing the setscrew in counterweight ①.</li> </ul>

## Standard Adjustment

### (3) Adjusting the timing belt tension

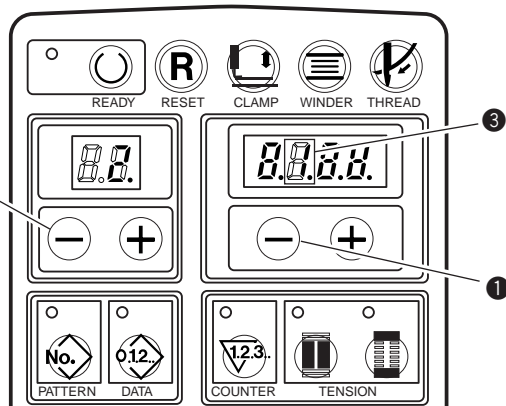
Timing belt driving the hook driving shaft determines the tension with the tension spring.  
(Standard initial tension of the timing belt : 70N to 80N)



Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> <li>○ When loosening the timing belt, loosen ❶ and ❷, press the timing belt with fingers in the direction of (⇒ mark), tighten ❶ in the state that the belt is slack, and fix with ❷.</li> <li>○ When stretching the timing belt, loosen ❶ and ❷, press the timing belt with fingers in the direction of (⇒ mark), tighten ❶ in the state that the fingers sre slowly returned, and fix with ❷.</li> </ul>	<ul style="list-style-type: none"> <li>○ If the timing belt tension is low, the belt runs around and may interfere with the machine frame.</li> <li>○ Set the time to loosen and stretch again the timing belt to 4 (four) hours or less. If the belt is left in the slack state for a long period of time, it absorbs moisture and the belt tension is deteriorated. So, be careful.</li> </ul>

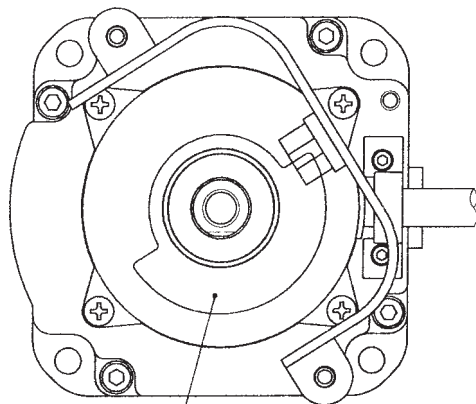
## 4. ADJUSTMENT OF THE ORIGIN SENSOR

### (1) Adjusting procedure of the upper detecting plate

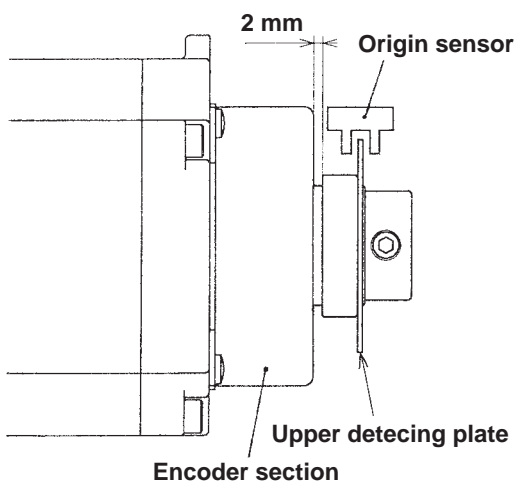


1. Pressing [Right  $\ominus$ ] key ❶, turn ON the power to set the test mode. (Refer to page 73 as well.)
2. Press [Left  $\ominus$  or  $\oplus$ ] key ❷ to display 2.
3. Turn the hand pulley to bring the needle bar to the upper dead point of its stroke.
4. Loosen the upper detecting plate.
5. Fix the upper detecting plate at position of "0" ❸ where the second one from the left of the numerals on the right side of the panel changes over almost from "0" to "1" as shown in the figure on the left.
6. Make sure that the needle bar is in the upper dead point of its stroke.
7. Turn OFF the power.

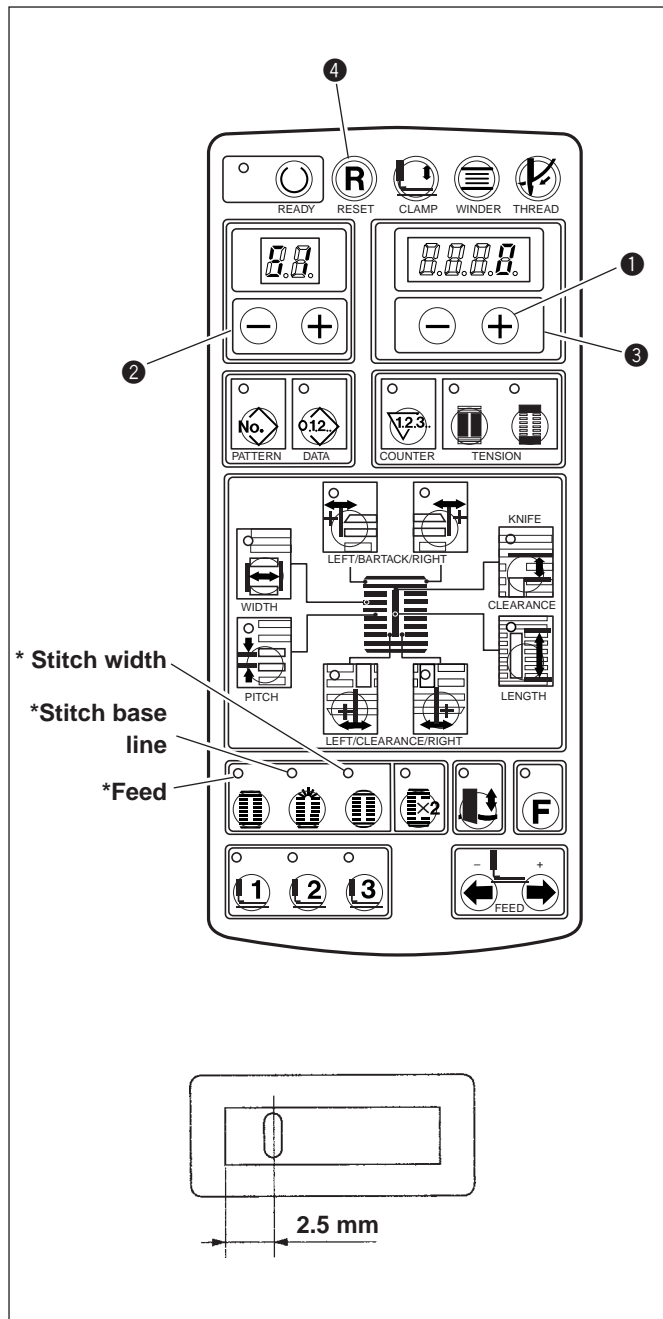
**(Caution)** Adjust so that the clearance provided between the upper detecting plate and the encoder section of the main motor is 2 mm.



Upper detecting plate

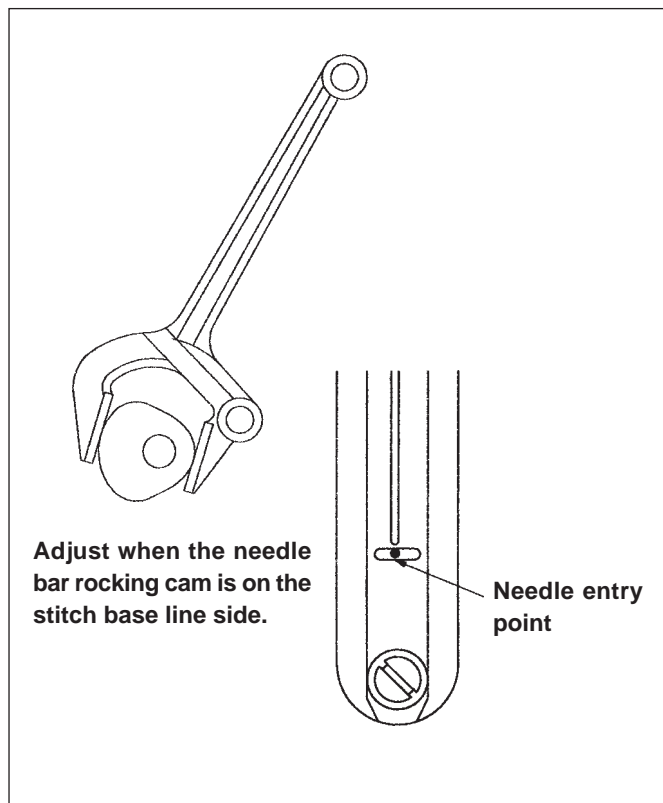


## (2) Adjusting procedure of stepping motor origin



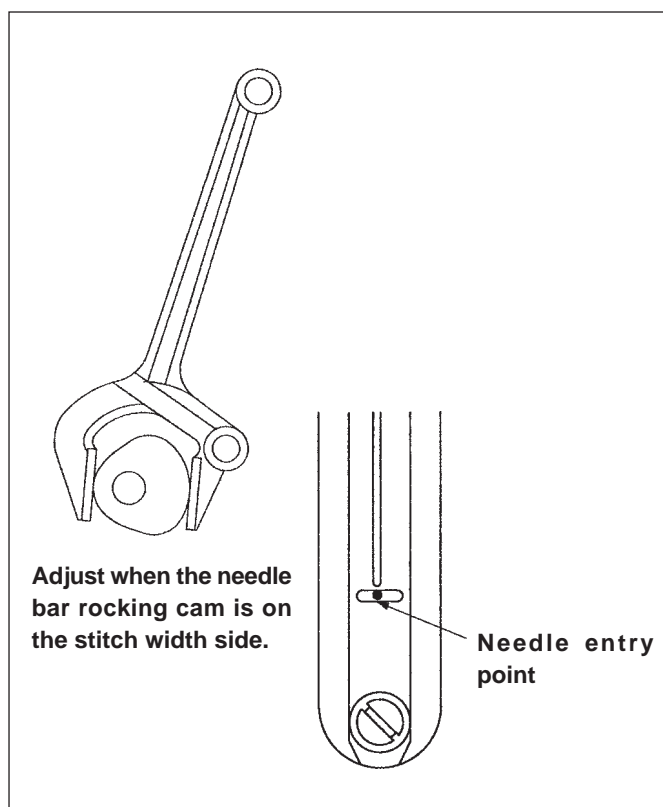
- 1) Entering procedure to the origin compensation mode
  1. Pressing [Right  $\oplus$ ] key ①, turn ON the power.
  2. Select 51, 52 and 53 of the numerals on the left side with [Left  $\ominus$  or  $\oplus$ ] key ② and make sure that the numeral on the right side is "0".
    - 51 : Feed
    - 52 : Stitch base line
    - 53 : Stitch width
  3. When the numeral on the right side is not "0", make the numeral "0" with [Right  $\ominus$  or  $\oplus$ ] key ③.
- 2) Feed (51)
  1. Select 51 with [Left  $\ominus$  or  $\oplus$ ] key.
  2. Press  $\textcircled{R}$  key ④.
  3. Press [Right] key ③ to move the feed and make the distance between the needle hole in the throat plate and the presser 2.5 mm.
  4. Loosen the setscrew in the feed origin sensor installing plate and fix the plate at the position of ON where the lamp on the left side of the lower left of the panel turns almost ON or OFF. (Refer to page 10.)
  5. Press [Right] key ③ to set the right side to "0".
  6. Press  $\textcircled{R}$  key ④ and make sure that the distance between the presser and the needle hole in the throat plate is 2.5 mm.

\* ON/OFF of the aforementioned respective sensors can be checked with the sewing pattern selection LED.



### 3) Stitch base line (left side : 52)

1. Select 52 with [Left  $\ominus$  or  $\oplus$ ] key ②.
2. Press **R** key ④.
3. Turn the hand pulley to bring the needle to the lowest point of its stroke on the stitch base line side.
4. Press [Right] key ③ to set the needle to the center of the needle hole in the throat plate. (When the needle does not move, press [Right] key after pressing **R** key ④.)
5. Loosen the screw in the stitch base line origin detecting plate and fix the plate at the position of ON where the lamp in the center of the lower left of the panel turns almost ON or OFF. (Refer to page 6.)
6. Press the right side key to set the right side to "0".
7. Press **R** key ④ and make sure that the needle is in the center of the needle hole in the throat plate.



### 4) Stitch width (Left side : 53)

1. Select 53 with [Left  $\ominus$  or  $\oplus$ ] key ②.
2. Press **R** key ④.
3. Turn the hand pulley to bring the needle to the lowest point of its stroke on the stitch width side.
4. Press the right side key to set the needle in the center of the needle hole in the throat plate. (When the needle does not move, press the right side key after pressing **R** key ④.)
5. Loosen the screw in the stitch width origin detecting plate and fix the plate at the position of ON where the lamp on the right side of the lower left of the panel turns almost ON or OFF. (Refer to page 8.)
6. Press the right side key to set the right side to "0".
7. Press **R** key ④ and turn the hand pulley to make sure that the needle does not rock.
8. Turn OFF the power.



## 5. LUBRICATION MECHANISM

### (1) Lubrication

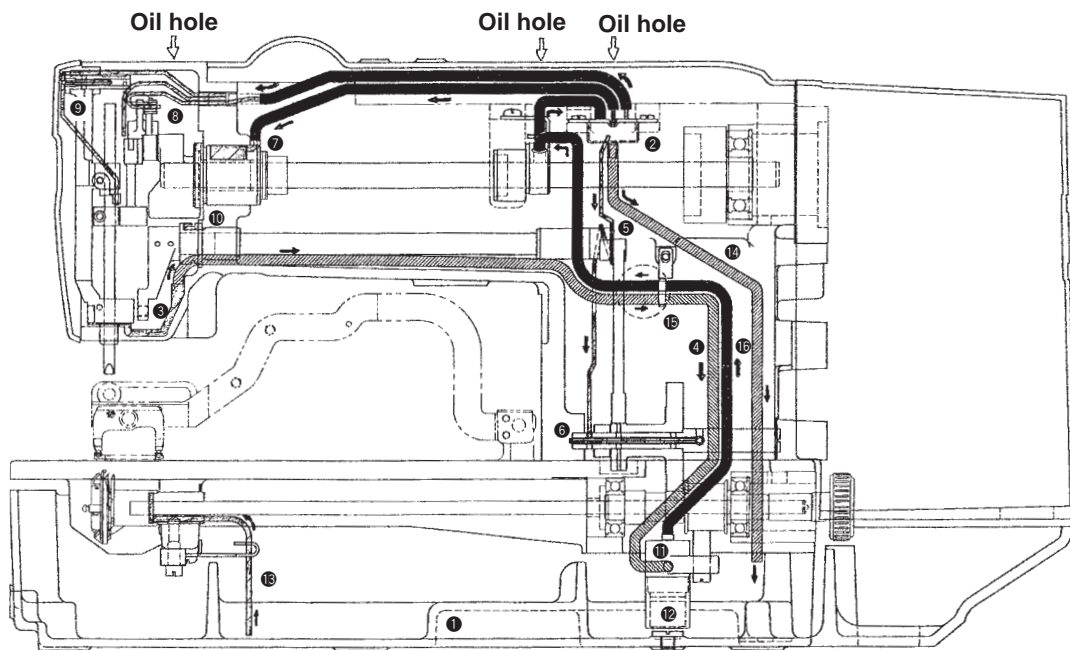
Lubrication mechanism of this sewing machine is as shown in the figure below.

Flow of oil is shown with the arrow marks in the figure.

Oil in oil reservoir ❶ is sucked and kept in oil tank ❷ once, and lubricated to the necessary places by means of the plunger pump making use of the main shaft.

The role of this plunger pump combines with the role of the reflux pump as well as the aforementioned forced lubrication.

Excessive oil kept in the face side cover section is collected with reflux felt ❸ and the collected oil is sucked up through reflux pipe ❹.



### (2) Lubricating the respective components

1) Oil kept in oil tank ❷ is lubricated to :

- (A) To needle bar rocking rear arm ❺ and needle rocking shaft ❻ with oil wick.
- (B) To main shaft front bushing ❼ components with oil wick.
- (C) To thread take-up lever ❸ components with oil wick.
- (D) To needle bar ❾ components with oil wick.

In addition, excessive oil kept in the oil tank is returned to oil reservoir ❶ through waste oil pipe ❿.

Besides, oil dropping from main shaft front bushing ❼ is lubricated to needle bar rocking shaft front bushing ❿.

### (3) Adjusting the amount of oil

Adjustment of the amount of oil for both lubricating amount and reflux amount is performed through oil pump base

⑪. In filter screen ⑫ of the oil pump base, there are three parts which play an role of the filter, namely, unwoven fabric, oil felt and compression spring.

The lubricating amount will be increased when removing the unwoven fabric and directly placing the felt on the oil hole.

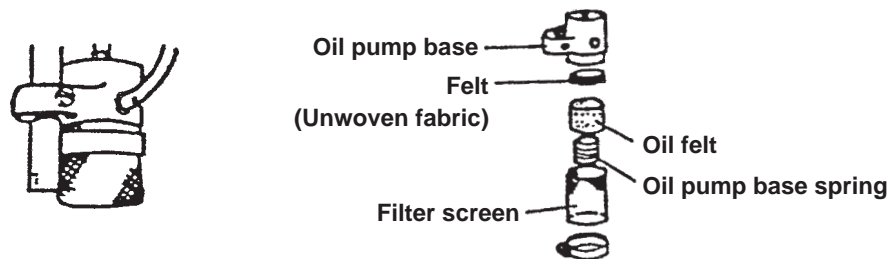
The standard number of pieces of the unwoven fabric is three pieces. Increasing the number of pieces will decrease the lubricating amount. The standard value of oil coming out of the oil pipe is 3 to 10 cc per minute at high speed.

In addition, the lubricating amount is in reverse proportion to the reflux amount (increasing the lubricating amount will decrease the reflux amount. On the contrary, decreasing the lubricating amount will increase the reflux amount.).

Take care not to change the number of pieces of the unwoven fabric or crush the filter screen.

#### <Remarks>

If oil is excessively kept in the reflux felt, the lubricating amount is temporarily increased. However, when the reflux is completed, the amount will be returned to the normal state.



### (4) Lubricating other components

- 1) Lubricating the hook is performed through felt ⑬ and the oil wick from oil reservoir ①. Adjustment of the amount of oil is described in the Instruction Manual. Adjust with the screw in the hook sleeve when the adjustment cannot be performed with the screw in the machine bed only.

#### <Check of oil pipe and reflux pipe>

When running the sewing machine at low speed, observe reflux pipe ④ and oil pipe ⑯ from oil sight window ⑮ and make sure whether the oil flows in the respective directions of the arrows. It is normal when it is flowing.

#### <Matters of caution>

Lubricating amount may be decreased after an extended period of disuse or at the time of unpacking. This is mainly because that the reflux felt has dried and absorbs a lot of air due to less resistance of reflux. As a result, suction of oil from the oil reservoir is decreased. At this time, apply oil into the oil holes in the machine arm and the top cover and leave the machine for approximately 30 minutes or remove the face cover and apply a few drops of oil to reflux felt ③ at the jaw section of the machine arm.

In addition, make the sewing machine run idle and make sure that the machine sucks up oil after performing the aforementioned measures.

# MEMO

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

6. DESCRIPTION OF OPERATION PANEL

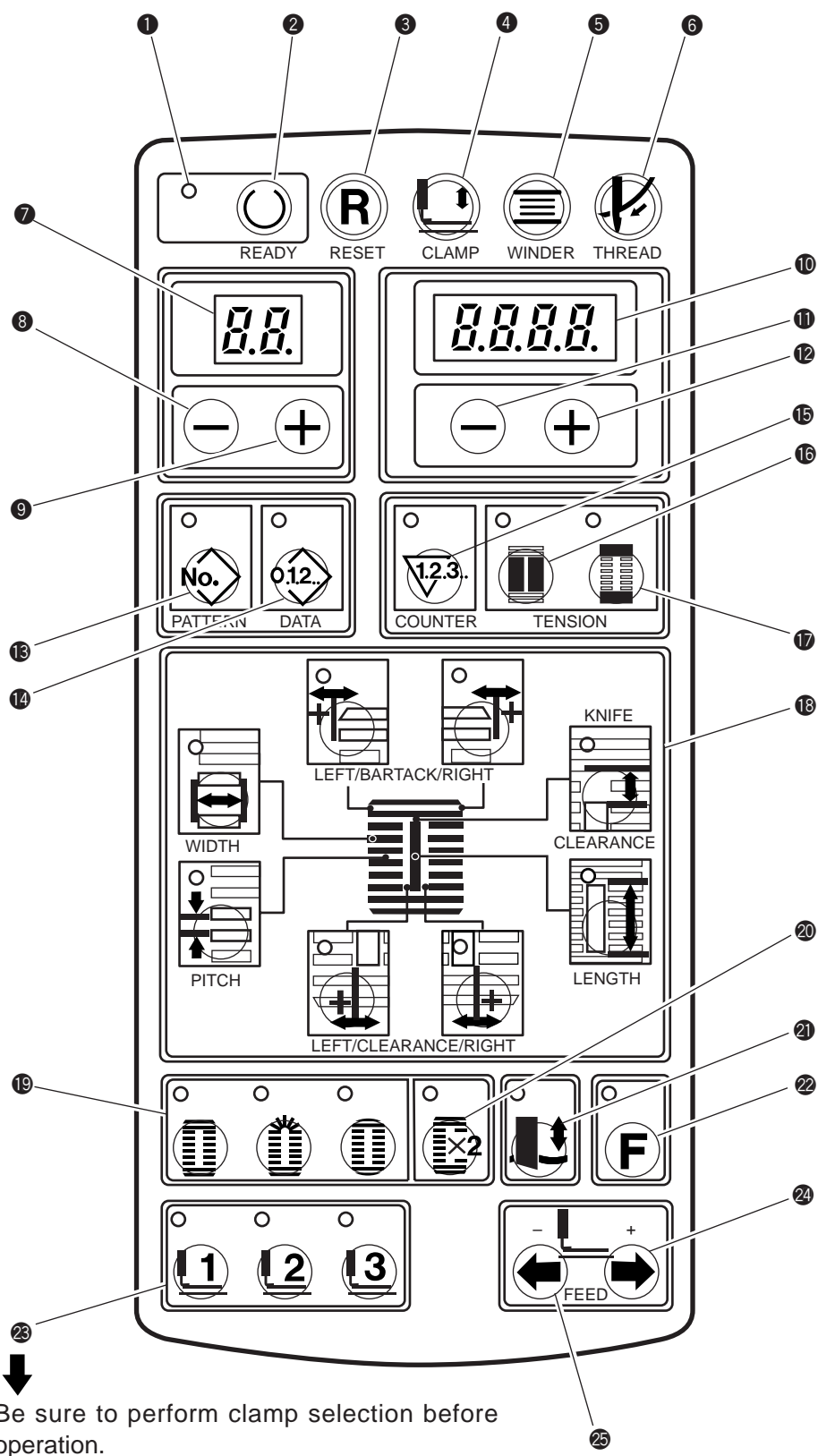
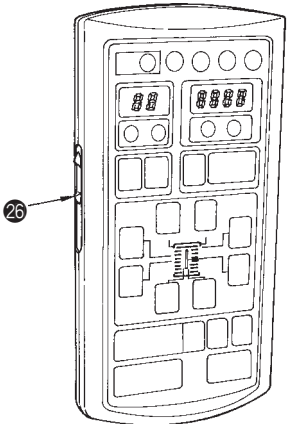
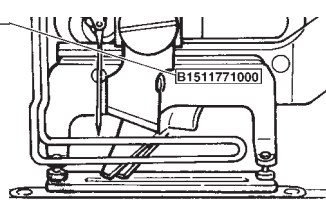









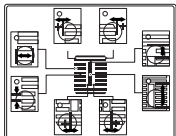










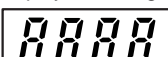






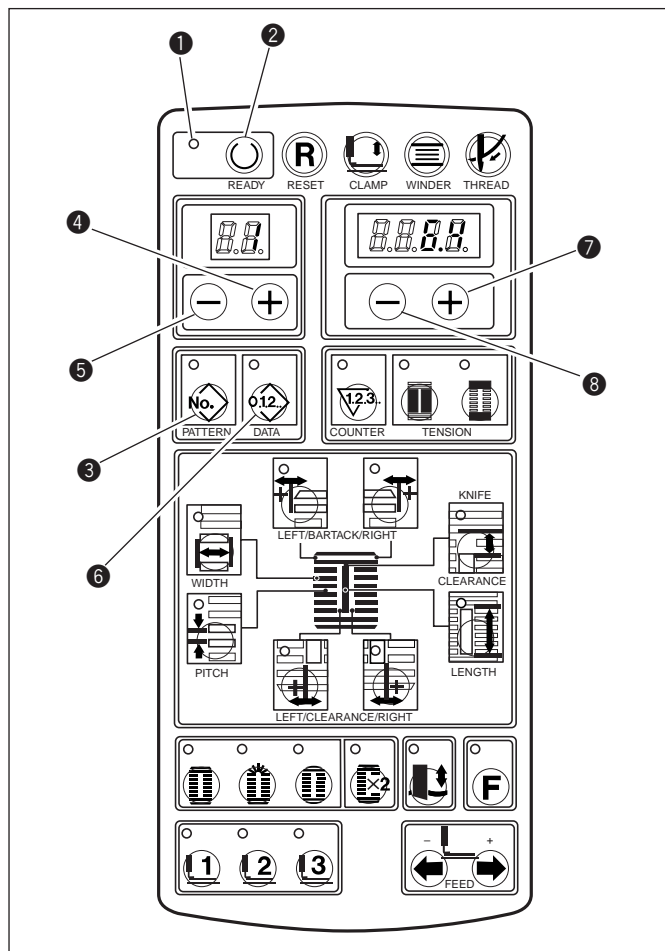


Table of presser type

	Type	Part No.
1	Type1	B1511771000
2	Type2	B1511772000
3	Type3	B1511773000



No	NAME	DESCRIPTION	No	NAME	DESCRIPTION
①	Sewing LED 	This LED lights up when the sewing machine can be operated.	⑭	Data key 	This key selects data display.
②	Ready key 	Every time this key is pressed, change-over of setting set ready can be performed.	⑮	Counter key 	This key selects counter display.
③	Reset key 	Release of error (when various errors occur.) The feed mechanism travels to its initial position (at the time of temporary stop) Counter reset (when counter is selected and the feed mechanism stays at its initial position.)	⑯	Thread tension key, left 	This key selects thread tension setting at parallel section display.
④	Clamp (presser) key 	Every time this key is pressed, change-over of presser up down is performed. (When auto-lifter device is used and the feed mechanism stays at its initial position.) Release solenoid ON (when foot pedal type 2-step pedal is used.) Release of temporary stop (at the time of temporary stop)	⑰	Thread tension key, right 	This key selects thread tension setting at bar-tacking section display.
⑤	Winder key 	Every time this key is pressed, change-over of setting bobbin winding mode is performed.	⑱	Data of each section selection key 	This key selects data of various sections display (when sewing LED goes off.). Overedge width, pitch at parallel section, left/right compensation of bar-tacking width, left/right compensation of knife groove width, clearance, cloth cutting length
⑥	Threading key 	Every time this key is pressed, moving to right end of needle bar moving to sewing position of needle bar is performed. (When sewing LED lights up.)	⑲	Sewing shape selection key  Square shape      Radial square shape      Round shape   	This key selects sewing shape (when sewing LED goes off.).
⑦	Display LED 2 digits 	This key displays pattern No., data No., etc.	⑳	1/2 stitching selection key 	Every time this key is pressed, change-over of 1-ply 2-ply stitching is performed. (When sewing LED goes off.)
⑧	"-" key, left 	This key subtracts pattern No., data No., etc.	㉑	Knife cancel key 	Every time this key is pressed, change-over of drop not drop is performed.
⑨	"+" key, left 	This key adds pattern No., data No., etc.	㉒	Function key 	Data No. optional function key (initial value : No. 13 basting) Data No. which has been set by the memory switch is displayed.
⑩	Display LED 4 digits 	This key displays various data, speed, counter value, etc.	㉓	Presser selection key 	This key selects presser type (when sewing LED goes off.). 1, 2, and 3 types
⑪	"_" key, right 	This key subtracts various data.	㉔	Forward key 	This key makes the feed mechanism travel forward stitch by stitch.
⑫	"+" key, right 	This key adds various data.	㉕	Backward key 	This key makes the feed mechanism travel backward stitch by stitch.
⑬	Pattern No. key 	This key selects pattern No. display.	㉖	Speed variable resistor	Speed increases when this is lifted upward and decreases when this is lowered downward.


