

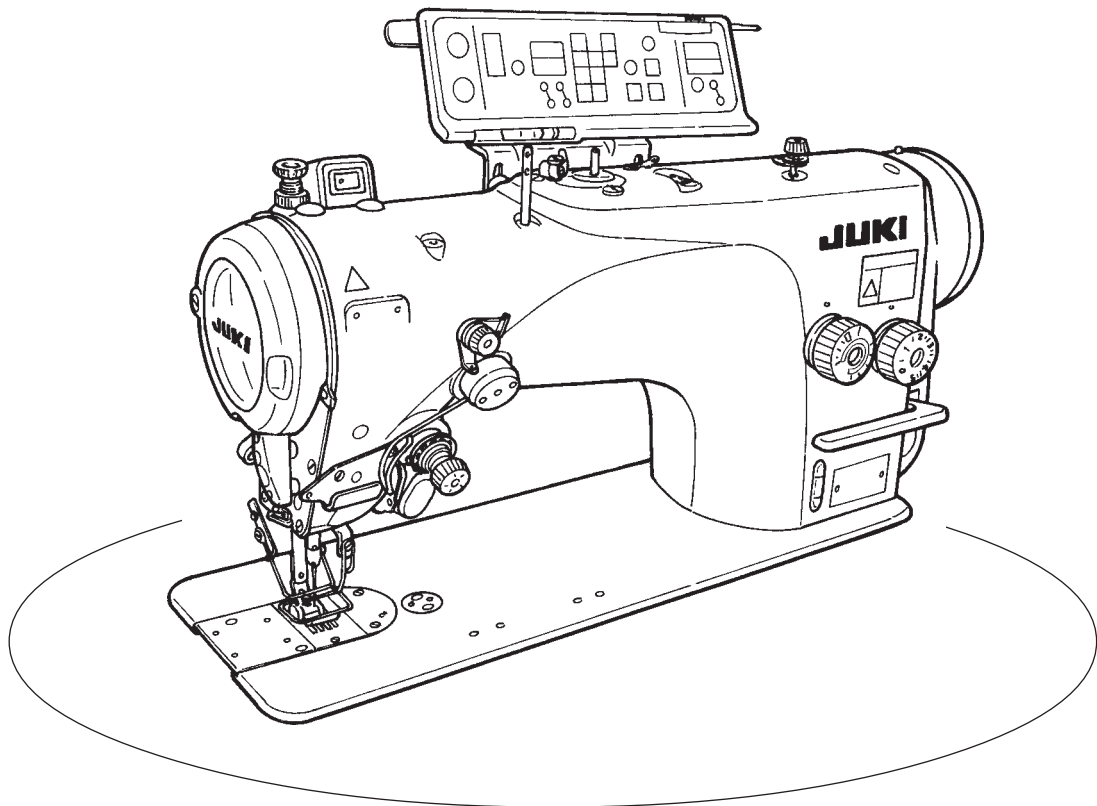
JUKI

Direct-drive, Computer-controlled, High-speed, 1-needle,
Lockstitch, Zigzag Stitching Machine

LZ-2290 Series

CP-760 / SC-905

ENGINEER'S MANUAL



29345808

No.01

1. SPECIFICATIONS

(1) Specifications of the machine head

	Model	LZ-2290SS / -7	LZ-2290SU / -7	LZ-2290DS / -7	LZ-2290DU / -7
1	Application	Light- to medium-weight materials			
2	Max. sewing speed	5,000 rpm (*1)	4,500 rpm (*1)	4,000 rpm (*1)	
3	Max. zigzag width	10 mm (*2)			
4	Max. feed amount (Normal/reverse)	5 mm/4 mm (*3) (Stepless fine adjustment)	2.5 mm/2.5 mm (*3) (Stepless fine adjustment)	5 mm (*3) (Stepless fine adjustment)	2.5 mm (*3) (Stepless fine adjustment)
5	Stitch pattern	8 kinds 14 patterns (Custom pattern : 64 stitches, 8 kinds can be stored.)			
6	Needle	SCHMETZ 134UK, 438, ORGAN DPX5 : #65 to #90			
7	Dimension of the bed	178 mmX517 mm			
8	Number of revolution of resistor pack	4,000 rpm (Excluding a certain territory of export)			
9	Needle bar stroke	33.4 mm			
10	Bobbin winder	Built-in in the upper face of machine head type (with bobbin thread retaining plate)			
11	Wiper (WB only)	Electromagnetic front-wiping system			
12	Automatic reverse stitching	Built-in electromagnetic system			
13	Lubrication	Lubrication system to oil tank for hook lubrication JUKI New Defrix Oil No. 1 is used. (Equivalent to ISO VG7) Plunger pump is employed.		Full non-lubrication	
14	Lift of the presser foot (by hand lifter)	5.5 mm			
15	Lift of the presser foot (by knee lifter)	10 mm			
16	Lift of the presser foot (by AK auto-lifter)	6 to 6.5 mm			
17	Kind of the hook (Part No.)	22525877		23557259 (Non-lubrication hook)	
18	Bobbin case (asm.)	23537350 (with idle-prevention spring)		23557556 (with idle-prevention spring)	
19	Height of the feed dog	1.2 mm	1.4mm	1.2 mm	1.4mm
20	Lubrication of the face plate section	Minute quantity lubrication by oil wick		Non-lubrication	
21	Drive system	Direct drive system (compact AC servo motor)			
22	Transmission function	Timing belt system			
23	Motor output	Rated output 450W			
24	Operating power	3-phase 200V, Single phase 100V			
25	Solenoid drive power	DC34V			
26	Additional function	Presser foot micro-lifting screw is provided as standard.			
27	Device and optional	AK-121 (auto-lifter device) 500 g tin of exclusive grease for maintenance (Part No. : 23640204) Touch-back kit (asm.) (Part No. : 23546658)			

* 1 : The sewing speed is regulated in accordance with the destination at the time of delivery. (Zigzag width is also regulated.)

* 2 : Zigzag width is regulated to 8 mm at the time of delivery. (Max. 10 mm is only for 2-step and 3-step zigzag machines.)

* 3 : Normal and reverse feed amounts are regulated to 2 mm at the time of delivery.

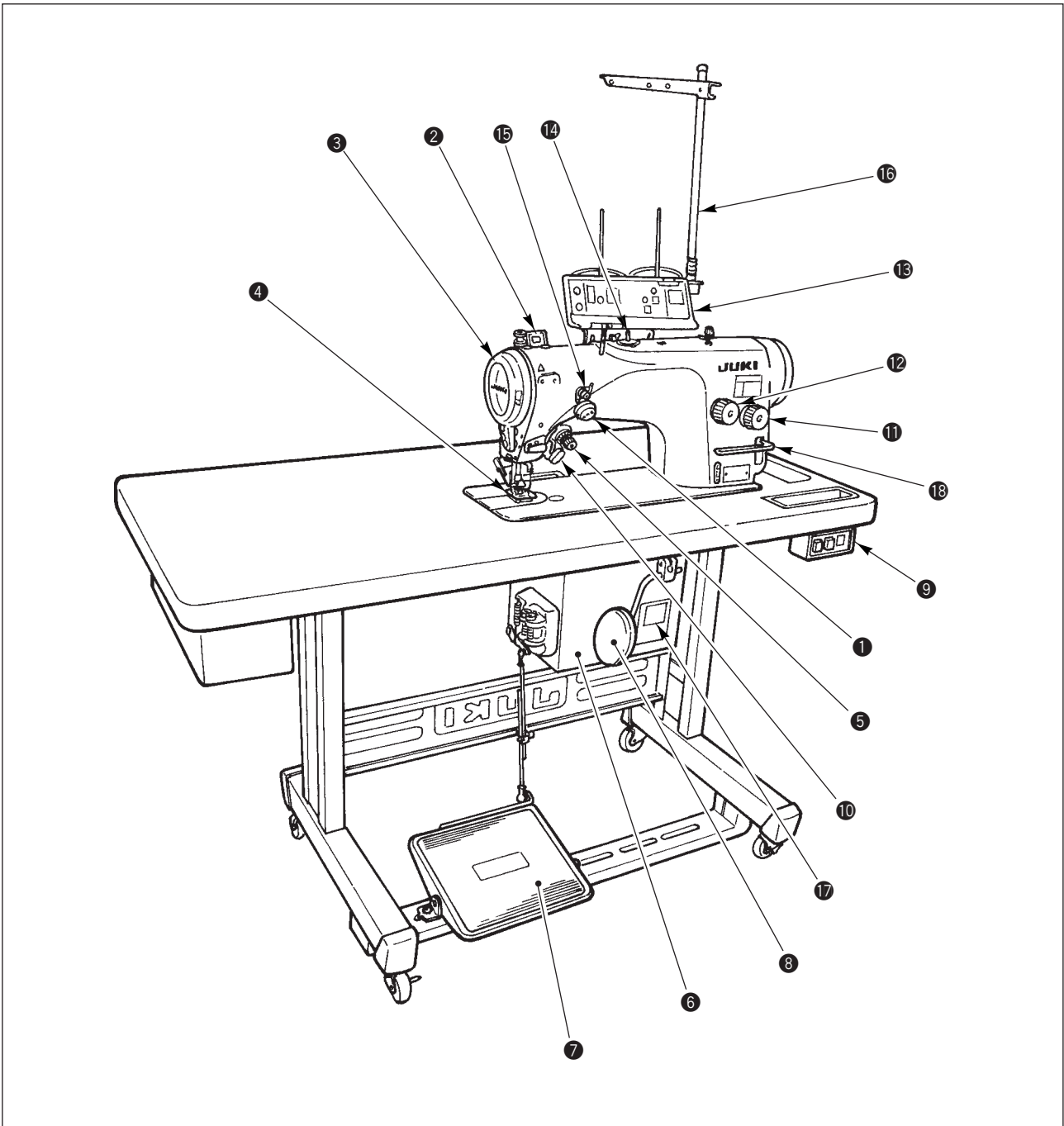
(2) Stitch pattern table

Name of pattern		Stitch pattern	Number of stitches for pattern	Max. zigzag width	Pattern selection key	Remarks
Straight stitch			1	-		
Standard zigzag stitch			2	8		
2-step zigzag stitch			4	10		
3-step zigzag stitch			6	10		
Scallop (right)	Standard scallop (<i>a</i>)		24	8		Scroll can be performed by pressing again.
	Crescent scallop (<i>b</i>)					
	Equal-width scallop (<i>c</i>)					
	Equal-width scallop (<i>d</i>)		12			
Scallop (left)	Standard scallop (<i>a</i>)		24	8		Scroll can be performed by pressing again.
	Crescent scallop (<i>b</i>)					
	Equal-width scallop (<i>c</i>)					
	Equal-width scallop (<i>d</i>)		12			
Blind stitch (right)			2+a	8		
Blind stitch (left)						
Custom pattern		-	Up to 64	10		

(3) Cautions in operation

- 1) Be sure to drain oil in the oil tank and attach the air vent cap (red rubber cap) supplied with the machine to the air vent (golden bushing) located on the side face of the machine bed when transporting the sewing machine.
- 2) In the case where placing SS or SU type machine on a stand or the like before setting the machine to the machine table, to protect the oil tank from damage, take care if there is any protruding object under the stand or the like.
- 3) Be sure to securely set the connector of the safety switch to the control box to prevent accidents at the time of maintenance.
- 4) Oil is kept in the gear box for lubrication. It is not necessary to replace the oil. Do not remove the gear box cover except when it is necessary.
* When the box cover has been removed, it is necessary to replace the packing.
- 5) Be sure to operate the sewing machine with the bobbin case removed when making the sewing machine run idle.
If the bobbin thread is in the bobbin case, the thread protrudes from the bobbin case and is entangled in the hook race or the hook shaft. As a result, the trouble will be caused.

2. NAME OF EACH COMPONENT

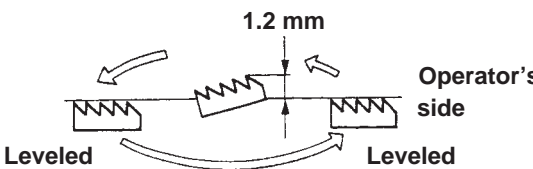

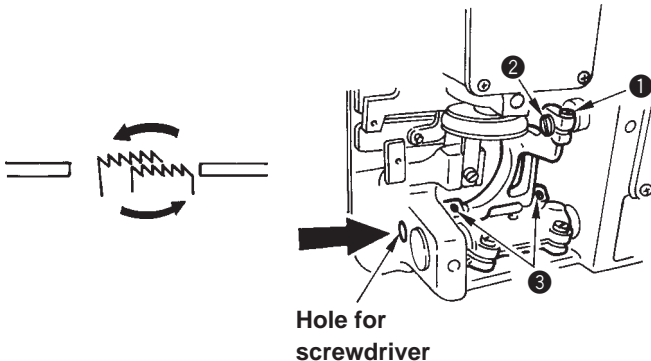
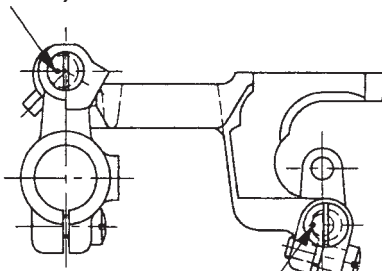
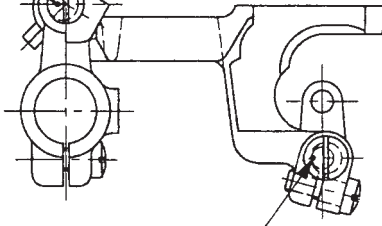


- | | | |
|---------------------------------|----------------------|--------------------------------|
| ① Needle thread draw-out device | ⑧ Knee lifter lever | ⑮ Tension controller No. 1 |
| ② Wiper evic | ⑨ Power switch | ⑯ Thread stand |
| ③ Thread take-up cover | ⑩ Hand switch | ⑰ Setting display section |
| ④ Finger guard | ⑪ Stitch length dial | ⑱ Reverse feed stitching lever |
| ⑤ Thread tension controller | ⑫ Condensation dial | |
| ⑥ Control box | ⑬ Control panel | |
| ⑦ Pedal | ⑭ Bobbin winder | |

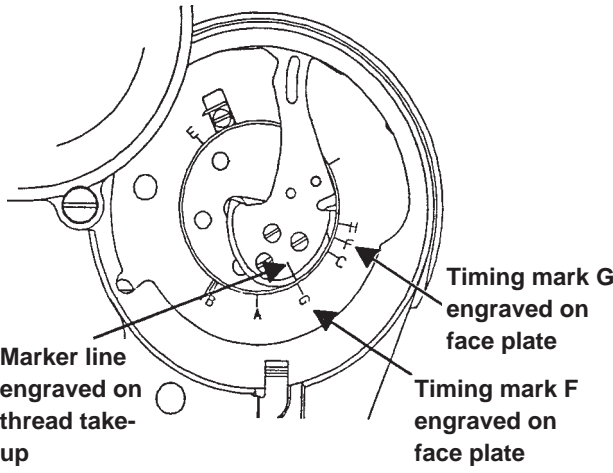
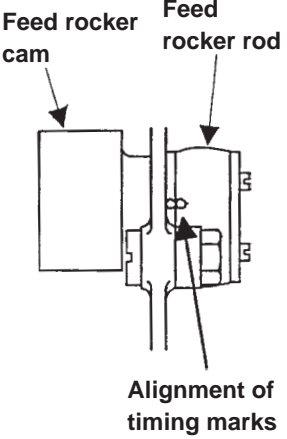
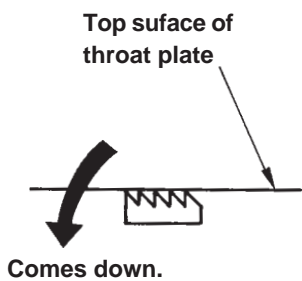
- ① Needle thread draw-out device
This device draws out needle thread at the time of thread trimming.
- ② Wiper device
This device wipes needle thread after thread trimming from the cloth by means of the wiper signal which is output from the PSC box.
- ③ Thread take-up cover
This is a cover to protect the human body from the contact with the thread take-up.
- ④ Finger guard
This is a guard to protect the human body (mainly fingers) from the contact with needle.
- ⑤ Thread tension controller
- ⑥ Control box
This box contains circuit to control sewing machine and motor, output circuits to activate respective outputs (thread trimming solenoid, reverse feed stitching solenoid, etc.), pedal sensor to detect pedal action, and power circuit to activate respective functions.
- ⑦ Pedal
This pedal performs sewing machine speed control, thread trimming action, presser lifting action (for AK118 only), etc. by operation of depressing the front part of pedal or the back part of pedal.
- ⑧ Knee lifter lever
- ⑨ Power switch
This is the power switch for motor, PSC, operation panel, etc.
- ⑩ Hand switch
This is an operation switch to perform reverse feed stitching, inverting of scallop pattern, etc. by means of the manual switch.
- ⑪ Stitch length dial
- ⑫ Condensation dial
- ⑬ Control panel
This panel is used for setting automatic reverse feed stitching, pattern stitching, zigzag width, etc.
- ⑭ Bobbin winder
This is a bobbin winder which is built in the machine head.
- ⑮ Tension controller No. 1
- ⑯ Thread stand
- ⑰ Setting display section
- ⑱ Reverse feed stitching lever

3. STANDARD ADJUSTMENT

(1) Height and inclination of the feed dog

Standard Adjustment	
<p>Standard height : 1.2 mm : LZ-2290SS, LZ-229DS : 1.4 mm : LZ-2290SU, LZ-2290DU</p> <p>Inclination : The feed dog should be almost leveled when the top surface of the ascending feed dog is flush with the top surface of the throat plate.</p>	<p>Reference for the height and inclination of the feed dog</p> <ul style="list-style-type: none"> ○ When the respective marker dots are leveled, the height is 1.2 mm and the inclination is leveled.
	
	<p>Position of marker dot (Inclination)</p>  <p>Position of marker dot (Height)</p> 

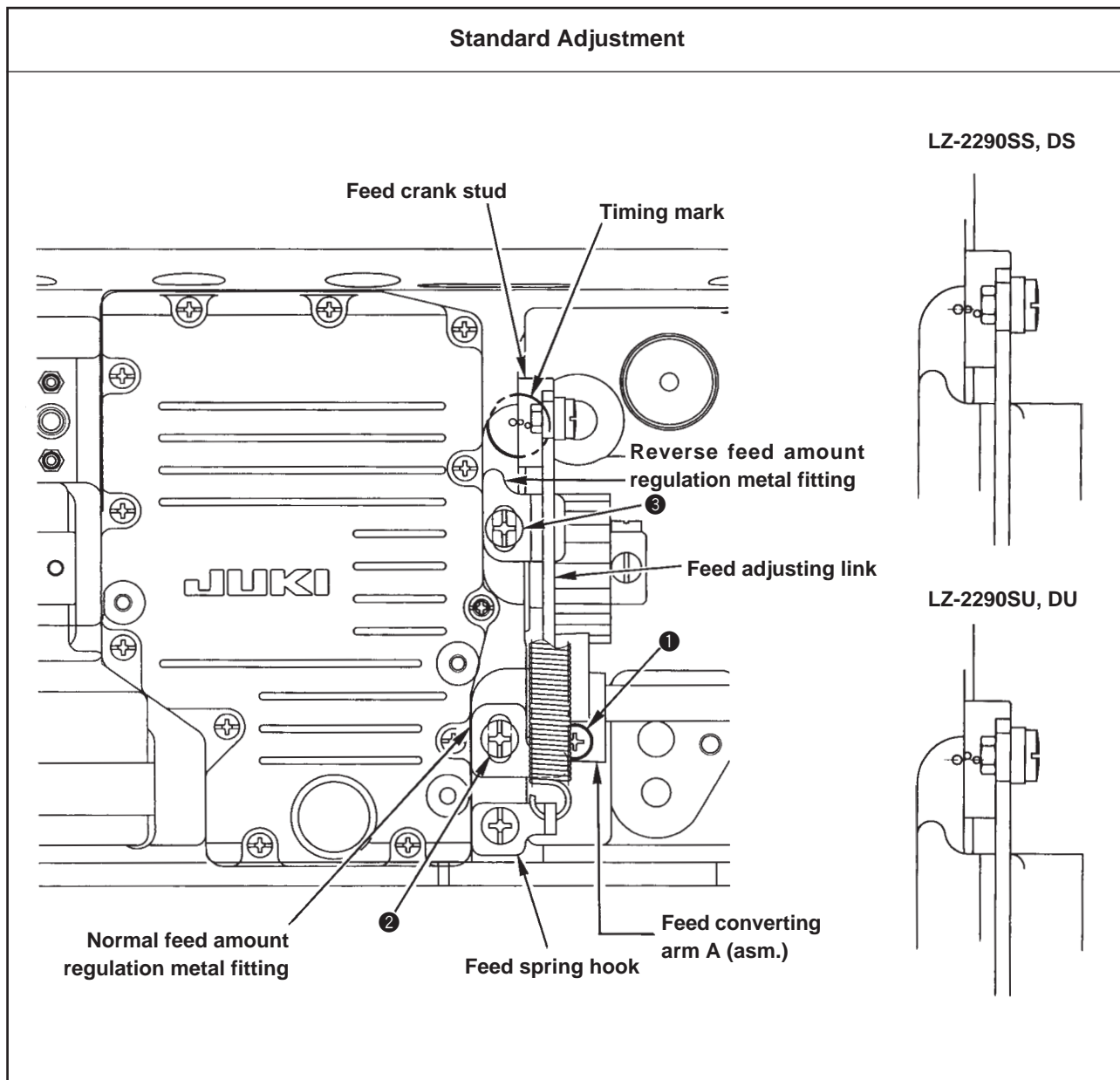
(2) Adjusting the feed timing

Standard Adjustment		
	<p style="text-align: center;">A</p> 	<p style="text-align: center;">B</p> 

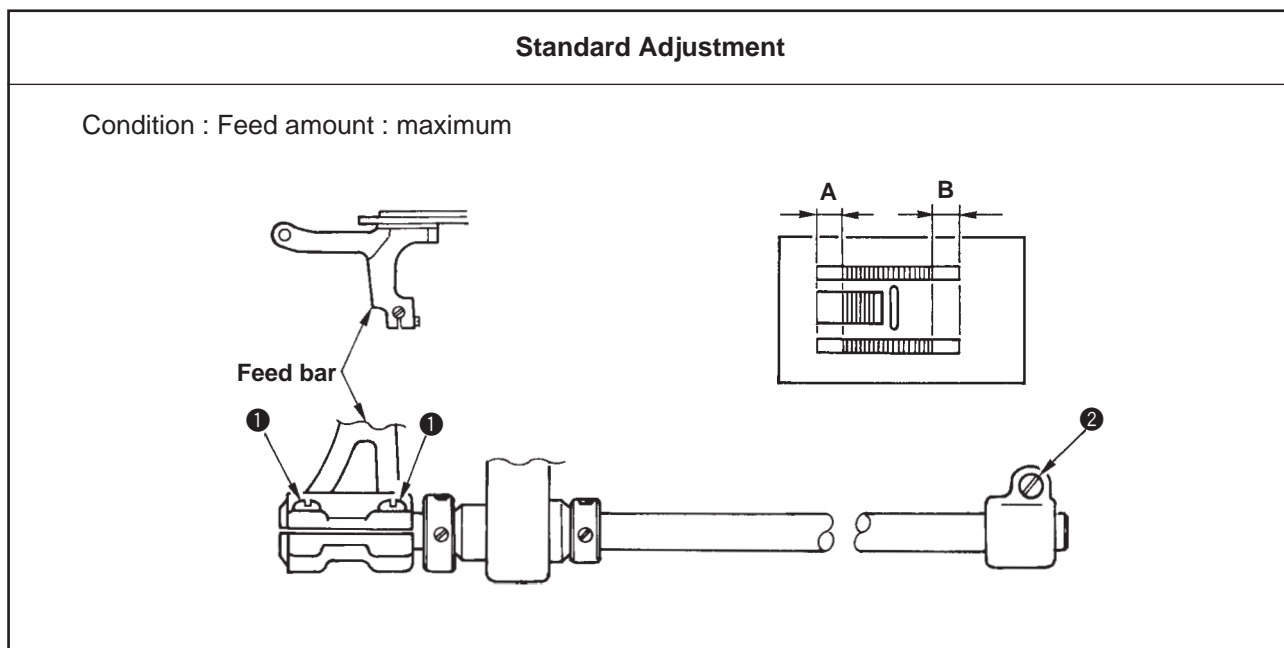
Adjustment Procedures	Results of Improper Adjustment
<p>1) Set the feed amount to 2.5mm. (2 mm at the time of delivery) Note, however, that the feed amount has to be set to “0” mm only for LZ-2290SU and LZ-2290DU.</p> <p>2) Adjusting the height of the feed dog Loosen screw ❶ and adjust the height of the feed dog by turning feed driving link shaft ❷.</p> <p>3) Adjusting the inclination of the feed dog Loosen screw ❸. Put a screwdriver through the hole for the screwdriver and adjust the inclination of the feed dog by turning the feed rocker shaft with the screwdriver.</p> <p>(Caution) 1. If the feed rocker shaft is not pressed in the direction A (⇒) during the adjustment procedure, there will be a play at the feed bar or washer will come off. So, be sure to adjust the feed dog with the feed rocker shaft pressed in the direction A (⇒).</p> <p>2. Check to be sure that the feed dog is leveled with the feed amount currently used when the top surface of the ascending feed dog is flush with the top surface of the throat plate.</p>	<ul style="list-style-type: none"> ○ Perform the adjustment of the inclination of the feed dog according to the sewing process. <p>(Example)</p> <ul style="list-style-type: none"> ○ When the feed force is required in such a process of tape attaching or the like : Adjust so that this side of the feed dog is raised. ○ When using the slippery material in such a process of attaching a facing of girdle : Adjust so that the feed dog should be leveled.

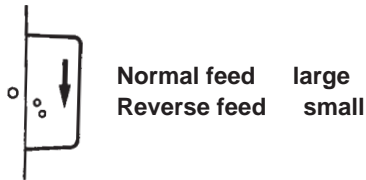
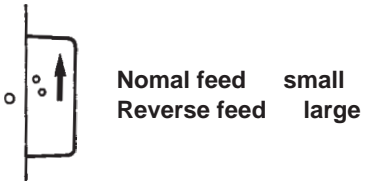
Adjustment Procedures	Results of Improper Adjustment
<p>A. Adjusting procedure by removing the gear box cover</p> <p>1) Remove the gear box cover. (Refer to the item “4-(1).))</p> <p>2) Adjust the marker line engraved on the thread take-up to the timing mark G engraved on the face plate.</p> <p>3) Set the feed amount to 2.5 mm. However, the feed amount has to be set to “0” mm only for LZ-2290SU and LZ-2290DU.</p> <p>4) In the aforementioned state, loosen the setscrew in the hook driving shaft sprocket and adjust the timing mark engraved on the feed rocker cam to the timing mark engraved on the feed rocker rod.</p> <p>(Caution) In this case, the hook timing (thread trimming timing for the machine equipped with a thread trimmer) changes. Be sure to perform re-adjustment.)</p> <p>B. Adjusting procedure with the gear box cover attached (For fine adjustment)</p> <p>1) Set the feed amount to 2.5 mm. * Refer the adjusting procedure for LZ-2290SU and LZ-2290DU to page 11.</p> <p>2) Adjust the marker line engraved on the thread take-up to the marker line engraved on the face plate.</p> <p>3) In the aforementioned state, loosen the setscrew in the hook driving shaft sprocket. Now, turn the hook driving shaft to adjust so that the feed dog comes down. Adjust so that the top surface of the feed dog is aligned with the top surface of the throat plate when the feed dog comes down.</p> <p>* There is a slight inclination at the feed dog. Adjust the feed dog so that “0” to 6 teeth come out from the top surface of the throat plate.</p> <p>(Caution) After the aforementioned adjustment, “hook timing” and further “thread trimming cam timing” for the machine equipped with a thread trimmer will change. Be sure to re-adjust them properly.</p>	

(3) Adjusting the feed amount



(4) Position of the feed dog

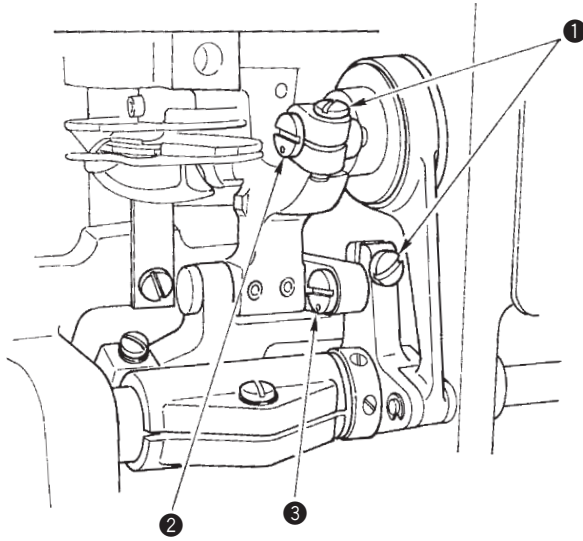


Adjustment Procedures	Results of Improper Adjustment																								
<p>[Feed “0” adjustment]</p> <ol style="list-style-type: none"> 1) Set the stitch length dial at “0”. 2) Loosen screw ❶, and align the timing mark on the feed crank stud with that on the feed crank stud support. (The position of the timing mark differs with models.) 3) When loosening screw ❶, confirm that there is no axial play at the feed converting arm A (asm.) and tighten screw ❶. <p>[Normal feed adjustment]</p> <ol style="list-style-type: none"> 4) Set the stitch length dial at the maximum value of the gauge to be used. <table border="1" data-bbox="215 593 833 663"> <tr> <td>Max. normal feed amount of the mechanism</td> <td>LZ-2290SS, DS=5 mm</td> </tr> <tr> <td></td> <td>LZ-2290SU, DU=2.5 mm</td> </tr> </table> <p>* Normal feed is regulated to 2 mm at the time of delivery.</p> <ol style="list-style-type: none"> 5) Loosen screw ❷, make the feed adjusting link come in contact with the screw and tighten screw ❷. <p>[Reverse feed adjustment]</p> <ol style="list-style-type: none"> 6) Loosen screw ❸, pushing the feed lever down to make the sewing machine enter the reverse feed stitching mode, press reverse feed amount regulation metal fitting against the projecting section of the reverse feed adjusting link B. Now, tighten screw ❸. (Set the condensation stitch length adjusting dial to the maximum value on the scale.) <table border="1" data-bbox="215 1008 833 1077"> <tr> <td>Max. reverse feed amount of the mechanism</td> <td>LZ-2290SS, DS=4 mm</td> </tr> <tr> <td></td> <td>LZ-2290SU, DU=2.5 mm</td> </tr> </table> <p>* Reverse feed is regulated to 2 mm at the time of delivery.</p> <ol style="list-style-type: none"> 7) To decrease the reverse feed stitching length for fastening stitching, use the condensation stitching function. (Refer to “Adjusting the condensation stitching mechanism” in the Instruction Manual for the LZ-2290 Series.) <ul style="list-style-type: none"> ○ The engraved dot is for reference only and fine adjustment is necessary. When the ratio of sewing length (as many as 10 stitches) of normal and reverse feed is approximately 90% in case of straight stitch feed amount of 2 mm, the adjustment is OK. 	Max. normal feed amount of the mechanism	LZ-2290SS, DS=5 mm		LZ-2290SU, DU=2.5 mm	Max. reverse feed amount of the mechanism	LZ-2290SS, DS=4 mm		LZ-2290SU, DU=2.5 mm	<p>In case of thread trimming</p> <ul style="list-style-type: none"> ○ If the timing marks are not aligned with each other, the actual feed amount will be different from the feed amount specified on the stitch length dial. If the timing marks greatly separate from each other, the normal or reverse feed amount will be increased causing the feed dog to come in contact with the thread trimming counter knife. <div style="text-align: center;">  <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">○</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">Normal feed</td> <td style="text-align: center;">large</td> </tr> <tr> <td style="text-align: center;">○</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">Reverse feed</td> <td style="text-align: center;">small</td> </tr> </table>  <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">○</td> <td style="text-align: center;">↑</td> <td style="text-align: center;">Normal feed</td> <td style="text-align: center;">small</td> </tr> <tr> <td style="text-align: center;">○</td> <td style="text-align: center;">↑</td> <td style="text-align: center;">Reverse feed</td> <td style="text-align: center;">large</td> </tr> </table> </div>	○	↓	Normal feed	large	○	↓	Reverse feed	small	○	↑	Normal feed	small	○	↑	Reverse feed	large
Max. normal feed amount of the mechanism	LZ-2290SS, DS=5 mm																								
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○	↓	Normal feed	large																						
○	↓	Reverse feed	small																						
○	↑	Normal feed	small																						
○	↑	Reverse feed	large																						

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Set the stitch length dial at the maximum. 2) Turn the handwheel, and fix the feed dog so that the clearances in front and rear are the same at the position where the feed dog does not come in contact with the throat plate. <ul style="list-style-type: none"> ○ In the case where the gear box (large) cover is not opened, loosen screw ❶ to adjust the position. ○ In the case where the gear box (large) cover is opened, loosen screw ❷ to adjust the position. 	<ul style="list-style-type: none"> ○ The feed dog will come in contact with the throat plate.

