

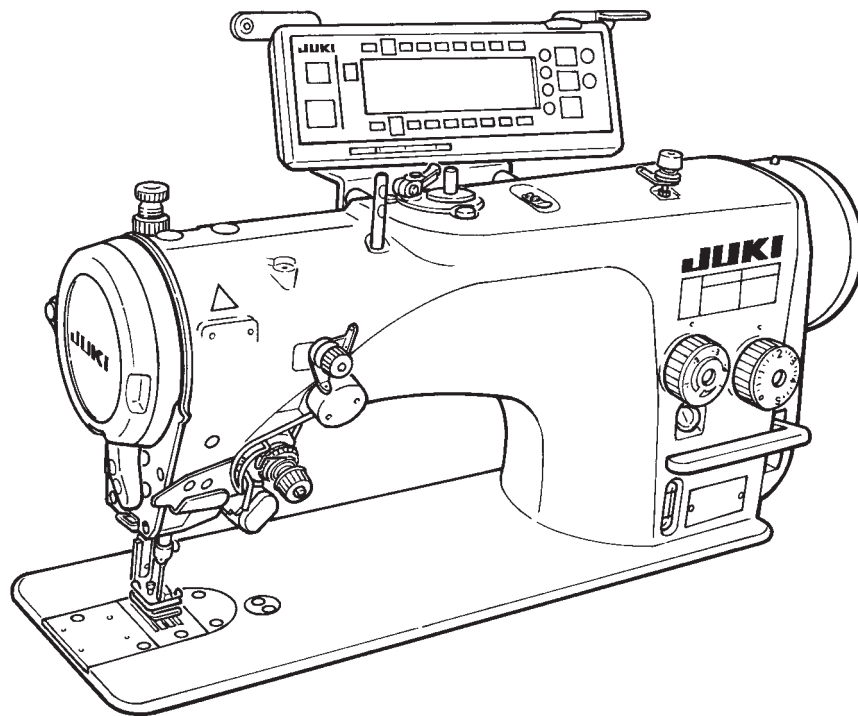
JUKI[®]

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

LZ-2290A Series

IP-100 / SC-915

ENGINEER'S MANUAL



40011067

No.E355-00

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-2290A Series • IP-100 / SC-915 are required to carefully read Section 2 "Standard Adjustment" which contains important information on the maintenance of LZ-2290A Series • IP-100 / SC-915.

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-2290A Series • IP-100 / SC-915 Parts Book" together with this Engineer's Manual.

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1. SPECIFICATIONS

(1) Specifications of the machine head


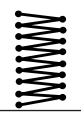






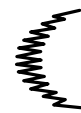



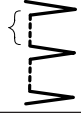
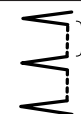
	Model	LZ-2290ASS / -7	LZ-2290ASU / -7	LZ-2290ADS / -7	LZ-2290ADU / -7
1	Application	Light- to medium-weight materials			
2	Max. sewing speed	5,000 rpm (*1)	4,500 rpm (*1)	4,000 rpm (*1)	
3	Max. zigzag width	10 mm (*2)			
4	Max. feed amount (Normal/reverse)	5 mm/4 mm (*3) (Stepless fine adjustment)	2.5 mm/2.5 mm (*3) (Stepless fine adjustment)	5mm/4 mm (*3) (Stepless fine adjustment)	2.5mm/2.5 mm (*3) (Stepless fine adjustment)
5	Stitch pattern	8 kinds 14 patterns (Custom pattern : 500 stitches, 20 kinds can be stored.)			
6	Needle	SCHMETZ 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.)	40003598 (with idle-prevention spring)		40003609 (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) Grease tube part No. (40006323) 500 g tin of exclusive grease for maintenance (Part No. : 23640204) Touch-back kit (asm.) (Part No. : 23546658) (For types other than WB, CB and 0B)			

* 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 applied to all 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	Remarks
Straight stitch			1	-	
Standard zigzag stitch			2	10	
2-step zigzag stitch			4	10	
3-step zigzag stitch			6	10	
Scallop (right)	Standard scallop (<i>a</i>)		24	10	
	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	10	
	Crescent scallop (<i>b</i>)				
	Equal-width scallop (<i>c</i>)				
	Equal-width scallop (<i>d</i>)		12		
Blind stitch (right)			2+a	10	
Blind stitch (left)					
Custom pattern		-	Up to 500	10	