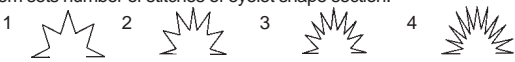


## (1) Sewing data

- 1) Make sure that sewing LED ❶ goes off.  
(When it lights up, press [Ready] ❷ key ❷ to make the LED go off.)
- 2) Press [Pattern No.] ❸ key ❸ to display the pattern No. (It is not necessary when the pattern is not changed.)
- 3) Press [Left +] key ❹ or [Left -] key ❺ to select the pattern No. you desire to change. (It is not necessary when the pattern is not changed.)
- 4) Press [Data] ❻ key ❻ to display the data No.
- 5) Press [Left +] key ❹ or [Left -] key ❺ to select the data No. you desire to change.
- 6) Press [Right +] key ❼ or [Right -] key ❽ to change the data.
- 7) Repeat steps 5), and 6) and when setting is completed, press [Ready] ❷ key ❷ to light up sewing LED.  
(When turning OFF the power without pressing [Ready] ❷ key ❷, the data is not stored in memory. Then, it is necessary to re-enter.)

## (2) Sewing data list

No.	Setting item	Description	Setting range	Unit
1	Cloth cut length	This item sets length of cloth that is cut by cloth cutting knife. When knife performs plural motions, plural motions are performed in accordance with knife size which has been set, and the cloth is cut as much as the set value. Normally, knife length is set for the knife drop of one time. (Setting more than 3 types of presser size is treated as the special order.)	6.0 to 67.0	0.1 mm
2	Knife groove width, right	This item sets the clearance between cloth cutting knife and right parallel section.	0 to 2.0	0.05 mm
3	Knife groove width, left	This item sets the clearance between cloth cutting knife and left parallel section.	0 to 2.0	0.05 mm
*3 4	Stitch width, left	This item sets stitch width of left parallel section.	0.1 to 3.0	0.05 mm
5	2nd bar-tacking length	This item sets length of 2nd bar-tacking section. Square type, radial square type, radial taper bar, radial straight bar, eyelet square type, eyelet flow bar-tacking, eyelet straight bar-tacking : 2nd bar-tacking setting	0.2 to 5.0	0.1 mm
6	1st clearance	This item sets the clearance between 1st bar-tacking and knife groove.	0 to 4.0	0.1 mm
7	2nd clearance	This item sets the clearance between 2nd bar-tacking and knife groove. Sewing machine performs jump feed after stopping and knife operates depending on the set value.	0 to 4.0	0.1 mm
8	Pitch at parallel section	This item sets sewing pitch of left and right parallel sections.	0.20 to 2.5	0.05 mm
9	Pitch at bar-tacking section	This item sets sewing pitch of bar-tacking section.	0.20 to 2.5	0.05 mm
*5 10	Shape	This item selects the shape. 0 : Square type 1 : Radial type 2 : Radial square type 3 : Round type 4 : Round square type 5 : Radial taper bar 6 : Radial straight bar 7 : Bar-tacking 8 : Semilunar type 9 : Eyelet square type 10 : Eyelet radial type 11 : Eyelet flow bar-tacking type 12 : Eyelet straight bar-tacking type	0/1/2/3/4/5/6/7/8/9/10/11/12	1
11	Length of radial round type shape	This item sets length of bar-tacking section. Radial square type, round square type, radial taper bar, radial straight bar : 1st bar-tacking setting Radial, round type, semilunar type : Common setting to 1st and 2nd bar-tacking. Eyelet radial type : 2nd bar-tacking setting	1.0 to 5.0	0.1 mm
12	Number of stitches of radial shape	This item sets number of stitches of radial shape section. 1 2 3 4	1 to 4	1N

No.	Setting item	Description	Setting range	Unit
13	Reinforcement sewing (off/number of times)	This item performs straight sewing for reinforcement in overedging width. 0 : Without function 1 to 9 : Number of times setting	0 to 9	1
14	Compensation of bar-tacking width, right	This item compensates the position of right stitch base line of bar-tacking section.	-2.0 to 1.0	0.05 mm
15	Compensation of bar-tacking width, left	This item compensates the position of the left side zigzag width of bar-tacking section.	-2.0 to 1.0	0.05 mm
*4	16 Knife motion Without/with/ 1st cycle/1st and 2nd cycles	This item selects the motion of cloth cutting knife. 0 : Without motion 1 : Motion at 2nd cycle only when double stitching is performed. (Normal motion) 2 : Motion at 1st cycle only when double stitching is performed. 3 : Motion both at 1st and 2nd cycles when double stitching is performed. (Setting of 2 or 3 is effective in case of the shape of square type, radial square type or round type.)	0/1/2/3	—
17	Left parallel section tension	This item sets the left parallel section tension.	0 to 255	1
18	Right parallel section tension	This item sets the right parallel section tension.	0 to 255	1
19	Tension at 1st bar-tacking section	This item sets the tension at 1st bar-tacking section.	0 to 255	1
20	Tension at 2nd bar-tacking section	This item sets the tension at 2nd bar-tacking section.	0 to 255	1
21	1/2 stitching	This item selects single/double stitching. 1 : Single stitching 2 : Double stitching	1/2	—
22	When double stitching is performed.  selection	This item selects double stitching when performing double stitching. This item selects whether 1st cycle and 2nd cycle are overlapped. 0 : Overlap (overlapping) 1 : Not overlap (not overlapping)	0/1	—
23	Tie stitching width	This item sets the tie stitch width at sewing end.	0 to 1.5	0.1 mm
24	Number of stitches of tie stitching at sewing end	This item sets the number of stitches of tie stitching at sewing end.	0/2/4/6	—
25	1st bar-tacking length	This item sets length of 1st bar-tacking section Square type : Setting of 1st bar-tacking.	0.2 to 5.0	0.1 mm
26	Number of stitches at the start of sewing	This item sets the number of stitches at the start of sewing.	0/2/4/6/8	—
27	Pitch at the start of sewing	This item sets the sewing pitch at the start of sewing. (Two stitches of the number of stitches of the data No.26)	0 to 0.7	0.05 mm
*3	28 Stitch width right	This item sets stitch width of the right parallel section.	0.1 to 2.5	0.05 mm
29	Maximum speed limitation	This item sets the max. speed limitation. (Depending on the speed setting value of memory switch No. 98)	400 to max	100 rpm
30	Storing location	This item sets the storing location where data is copied. 1 to 89 : capable of storing 90 to 99 : Not capable	1 to 89	1
*1	31 1st bar-tacking at the start ACT timing adjustment	This item adjusts timing of needle thread tension at the start of 1st bar-tacking.	-5 to 5	1 N
*1	32 Stitch width, right at the start ACT timing adjustment	This item adjusts timing of needle thread tension at the start of stitch width, right.	-5 to 5	1 N
*1	33 2nd bar-tacking at the start ACT timing adjustment	This item adjusts timing of needle thread tension at the start of 2nd bar-tacking.	-5 to 5	1 N
*2	34 Bar-tacking width (width of basting for sewing together)	This item sets the width of shape 7 : Bar-tacking. This item sets width when the function of basting for sewing together is provided.	1 to 6.	0.1 mm
*2	35 Function of basting for sewing together Not provided/provided	Normally basting for sewing together is performed before sewing.	0/1	—
*2	36 Function of basting of bar-tacking Not provided/pitch	Basting of zigzag is performed at the time of bar-tacking section of the square type.	0 to 1	0.1 mm
*4	37 Radius of eyelet hole	This item sets radius of eyelet hole section.	0.00 to 2.90	0.10 mm
*4	38 Length of bottom of eyelet hole	This item selects length of bottom (tail section) of eyelet hole. 0 to 3 : Short to long If the length is short, angle from parallel section to eyelet hole becomes sharp.	0 to 3	1
*4	39 Number of stitches of eyelet shape	This item sets number of stitches of eyelet shape section. 	1 to 4	1N
*4	60 Compensation of overedging width of 1st cycle when double stitching is performed.	This item narrows width of 1st cycle in terms of data No. 4 : overedging width setting. This setting is effective in case of the shape of square type, radial square type or round type.	0.00 to 1.50	0.05 mm
*4	61 Left parallel section tension at 1st cycle when double stitching is performed.	This item sets the left parallel section tension at 1st cycle when double stitching is performed. This setting is effective in case of the shape of square type, radial square type or round type.	0 to 255	1
*4	62 Right parallel section tension at 1st cycle when double stitching is performed.	This item sets the right parallel section tension at 1st cycle when double stitching is performed. This setting is effective in case of the shape of square type, radial square type or round type.	0 to 255	1

(The values in the list are the data of ROMRev : 005A. There is a case where they are different from the actual data.)

\* 1 ROMRev : Available from 004C

\* 2 ROMRev : Available from 004F and 005

\* 3 ROMRev : Individual setting of left/right stitch width is possible with 004C, D and E only. Overedging width up to 3 mm is available from 004F and 005

\* 4 ROMRev : Available from 005A

\* 5 ROMRev : Radial straight bar-tacking is added with 004C only.

ROMRev : Semilunar type and bar-tacking are added with 004F and 005 only.

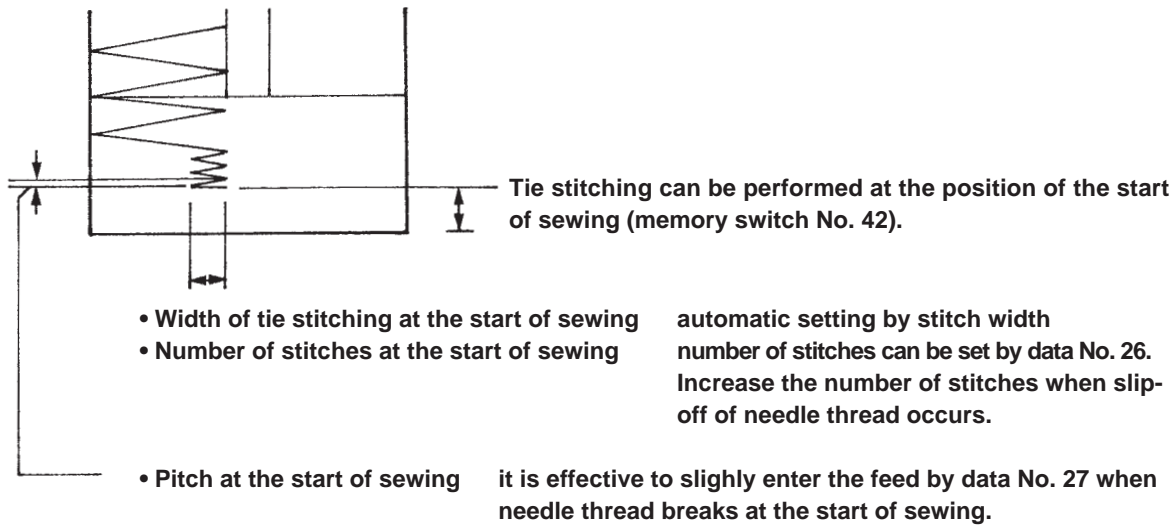
ROMRev : 4 kinds of eyelet shapes are added with 005A only.

Supplementary explanation to the sewing data list

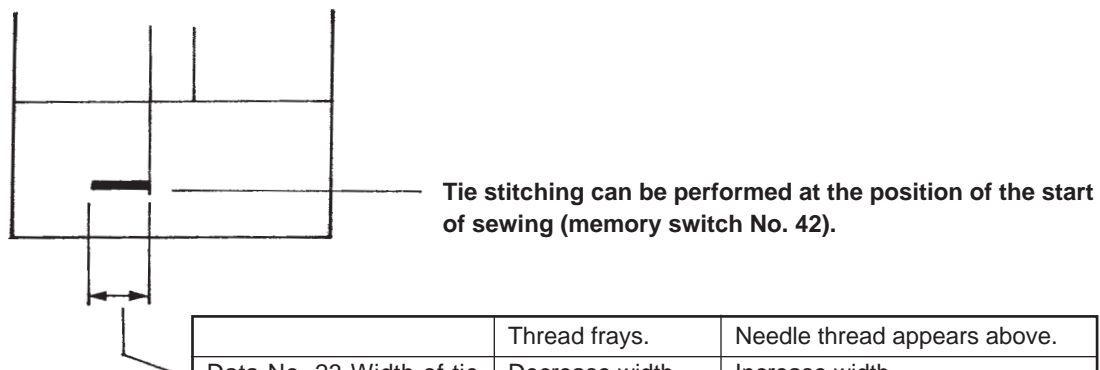
(1) Tie stitching

Tie stitching can be set to each pattern to protect the thread from slip-off of needle thread at the start of sewing, thread breakage, fray at the end of sewing, etc. in accordance with the sewing conditions.

1) Start of sewing



2) End of sewing



	Thread frays.	Needle thread appears above.
Data No. 23 Width of tie stitching	Decrease width.	Increase width.
Data No. 24 Number of stitches of tie stitching at sewing end	Increase number of stitches.	Decrease number of stitches.

- Setting of the feed direction cannot be performed.
- When thread frays or needle thread appears above, perform setting in accordance with the sewing conditions referring to the above table.



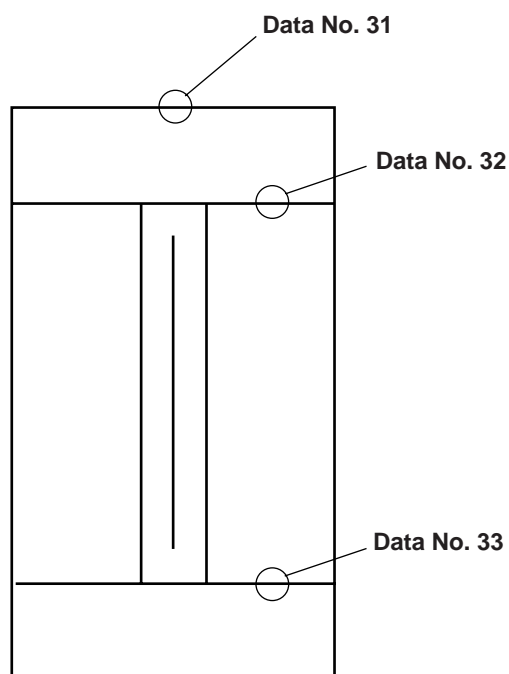
## (2) Adjusting the timing of needle thread tension

The timing to change the needle thread tension can be adjusted.

Data No. 31 : 1st bar-tacking at the start

Data No. 32 : Stitch width, right at the start

Data No. 33 : 2nd bar-tacking at the start



Set value : The thread tension changes early in the direction of “-”. The thread tension changes late in the direction of “+”.

Ex. : In case of the purl stitching, when the crest of seam at right parallel section is formed late, set the data No. 32, Stitch width, right at the start to “-” direction.

### (3) Making the radial taper bar shape

It is convenient to perform the fine adjustment of the data after inputting data and making stitches referring to the example of setting below. Main data determining the shape of the radial taper bar section are those with mark.

#### Caution when making the shape

Some data with mark or \* mark will cause "Er 18" and "Er 19".

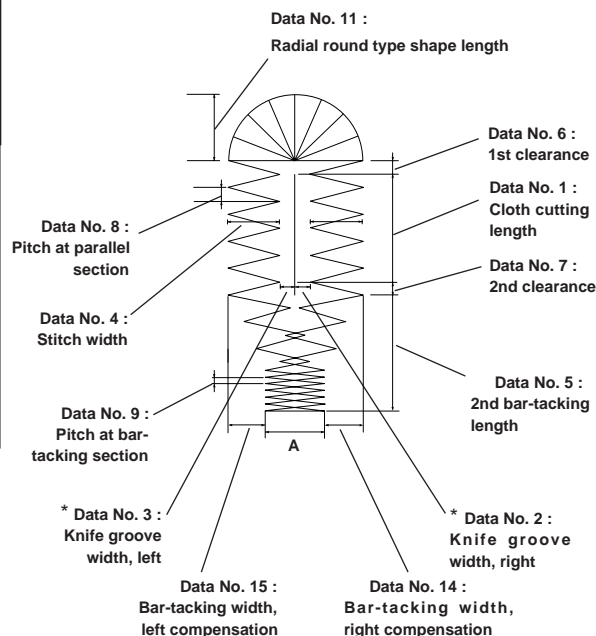
1. It is necessary to set the length of data No. 4 "2nd bar-tacking length" two times or more than data No. 14 "Compensation of bar-tacking width, right" or data No. 15 "Compensation of bar-tacking width, left". (Er 19)
2. Width A of the taper bar section cannot be made less than data No. 4, Stitch width, left.  
 $A = \text{No. 4, Stitch width} \times 2 \text{ "+" No. 2, Knife groove width, right} \text{ "+" No. 3, Knife groove width, left} \text{ "-" No. 14, Compensation of bar-tacking width, right} \text{ "-" No. 15, Compensation of bar-tacking width, left}$   
Accordingly, the error occurs in accordance with the set value of No. 14, Compensation of bar-tacking width, right or No. 15, Compensation of bar-tacking width, left. (Er 19)

#### Reference : Example of setting

No	Item	Pattern	
		For shirt	For knit
1	Cloth cutting length	12.70	19.10
2	Knife groove width, right	0.10	0.10
3	Knife groove width, left	0.10	0.10
4	Stitch width left	1.70	2.40
5	2nd bar-tacking length	3.0	4.0
6	1st clearance	1.50	1.50
7	2nd clearance	1.30	1.30
8	Pitch at parallel section	0.35	0.5
9	Pitch at bar-tacking section	0.30	0.30
10	Shape	5	5
11	Radial round type shape length	1.60	2.70
12	Number of stitches of radial shape	2	2
13	Reinforcement sewing (off/number of times)	0	2
14	Bar-tacking width, right compensation	-0.80	-1.20
15	Bar-tacking width, left compensation	-0.80	-1.20
16	Knife motion without/with	1	1
17	Left parallel section tension	190	175
18	Right parallel section tension	190	175
19	1st bar-tacking section tension	190	175
20	2nd bar-tacking section tension	190	175
21	1/2 stitching	1	2
22	When double stitching is performed < X selection	0	0
23	Tie stitching width	0.50	0.50
24	Number of stitches of tie stitching at sewing end	4	4
25	1st bar-tacking length	1.00	1.00
26	Number of stitches at the start of sewing	2	2
27	Pitch at the start of sewing	0.00	0.00
28	Stitch width right	1.70	2.40
29	Maximum speed limitation		
30	Storing location		
31	1st bar-tacking at the start ACT timing adjustment	0	0
32	Stitch width, right at the start ACT timing adjustment	0	0
33	2nd bar-tacking at the start ACT timing adjustment	0	0
34	Bar-tacking width (width of basting for sewing together)	3.6	5.00
35	Function of basting for sewing together Not provided/provided	0	0
36	Function of basting of bar-tacking Not provided/pitch	0	0
37	Radius of eyelet hole	0.7	0.7
38	Length of bottom of eyelet hole	2	2
39	Number of stitches of eyelet shape	3	3
60	Compensation of overedging width of 1st cycle when double stitching is performed.	0	0
61	Left parallel section tension at 1st cycle when double stitching is performed.	190	175
62	Right parallel section tension at 1st cycle when double stitching is performed.	190	175

Be sure to select 5.

Be sure to set "-" value.



#### (4) Sewing data initial value table

(Service patter) Purl stitch : depends on cloth cutting knife size.



No	Item	Setting range	Unit	Pattern No.									
				1	2	3	4	5	6	7	8	9	10
	1 Cloth cutting length (Corresponding to the inch size knives)	6.0 to 67.0	0.1 mm	6.40 (1/4)	9.50 (3/8)	11.10 (7/16)	12.70 (1/2)	14.30 (9/16)	15.90 (5/8)	17.50 (11/16)	19.10 (3/4)	22.20 (7/8)	25.40 (1)
*3	2 Knife groove width, right	0 to 2.0	0.05 mm	0.10									
	3 Knife groove width, left	0 to 2.0	0.05 mm	0.10									
	4 Stitch width left	0.1 to 3.0	0.05 mm	1.70									
	5 2nd bar-tacking length	0.2 to 5.0	0.1 mm	1.00									
	6 1st clearance	0 to 4.0	0.1 mm	1.50									
	7 2nd clearance	0 to 4.0	0.1 mm	1.30									
	8 Pitch at parallel section	0.20 to 2.5	0.05 mm	0.35									
	9 Pitch at bar-tacking section	0.20 to 2.5	0.05 mm	0.30									
*5	10 Shape	0 to 12	1	0									
	11 Radial round type shape length	1.0 to 5.0	0.1 mm	2.00									
	12 Number of stitches of radial shape	1 to 4	1N	3									
	13 Reinforcement sewing (off/number of times)	0 to 9	1	0									
	14 Bar-tacking width, right compensation	-2.0 to 1.0	0.05 mm	0.00									
	15 Bar-tacking width, left compensation	-2.0 to 1.0	0.05 mm	0.00									
*4	16 Knife motion Without/with/1st cycle/1st and 2nd cycles	0/1/2/3	—	1									
	17 Left parallel section tension	0 to 255	1	150									
	18 Right parallel section tension	0 to 255	1	150									
	19 1st bar-tacking section tension	0 to 255	1	60									
	20 2nd bar-tacking section tension	0 to 255	1	60									
	21 1/2 stitching	1/2	—	1									
	22 When double stitching is performed Selection	0/1	—	0									
	23 Tie stitching width	0 to 1.5	0.1 mm	1.00									
	24 Number of stitches of tie stitching at sewing end	0/2/4/6	—	4									
	25 1st bar-tacking length	0.2 to 5.0	0.1 mm	1.00									
	26 Number of stitches at the start of sewing	0/2/4/6/8	—	2									
	27 Pitch at the start of sewing	0 to 0.70	0.05 mm	0.00									
*3	28 Stitch width right	0.1 to 2.5	0.05 mm	1.7									
	29 Maximum speed limitation	400 to max	100 rpm	3000									
	30 Storing location	1 to 89	1	1	2	3	4	5	6	7	8	9	10
*1	31 1st bar-tacking at the start ACT timing adjustment	-5 to 5	1N	0									
*1	32 Stitch width, right at the start ACT timing adjustment	-5 to 5	1N	0									
*1	33 2nd bar-tacking at the start ACT timing adjustment	-5 to 5	1N	0									
*2	34 Bar-tacking width (width of basting for sewing together)	1.00 to 6.00	0.10 mm	2.00									
*2	35 Function of basting for sewing together Not provided/provided	0/1	—	0									
*2	36 Function of basting of bar-tacking Not provided/pitch	0.00 to 1.00	0.10 mm	0.00									
*4	37 Radius of eyelet hole	0.00 to 2.90	0.10 mm	0.70									
*4	38 Length of bottom of eyelet hole	0 to 3	1	2									
*4	39 Number of stitches of eyelet shape	1 to 4	1N	3									
*4	60 Compensation of overedging width of 1st cycle when double stitching is performed.	0.00 to 1.50	0.05 mm	0.00									
*4	61 Left parallel section tension at 1st cycle when double stitching is performed.	0 to 255	1	150									
*4	62 Right parallel section tension at 1st cycle when double stitching	0 to 255	1	150									
	Number of stitches according to the aforementioned setting			82	100	108	118	128	136	146	154	172	190

Number of stitches can be automatically set when the sewing data is changed.

(The values in the list are the data of ROMRev : 005A. There is a case where they are different from the actual data.)

\* 1 ROMRev : Available from 004C

\* 2 ROMRev : Available from 004F and 005

\* 3 ROMRev : Individual setting of left/right stitch width is possible with 004C, D and E only. Overedging width up to 3 mm is available from 004F and 005

















\* 4 ROMRev : Available from 005A

\* 5 ROMRev : Radial straight bar-tacking is added with 004C only.

ROMRev : Semilunar type and bar-tacking are added with 004F and 005 only.

ROMRev : 4 kinds of eyelet shapes are added with 005A only.