(5) Adjusting the slippage of materials (For LZ-2290SU and LZ-2290DU)

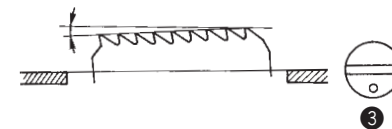
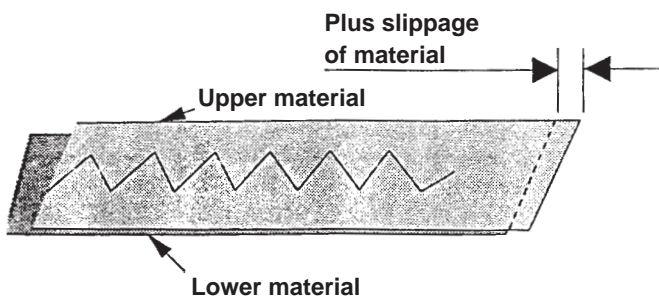
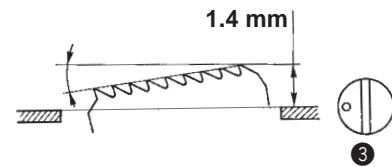
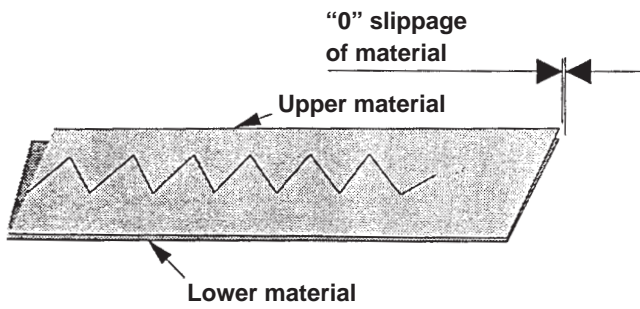
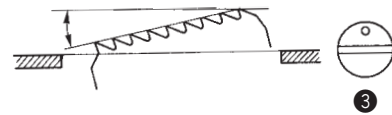
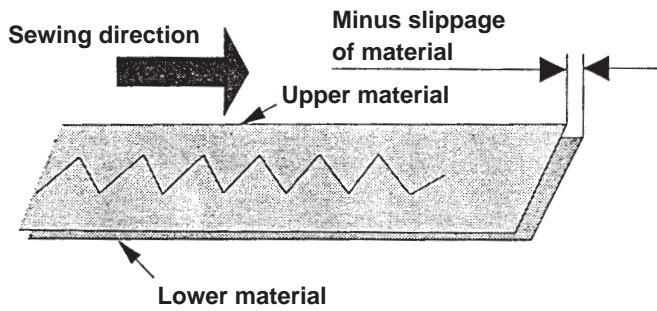
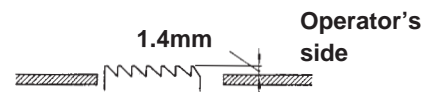
Standard Adjustment

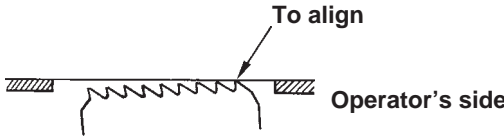
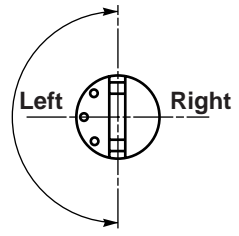


Standard state of engraved marker dot of vertical feed link shaft



Standard height of feed dog

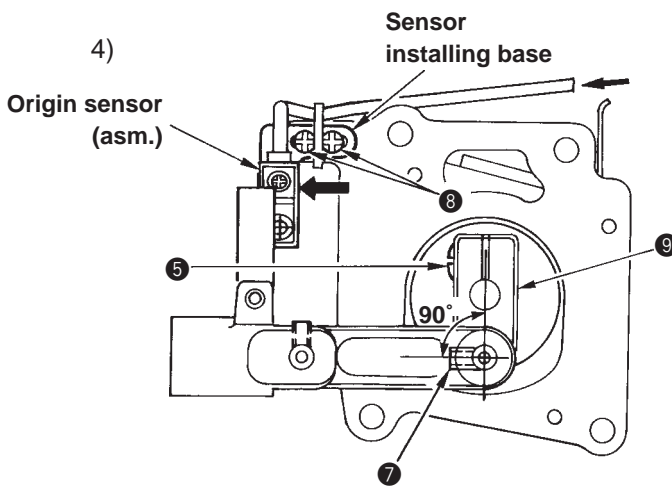
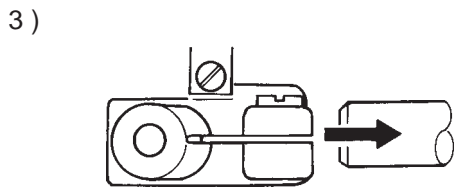
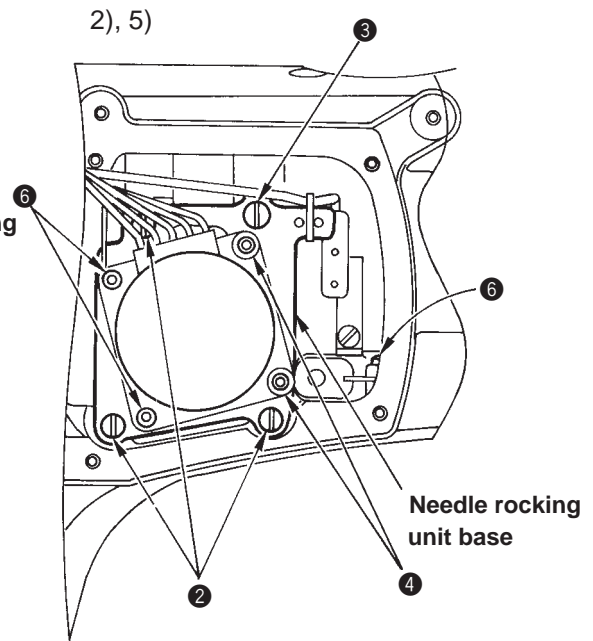
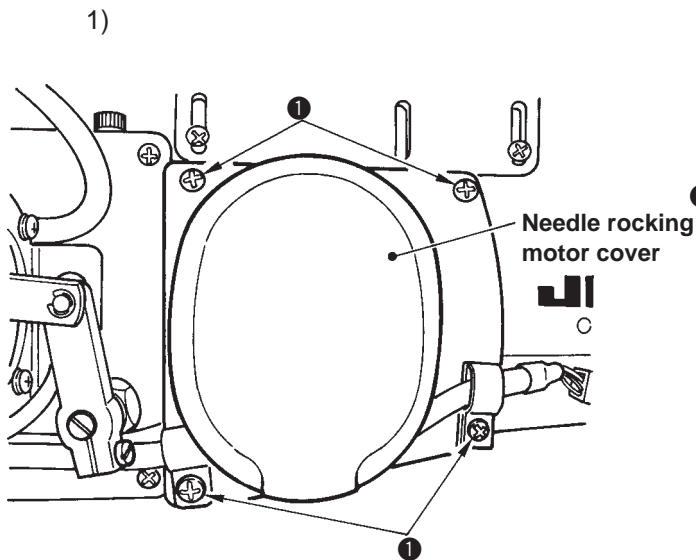


Adjustment Procedures	Results of Improper Adjustment
<p>1) To adjust the height and inclination of the feed dog, loosen setscrews ❶ in the vertical feed link shaft and turn vertical feed link shafts ❷ and ❸ with a screwdriver.</p> <p>2) The standard inclination is the position where the engraved marker dots of vertical feed link shafts ❷ and ❸ face in the direction of 9 o'clock (left side).</p> <p>3) The standard height of the feed dog is 1.4 mm from the top surface of the throat plate.</p> <p style="text-align: center;"><Adjusting the slippage of materials></p> <p>This machine can adjust "Amount of slippage of materials" by adjusting the height and inclination of the feed dog.</p> <p>4) Mainly adjust vertical feed link shaft ❸.</p> <p>The amount of slippage of materials can be adjusted by the position of the engraved marker dot which means the size of each theta of the inclination of the feed dog.</p> <p>* Points of adjustment</p> <ul style="list-style-type: none"> ○ Quality of finished products is improved when the slippage of materials is slightly adjusted to the minus state. (Operator's hand pressure should be considered in actual sewing.) ○ When performing the adjustment, simultaneously adjusting vertical feed link shafts ❷ and ❸ makes it difficult to see the characteristic of the slippage of the material. So, set ❷ to the standard state (reference) and mainly adjust ❸. ○ In the case where the slippage of material (0 to minus) cannot be obtained by adjusting vertical feed link shaft ❸ only, adjust vertical feed link shaft ❷ so that theta , inclination of the feed dog is increased. <p>* ❶ Set the feed pitch to "0" mm.</p> <p>❷ Adjust with the hook driving shaft sprocket so that the feed dog on this side is aligned with the top surface of the throat plate when the marker line engraved on the thread take-up is aligned with mark A on the face plate.</p> <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> ○ The height 1.4 mm of the feed dog has been factory-set at the time of delivery. Change the height in accordance process the process. (Characteristic of slippage of materials changes. So, be careful. ○ Characteristic of slippage of materials changes in accordance with materials. (The relation between the direction of the engraved dot and slippage of materials described in the Engineer's Manusl is the standard of adjustment.) ○ Adjust on the left-hand side the adjusting positions of the engraved marker dots of vertical feed link shafts ❷ and ❸. If the position of the engraved marker dot is on the right-hand side, the effect of prevention of slippage of material is difficult to be obtained. <div style="text-align: center;">  </div> <ul style="list-style-type: none"> ○ When the adjustment of the height of the feed dog has been performed, the sewing pitch is different from the scale on the stitch length dial. Re-adjust the scale with the actual sewing pitch.

(6) Adjusting the origin of the needle rocking motor

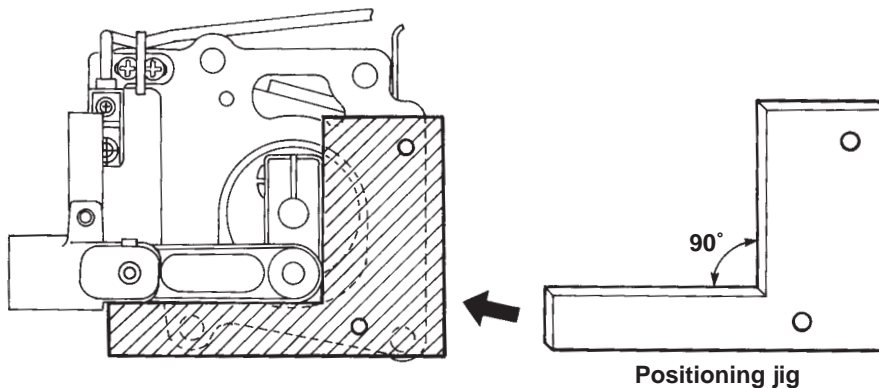
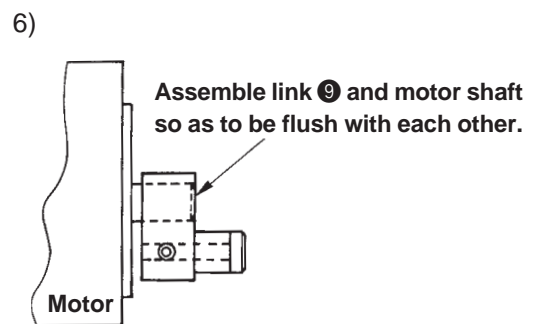
Standard Adjustment

- Adjustment of the origin is performed when the needle rocking amount in terms of the center is not equal, or the motor or the sensor is required to be replaced.



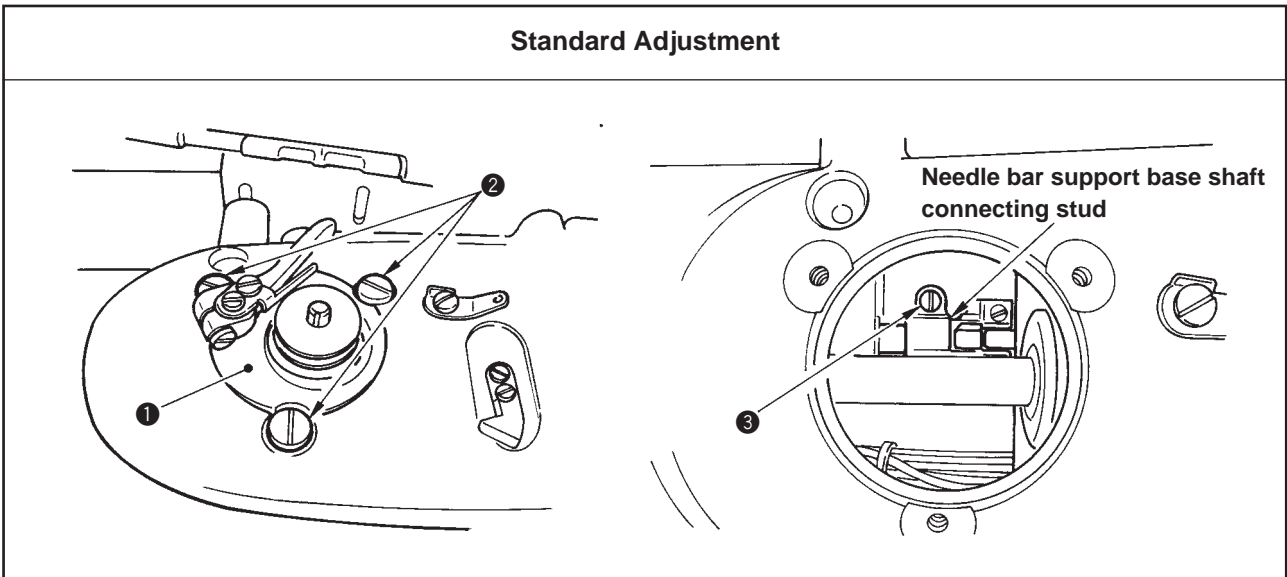
<Condition of the origin "0">

When the link is at 90°, move the light-up sensor from the rightend to the left. The position of the origin "0" is when the sensor goes out.

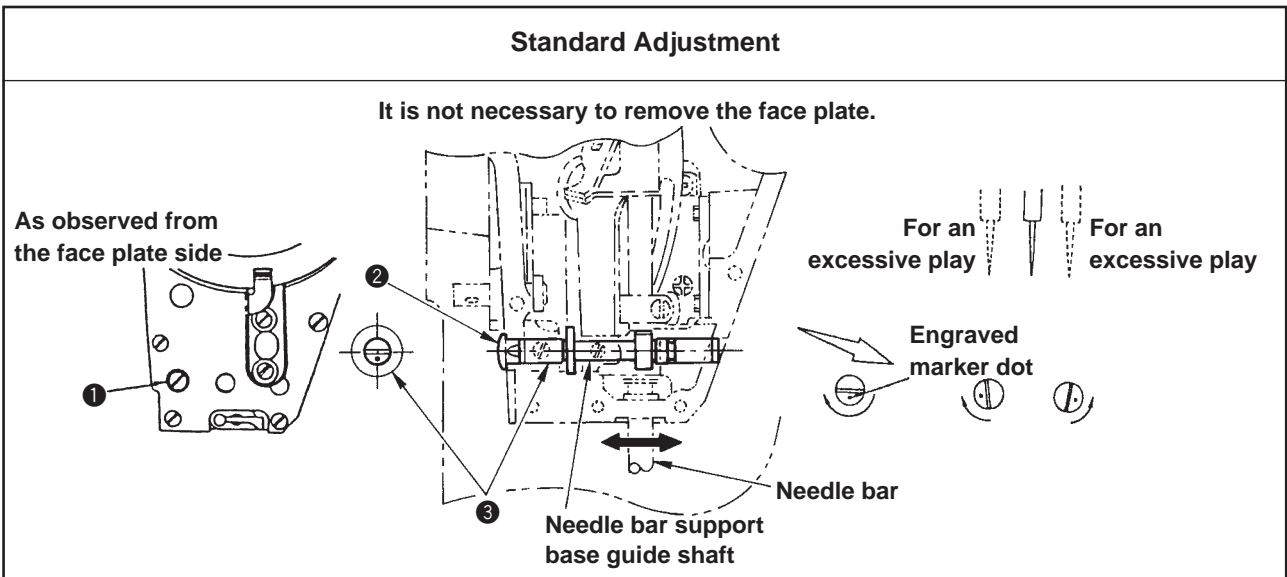


Adjustment Procedures	Results of Improper Adjustment
<p>1) Remove four setscrews ① in the needle rocking motor cover.</p> <p>2) Remove three setscrews ② and counter sunk screw ③. (At this time, loosen setscrew ④ in the needle bar support base shaft connecting stud as well. Refer to the item “(7) Adjusting the needle entry position”.)</p> <p>* When assembling, after temporarily tightening screws ③ and ②, tighten in the order of ③ and ②.</p> <p>3) Move the needle bar in the direction of the face plate, draw out the needle bar support base shaft from the needle bar support base shaft connecting stud, and remove the shaft together with the needle rocking unit base from the machine arm.</p> <p>In case of replacing or adjusting the needle rocking motor</p> <p>* For the replacement of the sensor, refer to the item of the sensor.</p> <p>4) Loosen setscrew ⑤ in the motor link bracket and remove link ⑨.</p> <p>5) Loosen four setscrews ⑥ in the needle rocking unit base and remove the motor to replace.</p> <p>6) Tighten setscrew ⑤ in the motor link bracket. (Check also setscrew ⑦ in the motor link.)</p> <p>In case of replacing or adjusting the sensor</p> <p>7) Confirm that the sensor lamp lights up in the hook adjusting mode.(See p.18.)</p> <p>8) Loosen setscrews ⑧ in the sensor installing plate, move the sensor installing plate to the right-hand end once, and gradually move it to the left-hand side. Tighten setscrews ⑧ when the sensor lamp goes out. This state is “0” of the origin. (However, it is when the link is at 90°.)</p> <p>○ To determine the position of the sensor, it is convenient to make a positioning jig as shown in the figure on the left.</p>	

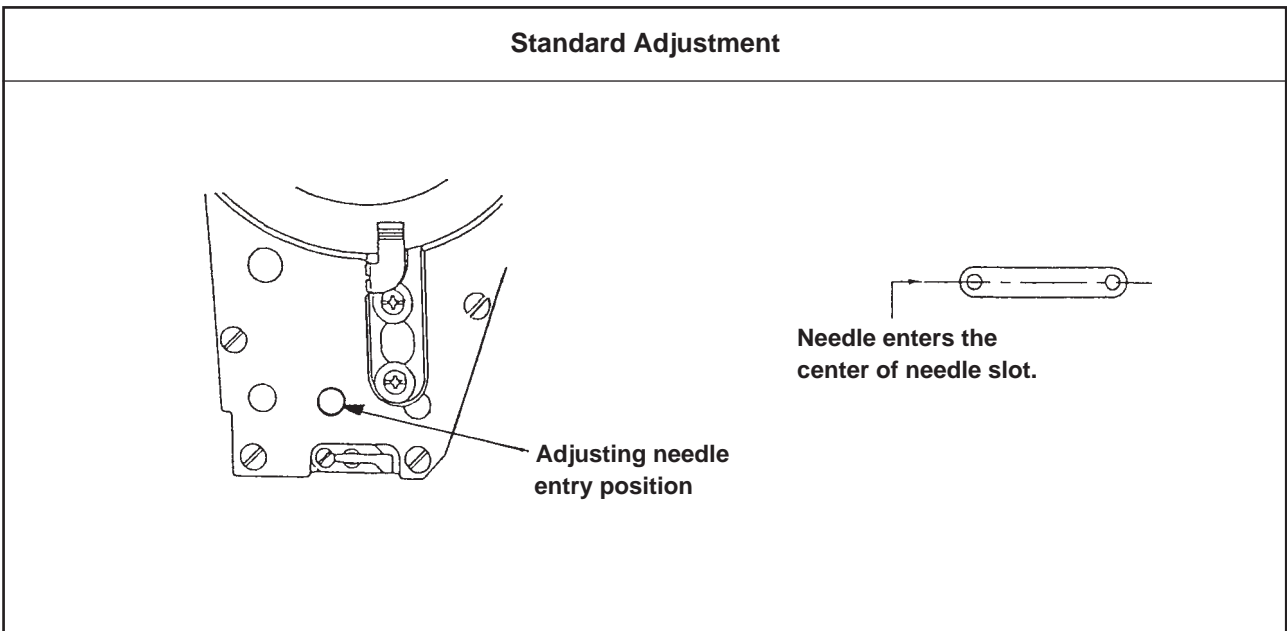
(7) Adjusting the needle entry position (In terms of needle rocking direction)




(8) Adjusting the longitudinal play at the needle bar



(9) Adjusting the needle entry position (In terms of longitudinal direction)

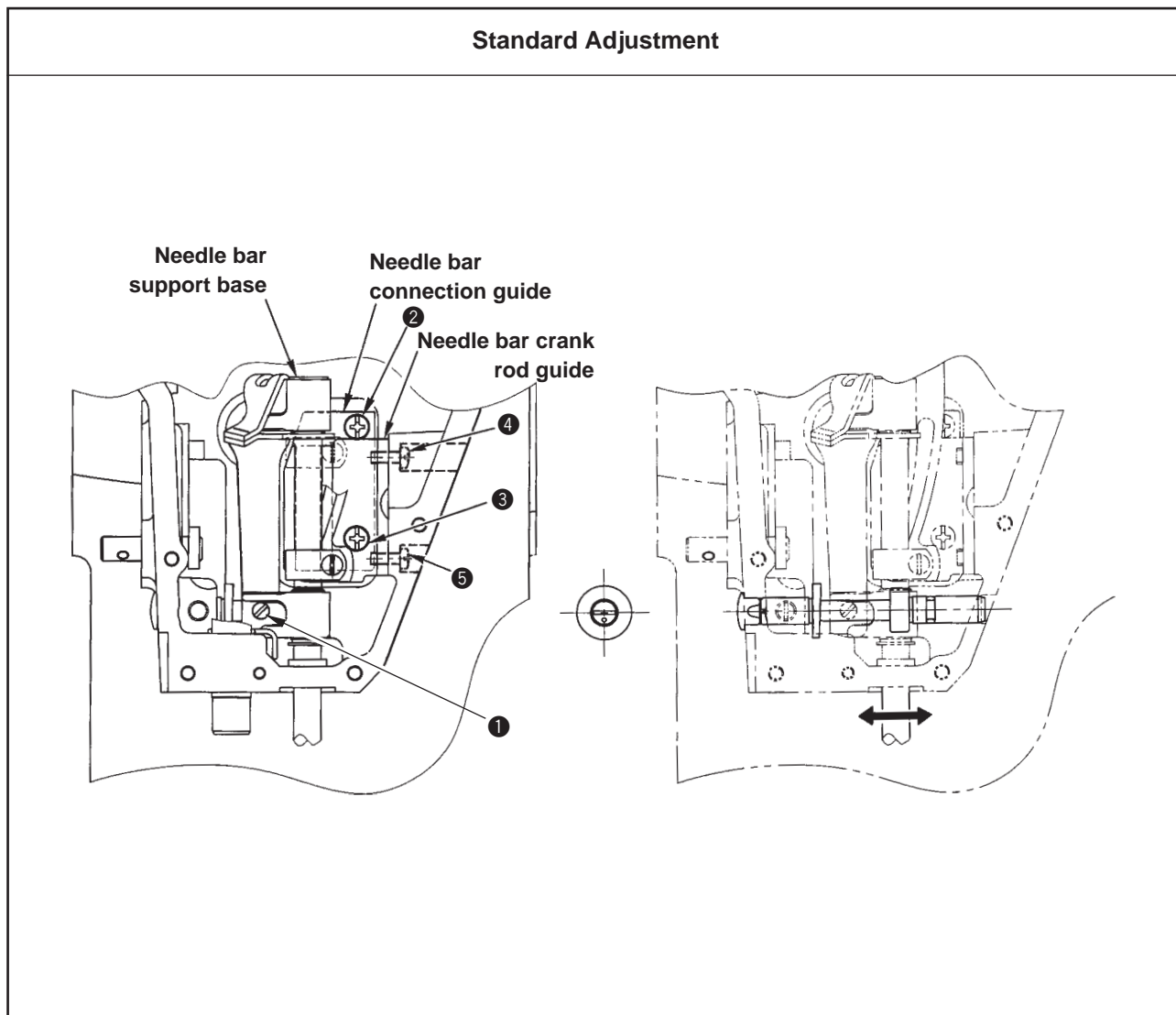


Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen setscrews ② and remove bobbin winder unit ①.</p> <p>2) Set both zigzag width and stitch base line to the position of "0". Set the position of the needle to the center and temporarily tighten it.</p> <p>3) Set the zigzag width to 8 mm which is factory-adjusted at the time of delivery, and securely tighten screw ③ at the position where the clearances of zigzag widths A and B are equal.</p> <p>Conditions : Needle enters the center of zigzag width. : Max. zigzag width (8 mm)</p>  <p>(Caution) Do not flap or strongly press the needle bar at the time of adjustment.</p>	<ul style="list-style-type: none"> ○ Thread will not be uniformly tensed when the needle throws to the right and left, or thread breakage or needle breakage will result.

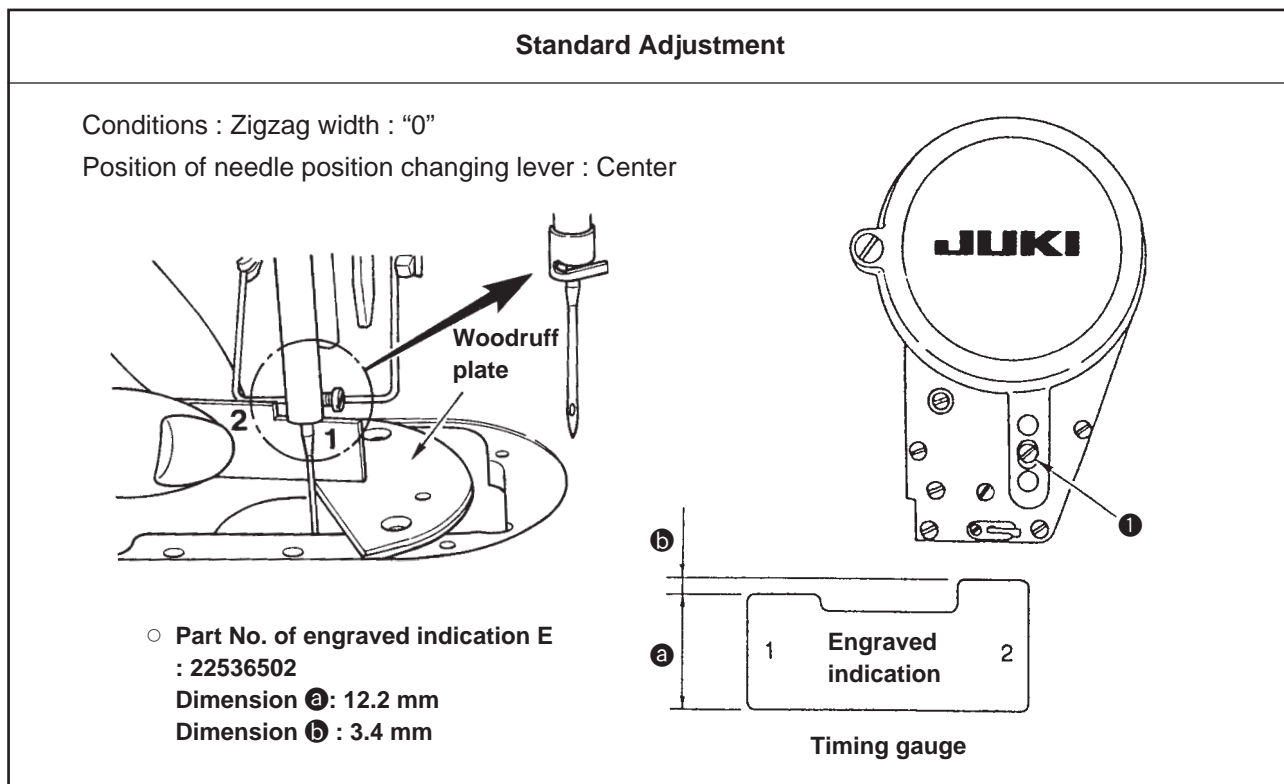
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen screw ① in the face plate.</p> <p>2) Remove rubber cap ②. Then tighten screw ① while pressing pin ③ in the needle bar support base guide located inside the face plate with a screwdriver.</p> <p>3) At this time, move the needle bar to the right and left by hand to confirm that there is neither extra load nor a longitudinal play.</p> <p>4) If the load applied to the needle bar and the longitudinal play existing at the needle bar at the rightmost needle throw position differ from those at the leftmost needle throw position, perform the adjustment by turning pin ③ in the needle bar support base guide to change the orientation of the engraved marker dot (toward the direction where the load and play are larger).</p> <p>(Caution) Be sure to check the longitudinal play at the needle bar support base. In the case where there is any longitudinal play or extra load, the needle throwing action will be affected.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen the screw, which can be observed through the hole for adjustment, in the needle bar support base guide shaft with the face plate attached.</p> <p>2) Move the needle bar back or forth to adjust so that the needle enters the center of the needle slot in the throat plate.</p> <p>3) Fix the needle bar support base guide shaft.</p> <p>4) Be sure to check the needle throw torque applied to the needle bar support base.</p> <p>(Caution)</p> <ol style="list-style-type: none"> 1. The needle entry position in terms of the longitudinal direction should be finely adjusted. If the needle bar has to be moved by a large margin for the adjustment of the needle entry position in case of replacement of gauges, carry out the adjustment referring to "(10) Position of the needle bar connection guide". 2. Be sure to check the left/right plays at the needle bar support base. In the case where there is any extra load applied to the base, needle throwing action will be affected. 	

(10) Position of the needle bar connection guide



(11) Height of the needle bar



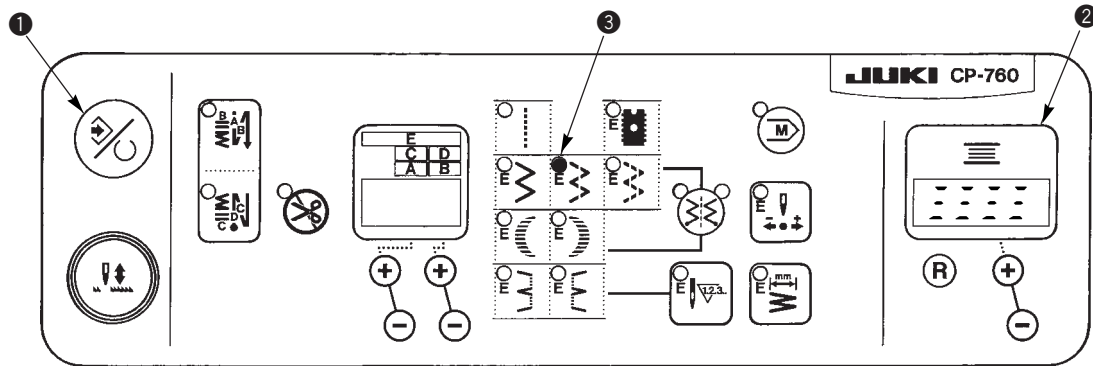
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Loosen the screw in the needle bar support base shaft referring to “(7) Adjusting the position of needle entry (in terms of the needle rocking direction)”. 2) Remove the thread take-up cover, thread take-up and face plate. Then loosen screws ② and ③ in the needle bar connection guide together with screws ④ and ⑤ in the needle bar crank rod guide. 3) Loosen screw ① in the needle bar support base guide shaft and adjust the needle entry point in terms of longitudinal direction. Then tighten the screw. (Refer to “(9) Adjusting the needle entry position (in terms of longitudinal direction”).) 4) Bring the needle bar to the lower dead position. Move the needle bar support base in the needle rocking direction until a position at which the base smoothly slide without a play is found. Now, temporarily tighten screw ③ in the needle bar connection guide. 5) Bring the needle bar to the upper dead position. Move the needle bar support base in the needle rocking direction until a position at which the base smoothly slide without a play is found. Now, temporarily tighten screw ② in the needle bar connection guide. 6) Sliding the needle bar support base, tighten screws ② and ③ in the needle bar connection guide. 7) Tighten screws ④ and ⑤ in the needle bar crank rod guide the same as the steps 4), 5) and 6). * Set the needle throw torque at the needle bar support base to 500g or less. 8) Tighten the screw in the needle bar support base shaft referring to “(7) Adjusting the position of needle entry (in terms of the needle rocking direction”. 9) Attach the thread take-up cover, thread take-up and face plate in position. <p>(Caution) Be sure to check the longitudinal play at the needle bar support base. In the case where there is any longitudinal play or extra load, the needle throing action will be affected.</p>	

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Set the mode to the hook adjusting mode. (See p.18.) 2) Remove the presser foot, throat plate, woodruff plate and feed dog. 3) Place the woodruff plate on the surface of the machine bed onto which the throat plate is to be attached. Now, loosen screw ① and adjust so that the distance from the top face of the woodruff plate to the bottom end of the needle bar is equal to the height of the “1” side of the timing gauge. <p>(Caution) Thickness of the throat plate may be different from that of the woodruff plate. So, be sure to use the woodruff plate for the adjustment. (Thickness of the woodruff plate : 2 mm)</p> <ul style="list-style-type: none"> ○ Engraved indication “1” side is the height of the needle bar and “2” side the needle-to-hook timing. <p>(Caution) Even when the timing gauge is used, the indented part of the needle may come in contact with the blade point of the hook in accordance with the kind or size of the needle. In this case, slightly lower the needle bar to adjust the height to the indented part of the needle. For the LZ-2290 Series, use timing gauge E.</p>	

(12) Adjusting the needle-to-hook timing and the needle guard

Standard Adjustment

- Hook adjusting mode



- Lifting amount of the needle (bar) : 3.4 mm

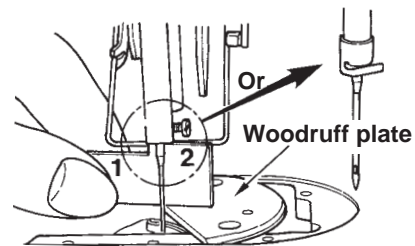
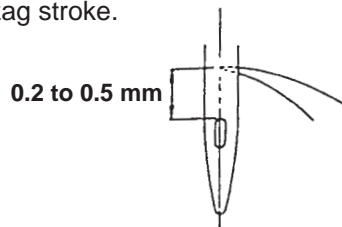


Fig. 1

- When the zigzag width is maximized, a distance of 0.2 to 0.5 mm should be provided between the top end of the needle eyelet and the blade point of the hook when the needle reaches the leftmost end of the zigzag stroke.



Fit the blade point of the hook onto the indented part of the needle.
(Approximately 0.05 mm)



Fig. 2

- The needle guard :
 - has to guard the needle both on the right- and left-hand sides.
 - A clearance of 0 to 0.05 mm should be provided between the needle and the blade point of the hook (when the needle reaches the rightmost end of the zigzag stroke).