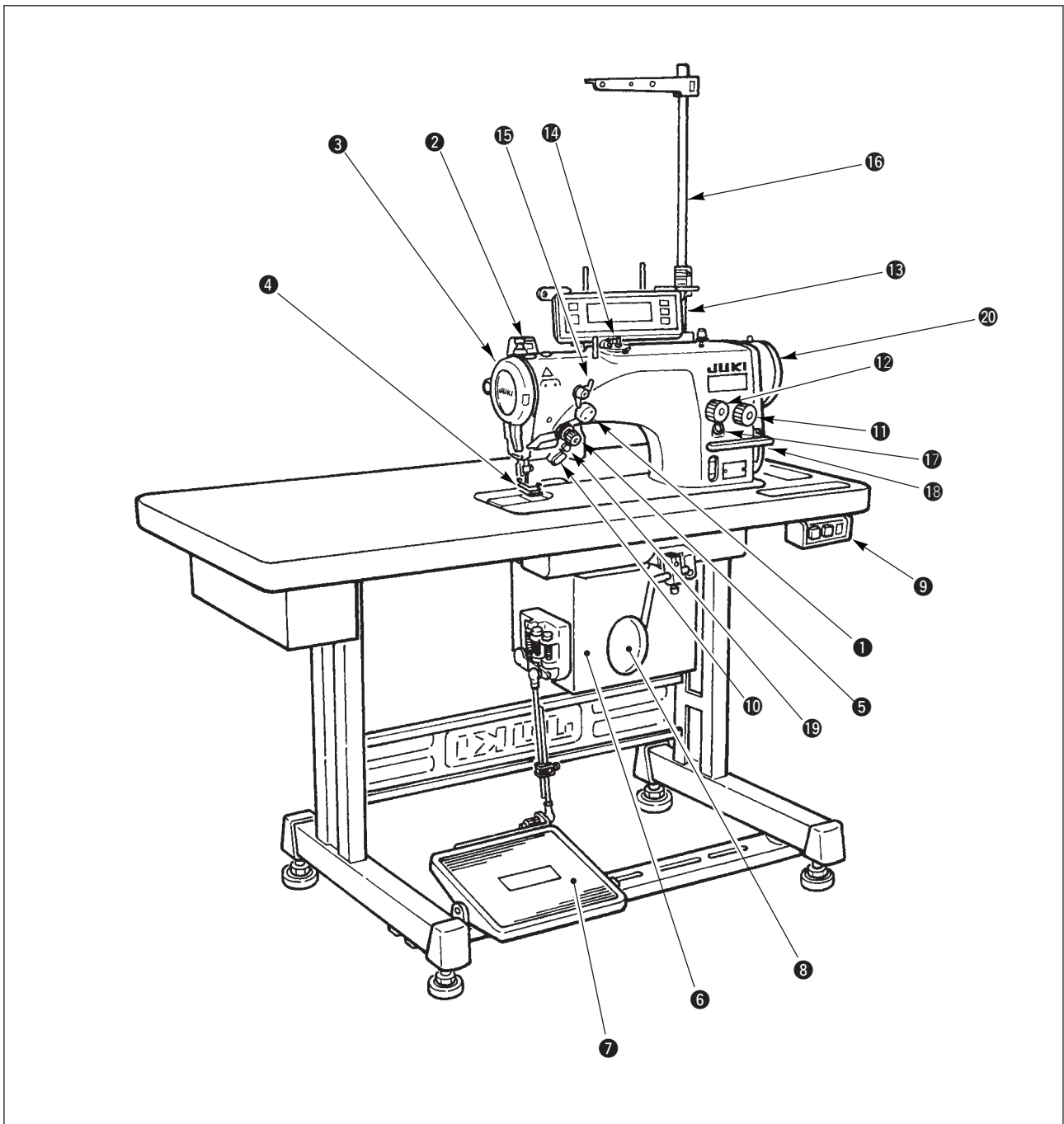
(3) Function list

Sewing	Free stitching	Overlapped stitching	Program stitching	Conden-sation	Conden-sation custom	Custom pattern (Internal memory)	Custom pattern (Smart media)	Zigzag width and stitch base line setting	Pattern register	Continuous stitching register	Cycle stitching register
Straight stitch 	○	○	○	○	○	-		○	○	×	×
Standard 	○	○	○	○	○	-		○	○	×	×
2-step 	○	○	○	○	○	-		○	○	×	×
3-step 	○	○	○	○	○	-		○	○	×	×
Blind stitch 	○	○	○	○	○	-		○	○	×	×
Scallop 	○	○	○	○	○	-		○	○	×	×
Custom 	○	○	○	○	○	-		○	○	×	×
Free 	-	-	-	○	○	○		○	○	×	×
Overlapped 	-	-	-	×	×	○		○	○	×	×
Program 	-	-	-	○	○	○		○	×	×	×
Pattern 	○	○	×	○	○	○		○	-	○	○
Continuous 	○	×	×	○	○	○		○	×	-	○
Cycle 	×	×	×	○	○	○		○	×	×	-
Max. number of steps	-	9	20	-	64	500	500	-	-	20	20
Max. number of stitches in each step	-	19	500	-	-	-	-	-	-	500	500
Max. number of registers that can be performed	-	-	-	-	Start 20 End 20	20	999	-	99	10	10
Max. number of stitches	-	-	10,000	-	-	10,000	499,500	-	-	10,000	10,000

(4) 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 ASS or ASU 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

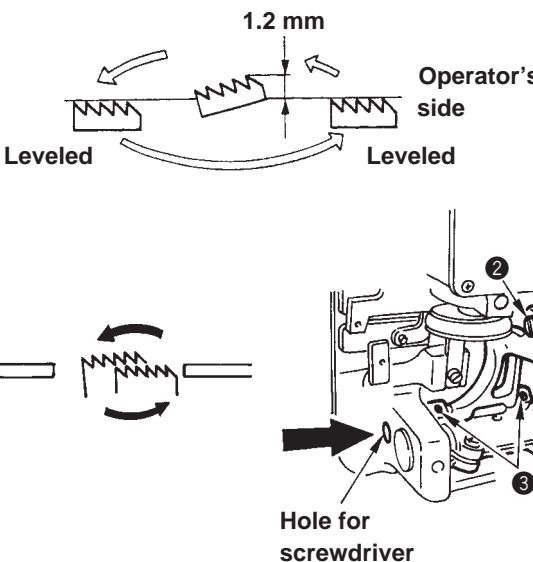
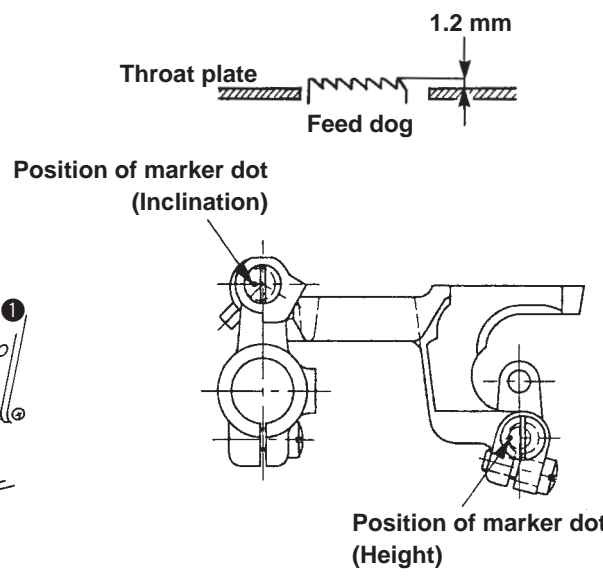


- | | | |
|---|----------------------|--------------------------------|
| ① Needle thread draw-out device
(LZ-2290A (U)-7) | ⑦ Pedal | ⑭ Bobbin winder |
| ② Wiper switch (WB/CB type) | ⑧ Knee lifter lever | ⑮ Tension controller No. 1 |
| ③ Thread take-up cover | ⑨ Power switch | ⑯ Thread stand |
| ④ Finger guard | ⑩ TB switch | ⑰ Oiling inlet |
| ⑤ Thread tension controller | ⑪ Stitch length dial | ⑱ Reverse feed stitching lever |
| ⑥ Control box | ⑫ Condensation dial | ⑲ Mirror switch |
| | ⑬ Operation panel | ⑳ Handwheel |

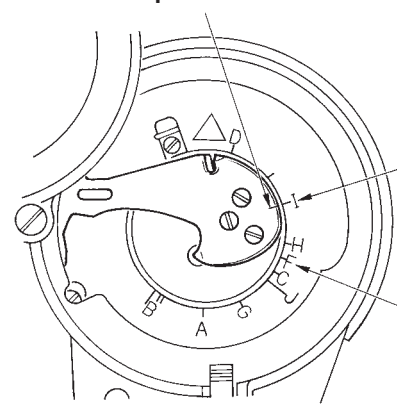
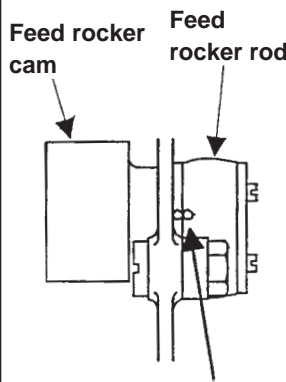
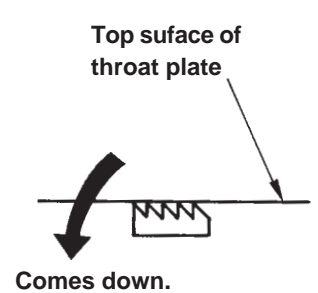
- ① Needle thread draw-out device (LZ-2290A (U)-7)
This device draws out needle thread at the time of thread trimming.
- ② Wiper switch (WB/CB type)
This switch is used to wipe needle thread after thread trimming from the cloth by means of the wiper signal which is output from the PSC box.
- ③ Thread 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 TB switch
This is an operation switch to perform reverse feed stitching by means of the TB switch.
- ⑪ Stitch length dial
- ⑫ Condensation dial
- ⑬ Operation 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 Oiling inlet
This is the oiling inlet for hook lubrication. (For ASS and ASU only)
- ⑱ Reverse feed stitching lever
- ⑲ Mirror switch
This is an operation switch to inverse scallop pattern or custom pattern by means of the mirror switch.
- ⑳ Handwheel