## (5) Sewing data initial value table (Change not possible)

No	Item	Setting range	Unit	Pattern No.										Pattern No.				
				90	91	92	93	94	95	96	97	98	99	95	96	97	98	99
				 Square type (standard) Purl stitch	 Radial type Whip	 Radial square type Whip	 Round type Whip	 Round type square type Whip	 Square type basting Whip	 Semilunar type Whip	 Bar-tacking 3 bastings Whip	 Radial straight double stitching Whip	 Radial taper bar double stitching and basting Purl stitch	 Eyelet square type Whip	 Radial Basting Whip	 Square type Double stitching Whip	 Round type Double stitching Whip	 Square type Basting Whip
				12.70					19.10					19.10			13.00	19.10
	1 Cloth cutting length	6.0 to 67.0	0.1 mm	12.70					19.10					19.10			13.00	19.10
	2 Knife groove width, right	0 to 2.0	0.05 mm	0.10										0.10				
	3 Knife groove width, left	0 to 2.0	0.05 mm	0.10										0.10				
*3	4 Stitch width left	0.1 to 3.0	0.05 mm	1.70					2.00					1.70	2.40	1.70	2.00	2.40
	5 2nd bar-tacking length	0.2 to 5.0	0.1 mm	1.00										1.00				4.00
	6 1st clearance	0 to 4.0	0.1 mm	1.50					1.00					1.50				
	7 2nd clearance	0 to 4.0	0.1 mm	1.30										1.50				
	8 Pitch at parallel section	0.20 to 2.5	0.05 mm	0.35					0.45					0.35		0.80	0.45	0.50
	9 Pitch at bar-tacking section	0.20 to 2.5	0.05 mm	0.30										0.30				
*5	10 Shape	0 to 12	1	0	1	2	3	4	0	1	0	3	0	9	8	7	6	5
	11 Radial round type shape length	1.0 to 5.0	0.1 mm	2.00										2.00				2.70
	12 Number of stitches of radial shape	1 to 4	1N	3										3				2
	13 Reinforcement sewing(off/number of times)	0 to 9	1	0					2			0	1	0		3	0	2
	14 Bar-tacking width, right compensation	-2.0 to 1.0	0.05 mm	0.00										0.00				-1.20
	15 Bar-tacking width, left compensation	-2.0 to 1.0	0.05 mm	0.00										0.00				-1.20
*4	16 Knife motion Without/with/1st cycle/1st and 2nd cycles	0/1/2/3	-	1										1				
	17 Left parallel section tension	0 to 255	1	150	100									100				175
	18 Right parallel section tension	0 to 255	1	150	100									100				175
	19 1st bar-tacking section tension	0 to 255	1	60	120		100			100	100			100				175
	20 2nd bar-tacking section tension	0 to 255	1	60	120		100			100	100			100				175
	21 1/2 stitching	1/2	-	1								2	2	1			2	2
	22 When double stitching is performed  Selection	0/1	-	0									1	0				
	23 Tie stitching width	0 to 1.5	0.1 mm	1.00										1.00				0.50
	24 Number of stitches of tie stitching at sewing end	0/2/4/6	-	4										4				
	25 1st bar-tacking length	0.2 to 5.0	0.1 mm	1.00										1.00				
	26 Number of stitches at the start of sewing	0/2/4/6/8	-	2										2				
	27 Pitch at the start of sewing	0 to 0.70	0.05 mm	0.00										0.00				
*3	28 Stitch width right	0.1 to 2.5	0.05 mm	1.70										-	-	-	2.00	2.40
	29 Maximum speed limitation	400 to max	100 rpm	3000										3000				
	30 Storing location	1 to 89	1	90	91	92	93	94	95	96	97	98	99	95	96	97	98	99
*1	31 1st bar-tacking at the start ACT timing adjustment	-5 to 5	1N	0										0				
*1	32 Stitch width, right at the start ACT timing adjustment	-5 to 5	1N	0										0				
*1	33 2nd bar-tacking at the start ACT timing adjustment	-5 to 5	1N	0										0				
*2	34 Bar-tacking width (width of basting for sewing together)	1.00 to 6.00	0.10 mm	3.60						5.00	2.00	5.00		3.60	5.00	2.00	5.00	
*2	35 Function of basting for sewing together Not provided/provided	0/1	-	0										0				
*2	36 Function of basting of bar-tacking Not provided/pitch	0.00 to 1.00	0.10 mm	0.00										0.00				
*4	37 Radius of eyelet hole	0.00 to 2.90	0.10 mm	0.70										0.70				
*4	38 Length of bottom of eyelet hole	0 to 3	1	2										2				
*4	39 Number of stitches of eyelet shape	1 to 4	1N	3										3				
*4	40 Compensation of overedging width of 1st cycle when double stitching is performed.	0.00 to 1.50	0.05 mm	0.00										0				
*4	61 Left parallel section tension at 1st cycle when double stitching is performed.	0 to 255	1	150										100				175
*4	62 Right parallel section tension at 1st cycle when double stitching	0 to 255	1	150										100				175
	Number of stitches according to the aforementioned setting			118	140	126	140	128	170	188	238	284	266	164	164	50	266	294

Number of stitches can be automatically set when the sewing data is changed.

(The values in the list are the data of ROMRev : 005A. There is a case where they are different from the actual data.)

\* 1 ROMRev : Available from 004C

\* 2 ROMRev : Available from 004F and 005

\* 3 ROMRev : Individual setting of left/right stitch width is possible with 004C, D and E only. Overedging width up to 3 mm is available from 004F and 005

\* 4 ROMRev : Available from 005A

\* 5 ROMRev : Radial straight bar-tacking is added with 004C only.

ROMRev : Semilunar type and bar-tacking are added with 004F and 005 only.

ROMRev : 4 kinds of eyelet shapes are added with 005A only.

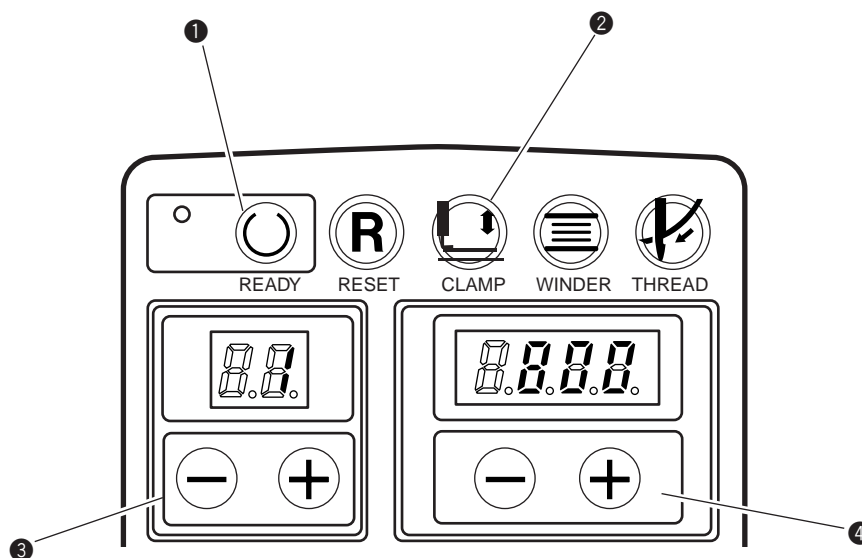
## 7. MEMORY SWITCH

### (1) How to use the memory switch

Various data can be changed in accordance with each level.

For user's level (U) : pressing [Ready] key ❶, turn ON the power, and the mode becomes memory switch mode.

For service level (S) : simultaneously pressing [Ready] key ❶ and [Clamp] key ❷, turn ON the power, and the mode becomes memory switch mode.



1) Select the memory switch No. with [Left  $\oplus$ ] or [Left  $\ominus$ ] key ❸. (See page 62.)

2) Change the set value with [Right  $\oplus$ ] or [Right  $\ominus$ ] key ❹.

3) When changing respective data, repeat steps 1) to 2).

4) Turn OFF the power after completion of setting.

\* The respective set values of the memory switch are common to and effective for all service patterns and patterns made by our customers.

## (2) Memory switch list

NO.	Setting item	Level	Level *2	Setting range	Unit	Initial value
1	Soft-start speed setting 1st stitch	u	u	400 to 3600	100 rpm	800
2	Soft-start speed setting 2nd stitch	u	u	400 to 3600	100 rpm	800
3	Soft-start speed setting 3rd stitch	u	u	400 to 3600	100 rpm	2000
4	Soft-start speed setting 4th stitch	u	u	400 to 3600	100 rpm	3000
5	Soft-start speed setting 5th stitch	u	u	400 to 3600	100 rpm	3600
6	Needle thread tension setting (sewing start)	u	p	0 to 255	1	40
7	Needle thread tension setting (sewing end)	u	p	0 to 255	1	50
8	Needle thread tension setting (at the time of thread trimming)	u	p	0 to 255	1	80
9	Needle thread tension setting (false gimp)	u	p	50 to 255	1	100
10	Display selection	u	u	0/1/2/3	-	0
11	Kind of presser	u	p	1/2/3/4/5/6	-	1
12	Presser lifting solenoid lifting speed setting	u	u	0 to 18	1	8
13	Presser position selection when ready key is ON. (Up/down)	u	u	0/1	-	0
14	Presser position selection when 1-cycle is completed. (Up/down)	u	u	0/1	-	0
15	Sewing counter None/UP/DOWN	u	u	0/1/2	-	1
16	Start selection when count is "0" Permitted/prohibited	u	u	0/1	-	1
17	Active tension VR function Without/with	u	u	0/1	-	0
18	Function switch setting	u	u	1 to 43	1	13
19	With or without reinforcement of radial shape	u	u	0/1	-	0
20						
21	Cloth cutting knife size	s	p	6.0 to 40.0	0.1 mm	40
22	Cloth cutting knife plural motion function Invalid/valid	s	p	0/1	-	0
23	Cloth cutting knife drive position	s	s	0 to 2	0.1 mm	0
24	Cloth cutting knife (solenoid) motion time	s	s	10 to 200	2 ms	50
25	Cloth cutting knife (cylinder) motion time	s	s	10 to 200	2 ms	80
26	Presser-up drive waiting time	s	s	10 to 200	10 ms	50
27	Stop-motion solenoid ON timing	s	s	150 to 400	10°	360
28	Stop-motion solenoid action time	s	s	10 to 200	10 ms	50
29	Auto-lifter pedal selection 1/2 pedals	s	s	0/1	-	0
30	Continuous operation OFF/ON	s	s	0/1	-	0
31	Data setting change prohibition Permitted/prohibited	u	u	0/1	-	0
32	Start-up waiting time	s	s	0 to 150	10 ms	60
*1 33	Compensation of basting needle entry position	s	s	0.00 to 2.50	0.1 mm	1.5
34						
35	Basting pitch	s	p	1 to 5	1 mm	4
36	Speed setting at the time of basting	s	u	400 to 3600	100rpm	2000
37	Presser size width	s	u	3 to 6	0.1 mm	3
38	Presser size length	s	u	9 to 70	1 mm	9
39	Individual tension setting function Without/individual	s	s	0/1	-	0
40	Changeover of mm/inch indication mm/inch	s	s	0/1	-	0
41	Every time origin retrieval function Without/with/per cycle	s	s	0/1/2	-	0
42	Sewing start position	s	s	0.0 to 4.9	0.1 mm	0.5
43	Pattern data register deletion function Without/with	s	s	0/1	-	0
*2 44	Individual adjustment of left/right stitch width common/individual	u	-	0/1	-	0
*1 45	Prohibiting function of presser type selection Permitted/prohibited	u	u	0/1	-	0
*1 46	Counter update unit	u	u	1 to 15	1	1
*2 47	Thread breakage detection function Invalid/valid	-	u	0/1	-	1
*2 48	Selection of memory switch function OFF/ON	-	u	0/1	-	0
*1 49	Normally, do not change setting	-	s	0/1	-	0
50						
51	Lengthwise feed origin compensation (longitudinal compensation of knife drop)	org	org	-40 to 100	1 pulse	0
52	Stitch base line origin compensatio (lateral compensation of knife drop)	org	org	-50 to 50	1 pulse	0
53	Needle rocking origin compensation	org	org	-10 to 100	1 pulse	0
54						
55	Active tension variation compensation	org	org	0 to 50	1	0
*2 61	Rolling length at the start of sewing of basting	-	p	0.00 to 20.00	0.10 mm	8.00
*2 62	Rolling pitch at the start of sewing of basting	-	p	0.20 to 5.00	0.10 mm	0.80
*2 63	Rolling width at the start of sewing of basting	-	p	0.00 to 6.00	0.10 mm	1.50
*2 64	Pitch of basting for sewing together	-	p	1.00 to 5.00	0.50 mm	2.00
*2 65	Needle thread tension setting (basting for sewing together)	-	p	0 to 255	1	100
98	Max. speed limitation setting	s	s	400 to 3600	100 rpm	3000
*1 00	Ver. display	s	s	-	-	-

(The values in the list are the data of ROMRev : 005A. There is a case where they are different from the actual data.)

\*1 ROMRev : Available from 004C

\*2 ROMRev : Available from 004F and 005

\*3 ROMRev : Individual setting of left/right stitch width is possible with 004C, D and E only. Overedging width up to 3 mm is available from 004F and 005

\*4 ROMRev : Available from 005A

### (3) How to set the memory switch

#### 1) How to set the soft-start speed (Memory switch Nos. 1 to 5)

Number of revolution of the sewing machine from 1st stitch to 5th stitch can be set per stitch.

No. 1 : Number of revolution of 1st stitch	<input type="text"/> 1	<input type="text"/> 8 <input type="text"/> 0 <input type="text"/> 0
No. 2 : Number of revolution of 2nd stitch	<input type="text"/> 2	<input type="text"/> 8 <input type="text"/> 0 <input type="text"/> 0
No. 3 : Number of revolution of 3rd stitch	<input type="text"/> 3	<input type="text"/> 2 <input type="text"/> 0 <input type="text"/> 0 <input type="text"/> 0
No. 4 : Number of revolution of 4th stitch	<input type="text"/> 4	<input type="text"/> 3 <input type="text"/> 0 <input type="text"/> 0 <input type="text"/> 0
No. 5 : Number of revolution of 5th stitch	<input type="text"/> 5	<input type="text"/> 3 <input type="text"/> 6 <input type="text"/> 0 <input type="text"/> 0

**Caution : Number of revolution of the number of stitches in the rear can be set lower. However, the sewing machine runs at the number of revolution which has been set and may not run smoothly.**

#### 2) How to set the needle thread tension (Memory switch Nos. 6 to 9 and 65)

Setting of needle thread tension at the respective sections can be performed.

No. 6 : Setting of tension at the start of sewing (As many as the number of stitches set by data No. 26)

6   4  0

No. 7 : Setting of tension at the end of sewing (As many as the number of stitches set by data No. 24)

7   5  0

No. 8 : Setting of tension at the time of thread trimming (Tension set is kept for one second after completion of sewing.)

8   8  0

No. 9 : Setting of tension at the time of basting

9  1  0  0

No. 65 : Setting of tension at the time of basting for sewing together

6  5  1  0  0

#### 3) Individual tension setting of left/right parallel section and 1st/2nd bar-tacking section (Memory switch No. 39)

This switch is used when individually setting tension of all left/right parallel section and 1st/2nd bar-tacking section.

0 : Individual setting impossible (Common to left/right parallel section and 1st/2nd bar-tacking section)

1 : Individual setting possible.

Example) Set the memory switch No. 39 to "1 : Individual setting".

Changeover of left parallel section and right parallel section can be performed every time pressing the parallel section tension key on the panel.

Similarly, changeover of 1st bar-tacking section and 2nd bar-tacking section can be performed every time pressing the bar-tacking tension key.

Example) Left parallel section	<input type="text"/> <input type="text"/>	<input type="text"/> 1 <input type="text"/> 5 <input type="text"/> 0
Right parallel section	<input type="text"/> <input type="text"/>	<input type="text"/> 1 <input type="text"/> 4 <input type="text"/> 0
1st bar-tacking section	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> 6 <input type="text"/> 0
2nd bar-tacking section	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> 7 <input type="text"/> 0

\* Normally, it is possible to select the data and to individually set the tension. However, when setting tension using the tension key, the tension is common to each section. (Parallel section : data No. 17, bar-tacking section : data No. 19)

#### 4) Display selection (Memory switch No. 10)

1 0      □ □ □ 0

When displaying the pattern No., the following items can be displayed by the 4 digits on the right side.

- 0 : No display
- 1 : Counter value
- 2 : Cloth cutting length (Data No. 1)
- 3 : Number of stitches

Example) 2 : When the cloth cutting length is selected :

□ 4      1 2. 7 0

└─ Cloth cutting length

└─ Pattern No.

#### 5) Kind of presser setting (Memory switch Nos. 11, 37 and 38)

1 1      □ □ □ 1

This switch selects the presser type actually installed.

Each type can correspond up to the sewing size mentioned below.

- Type 1 : 25 mm in length, 4 mm in width
- Type 2 : 35 mm in length, 5 mm in width
- Type 3 : 41 mm in length, 5 mm in width
- Type 4 : 46 mm in length, 5 mm in width
- Type 5 : 70 mm in length, 5 mm in width
- Type 6 : 41 mm in length, 6 mm in width

When selecting type 5 or 6, set the length and width according to each presser size.

Set value of width of No. 37, Set value of length of No. 38

3 7      □ 3. 0 0    to    □ 6. 0 0

3 8      □ 9. 0 0    to    7 0. 0 0

- (Caution) 1. When selecting the type 5 (70 mm, 5 mm), the presser arm is exclusive. It is necessary to replace the parts listed on page 118. (See p.118.)**
- 2. For the type 6 (41 mm, 6 mm), it is necessary to replace the presser, throat plate and feed plate. (Select it in case the standard presser arm is installed.)**

**Calculation of sewing size**

**Length (total length) = Cloth cutting length + length of 1st and 2nd bartackings + width of 1st and 2nd clearances**

**Width = Width of overedging x 2 + width of left/right knife grooves**

Re : Er 15

When performing plural motions of knife, Er15 of Error No. may occur since the knife bar comes in contact with the presser arm according to the size of knife and the kind of presser arm.

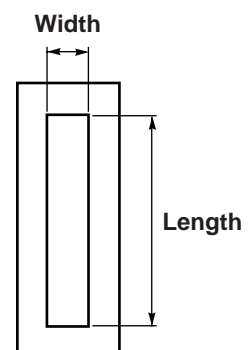
Remedy : Replace the knife with a larger size one.

Replace the presser arm with one for type 5.

#### List of presser frame dimension

Presser frame dimension (Length, width)	Sewing area (Length, width)	Kind of presser
30 mm, 5.6 mm	25 mm, 4 mm	Presser type 1
40 mm, 6.6 mm	35 mm, 5 mm	Presser type 2
46 mm, 6.6 mm	41 mm, 5 mm	Presser type 3
53 mm, 6.6 mm	46 mm, 5 mm	Presser type 4
66 mm, 6.6 mm	60 mm, 5 mm	Presser for 60 mm
76 mm, 6.6 mm	70 mm, 5 mm	Presser for 70 mm
46 mm, 7.6 mm	41 mm, 6 mm	Presser for zigzag width of 6 mm

#### Presser frame dimension



When inputting the presser size, input the size of sewing area.



6) Presser lifting solenoid lifting speed setting (Memory switch No. 12)

(Standard set value)

Setting of lifting speed of the auto-lifter solenoid can be changed.

0 : Slow

18 : Fast

7) Presser position selection of the auto-lifter (Memory switch Nos. 13 and 14)

This switch sets UP/DOWN position of presser after each action is completed.

No. 13 : Setting of the position of presser when the ready key is turned ON

Position after origin retrieval can be set.

0 : UP position

1 : DOWN position

No. 14 : Setting of the position of presser when 1-cycle is completed

0 : UP position

1 : DOWN position

8) Counter function (Memory switch Nos. 15 and 16)

This switch sets the counter function on the panel.

No. 15 : Counter function selection

0 : No function

1 : UP counter function (Count-up when 1-cycle is completed)

2 : DOWN counter function (Count-down when 1-cycle is completed)

No. 16 : Start selection when count is "0" (When selecting "2 : DOWN counter" with No. 15)

0 : Starting permitted

1 : Starting prohibited

\* When selecting "Starting prohibited", "0" flashes on and off, and the sewing machine does not run even when depressing the start pedal. Press "Reset" key to release. The display is restored and starting can be performed.

9) ACTVR function (Memory switch No. 17)

This function is used when performing fine adjustment of tension at parallel section or bar-tacking section using the optional tension variable resistor.

0 : Ineffective

1 : Effective

Range of fine adjustment

Tension at parallel section :  $\pm 50$  for the set value on the panel

Tension at bar-tacking section :  $\pm 20$  for the set value on the panel

When fine adjustment cannot be performed with the variable resistor, change the set value on the panel.

**Caution : If you make the setting effective without connecting the variable resistor, the tension becomes improper. Do not make the setting effective when the variable resistor is not connected.**

10) Function switch setting (Memory switch No. 18)

This switch sets the data No. which is selected with "F" key on the panel.

It is convenient to register the data No. which is often used.

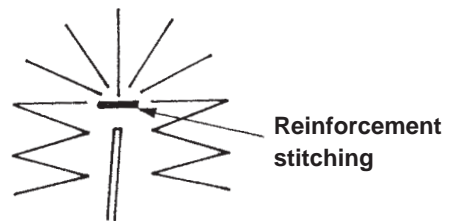
Data No. 13 "Basting" is set for the initial setting.

11) Reinforcement stitching of radial shape function (Memory switch No. 19)

This switch can perform setting of reinforcement stitching in lateral direction before sewing the radial section when selecting the radial shape in the data No. 10.

0 : Without reinforcement stitching

1 : With reinforcement stitching



## 12) Cloth cutting knife plural action setting (Memory switch Nos. 21 and 22)

When you desire to make a buttonhole larger than the knife size actually installed, you can make it by means of plural actions of the knife.

No. 21 : Cloth cutting knife size

This switch sets the knife size actually installed.

No. 22 : Cloth cutting knife plural motion function

0 : Without plural motions

1 : With plural motions

\* If this setting is performed, all patterns perform plural motions.

If you desire to sew cloth cut length (data No. 1) smaller than the knife size actually installed, "Error 15" will appear.

Example) When making a hole of 25.4 mm (1 inch) with a knife of 12.7 mm (1/2 inch) :

1. Memory switch No. 21 : Set the cloth cutting knife size to 12.70.
2. Memory switch No. 22 : Set the plural motion function to "1 : With".
3. Turn OFF and ON the power.
4. Data No. 1 : Set the cloth cut length to 25.40.
5. Press [Ready] key to start the sewing machine.

Actuate the knife three times during sewing to make a hole of 25.4 mm.

\* Overlapping amount, when actuating the knife plural times, is 2 mm.

## 13) Selection of 1/2 pedals for auto-lifter (Memory switch No. 29)

This switch is set when using 2-pedal type for standing work.

0 : 1-pedal (Including treadle type presser lifter)

1 : 2-pedals for standing work

## 14) Data setting change prohibition function (Memory switch No. 31)

This switch is used when letting the operator not change the data setting.

0 : Change permitted

1 : Change prohibited

\* Change of needle thread tension cannot be prohibited.

15) Basting function (Memory switch Nos. 35 and 36)

This switch sets the pitch and number of revolution when performing basting in advance before performing overedging.

No. 35 : Bast ring pitch

Pitch at the time of basting is set.

No. 36 : Speed at the time of basting

Limitation of number of revolution when performing basting is set.

\* Number of revolution may be lower than that which has been set in accordance with the pitch.

16) Changeover of mm/inch indication function (Memory switch No. 40)

Unit displayed on the panel can be changed.

0 : Indication of mm

1 : Indication of inch

Indication of inch is that of decimal points.

17) Origin retrieval function (Memory switch No. 41)

This switch is set when performing the origin retrieval at the time of completion of sewing.

0 : Origin retrieval is not performed.

1 : Origin retrieval is performed at the time of completion of sewing.

2. For cycle-sewing, origin retrieval is performed every time 1-cycle is completed.

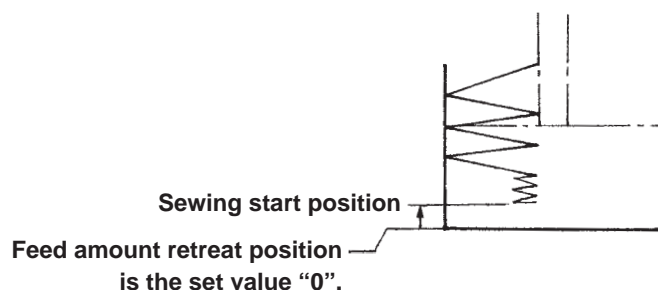
18) Sewing start position setting function (Memory switch No. 42)

This switch sets the position of feed direction at the sewing start.

Error 18 will appear when the sewing start position is larger than (2nd bar-tacking length - 0.1 mm).

\* When changing the sewing start position, make sure of the adjustment of needle thread trimmer and bobbin thread trimmer.



19) Pattern data register deletion function (Memory switch No. 43)

This switch is set when deleting the pattern data which has been registered.

0 : Without

1 : With

How to delete the data

1. Set the memory switch No. 43 to "1 : With".
2. Turn OFF and ON the power.
3. Select the pattern No. you desire to delete.
4. Select the data and select the data No. 30 : Storing location.
5. Set the value of the pattern No. in the storing location to "0".
6. Press [Ready] key to delete the data.
7. When deletion is completed, to avoid maloperation, turn ON and OFF the power and set the memory switch No. 43 to "0 : Without".

\* The data once deleted cannot be restored. So, be careful when performing this operation.

\* The pattern data 90 to 99 cannot be deleted.

20) Origin compensation function (Memory switch Nos. 51, 52 and 53)

Refer to "Adjustment of the origin sensor" (pages 43 and 44).

21) Max. speed limitation setting (Memory switch No. 98)

This switch can limit the maximum number of revolution of the whole sewing machine.

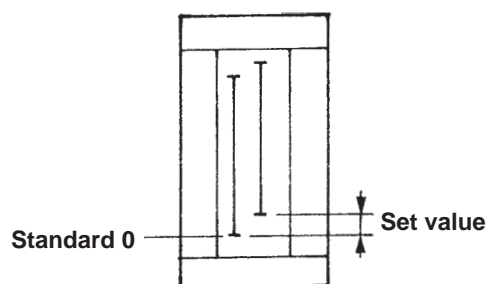
\* The value of the data No. 29 may be larger according to the order of setting. However, the value of the memory switch No. 98 has priority.

22) Cloth cutting knife drive position (Memory switch No. 23)

       mm

This switch can advance the timing of the cloth cutting knife drive.

- When the timing is advanced, the knife drop moves in the rear as shown in the figure.
- Even when the timing of the cloth cutting knife drive is changed, the total length of sewing is not changed.



23) Cloth cutting knife (solenoid) motion time (Memory switch No. 24)

ms

This switch can change the length of time during which the cloth cutting knife solenoid is held ON. (SA and SB types)

24) Cloth cutting knife (cylinder) motion time (Memory switch No. 25)

ms

This switch can change the length of time during which the cloth cutting knife cylinder is held ON. (SC type)

25) Presser-up drive waiting time (Memory switch No. 26)

ms

This switch can change the waiting time from the start of detection of the needle-up position of the last stitch to the drive of the auto-lifter.

26) Stop-motion solenoid ON timing (Memory switch No. 27)

°

This switch can change the timing (waiting angle) from the upper dead point of one stitch before the last stitch to the drive of the stop-motion solenoid. (SA type)

27) Stop-motion solenoid action time (Memory switch No. 28)

ms

This switch can change the length of time during which the stop-motion solenoid is held ON. (SA type)

28) Start-up waiting time (Memory switch No. 32)

ms

This switch can change the time from turning ON the start switch to the start of the sewing machine.

29) Active tension variation compensation (Memory switch No. 55)

This switch can compensate the tension value of the active tension.

30) Compensation of basting needle entry position (Memory switch No. 33)

mm

This switch is used when the needle entry position after second circuit is desired to be slipped at the time of basting.

31) Prohibiting function of presser type selection (Memory switch No. 45)

This switch is used when the selection of presser type is desired to be prohibited on the panel.