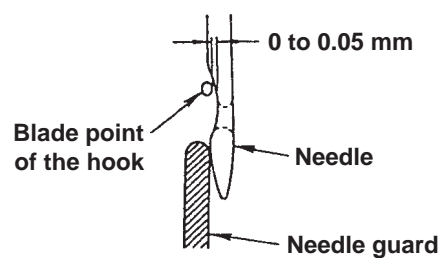
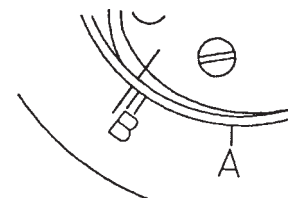


Fig. 3






Remarks Marker lines engraved on the face plate

- The needle-to-hook timing is adjusted using the timing gauge as described above. However, you can use the marker lines engraved on the face plate for reference when adjusting it.
- Be sure to remember that the marker lines are used only for reference. So, it is recommended to use the timing gauge for adjusting the needle-to-hook relation so as to make the most out of many functions of the LZ-2290 Series models of sewing machine.



Adjustment Procedures

- 1) Pressing setting switch ❶, turn ON the power when performing hook adjustment.
- 2) At this time, bobbin thread counter ❷ displays lateral three bars.
- 3) The sewing machine does not run even when depressing the front part of pedal during the hook adjusting mode.
- 4) Zigzag operation works by turning the handwheel by hand.
- 5) For hook adjustment, make use of 2-step zigzag pattern ❸ to adjust left/right/center.
- 6) To return from hook adjusting mode to normal sewing mode, turn off/on the power.
- 7) Set the needle bar to the position of zigzag width "0", and adjust so that the blade point of the hook is brought to the center of the needle at the height of the timing gauge on which "2" is engraved. (Fig. 1)
- 8) At this time, adjust so that the blade point of the hook slightly comes in contact with the needle when the needle guard does not come in contact with the needle (Fig. 2). Then tighten the screw in the hook.
- 9) Maximize the zigzag width (see the table below). Adjust by bending the needle guard so that the needle comes in contact with the needle guard and does not come in contact with the blade point of the hook at both the rightmost and leftmost needle throwing positions. At this time, adjust so that a clearance of 0 to 0.05 mm is provided between the needle and the blade point of the hook at the rightmost needle throwing position. (Fig. 3)

Name of pattern	Stitch pattern	Max. zigzag width
Standard zigzag		8 mm
2-step zigzag		10 mm
3-step zigzag		10 mm
Scallop		8 mm
Blind stitch		8 mm
Custom pattern	-	8 mm

(Caution)

1. Hook is common to the LZ-2290 Series.
Part No. is 225258. Designate the hook with the part No. when replacing it.
2. When changing the kind or size of the needle, be sure to check the clearance between the needle and the blade point of the hook.
3. The maximum zigzag width is regulated to 8 mm since the standard gauge is 8 mm at the time of delivery.

Results of Improper Adjustment

- If the timing relation between the needle and the blade point of the hook is excessively advanced, smaller thread loops will be made particularly when the needle throws to the right or stitch skipping and thread breakage will result.
- If the timing relation between the needle and the blade point of the hook is excessively retarded, larger thread loops will be made particularly when the needle throws to the left resulting in tilted thread loops and stitch skipping.
- If the needle guard does not come in contact with the needle, the needle vibrates when the sewing machine runs at high speed resulting in thread breakage and stitch skipping.
- If the needle comes in contact with the blade point of the hook, the blade point will be damaged resulting in an extraordinary shortened service life of the hook.

(13) Position of the bobbin case stopper

Standard Adjustment

- The bobbin case stopper should be located within the range from the position at which top end **A** of the bobbin case stopper is aligned with line **B** to the position that is 0.5 mm away from line **B** in direction **C**.

Bobbin case stopper ②

Screw ①

(14) Orientation of the needle bar thread holder

Standard Adjustment

- The needle bar thread holder varies in accordance with the needle bar.

1) In case of no flat portion at the bottom end of needle bar

Install the holder so that the flat portion at the bottom end of needle bar faces to this side, or the right end faces to the rear end.

Front **(Good)** **(No good)**

2) In case where the flat portion is at the bottom end of needle bar

Install the holder so that the thread hole faces to this side.

Front **(Good)** **(No good)**

- There are three different kinds of the needle bar thread holders.

(1) **(2)** **(3)**

(1) In use of without auxiliary thread take-up and without flat portion at the bottom of needle bar

(2) In case of with auxiliary thread take-up and with flat portion at the bottom of needle bar

(3) In case of without auxiliary thread take-up and with flat portion at the bottom of needle bar (Used for the machine equipped with the wiper)

	Needle bar
Without flat portion (Part No. : 22507800)	
With flat portion (Part No. : 22507503)	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen screw ❶ and adjust the position of bobbin case stopper ❷ by turning the entire unit of the bobbin case stopper.</p> <p>(Caution) After the position of the bobbin case stopper has been adjusted, turn the bobbin case by fingers in the reverse direction of rotation to confirm that the bobbin case will never slip out of the small claw.</p>	

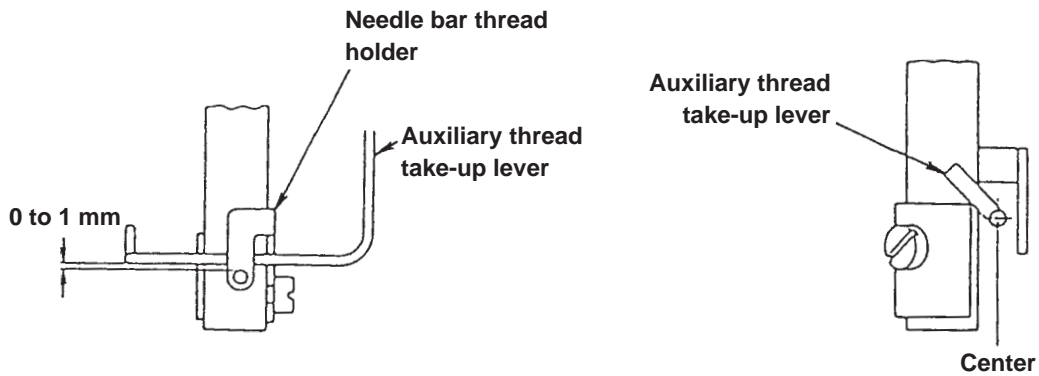
Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ Loosen needle clamp screw ❷ or needle bar thread holder screw ❶, and adjust the position of needle bar thread holder ❸ with respect to the needle bar. ○ Loosen the screw in the needle bar connection, and adjust the entire unit of the needle bar and needle bar thread holder. 	<ul style="list-style-type: none"> ○ If the orientation of the needle bar thread holder is not properly adjusted, the thread is likely to untwist resulting in thread breakage.

(15) Auxiliary thread take-up lever

Standard Adjustment

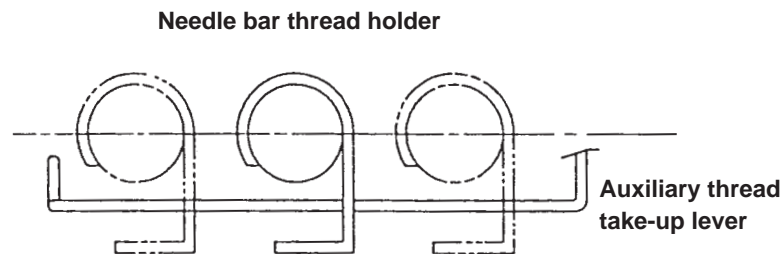
○ Vertical position

When the needle bar is in the lowest position of its stroke, the distance from the top end of the eyelet in the needle bar thread holder to the bottom end of the auxiliary thread take-up lever should be 0 to 1 mm.



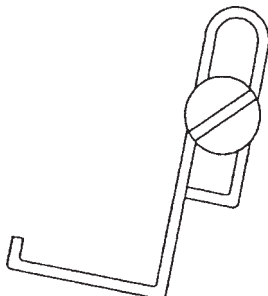
○ Longitudinal position

The auxiliary thread take-up lever, as observed sideways, moves the center of the needle bar and needle bar thread holder while keeping in parallel to the needle rocking stroke.

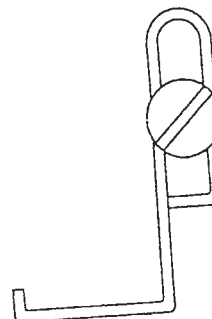


In parallel to the needle rocking stroke

Even when the auxiliary thread take-up lever is positioned with its left-hand side raised, no problem will result. ()

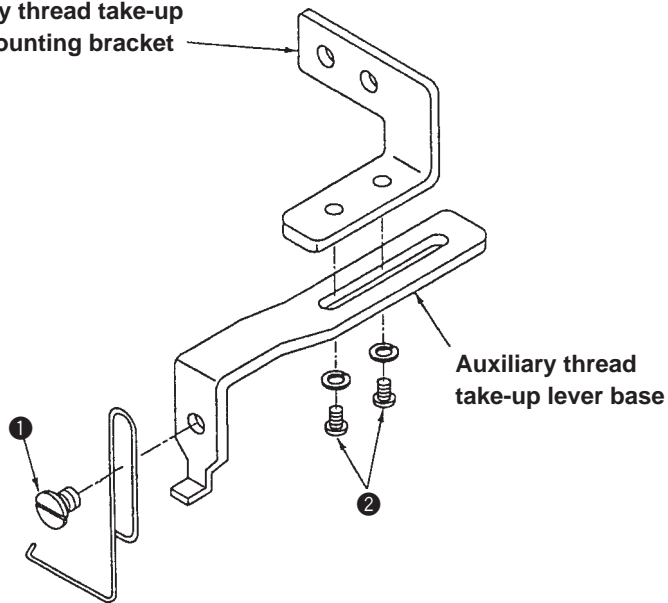


The position of the auxiliary thread take-up lever is not acceptable when it is positioned with its left-hand side lowered. (X)



Adjustment Procedures

Auxiliary thread take-up lever mounting bracket

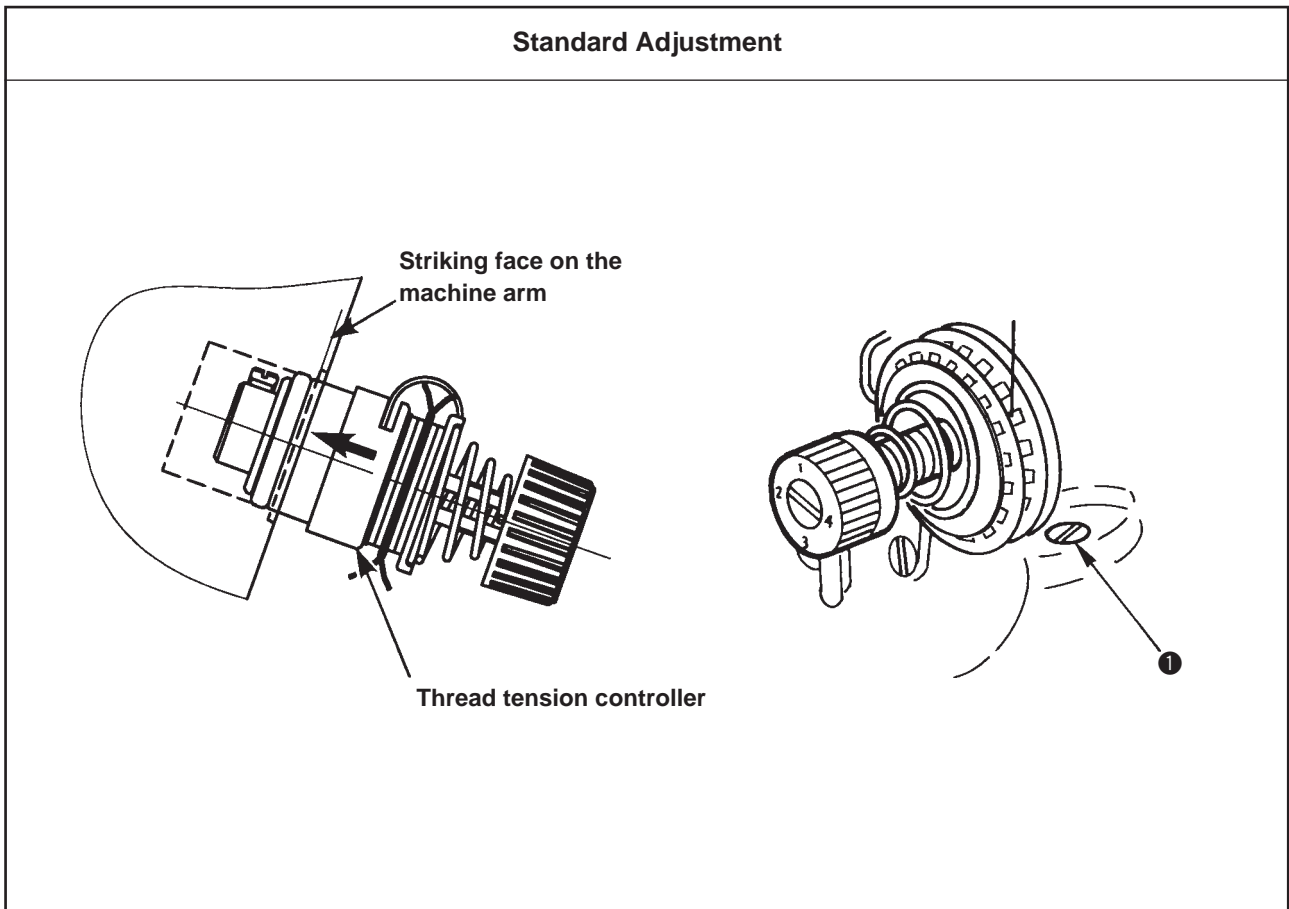


- 1) Loosen screw ①, and adjust the vertical position of the auxiliary thread take-up lever. At this time, carefully position the auxiliary thread take-up lever so that it is leveled or its left-hand side is raised.
- 2) Loosen screws ②, and adjust the longitudinal position of the auxiliary thread take-up lever. Use a thicker one of the hexagon wrench keys supplied with the machine as accessories. At this time, adjust so that the auxiliary thread take-up lever is in parallel to the needle rocking stroke and tighten the screws.

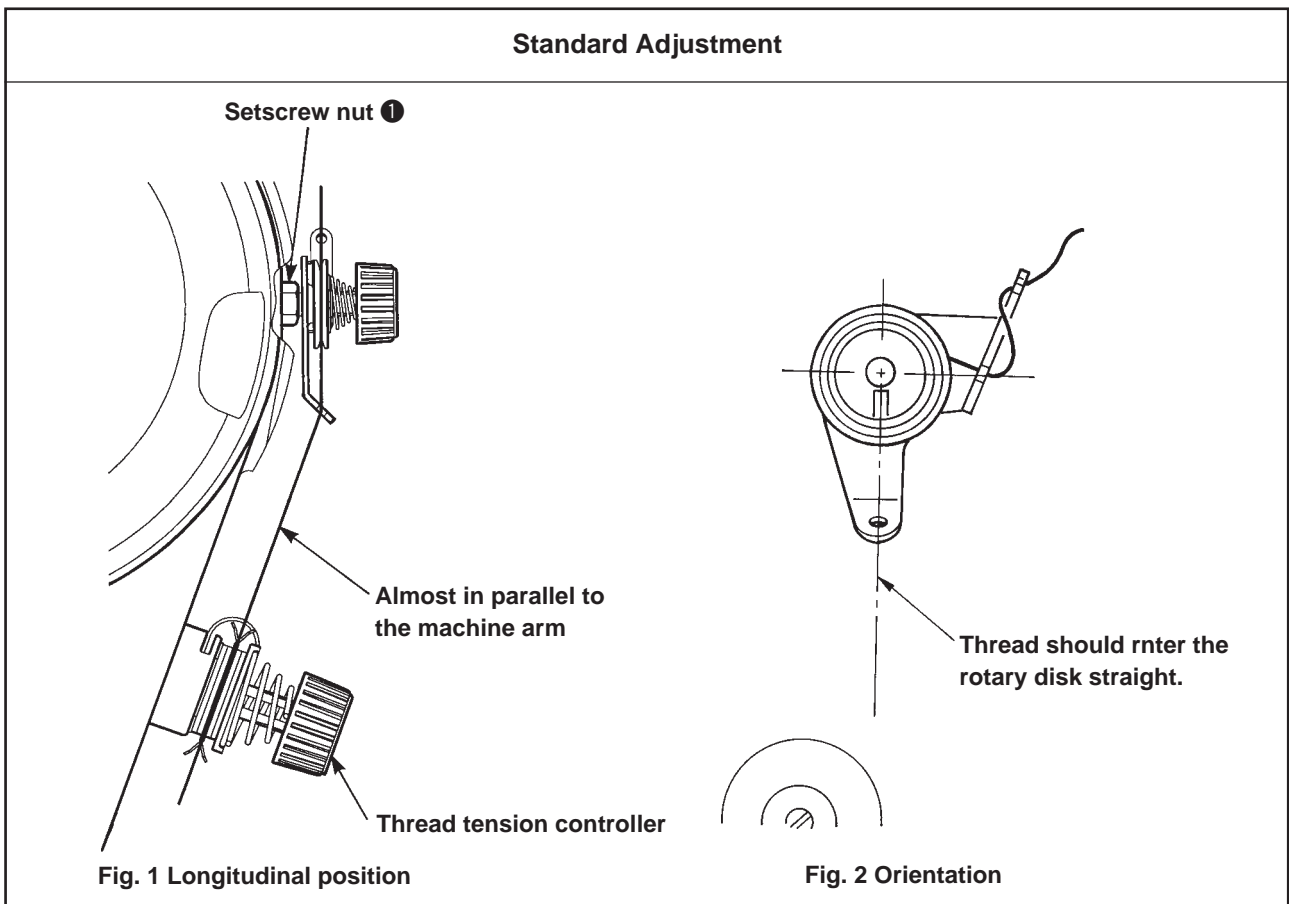
Results of Improper Adjustment

- If the auxiliary thread take-up lever is lowered from the correct vertical position, the thread take-up amount of the auxiliary thread take-up lever will be decreased and larger thread loops will be produced.
- On the contrary, if the auxiliary thread take-up lever is raised, the thread take-up amount of the auxiliary thread take-up lever will be increased and smaller thread loops will be produced.
- If the auxiliary thread take-up lever is excessively raised from the correct vertical position, the auxiliary thread take-up lever will come in contact with the needle bar thread holder. So, be careful.
- If the longitudinal position of the auxiliary thread take-up lever is not proper or the auxiliary thread take-up lever is not in parallel to the needle rocking stroke, thread breakage and stitch skipping will be caused.

(16) Position of the thread tension



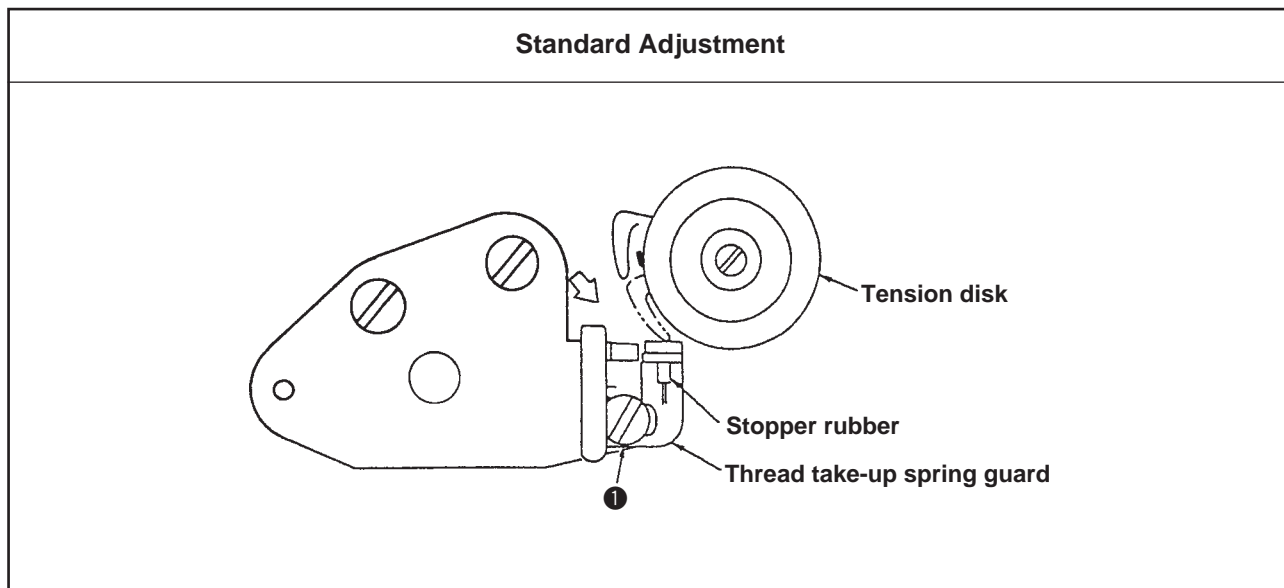
(17) Position of the pre-tension



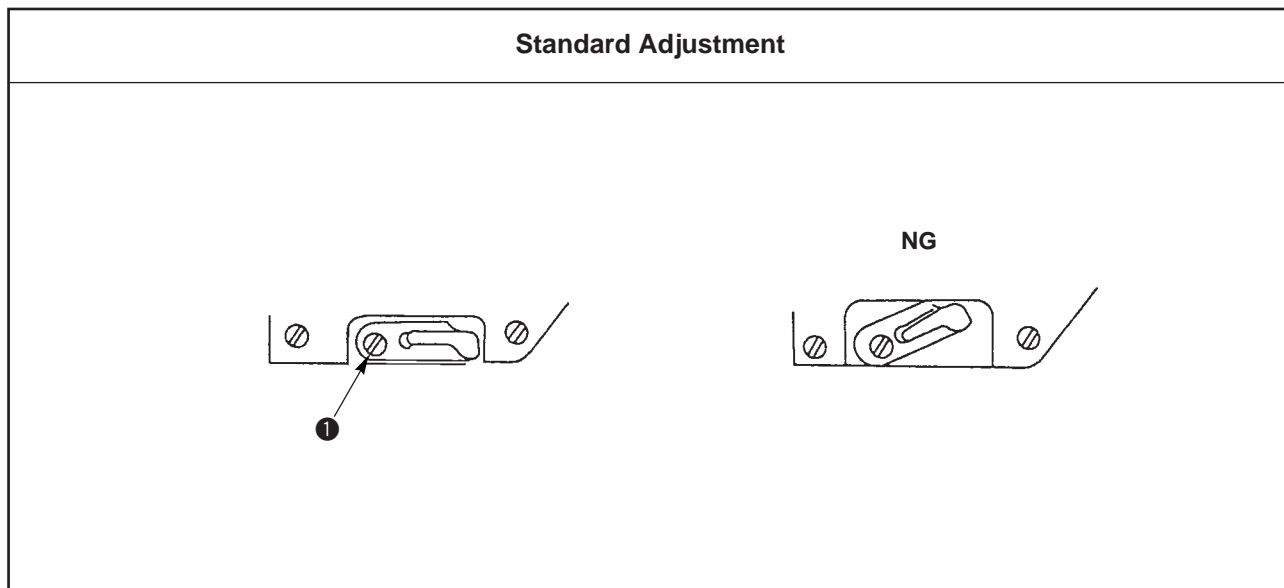
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen screw ❶, and adjust the position of the thread tension in the state that the thread tension controller is pushed to the striking face on the machine arm.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen setscrew nut ❶, and adjust the longitudinal position of the pre-tension so that the thread is in parallel to machine arm as illustrated in Fig. 1.</p> <p>2) Adjust the orientation of the pre-tension so that the thread enters the rotary disk straight.</p> <p>3) Adjust the pressure of the pre-tension so that the rotary disk rotates smoothly.</p>	<ul style="list-style-type: none"> ○ If the orientation of the pre-tension is improper, the thread is bent, and unstable tension and slip of the rotary disk will occur resulting thread breakage or stitch skipping. 1) Pressure of the pre-tension is excessively low : Rotary disk does not rotate smoothly, and defective stitching or thread breakage will occur. 2) In case of the sewing machine with thread trimmer, if the pressure of the pre-tension is excessively high : Thread slip at the needle top after thread trimming or thread slip at the needle top at the start of sewing will occur.

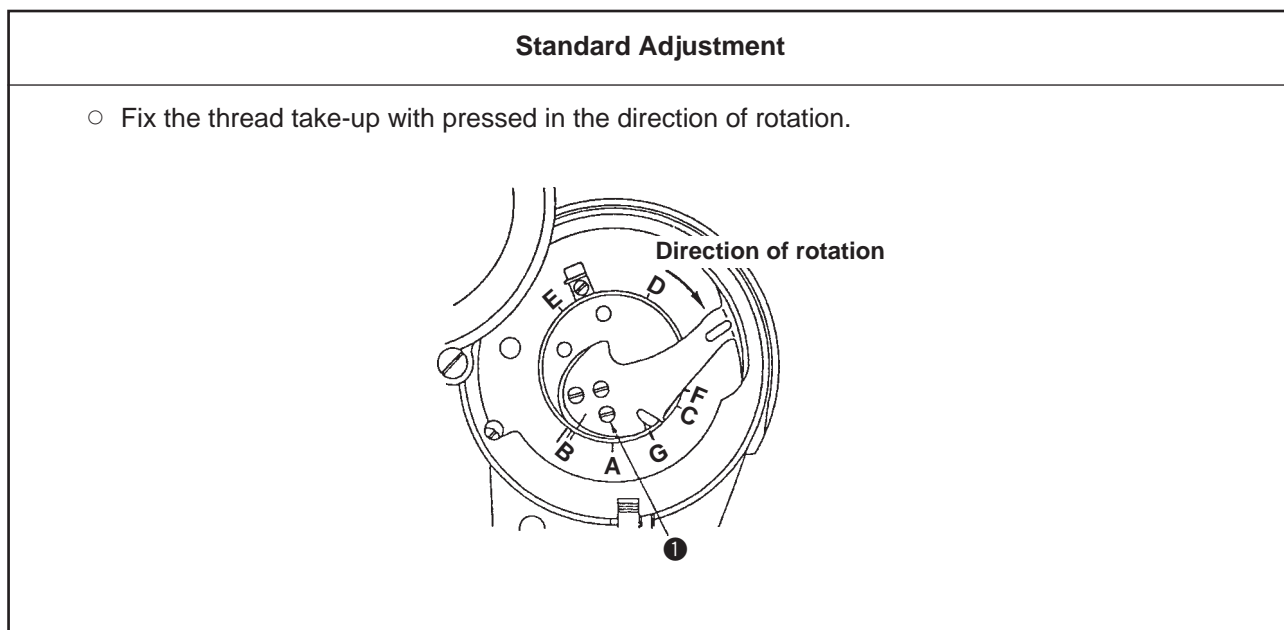
(18) Position of the thread take-up spring guard



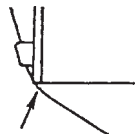
(19) Installing the thread take-up thread guide B



(20) Installing the thread take-up



Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> Loosen screw ①, and adjust the position of the thread take-up spring guard so that the stopper rubber does not come in contact with the outer periphery of the thread tension disk. 	

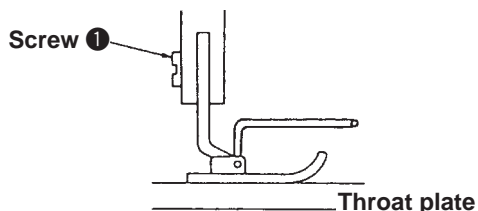
Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> Loosen the screw ①, and adjust the position of the thread take-up thread guide B so that is installed with leveled. 	<ul style="list-style-type: none"> If the thread take-up guide B is installed with faced upward, the thread will come in contact with the edge of the machine arm. This will adversely affect the quality of the finished seam. 

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> Slightly tighten three screws ①. Then tighten screws ① with the thread take-up pressed in the direction of rotation. 	<ul style="list-style-type: none"> If the thread take-up is not fixed taking the correct method, timing of the thread take-up with respect to the needle bar and the feed mechanism will change. This will change the feeling of finished seam or cause thread breakage.

(21) Installation of the presser foot

Standard Adjustment

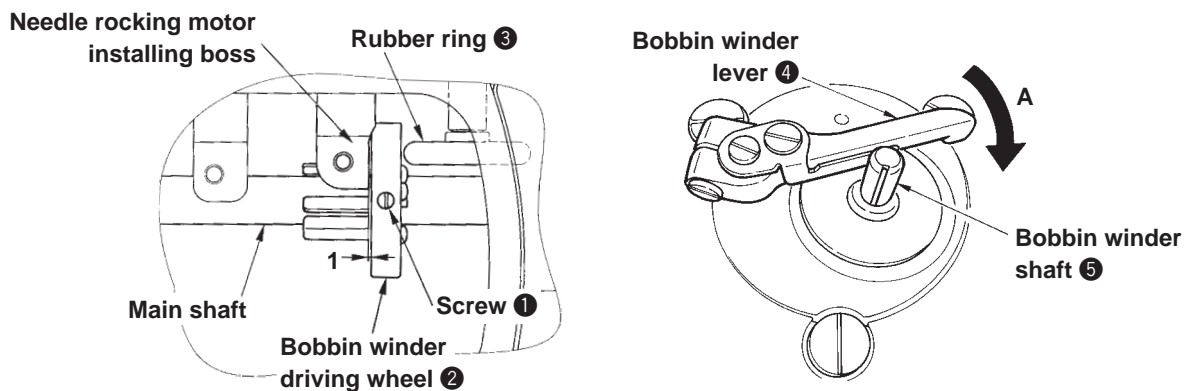
- The top surface of the throat plate should be closely fitted on the reverse side of the presser foot.



(22) Installing and adjusting the bobbin winder unit

Standard Adjustment

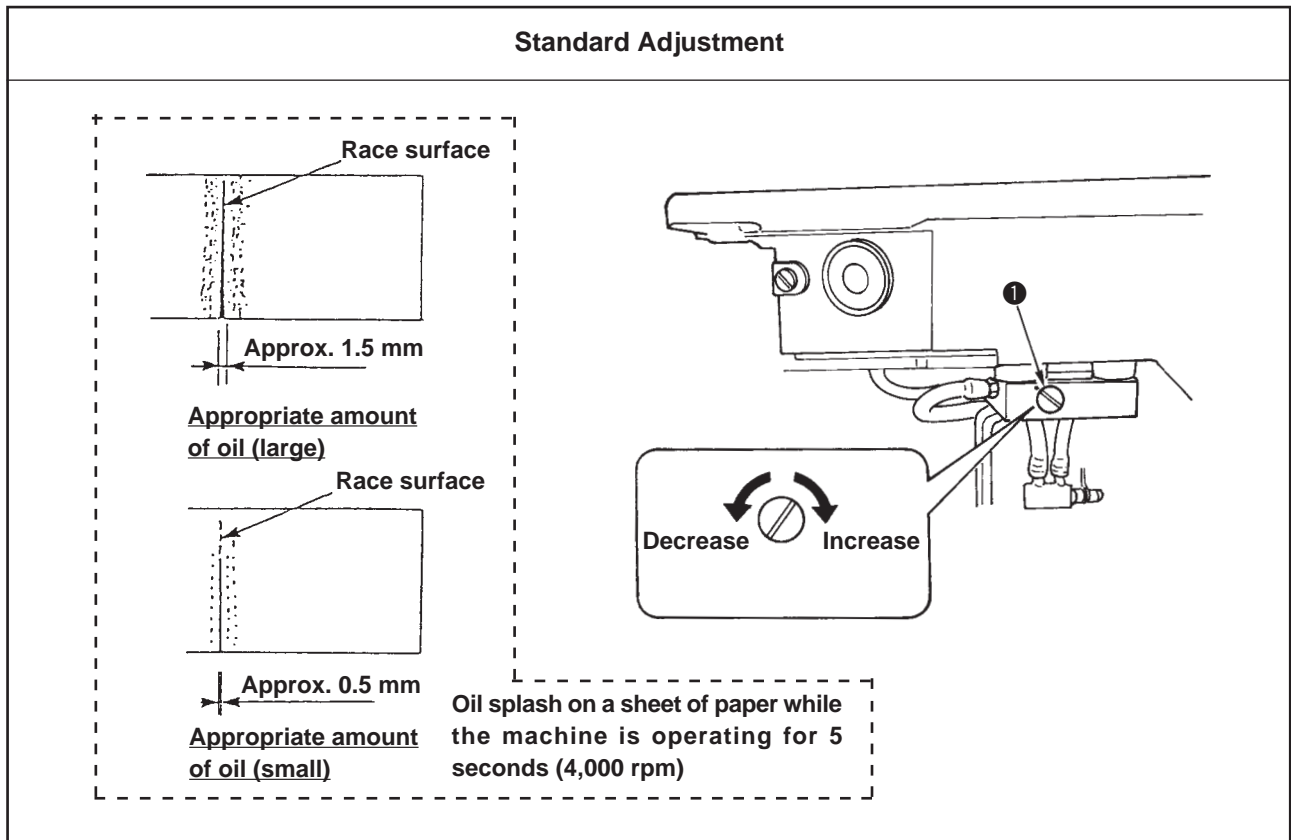
- A clearance of 1 mm should be provided between the end of needle rocking motor installing boss and the bobbin winder driving wheel (asm.).
At this time, tilt the bobbin winder lever in the direction A and adjust so that the bobbin winder shaft does not rotate when turning the bobbin winder shaft by hand.