3. STANDARD ADJUSTMENT

(1) Height and inclination of the feed dog

Standard Adjustment	
<p>Standard height : 1.2 mm : LZ-2290ASS, LZ-229ADS : 1.4 mm : LZ-2290ASU, LZ-2290ADU</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. (ASS, ADS)</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. (ASS, ADS)
	

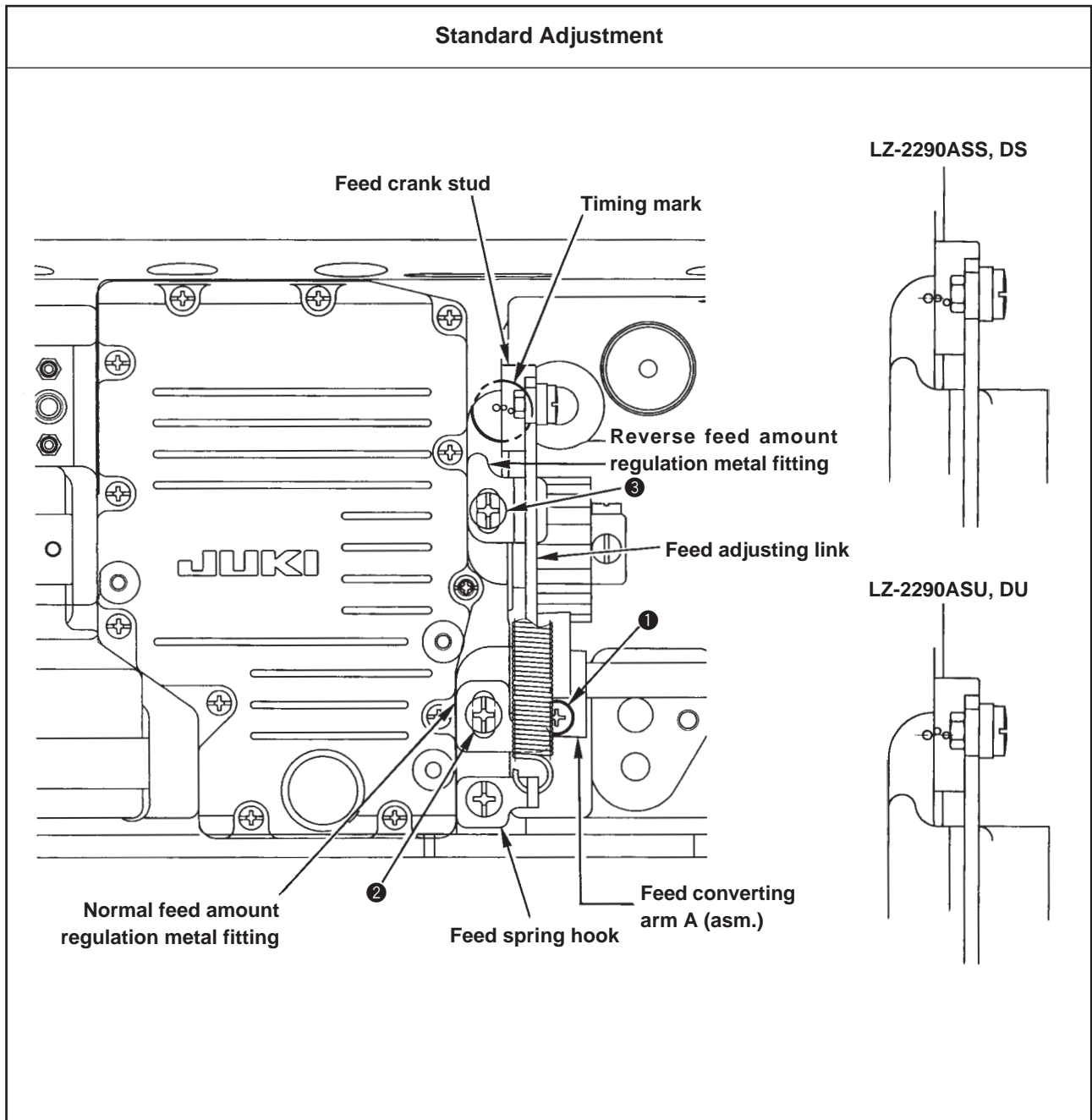
(2) Adjusting the feed timing

Standard Adjustment		
<p>Marker line engraved on thread take-up</p> <p>Timing mark I engraved on face plate</p> <p>Timing mark F engraved on face plate</p> 	<p>A</p> <p>Feed rocker cam</p> <p>Feed rocker rod</p> <p>Alignment of timing marks</p> 	<p>B</p> <p>Top surface of throat plate</p> <p>Comes down.</p> 