0 : Selection permitted

1 : Selection prohibited

32) Counter update unit (Memory switch No. 46)

This switch is used when you desire to make the counter Up (Down) after the predetermined number of pcs. has been sewn with the No. of pcs. counter or the like.

1 : Counting every time

2 to 15 : Counting after number of times of setting has been sewn

33) Ver. display (Memory switch No. 00)

This switch displays the Ver. of ROM.

34) Invalidity of thread breakage detection function (Memory switch No. 47)

This switch is used when the thread breakage detection is desired to be invalid in case needle thread tension is low or the like.

35) Memory switch function selection (Memory switch No. 48)

When the memory switch is desired to be changed, the memory switch can be changed without turning OFF the power by using this function. (It can be changed when the sewing LED went out.)

The items of level "P" in the memory switch list can be changed.

① Make the function valid. (Setting cannot be changed while the power is turned ON unless this setting is performed.)

1 : Turn OFF the power.

2 : Pressing the READY key, turn ON the power.

3 : Select memory switch No. 48 and set it to "1".

4 : Turn OFF the power.

② Method to use

1 : Press "F" key. (The mode changes to the memory switch setting mode.)

2 : Perform setting of the memory switch you desire to change.

(Once the data is changed, it is stored in memory.)

3 : Press again "F" key. (The mode returns to the normal mode.)

4 : Press the READY key and sewing is possible.

#### (4) DIP switches on the SDC circuit board

DIP switches on the SDC circuit board are described in the table below.

Use the SDC circuit board with the following settings when LBH-1700 is used since the board is common to the other models.

NO.	Name (function mode)	Standard setting
SW1	Selection of model	ON
SW2	Selection of model	OFF
SW3	Selection of special action of reverse revolution to lift needle	OFF
SW4	Selection of reverse revolution to increase penetrating force	OFF
SW5	Selection of rotating direction of main shaft of sewing machine	OFF
SW6	Selection of woodruff plate sensor active	OFF
SW7	Change of thread trimming speed	OFF
SW8	Selection of speed input method	OFF

**Turning ON the switches other than SW 1 will result in trouble. Never change those switches.**

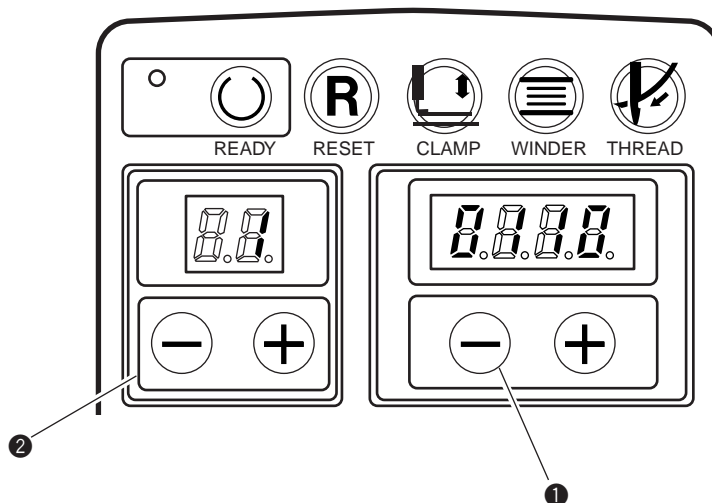


## 8. TEST MODE

### (1) How to use the test mode

Input check of the various sensors can be performed.

- 1) Pressing [Right  $\ominus$ ] key ❶, turn ON the power.



- 2) Select the sensor No. you desire to make sure with [Left  $\oplus$ ] or [Left  $\ominus$ ] key ❷. (No. 1 to 3)

No. 1 : Feed origin sensor, stitch base line sensor, stitch width origin sensor, and not used

No. 2 : Thread breakage detection, needle-up position detection sensor, knife return sensor, and presser fall sensor

No. 3 : Not used, safety switch, start switch and presser switch

If you turn the sensor ON - OFF, the value will change 1/0.

Display when the sensor is ON :

☐ 1      0 1 1 -

(Feed origin sensor, stitch base line sensor, stitch width sensor and not used)

☐ 2      0 0 1 0

(Thread breakage detection, needle-up position detection sensor, knife return sensor, and presser fall sensor)

☐ 3      - 1 0 0

(Not used, safety switch, start switch, and presser switch)

## 9. ERROR DISPLAY LIST

Error No. is displayed in the display when an error has occurred.

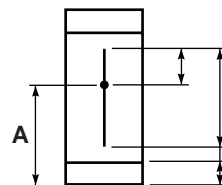
No.	Description	How to recover/supposed cause
Er1	<p>Servo motor error</p> <ul style="list-style-type: none"> <li>When error is output from servo motor circuit board.</li> </ul> <p>LED on servo motor circuit board flashes on and off when an error has occurred.</p> <p>Contents of error will be found in accordance with the number of times of flashing.</p> <p>1 : Motor-lock  2 : Defective upper dead point sensor  3 : Detection of defective phase of motor encoder  4 : Defective motor position sensor  5 : Motor drive element error  6 : Detection of low voltage of power voltage  7 : Detection of motor control current limiting value  8 : Detection of high voltage of power voltage  9 : False rotating direction of motor  10 : Input of motor control method</p> <p>How to count flashing : Count a long flashing as 1 (one) and continue to count the number of times of short flashings.</p>	Turn OFF the power.
Er2	<p>Presser lifting motion error</p> <ul style="list-style-type: none"> <li>When presser lowering detection switch signal does not change after 2 (two) seconds has passed from presser lifting motion.</li> <li>When presser lowering detection switch is OFF before turning ON the power.</li> </ul>	<p>Turn OFF the power./</p> <p>Defective sensor</p> <p>Improper adjustment (Re-adjust the item on page 38.)</p>
Er3	<p>Cloth cutting knife return error</p> <ul style="list-style-type: none"> <li>When cloth cutting knife does not return within 500 ms after turning OFF cloth cutting knife solenoid or cylinder.</li> </ul>	<p>Turn OFF the power./</p> <p>Defective sensor</p> <p>Improper adjustment</p>
Er9	<p>Safety switch error</p> <ul style="list-style-type: none"> <li>When depressing pedal in the state that safety switch is OFF.</li> </ul>	<p>Turn OFF the power./</p> <p>Sewing machine is in the state of being tilted.</p> <p>Defective sensor</p> <p>Improper adjustment</p>
Er10	<p>Temporary stop error</p> <ul style="list-style-type: none"> <li>When temporary switch is turned ON.</li> <li>For treadle type 2-pedal system, start switch is turned OFF during rotation.</li> </ul>	Press reset key, or temporary stop switch again.
Er11	<p>Speed detection error</p> <ul style="list-style-type: none"> <li>When speed detection function is defective.</li> </ul>	Possible to re-start after pressing reset key/defective connection with servo circuit board
Er12	<p>Needle UP error</p> <ul style="list-style-type: none"> <li>When needle bar is not in its upper position during stopping.</li> </ul>	Detection of UP position by manually rotating main shaft/defective sensor

No.	Description	How to recover/supposed cause
Er13	Cloth cutting knife motion error <ul style="list-style-type: none"> <li>When cloth cutting knife return detection switch signal does not change within 500 ms after turning ON cloth cutting knife solenoid or cylinder.</li> </ul>	Possible to re-start after pressing reset key/improper adjustment.
Er14	Knife size, presser size error <ul style="list-style-type: none"> <li>When the set various data exceed sewing possible area. <ol style="list-style-type: none"> <li>When total length is longer than the presser size.</li> <li>When stitch width + knife groove width is wider than 1/2 of presser width.</li> </ol> </li> </ul>	Replace the presser or re-input the data after releasing error with reset key.
Er15	Knife size, presser size error (When knife operates plural times.) <ul style="list-style-type: none"> <li>When the input knife size is not proper for the cloth cutting length. <ol style="list-style-type: none"> <li>When the knife size is larger than the cloth cutting length.</li> <li>When the knife bar comes in contact with the work clamp. <b>1</b> (When desired to open a large hole with a small size knife.)</li> </ol> </li> </ul>	Replace the knife or re-input the data after releasing error with reset key.
Er16	Knife driving timing error ROMRev : up to 004E <ul style="list-style-type: none"> <li>Knife driving timing cannot be obtained. (When 2nd bar-tacking length + 2nd clearance is shorter than 2 mm.)</li> </ul>	Re-input the data after releasing error with reset key.
	ROMRev: from 004F <ul style="list-style-type: none"> <li>When bar-tacking length + 2nd clearance is less than 2 mm at the time of double stitching.</li> <li>When setting which requires 2-times of knife driving after jump feed (depending on the set values of knife size, cloth cut length and 2nd clearance).</li> </ul>	
Er17	Cycle stitching data error When the data of selected pattern No. is ineffective.	Re-input the data after releasing error with reset key.
Er18	Sewing start position error <ul style="list-style-type: none"> <li>When the sewing start position is larger than the bar-tacking length. When the sewing start position protrudes from the bar-tacking length at the sewing start processing in accordance with the number of stitches at the sewing start and pitch.</li> <li>- At the time of taper bar - When left bar-tacking width compensation value X 2 + sewing start position + (number of stitches at the sewing start – 2) X pitch at the sewing start is larger than bar-tacking length – 0.1 mm.</li> </ul>	Re-input the data after releasing error with reset key.

1 Standard data A classified in the presser type

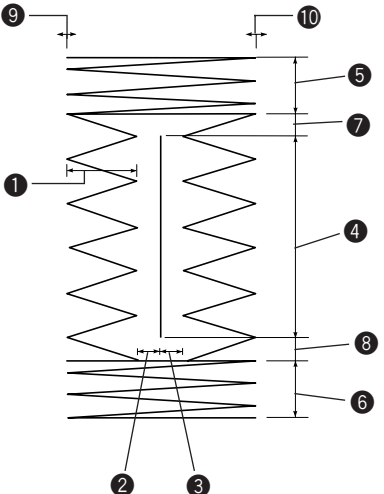
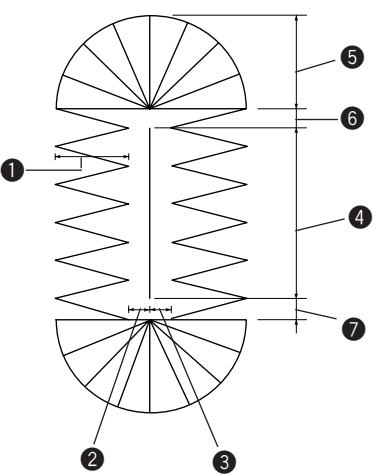
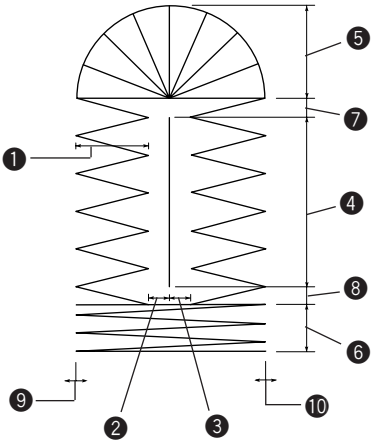
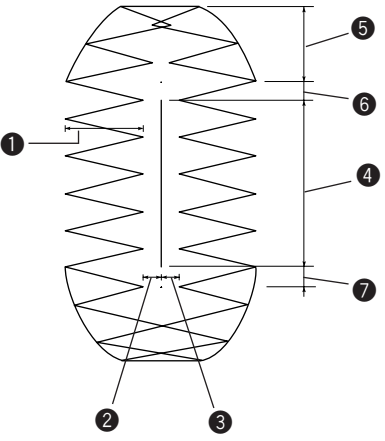
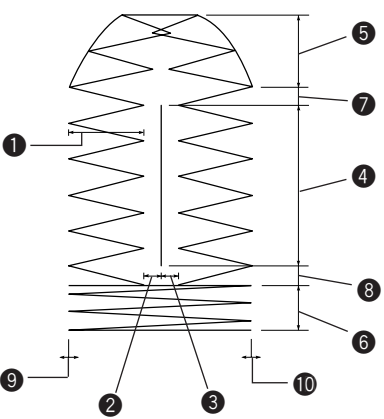
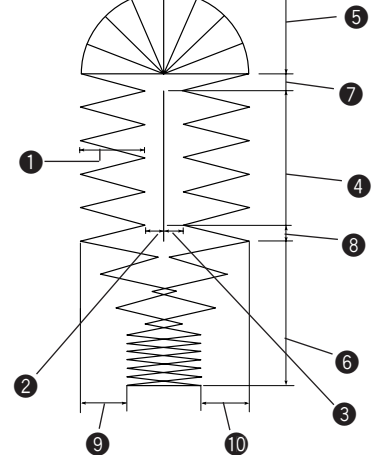
- |   |       |         |
|---|-------|---------|
| 1 | }     | 24 (mm) |
| 2 |       |         |
| 3 |       |         |
| 4 | ..... | 29 (mm) |
| 5 | ..... | 53 (mm) |
| 6 | ..... | 24 (mm) |

In case of 2nd bar-tacking length + 2nd clearance + cloth cutting length  
“—” knife size (Memory switch No. 21) A, Er (error) 15 occurs.



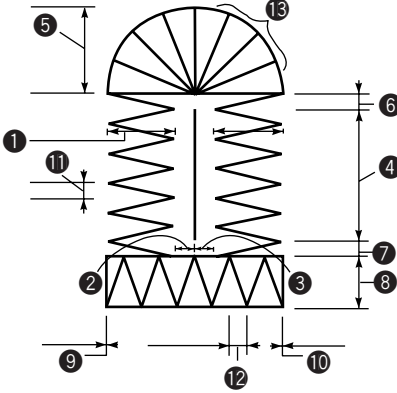
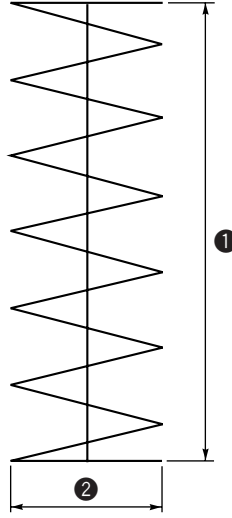
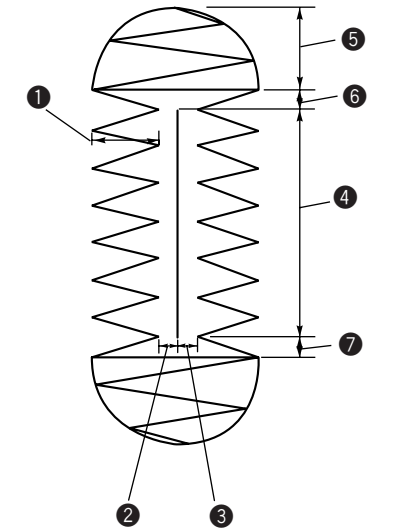
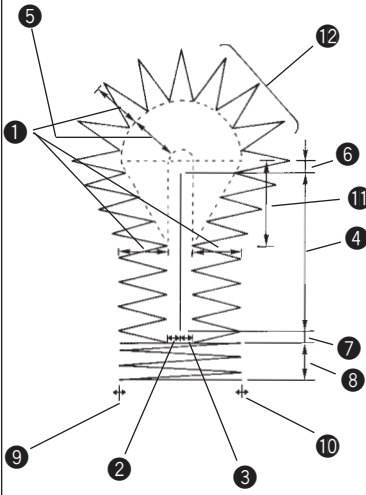
No.	Description	How to recover/supposed cause
Er19	<p>Bar-tacking compensation error</p> <ul style="list-style-type: none"> <li>When stitch width, right + right knife groove width + right bar-tacking width compensation or stitch width, left + left knife groove width + left bar-tacking width compensation exceeds 1/2 of presser size.</li> <li>At the time of taper bar - <ul style="list-style-type: none"> <li>When bar-tacking width compensation is "+".</li> <li>When bar-tacking width compensation value X 2 is larger than bar-tacking length.</li> <li>When taper bar width is smaller than stitch width. (Stitch width &gt; right knife groove width - right bar-tacking width compensation + left knife groove width - left bar-tacking width compensation + stitch width x 2)</li> </ul> </li> </ul>	Re-input the data after releasing error with reset key.
Er30	<p>Eyelet width error</p> <ul style="list-style-type: none"> <li>When overedging width + radius of eyelet hole + knife groove width (right or left) exceed 1/2 of the width of presser size.</li> </ul>	Re-input the data after releasing error with reset key.
Er31	<p>Eyelet length error</p> <ul style="list-style-type: none"> <li>When the bottom (tail section) of eyelet hole overlaps 2nd bar-tacking section. (When the length of bottom of eyelet hole is large or cloth cutting length is small.)</li> </ul>	Re-input the data after releasing error with reset key.
Er40	<p>S. State error</p> <p>When signal from the servo motor circuit board is defective.</p>	Turn OFF the power.
Er41	<p>Feed stepping motor origin retrieval error</p> <ul style="list-style-type: none"> <li>When the origin signal does not enter at the time of origin retrieval.</li> </ul>	Turn OFF the power./ Defective sensor Improper adjustment
Er42	<p>Stitch base line stepping motor origin retrieval error</p> <ul style="list-style-type: none"> <li>When the origin signal does not enter at the time of origin retrieval.</li> </ul>	Turn OFF the power./ Defective sensor Improper adjustment
Er43	<p>Stitch width stepping motor origin retrieval error</p> <ul style="list-style-type: none"> <li>When the origin signal does not enter at the time of origin retrieval.</li> </ul>	Turn OFF the power./ Defective sensor Improper adjustment
Er95	<p>RAM error</p> <p>Access to RAM error</p>	Turn OFF the power.
Er98	<p>Pattern operation step-over</p> <ul style="list-style-type: none"> <li>When the number of steps of sewing data is over.</li> </ul>	Re-input the data after releasing error with reset key.
Er99	<p>EEPROM error</p> <p>Writing error of EEPROM</p>	Turn OFF the power.
"0"	Sewing counter DOWN is over. (Display : "0" flashes on and off.)	Press reset key.
"H"	<p>Temperature error</p> <p>High temperature error due to temperature detection (Display : "H")</p>	Turn OFF the power./cleaning of fan
"- [] -"	<p>Needle thread breakage error</p> <p>When needle thread breakage is continuously detected 3 (three) stitches or more. (Display : "- []- ")</p>	Possible to re-start after pressing threading key.

When an error (Er14, 18, 19, 30) has occurred by data setting, refer to the table below and re-input the data.  
**[With regard to input data]**

<p align="center"><b>Shape No. 0 : Square type</b></p>  <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ 1st bar-tacking length Data No. 25</li> <li>⑥ 2nd bar-tacking length Data No. 5</li> <li>⑦ 1st clearance Data No. 6</li> <li>⑧ 2nd clearance Data No. 7</li> <li>⑨ Bar-tacking, left compensation Data No. 15</li> <li>⑩ Bar-tacking, right compensation Data No. 14</li> </ul>	<p align="center"><b>No. 1 : Radial type</b></p>  <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Radial type shape length Data No. 11</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> </ul>
<p>Total width = ① X 2 + ② + ③ (+ ⑨ + ⑩)  Total length = ④ + ⑤ + ⑥ + ⑦ + ⑧</p>	<p>Total width = ① X 2 + ② + ③  Total length = ④ + ⑤ X 2 + ⑥ + ⑦</p>
<p align="center"><b>No. 2 : Radial square type</b></p>  <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Radial type shape length Data No. 11</li> <li>⑥ 2nd bar-tacking length Data No. 5</li> <li>⑦ 1st clearance Data No. 6</li> <li>⑧ 2nd clearance Data No. 7</li> <li>⑨ Bar-tacking, left compensation Data No. 15</li> <li>⑩ Bar-tacking, right compensation Data No. 14</li> </ul>	<p align="center"><b>No. 3 : Round type</b></p>  <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Round type shape length Data No. 11</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> </ul>
<p>Total width = ① X 2 + ② + ③ (+ ⑨ + ⑩)  Total length = ④ + ⑤ + ⑥ + ⑦ + ⑧</p>	<p>Total width = ① X 2 + ② + ③  Total length = ④ + ⑤ X 2 + ⑥ + ⑦</p>
<p align="center"><b>No. 4 : Round square type</b></p>  <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Round type shape length Data No. 11</li> <li>⑥ 2nd bar-tacking length Data No. 5</li> <li>⑦ 1st clearance Data No. 6</li> <li>⑧ 2nd clearance Data No. 7</li> <li>⑨ Bar-tacking, left compensation Data No. 15</li> <li>⑩ Bar-tacking, right compensation Data No. 14</li> </ul>	<p align="center"><b>No. 5 : Radial taper bar</b></p>  <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Radial round type shape length Data No. 11</li> <li>⑥ 2nd bar-tacking length Data No. 5</li> <li>⑦ 1st clearance Data No. 6</li> <li>⑧ 2nd clearance Data No. 7</li> <li>⑨ Bar-tacking, left compensation Data No. 15</li> <li>⑩ Bar-tacking, right compensation Data No. 14</li> </ul>
<p>Total width = ① X 2 + ② + ③ (+ ⑨ + ⑩)  Total length = ④ + ⑤ + ⑥ + ⑦ + ⑧</p>	<p>Total width = ① X 2 + ② + ③ (+ ⑨ + ⑩)  Total length = ④ + ⑤ + ⑥ + ⑦ + ⑧</p>

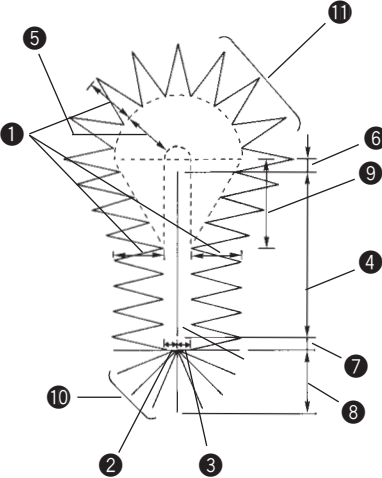
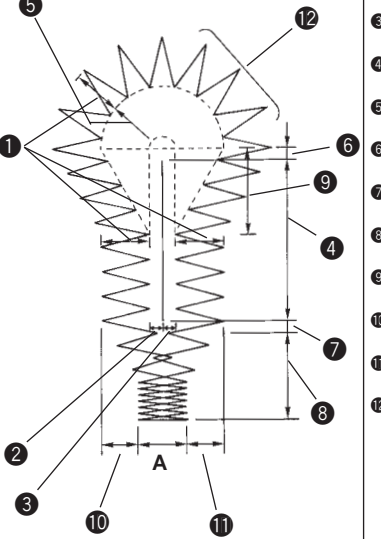
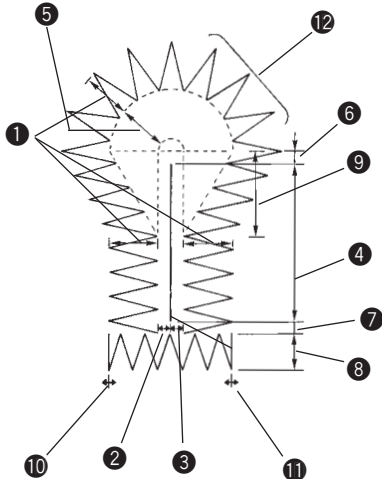
\* When the bar-tacking width compensation value is set to + (plus), the value is added to the total width.

[With regard to input data]

Shape No. 6 : Radial straight bar	Shape No. 7 : Bar-tacking
 <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Length of radial round type shape Data No. 11</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> <li>⑧ 2nd bar-tacking length Data No. 5</li> <li>⑨ Bar-tacking width, left compensation Data No. 15</li> <li>⑩ Bar-tacking width, right compensation Data No. 14</li> <li>⑪ Pitch at parallel section Data No. 8</li> <li>⑫ Pitch at bar-tacking section Data No. 9</li> <li>⑬ Number of stitches of radial shape Data No. 12</li> </ul>	 <ul style="list-style-type: none"> <li>① Cloth cut length Data No. 1</li> <li>② Bar-tacking width Data No. 34</li> </ul>
<p>Total width = ① x 2 + ② + ③ (+ ⑨ + ⑩)</p> <p>Total length = ④ + ⑤ + ⑧ + ⑥ + ⑦</p>	<p>Total width = ②</p> <p>Total length = ①</p>
Shape No. 8 : Semilunar type	Shape No. 9 : Eyelet square type
 <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Length of radial round type shape Data No. 11</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> </ul>	 <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Radius of eyelet hole Data No. 37</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> <li>⑧ 2nd bar-tacking length Data No. 5</li> <li>⑨ Bar-tacking width, left compensation Data No. 15</li> <li>⑩ Bar-tacking width, right compensation Data No. 14</li> <li>⑪ Length of bottom of eyelet hole Data No. 38</li> <li>⑫ Number of stitches of eyelet shape Data No. 39</li> </ul>
<p>Total width = ① x 2 + ② + ③</p> <p>Total length = ④ + ⑤ x 2 + ⑥ + ⑦</p>	<p>Total width = ① x 2 + ⑤ x 2 + ② + ③</p> <p>Total length = ④ + ① + ⑤ + (② + ③)/2 + ⑧ + ⑥ + ⑦</p>

\* When the bar-tacking width compensation value is set to + (plus), the value is added to the total width.

[With regard to input data]

Shape No. 10 : Eyelet radial type	Shape No. 11 : Eyelet flow bar-tacking type
 <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Radius of eyelet hole Data No. 37</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> <li>⑧ Length of radial type shape Data No. 11</li> <li>⑨ Length of bottom of eyelet hole Data No. 38</li> <li>⑩ Number of stitches of radial shape Data No. 12</li> <li>⑪ Number of stitches of eyelet shape Data No. 39</li> </ul>	 <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Radius of eyelet hole Data No. 37</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> <li>⑧ 2nd bar-tacking length Data No. 5</li> <li>⑨ Length of bottom of eyelet hole Data No. 38</li> <li>⑩ Bar-tacking width, left compensation Data No. 15</li> <li>⑪ Bar-tacking width, right compensation Data No. 14</li> <li>⑫ Number of stitches of eyelet shape Data No. 39</li> </ul>
<p>Total width = ① x 2 + ⑤ x 2 + ② + ③</p> <p>Total length = ④ + ① + ⑤ + ( ② + ③ ) / 2 + ⑧ + ⑥ + ⑦</p>	<p>Total width = ① x 2 + ⑤ x 2 + ② + ③</p> <p>Total length = ④ + ① + ⑤ + ( ② + ③ ) / 2 + ⑧ + ⑥ + ⑦</p> <p>A = ① x 2 + ② + ③ - ⑩ - ⑪</p>
Shape No. 12 : Eyelet straight bar-tacking type	
 <ul style="list-style-type: none"> <li>① Stitch width Data No. 4</li> <li>② Knife groove width, left Data No. 3</li> <li>③ Knife groove width, right Data No. 2</li> <li>④ Cloth cutting length Data No. 1</li> <li>⑤ Radius of eyelet hole Data No. 37</li> <li>⑥ 1st clearance Data No. 6</li> <li>⑦ 2nd clearance Data No. 7</li> <li>⑧ 2nd bar-tacking length Data No. 5</li> <li>⑨ Length of bottom of eyelet hole Data No. 38</li> <li>⑩ Bar-tacking width, left compensation Data No. 15</li> <li>⑪ Bar-tacking width, right compensation Data No. 14</li> <li>⑫ Number of stitches of eyelet shape Data No. 39</li> </ul>	
<p>Total width = ① x 2 + ⑤ x 2 + ② + ③</p> <p>Total length = ④ + ① + ⑤ + ( ② + ③ ) / 2 + ⑧ + ⑥ + ⑦</p>	

\* When the bar-tacking width compensation value is set to + (plus), the value is added to the total width.