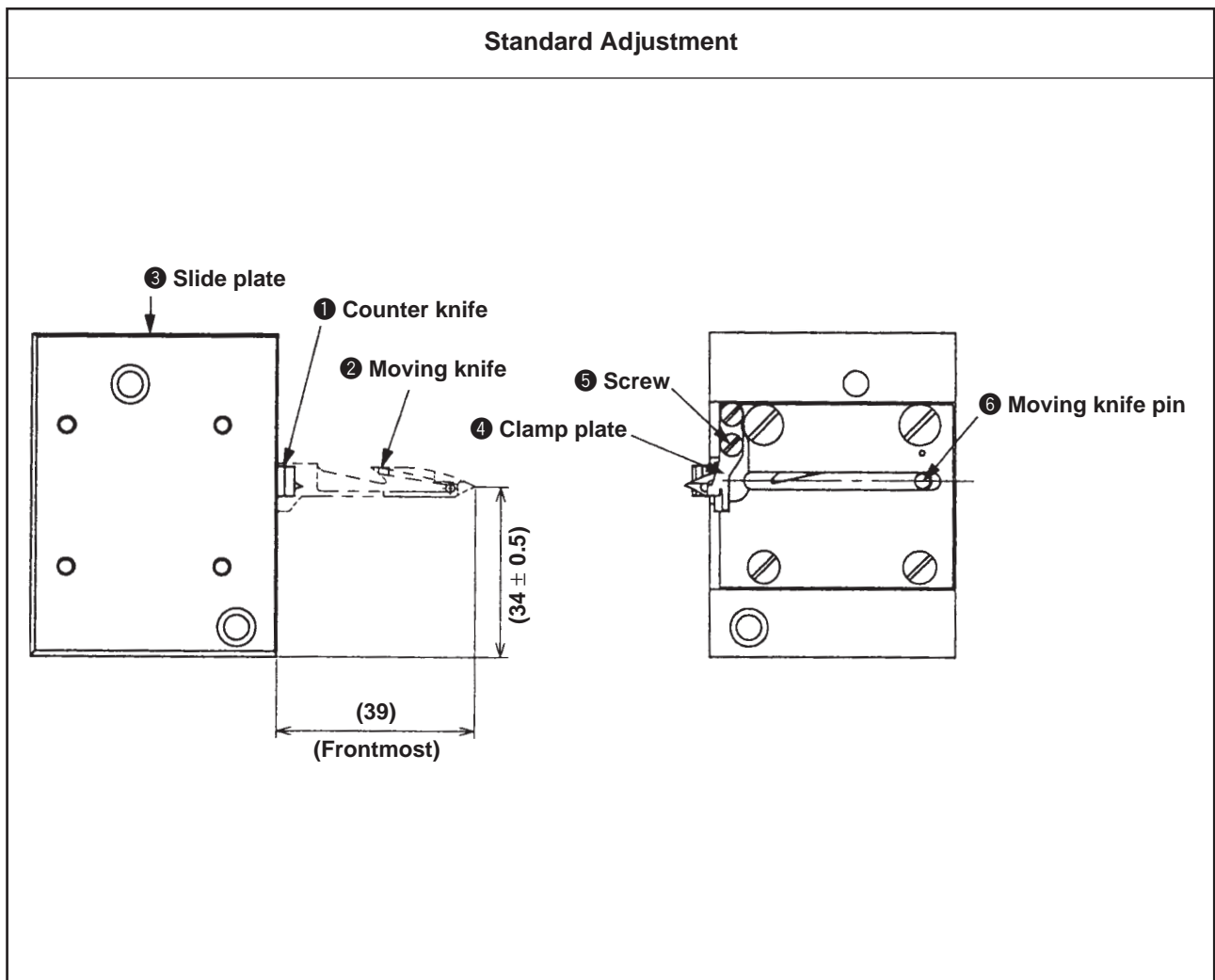
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Put the presser foot in the presser bar, and insert screw ❶. At this time, do not tighten screw ❶. 2) Turn the handwheel until the feed dog descends under the top surface of the throat plate. 3) Applying a pressure onto the presser foot, tighten screw ❶ with the sole of the presser foot closely fitted on the top surface of the throat plate. 	<ul style="list-style-type: none"> ○ If the presser foot is not closely fitted on the throat plate, the material will not be fed straight and the material will flop causing thread breakage and stitch skipping.

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Loosen screws ❶. 2) In the state that bobbin winder lever ❷ is tilted in the direction A, slightly press bobbin winder driving wheel ❸ to rubber ring ❹ of the bobbin winder unit. 3) Temporarily tighten screws ❶ and in the state that bobbin winder lever ❷ is tilted in the direction A, turn bobbin winder shaft ❸ by hand, and check that the bobbin winder shaft does not rotate. If bobbin winder driving wheel ❸ and rubber ring ❹ shift with each other, adjust again. 4) Securely tighten screws ❶. <p>(Caution) The rubber ring is the article for consumption. If the rubber ring is excessively worn out, replace it with a new one. Part No. : A321600100A</p>	<ul style="list-style-type: none"> ○ When turning the bobbin winder shaft by hand in the state that the bobbin winder lever is tilted in the direction A, if the bobbin winder shaft rotates, the bobbin thread is not completely wound up. ○ If the bobbin winder driving wheel and the rubber ring are strongly pressed with each other, the service life of the rubber ring is shortened.


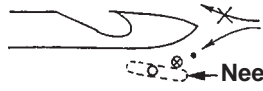
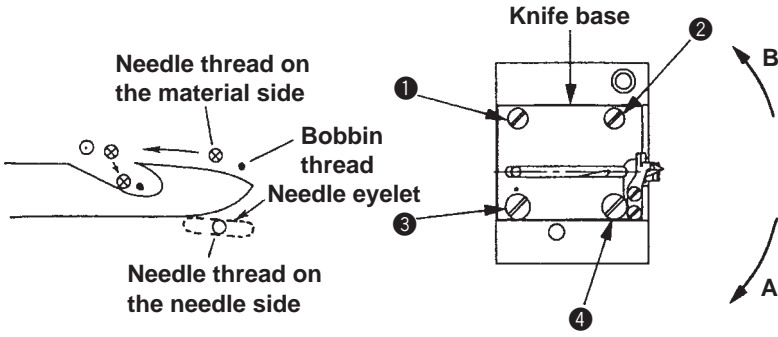
(23) Adjusting the amount of oil in the hook (LZ-2290SS/-7, LZ-2290SU/-7)



(24) Adjusting the thread trimming unit



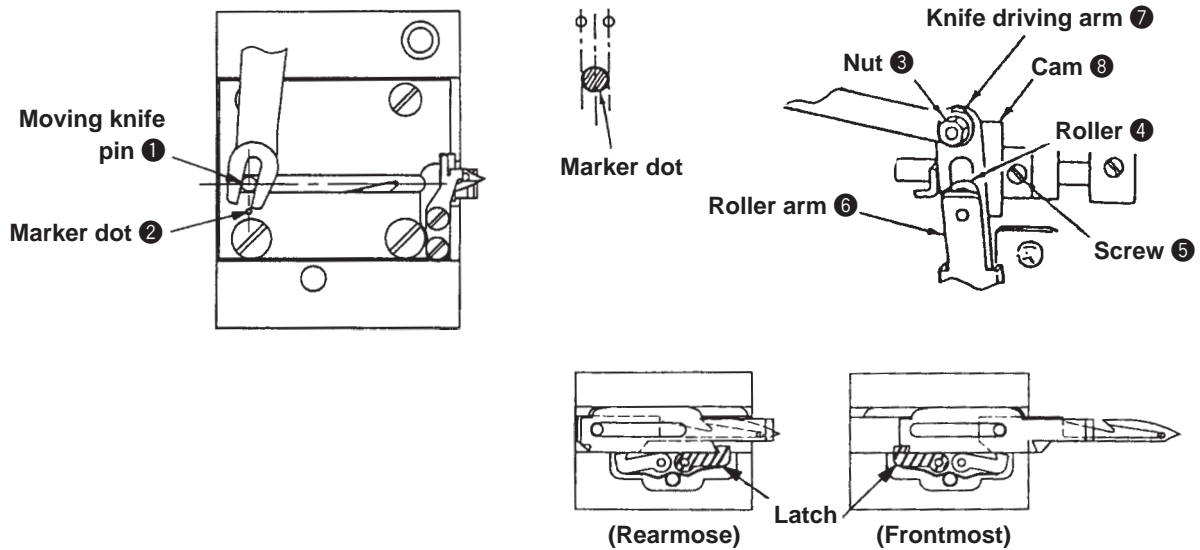
Adjustment Procedures	Results of Improper Adjustment
<p>The amount of oil in the hook can be adjusted with oil amount adjusting screw ❶.</p> <p>1) Adjusting procedure Turning (clockwise) oil amount adjusting screw ❶ increases the oil amount in the hook and turning (counterclockwise) it decreases the oil amount in the hook.</p>	

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ Move moving knife ❷ forward until it will go no further (by approximately 39 mm) and confirm that the end of slide plate ❸ is spaced 34 ± 0.5 mm from the top of the moving knife. ○ Adjust the operating pressure of counter knife ❶ and moving knife ❷ by tightening screw ❺ in clamp plate ❹ . At this time, the force to move moving knife pin ❻ in the direction of the arrow is more or less than 600 gf. ○ If screw ❺ is excessively loose, defective thread trimming may occur. 	<ul style="list-style-type: none"> ○ When the moving knife is positioned in the front : <ul style="list-style-type: none"> 1) In the case where the needle thread is trimmed twice :  <p style="text-align: center;">Needle eyelet</p> ○ When the moving knife is positioned in the rear : <ul style="list-style-type: none"> 2) In the case where the needle thread is not trimmed :  <p style="text-align: center;">Needle eyelet</p>
<ul style="list-style-type: none"> ○ When the moving knife is properly positioned :  	<p>How to solve the aforementioned troubles</p> <ol style="list-style-type: none"> 1) In the case where the needle thread is trimmed twice : Slightly loosen screws ❶ to ❹ , and slant the knife base in the direction A. Then tighten screws ❶ to ❹ . 2) In the case where the thread is not trimmed : Slightly loosen screws ❶ to ❹ , and slant the knife base in the direction B. Then tighten screws ❶ to ❹ .

(25) Initial position of the moving knife

Standard Adjustment

- Moving knife pin ① should be aligned with marker dot ②.
- Acceptable range of the position of moving knife is as wide as the marker dot.

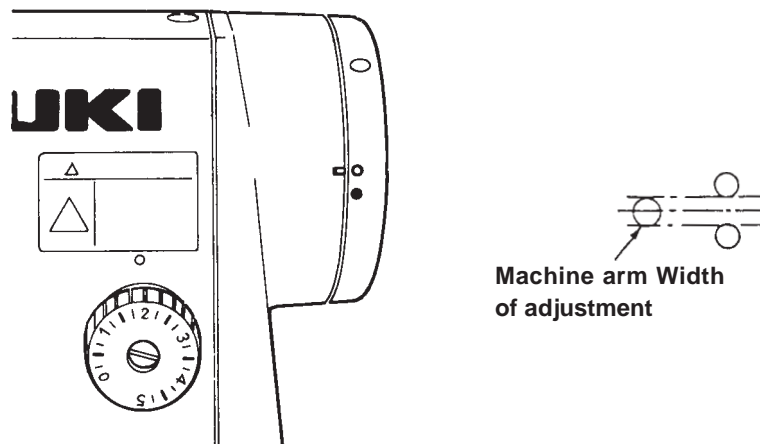


(26) Timing of the thread trimming cam

Standard Adjustment

(See the figure shown above.)

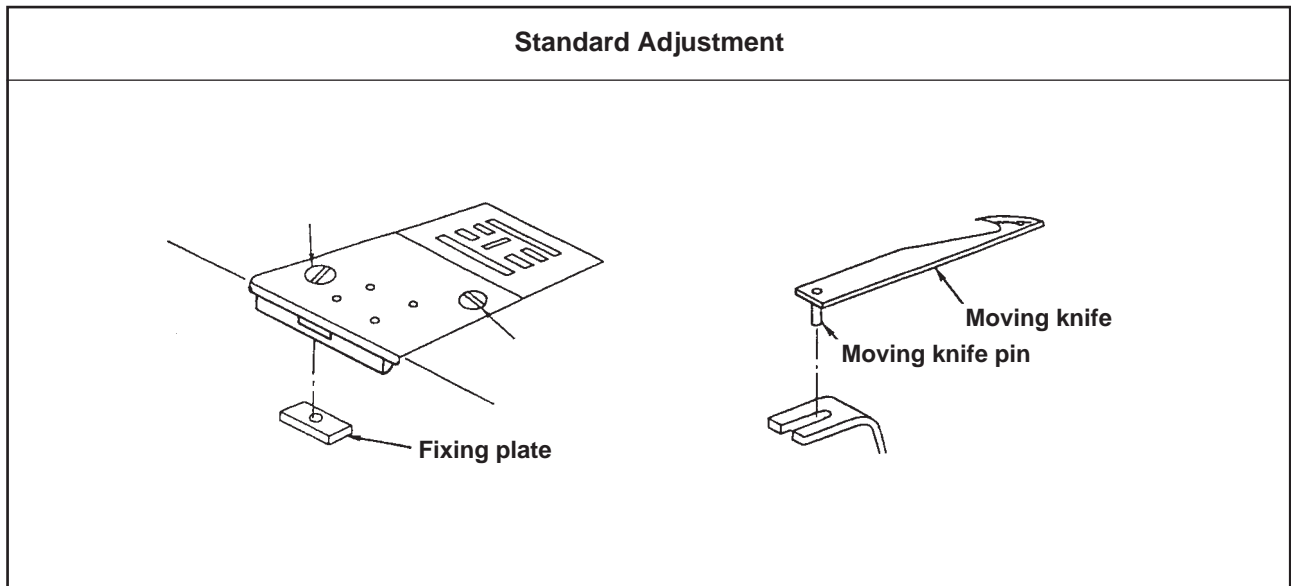
- Press roller arm ⑥ until roller ④ fits in the groove in thread trimming cam ⑧. Now, lightly turn the main shaft handwheel carefully in the reverse direction until it stops. At this time, the marker dot engraved on the machine arm should be aligned with the red marker dot engraved on the handwheel. Adjust the thread trimming cam longitudinally within the width of a dot.



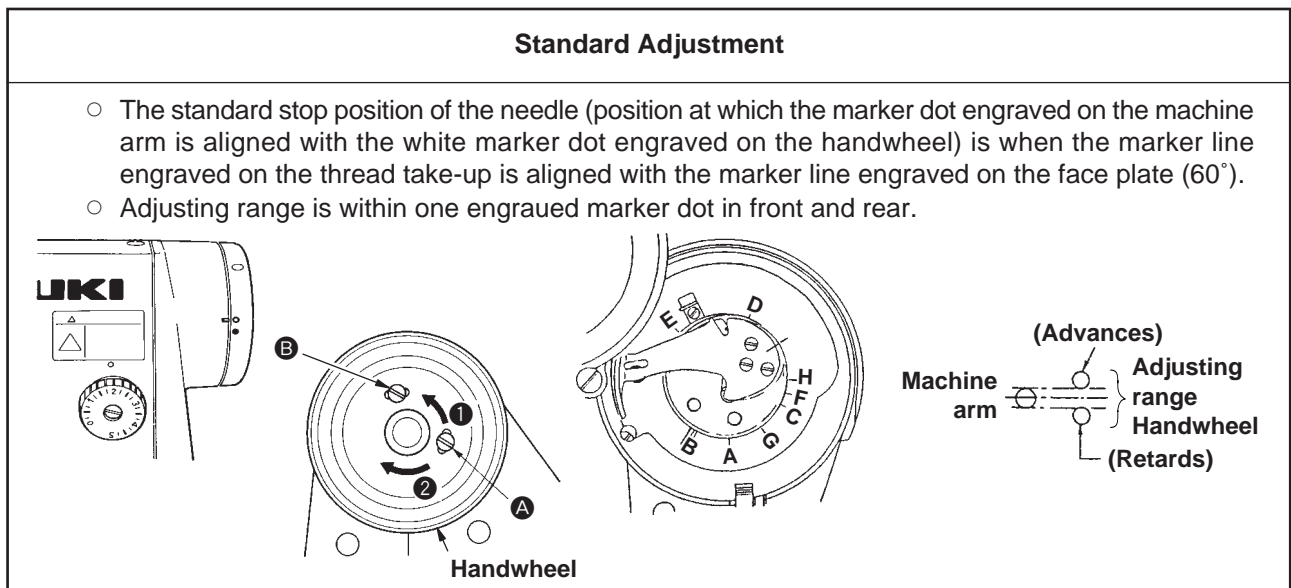
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen nut ③ in the knife driving arm, and adjust the initial position of the moving knife. Loosen/tighten nut ③ after roller has fitted in the groove on the thread trimming cam by pressing roller arm ⑥ with fingers. This will prevent knife driving arm ⑦ from moving out of position thereby allowing you to perform the adjustment in safety.</p> <p>2) After adjusting the initial position of the moving knife, turn the handwheel in the state that roller ④ has fitted in the groove on the thread trimming cam, and check that the latch has securely entered when the moving knife moves forward or backward until it will go no further. (You can hear “click” when the latch has entered.)</p>	<ul style="list-style-type: none"> ○ If the initial position of the moving knife is not properly adjusted, the moving knife will fail to cut the thread or cut the thread at a wrong position reducing the length of remaining thread after thread trimming.

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ If the timing of the thread trimming cam is not correct, adjust it in the following steps of procedure. <ol style="list-style-type: none"> 1) Loosen two screws ⑤ in the cam. 2) Turn the main shaft handwheel until the red marker dot engraved on the handwheel is aligned with the marker dot engraved on the machine arm. 3) Push roller arm ⑥ until the roller fits in the groove on the cam. Lightly push the cam on the pulley side and turn it in the reverse direction until it will go no further. Now, tighten the screws. 	<ul style="list-style-type: none"> ○ If the timing of the thread trimming cam is excessively advanced, the knife will fail to cut the thread or the length of the thread remaining after thread trimming will be decreased resulting in slip-off of the thread. ○ If the timing of the thread trimming cam is excessively retarded, the knife will fail to cut the thread or the moving knife will fail to fully return to the home position making the moving knife projects at the start of sewing.

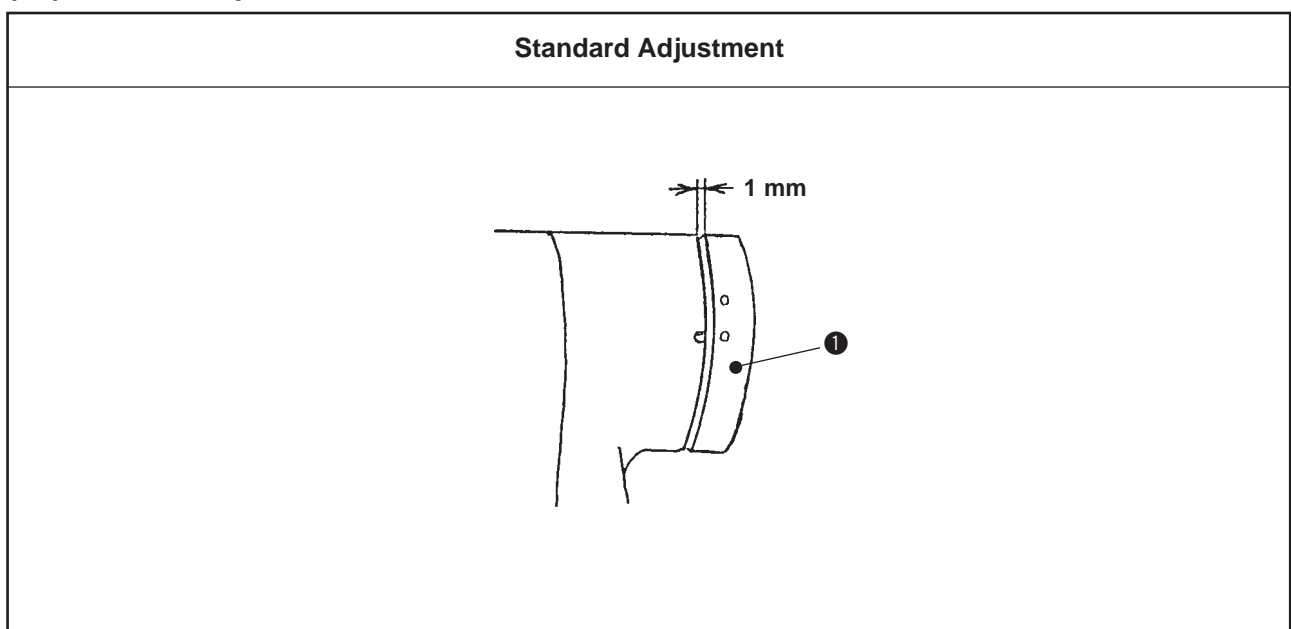
(27) Installing/removing the knife unit



(28) Stop position of the needle after thread trimming



(29) Clearance provided between the main shaft handwheel and the stator



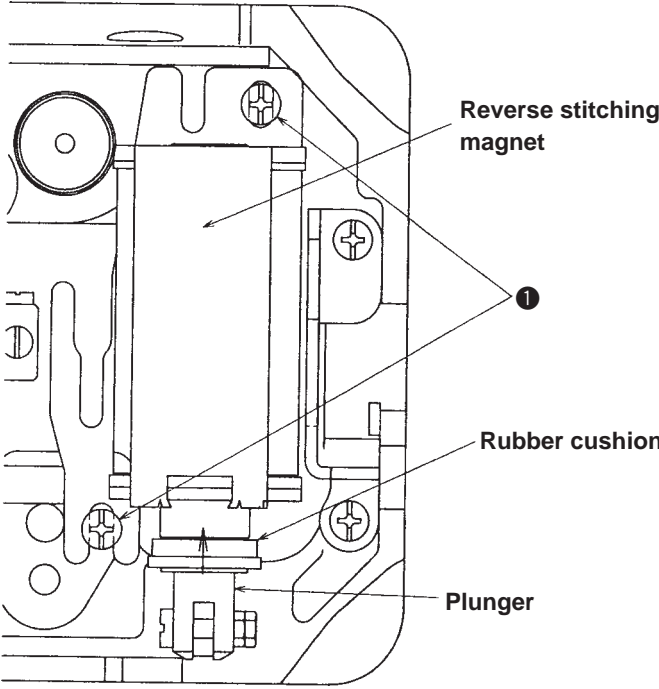
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen screw ❶.</p> <p>2) Remove screw ❷, and the knife unit will come off. Installation is carried out analogously in reverse order.</p> <p>(Caution) When installing the knife unit, take care to allow the moving knife pin to securely rest on the knife yoke.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>○ Stop the needle in its upper stop position. Loosen screw ❶ in the figure and adjust the stop position of the needle by moving the screw within the slot.</p> <ul style="list-style-type: none"> ○ To advance the stop position in the direction ❶ ○ To retard the stop position in the direction ❷ <p>(Caution) Do not rotate the sewing machine with screws ❶ and ❷ loosened during performing adjustment. Be sure only to loosen screws ❶ and ❷ and not to remove them.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Provide a clearance of 1 mm between handwheel ❶ and the pulley cover. If the clearance is excessively narrow, the position detecting magnet comes in contact with the synchronizer, and if it is excessively wide, defective detection may occur.</p> <p>2) Be sure to adjust screw No. 1 in the handwheel to the flat portion of the motor shaft and tighten the screws in the order of No. 1 and No. 2.</p>	

(30) Position of the automatic reverse stitching magnet

Standard Adjustment

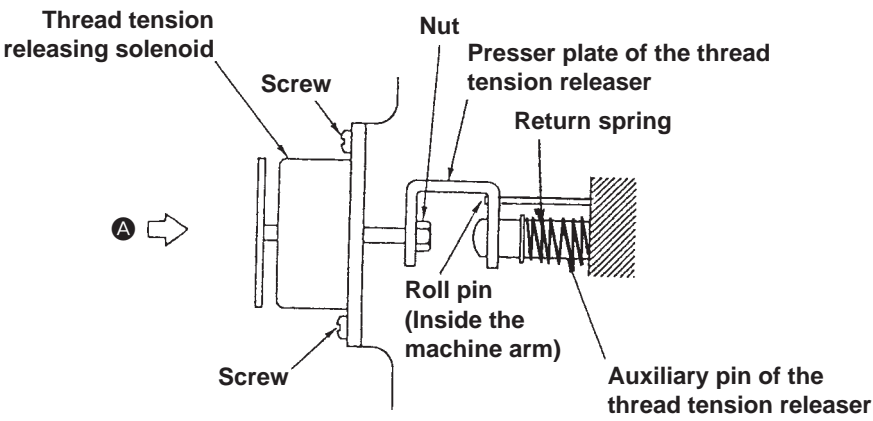


- Max. feed amount
LZ-2290SS, DS = 5 mm
LZ-2290SU, DU = 2.5 mm
Standard delivery : 2 mm
- Max. reverse feed amount
LZ-2290SS, DS = 4 mm
LZ-2290SU, DU = 2.5 mm
Standard delivery : 2 mm

(31) Adjusting the thread tension releasing solenoid

Standard Adjustment

- The presser plate of the thread tension releaser should be engaged with the roll pin and the auxiliary pin of the thread tension releaser.
- When the solenoid is pushed by fingers in the direction A, it should move smoothly. Also, when the solenoid is released, it should smoothly return to its home position.
- When the solenoid is pushed in the direction A, the tension disk should rise.



Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ Loosen two screws ①. Adjust the position of the automatic reverse stitching magnet by moving it. ○ At the max. feed amount press down the feed lever until the plunger moves in the direction of the arrow (➡). At this time, the rubber cushion should turn while being applied with a little load. 	

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) If the thread tension releasing solenoid fails to move smoothly when it is pressed in the direction ①, loosen the four screws and adjust the center of the solenoid. 2) If the tension disk fails to rise when the thread tension releasing solenoid is pressed in the direction ①, check first the position of the thread tension controller, then remove the solenoid. Then loosen the nut and adjust the position of the presser plate of the thread tension releaser. 	<ul style="list-style-type: none"> ○ If the thread tension releasing solenoid fails to be engaged with the auxiliary pin of the thread tension releaser, the tension disk will not rise at the time of thread trimming resulting in slip-off of the thread. ○ If the thread tension releasing solenoid fails to be engaged with the roll pin, the return spring lacks, or the solenoid fails to smoothly return to its home position, the tension disk will be held raised after thread trimming.

(32) Adjusting the stitch length dial

Standard Adjustment

(a) Assembling the stitch length dial

(b) Assembling the condensation dial

* The name of part or the like in the parentheses () in the description is the description in case of assembling the condensation dial.

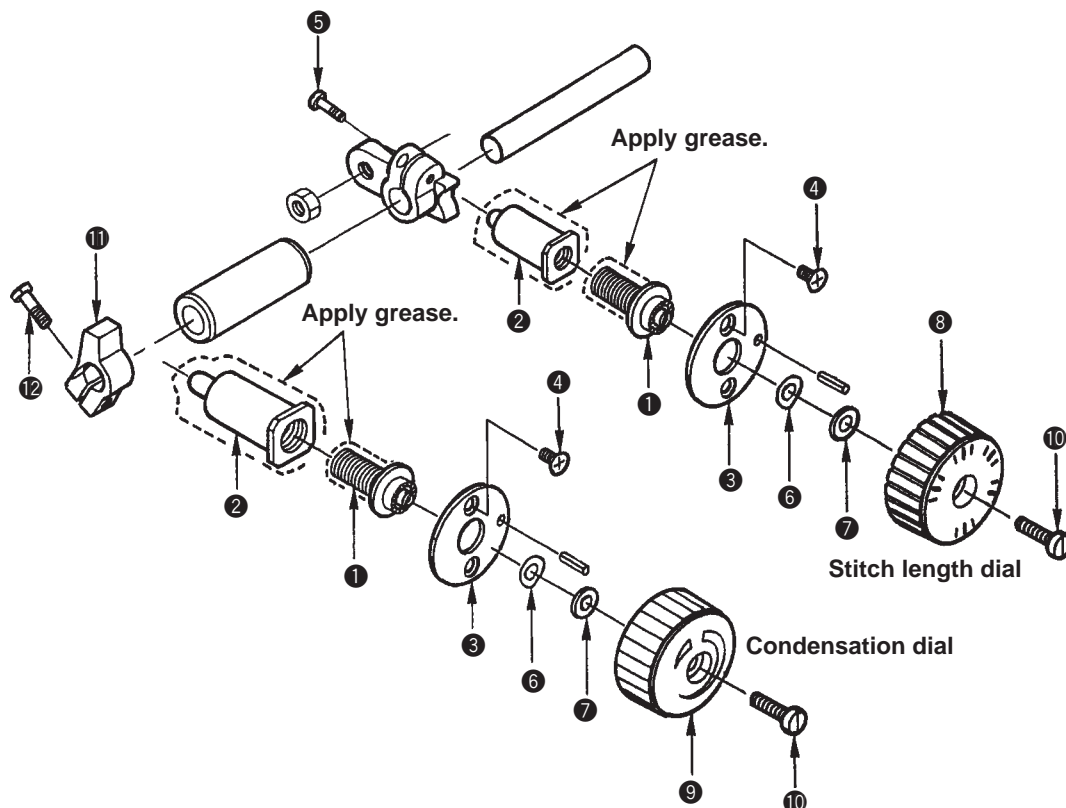
- 1) Apply the exclusive grease to feed adjusting screw ① and feed adjusting shaft ② (condensation adjusting shaft ②).
- 2) Screw feed adjusting screw ① in feed adjusting shaft ② (condensation adjusting shaft ②) and temporarily connect them.
- 3) Insert feed adjusting screw ① which has been temporarily connected in step 2) into the stitch length dial section (condensation dial section) until it will go no further.
- 4) Attach feed adjusting base ③ onto the machine arm with two setscrews ④.
- 5) Turn clockwise feed adjusting screw ① until it will move no further using a slit screwdriver.
- 6) Tighten setscrew ⑤ in the feed controller.

(Caution) Note that the end face of the feed controller shaft should be flush with that of the feed controller.

- At this time, the feed controller and the components of the feed controller and the stitch length dial are in the alignment and the components are in the state of being fixed.

(Caution) If the components should move, perform the work again from step 5).

- 7) Place washer ⑥ and flat washer ⑦ in order, adjust the scale "0" on stitch length dial ⑧ (scale "1" on condensation dial ⑨) to the marker dot engraved on the machine arm, insert the dial into the machine arm, and fix stitch length dial ⑧ (condensation dial ⑨) with setscrew ⑩.
- 8) (Turn condensation dial ⑨ and adjust the scale "0" to the marker dot engraved on the machine arm.)
- 9) (Press condensation stopper (asm.) ⑪ to condensation adjusting shaft ② from the back of the machine arm and tighten setscrew ⑫ to fix the stopper. Fix it without any play in the thrust direction.)



Adjustment Procedures

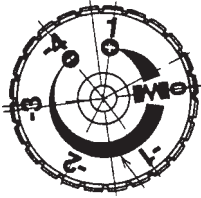
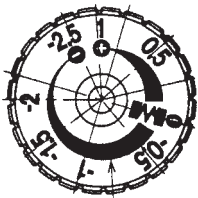
- When the work of step 7) (work of step 9) has been completed, turn stitch length dial ⑧ (condensation dial ⑨) and check that the dial moves as specified in the scale.
- When the marker dot engraved on the machine arm cannot be adjusted, check and re-adjust from the work of step 5).