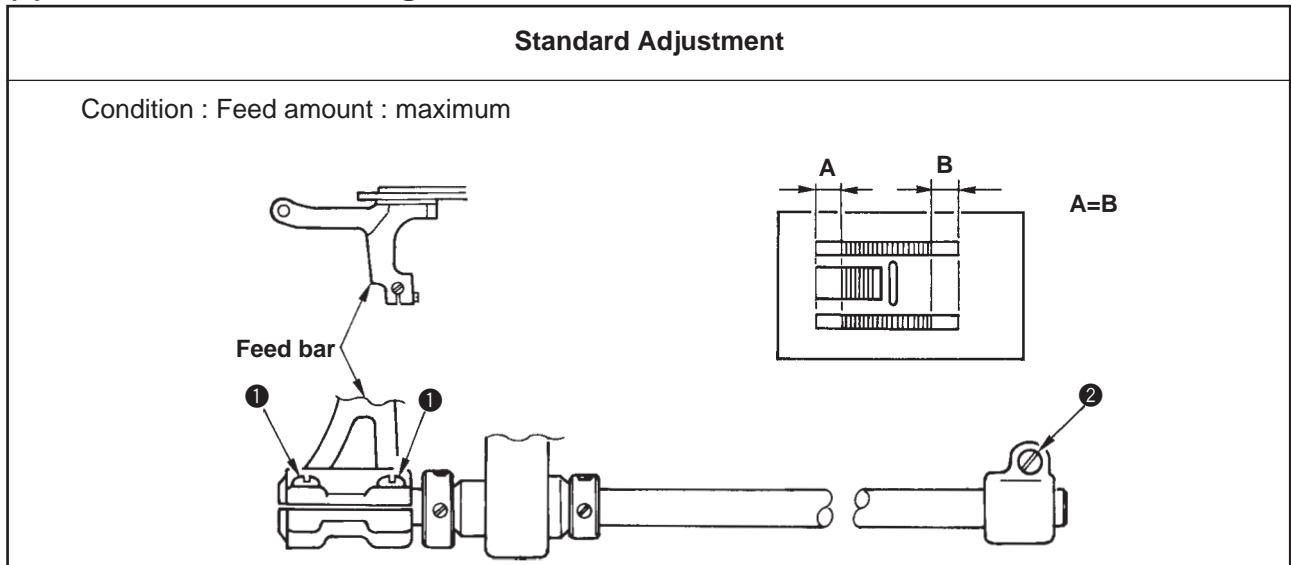
Adjustment Procedures	Results of Improper Adjustment
<p>1) Set the feed amount to 0 mm. Feed amount is regulated to (max. 2 mm at the time of delivery.)</p> <p>2) Adjusting the height of the feed dog Loosen screw ❶ and adjust the height of the feed dog by turning feed driving link shaft ❷.</p> <p>3) 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> <p>3. For the adjustment of slippage of materials for ASU and ADU, refer to (5) Adjusting the slippage of materials and adjusting the feed timing.</p>	<p>○ Perform the adjustment of the inclination of the feed dog according to the sewing process.</p> <p>(Example)</p> <p>○ 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.</p> <p>○ When using the slippery material in such a process of attaching a facing of girdle : Adjust so that the feed dog should be leveled.</p>

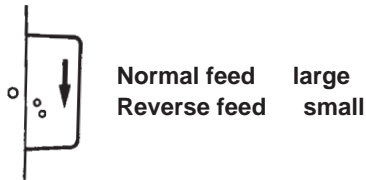
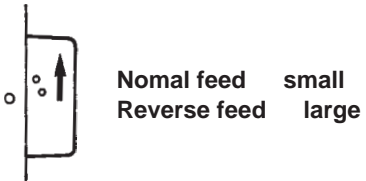
Adjustment Procedures	Results of Improper Adjustment
<p>A. Adjusting procedure by removing the gear box cover (ASS,ADS)</p> <p>1) Remove the gear box cover. (Refer to the item 4-(1).)</p> <p>2) Adjust the marker line engraved on the thread take-up to the timing mark I engraved on the face plate.</p> <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) (ASS,ADS)</p> <p>1) Set the feed amount to "0" mm.</p> <p>2) Adjust the marker line engraved on the thread take-up to marker line J 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>	<p>○ For the adjustment of ADU and ASU, refer to (5) Adjusting the slippage of materials and adjusting the feed timing.</p>

(3) Adjusting the feed amount



(4) Position of the feed dog

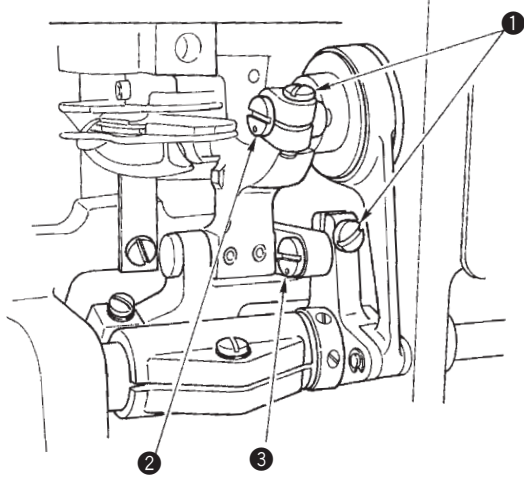


Adjustment Procedures	Results of Improper Adjustment								
<p>[Feed “0” adjustment]</p> <ol style="list-style-type: none"> 1) Set the stitch length dial at “0”. 2) Loosen screw ❶, and align the timing mark on the feed crank stud with that on the feed crank stud support. (The position of the timing mark differs with models.) Insert a sheet of paper between the throat plate and the presser foot, turn the handwheel by hand and check that the needle entry points are the same. If the points are not the same, perform again fine adjustment. (Fine adjustment is necessary since the marks are standard.) 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="213 703 852 775"> <tr> <td>Max. normal feed amount of the mechanism</td> <td>LZ-2290ASS, ADS=5 mm</td> </tr> <tr> <td></td> <td>LZ-2290ASU, ADU=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="213 1120 852 1191"> <tr> <td>Max. reverse feed amount of the mechanism</td> <td>LZ-2290ASS, ADS=4 mm</td> </tr> <tr> <td></td> <td>LZ-2290ASU, ADU=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-2290A Series.) 8) 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-2290ASS, ADS=5 mm		LZ-2290ASU, ADU=2.5 mm	Max. reverse feed amount of the mechanism	LZ-2290ASS, ADS=4 mm		LZ-2290ASU, ADU=2.5 mm	<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 thread trimming counter knife. (In case of thread trimming) <div style="text-align: center;">  <p>Normal feed large Reverse feed small</p>  <p>Normal feed small Reverse feed large</p> </div>
Max. normal feed amount of the mechanism	LZ-2290ASS, ADS=5 mm								
	LZ-2290ASU, ADU=2.5 mm								
Max. reverse feed amount of the mechanism	LZ-2290ASS, ADS=4 mm								
	LZ-2290ASU, ADU=2.5 mm								

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Adjust the stitch length dial to the maximum feed amount the feed dog to be used. <p>* Feed amount of both normal feed and reverse feed is regulated to 2 mm at the time of delivery from the factory. The maximum feed amount of the feed dog at the time of delivery is 2 mm. (Feed dog part No. : 22581508)</p> <ol style="list-style-type: none"> 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. (A = B) 3) In the case where the gear box (large) cover is not opened, loosen setscrews ❶ in the feed bar crank to adjust the position. 4) In the case where the gear box (large) cover is opened, loosen setscrew ❷ in the feed rocker shaft crank 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 ASU and ADU)

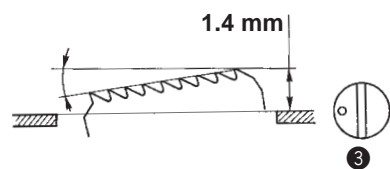
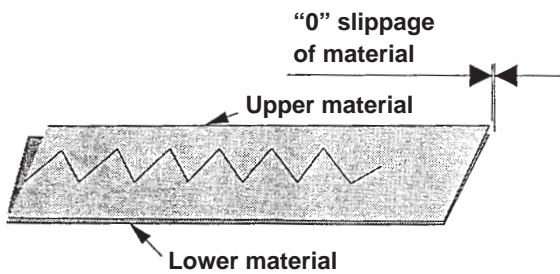
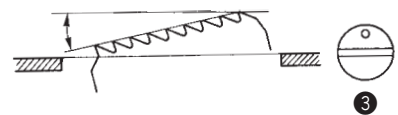
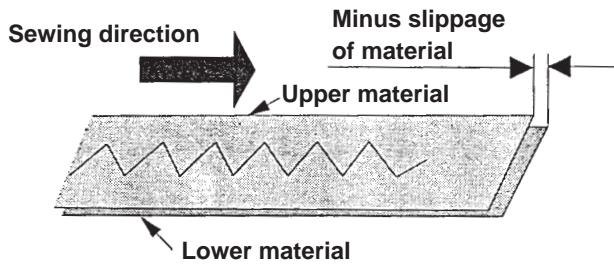
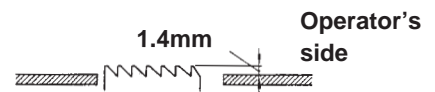
Standard Adjustment