## 10. TROUBLES AND CORRECTIVE MEASURES


### (1) With regard to sewing

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
1. Needle thread breakage	1-1) Attaching needle is wrong.	1)-A Direction of needle is wrong.	Attach the needle so that the indented part of the needle faces to this side as observed from the front of the sewing machine.	
		1)-B Height of needle is wrong.	Insert the needle until the top end of the shank of needle comes in contact with the upper end of the needle hole of needle bar.	
		1)-C Needle is bent.	Place the needle on the flat section of the table or the like, press the shank section with fingers and turn the needle to check the deflection of the needle tip. If the needle is deflected, replace it.	
	1-2) Threading is wrong.		Correctly thread the needle thread.	
	1-3) There are scratches on the thread path sections.	3)-A There are scratches on thread take-up spring, thread tension lever, thread tension disk, throat plate, needle bar thread guide, etc. Or, thread path has worn out.	Correct the scratch with buff, or replace the part. Especially take care of the finish of the lower face of needle hole in the throat plate.	
		3)-B There is a scratch on the blade point of hook or periphery of hook.	Correct the scratch with buff, or replace the part.	
	1-4) Adjustment of thread tension components is wrong.	4)-A Bar-tacking thread tension is too high or too low.	Checking the balance of stitches at bar-tacking section (needle thread on the right side and bobbin thread on the wrong side), adjust the tension.	
		4)-B Thread tension at parallel is too high or too low.	Make the bobbin thread tension proper. Confirming the crest of seam at parallel section of stitches, adjust the tension. (Refer to the Instruction Manual.)	
		4)-C Tension or stroke of thread take-up spring is improper.	Standard stroke : 8 to 10 mm Standard tension : 6 to 10g (In case of purl stitching)	

To the next page



Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
	From the previous page			
	1-5) Needle-to-hook timing is improper.	5)-A Height of the needle bar is improper.	Perform adjusting the timing when needle enters in the center of the throat plate of left stitch base line. At this time, clearance provided between the bottom end of needle bar and the top surface of throat plate is 11.9 mm (standard) or 11.4 mm (K) at the lowest point of the needle bar. Adjust the height using the timing gauge "1".	(See page 2.)
		5)-B Adjustment of the blade point of hook and needle is improper.	Perform adjusting timing when needle enters in the center of the throat plate of left stitch base line. Loosen hook sleeve setscrew and adjust, using the timing gauge "2", so that the blade point of hook comes in the center of needle when needle goes up from its lower dead point. In addition, make sure that needle does not come in contact with the blade point of hook at the time of right throw on right stitch base line (when needle throws on the right side). At this time, provide a clearance of 0.01 to 0.04 mm between the needle and the blade point of hook.	(See page 2.)
			To the next page	


Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
	1-6) Thread is entangled in the hook.		Remove thread (single thread) entangled in inner hook or outer hook.	
	1-7) Thread breakage due to needle heat		Decrease the number of revolution.	
	1-8) Position of thread take-up thread guide (A) is improper.		Adjustment of thread take-up thread guide (A) 	
	1-9) Thread breakage at the start of sewing	9)-A Tension at the start of sewing is too low.	Increase tension at the start of sewing.	(See page 63.)
		9)-B Soft-start speed is too fast.	Delay the soft-start speed.	(See page 63.)
		9)-C Number of stitches at the start of sewing is too many.	Decrease the number of stitches at the start of sewing.	(See page 56.)
		9)-D Thread breakage due to piercing of needle	Enter the start of sewing pitch.	(See page 56.)
	1-10) Thread breakage at the end of sewing	10)-A Number of stitches of tie stitching is too many.	Decrease the number of stitches of tie stitching.	(See page 56.)
		10)-B Width of tie stitching is too narrow.	Widen the width of tie stitching.	(See page 56.)
		10)-C Number of stitches of radial shape at the end of sewing is too many.	Increase the bar-tacking pitch.	(See page 55.)
	1-11) Partial catch of thread by hook due to return of twist (Single yarn catch)		Increase the stroke of thread take-up spring, decrease the tension and make the loop smaller.	
			Advance the timing of catching thread at the blade point of hook, and make the loop smaller to stabilize catching thread.	

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
2. Stitch skipping	2-1) Attaching needle is wrong.	1)-A Direction of needle is wrong.	Attach the needle so that the indented part of the needle faces to this side as observed from the front of the sewing machine.	
		1)-B Height of needle is wrong.	Insert the needle until the top end of the shank of needle comes in contact with the upper end of the needle hole of needle bar.	
		1)-C Needle is bent.	Place the needle on the flat section of the table or the like, press the shank section with fingers and turn the needle to check the deflection of the needle tip. If the needle is deflected, replace it.	
		1)-D Needle tip is blunt.	Replace the needle.	
		1)-E Needle is too thin.	Use a proper needle for the fabric or thread.	
	2-2) Needle-to-hook timing is improper.	2)-A Height of the needle bar is improper.	Perform adjusting the timing when needle enters in the center of the throat plate of left stitch base line. At this time, clearance provided between the bottom end of needle bar and the top surface of throat plate is 11.9 mm (standard) or 11.4 mm (K) at the lowest point of the needle bar. Adjust the height using the timing gauge "1".	(See page 2.)
		2)-B Adjustment of the blade point of hook and the needle is improper.	Perform adjusting the timing when needle enters in the center of the throat plate of left stitch base line. Loosen hook sleeve setscrew and adjust, using the timing gauge "2", so that the blade point of hook comes in the center of needle when needle goes up from its lower dead point. At this time, provide a clearance of 0.01 to 0.04 mm between the needle and the blade point of hook.	(See page 2.)

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Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
	2-3) Blade point of hook is blunt.	3-A) The blade point comes in contact with the needle.	Correct the blade point or replace the hook, and adjust the hook timing according to item 2)-B.	
	2-4) State of pressing fabric is improper.	4)-A Presser is inclined, or does not move smoothly. (Presser presses fabric while it is inclined.)	Replace hinge screw for attaching the work clamp check holder.	
		4)-B Presser pressure is too low.	Increase the presser pressure.	
		4)-C Presser is too large in terms of the button hole.	Use the presser suitable for the button hole.	
		4)-D Fabric flops since overlapped section is pressed.	Use the presser for overlapped section. Or, decrease the number of revolution.	
		4)-E Fabric flops since material is of thin knit or jersey.	Use the presser for knit and jersey. Adjust the hook timing to K type timing.	
	2-5) Adjustment of thread tension is improper.	5)-A Tension at the parallel section is too high.	Adjust the needle thread tension to proper one. (Decrease the tension.)	
		5)-B Tension or stroke of thread take-up spring is improper.	Standard stroke : 8 to 10 mm Tension : 6 to 8g.	
	2-6) Play of needle bar		Decrease the play of needle bar. Or, replace the needle bar.	

To the next page

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
3. Needle thread slip-off	2-7) Change of needle thread loop	7)-A Loop of spun thread or cotton thread falls at the speed of 3,300 rpm or more.	Decrease the number of revolution.	
		7)-B Loop is hard to be made with fabric related to knit.	Raise the lowest point of needle bar by 0.6 mm, and re-adjust needle-to-hook timing.	
			It is effective to slightly lower needle bar than the case of standard timing and to delay the hook timing.	
			 <p><b>Adjust so that the blade point of hook comes to the position of approximately 1 mm from the top end of the needle eyelet.</b></p>	
	3-1) Installation or timing of needle thread trimmer is improper.	1)-A Opening timing of trimmer is too early.	Adjust the longitudinal position of needle thread trimmer driving cam so that the trimmer gradually opens at the position of approximately 2 to 3 mm from the start of sewing.	
		1)-B Thread grasping force of the trimmer is too weak.	Correct the thread presser spring so that the spring comes in contact with the whole of the blade of thread trimmer.	
		1)-C Closing amount of the trimmer is too small.	When there is a mismatch of the trimmer, replace it.	
			Retreat the needle thread trimmer driving cam.	
	3-2) Finish of thread presser spring is improper.	2)-A Thread presser spring cuts needle thread.	Finish with buff the contact face of the thread presser spring with needle thread.	
	3-3) Setting of tension at the start of sewing is improper.	3)-A Tension is too high.	Adjust the tension so that whip stitching is performed at the start of sewing. Memory switch No. 6	
To the next page				(See page 63.)

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
	3-4) Number of stitches at the start of sewing is too small.		Increase the number of stitches at the start of sewing. Data No. 26	(See page 56.)
	3-5) Thread slip-off due to hangnail of thread		Refer to "1. Needle thread breakage" of trouble.	
	3-6) Main shaft stop position is improper.	6)-A Adjustment of origin sensor	Refer to the item (1) of "Adjusting procedure of the upper detecting plate".	(See page 46.)
	3-7) Number of revolution at the start of sewing is too high. (In case of tetron thread)		Refer to the memory switch, and decrease the number of revolution of the soft-start.	(See page 63.)
4. Needle thread remains.	4-1) Thread tension is improper.	1)-A Setting of needle thread tension (at the end of sewing) is improper.	Change the data of the memory switch.	(See page 63.)
		1)-B Setting of needle thread tension (at the time of thread trimming) is improper.	Change the data of the memory switch.	
	4-2) Main shaft stop position is improper.	2)-A Adjustment of origin sensor	Refer to the item (1) of "Adjusting procedure of the upper detecting plate".	(See page 46.)
	4-3) Needle thread trimmer is positioned too high.		Lower the trimmer to such an extent that it does not come in contact with the presser.	(See page 24.)
	4-4) Closing amount of needle thread trimmer is too small.		Increase the closing amount with the needle thread trimmer guide A.	(See page 24.)
	4-5) Position of needle thread trimming is extremely to the right.		Adjust the most advanced amount of needle thread trimmer to 5 mm.	(See page 24.)
	4-6) Set value of tie stitching on the panel is improper.	6)-A Width of tie stitching is too narrow.	Widen the width of tie stitching.	(See page 56.)
		6)-B Number of stitches of tie stitching is too many.	Decrease the number of stitches of tie stitching.	(See page 56.)

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
5. Crest of seam wobbles.	5-1) Wobbling at the start of sewing	1)-A Tension at the start of sewing is too low.	Increase the tension at the start of sewing.	(See page 63.)
		1)-B Tension at the parallel section is too low.	Increase the tension at the parallel section.	
		1)-C Stroke of the thread take-up spring is too large.	Decrease the stroke of the thread take-up spring and increase the spring pressure.	
		1)-D Position of the needle thread trimmer is too high.	Lower the needle thread trimmer to such an extent that it does not come in contact with the work clamp check holder or the presser foot.	
	5-2) Wobbling at the parallel section	2)-A Tension at the parallel section is too low.	Increase the tension at the parallel section.	
6. Thread frays.	6-1) Needle thread frays when pulling it at the end of sewing.	2)-B Tension of the thread take-up spring is too low and the stroke is insufficient.	Increase the tension of the thread take-up spring and increase the stroke.	
		1)-A Bar-tacking thread tension is too low.	Increase the bar-tacking thread tension.	
	6-2) Bobbin thread frays when pulling it at the end of sewing.	1)-B Bobbin thread tension is too low.	Increase the bobbin thread tension.	
		2)-A Bar-tacking thread tension is too high.	Decrease the bar-tacking thread tension.	
	6-3) Set value of tie stitching on the panel is improper.	2)-B Bobbin thread tension is too high.	Decrease the bobbin thread tension.	
		3)-A Width of tie stitching is too wide.	Narrow the width of tie stitching.	(See page 56.)
		3)-B Number of stitches of tie stitching is too small.	Increase the number of stitches of tie stitching.	(See page 56.)

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
7. Needle breaks.	7-1) Other parts come in contact with needle.	1)-A Blade point of the hook comes in contact with needle.	Refer to the item (2) of STANDARD ADJUSTMENT. (Needle-to-hook timing)	(See page 2.)
		1)-B Needle is not in the center of needle hole in the throat plate.	Refer to the items (4) to (6) of STANDARD ADJUSTMENT. (Adjusting the needle entry point)	(See pages 4 to 7.)
		1)-C Needle is bent.	Replace the needle.	
		1)-D Needle thread trimmer comes in contact with needle.	Refer to the item (25) of STANDARD ADJUSTMENT. (Adjusting the needle thread trimmer actuating arm)	(See page 28.)
	7-2) When operating the needle thread trimmer, it comes in contact with needle.	2)-A Installing position of needle thread trimmer is improper.	Refer to the items (19) to (21) of STANDARD ADJUSTMENT. (Installing position of the needle thread trimmer)	(See pages 22 to 25.)
		2)-B Needle stop position is too low.	Make sure that main shaft is in the stop position and actuate the needle thread trimmer. (Lift the presser.)	
	7-3) Needle thread trimmer moves to the front side and comes in contact with needle. (B, C types)	3)-A Engagement of the needle thread trimmer driving arm and the driving cam is too tight.	Refer to the item (25) of STANDARD ADJUSTMENT. (Adjusting the needle thread trimmer driving arm)	(See page 28.)
	7-4) Basting thread tension is too high.		Decrease the basting thread tension, or decrease the pitch.	(See pages 63, 68.)
	8-1) Bobbin thread tension is improper.		Re-set the bobbin thread tension to 15g (purl stitching).	
	9-1) Position of the start of sewing is near to the most retreated position of the feed.		Increase the set value of the position of the start of sewing.	(See page 68.)
8. Sewing is occasionally disordered.				
9. Tie stitches protrude at 2nd bartacking of radial type shape or round type shape.				



## (2) Woth regard to mechanical components

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
1. Height of needle is improper when the sewing machine has stopped.	1-1) Main shaft stop position is improper.	1)-A Position of origin sensor is improper.	Refer to the item (1) of adjusting procedure of the origin sensor. (Adjusting procedure of the upper detecting plate)	(See page 46.)
2. Cloth cutting knife fails to drop.		Cord of knife driving solenoid is disconnected. (A, B types)	Connect the cord.	
		Air pressure is too low, or air leaks. (C type)	Set the air pressure to 0.5MPa.	
3. Cloth cutting knife fails to cut.	3-1) Stroke of the cloth cutting knife is improper.	1)-A Installing position of knife driving solenoid is improper.	Refer to the item (1) of STANDARD ADJUSTMENT.	(See pages 12 to 13.)
		1)-B Installing position of the cloth cutting knife is improper.	Slightly lower the height of cloth cutting knife.	
	3-2) Sharpness of the cloth cutting knife is dull.	2)-A Blade of the knife is broken.	Replace the knife with a new one.	
		2)-B A knife other than the genuine one is used.	Replace the knife with a genuine one.	
4. Cloth cutting knife fails to return.	4-1) Skew in the cloth cutting knife drive section	1)-A Adjusting the play of knife bar is improper.	Adjust the play with the knife bar presser.	
		1)-B Cloth cutting knife interferes with needle bar.	Refer to the item (1) of STANDARD ADJUSTMENT.	(See pages 12 to 13.)
		1)-C Skew due to cutting waste or dust in drive section	Clean often the drive section.	
	4-2) The cloth cutting knife bites in cloth and does not return.	2)-A Sharpness of the knife is dull.	Replace the knife with a new one.	
		2)-B Setting of knife groove width is excessively large for the floppy materials.	Replace the presser or make the setting of knife groove width as small as possible.	
		2)-C Installing position of knife driving solenoid is improper.	Refer to the item (1) of STANDARD ADJUSTMENT.	(See pages 12 to 13.)

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
5. Start pedal fails to start. (Presser lifting lever has not fully returned.)	5-1) Return of bobbin thread trimmer driving arm is improper.	1)-A Throat pate, throat plate base and bobbin thread trimmer are clogged with foreign matters such as lint or the like.	Remove work clamp carrier and clean around the throat plate.	
		1)-B Mismatch of bobbin thread trimmer lever and bobbin thread trimmer ball screw.	Adjust the length of bobbin thread trimmer ball screw.	
			Apply grease.	
		1)-C Operation of bobbin winder trip latch is improper.	Re-adjust the bobbin winder trip latch. Refer to the item (27) of STANDARD ADJUSTMENT.	
	5-2) Mismatch of starting safety arm and presser lifting lever	2)-A Clearance provided between starting safety arm and presser lifting lever is too small.	Adjust the clearance to 0.3 to 0.8cmmm.	(See page 16.)
		3)-A Clearance provided between starting safety lever and spring of stop-motion solenoid is improper.	Adjust the clearance to 0.5 to 1 mm.	(See page 20.)
	5-3) Return of starting safety lever is improper.			
	5-4) Needle thread trimmer is mismatched.			
		4)-A Needle thread trimmer comes in abnormal contact with presser and actuating plate.	Refer to the items (19), (20) and (21) of STANDARD ADJUSTMENT. (Adjusting the needle thread trimmer)	(See pages 22 to 25.)

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
6. Presser fails to work. (Presser fails to go up.)	6-1) Bobbin thread trimmer driving arm fails to work.	1)-A Throat plate, throat plate base, and bobbin thread trimmer are clogged with foreign matters such as lint or the like.	Remove the work clamp carrier and clean around the throat plate.	
		1)-B Bobbin thread trimmer interferes with bobbin thread trimmer ball screw.	Adjust the length of bobbin thread trimmer ball screw.	
		1)-C Inner hook stopper comes in contact with bobbin thread puller.	Adjust the inner hook stopper.	
	6-2) Starting safety arm fails to return and comes in contact with presser lifting lever.		Remove interference of the components related to the starting safety arm.	
	6-3) Clearance provided between starting safety arm presser lifting lever is too small.		Refer to the item (13) of STANDARD ADJUSTMENT. (Position of the starting safety arm)	(See page 16.)
	6-4) Position of needle thread trimmer is improper.	4)-A When needle thread trimmer is removed and the presser lightly works, it is supposed that the trimmer interferes with other parts.	Refer to the items (19), (20) and (21) of STANDARD ADJUSTMENT. (Adjusting the position of the needle thread trimmer)	(See pages 22 to 25.)
	6-5) Mismatch of slide roller bracket and needle thread trimmer crank (front) (When the needle thread trimmer is in the most advanced position.)		Re-adjust the slide roller bracket. (Rotating direction) Refer to the item (28) of STANDARD ADJUSTMENT.  Advancing amount of the needle thread trimmer is too large. Refer to the item (19) of STANDARD ADJUSTMENT.	(See page 32.)  (See page 22.)
7. Sewing machine fails to run at high speed even when depressing the starting pedal. (2-pedal system)	7-1) Starting safety hook does not engage with starting safety lever.	1)-A Starting sensor plate comes in contact with starting sensor.	Adjust the installing position of the starting sensor.	(See page 18.)
		1)-B Needle thread trimmer control lever is excessively pressed to needle thread trimmer crank, rear.	Adjust the position of the needle thread trimmer control lever.	(See page 20.)

### (3) With regard to electrical components

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
1. Display fails to appear on the operation panel.	1. DC+24V is not supplied to MAIN circuit board.	1. Power has not come yet.	Check whether the power comes to the power switch.	
		2. Power is not supplied to PWR circuit board.	Check the connection of CN30, terminal board and P38-J38 when AC60V does not come between Nos. 3 to 6 pins of CN36.	
		3. DC+85V has short-circuited somewhere.	Draw out CN37 and check continuity between Nos. 1 to 6 pins of CN37 on PWR circuit board. If the resistance value is excessively lower than 12KΩ, draw out CN11 on PWR circuit board, and check continuity between Nos. 2 to 6 pins of CN11 on MAIN circuit board. If the resistance value is excessively low, MAIN circuit board is defective. Check continuity between the respective connectors of the stepping motor relay cord, and the respective pins and earths of CN14, CN15 and CN16. If there is the continuity, cable or motor is defective. Check the wiring.	
		4. DC+24V has short-circuited somewhere.	Check continuity of DC+24V of the respective connectors of CN19 and CN23, and GND. If there is the continuity, sensor or cable is defective. Check the wiring.	
		5. Fuse F6 has blown out.	When the cause is "3." or "4.", fuse has blown out. Remove the cause and replace the fuse.	
		6. Failure with PWR circuit board.	When DC+24V has not come between Nos. 3 to 6 pins of CN37, or between Nos. 3 to 6 pins of CN11, replace the PWR circuit board.	

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Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
	2. Signal is not transferred to the operation panel.	1. Connection is defective or cable is defective.	Check the connection of CN17, CN41 and CN44.	
		2. Failure with MAIN circuit board	Perform the aforementioned check, and replace MAIN circuit board if there is no trouble.	
	3. DC+5V is not supplied to MAIN circuit board.	1. Failure with SDC circuit board	Draw out CN12, and replace SDC circuit board if the voltage of Nos. 1 to 34 pins on the cable side is not DC+5V.	
2. Sewing LED fails to light even when pressing the ready key.	1. Set ready state is not completed.	1. Signal is not transferred from SDC circuit board.	When panel operation or pedal operation is not accepted, signal from SDC circuit board is not transferred. Replace the SDC circuit board.	
	2. Sewing LED fails to light.	1. Failure with the sewing LED	When the starting switch is accepted, replace the operation box.	
		2. Connection is defective or cable is defective.	Replace the operation box.	
3. Error No. 1 Servo motor error	1. Servo motor error E 1 Motor lock	1. Sewing machine lock or heavy load	Check the driving system.	
	2. Servo motor error E 2 Upper dead point sensor is defective.	1. UP position signal is not transferred even when the sewing machine runs.	Measure the voltage between Nos. 2 to 3 pins of CN44. When the voltage does not change over HIGH/LOW even by turning the main shaft by hand and moving sensor slit to and fro, replace the UP position detecting sensor.	
		2. Failure with SDC circuit board	When the signal from the sensor changes over HIGH/LOW, replace the SDC circuit board.	
		3. Connection is defective or cable is defective.	Check the connection of CN44 and CN114.	

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Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
3. Servo motor error E 3 Detection of motor encoder defective phase		1. Signal is not transferred from encoder.	Measure the voltage between Nos. 2 to 3, 4 and 5 pins of CN43. When the voltage does not change over HIGH/LOW even by turning the main shaft by hand, replace the servo motor.	
		2. Failure with SDC circuit board	When the signal from the sensor changes over HIGH/LOW, replace the SDC circuit board.	
		3. Connection is defective or cable is defective.	Check the connection of CN43.	
4. Servo motor error E 4 Motor position sensor is defective.		1. Signal is not transferred from encoder.	Measure the voltage between Nos. 2 to 6 and 7 pins of CN43. When the voltage does not change over HIGH/LOW even by turning the main shaft by hand, replace the servo motor.	
		2. Failure with SDC circuit board	When the signal from the sensor changes over HIGH/LOW, replace the SDC circuit board.	
		3. Connection is defective or cable is defective.	Check the connection of CN43.	
5. Servo motor error E 5 Motor drive element error		1. Motor drive element is defective.	When error is not recovered even by turning ON the power again, replace the SDC circuit board.	
6. Servo motor error E 6 Detection of low voltage of power voltage		1. Power voltage is lower than -15% of the rated voltage.	Check the connection of transformer tap. Check the power voltage.	
		2. Failure with SDC circuit board	When the power voltage is not defective, replace the SDC circuit board.	
7. Servo motor error E 7 Detection of limitation value of control current		1. Excessive heavy load	Check whether there is any trouble with load by turning the main shaft by hand.	
		2. Failure with SDC circuit board	When there is no trouble, replace the SDC circuit board.	
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Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
4. Error No. 2 Presser lifting motion error	8. Servo motor error E 8 Detection of high voltage of power voltage	1. Power voltage is higher than +15% of the rated voltage.	Check the connection of transformer tap. Check the power voltage.	(See page 38.)
		2. Failure with SDC circuit board	When the power voltage is not defective, replace the SDC circuit board.	
		1. Connection is defective or cable is defective.	Check the motor wiring.	
	9. Servo motor error E 9 Rotating direction of motor is defective.	2. Failure with SDC circuit board	Replace the SDC circuit board.	
		3. Failure with servo motor	Replace the servo motor.	
		1. Installing position of presser fall detecting switch is defective.	Move the contactless sensor up or down, and adjust the installing position while checking the position with the motion display lamp.	
	1. Presser fall detecting switch has not been detected.	2. Connection is defective or cable is defective.	Check the connection of CN23 and CN63.	
		3. Presser fall detecting switch is defective.	Move the presser up or down, and check whether the motion display lamp of the contactless sensor lights up.	
		1. Load is heavy.	Check the assembling. Change the setting of memory switch No. 12	
	2. Presser fails to move.	2. Power voltage is too low.	Check the power voltage. Change the setting of memory switch No. 12	
		3. Setting of memory switch is wrong.	Check the memory switch No. 12, lifting speed setting of the presser lifting solenoid.	
		4. Presser lifting solenoid is defective.	Measure the resistance value. Replace the solenoid if the value is not 2.8Ω.	
		5. Failure with MAIN circuit board	When the presser fails completely to move while there is no trouble with the solenoid, replace the MAIN circuit board.	
		6. Fuse has blown out.	Check according to the aforementioned items, and replace fuse F5 (10AT) after removing the cause.	

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
5. Error No. 3 Cloth cutting knife return error	1. Knife return detecting switch has not been detected.	1. Installing position of the knife return detecting switch is wrong. 2. Connection is defective or cable is defective. 3. Knife return detecting switch is defective.	Adjust so that the detecting plate covers the photo sensor slit when the knife has returned. Check ON/OFF with input check 2 of the test mode.  Check the connection of CN23 and CN59.  Check ON/OFF with input check 2 of the test mode. Take care of the interference of the needle thread trimmer and the knife.	
6. Error No. 41 Stepping motor origin retrieval error	1. Origin retrieval detecting switch has not been detected.	1. Installing position of the origin retrieval switch is wrong.	Check assembling of the photo sensor and the detecting plate.	
7. Error No. 42 Stitch base line stepping motor origin retrieval error		2. Connection is defective or cable is defective.	Check the connection of CN23 and CN56. Check the connection of CN23 and CN61. Check the connection of CN23 and CN60.	
8. Error No. 43 Stitch width stepping motor origin retrieval error	2. Stepping motor fails to work.	3. Origin retrieval switch is defective.	Check ON/OFF with input check 1 of the test mode.	
		1. Load is heavy.	Check the assembling.	
		2. Connection is defective or cable is defective.	Check the connection of CN41, CN16 and CN51. Check the connection of CN42, CN14 and CN53. Check the connection of CN43, CN15 and CN52.	
		3. Stepping motor is defective.	Resistance of each phase of any stepping motor is approximately 1 $\Omega$ . However, the actual observation shows approximately 1.2 to 1.5 $\Omega$ according to wiring resistance, contact resistance, etc. Check the resistance value referring to the circuit diagram.	