<REFERENCE>

Max. scale of the stitch length dial

Model	Max. scale	Part No. of stitch length dial
LZ-2290SS, DS	5 mm	11071909
LZ-2290SU, DU	2.5 mm	26302000

Condensation dial specifications

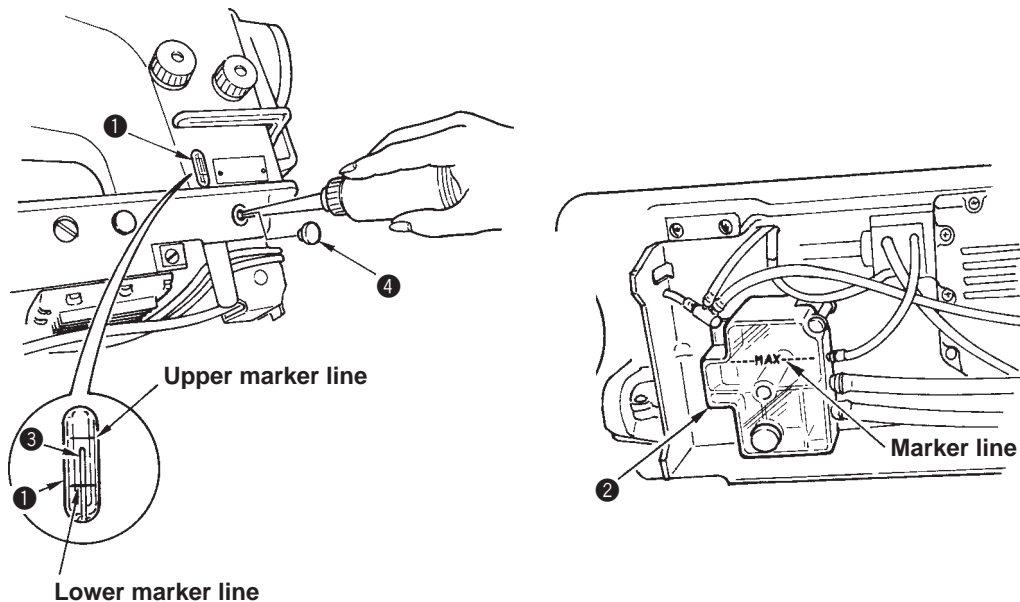
Model	LZ-2290SS, DS	LZ-2290SU, DU
Shape		
Part No.	23534407	23545007
Max. scale	-4 mm	-2.5 mm

Results of Improper Adjustment

(33) Adjusting the lubrication mechanism

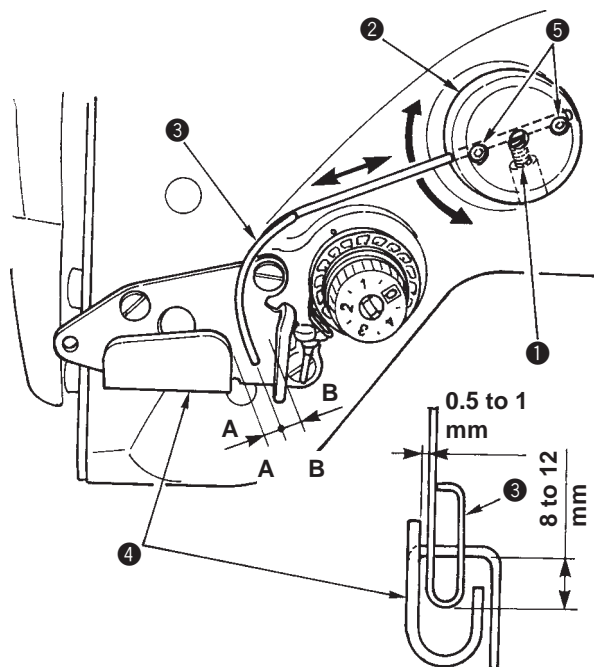
Standard Adjustment

- Forced lubrication is performed to the hook by means of the plunger pump placed in the hook shaft front bushing in the machine head



(34) Adjusting the position of the thread draw-out wire

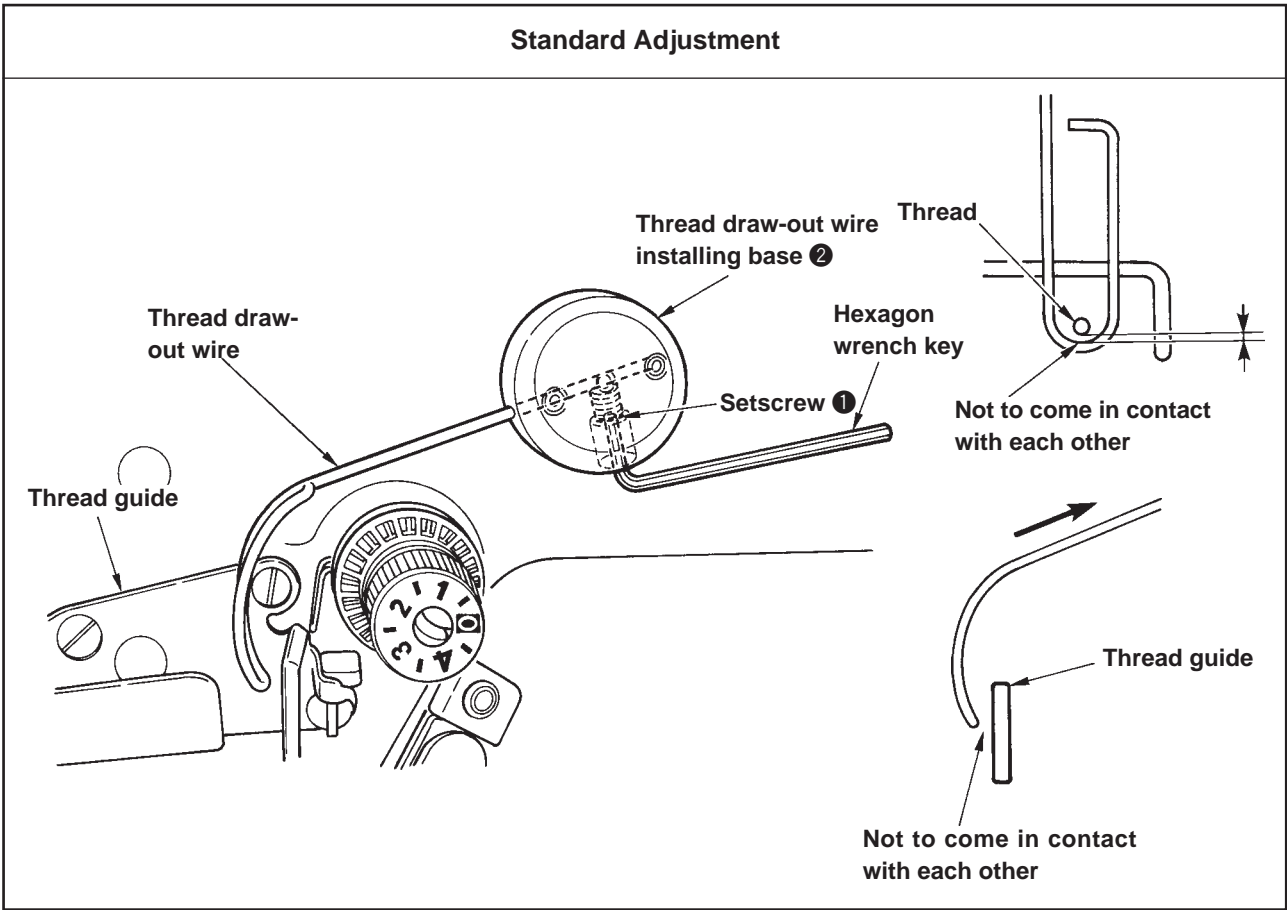
Standard Adjustment



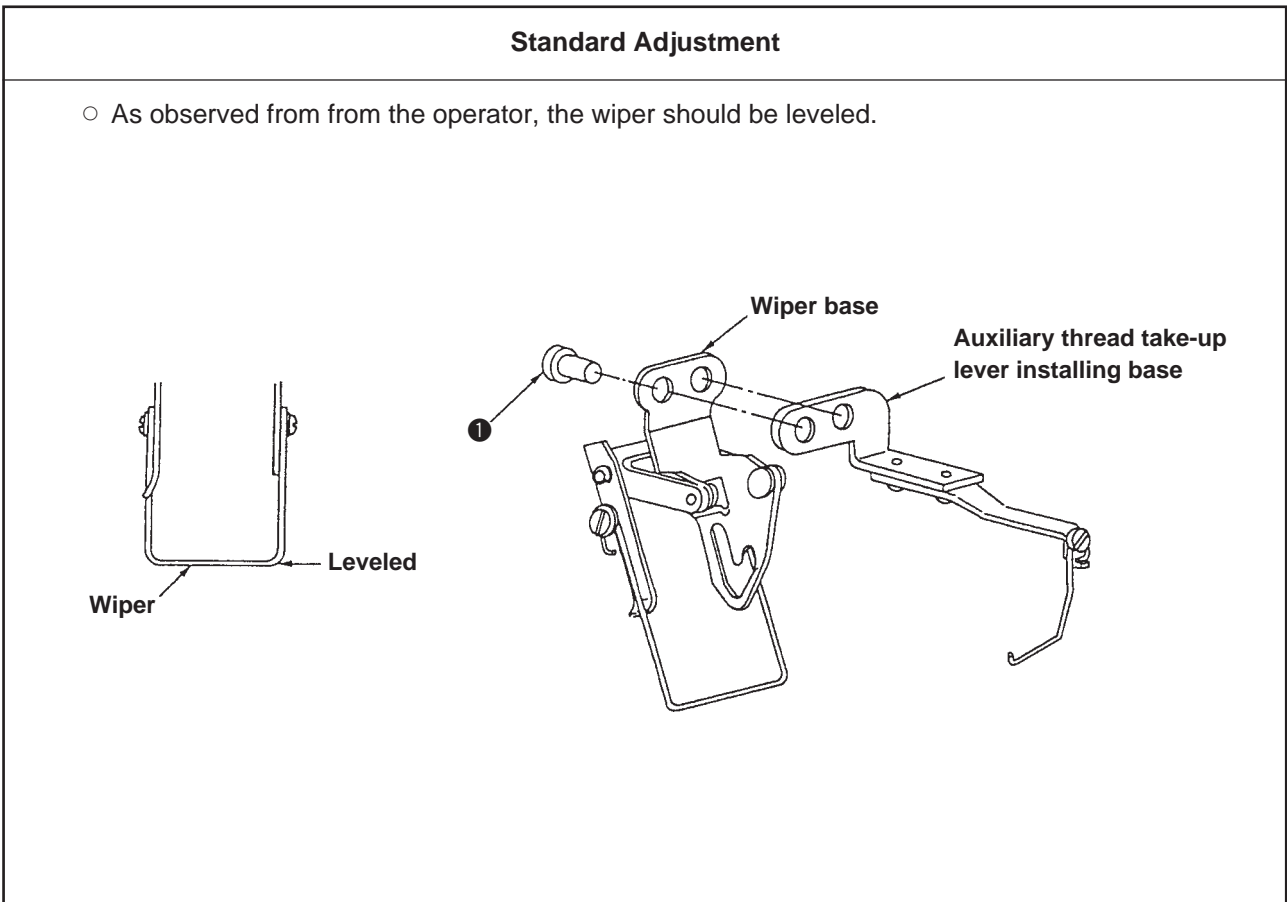
Adjustment Procedures	Results of Improper Adjustment
<p>1) When top end ③ of the gauge of oil amount indicating window ① comes down to the lower marker line, fill JUKI Defrix Oil No. 1 from oil inlet ④ up to the marker line of oil tank ② with the sewing machine tilted. Even when the gauge comes down to the lower marker line, oil in the oil tank remains for safety. It is recommended to fill oil as soon as possible.</p> <ul style="list-style-type: none"> ○ The amount of oil to be filled is approximately 150 cc. <p>2) For the adjustment of the amount of oil in the hook, check the amount in the hook after making the sewing machine run idle continually for approximately 30 seconds and stabilizing the amount of oil.</p> <p>(Caution)</p> <ol style="list-style-type: none"> 1. When using the sewing machine with it tilted to the front, the state of the oil amount indicating window is not useful. So, be careful. 2. If the oil amount adjustment screw is excessively loosened, the O ring comes off and oil spouts out. Do not loosen it more than 5 turns. 3. The oil pipe which has been removed once is likely to easily come off. As a result, oil leakage may be caused. Be sure to replace the pipe with a new one when it is removed. 4. When assembling the respective pipes, take care not to allow you to come in contact with the moving parts. 	

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ Standard position of the thread draw-out wire <ol style="list-style-type: none"> 1) Loosen setscrew ①. 2) Turn the thread draw-out wire together with thread draw-out wire installin base ②, adjust the installing position of the thread draw-out wire so that a distance of 8 to 12 mm is provided between the top end of thread draw-out wire ③ and the guide portion of thread take-up thread guide A ④, and tighten screw ①. <p>(Caution)</p> <ol style="list-style-type: none"> 1. At this time, leave a space of 0.5 to 1 mm between the thread draw-out wire and the top surface of the thread take-up thread guide A. 2. After the completion of adjustment, be sure to operate the thread draw-out wire and check that the thread draw-out wire does not come in contact with the thread take-up thread guide A. <ol style="list-style-type: none"> 3) Finely adjust with setscrews ⑤ so that the top end of the thread draw-out wire is placed approximately in the center (A B) of the thread take-up thread guide A. <ul style="list-style-type: none"> ○ When turning OFF the thread draw-out unit : It is possible to turn OFF with the function setting No. 89 described in the function setting list. 	<ul style="list-style-type: none"> ○ If the stroke of the thread draw-out wire is insufficient, the length of the needle thread remaining after thread trimming will be reduced resulting in stitch skipping and slip-off of the thread at the start of sewing. If the stroke of the thread draw-out wire is excessive, thread breakage will occur at the start of sewing.

(35) Adjusting the stroke of the thread draw-out wire



(36) Installing the wiper base



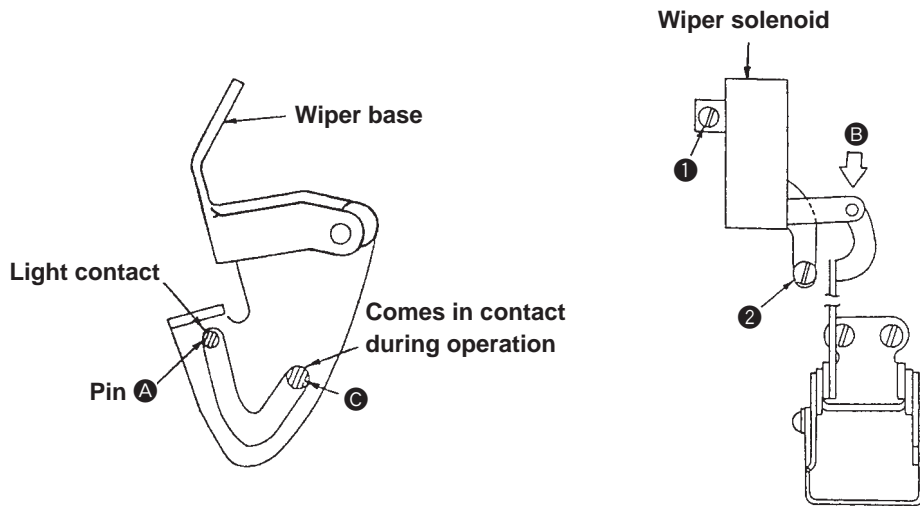
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen setscrew ❶ with the hexagon wrench key supplied with the machine as accessory.</p> <p>2) Turn the thread draw-out wire together with thread draw-out wire installing base ❷ and adjust up or down the top end of the thread draw-out wire.</p> <p>(Caution)</p> <ol style="list-style-type: none"> 1. When making the remaining amount of needle thread longer, adjust the position of the thread draw-out wire to the position where the wire does not come in contact with needle thread. 2. When making the remaining amount of needle thread shorter, take care so that the thread draw-out wire and the thread guide do not come in contact with each other. 3. When turning OFF the thread draw-out unit, it can be turned OFF with the function setting No. 89 of the control box. 	

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ Loosen two setscrews ❶ and adjust the installing position of the wiper base. The setscrews are used commonly to fix the wiper base and auxiliary thread take-up lever installing base. So, it is necessary to adjust the installed state of the wiper base while checking the respective bases for inclination and torsion. ○ When the auxiliary thread take-up lever is not used, enter two each of spacers (WP04808568P + WP0482086SD) as thick as the auxiliary thread take-up lever installing base. 	

(37) Adjusting the wiper solenoid

Standard Adjustment

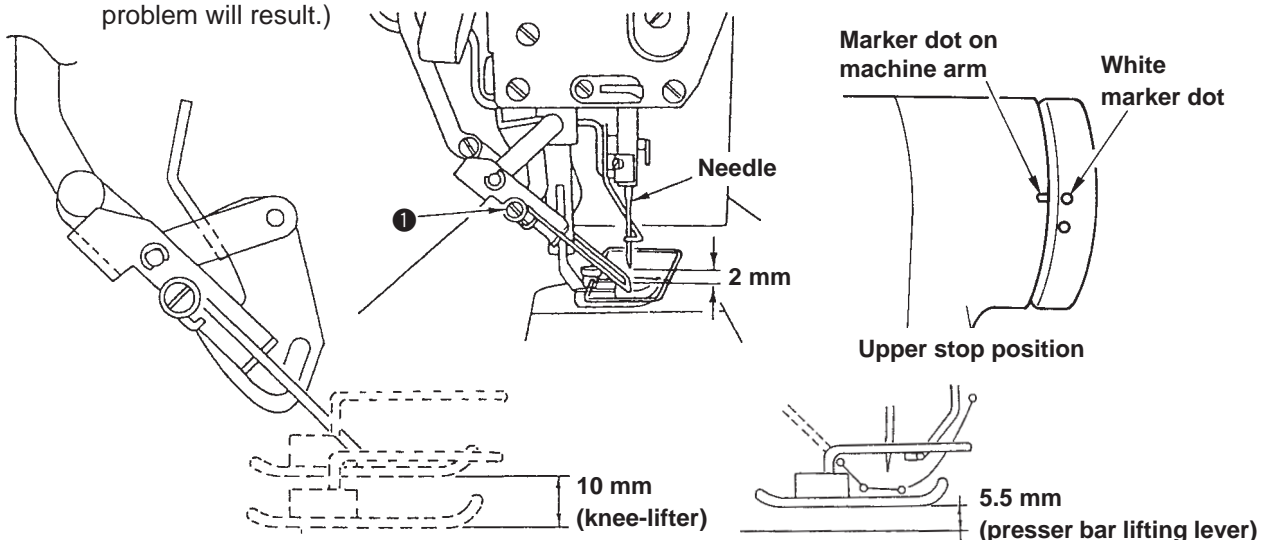
- When the wiper solenoid is OFF (in the normal state), the pin should be lightly fitted onto the leftmost end of the slot while providing no clearance between them. (State **A**)
Confirm that the pin comes in contact with the rightmost end of the slot at position **C** when the wiper solenoid is actuated (when it is pressed in direction **B**).



(38) Position of the wiper

Standard Adjustment

- When the wiper is in operation, it should not come in contact with the auxiliary thread take-up lever.
- When needle stops in its upper stop position, a clearance of approximately 2 mm should be provided between the needle tip and the wiper.
- When the wiper is operated after the presser foot has been raised by operating the presser bar lifting lever, it should not come in contact with the presser foot.
- When the presser foot is raised as high as 10 mm by operating the knee-lifter, the wiper should not come in contact with the presser foot. (If the wiper comes in light contact with the presser foot, no problem will result.)



Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ Loosen setscrews ① and ② when the solenoid is not actuated (OFF). Adjust the state Ⓐ by moving the entire unit of solenoid up or down. 	

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> ○ Loosen setscrews ① (one each for both sides) and adjust the position of the wiper. Carefully tightn the setscrews while preventing the wiper from twisting. 	

(39) Applying the exclusive grease

- * Exclusive grease (23640204) is applied to the portions other than the lubricating portions to which lubrication is necessary

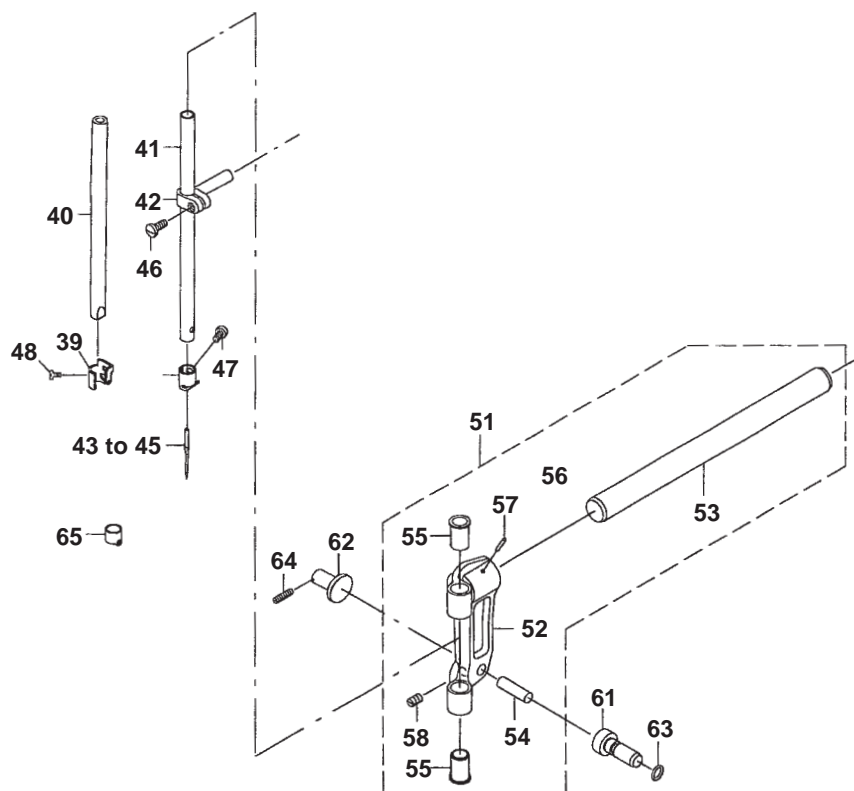
It is not necessary to add grease to the portions when the machine is generally used. However, when the machine is used under the severe conditions, it is effective to periodically fill up the exclusive grease (approximately once or twice a year).

[Note when applying grease]

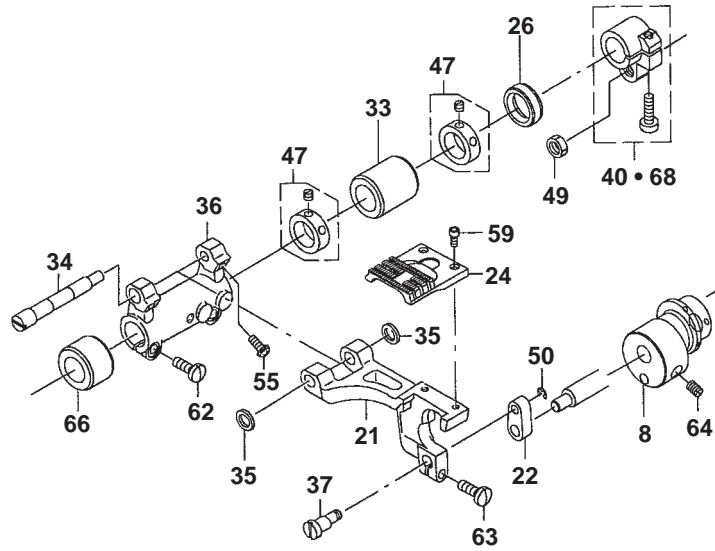
- 1) Needle bar metal of DS and DU heads

Needle bar metals are set to the upper and lower parts of the needle bar support base and there is a grease groove inside each metal (No. 55). Draw the needle bar and fill up the exclusive grease to the groove.

When newly filling up the grease, make the sewing machine run idle for 10 seconds each to discharge excess grease which occurs at this time and wipe the grease. Perform this operation several times and use the sewing machine when the grease does not occur.



- 2) There is a grease groove inside the bearing of link (No. 22). When the machine is used under the severe conditions, remove link shaft (No. 37) and fill up the exclusive grease to the grease groove.



- 3) Feed base shaft of DS and DU heads

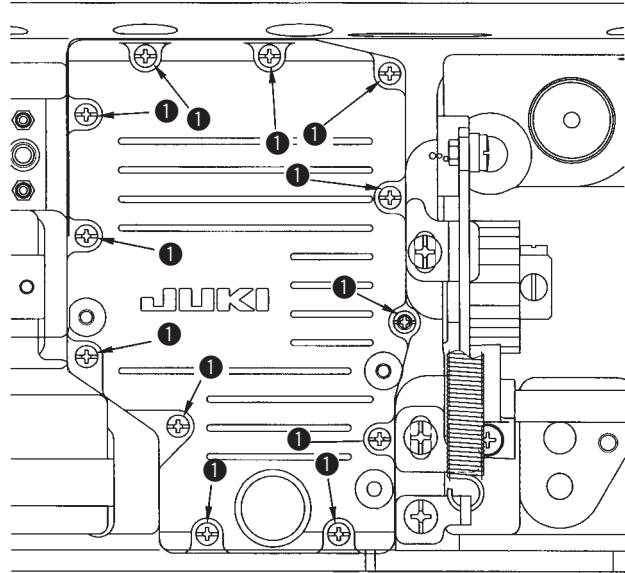
There are two grease holes in the shaft of feed base shaft (No. 34). When the machine is used under the severe conditions, periodically fill up the exclusive grease to the holes.

4. PROCEDURES OF DISASSEMBLING/ASSEMBLING AND CAUTIONS

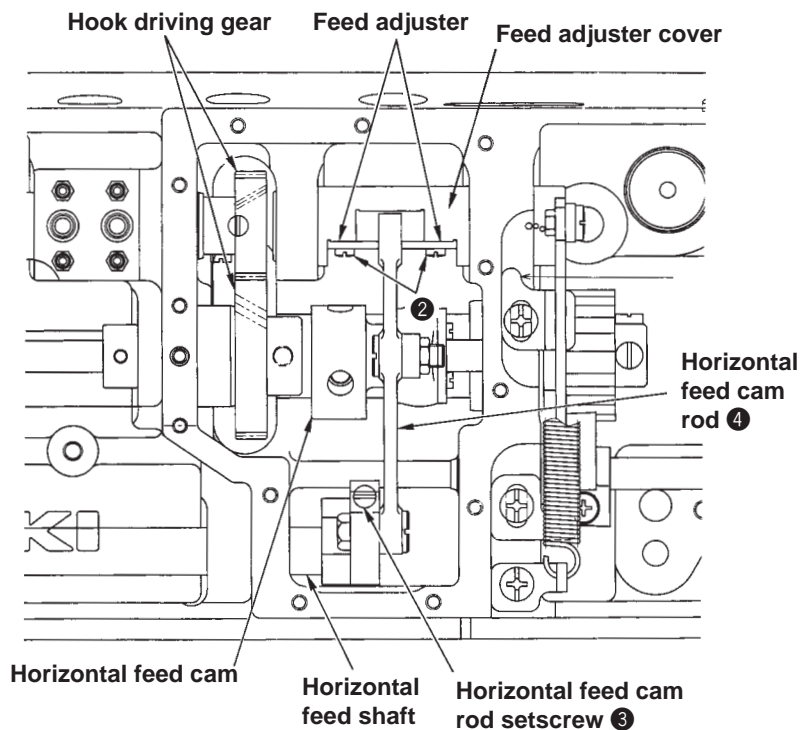
(1) Adjusting and assembling of the gear box (large)

Procedures of disassembling/assembling

- Loosen setscrews ① and remove the gear box cover.



- Centering the horizontal feed cam
 - 1) Loosen setscrew ③ in the horizontal feed cam rod.
 - 2) Loosen setscrews ② in the feed adjuster cover and adjust so that horizontal feed rod ④ can smoothly move up or down. Then tighten setscrews ②.
 - 3) Turn the handwheel and tighten setscrew ③ in the horizontal feed cam rod while performing the centering of the horizontal feed cam.

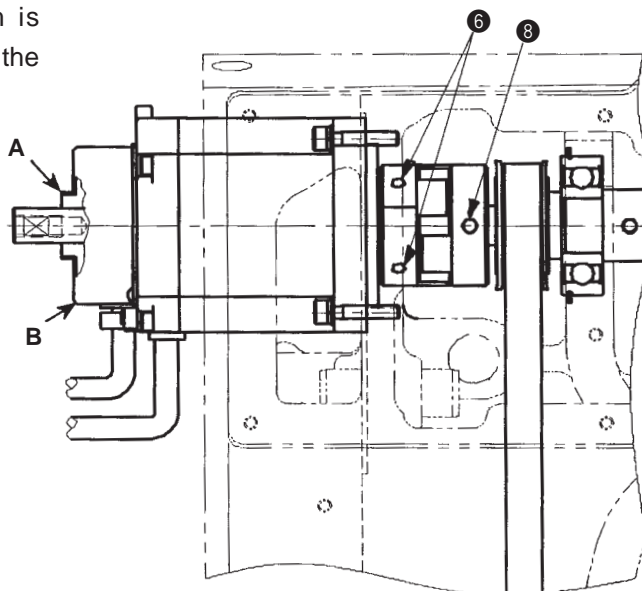
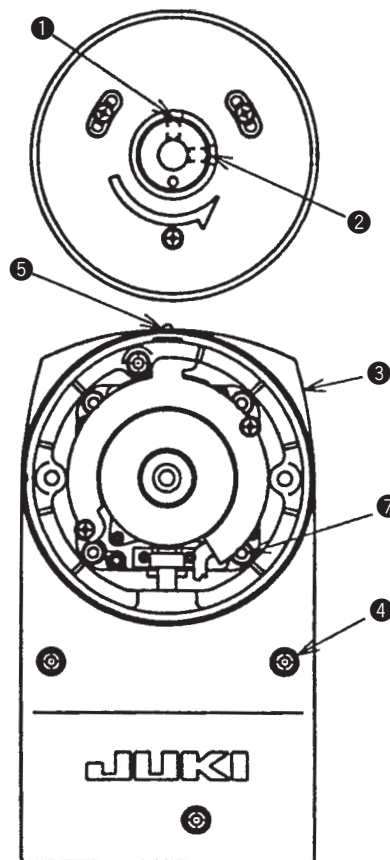


Caution in disassembling	Caution in assembling
<ul style="list-style-type: none"> ○ For removing/installing the gear box cover, be sure to refer to the item “(4) Removing/installing the gear box cover” and carefully perform the work. 	<ul style="list-style-type: none"> ○ The horizontal feed cam and hook driving gear are mounted in the gear box (large). In the case where centering and adjustment of play of the aforementioned components are not securely performed when assembling and adjusting, seizure due to the torque of the sewing machine, abnormal heat, or defective return of the lever will be caused.

(2) Replacing the motor

Procedures of disassembling/assembling

- 1) Loosen the setscrews in the handwheel in the order of screw No. 2 ② and screw No. 1. ①.
- 2) Remove four setscrews ④ in pulley cover ③ with the hexagon wrench key of 4 mm.
- 3) Remove the pulley cover while paying attention to LED ⑤ of the synchronizer.
- 4) Remove the window plate, and loosen coupling setscrews ⑧ fixed on the motor shaft in the order of screw No. 2 and screw No. 1.
- 5) Remove four motor setscrews ⑦ with the hexagon wrench key of 4 mm.
- 6) Quietly pull out the motor, loosen setscrews ⑥ in the coupling, and remove the coupling from the motor.
- 7) Fit the coupling the hole diameter of which is smaller to the new motor, adjust screw No. 1 of setscrews ⑥ to the flat portion of the motor and tighten it. At this time, set the clearance between the motor and the coupling to 0.5 mm.
- 8) Insert the motor into the machine arm, adjust screw No. 1 of coupling setscrews ⑧ to the flap portion of main shaft and tighten it.
- 9) After installing the pulley cover, tighten the setscrews in the order of screw No. 1 and screw No. 2 at the position where a clearance of approximately 1 mm is provided between the handwheel and the pulley cover.

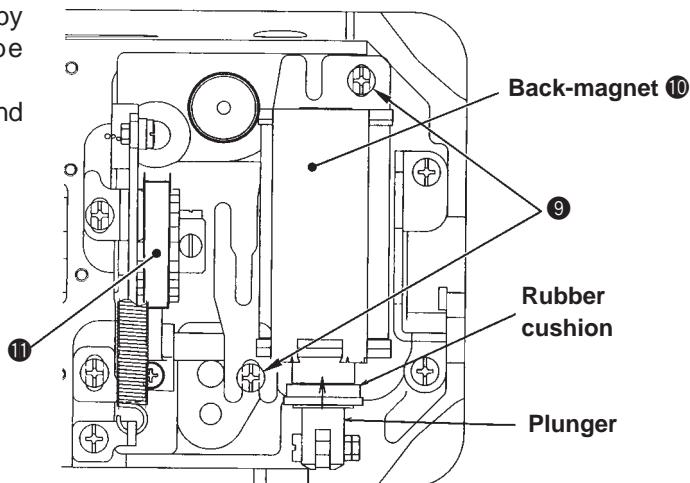


Caution in disassembling	Caution in assembling
<p>(Caution) There is the release section A at the shaft section of the encoder case B in the rear of the motor.</p> <p>When the handwheel is held removed, dust or the like enters from the part and the sensor section is damaged. As a result, malfunction of the motor may be caused. Take care of the dust when replacing the motor and install the handwheel quickly.</p> <p>When storing the motor itself for a long period, install the encoder cover (installed at the time of delivery of the motor).</p>	

(3) Replacing the timing belt

Procedures of disassembling/assembling

- * The timing belt (22505705) of the highest quality is used, and it is not necessary to replace it unless a special trouble occurs.
- 1) Perform removing/installing of the motor in accordance with the steps of the item (2) Replacing the motor.
- 2) Tilt the sewing machine, remove back-magnet setscrews ⑨ and remove back-magnet ⑩.
- 3) Pressing timing belt ⑪ in the right-hand direction, turn the timing belt to the front by fingers, then the timing belt can be removed.
- 4) Replace the timing belt with a new one and install again the the reverse order.



(4) Removing/installing the gear box cover

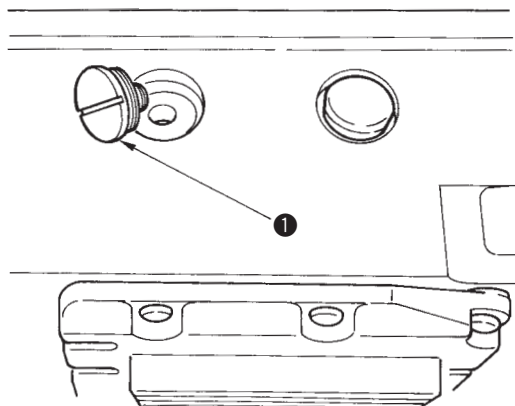
Procedures of disassembling/assembling

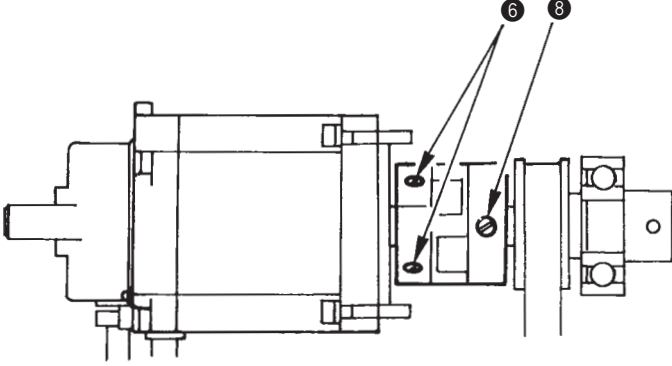
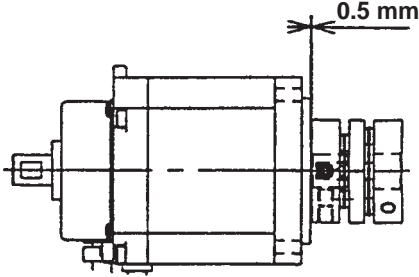
Do not open the gear box cover unless a trouble occurs.

When it is compelled to open it, take care of the following matters.

* Start the work after preparing a new gear box cover packing (23526601).

- 1) Tilt the sewing machine and prepare an oil receiver under the gear box.
- 2) Loosen the setscrew of the pipe presser and remove it from the cover.
- 3) Remove the gear box setscrews and drain oil inside the gear box.
- 4) When the maintenance of the inside has been completed, close the gear box cover.
At this time, replace the packing with a new one. In addition, cleanly wipe oil on the connected face of the cover and the machine bed.
Turn the setscrew once more to securely tighten after all setscrews have been tightened once.
- 5) Remove stop plug ① in the front of the machine bed and fill 200 cc of JUKI Defrix Oil No. 2.