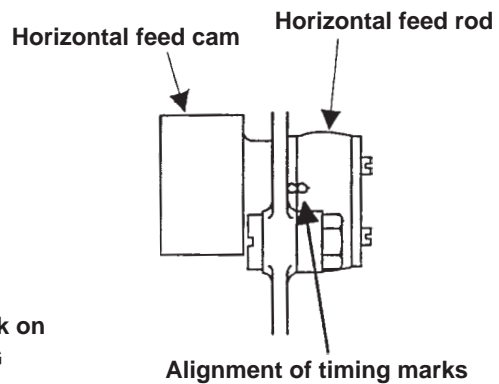
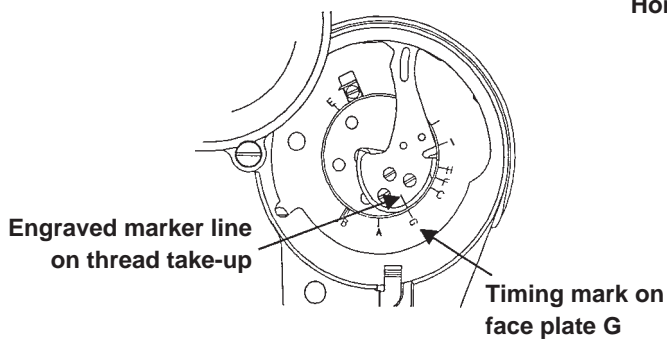
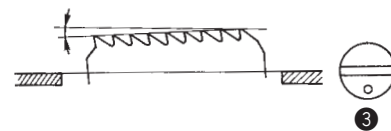
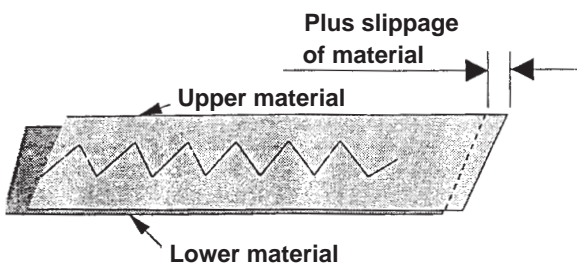
Standard state of engraved marker dot of vertical feed link shaft

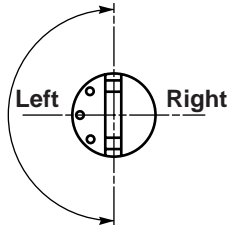


Standard height of feed dog



Standard position



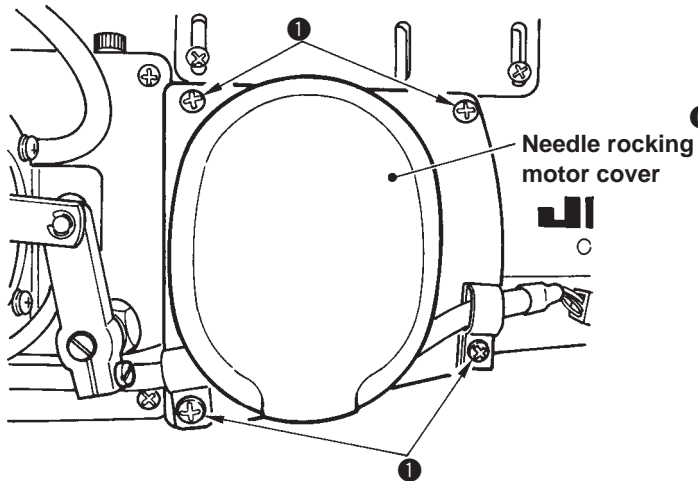
Adjustment Procedures	Results of Improper Adjustment
<p>1) To adjust the height and inclination of the feed dog, loosen setscrews ❶ in the vertical feed link shaft and turn vertical feed link shafts ❷ and ❸ with a screwdriver.</p> <p>2) The standard inclination is the position where the engraved marker 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 style="text-align: center;">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. 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> <ol 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 style="text-align: center;"><Adjusting the feed timing></p> <ol style="list-style-type: none"> Adjust the engraved marker line on the thread take-up to timing mark G on the face plate. Set the feed amount to 2.5 mm. However, for LZ-2290SU and LZ-2290DU, set it to "0" mm. In this state, loosen the setscrew in the hook driving shaft sprocket, and adjust timing mark on the horizontal feed cam to that of the horizontal feed rod. <p>(Caution) In this case, the hook timing (thread trimming timing in case of the machine with thread trimmer) changes. Be sure to perform re-adjustment.</p>	<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. 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. <ul style="list-style-type: none"> 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 Manual 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;">  <p>Range of use of engraved marker dot</p> </div>

(6) Adjusting the origin of the needle rocking motor

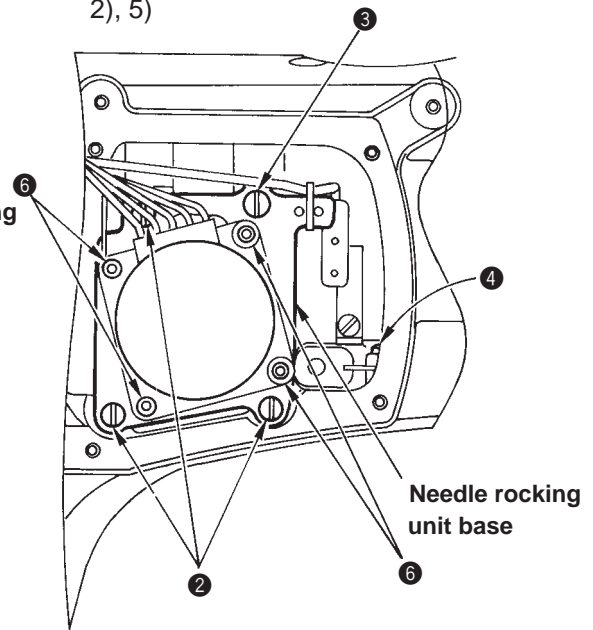
Standard Adjustment

- Adjustment of the origin is performed in case the needle rocking amount in terms of the center is not equal when (7) Adjusting the needle entry position is performed, or the motor or the sensor is required to be replaced.