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Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
From the previous page				
9. Error No. 9 Safety switch error		4. Short-circuit of wiring	There is a case of short-circuit of wiring of stepping motor when fuse has blown out. Check continuity between earth and connector pins of the respective stepping motors. When fuse F5 has blown out, there is a case of short-circuit of wiring of thread tension solenoid, presser lifting solenoid, or cloth cutting knife solenoid. Check continuity between earth and connector pins of the respective solenoids. In case of short-circuit of wiring, there is a case where the transistor on MAIN circuit board has already broken. When there is no spare fuse, replace the fuse after removing the cause with special care.	
		5. Failure with MAIN circuit board	Check according to the aforementioned items. When fuse has not blown out, replace MAIN circuit board.	
		6. Fuse has blown out.	Check according to the aforementioned items and replace fuse F5 (10AT) after removing the cause.	
	1. When the sewing machine head is tilted, error is displayed.	1. Starting switch is pressed.	Do not press the starting switch when the sewing machine head is tilted.	
	2. When the sewing machine head is not tilted, error is displayed.	1. Installing position of safety switch is wrong.	Check assembling of the safety switch.	
		2. Connection is defective or cable is defective.	Check the connection of CN23 and CN72.	
		3. Safety switch is defective.	Check ON/OFF with input check 3 of the test mode.	

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
10. Error No. 10 Temporary stopping	1. State that temporary stop switch is pressed is detected.	1. Temporary stop switch is pressed.	Press reset key, or press again the temporary stop switch to release.	
		2. Connection is defective or cable is defective.	Check the connection of CN23 and CN58.	
		3. Temporary stop switch is defective.	Replace the temporary stop switch.	
	2. When 2-pedal system is used, starting switch has been turned OFF during running.	1. Assembling of starting switch is wrong.	Check the assembling of the starting switch.	
		2. Connection is defective or cable is defective.	Check the connection of CN18 and CN65.	
11. Error No. 11 Speed detection error	1. Abnormal speed of rotation is detected.	1. Connection of SDC•I/F cable is defective or cable is defective.	Check the connection of CN12 and CN40.	
		2. Connection of UP position detecting cord is defective or cable is defective.	Check the connection of CN44 and CN114.	
		3. Connection of encoder cable is defective or cable is defective.	Check the connection of CN43.	
		4. Failure with SDC circuit board	When servo motor error is not displayed and the error No. 11 is displayed again, replace the SDC circuit board.	
12. Error No. 12 Needle UP error	1. The sewing machine has not stopped at the section of UP stop position.	1. Stop position is changed.	Turn up to UP stop position with the hand pulley.	

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
13. Error No. 13 Cloth cutting knife motion error	1. Knife return detecting switch has not been detected.	1. Installing position of the knife return detecting switch is wrong.	Adjust so that the detecting plate covers the photo sensor slit when the knife has returned. Check ON/OFF with input check 2 of the test mode.	
		2. Connection is defective or cable is defective.	Check the connection of CN23 and CN59.	
		3. Knife return detecting switch is defective.	Check ON/OFF with input check 2 of the test mode. Take care of the interference of needle thread trimmer and knife.	
	2. Cloth cutting knife fails to work.	1. Load is heavy.	Check the assembling. Change the setting of memory switch.	
		2. Cloth cutting knife solenoid is defective.	Measure the resistance value. If the value is not 3.2Ω, replace the solenoid.	
14. Error No. 14 Knife size, presser size error	1. Input data is wrong.	3. Failure with MAIN circuit board	If there is no trouble with the solenoid and the knife fails completely to work, replace the MAIN circuit board.	
		4. Fuse has blown out.	Check according to the aforementioned items, and replace fuse F5 (10AT) after removing the cause.	
		1. Length of pattern is larger than size of presser.	Change the data so that the length fits the size of presser. Or, increase the size of presser.	
		2. Overedging width + knife groove is wider than 1/2 of size of presser.	Change overedging width and knife groove to fit the width of presser.	

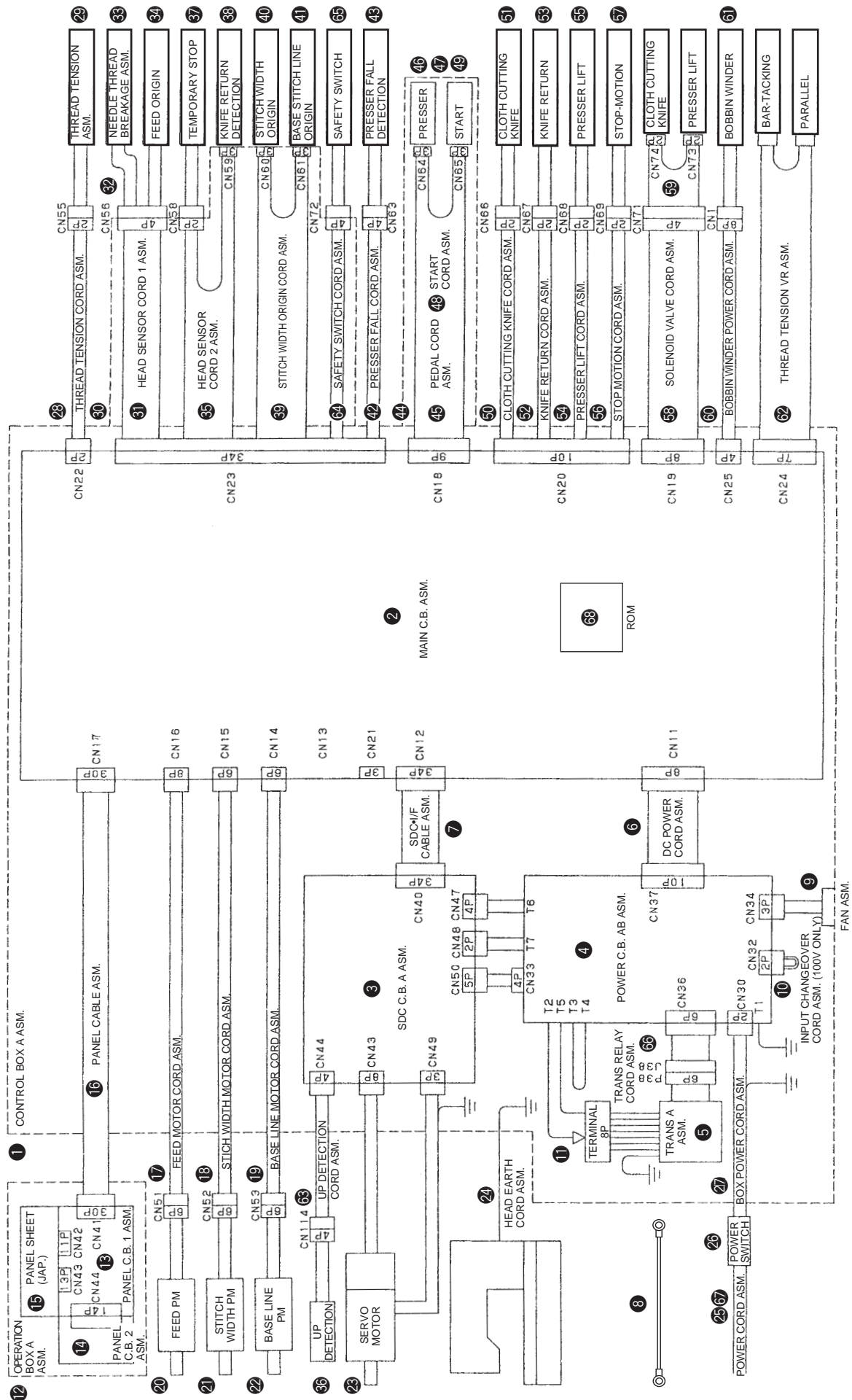
Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
15. Error No. 15 Knife size, cloth cutting length error	1. Input data is wrong. (At the time of operation of plural times)	1. Knife size is larger than cloth cutting length.  2. When knife bar comes in contact with work clamp.	Change the data so that the cloth cutting length is larger than the knife size. Or, make the knife size less than the cloth cutting length.  Knife bar may come in contact with work clamp when using a long presser with a small knife size. In this case, replace the knife size with a larger one.	
16. Error No. 16 Knife drive timing error	1. Knife drive timing is not obtained.	1. 2nd bar-tacking length + 2nd clearance is shorter than 2 mm.	Change the data so that 2nd bar-tacking length + 2nd clearance becomes more than 2 mm.	
17. Error No. 17 Cycle sewing data ineffective error	1. Pattern selected for cycle sewing is ineffective.	1. Input data is wrong.	Change the data.	
18. Error No. 18 Position of the start of sewing error	1. Position of the start of sewing is wrong.	1. Position of the start of sewing calculated from the number of stitches at the start of sewing and pitch is longer than the bar-tacking length.  2. Left/right bar-tacking width compensation values X 2 + position of the start of sewing is larger than bar-tacking length - 0.1 mm at the time of flow bar-tacking.	Change the data.  Change the data.	
19. Error No. 19 Bar-tacking compensation error	1. Bar-tacking width + bar-tacking compensation value is larger than 5 mm.	1. Overedging width + right knife groove + right compensation exceeds 1/2 of the size of presser.  2. Overedging width + left knife groove + left compensation exceeds 1/2 of the size of presser.	Change the data.  Change the data.	
20. Error No. 30 Eyelet width error	1. Input data is wrong.	1. When overedging width + radius of eyelet hole + knife groove width, left exceed 1/2 of the width of presser size.  2. When overedging width + radius of eyelet hole + knife groove width, right exceed 1/2 of the width of presser size.	Change overedging width, radius of eyelet hole and knife groove width so as to adapt to 1/2 of the width of presser size.  Change overedging width, radius of eyelet hole and knife groove width, right so as to adapt to 1/2 of the width of presser size.	
21. Error No. 21 Eyelet length error	1. Input data is wrong.	1. When the bottom (tail section) of eyelet hole overlaps 2nd bar-tacking section.	Change length of the bottom of eyelet hole and the cloth cutting length so that the bottom of eyelet hole does not overlap 2nd bar-tacking section.	
22. Error No. 40 S. State error	1. Signal from SDC circuit board is wrong.	1. Connection is defective or cable is defective.  2. SDC circuit board is defective.	Check the connection of CN12 and CN40.  Replace the SDC circuit board.	

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
23. Error No. 98 Pattern operation step-over	1. Input data is wrong.	1. Result of pattern operation has exceeded number of allowable steps.	Change the data.	
24. Error No. 99 EEPROM error	1. Failure of writing of EEPROM	1. Writing timing was improper.	When the error occurs again, replace the EEPROM. Keep a copy of the pattern data, setting of memory switch, etc.	
25. "H" Temperature error	1. Temperature sensor of MAIN circuit board has detected high temperature.	1. Temperature of MAIN circuit board has become high.	Clean the fan filter located in the rear of control box. If temperature falls down, the error is automatically restored to the normal condition.	
		2. Cooling fan fails to work.	Check the connection of CN34. Replace the fan if DC+24V is supplied to CN34. If not, replace the PWR circuit board.	
		3. Failure with MAIN circuit board	When the error is not restored even if cooling is performed, replace the MAIN circuit board.	
26. "0" Sewing counter "0"	1. Sewing counter has become "0".	1. DOWN counter has reached "0".	Press the reset key to restore.	
27. "., [] -" Needle thread breakage error	1. Needle thread breakage error is detected.	1. Needle thread is slack in the thread path.	Three stitches are required after the detection of thread breakage. If there is a slackness between needle and the active tension, malfunction will occur. Remove the slackness of thread.	
		2. Wiring is short-circuited with earth.	Check the wiring.	
28. The sewing machine fails to stop even if thread breaks.	1. Needle thread breakage error is not detected.	1. Thread is entangled with thread take-up lever and contact of thread breakage detecting plate and thread take-up spring becomes ON/OFF.	Perform threading again.	
		2. Adjustment of thread take-up lever is improper.	Stroke of the thread take-up spring is short and the spring does not come in contact with the detecting plate.	
		3. Connection is defective or cable is defective.	Check the connection of CN23 and CN56.	

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
29. Parameter cannot be changed.	1. Panel switch fails to work.	1. Connection is defective or cable is defective.	Check the connection of CN41, CN42, CN43 and CN17. Check the insertion only of CN42 and CN43 in operation box and do not draw or insert them since the surface coat carbon on them will be taken off and defective contact will result.	
		2. One or several places fail to work.	Panel sheet is defective. Replace the operation box.	
		3. Parameter only cannot be changed.	Memory switch is set to the prohibition of change of parameter.	
		4. All places cannot accept.	Operation box is defective.	
30. Sewing shape cannot be obtained.	1. Step-out of stepping motor	1. Load is heavy.	Check the assembling.	
		2. Connection is defective or cable is defective.	Check the connection of CN14, CN15, CN16, CN51, CN52 and CN53.	
		3. Stepping motor is defective.	Resistance of each phase of any stepping motor is approximately 1Ω. However, the actual observation shows approximately 1.2 to 1.5Ω according to wire resistance, contact resistance, etc. Check the resistance value referring to the circuit diagram.	
		4. Failure with MAIN circuit board	Check according to the aforementioned items. Replace the MAIN circuit board unless the fuse has blown out.	
	2. Presser or needle bar fails to work.	1. Assembling is wrong.	Check the assembling.	

Trouble	Cause (1)	Cause (2)	Checking order and adjusting procedure	Page
31. Number of revolution cannot be increased.	1. Number of revolution fails to react to the speed variable resistor.	1. Connection is defective or cable is defective.	Check the connection of CN17 and CN41.	
		2. Speed variable resistor is defective.	Replace the operation box.	
		3. Failure with MAIN circuit board	Replace the MAIN circuit board.	
		4. Failure with SDC circuit board	Replace the SDC circuit board.	
	2. Number of revolution is low.	1. Limitation is applied to the number of revolution.	Change the setting of memory switch.	
		2. Number of revolution of the pattern is set to low.	Change the parameter.	
32. Active tension fails to work.	1. Command is not ordered to the thread tension solenoid.	1. Connection is defective or cable is defective.	Check the connection of CN22 and CN55.	
		2. Set value of the tension is low.	Change the parameter.	
		3. Failure with MAIN circuit board	Replace the MAIN circuit board.	
	2. Thread tension solenoid fails to work.	1. Load is heavy.	Check the assembling.	
		2. Thread tension solenoid is defective.	Check the continuity ( $13.6\Omega \pm 10\%$ ). Relace the thread tension solenoid in case of breaking of wire or short-circuit.	

# 11. CIRCUIT DIAGRAM (BLOCK DIAGRAM 100 to 240V)





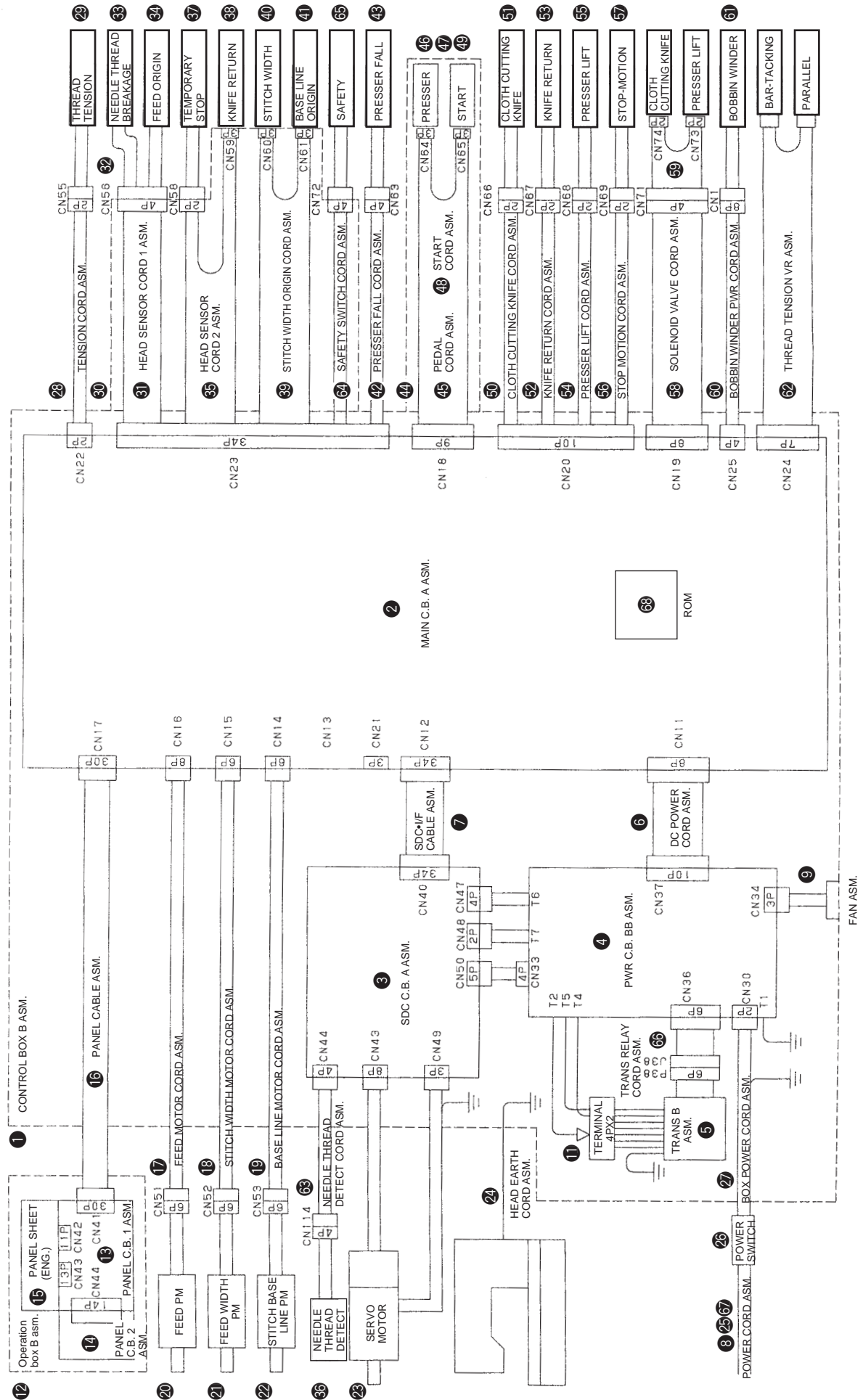
No.	Part No.	Name of part	Remarks	No.	Part No.	Name of part	Remarks
①	M1001600AA0	Control box A asm.		④1	HD00057000A	Stitch base line origin sensor	
②	M8601600AA0B	MAIN circuit board A asm.	4M ROM C.B.	④2	M85116000A0	Presser fall cord asm.	For SB, SC
	M8601600AA0A	MAIN circuit board A asm.	1M ROM C.B.	④3	14512651	Presser fall sensor asm.	For SB, SC
③	M8610610AAAA	SDC circuit board AA asm.		④4	M85205900A0	Pedal asm.	For SB, SC
④	M8620600AAB	PWR circuit board AB asm.		④5	M90115900A0	Pedal cord asm.	For SB, SC
⑤	M8901590AA0	Transformer A asm.		④6	HD001350000	Presser switch	For SB, SC
⑥	M85196000A0	DC power cord asm.		④7	HD001350000	Start switch	For SB, SC
⑦	M85196100A0	SDC•I/F cable asm.		④8	M85126000A0	Starting cord asm.	For SA
⑧	M90345800A0	Earth cord asm. for 100V		④9	HD00057000A	Starting switch	For SA
⑨	M85405800A0	Fan asm.		⑤0	M85136000A0A	Cloth cutting knife cord asm.	
⑩	M85236000A0	Input changeover cord asm.		⑤1	14510085	Knife driving solenoid compl.	
⑪	HK026650080	Terminal board 8P		⑤2	M85266000A0	Knife return cord asm.	Optional
⑫	M1010600AA0	Operation box A asm.		⑤3	14510853	Knife return solenoid asm.	Optional
⑬	M86036000A0	PANEL circuit board 1 asm.		⑤4	M85156000A0	Presser lifter cord asm.	For SB, SC
⑭	M86046000A0	PANEL circuit board 2 asm.		⑤5	14514251	Presser lifter solenoid asm.	For SB, SC
⑮	M300160000A	Panel sheet (Japanese)		⑤6	M85146000A0	Stop motion cord asm.	For SA
⑯	M85206000A0	Panel cable asm.		⑤7	14513055	Stop motion solenoid asm.	For SA
⑰	M85026000A0	Feed motor cord asm.		⑤8	M85176000A0	Solenoid valve cord asm.	For SC
⑱	M85036000A0	Stitch width motor cord asm.		⑤9	14204655	Solenoid valve asm.	For SC
⑲	M85046000A0	Stitch base line motor cord asm.		⑥0	M85246000A0	Bobbin winder power cord asm.	Optional
⑳	14505101	Feed stepping motor		⑥1	G50011980A0A	Bobbin winder	Optional
㉑	14507800	Feed width stepping motor		⑥2	M85256000A0	Thread tension VR asm.	Optional
㉒	14506901	Stitch base line stepping motor		⑥3	M85276000A0	Up position detect cord asm.	
㉓	M6001610AA0	Servo motor		⑥4	M85286000A0	Safety switch cord asm.	
㉔	M90195800A0	Head earth cord asm.		⑥5	14516652	Safety switch asm.	
㉕	M90175800A0	Power cord asm.		⑥6	M85306000A0	Transformer relay cord asm.	
㉖	HA004250000	Power switch		⑥7	M90355800A0	Power supply cord asm. for 100V	
㉗	M85216000A0	Box power cord asm.		⑥8	HL010523000	1M ROM	HL010523004 *
㉘	M85066000A0	Thread tension cord asm.			HL014581000	4M ROM	HL014581005 *
㉙	14513154	Thread tension asm.		⑥9			
㉚	M85186000A0	Head sensor cord 1 compl.		⑦0			
㉛	M85076000A0	Head sensor cord 1 asm.		⑦1			
㉜	14505259	Head sensor asm.		⑦2			
㉝	14506059	Needle thread breakage detector asm.		⑦3			
㉞	14505952	Feed origin sensor asm.		⑦4			
㉟	M85086000A0	Head sensor cord 2 asm.		⑦5			
㊱	14404750	UP position detector asm.		⑦6			
㊲	14511158	Temporary stop switch asm.		⑦7			
㊳	HD00057000A	Knife return detecting sensor		⑦8			
㊴	M85096000A0	Stitch width base line origin cord asm.		⑦9			
㊵	HD00057000A	Stitch width origin sensor		⑧0			

For \* marks, refer to the history of ROM revision.

History of ROM revision (No. of ROM is denoted.) (Ver. is displayed with memory switch No. 00.)