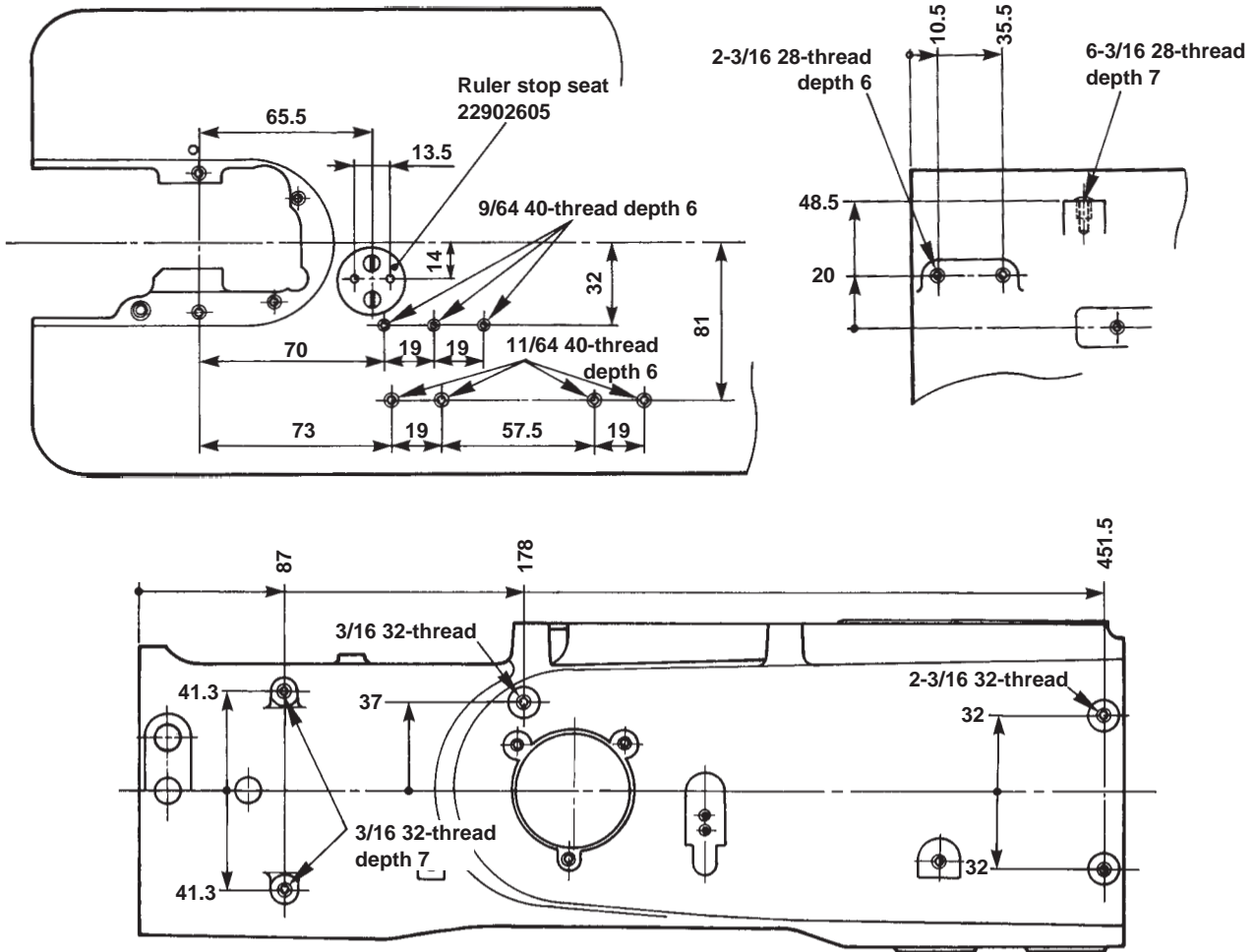


Caution in disassembling	Caution in assembling
<p>○ When removing/installing the motor, unless the motor is defective, loosen coupling setscrew ⑧ without loosening coupling setscrews ⑥ and remove the motor with the coupling installed.</p> 	<p>* When the motor is separated from the coupling, set the clearance between the end face of the motor and that of the coupling to 0.5 mm when re-assembling.</p> 

Caution in disassembling	Caution in assembling

5. SCREWS FOR ATTACHMENTS

The machine arm and bed are provided with screws that can be used for installing attachments for the sewing machine. Locations and sizes of the screws are as shown below.

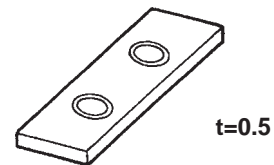


6. SPARE PARTS

1) Without the thread trimmer

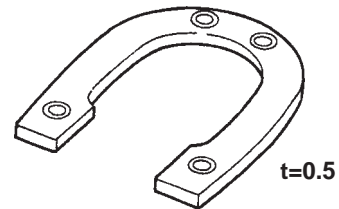
Feed base spacer (Part No. : 10025906)

Enter this spacer between the feed base and the feed dog when desired to increase the feed dog height in the case where prevention of inactive feed at the overlapped section, prevention of the material-turn at the overlapped section or feed dog height adjustment when the commercially-available feed dog is used.



2) With the thread trimmer

Use the following spacers (feed base, throat plate) if the counter knife comes in contact with the feed dog when performing the adjustment of feed dog height or feed timing, or the commercially-available feed dog is used.



Feed base spacer	(Part No. : 10025906)
Throat plate spacer	(Part No. : 22503908)

To keep the space



3) Exclusive grease

* Exclusive grease (23640204) is applied to the parts for which lubrication is necessary except the lubricating section.

Never use any grease other than the exclusive grease.

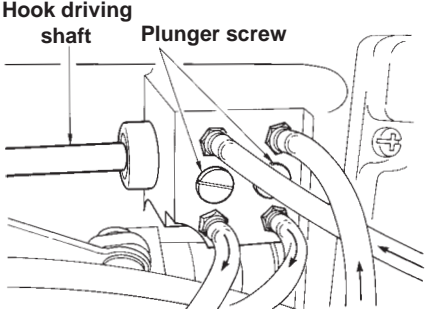
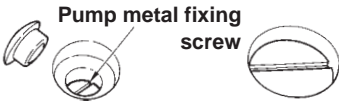
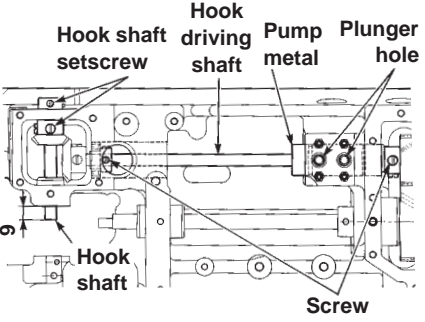
Addition of the grease is not necessary for general use of the sewing machine. In the case where the sewing machine is used under the specially severe conditions, it is effective to periodically fill the exclusive grease (once in one to two years).

7. TROUBLES AND CORRECTIVE MEASURES (WITH REGARD TO LUBRICATION)

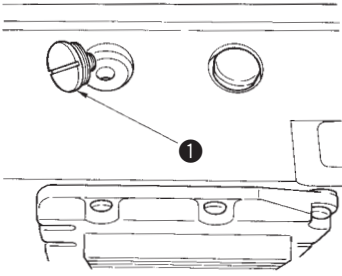
1) Oil fails to come to oil wick of the face plate.

Trouble	Cause and corrective measure
Oil wick of the face plate has dried out.	<ul style="list-style-type: none"> • Check whether the route of oil wick from the float case is interrupted. • Fill oil to oil wick as pump priming in case of a long period of disuse.


2) Oil amount in the hook is not obtained or insufficient.


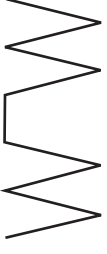
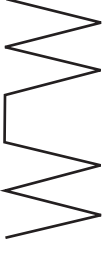
Trouble	Cause and corrective measure
<p>Plunger pump fails to operate. (Oil coming out from the joint section of machine bed does not move.)</p>   	<ul style="list-style-type: none"> • Plunger is not fitted in the groove of plunger of the hook driving shaft. Remove plunger screw, spring and plunger, and check that the groove of plunger is in the center of the hole of machine bed. At the time of NG Longitudinal position of the hook driving shaft is slipped or the position of pump metal is slipped. <p>[Adjusting the longitudinal position of hook driving shaft Finely adjust so that the groove of plunger of the hook driving shaft is aligned with the plunger hole. At this time, loosen the thrust screw of the hook driving shaft.]</p> <p>[Adjusting the position of pump metal Move the pump metal to the right or left (fine adjustment) and determine the position of pump metal so that work holes in the machine arm (plunger hole) are aligned with the plunger holes of pump metal. (Be sure to check that the plunger smoothly enters.) In addition, an O ring is mounted on the pump metal. So, be careful at the time of adjustment. After determining the position, fix the pump metal fixing screw. (Tightening torque : 25 Nm)]</p> <ul style="list-style-type: none"> • When the position of the pump metal is properly adjusted, correct the position of the hook shaft. (Adjust the groove of plunger to the center of the hole of machine bed.) <p>[Loosen the setscrews in the hook shaft and adjust the position of the hook shaft to 9 mm from the end face. Adjust the backlash of the hook bevel gear when tightening the setscrews.]</p> <p>(Open the gear box cover and correction of the gear position, hook shaft bearing support and position of thread trimmer cam are necessary.) Worn-out or burr of the top end of the plunger At the time of NG Replace the plunger.</p>
Oil in the pipe is moving, however, the amount of oil is insufficient.	<ul style="list-style-type: none"> • The shape of the top end of the oil amount adjustment screw is defective. Replace it. • The hook shaft front stop plug felt clogs. Replace the felt. • The oil hole of the lubricating hook clogs. Replace the hook. • Re-check the adjustment of the oil amount.

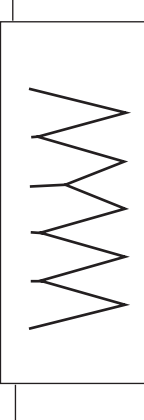
3) Gear is noisy.


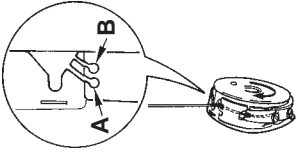
Trouble	Cause and corrective measure
<p data-bbox="165 226 544 248">Oil is not contained in the gear box.</p>  <p>The diagram illustrates the location of the stop plug (1) on the machine bed. It shows a top-down view of the stop plug and a side view of the machine bed with the stop plug (1) indicated by a circled number 1. The gear box cover is also shown in the side view.</p>	<ul style="list-style-type: none"><li data-bbox="624 226 1401 286">• Oil in the gear box has leaked since the air vent cap was not put at the time of transportation. <p data-bbox="644 297 1422 465">Remove stop plug ❶ in the front of the machine bed, insert a piece of stiff thread or the like into the gear box, and check whether oil is fully contained inside. When oil is insufficient, open the gear box cover or draw out all the oil inside the gear box with a vinyl pipe, and fill 200 cc of JUKI Defrix Oil No. 2.</p>

8. TROUBLES AND CORRECTIVE MEASURES (WITH REGARD TO SEWING)


Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure	
1. Thread breakage	<p>1-1) Stitches are not properly formed. (Lower cloth)</p>  <p>Thread knots are made.</p>	Smaller thread loops are produced.	Stroke of the thread take-up spring is too large.	Reduce the stroke of the thread take-up spring.	
		Thread breakage occurs when the needle throws to the right.	The hook timing is excessively advanced.	Re-adjust the hook timing properly using a timing gauge.	
			The auxiliary thread take-up lever excessively works.	Lower the auxiliary thread take-up lever.	
			Both the needle thread tension and bobbin thread tension are too high.	Reduce the tension to balance the needle thread and bobbin thread.	
			Height of the needle bar is defective.	Properly adjust the height of the needle bar using a timing gauge.	
			Larger thread loops are produced and they tilt.	Stroke of the thread take-up spring is too small.	Lengthen the stroke of the thread take-up spring.
		Thread breakage occurs when the needle throws to the left.	The hook timing is excessively retarded.	Re-adjust the hook timing properly using a timing gauge.	
			The auxiliary thread take-up lever fails to work.	Properly adjust the auxiliary thread take-up lever.	
			Both the needle thread tension and bobbin thread tension are too low.	Increase the needle tension to balance the needle thread tension and bobbin thread tension.	
			Height of the needle bar is defective.	Properly adjust the height of the needle bar using a timing gauge.	
			An excessive clearance is provided between the blade pointer the hook and the needle.	If the needle guard works excessively, raise the needle guard.	
			The material flops.	Adjust the needle-to-hook relation again.	
				Replace the throat plate with another throat plate which has a smaller needle slot.	
				Loosen the screw in the presser foot, and re-tighten it with the presser foot closely fitted onto the throat plate.	
				Replace the presser foot with another one which has a smaller recess.	
		Use a needle which has a round tip. We recommend the 438SKL needle.			
		Replace the needle with a new one.			

Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure
	<p data-bbox="204 1503 226 1861">1-2) The thread breaks when the needle reaches the lowest position of its stroke.</p>  <p data-bbox="544 1704 566 1816">(Lower cloth)</p>	<p data-bbox="204 1155 226 1451">Blade point of the hook is defective.</p> <p data-bbox="264 1155 287 1451">The needle vibrates during sewing.</p> <p data-bbox="325 1111 384 1451">The time when the needle and bobbin threads go over the hook is too late. As a result the threads break under the hook.</p>	<p data-bbox="325 741 347 1048">The needle thread tension is too low.</p> <p data-bbox="405 689 448 1048">The stroke of the thread take-up spring is too small.</p> <p data-bbox="485 689 528 1048">The tension of the thread take-up spring is too low.</p> <p data-bbox="564 689 608 1048">The tension provided by the pre-tension disk is too low.</p> <p data-bbox="644 689 687 1048">The bobbin case holder stopper is positioned too near to the needle.</p>	<p data-bbox="204 114 247 645">Correct the blade point of the hook or replace the hook with a new one.</p> <p data-bbox="264 114 287 645">Adjust the needle guard so that it works more effectively.</p> <p data-bbox="325 114 368 645">Increase the needle thread tension. Then balance the tension of needle and bobbin threads.</p> <p data-bbox="405 114 427 645">Lengthen the stroke of the thread take-up spring.</p> <p data-bbox="485 114 507 645">Increase the tension of the thread take-up spring.</p> <p data-bbox="564 114 592 645">Increase the tension provided by the pre-tension disk.</p> <p data-bbox="644 114 687 645">Adjust the position of the bobbin case stopper by moving it away from the needle.</p>
1-3)	<p data-bbox="724 1503 783 1816">Miscellaneous Thread breakage occurs when sewing joining section between scallops</p> 	<p data-bbox="724 1111 783 1451">The sewing machine fails to perform sewing with consistency because of excessively low thread tension.</p> <p data-bbox="823 1111 866 1451">Same causes as "1-1) Stitches are not properly formed."</p>		<p data-bbox="724 114 783 645">Set the thread tension at a higher value. (For reference, 65 g for the needle thread and 25 g for the bobbin thread)</p>
2. Stitch skipping				
3. Isolated idling loops		<p data-bbox="979 1111 1007 1451">Presser foot components are defective.</p> <p data-bbox="1225 1111 1252 1451">The needle thread tension is insufficient.</p> <p data-bbox="1289 1111 1332 1451">The thread take-up spring has been improperly adjusted.</p> <p data-bbox="1449 1111 1492 1451">The bobbin case holder stopper is defective.</p>	<p data-bbox="979 689 1023 1048">The needle slot in the presser foot is located this side of the needle slot in the throat plate.</p> <p data-bbox="1066 869 1093 1048">The presser foot rises.</p> <p data-bbox="1145 689 1189 1048">Recess on the sole of the presser foot is smaller for the stitch length employed.</p> <p data-bbox="1289 689 1332 1048">The stroke of the thread take-up spring is too small.</p> <p data-bbox="1369 689 1412 1048">Tension of the thread take-up spring is too low.</p>	<p data-bbox="979 114 1023 645">Replace the presser foot with a new one, or correct the presser bar.</p> <p data-bbox="1066 114 1109 645">Return the micro-lifting mechanism to the home position, or readjust the position of the presser bar bracket.</p> <p data-bbox="1145 114 1189 645">Replace the presser foot with a new one.</p> <p data-bbox="1225 114 1252 645">Increase the needle thread tension.</p> <p data-bbox="1449 114 1492 645">Maximize the distance between the bobbin case and the hook as long as the bobbin case does not rotate.</p>

Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure
4. Irregular stitches		<p>The needle thread tension and bobbin thread tension are insufficient.</p> <p>Failed bobbin and bobbin case</p> <p>The thread take-up spring has been improperly adjusted.</p> <p>Tension controller components are defective.</p>	<p>Bobbin has been unevenly wound causing hindrance.</p> <p>The bobbin is deformed.</p> <p>Failed engagement between the bobbin and the bobbin case</p> <p>The stroke of the thread take-up spring is too large.</p> <p>Tension of the thread take-up spring is too high.</p> <p>Thread slips in the tension disk.</p> <p>Irregular rotation of the machine because of the failed tension disk.</p> <p>Irregular rotation of the machine because of worn-out felt.</p> <p>Failed position of the tension controller.</p>	<p>Increase the needle thread tension and bobbin thread tension.</p> <p>Adjust so that a bobbin is evenly wound with thread.</p> <p>Replace the bobbin with a new one and increase the bobbin winding tension.</p> <p>Replace the bobbin or bobbin case with a new one.</p> <p>Reduce the stroke of the thread take-up spring.</p> <p>Lower the tension of the thread take-up spring.</p> <p>Increase the tension provided by the pre-tension disk or lower the tension provided by the thread tension controller.</p> <p>Replace the tension disk with a new one.</p> <p>Replace the felt with a new one.</p> <p>Adjust the position of the tension controller to prevent the tension disk from keeping held raised.</p>
		<p>The pre-tension disk is defective.</p> <p>The position of the bobbin case holder stopper is too near to the needle.</p> <p>The installing direction of the bobbin in the bobbin case is not correct.</p>	<p>The pre-tension disk comes in contact with the machine arm.</p> <p>The orientation of the pre-tension disk is defective. As a result, the disk rises in accordance with the tension it applies.</p>	<p>Re-fix the pre-tension disk at a position where the disk does not come in contact with the machine arm.</p> <p>Correct the pre-tension disk or adjust the position of the disk.</p> <p>Adjust the position of the bobbin case holder stopper.</p> <p>Re-install the bobbin in the bobbin case while facing it in the correct direction.</p>

Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure
5. Material swells at the sewn part.	<p>Stitches gather at the center of the material.</p> 	<p>The needle thread tension and bobbin thread tension are too high.</p>	<p>Thread path has been poorly finished. Feed timing is excessively advanced. Thread enters in hole B in the bobbin case.</p>	<p>Finish the thread path to smoothen its surface. Adjust the feed timing to the proper one. Enter thread in hole A of the bobbin case.</p> 
6. Uneven material feed		<p>The presser foot is defective.</p>	<p>The presser foot pressure is too low. Failed parallelism of the presser foot</p>	<p>Increase the presser foot pressure. Re-attach the presser foot so that it closely fitted onto the throat plate, or replace the presser foot with a new one.</p>
		<p>The material flops.</p>	<p>Needle slot in the throat plate is too large.</p>	<p>Replace the throat plate with another throat plate which has a smaller needle slot in accordance with the needle used and the zigzag width specified.</p>
		<p>The presser foot is defective.</p>	<p>The recess on the sole of the presser foot is too large.</p>	<p>Replace the presser foot with another one which has a smaller recess or no recess.</p>
		<p>The presser foot is defective.</p>	<p>The needle has a blunt tip.</p>	<p>Replace the needle with a new one.</p>
6. Uneven material feed	<p>The upper cloth and lower cloth shift in the feeding direction.</p>	<p>The presser foot is defective.</p>	<p>Presser foot pressure is too high.</p>	<p>Lower the presser foot pressure. If an aluminum presser bar, that is optionally available, is used, only the presser foot pressure can be lowered without reducing efficiency of feed.</p>
		<p>The feed mechanism is defective.</p>	<p>The sole of the presser foot has been poorly finished.</p>	<p>Buff up the sole of the presser foot to enable the material to be smoothly fed under the presser foot.</p>
			<p>Failed inclination of the feed dog.</p>	<p>Adjust the inclination of the feed dog to the standard state (where the feed dog is positioned with its front side lowered.)</p>
			<p>Height of the feed dog is excessive.</p>	<p>Adjust the height of the feed dog to the standard height (0.8 mm) or slightly lower the feed dog below the standard height.</p>

9. TROUBLES AND CORRECTIVE MEASURES (WITH REGARD TO MECHANICAL COMPONENTS)

Trouble	Cause 1	Cause 2	Corrective measure and adjusting procedure
1. Several stitches skip or thread comes off at the start of sewing.	1-1) Length of thread remaining after thread trimming is too short.	1)-A Tension provided by the pre-tension disk is too high.	Loosen the pre-tension disk as long as the thread slips in the tension disk.
		1)-B The tension disk fails to rise at the time of thread trimming.	Inspect the thread tension releasing solenoid components and adjust them, if necessary.
		1)-C The tension disk comes in contact with the thread take-up spring guard.	Correct the position of the tension disk and thread take-up spring guard so that they do not come in contact with each other.
		1)-D The cam timing is excessively advanced.	Properly adjust the cam timing.
	1-2) Needle thread feeding amount is insufficient.	2)-A Stroke of the thread feeding wire is too small.	Lengthen the stroke of the thread feeding wire.
		2)-B The thread feeding wire has been improperly positioned.	Properly adjust the position of the thread feeding wire.
	1-3) Thread trimming failure because the bobbin thread is too short.	2)-C The thread slips off the thread feeding wire and take-up thread guide.	Re-thread the thread feeding wire and take-up thread guide. If the thread frequently slips off the thread feeding wire, replace the wire with a new one.
1-4) Failed clamp of the bobbin thread	3)-A Bobbin thread tension is too high.	Reduce bobbin thread tension to such an extent that thread tension is sufficiently obtained.	
1-5) The needle thread and bobbin thread do not neatly interlace with each other at the start of sewing.	4)-A	Enter 3 stitches at soft start (1,200 rpm).	
1-6) The needle thread is not under the presser foot when the wiper sweeps the thread and is free.	5)-A Sewing speed at the start of sewing is too high. This prevents the needle thread and bobbin thread from smoothly interlacing with each other.	 <p>Create a custom pattern as shown below and make a larger back-tack stitch length than the needle hole width of the presser. The stitch length of 1.6 to 2 mm is recommended for reference.</p>	
	6)-A Needle thread is not early retained with the presser foot and the throat plate.		
1-7) Idle stitches are made at the start of sewing.	7)-A The needle thread and bobbin thread do not interlace with each other because the material makes no resistance to the threads.	Place the threads under the presser foot and start the sewing machine while holding the threads there.	

Trouble	Cause 1	Cause 2	Corrective measure and adjusting procedure
2. Needle thread end rests on the material at the start of sewing.	<p>2-1) Length of thread remaining at the needle eyelet is excessive.</p> <p>2-2) Top end of tangled-up thread on the wrong side of the material appears on the right side of the material.</p>	<p>1)-A Tension applied by the pre-tension disk is too low.</p> <p>1)-B Thread trimming cam timing has been excessively retarded.</p>	<p>Increase the tension applied by the pre-tension disk.</p> <p>Adjust the thread trimming cam timing to the correct value.</p> <p>Place the needle thread under the presser foot at the start of sewing, thereby preventing the thread from being tangled up. (Particularly when reverse feed stitches are made at the start of sewing)</p>
3. Thread slips off the needle eyelet immediately after thread trimming.	<p>3-1) The moving knife fails to separate the threads and trim the thread at the needle.</p>	<p>1)-A Thread trimming cam timing has been excessively advanced.</p> <p>1)-B Locus of the moving knife is defective.</p>	<p>Properly adjust the thread trimming cam timing.</p> <p>Re-install the knife unit or replace the knife unit with a new one.</p>
4. Thread breaks at the start of sewing.	<p>4-1) The needle thread feeding amount at the time of thread trimming is excessive, causing the thread to break when the needle reaches the lowest position of its stroke at the start of sewing.</p> <p>4-2) Stitch length is too short</p>	<p>2)-A The thread slacks because of small stitch length.</p> <p>2)-B The needle repeatedly enters the same point since the stitch length is small.</p> <p>2)-C Thread tension fluctuates because of tangle-up thread.</p>	<p>Reduce the needle thread feeding amount.</p> <p>To start sewing with a small stitch length, place the needle thread end under the presser foot and start the sewing machine.</p>

Trouble	Cause 1	Cause 2	Corrective measure and adjusting procedure
5. Needle breakage	5-1) The needle breaks when it hits against this side of the needle slot in the throat plate.	1)-A Needle thread tension is too high.	Reduce the needle thread tension. The needle thread tension may have been increased because of isolated idling loops. S0, also refer to the description of "isolated idling loops."
	5-2) The needle breaks when it hits against both sides of the needle slot in the throat plate.	1)-B The needle fails to enter the needle slot in the throat plate.	Adjust the needle entry point.
		2)-A Zigzag width is wider than the needle slot.	Decrease the zigzag width or replace the throat plate with an appropriate one.
		2)-B The needle throwing range exceeds the needle slot since the needle throw positioning lever has been moved too far.	Return the needle throw positioning lever to the home position and make the stopper work at a position where the needle does not come in contact with the throat plate.
6. Needle thread cannot be cut.	6-1) The last stitch skips.	1)-A Refer to the description of "Stitch skipping."	
	6-2) The moving knife spreads the thread loops.	1)-B Thread tension is insufficient at the time of thread trimming.	Increase the thread tension provided by the pre-tension disk. (6 g or higher)
		2)-A Thread tension is insufficient at the time of thread trimming.	Increase the thread tension provided by the pre-tension disk. Lengthen the stroke of the needle thread feeding device. (The needle thread is tensed by steeply bending the thread path.)
7. Bobbin thread cannot be cut.	7-1) The moving knife spreads the bobbin thread.	1)-A Bobbin thread tension is too low.	Increase the bobbin thread tension, then balance the needle thread and bobbin thread.

For LZ-2290SU only

Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure
8. Adjustment of slippage of cloth is difficult.	8-1) Minus slippage of cloth is difficult.	Inclination of the feed dog is insufficient.	Lower the rear end of the feed dog.	Adjust and lower vertical feed link shaft.
		Direction of marker dots of vertical feed link shafts is on the left side.	Raise the front end of the feed dog.	Adjust and raise vertical feed link shaft.
	8-2) Plus slippage of cloth is difficult.	Inclination of the feed dog is insufficient.	Raise the rear end of the feed dog.	Adjust and raise vertical feed link shaft.
		Direction of marker dots of vertical feed link shafts is on the left side.	Lower the front end of the feed dog.	Adjust and lower vertical feed link shaft.
		Position of the presser fulcrum is in the front side.	Adjust the direction of the marker dots of vertical feed link shafts on the left side.	Adjust the direction of the marker dots of vertical feed link shafts on the left side.
		Height of the feed dog is too high.		Change the position to the rear.
9. Straight sewing of cloth is difficult.	Sewing products flop.	Height of the feed dog is too high.	Adjust vertical feed link shafts lower the height of the feed dog.	

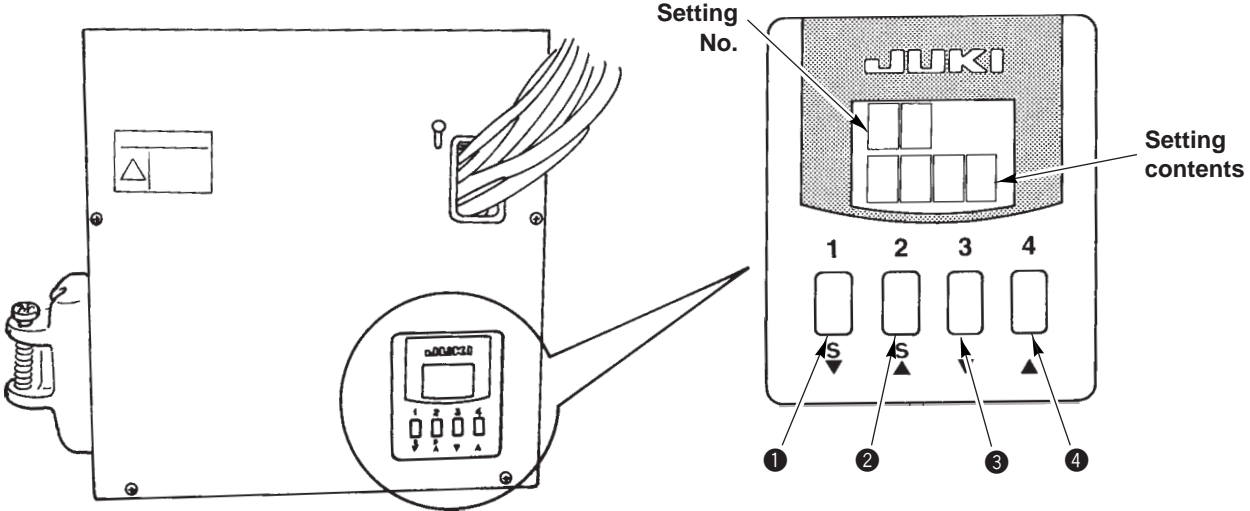
(Caution) For the details, refer to the item “(5) Adjusting the slippage of materials”.

10. FOR GENERAL EXPORT

Supply voltage	Single phase 200V / 220V / 240V	3-phase 200V / 220V / 240V
Frequency	50 Hz / 60 Hz	
Rated current	4.6A / 4.3A / 4.0A	3.0A / 2.7A / 2.3A
Operating environment	Temperature : 0 to 40°C Humidity : 90% or less	

11. SETTING FOR FUNCTIONS

(1) Names and functions of the respective sections of the electrical box (SC-905).



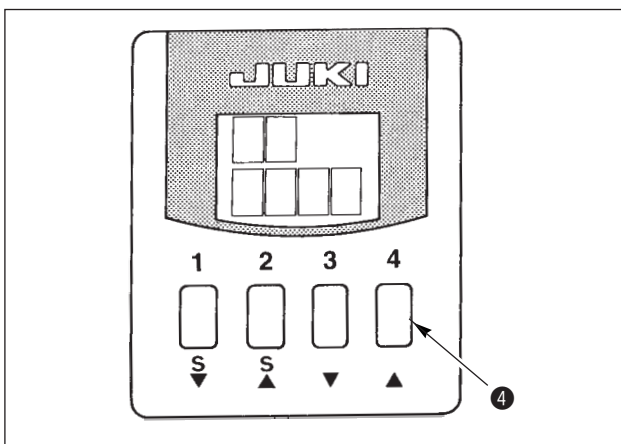
Selection and setting of the various functions can be performed with four setting switches and an indicator of the SC-905.

- ① Switch for confirming the contents of change and updating setting No. in DOWN direction (SET-)
- ② Switch for confirming the contents of change and updating setting No. in UP direction (SET+)
- ③ Down switch (DOWN)
- ④ Up switch (UP)

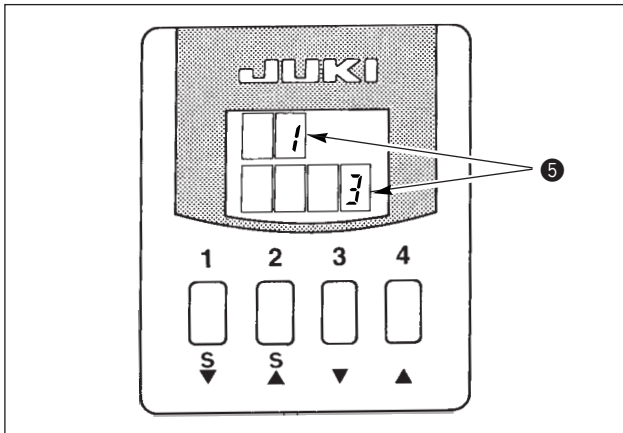
(Caution) Do not perform switch operations other than those described in the following explanations. Be sure to re-turn the power switch ON after one second or more has passed. If the power is turned ON immediately after turning it OFF, the sewing machine may not work normally. In this case, turn ON the power again.

WARNING :
 To avoid possible personal injuries caused by movement other than that you desired, do not operate the switches in the procedure other than those required, as described below, to specify the functions.

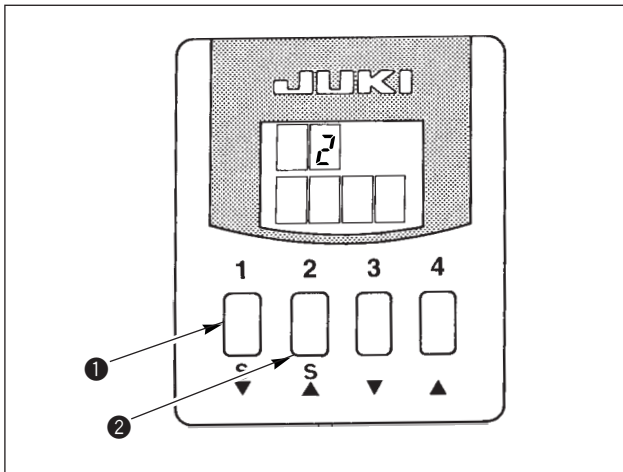
(2) How to change over to the function setting mode



- 1) Turn OFF the power to the unit.
- 2) Pressing switch ④, turn ON the power to the unit.



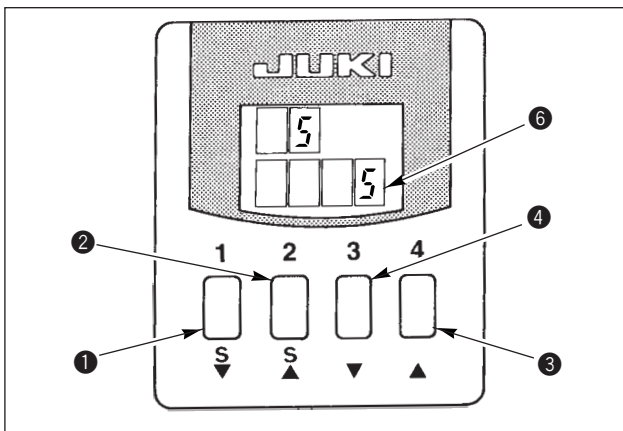
3) Indication ⑤ will be shown on the display. (If the indication fails to change, re-perform the procedures 1) to 3).



4) When you want to advance the setting No., press switch ② to advance the setting No. When you want to return the setting No., press switch ① to return the setting No.

(Caution) Keep pressing switch ② or switch ①, and the setting No. will advance (return) continuously.

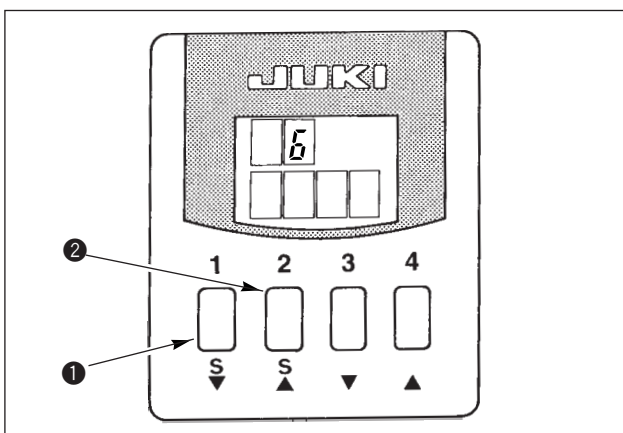
When the setting No. is advanced (returned), the contents which are before by one (after by one) will be determined. So be careful when changing the contents (up / down switch is touched.)