1)



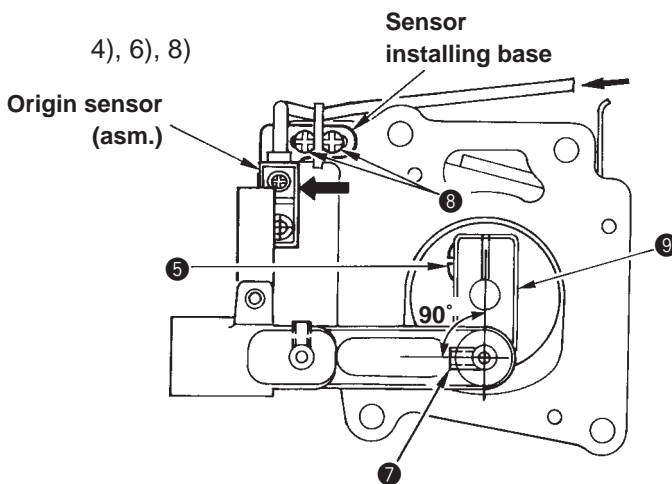
2), 5)



3)



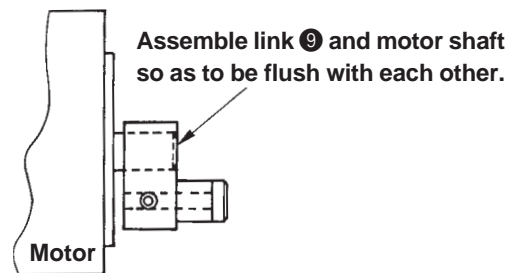
4), 6), 8)



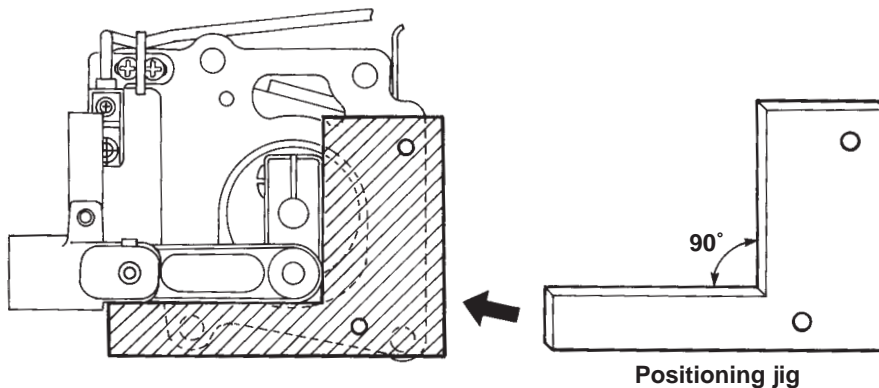
<Condition of the origin "0">

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.

6)

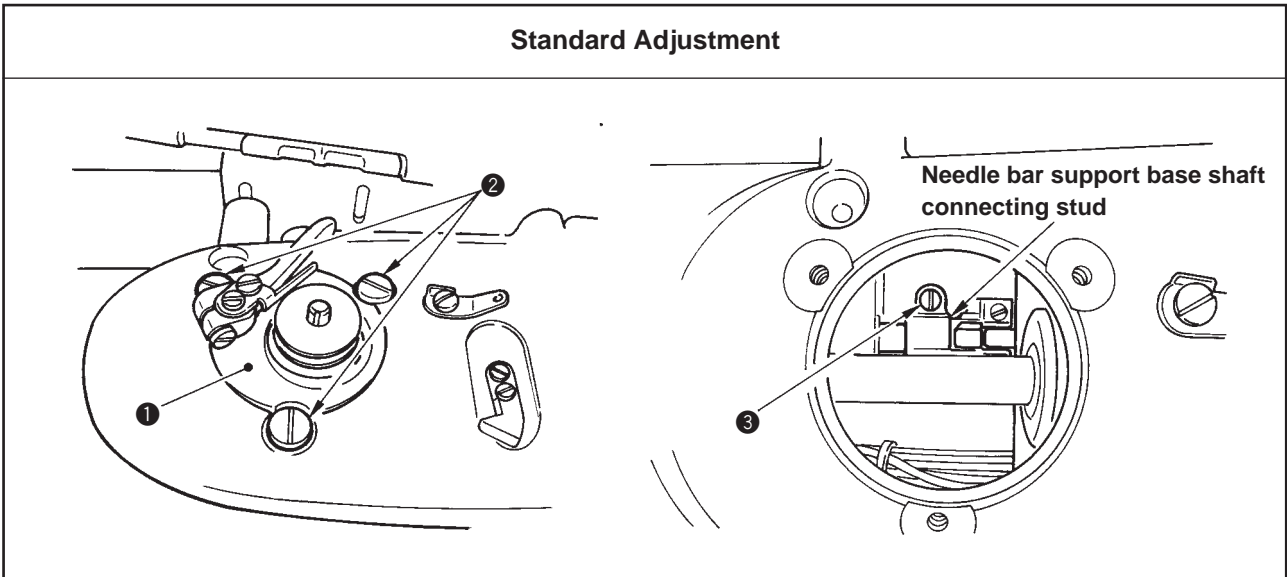


9)