1M ROM Rev.	Ver. display	4M ROM Rev.	Ver. display	Remarks
004A	—	—	—	
004B	—	—	—	
004C	3.00	—	—	
004D	3.20	—	—	
004E	3.30	—	—	
004F	4.00	005	10.00	Function of 1M and 4M is same.
—	—	005A	11.00	

# BLOCK DIAGRAM 220 to 415V



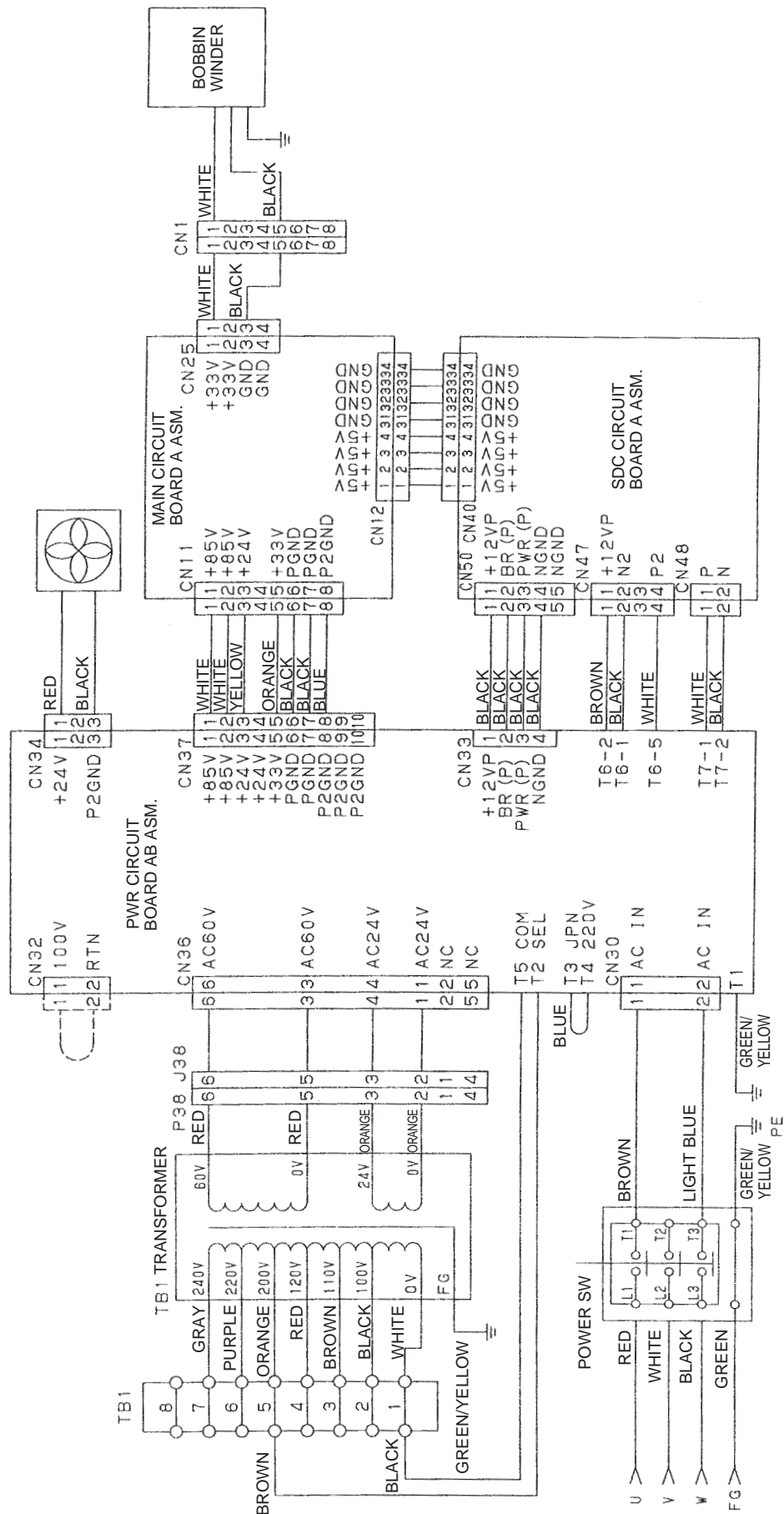
No.	Part No.	Name of part	Remarks	No.	Part No.	Name of part	Remarks
①	M1001600BA0	Control box B asm.		④①	HD00057000A	Stitch base line origin sensor	
②	M8601600AA0B	MAIN circuit board A asm.	4M ROM C.B.	④②	M85116000A0	Presser fall cord asm.	For SB, SC
	M8601600AA0A	MAIN circuit board A asm.	1M ROM C.B.	④③	14512651	Presser fall sensor asm.	For SB, SC
③	M8610610AAAA	SDC circuit board AA asm.		④④	M85205900A0	Pedal asm.	For SB, SC
④	M8620610BAB	PWR circuit board BB asm.		④⑤	M90115900A0	Pedal cord asm.	For SB, SC
⑤	M8901590BA0	Transformer B asm.		④⑥	HD001350000	Presser switch	For SB, SC
⑥	M85196000A0	DC power cord asm.		④⑦	HD001350000	Start switch	For SB, SC
⑦	M85196100A0	SDC•I/F cable asm.		④⑧	M85126000A0	Starting cord asm.	For SA
⑧	M90245800A0	Power supply cable asm. for 100V		④⑨	HD00057000A	Starting switch	For SA
⑨	M85405800A0	Fan asm.		⑤①	M85136000A0A	Cloth cutting knife cord asm.	
⑩				⑤②	14510085	Knife driving solenoid compl.	
⑪	HK054250040	Terminal board 4P		⑤③	M85266000A0	Knife return cord asm.	Optional
⑫	M1010600BA0	Operation box B asm.		⑤④	14510853	Knife return solenoid asm.	Optional
⑬	M86036000A0	PANEL circuit board 1 asm.		⑤⑤	M85156000A0	Presser lifter cord asm.	For SB, SC
⑭	M86046000A0	PANEL circuit board 2 asm.		⑤⑥	14514251	Presser lifter solenoid asm.	For SB, SC
⑮	M300160000B	Panel sheet (English)		⑤⑦	M85146000A0	Stop-motion cord asm.	For SA
⑯	M85206000A0	Panel cable asm.		⑤⑧	14513055	Stop-motion solenoid asm.	For SA
⑰	M85026000A0	Feed motor cord asm.		⑤⑨	M8517600A0	Solenoid valve cord asm.	For SC
⑱	M85036000A0	Stitch width motor cord asm.		⑥①	14204655	Solenoid valve asm.	For SC
⑲	M85046000A0	Stitch base line motor cord asm.		⑥②	M85246000A0	Bobbin winder power cord asm.	Optional
⑳	14505101	Feed stepping motor		⑥③	14522551	Bobbin winder	Optional
㉑	14507800	Feed width stepping motor		⑥④	M85256000A0	Thread tension VR asm.	Optional
㉒	14506901	Stitch base line stepping motor		⑥⑤	M85276000A0	Up position detect cord asm.	
㉓	M6001610AA0	Servo motor		⑥⑥	M85286000A0	Safety switch cord asm.	
㉔	M90195800A0	Head earth cord asm.		⑥⑦	14516652	Safety switch asm.	
㉕	M90175800A0	Power cord asm.		⑥⑧	M85306000A0	Transformer relay cord asm.	
㉖	HA004250000	Power switch		⑥⑨	M90285800A0	Power supply cable asm. for JE	
㉗	M85216000A0	Box power cord asm.		⑦①	HL010523000	1M ROM	HL010523004 *
㉘	M85066000A0	Thread tension cord asm.		⑦②	HL014581000	4M ROM	HL014581005 *
㉙	14513154	Thread tension asm.		⑦③			
㉚	M85186000A0	Head sensor cord 1 compl.		⑦④			
㉛	M85076000A0	Head sensor cord 1 asm.		⑦⑤			
㉜	14505259	Head sensor asm.		⑦⑥			
㉝	14506059	Needle thread breakage detector asm.		⑦⑦			
㉞	14505952	Feed origin sensor asm.		⑦⑧			
㉟	M85086000A0	Head sensor cord 2 asm.		⑦⑨			
㊱	14404750	UP position detector asm.		⑧①			
㊲	14511158	Temporary stop switch asm.		⑧②			
㊳	HD00057000A	Knife return detecting sensor		⑧③			
㊴	M85096000A0	Stitch width base line origin cord asm.		⑧④			
㊵	HD00057000A	Stitch width origin sensor		⑧⑤			

For \* marks, refer to the history of ROM revision.

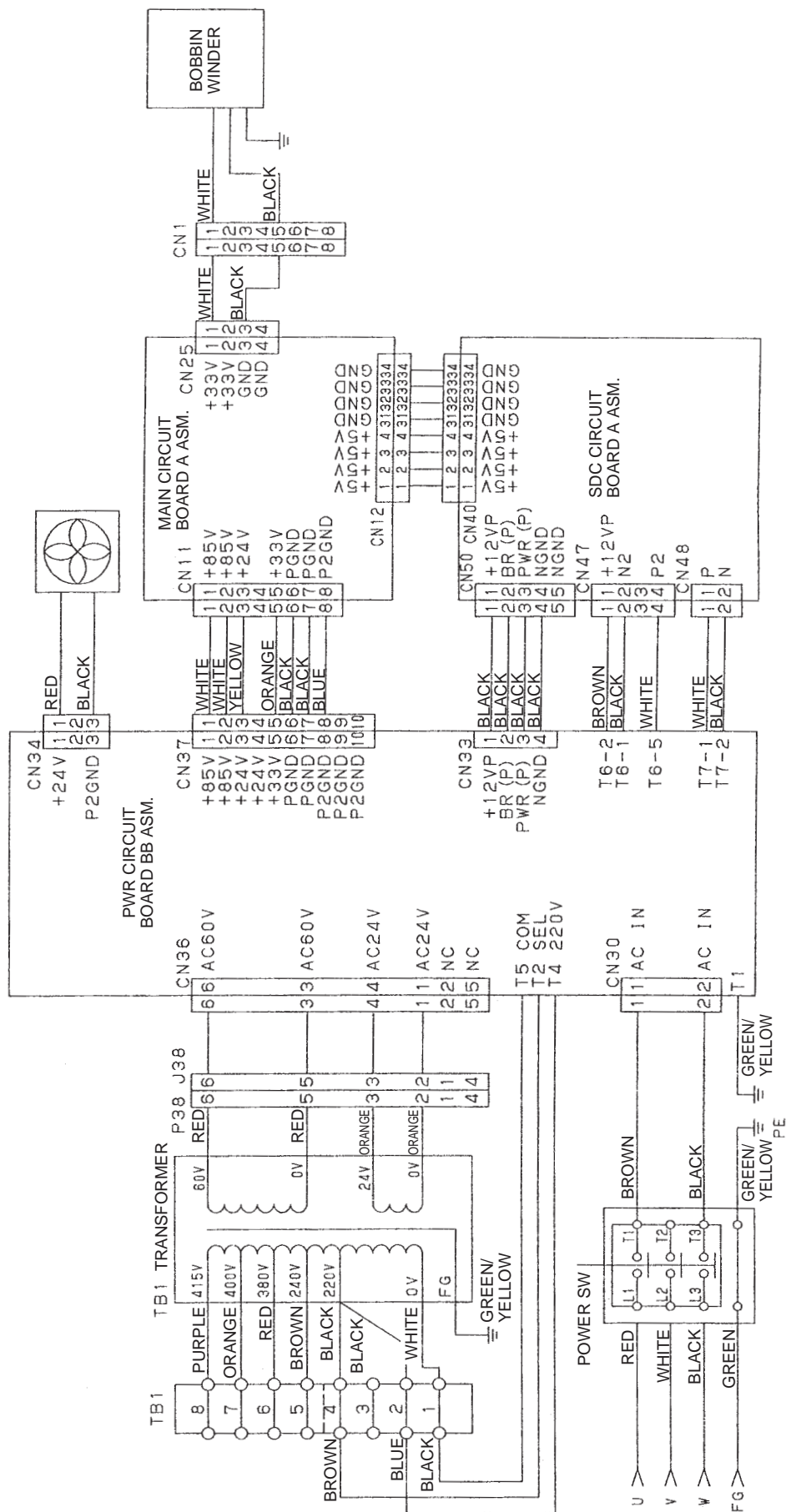
History of ROM revision (No. of ROM is denoted.) (Ver. is displayed with memory switch No. 00.)

1M ROM Rev.	Ver. display	4M ROM Rev.	Ver. display	Remarks
004A	—	—	—	
004B	—	—	—	
004C	3.00	—	—	
004D	3.20	—	—	
004E	3.30	—	—	
004F	4.00	005	10.00	Function of 1M and 4M is same.
—	—	005A	11.00	