EXAMPLE) CHANGING THE FLICKER REDUCING FUNCTION (SETTING No. 5)

Press switch ② four times to set the setting No. to "5". Press switch ④ five times to change the set No. to "5" since the current set value is displayed on LED ⑥. (Standard : "0")

(Reference) Keep pressing switch ④ or switch ③, and the setting value can be changed continuously.



5) When the change has been completed, press switch ① or ② to specify the changed value.

(Caution) 1. When turning OFF the power before performing this work, the contents which have been changed are not updated.

2. Press switch ②, and screen display will change to the contents of next setting No.

3. Press switch ①, and screen display will change to the contents of previous setting No.

After completing the operation, turn OFF the power. The machine returns to the normal operation by turning ON the power again.

12. FUNCTION SETTING LIST

No.	Item	Description	Setting range	Indication of standard function setting	Ref. page Inst.manual
1	Soft start function	The number of stitches to be sewn at a low speed when the soft-start function is used at the start of sewing. 0 : Soft-start function is not operative.	0 to 9 (Stitches)	<input type="checkbox"/> 1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 3	22
*	2	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	<input type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
*	3	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	<input type="checkbox"/> 3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
*	4	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0 to 19 (Stitches)	<input type="checkbox"/> 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 5	
5	Flicker reducing function	Flicker reducing function (If the hand lamp flickers.) 0 : Flicker reducing function is not operative. 1 : Less effective 8 : Highly effective	0 to 8	<input type="checkbox"/> 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	22
6	Bobbin thread counting function	Bobbin thread counting function 0 : Bobbin thread counting function is not operative. 1 : Bobbin thread counting function is operative.	0/1	<input type="checkbox"/> 6 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1	22
*	7	Unit of bobbin thread counting down 0 : Count/10 stitches 1 : Count/15 stitches 2 : Count/20 stitches	0 to 2	<input type="checkbox"/> 7 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
*	8	Number of rotation of reverse feed stitching	180 to 3,000 (r.p.m.)	<input type="checkbox"/> 8 1 3 5 0	
*	9	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	<input type="checkbox"/> 9 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
10	Setting of needle bar stop position when the sewing machine stops.	Position of needle bar is specified when the sewing machine stops. 0 : Predetermined lowest position 1 : Predetermined highest position	0/1	1 0 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	22
11	Click sound of key switch mounted on PSC	Click sound of key switch mounted on PSC is specified. 0 : Click is not operative. 1 : Click is operative.	0/1	1 1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1	22
12	Optional switch function selection	Switching of functions of optional switch 0 : No function 1 : Needle up/down compensating stitching 2 : No function 3 : No function 4 : Thread trimming function 5 : Presser foot lifting function 6 : One stitch compensating stitching 7 : No function Do not set to 2, 3 and 7. If these numbers are set, trouble or accident will be caused.	0 to 6	1 2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	23
*	13	Function of prohibiting start of the sewing machine by bobbin thread counter (After thread trimming) 0 : When counting is out (-1 or less), function of prohibiting start of the sewing is not operative. 1 : When counting is out (-1 or less), function of prohibiting start of the sewing machine is operative. 2 : Function of "1" + counter (-1 or less) stop (temporary stop)	0 to 2	1 3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
*	14	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	1 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1	
*	15	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0 to 19	1 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1	
*	18	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	1 8 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1	

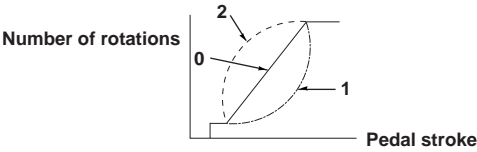
* Do not change the set values with asterisk (*) mark as they are functions for maintenance. If the standard set value set at the time of delivery is changed, it is in danger of causing the machine to be broken or the performance to be deteriorated. If it is necessary to change the set value, please purchase the Engineer's Manual and follow the instructions. (Descriptions of setting in this list are the standard values at the time of delivery of LZ-2290.) However, contents of function setting are subject to change for improvement of function and performance without notice.

No.	Item	Description	Setting range	Indication of standard function setting	Ref. page Inst.manual
*	19	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	<input type="checkbox"/> 1 <input type="checkbox"/> 9 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
*	20	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.		<input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
	21	Function of neutral presser lifting Function of lifting presser foot when the pedal is in neutral position. 0 : Function of neutral automatic presser lifting is not operative. 1 : Selection of function of neutral presser lifting.	0/1	<input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	23
	22	Function of changeover of compensating switch on the operation panel function Function of needle up/down compensating switch on the operation panel can be changed. 0 : Needle up/down compensation 1 : One stitch compensation	0/1	<input type="checkbox"/> 2 <input type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	23
*	24	Function of fine adjustment of number of rotation Number of rotation can be compensated. Be sure to normally use this function with "0".	-1.5% to 1.5% (0.1 %)	<input type="checkbox"/> 2 <input type="checkbox"/> 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
	30	Function of reverse feed stitching on the way Function of reverse feed stitching on the way 0 : Function of reverse stitching on the way is not operative. 1 : Function of reverse feed stitching on the way is operative.	0/1	<input type="checkbox"/> 3 <input type="checkbox"/> 0 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	24
	31	Number of stitches of reverse feed stitching on the way Number of stitches of reverse feed stitching on the way.	0 to 19 (Stitches)	<input type="checkbox"/> 3 <input type="checkbox"/> 1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 4	24
	32	Effective condition of reverse feed stitching on the way when the sewing machine is stopping. Effective condition of reverse feed stitching on the way 0 : Function is not operative when the sewing machine stops. 1 : Function is operative when the sewing machine stops.	0/1	<input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	24
	33	Thread trimming function by reverse feed stitching on the way Thread trimming function by reverse feed stitching on the way 0 : Automatic thread trimming function after completion of reverse feed stitching on the way is not operative. 1 : Automatic thread trimming after completion of reverse feed stitching on the way is performed.	0/1	<input type="checkbox"/> 3 <input type="checkbox"/> 3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	24
*	35	Number of rotation at a low speed Lowest speed by pedal	20 to 400 (r.p.m.)	<input type="checkbox"/> 3 <input type="checkbox"/> 5 <input type="checkbox"/> <input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> 0	
*	36	Number of rotation of thread trimming Thread trimming speed	20 to 250 (r.p.m.)	<input type="checkbox"/> 3 <input type="checkbox"/> 6 <input type="checkbox"/> <input type="checkbox"/> 1 <input type="checkbox"/> 8 <input type="checkbox"/> 0	
	37	Number of rotation of soft-start Sewing speed at the start of sewing (soft-start)	130 to 5500 (r.p.m.)	<input type="checkbox"/> 3 <input type="checkbox"/> 7 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> 0	22
*	38	Maker's function Do not change the set value. It is very dangerous if the value is changed since the machine will break.		<input type="checkbox"/> 3 <input type="checkbox"/> 8 <input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> 0 <input type="checkbox"/> 0	
*	39	Pedal stroke at the start of rotation Position where the sewing machine starts rotating from pedal neutral position (Pedal stroke)	10 to 50 (0.1 mm)	<input type="checkbox"/> 3 <input type="checkbox"/> 9 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 3 <input type="checkbox"/> 0	
*	40	Low speed section of pedal Position where the sewing machine starts accelerating from pedal neutral position (Pedal stroke)	10 to 100 (0.1 mm)	<input type="checkbox"/> 4 <input type="checkbox"/> 0 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 6 <input type="checkbox"/> 0	
*	41	Starting position of lifting presser foot by pedal Position where the cloth presser starts lifting from pedal neutral position (Pedal stroke)	-60 to -10 (0.1mm)	<input type="checkbox"/> 4 <input type="checkbox"/> 1 <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> 2 <input type="checkbox"/> 1	
*	42	Starting position of lowering presser foot Starting position of lowering presser foot Stroke from the neutral position	8 to 50 (0.1 mm)	<input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 <input type="checkbox"/> 0	

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No.	Item	Description	Setting range	Indication of standard function setting	Ref. page Inst.manual
* 43	Pedal stroke 2 for starting thread trimming	Position 2 where the thread trimming starts from pedal neutral position (When the function of lifting presser foot by pedal is provided.) (Pedal stroke)	-60 to -10 (0.1 mm)	<input type="text" value="4"/> <input type="text" value="3"/> <input type="text" value="-"/> <input type="text" value="5"/> <input type="text" value="1"/>	
* 44	Pedal stroke for reaching the maximum number of rotation	Position where the sewing machine reaches its highest sewing speed from pedal neutral position (Pedal stroke)	10 to 150 (0.1 mm)	<input type="text" value="4"/> <input type="text" value="4"/> <input type="text" value="1"/> <input type="text" value="5"/> <input type="text" value="0"/>	
* 45	Compensation of neutral point of the pedal	Compensation value of the pedal sensor	-15 to 15	<input type="text" value="4"/> <input type="text" value="5"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	
* 46	Auto-lifter selecting function	Auto-lifter selection 0 : Solenoid drive system 1 : Pneumatic drive system	0/1	<input type="text" value="4"/> <input type="text" value="6"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	
* 47	Holding time of lifting auto-lifter	Limitation time of waiting for lifting solenoid type auto-lifter device	10 to 600 (second)	<input type="text" value="4"/> <input type="text" value="7"/> <input type="text" value=""/> <input type="text" value="6"/> <input type="text" value="0"/>	25
* 48	Pedal stroke 1 for starting thread trimming	Position where thread trimming starts from pedal neutral position (Standard pedal) (Pedal stroke)	-60 to -10 (0.1 mm)	<input type="text" value="4"/> <input type="text" value="8"/> <input type="text" value="-"/> <input type="text" value="3"/> <input type="text" value="5"/>	
* 49	Lowering time of presser foot	Lowering time of presser foot after the pedal has been depressed. (Start of rotation of the sewing machine is delayed during this time.)	0 to 250 (10 ms)	<input type="text" value="4"/> <input type="text" value="9"/> <input type="text" value="1"/> <input type="text" value="4"/> <input type="text" value="0"/>	26
* 51	Compensation of solenoid-on timing of reverse feed stitching at the start of sewing	Compensation of starting the solenoid for reverse feed stitching when reverse feed stitching at the start of sewing is performed.	-36 to 36 (10°)	<input type="text" value="5"/> <input type="text" value="1"/> <input type="text" value="-"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	25
* 52	Compensation of solenoid-off timing of reverse feed stitching at the start of sewing	Compensation of releasing the solenoid for reverse feed stitching when reverse feed stitching at the start of sewing is performed.	-36 to 36 (10°)	<input type="text" value="5"/> <input type="text" value="2"/> <input type="text" value="-"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	25
* 53	Compensation of solenoid-off timing of reverse feed stitching at the end of sewing	Compensation of releasing the solenoid for reverse feed stitching when reverse feed stitching at the end of sewing is performed.	-36 to 36 (10°)	<input type="text" value="5"/> <input type="text" value="3"/> <input type="text" value="-"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	25
55	Foot lift after thread trimming	Function of lifting presser foot at the time of (after) thread trimming 0 : Not provided with the function of lifting presser foot after thread trimming 1 : Provided with the function of lifting presser foot automatically after thread trimming	0/1	<input type="text" value="5"/> <input type="text" value="5"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="1"/>	26
56	Reverse revolution to lift the needle after thread trimming	Function of reverse revolution to lift the needle at the time of (after) thread trimming 0 : Not provided with the function of reverse revolution to lift the needle after thread trimming 1 : Provided with the function of reverse revolution to lift the needle after thread trimming	0/1	<input type="text" value="5"/> <input type="text" value="6"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	26
* 57	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	<input type="text" value="5"/> <input type="text" value="7"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	
58	Function of holding predetermined upper/lower position of the needle bar	Function of holding predetermined upper/lower position of the needle bar 0 : Not provided with the function of holding predetermined upper/lower position of the needle bar 1 : Provided with the function of holding predetermined upper/lower position of the needle bar	0/1	<input type="text" value="5"/> <input type="text" value="8"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	26
59	Function of Auto/Manual change-over of reverse feed stitching at the start of sewing	This function can specify the sewing speed of reverse feed stitching at the start of sewing. 0 : The speed will depend on the manual operation by pedal, etc. 1 : The speed will depend on the specified reverse feed stitching speed (No. 8).	0/1	<input type="text" value="5"/> <input type="text" value="9"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="1"/>	26
60	Function of stop immediately after reverse feed stitching at the start of sewing	Function at the time of completion of reverse feed stitching at the start of sewing 0 : Not provided with the function of temporary stop of the sewing machine at the time of completion of reverse feed stitching at the start of sewing 1 : Provided with the function of temporary stop of the sewing machine at the time of completion of reverse feed stitching at the start of sewing.	0/1	<input type="text" value="6"/> <input type="text" value="0"/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value="0"/>	26

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No.	Item	Description	Setting range	Indication of standard function setting	Ref. page Inst.manual
* 61	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	<input type="text" value="6"/> <input type="text" value="1"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="1"/>	
* 64	Change-over speed of condensation stitch or EBT (end back tack)	Initial speed when starting EBT	0 to 250 (r.p.m.)	<input type="text" value="6"/> <input type="text" value="4"/> <input type="text"/> <input type="text" value="1"/> <input type="text" value="7"/> <input type="text" value="0"/>	
* 65	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	-36 to 0 (10°)	<input type="text" value="6"/> <input type="text" value="5"/> <input type="text" value="-"/> <input type="text"/> <input type="text" value="1"/> <input type="text" value="5"/>	
* 66	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	-36 to 0 (10°)	<input type="text" value="6"/> <input type="text" value="6"/> <input type="text" value="-"/> <input type="text"/> <input type="text" value="1"/> <input type="text" value="5"/>	
* 67	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0 to 9 (Stitches)	<input type="text" value="6"/> <input type="text" value="7"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="2"/>	
* 68	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0 to 35 (10°)	<input type="text" value="6"/> <input type="text" value="8"/> <input type="text"/> <input type="text"/> <input type="text" value="2"/> <input type="text" value="7"/>	
* 69	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0 to 35 (10°)	<input type="text" value="6"/> <input type="text" value="9"/> <input type="text"/> <input type="text"/> <input type="text" value="1"/> <input type="text" value="2"/>	
70	Function of soft-down of presser foot	Presser foot is slowly lowered. 0 : Presser foot is rapidly lowered. 1 : Presser foot is slowly lowered.	0/1	<input type="text" value="7"/> <input type="text" value="0"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="0"/>	26
71	Function of limitation of re-acceleration from reduction of speed	Speed limitation is performed at the time of re-acceleration on the way of reducing speed of the sewing machine. It is effective when operating inching sewing.	0 to 5 (1/step)	<input type="text" value="7"/> <input type="text" value="1"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="0"/>	27
72	Function of limitation of acceleration at the start of rotation	Speed limitation is performed at the time of start-up of the sewing machine (excluding the start of sewing). It is effective when operating inching sewing.	0 to 5 (1/step)	<input type="text" value="7"/> <input type="text" value="2"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="1"/>	27
73	Retry function	This function is used when needle cannot pierce materials . 0 : Normal 1 : Retry function is provided.	0/1	<input type="text" value="7"/> <input type="text" value="3"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="0"/>	27
* 75	Rotating direction of motor	Normal rotating direction of motor 0 : Clockwise 1 : Counterclockwise	0/1	<input type="text" value="7"/> <input type="text" value="5"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="0"/>	
76	Function to select the start-up speed of the sewing machine	Starting curve of the sewing machine is selected. 0 : Normal curve 1 : More sharp curve	0/1	<input type="text" value="7"/> <input type="text" value="6"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="0"/>	27
87	Function of pedal curve selection	Pedal curve is selected. (Improving pedal inching operation) 	0/1/2	<input type="text" value="8"/> <input type="text" value="7"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text" value="0"/>	27

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No.	Item	Description	Setting range	Indication of standard function setting	Ref. page Inst.manual
89	Return of needle thread feed	Return of feed function 0 : Without function 1 : With function	0/1	<input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1	
* 91	Function of prohibiting compensation operation after turning handwheel by hand	Function of compensating stitching when turning handwheel by hand at the time of completion of constant-dimension stitching 0 : Function of compensating stitching is effective. 1 : Function of compensating stitching is prohibited.	0/1	<input type="checkbox"/> 9 <input type="checkbox"/> 1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1	
92	Function of reducing speed of reverse feed stitching at the start of sewing	Function to reduce speed at the time of reverse feed stitching at the start of sewing. 0 : Speed is not reduced. 1 : Speed is reduced.	0/1	<input type="checkbox"/> 9 <input type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	27
93	Function added to needle up/down compensating switch	Operation of needle up/down compensating switch is changed after turning ON the power or thread trimming. 0 : Normal (needle up/down compensating stitching only) 1 : One stitch compensating stitching is performed only when aforementioned changeover is made. (Upper stop if upper stop)	0/1	<input type="checkbox"/> 9 <input type="checkbox"/> 3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	28
* 94	Maker's function	Do not change the set value. It is very dangerous if the value is changed since the machine will break.	0/1	<input type="checkbox"/> 9 <input type="checkbox"/> 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	
96	Max. number of rotation setting	Max. number of rotation of the sewing machine head can be set. * Setting varies in accordance with resistance pack to be connected.	50 to MAX (r.p.m.)	<input type="checkbox"/> 9 <input type="checkbox"/> 6 <input type="checkbox"/> 4 <input type="checkbox"/> 0 <input type="checkbox"/> 0 <input type="checkbox"/> 0	28

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13. DETAILED EXPLANATION OF SELECTION OF FUNCTIONS

The functions that cannot be described in the Instruction Manual are described below.

① Unit of bobbin thread counting down (Function setting No. 7)

Unit of bobbin thread counting down (subtraction) can be changed.

<input type="checkbox"/> 7	0 : 1 count-down per 10 stitches
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	1 : 1 count-down per 15 stitches
	2 : 1 count-down per 20 stitches

② Function of prohibiting start of the sewing machine by bobbin thread counter (Function setting No. 13)

This is a function to prohibit start of the sewing machine when the value of the bobbin thread counter reaches - (minus) 1 or less.

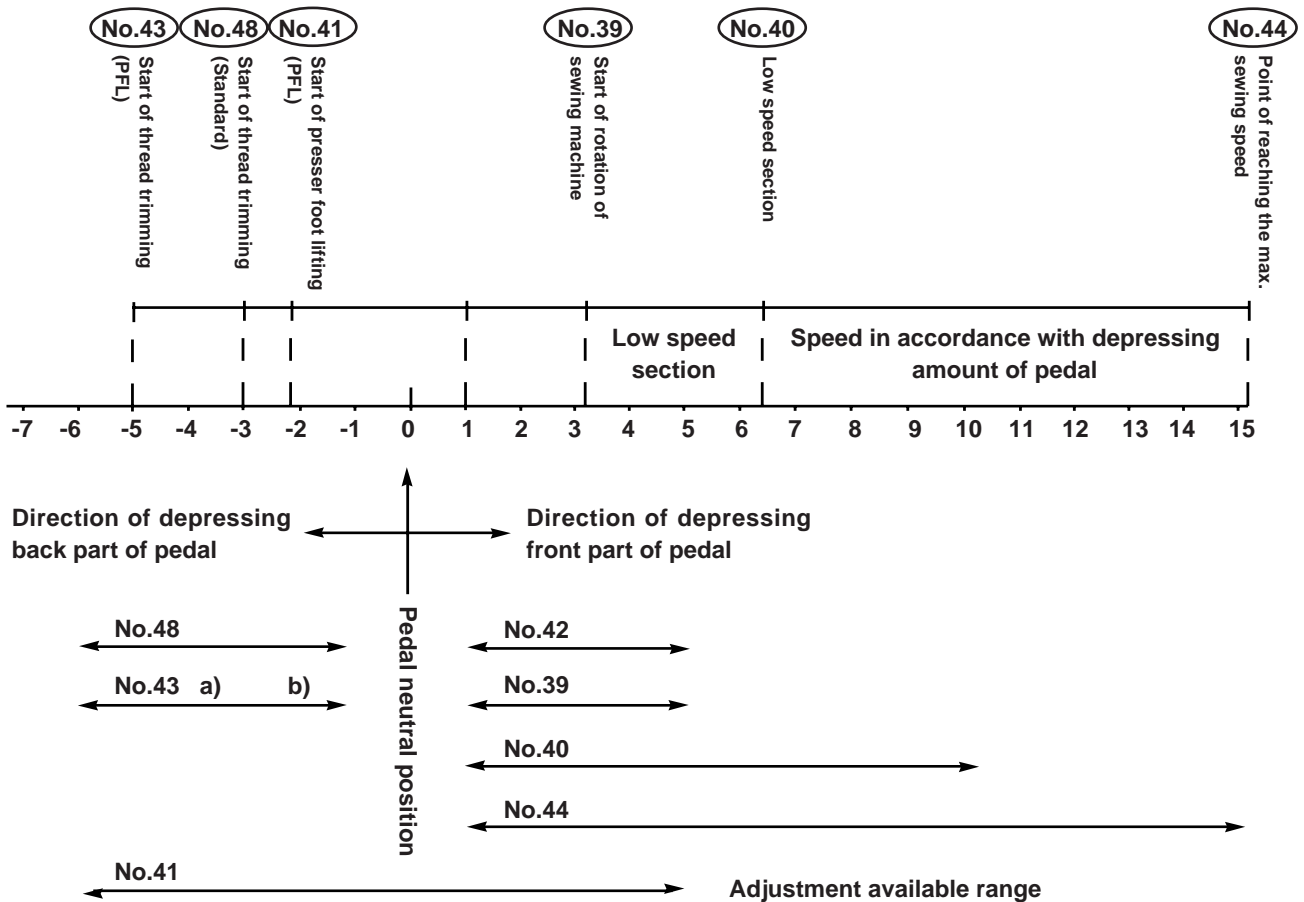
<input type="checkbox"/> 1 <input type="checkbox"/> 3	0 : Even when counting is out (-1 or less), function of prohibiting start of the sewing machine is not operative.
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0	1 : When counting is out, the sewing machine stops. (Start of the sewing machine is prohibited after completing the process during sewing.)
	2 : Temporary stop with function of "1" + counter (-1 or less)

③ Number of rotation of reverse feed stitching (Function setting No. 8)

This function sets the number of rotation of reverse feed stitching at the start of sewing, at the end of sewing and at the overlapping stitching.

<input type="checkbox"/> 8	Setting range
<input type="checkbox"/> 1 <input type="checkbox"/> 9 <input type="checkbox"/> 0 <input type="checkbox"/> 0	180 to 3,000 [rpm] <10/rpm>

④ Adjusting the pedal stroke (Function setting Nos. 39, 40, 41, 43, 44 and 48)



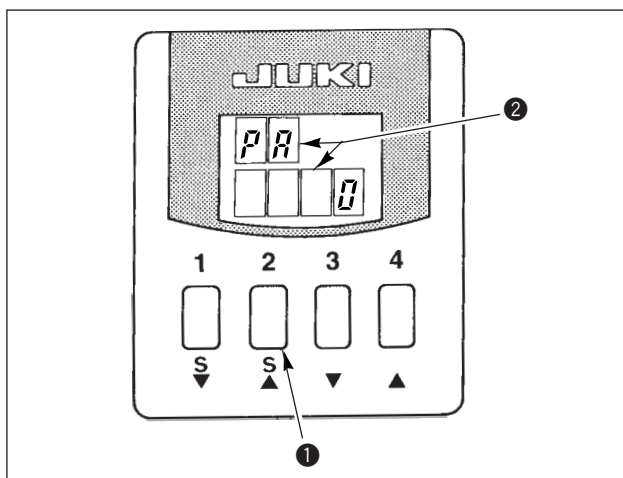
⑤ Compensation of neutral point of the pedal (Function setting No. 45)

This function displays the compensation value of the neutral point of the pedal. Setting of the compensation value of the neutral point of the pedal is performed by means of the automatic compensation of the neutral position of the pedal.

 Setting range
 -15 to 15

Automatic compensation of the neutral position of the pedal

Be sure to execute the following operations when the pedal sensor spring or the like is replaced.

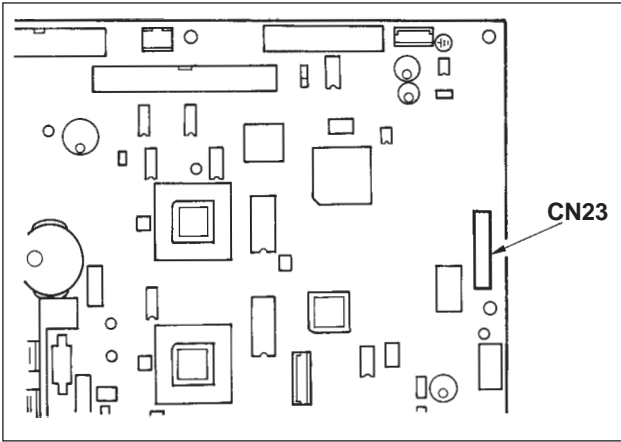


- 1) Pressing switch ①, turn ON the power switch.
- 2) Indication on the screen will be as illustrated in ②. At this time, the value indicated in the 7 segments of four figures is the compensation value.

(Caution) At this time, the pedal sensor does not work properly if the pedal is depressed. Do not place the foot or any object on the pedal.

- 3) Turn OFF the power switch once, and turn ON the power switch to return to the normal mode.

14. EXTERNAL OUTPUT/INPUT CONNECTORS



The following convenient signals are prepared in the case where the counter or the like is set up after setting up the sewing machine.

(Caution) Consult the engineers who have electrical knowledge when using the connectors.

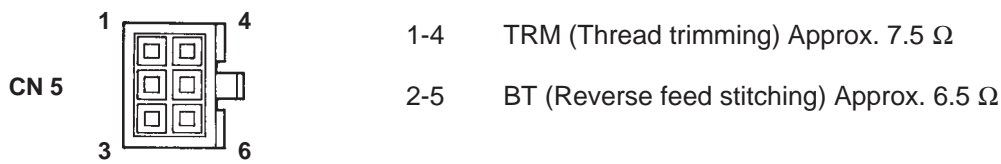
Table of allocation of the connector and signal

CN23	Name of signal	Output/input	Description	Electric spec.
1	+5V	-	Power source	DC5V, 100 mA
2	LSWINH	Input	Rotation by pedal is prohibited while "L" signal is inputted.	DC5V, -5 mA
3	SOFT	Input	Speed of rotation is limited to soft-speed while "L" signal is inputted.	DC5V, -5 mA
4	DDET	Output	"L" is output when the needle bar is in its lower position.	DC5V, 1 mA
5	UDET	Output	"L" is output when the needle bar is in its upper position.	DC5V, 1 mA
6	S.STATE	Output	"L" is output when the sewing machine is in stopping state.	DC5V, 1 mA
7	SGND	-	0V	
8	HS	Output	Pulse is output in accordance with rotation of the sewing machine. (45/rotation)	DC5V, 1 mA
9	N.C.		Not connected.	

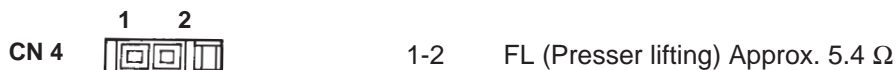
JUKI genuine Part No.	Part No. of connector HK024910090	Part No. of pin contact HK032040000
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(1) Connector connection diagram

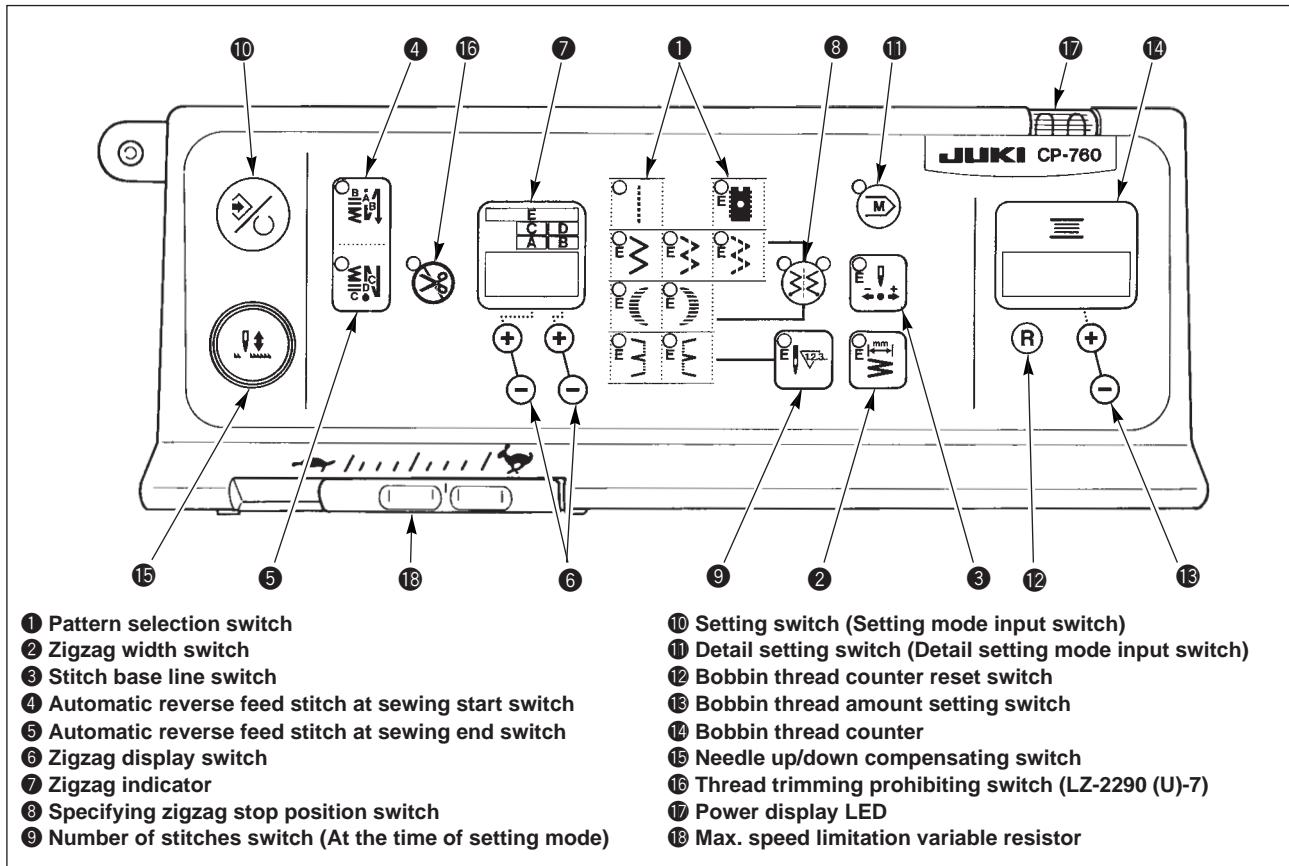
Machine head solenoid



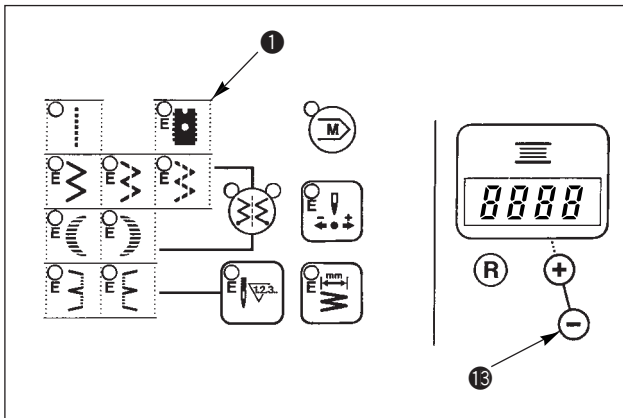
Presser lifting solenoid



15. FUNCTION SETTING OF THE OPERATION PANEL



(1) Initializing the panel data



1) The panel data can be returned to the initial state at the time of delivery.

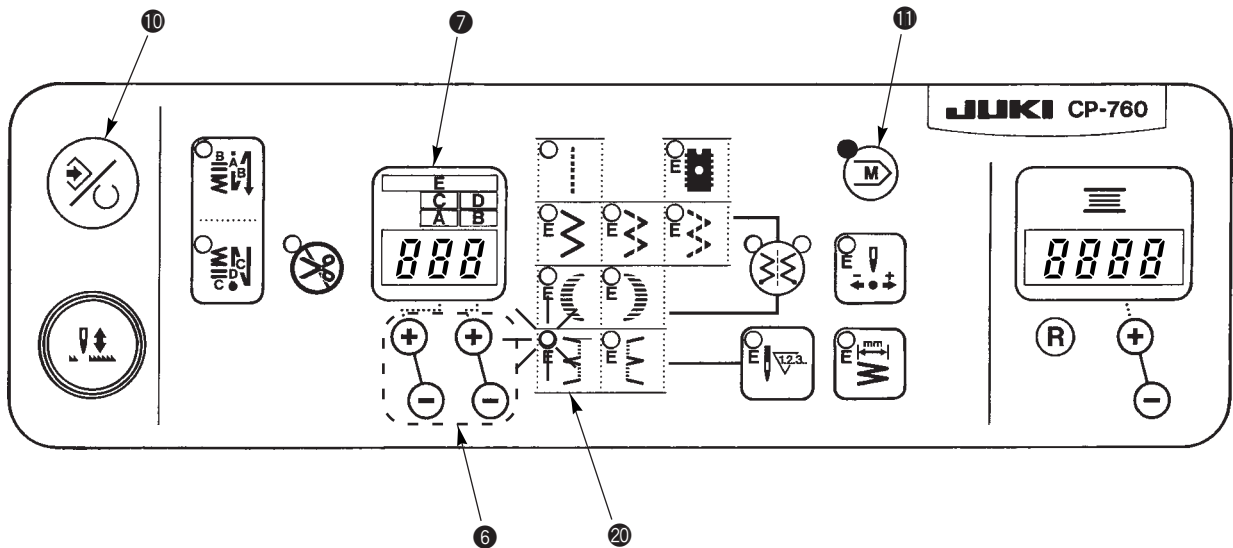
2) Initializing procedure

(1) Turn OFF the power.