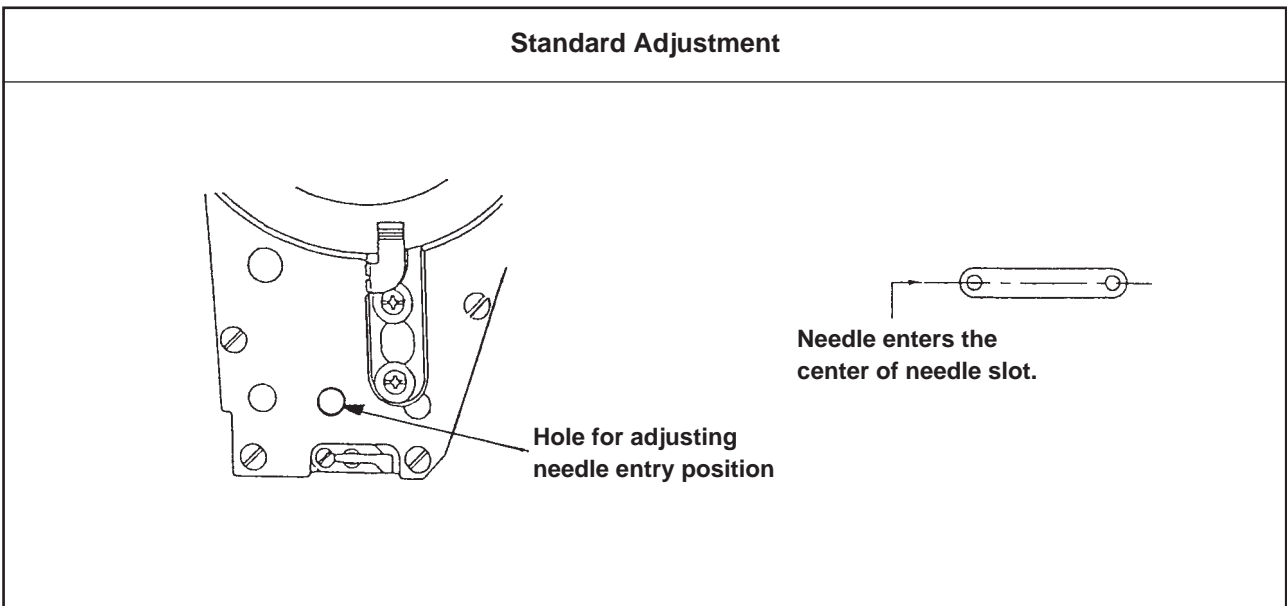


Adjustment Procedures	Results of Improper Adjustment
<p>1) Remove four setscrews ① in the needle rocking motor cover.</p> <p>2) Remove three setscrews ② and counter sunk screw ③. (At this time, loosen setscrew ④ in the needle bar support base shaft connecting stud as well. Refer to the item “(7) Adjusting 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.(Refer to (12) Adjusting the needle-to-hook timing and the needle guard.)</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 ⑨ is at 90°.)</p> <p>9) To determine the position of the sensor, it is convenient to make a positioning jig as shown in the figure on the left.</p>	

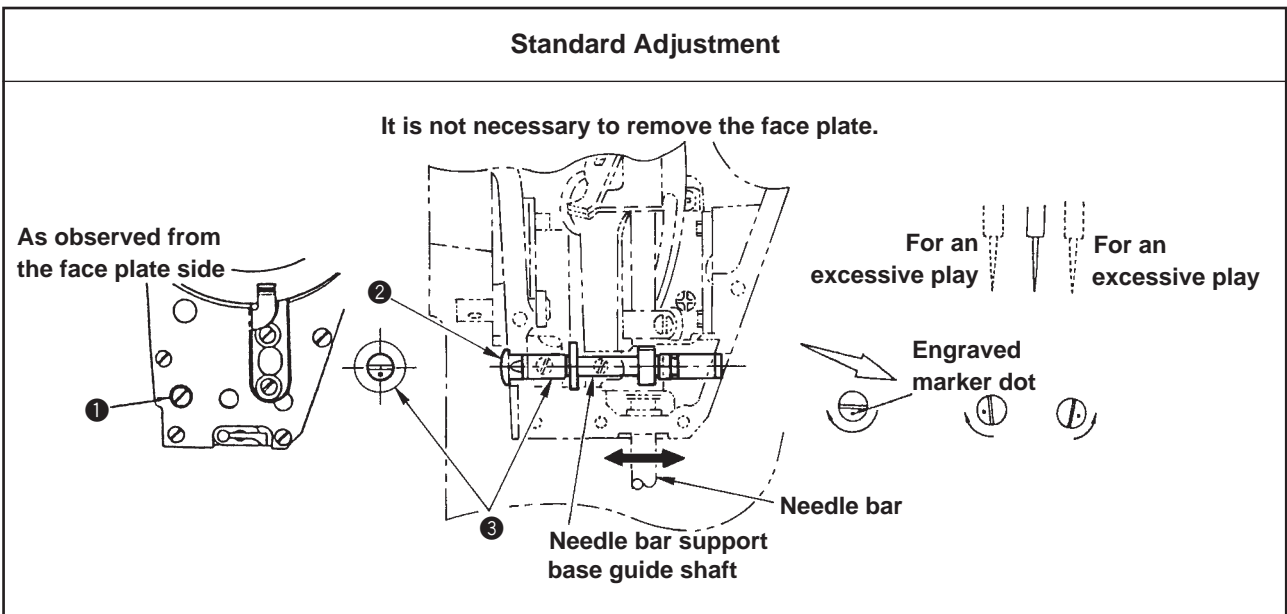
(7) Adjusting the needle entry position (In terms of needle rocking direction)

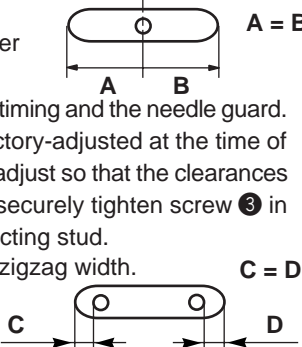


(8) Adjusting the needle entry position (In terms of longitudinal direction)