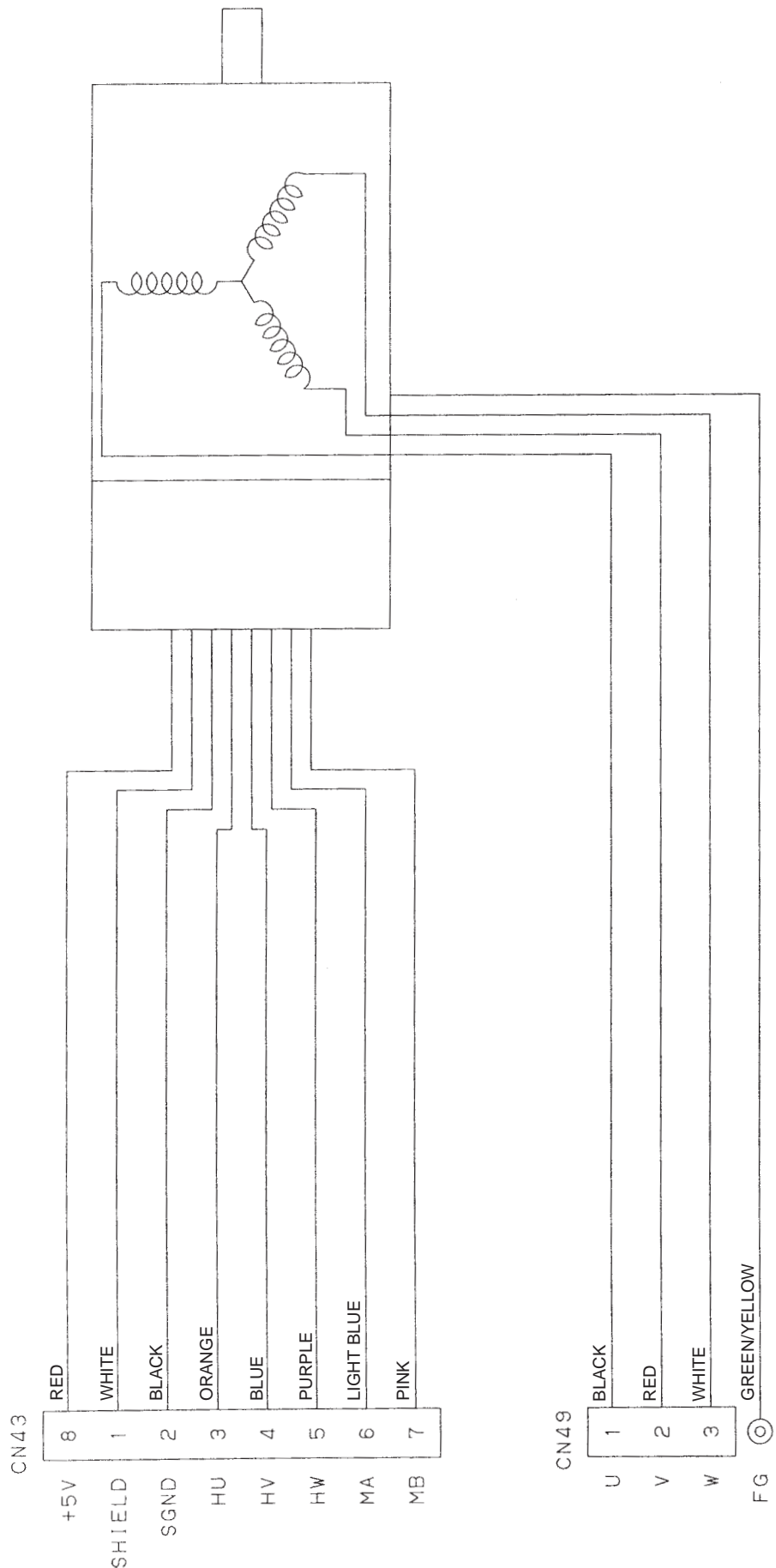
POWER CIRCUIT DIAGRAM 100 to 240V



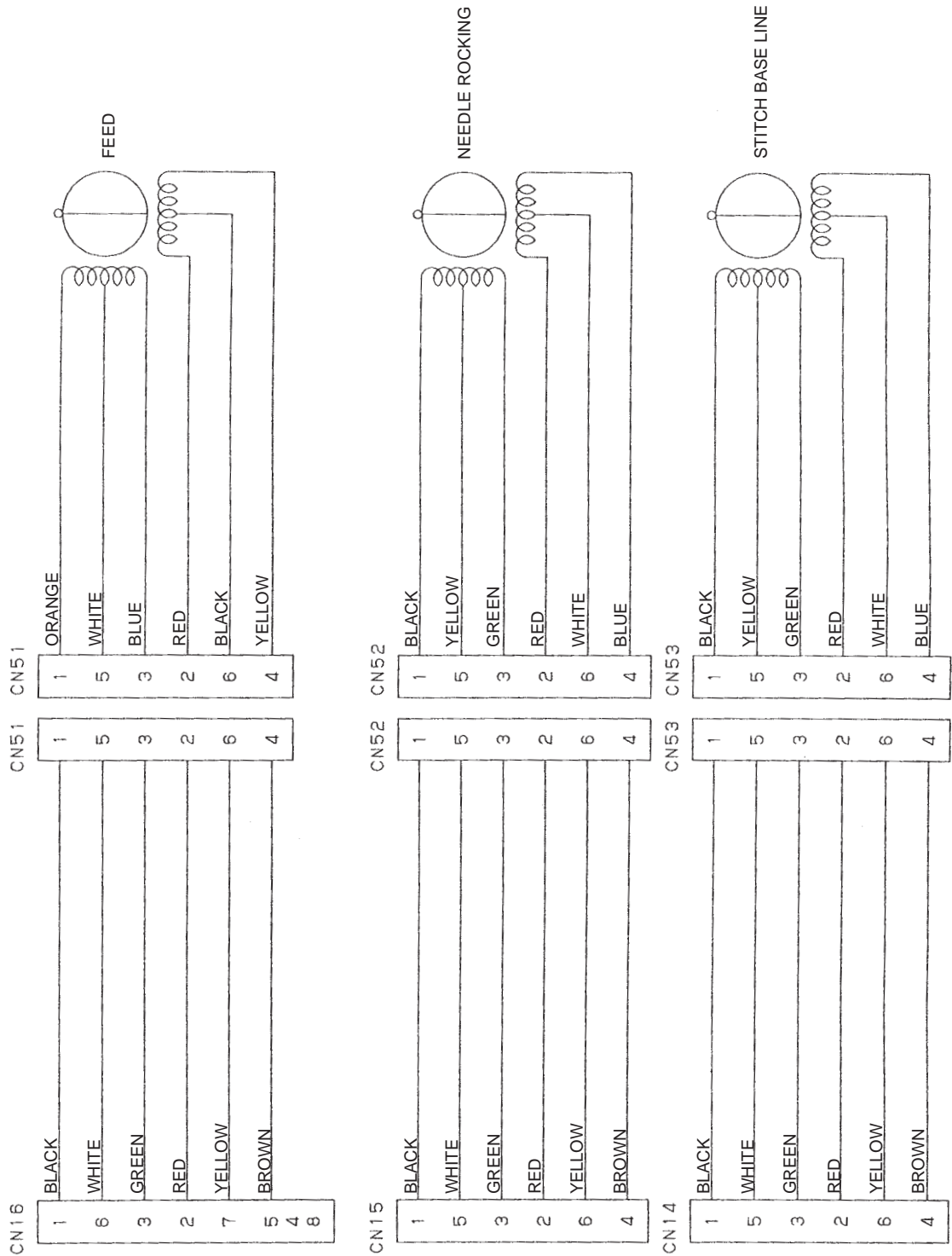
POWER CIRCUIT DIAGRAM 220 to 415V



SERVO MOTOR CIRCUIT DIAGRAM

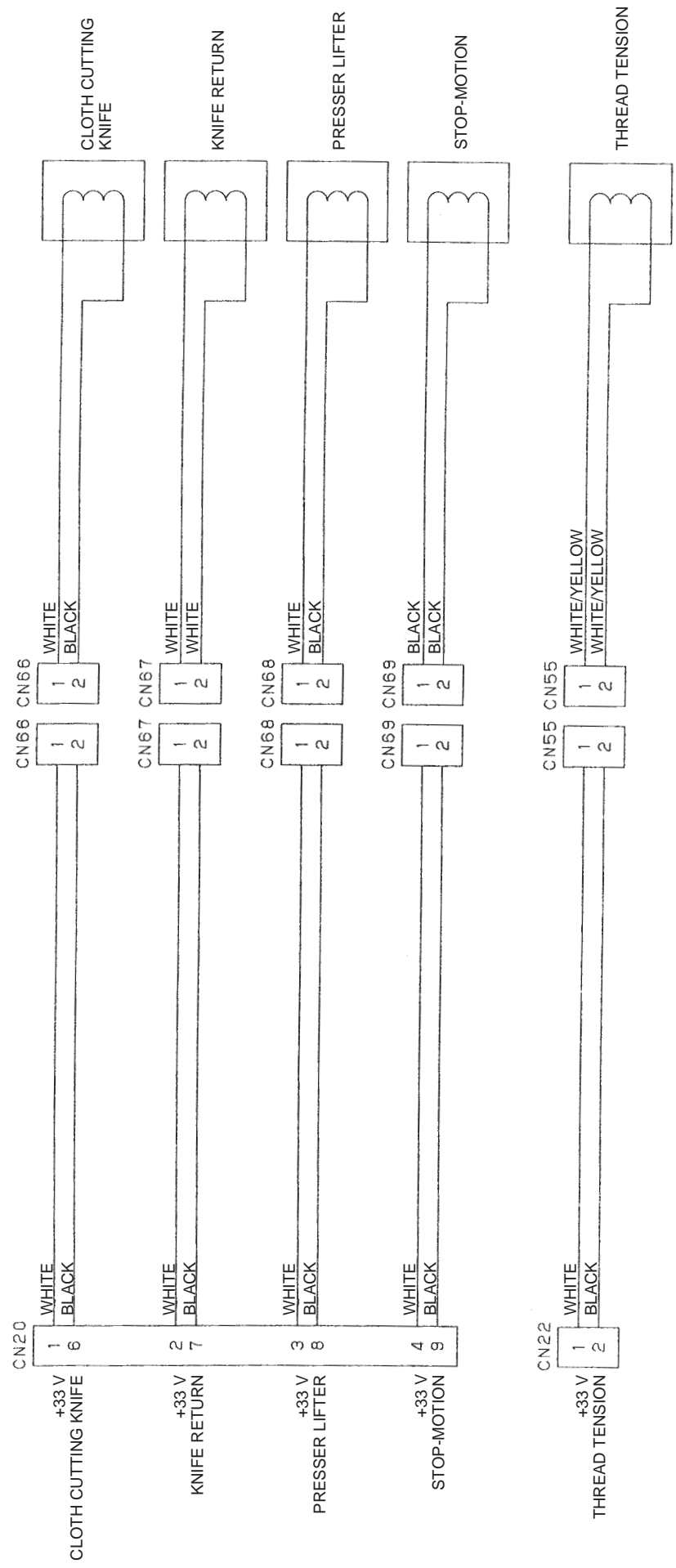


STEPPING MOTOR CIRCUIT DIAGRAM



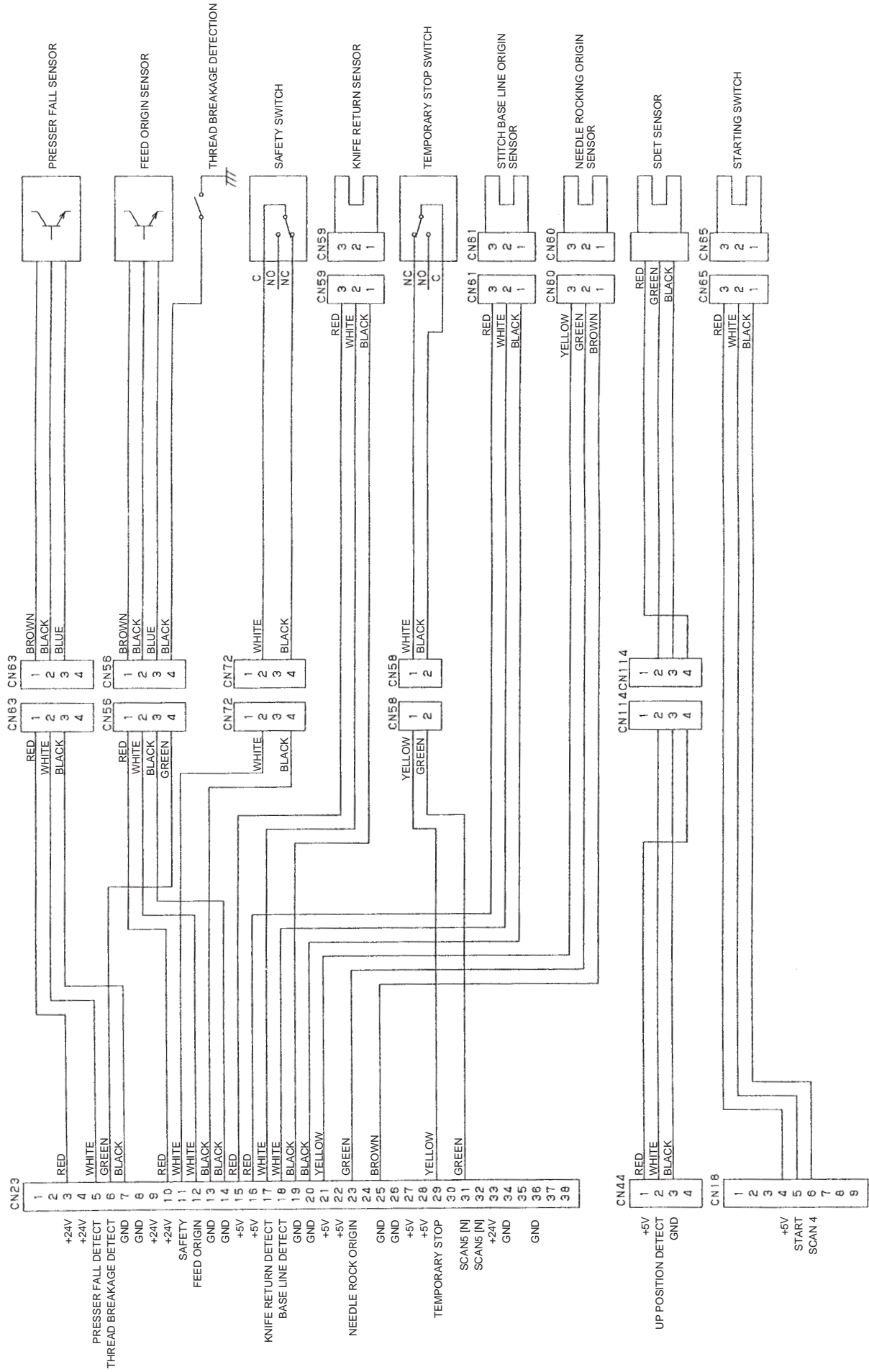


SOLENOID CIRCUIT DIAGRAM



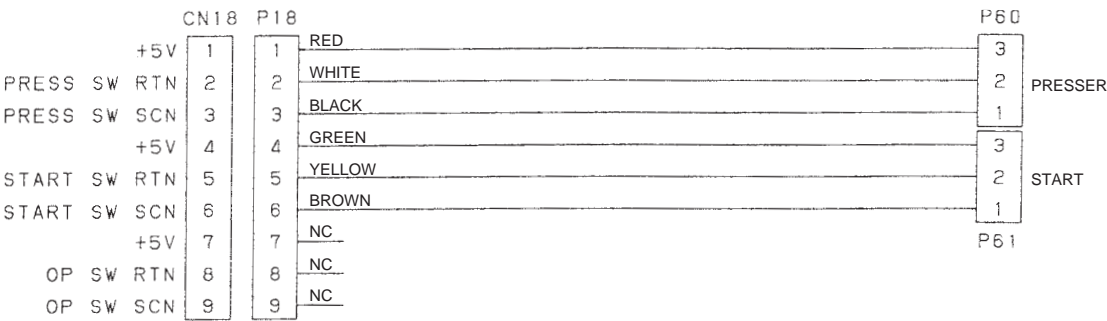


HEAD SENSOR CIRCUIT DIAGRAM

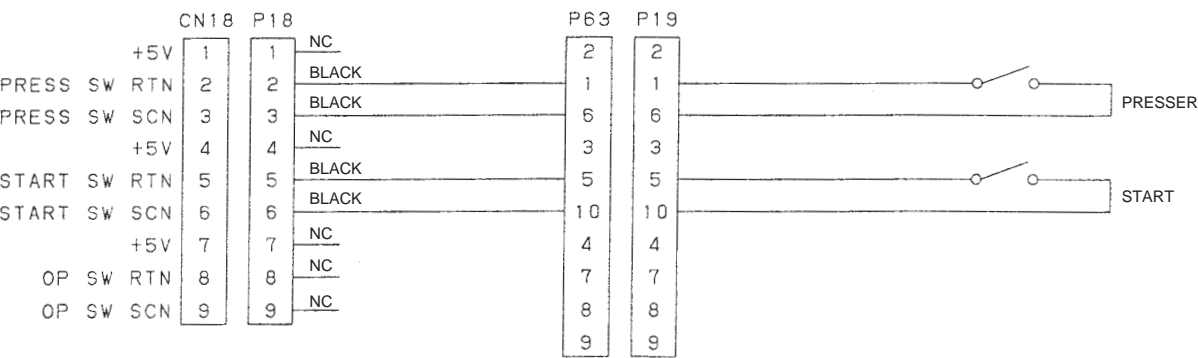


PEDAL SWITCH CIRCUIT DIAGRAM

1-PEDAL TYPE

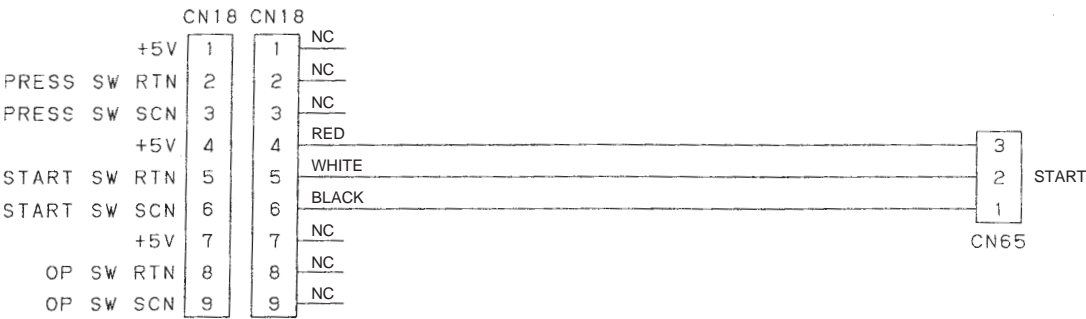


SEWING MACHINE FOR STANDING WORK

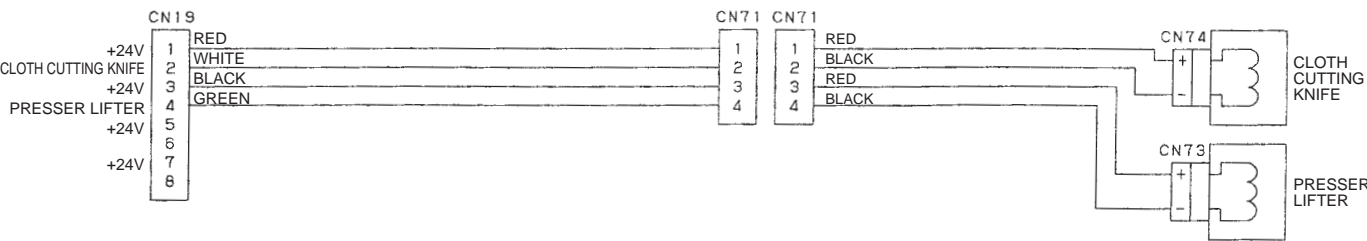


STARTING SWITCH CIRCUIT DIAGRAM

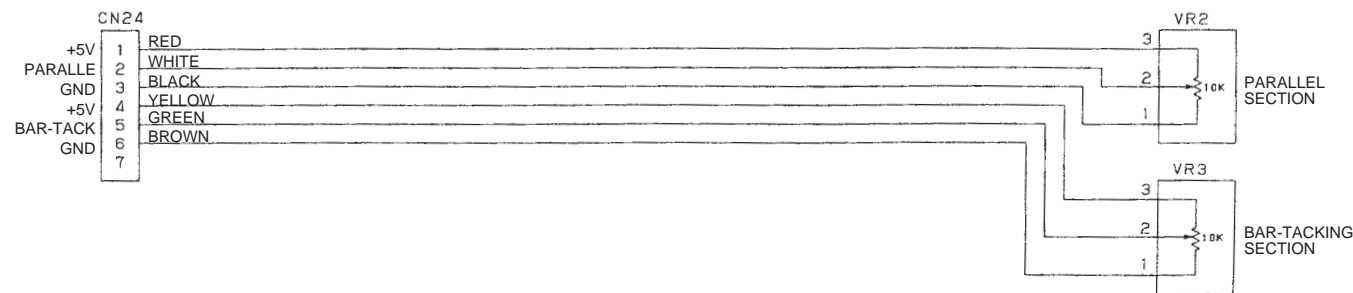
2-PEDAL TYPE



SOLENOID VALVE CIRCUIT DIAGRAM



THREAD TENSION VR CIRCUIT DIAGRAM



## 12. OPTIONAL PARTS

### (1) Table of the optional parts

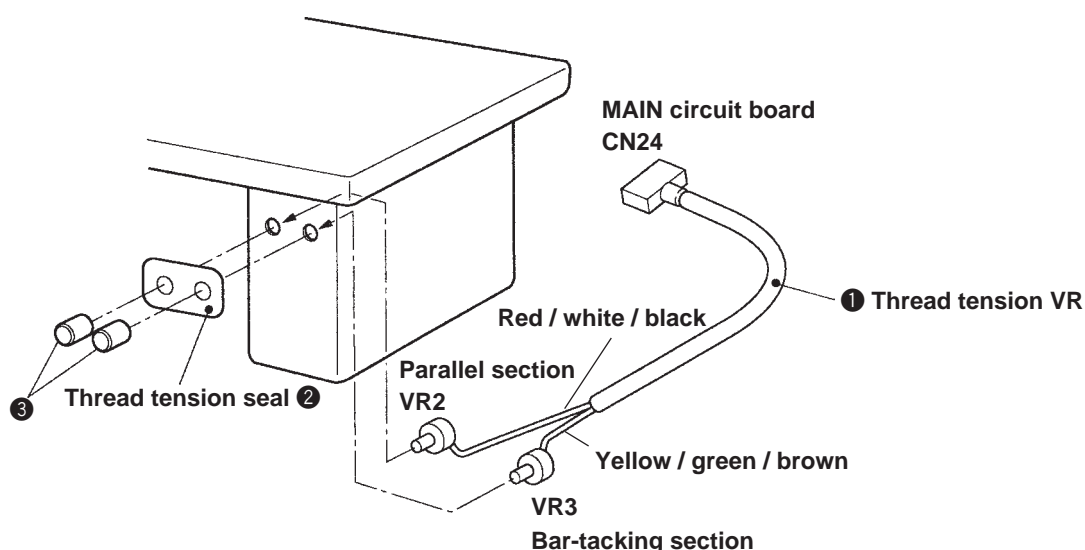
Name of optional part	Part No.	Remarks
Thread tension VR (Variable resistor)	Set part No. : M85256000B0 ( M85256000A0 M3002600000 HX001420000 )	
Electric type bobbin winder	G50011980A0A M85246000A0 B32217710A0 SK3452000SC X 4	
Pedal for standing work (2-pedal type)	GPK510010B0 M90135900A0	

Refer to the circuit diagram for the connection.

### (2) Thread tension VR (variable resistor)

#### 1) Installation

1. Remove the stopper located in the front of the control box, and install thread tension VR (variable resistor) ❶ so that the VR2 (wire colors : red/white/black) is located on the left side and the VR3 (wire colors : yellow/green/brown) on the right side.
2. Paste thread tension seal ❷ on the control box and fix knobs ❸ to the thread tension VR.



#### 2) How to use the thread tension VR (variable resistor)

Set the memory switch No. 17 to "1" to use the thread tension VR.

Fine adjustment for the value set by the panel can be performed by using the VR.

- 1) Set the respective tensions at parallel section and bar-tacking section in advance.
- 2) Turning the knob of VR of the section where you desire to adjust according to the result of sewing can change the tension. (Possible even during sewing)

**Note)** Since the variable resistor can perform the fine adjustment for the value set by the panel, re-set the value by using the panel and perform the adjustment again if the adjustment cannot be performed even when the knob of the variable resistor is turned to the maximum.

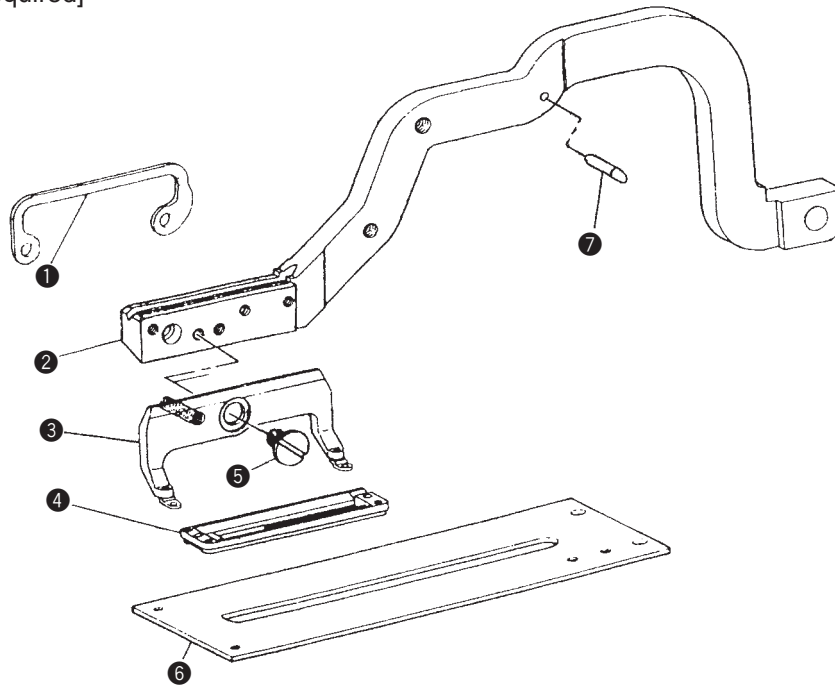
Range of adjustment by variable resistor (In terms of panel setting value)

	Range	Example	
Parallel section	± 50	Panel setting value 150	VR setting range 100 to 200
Bar-tacking section	± 20	Panel setting value 60	VR setting range 40 to 80

## 13. OTHERS

### (1) How to remodel the presser to the type 4 presser

[Table of the parts required]



	Part No.	Name of part
①	B1513774000	Work clamp bracket
②	B1551784000	Work clamp
③	B15117740A0	Work clamp check holder asm.
④	B1552784000	Presser
⑤	SD0790202SP	Hinge screw
⑥	B1613774000	Work clamp carrier
⑦	PS0300102K0	Spring pin

[Points of adjustment and setting]

1. Replace the aforementioned parts, ① to ⑦, and temporarily assemble them. Assemble the other parts from the work clamp which has been removed.
2. Adjust the longitudinal position of the presser and the longitudinal position of the feed shaft. (Refer to the item (9) on page 10.)

\* Here, move the work clamp back and forth within the range of feed, and check that there is no uneven torque.

If there is an uneven torque, adjust the backlash of the feed gear. (Refer to page 8.).

3. Adjust the needle thread trimmer components. (Refer to the items (16) to (25) on pages 20 to 29.)
4. Adjust the opening timing and opening amount of the bobbin thread trimmer. (Refer to the item (27) on page 30.)
5. Set the memory switch No. 11, kind of presser, to "4". (Refer to pages 61 and 62, and the item (5) on page 64.)

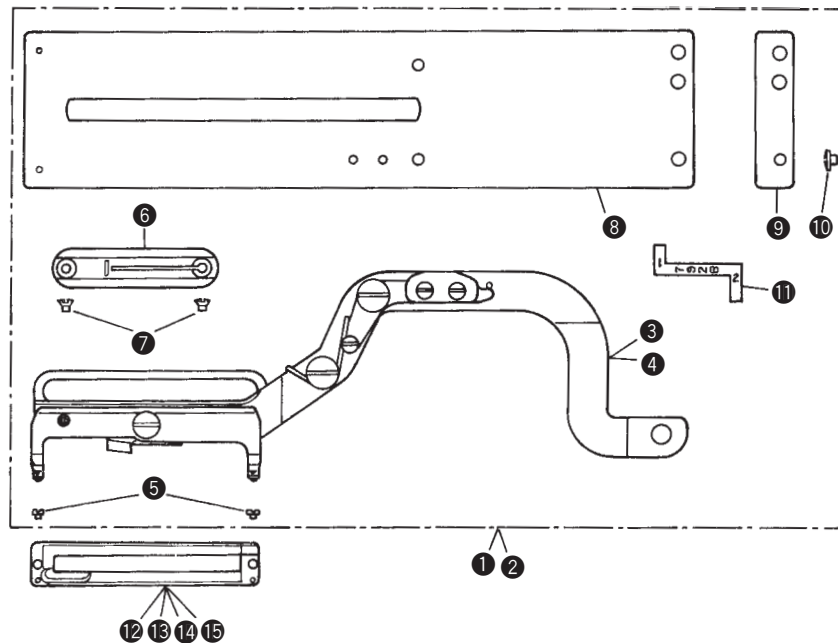
**Caution)** ○ Be sure to attach the cloth cutting knife of 31.8 mm (1 1/4") or less.

Otherwise, the cloth cutting knife comes in contact with the throat plate setscrews resulting in breakage of the cloth cutting knife.

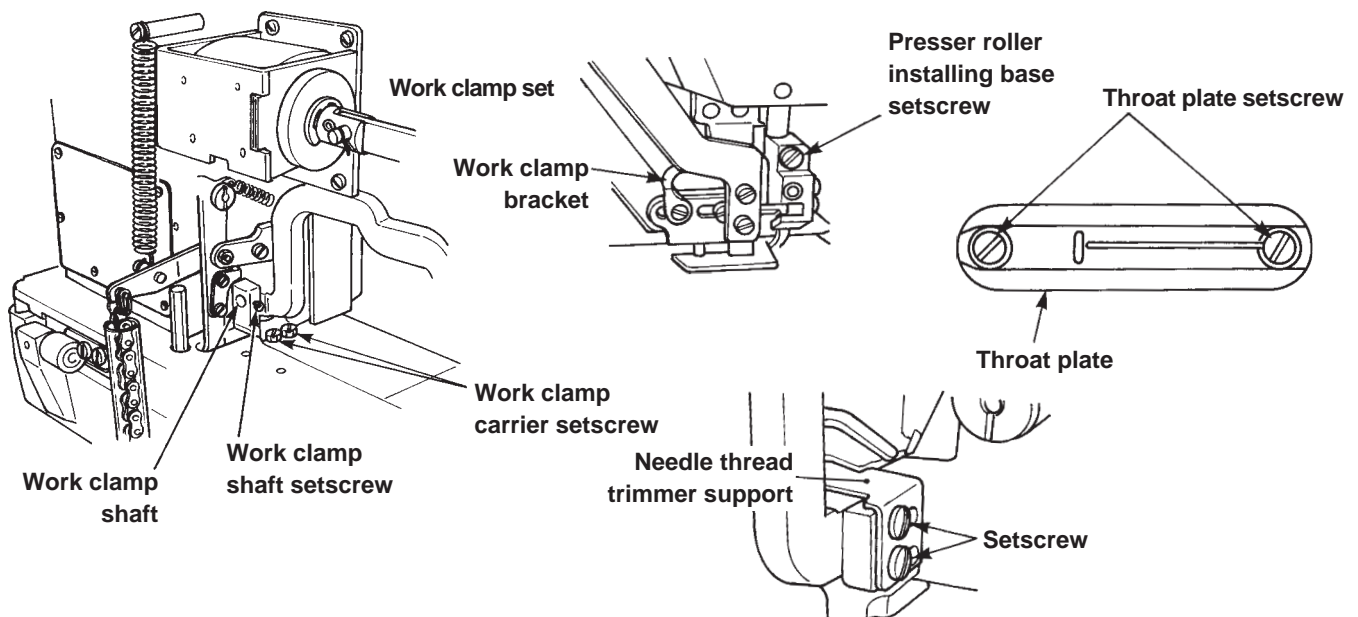
- If the length of the cloth cutting knife exceeds 31.8 mm (1 1/4"), perform "Cloth cutting knife plural times motion setting".

For the setting procedure, refer to 12) Knife plural times motion setting of the memory switch setting procedure (page 67).

## (2) Points of replacing the presser with that of 60 mm or 70 mm



No.	Part No.	Name of part	Q'ty	Remarks
①	14523062	Feed 70 mm set	1	For max. sewing length 70 mm
②	14523864	Feed 60 mm set	1	For max. sewing length 60 mm
③	14523054	Work clamp 70 asm.	1	For max. sewing length 70 mm
④	14523856	Work clamp 60 asm.	1	For max. sewing length 60 mm
⑤	SS6060210SP	Presser installing plate spring setscrew	2	
⑥	13797808	Throat plate 2B	1	
⑦	SS2090530SP	Throat plate setscrew	2	
⑧	14523302	Work clamp carrier 70	1	
⑨	14524201	Work clamp carrier spacer	1	
⑩	SS7220340SP	Work clamp carrier setscrew	1	
⑪	13798004	Timing gauge B	1	
⑫	14523401	Presser 70	1	For max. sewing length 70 mm for knit
⑬	14523708	Urethane presser 70	1	For max. sewing length 70 mm for cloth
⑭	14524102	Flat presser 70	1	For max. sewing length 70 mm for heavy-weight cushion materials
⑮	14524003	Flat presser 60	1	For max. sewing length 60 mm for heavy-weight cushion materials



## 1) Replacing and assembling procedure of the parts

1. Connect work clamp 60 asm. ③ or work clamp 70 asm. ④ and the presser with presser installing plate spring setscrews ⑤.
2. Remove the needle and the cloth cutting knife from the sewing machine.
3. Remove the presser roller installing base setscrew.
4. Remove the needle thread trimmer support setscrews and remove the needle thread trimmer support.
5. Loosen work clamp shaft setscrew and pull out the work clamp shaft.
6. Remove the work clamp asm.
7. Loosen the work clamp bracket setscrew and remove the presser roller installing base from the work clamp asm.
8. Remove the work clamp carrier setscrew and remove the work clamp carrier.
9. Remove the throat plate setscrews and remove the throat plate.
10. Temporarily tighten throat plate 2B ⑥ with throat plate setscrews ⑦.
11. Assemble the needle and the cloth cutting knife, position throat plate 2B ⑥ properly, and fix throat plate setscrews ⑦. When the position of the throat plate is improper, refer to the item **(10) Knife drop position** on page 10.
12. Remove the needle and the cloth cutting knife.
13. Set work clamp carrier spacer ⑨ to the rear side of work clamp carrier 70 ⑧ so that the holes of them overlap each other as shown in the figure, and fix them with work clamp carrier setscrew ⑩.
14. Attach the work clamp carrier to the sewing machine.
15. Loosen the work clamp bracket setscrew and attach the presser roller installing base to work clamp 60 asm. ③ or work clamp 70 asm. ④. Then fix the work clamp bracket setscrew.
16. Attach work clamp 60 asm. ③ or work clamp 70 asm. ④ which has been connected to the sewing machine.
17. Enter the work clamp shaft and fix the work clamp shaft setscrew.
18. Attach the needle thread trimmer support with the needle thread trimmer support setscrews.
19. Attach the presser roller installing base with the presser roller installing base setscrew.
20. Attach the needle and the cloth cutting knife to the sewing machine.
21. Adjust the needle thread trimmer properly. Refer to the items **(20) Lateral position of the needle thread trimmer, (23) Opening timing of the needle thread trimmer and (25) Adjusting the needle thread trimmer lever** on pages 24 to 29.
22. Adjust the vertical position of work clamp bracket so that there is no lateral play in the work clamp when the presser is lifted.
23. Use timing gauge B ⑪ for hook adjusting since the throat plate is changed.

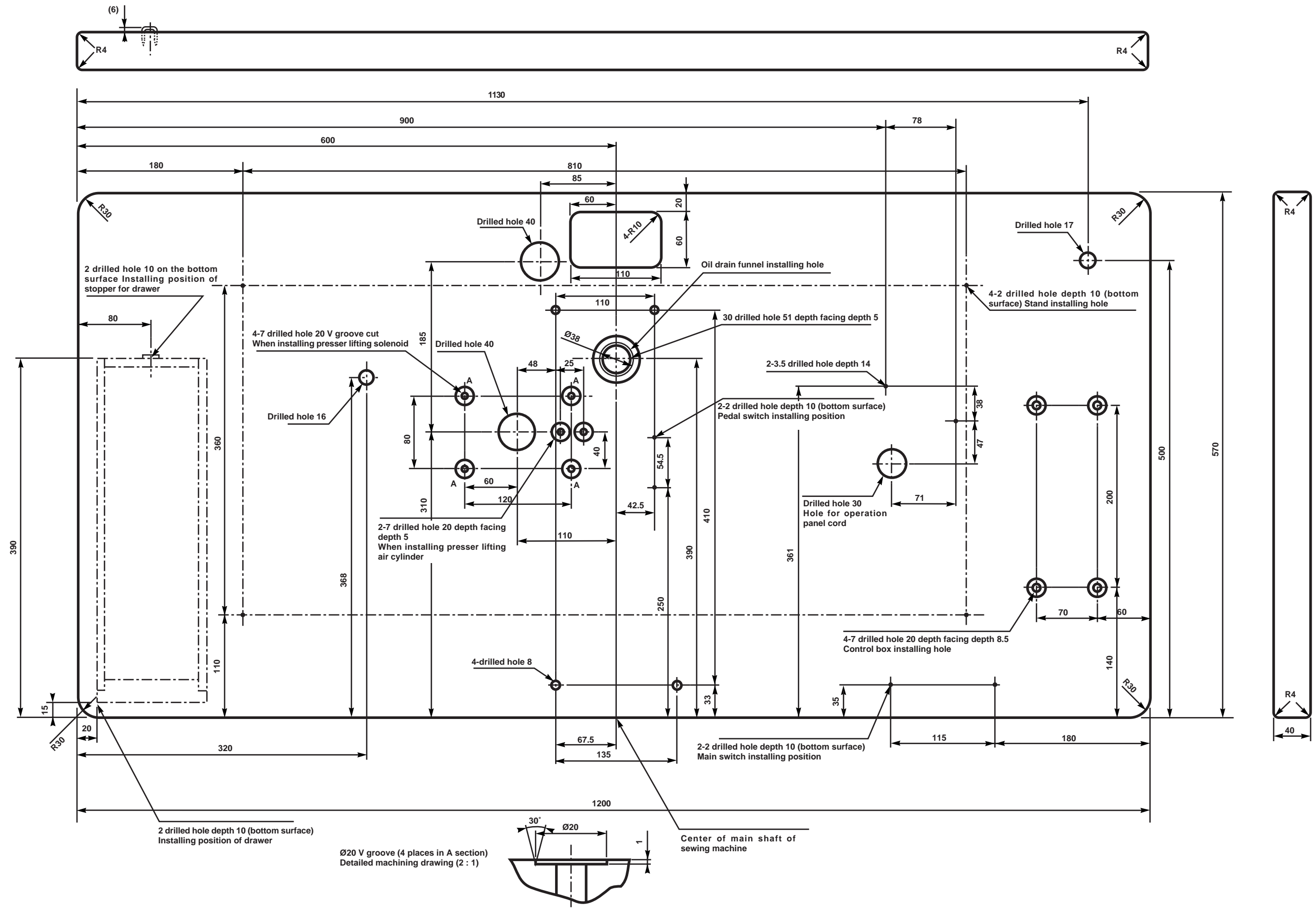
## 2) Setting the memory switch

1. Pressing the READY key and the CLAMP key, turn ON the power.
2. Set the memory switch No. 11 with the left “+” or “-” key and set the presser type to 5 with the right “+” or “-” key. Refer to the item **5) Kind of presser setting** on page 64.
3. Set the memory switch No. 21 with the left “+” or “-” key and set the cloth cutting knife length to be used with the right “+” or “-” key. Use the knife size of 31.8 mm (1 1/4”) or less. When using the knife size of 17 mm or less, the maximum length is limited. Refer to the item **12) Cloth cutting knife plural action setting** on page 67.
4. Set the memory switch No. 22 with the left “+” or “-” key and set the cloth cutting knife plural action to “1” with the right “+” or “-” key. Refer to the item **12) Cloth cutting knife plural action setting** on page 67.
5. Set the memory switch No. 37 with the left “+” or “-” key and set the presser size width to “5” with the right “+” or “-” key. Refer to the item **5) Kind of presser setting** on page 64.
6. Set the memory switch No. 38 with the left “+” or “-” key and set the length of presser size to 60 or 70 according to the length of presser with the right “+” or “-” key. Refer to the item **5) Kind of presser setting** on page 64.
7. Turn OFF the power.
8. Set the sewing length and start sewing.

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# 14. DRAWING OF THE TABLE



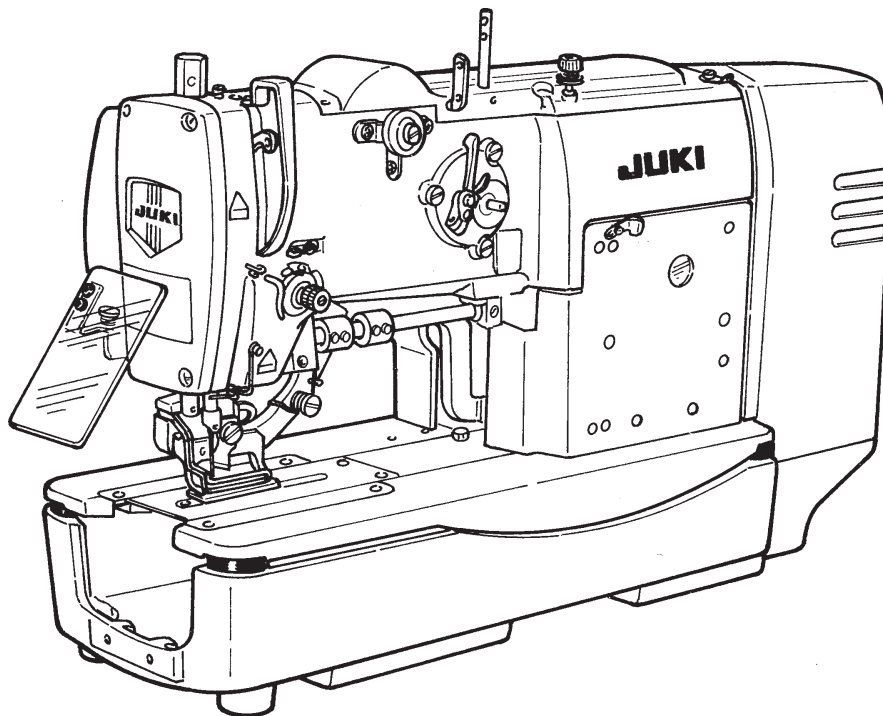
Part No. : 14514905

**JUKI®**

**Electronic Buttonholing Machine**

**LBH-1700 Series**

**ENGINEER'S MANUAL**



**29339504**

**No.04**

## **PREFACE**

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machine.

The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered by the Instruction Manual.

It is advisable to use the relevant Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines.

In addition, for the motor for the sewing machine with thread trimmer, refer to the separate Instruction Manual or Engineer's Manual for the motor. And for the control panel, refer to the Instruction Manual for the control panel.

This manual gives the "Standard Adjustment" on the former page under which the most basic adjustment value is described, and on the latter page "Results of Improper Adjustment" under which stitching errors and troubles arising from mechanical failures are described together with the "Adjustment Procedures".

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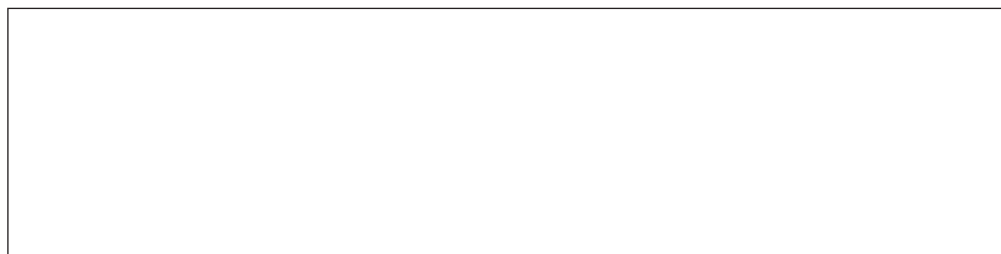
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