(2) Simultaneously pressing custom pattern switch ① and “-” switch ⑬ of the bobbin thread amount setting switch, turn ON the power.

The count value of the bobbin thread counter cannot be initialized.

(2) Setting of the key lock



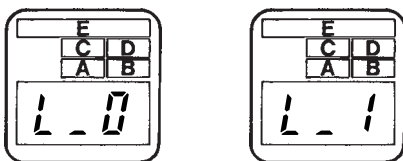
1) The contents of the key lock can be changed. There are two kinds of the key lock level, L_0 and L_1. The level has been set to L_0 level at the time of delivery.

(1) Functions that cannot be locked at the L_0 level

- ① ON/OFF of the automatic reverse feed stitching
- ② Prohibition of thread trimming
- ③ Specifying the stop position
- ④ Bobbin thread counter

(2) Functions that cannot be locked at the L_1 level

- ① Zigzag pattern
- ② ON/OFF of the automatic reverse feed stitching
- ③ Prohibition of thread trimming
- ④ Specifying the stop position
- ⑤ Bobbin thread counter



2) Setting procedure

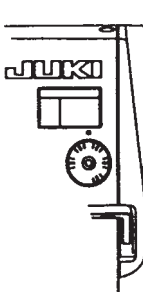
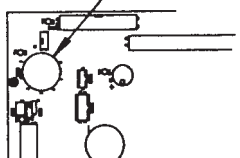
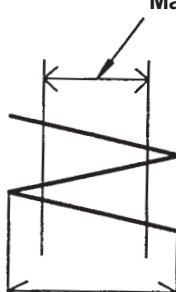
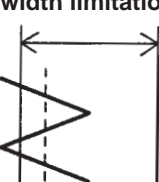
- (1) Pressing setting switch ⑩, press detail setting switch ⑪ to enter the detail setting mode.
- (2) Press left blind stitch switch ⑳. LED of left blind stitch switch ⑳ flashes on and off and the level of key lock is displayed in zigzag indicator ⑦.
- (3) Change over the display with zigzag display switch ⑥.
- (4) Press setting switch ⑩ to determine the setting.

16. ERROR CODE LIST

(1) PSC box

No.	Description of error detected	Cause of occurrence expected	Items to be checked
Er0	Execution of data initialization (This is not the error.)	<ul style="list-style-type: none"> When the machine head is changed. 	
Er1	Phase missing of power	<ul style="list-style-type: none"> When 3-phase input is missing, and single phase operation is performed. When input voltage is less than the guaranteed voltage. 	<ul style="list-style-type: none"> Check the power plug and receptacle for loose connection and disconnection. Check the power switch terminal for loose connection and disconnection. Check whether power fuse has blown. Check whether input voltage is lower by -10% than the rated voltage.
Er2	Fall detection switch failure	<ul style="list-style-type: none"> When fall detection switch is inputted in the state that the power is turned ON. 	<ul style="list-style-type: none"> Check whether the machine head is tilted without turning OFF the power switch (sewing machine operation is prohibited for safety sake). Check whether the fall detection switch cord is caught in the sewing machine or the like and has broken. Check whether the fall detection switch lever is caught in something.
Er3	Disconnection of synchronizer connector	<ul style="list-style-type: none"> When position detection signal is not inputted from the sewing machine head synchronizer. When the synchronizer has broken. 	<ul style="list-style-type: none"> Check the synchronizer connector (CN9) for loose connection and disconnection. Check whether the synchronizer cord has broken since the cord is caught in the machine head or the like.
Er4	Synchronizer lower position sensor failure		
Er5	Synchronizer upper position sensor failure		
Er6	Operation panel transmission failure	<ul style="list-style-type: none"> Disconnection of operation panel cord Operation panel has broken. 	<ul style="list-style-type: none"> Check the operation panel connector (CN17) for loose connection and disconnection. Check whether the operation panel cord has broken since the cord is caught in the machine head or the like.
Er7	Overload of motor	<ul style="list-style-type: none"> When the machine head is locked. When sewing extra-heavy material beyond the guarantee of the machine head. When the motor does not run. 	<ul style="list-style-type: none"> Check whether the thread has been entangled in the motor pulley. Check the motor output connector (4P) for loose connection and disconnection.
Er8	Machine head connector failure	<ul style="list-style-type: none"> When the machine head connector is not properly read. 	<ul style="list-style-type: none"> Check the machine head connector (CN11) for loose connection and disconnection.
Er10	Solenoid short-circuit	<ul style="list-style-type: none"> When the short-circuited solenoid is desired to be driven. 	<ul style="list-style-type: none"> Check whether the solenoid is short-circuited.
Er11	Overvoltage	<ul style="list-style-type: none"> When voltage upper than guaranteed one is inputted. When 200V is inputted for 100V setting. 	<ul style="list-style-type: none"> Check whether the applied power voltage is higher than the rated voltage + (plus) 10% or more. Check whether 100V/200V changeover connector is set by mistake. In the above cases, POWER circuit board has broken.
Er13	Low voltage	<ul style="list-style-type: none"> When voltage lower than guaranteed one is inputted. When 100V is inputted for 200V setting. 	<ul style="list-style-type: none"> Check whether the voltage is lower than the rated voltage - (minus) 10% or less. Check whether 100V/200V changeover connector is set by mistake.
Er24	Motor driver failure	<ul style="list-style-type: none"> Motor driver has broken. 	
Er30	Encoder failure	<ul style="list-style-type: none"> When the motor signal is not properly inputted. 	<ul style="list-style-type: none"> Check the motor signal connector (CN13, CN41) for loose connection and disconnection. Check whether the motor signal cord has broken since the cord is caught in the machine head or the like.
Er31	Motor hole sensor failure		

(2) Operation panel error

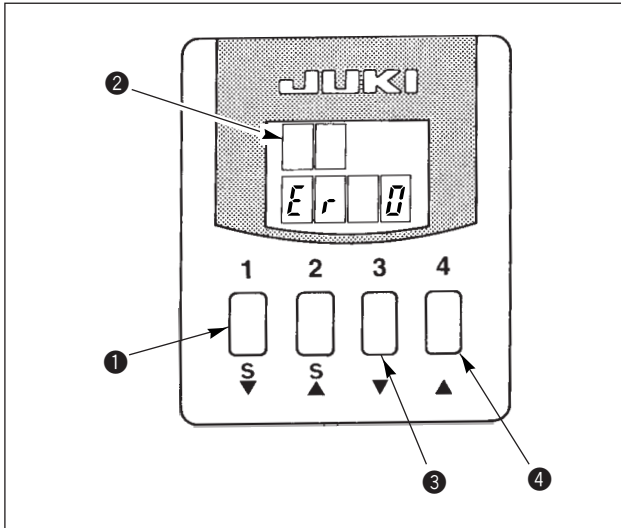
No.	Description and place to be checked	Corrective measure
PE 0	<ul style="list-style-type: none"> UP position detection error at the time of turning ON the power <p>The sewing machine does not stop at UP position.</p>  <p>Trouble of synchronizer</p>  <p>Disconnection/looseness of synchronizer connector</p>	<ul style="list-style-type: none"> Turn the sewing machine handwheel by hand and adjust the marker dot of the sewing machine. Insertion of synchronizer Replace synchronizer.
PE 1	<ul style="list-style-type: none"> Max. zigzag width limitation error <ol style="list-style-type: none"> When the value of max. zigzag width limitation is changed or zigzag width of zigzag pattern is larger than max. zigzag width limitation. Zigzag width of the pattern which has been copied from the pattern copy between panels is larger than max. zigzag width limitation. <p>Max. zigzag width limitation</p>  <p>Zigzag width of zigzag pattern</p>	<ul style="list-style-type: none"> Make the zigzag width of pattern smaller than max. zigzag width limitation.
PE 2	<ul style="list-style-type: none"> Stitch base line position error <ol style="list-style-type: none"> When the value of max. zigzag width limitation is changed, the zigzag width is within the value of max. zigzag width limitation. However, when the zigzag width is out of the area of max. zigzag width limitation due to the position of stitch base line of the zigzag pattern. Zigzag width of the pattern which has been copied from the pattern copy between panels is within max. zigzag width limitation. However, when the zigzag width is out of the area of max. zigzag width limitation due to the position of stitch base line. <p>Max. zigzag width limitation</p>  <p>Position of stitch base line</p>	<ul style="list-style-type: none"> Set the position of the stitch base line within the area of max. zigzag width limitation.

No.	Description and place to be checked	Corrective measure
PE 3	<ul style="list-style-type: none"> • Custom pattern pitch error The max. traveling amount of 1 Step exceeds 8.0 mm at the position specifying data of the custom pattern. <div data-bbox="598 297 794 622" style="text-align: center;"> </div>	<ul style="list-style-type: none"> • Set the max. traveling amount of 1 Step to less than 8 mm.
PE 3 Flashing	<ul style="list-style-type: none"> • In case the travelling amount of the start from the end of custom pattern exceeds 8.0 mm. 	<ul style="list-style-type: none"> • Set the travelling amount of the start from the end of custom pattern to less than 8.0 mm.
PE 4	<ul style="list-style-type: none"> • Condensation custom pattern pitch error The max. traveling amount of 1 Step exceeds 8 mm at the position specifying data of the condensation custom pattern. 	<ul style="list-style-type: none"> • Set the max. traveling amount of 1 Step to less than 8 mm.
PE 4 Flashing	<ul style="list-style-type: none"> • In case the travelling amount of the start of next sewing from the end of condensation custom pattern exceeds 8.0 mm. 	<ul style="list-style-type: none"> • Set the travelling amount of the start of next sewing from the end of condensation custom pattern to less than 8.0 mm.
PE 5	<ul style="list-style-type: none"> • Panel communication error <ul style="list-style-type: none"> ① Disconnection of the panel cord ② Slackness of the panel cord connector ③ Needle rocking control error 	<ul style="list-style-type: none"> • Check or replace the panel cord. • Re-connect the connector. • Turn ON / OFF power. • Re-connect CN1 connector. • Re-connect CN14 connector or stepping motor connector.
PE 6	<ul style="list-style-type: none"> • Communication between panels error <ul style="list-style-type: none"> ① Disconnection of the panel cord ② Slackness of the panel cord connector 	<ul style="list-style-type: none"> • Check or replace the panel cord. • Re-connect the connector.
BTSW LED Flashing 1 time	<ul style="list-style-type: none"> • Communication between panels error <ul style="list-style-type: none"> ① Disconnection of the panel cord ② Slackness of the panel cord connector 	<ul style="list-style-type: none"> • Check or replace the panel cord. • Re-connect the connector.
BTSW LED Flashing 2 times	<ul style="list-style-type: none"> • Overheat error An error that occurs when the temperature of the radiator on CTL circuit board inside the control box has risen more than the specified temperature. 	<ul style="list-style-type: none"> • Clean the filter of cooling fan. • Re-connect the connector. • Check the connector pin. • Remove the cause of blown-out and replace the fuse.
BTSW LED Flashing 3 times	<ul style="list-style-type: none"> • Needle rocking drive origin error An error that occurs when the detection of the needle rocking origin is performed and the origin is not detected at the time of turning ON the power. <ul style="list-style-type: none"> ① Disconnection of PM relay cable ② Trouble of the origin sensor ③ Disconnection of the power transformer connector pin ④ F1 fuse has blown. 	<ul style="list-style-type: none"> • Re-connect the connector. • Check the connector pin. • Remove the cause of blown-out and replace the fuse.

(3) Way of referring to the error history

You can check the error information occurred in the past.

Error information can be recorded up to 127 cases. (Error information more than 127 cases is overwritten from older one.)

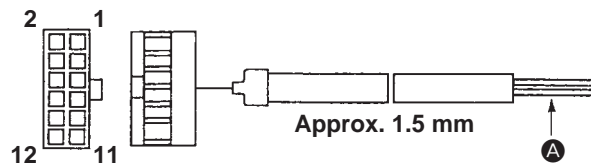


- 1) Pressing switch ❶ inside the front cover, turn ON the power switch.
- 2) LED displays the latest error information with “peep” sound. (If there is no error, indication ❷ changes to indicate “Er0”.)
- 3) When switch ❸ is pressed, old error information in the error history can be called. (When the information reaches the last, an alarm sound “peeps”.)
- 4) When switch ❹ is pressed, new error information in the error history can be called. (An alarm sound “peeps” at the latest information.)

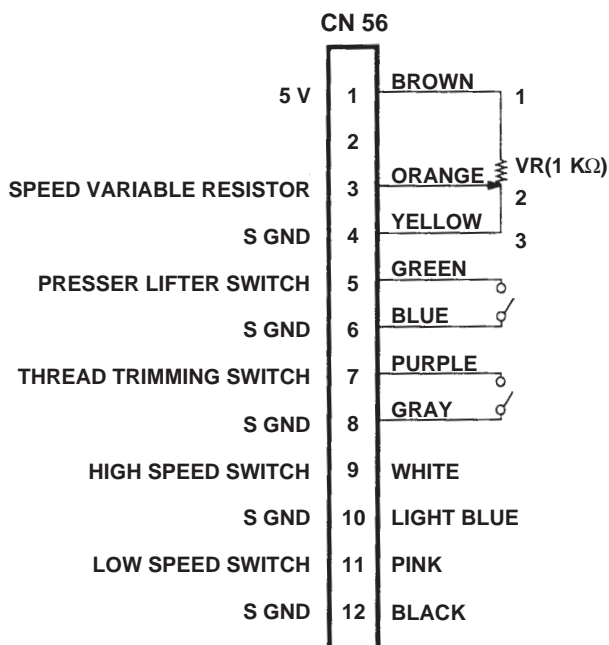
(Caution) Refer to “16. Error code list” for error No. and the description.

17. OPTIONAL COED

(1) Relay cord A asm. for standing machine (Part No. M9701351AA0)



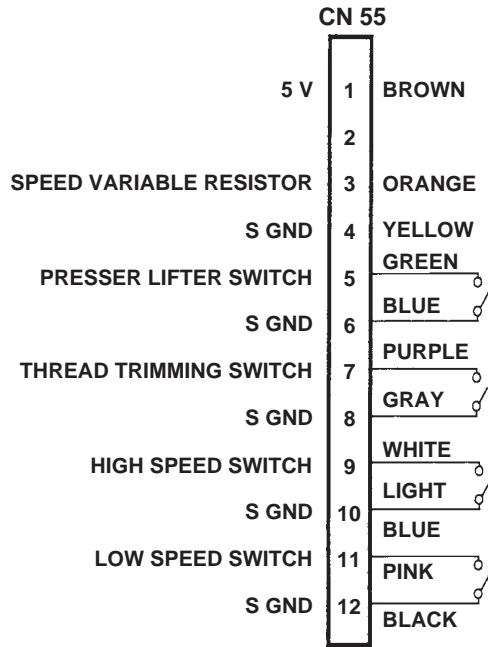
1) Wiring diagram of variable pedal PK-70, -71



To be used with variable between 1 and 2V (Acceleration / retardation)
Neutral position : 1V ± 0.05V (between 3 and 4)

- Power source section ❶ sorted by color for each signal appears from the relay cord A asm. for standing machine. Perform connection of the switches and the speed variable resistor according to the wiring diagram.
- Use this cord by inserting it into the connector (CN10) of pedal for standing machine in PSC box.

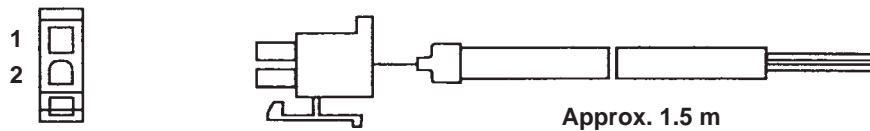
2) Wiring diagram of fixed max. speed



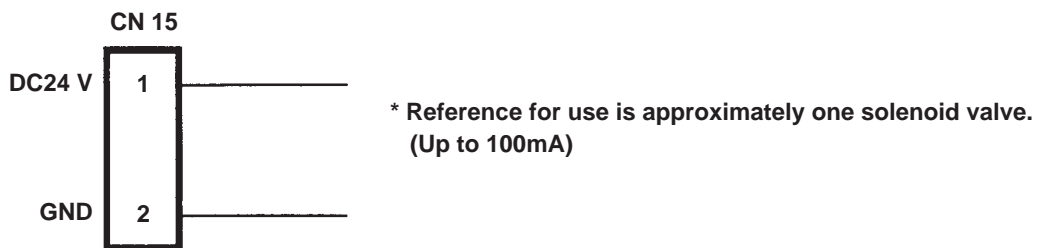
Use this cord by inserting it into the connector (CN10) of pedal for standing machine in PSC box.

(Caution) When decreasing the speed of the high speed switch, use the max. speed limitation variable resistor located on the panel.

(2) Relay cord A asm. for DC24V (Part No. M9703351AA0)

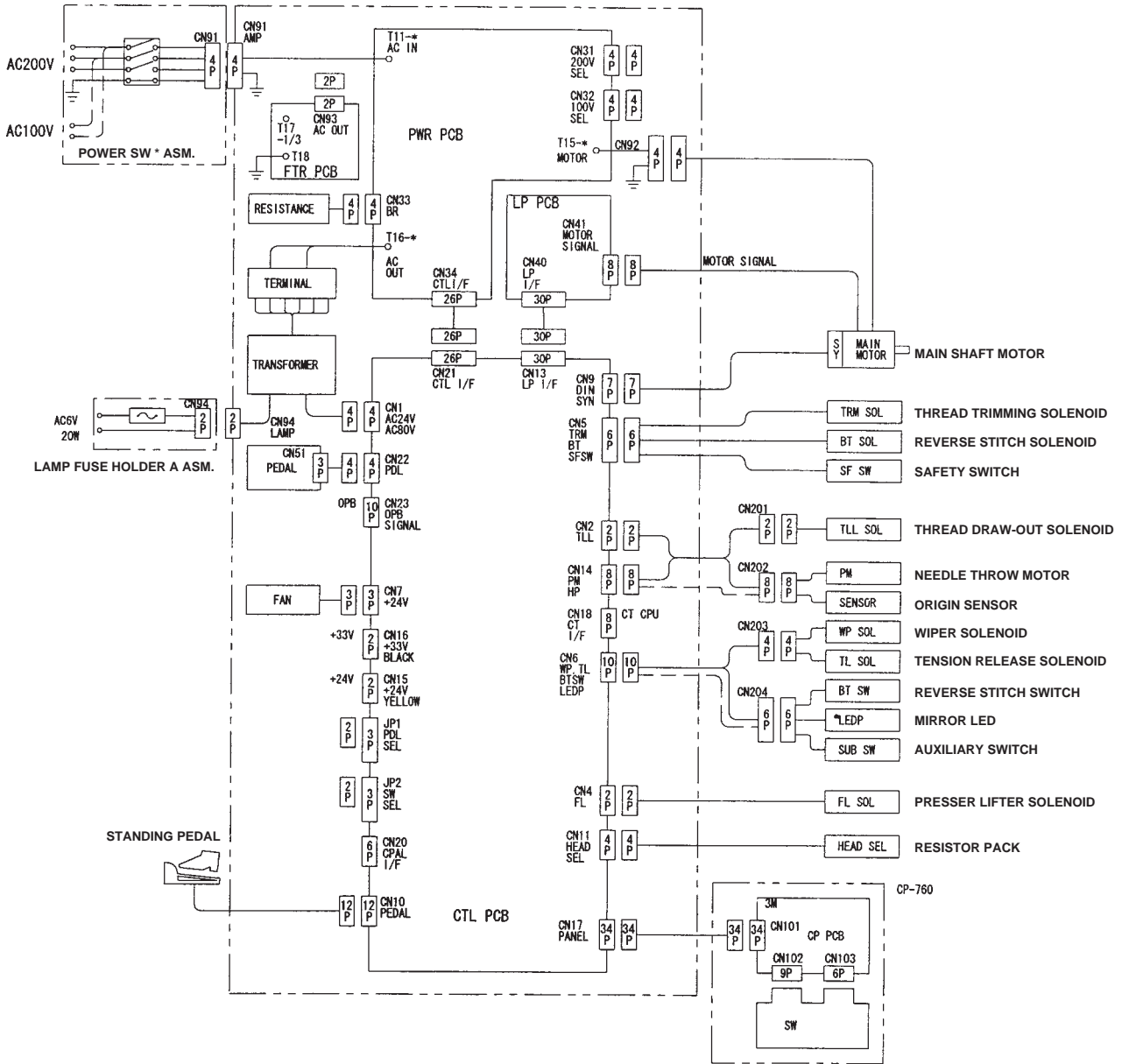


Wiring diagram



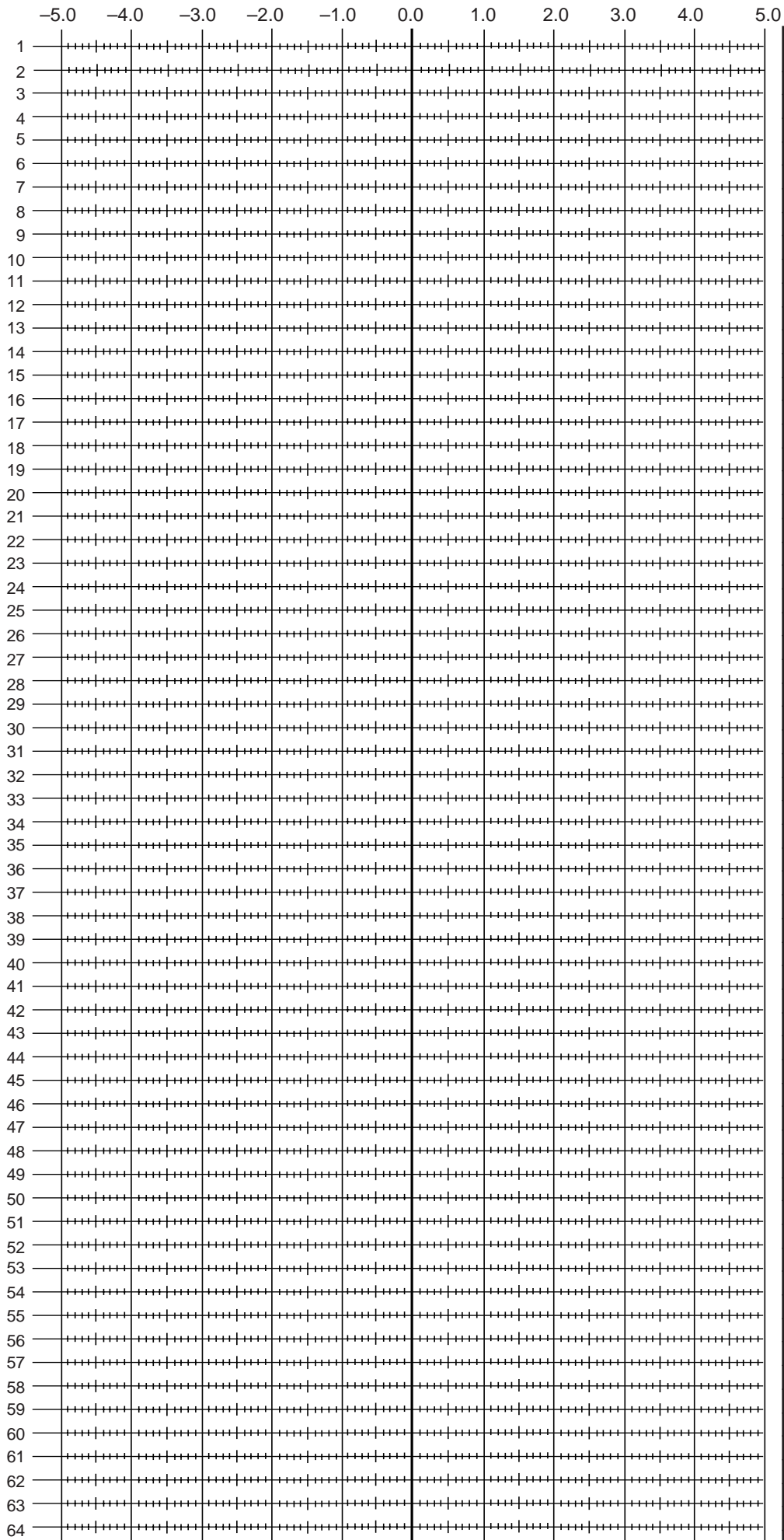
Use this cord by inserting it into the yellow connector (CN15 2P) of DC24v in PSC box.

18. BLOCK DIAGRAM



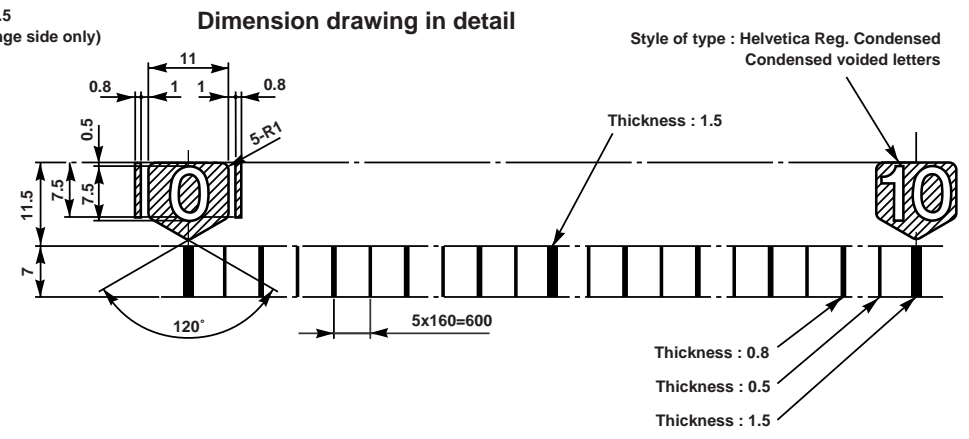
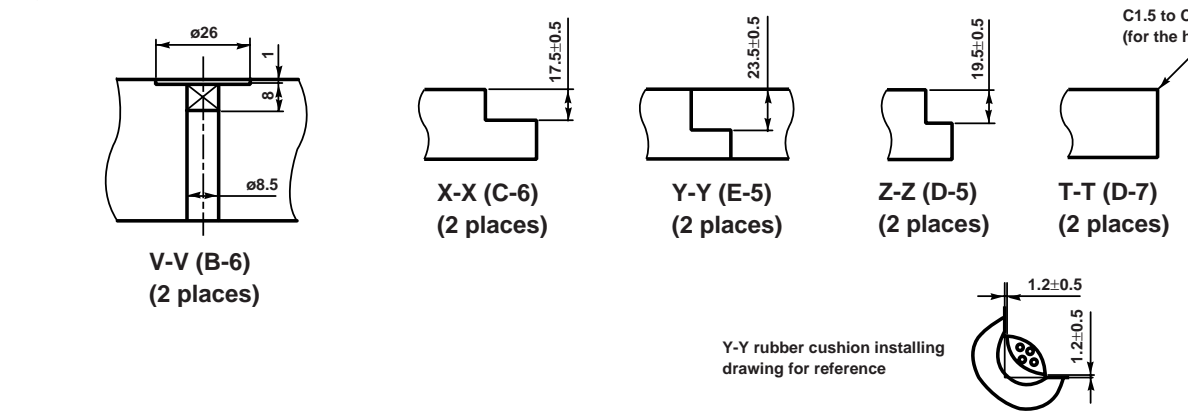
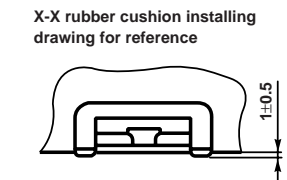
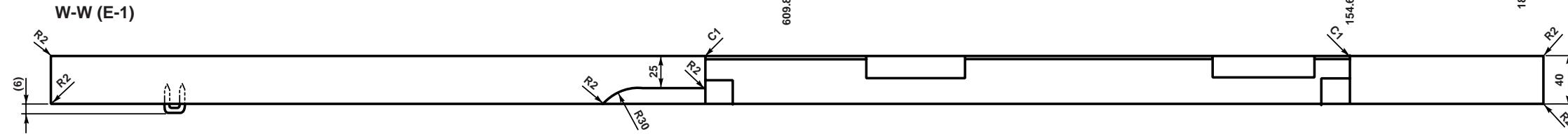
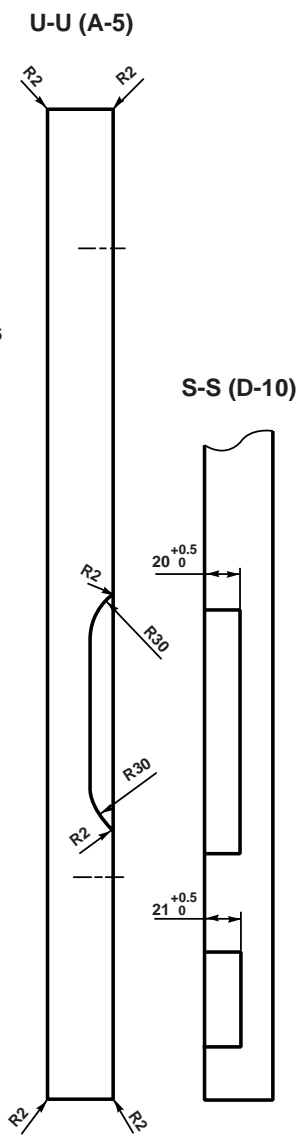
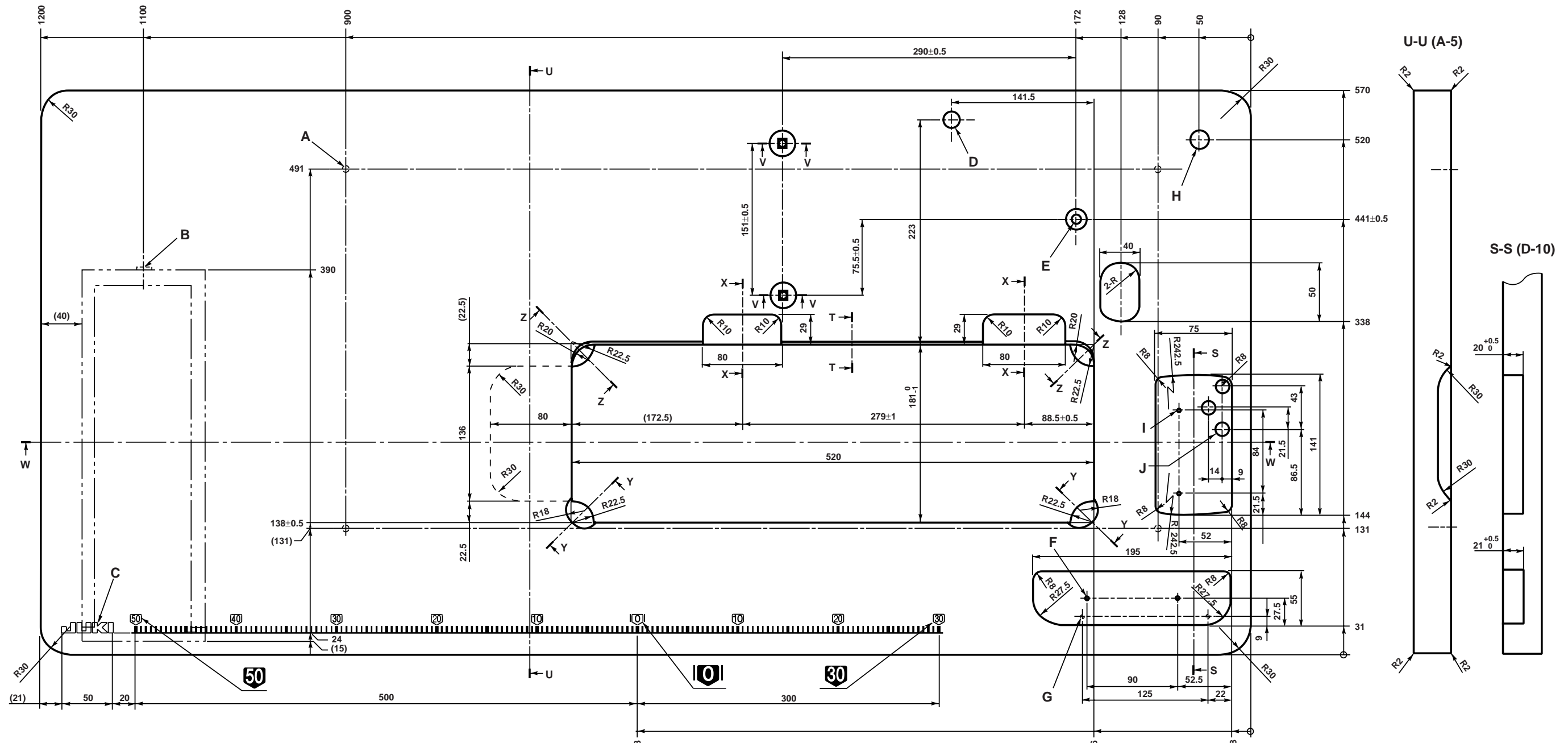
A large rectangular area with rounded corners, containing a series of horizontal lines for writing. The lines are evenly spaced and extend across the width of the page.

CUSTOM PATTERN NEEDLE ENTRY POSITION DATA SHEET



Step No	Needle entry position	Feed direction
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
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19. DRAWING OF TABLE



- Style of type : Helvetica Reg. Condensed
Condensed voided letters
- A : 4-ø3.4 on the bottom surface, depth 20
(Drill a hole at the time of set-up)
 - B : Installing position of stopper for drawer
(on the reverse side)
 - C : JUKI logo type
 - D : ø16, depth 30
 - E : 9 drill X ø20 chamfered, depth 17
 - F : 2-ø3, depth 10
 - G : 2-ø3.4 depth 10 (on the bottom surface)
(Drill a hole at the time of set-up)
 - H : ø18 drilled hole
 - I : 2-ø3 depth 10
 - J : 3-ø13 drilled hole

PREFACE

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

All personnel engaged in repair of LZ-2290 Series • CP-760 / SC-905 are required to carefully read Section 2 "Standard Adjustment" which contains important information on the maintenance of LZ-2290 Series • CP-760 / SC-905.

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

It is advisable to use "LZ-2290 Series • CP-760 / SC-905 Parts Book" together with this Engineer's Manual.

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