(9) Adjusting the longitudinal play at the needle bar

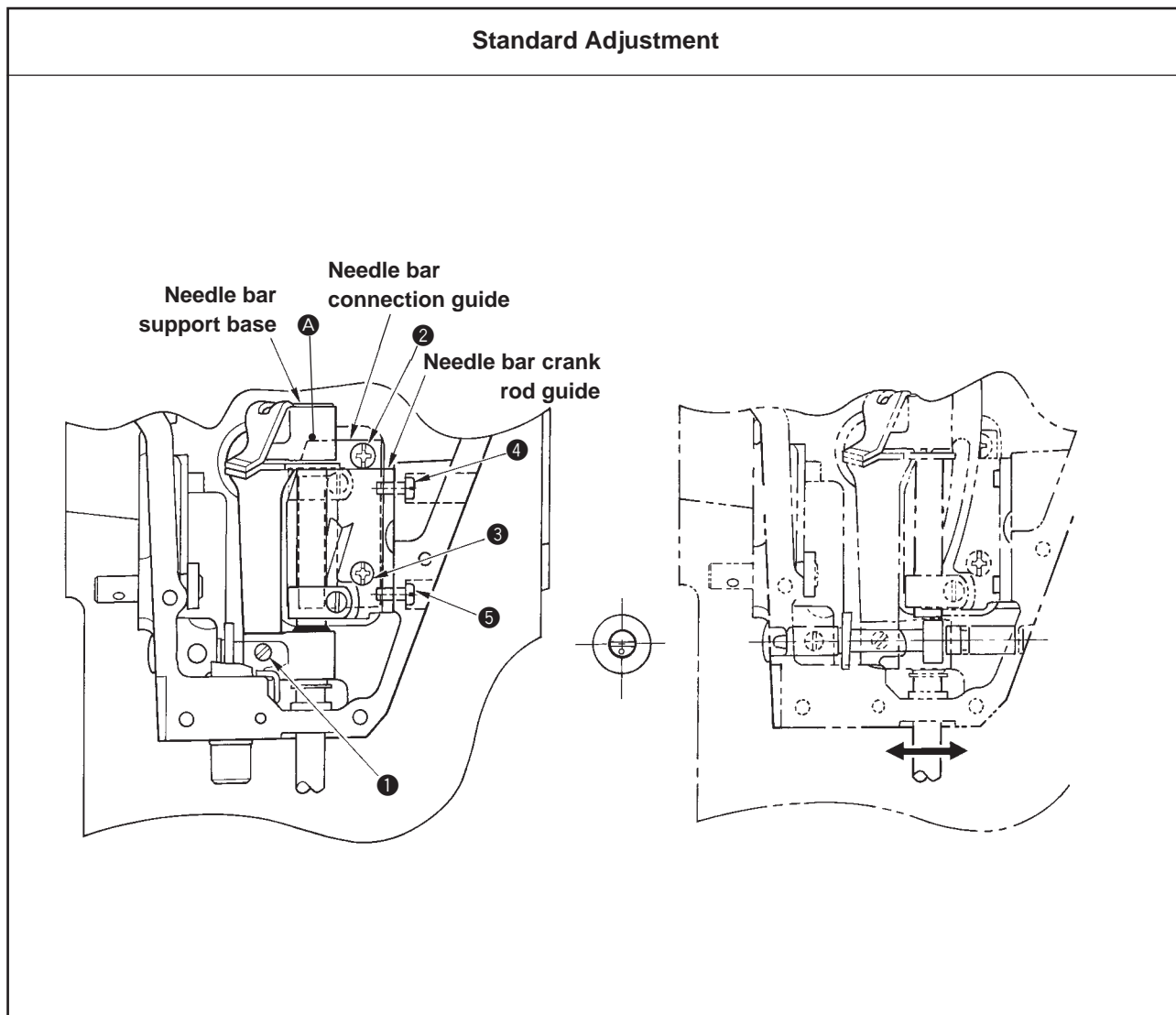


Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen setscrews ② and remove bobbin winder unit ①.</p> <p>2) Set both zigzag width and stitch base line to the position of "0" in the hook adjusting mode. Set the position of the needle to the center and temporarily tighten it. Refer to (12) Adjusting the needle-to-hook timing and the needle guard.</p> <p>3) Set the zigzag width to 8 mm which is factory-adjusted at the time of delivery, move the needle bar by hand to adjust so that the clearances of zigzag widths C and D are equal and securely tighten screw ③ in the needle bar support base shaft connecting stud. Conditions : Needle enters the center of zigzag width. $C = D$: 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.

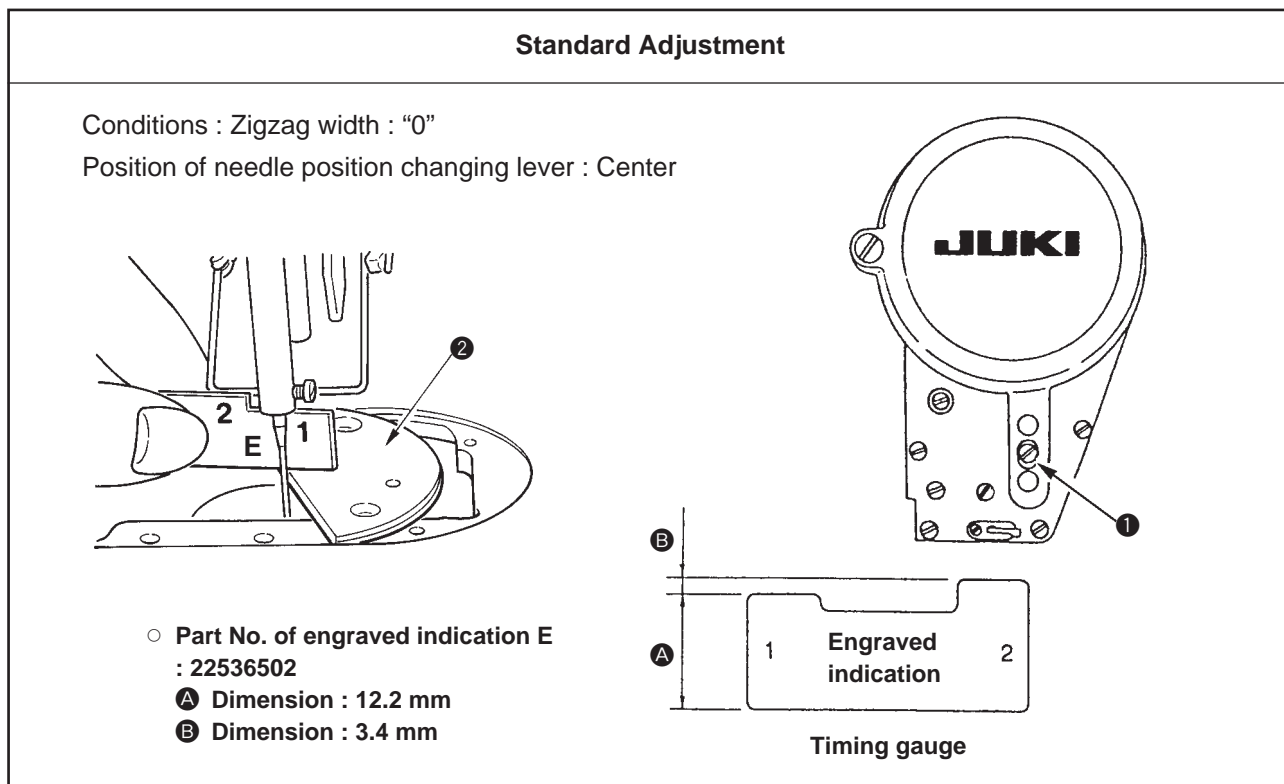
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen the screw, which can be observed through the hole for adjustment, in the needle bar support base guide shaft with the face plate attached.</p> <p>2) Move the needle bar back or forth to adjust so that the needle enters the center of the 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. 	

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)</p> <ol style="list-style-type: none"> 1. 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. 2. Refer to (5) Disassembling/assembling the needle bar support base shaft (asm.) of 4. PROCEDURES OF DISASSEMBLING/ASSEMBLING. 	<ul style="list-style-type: none"> ○ When there is a longitudinal play at the needle bar, a clearance between the needle and the blade point of the hook occurs. As a result, sewing trouble or worn-out of the blade point of the hook will result.

(10) Position of the needle bar connection guide



(11) Height of the needle bar



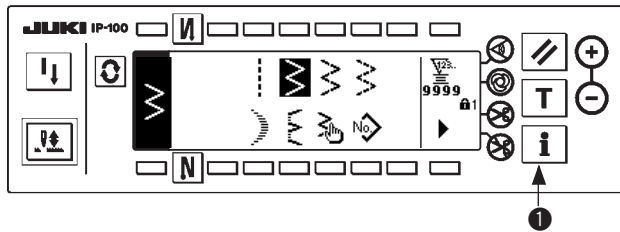
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Loosen the screw in the needle bar support base shaft connecting stud referring to "(7) Adjusting the needle entry position (in terms of needle rocking direction)". 2) Remove the thread take-up cover, thread take-up 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 slide at the needle bar support base, pressing or drawing the portion near section A, to 5N (500g) or less. 8) Loosen the screw in the needle bar support base shaft connecting stud referring to "(7) Adjusting the needle entry position (in terms of needle rocking direction)". 9) Attach the thread take-up cover, thread take-up and face plate in position. <p>(Caution) 1. 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> <p>2. Refer to (5) Disassembling/assembling the needle bar support base shaft (asm.) of 4. PROCEDURES OF DISASSEMBLING/ASSEMBLING.</p>	

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Set the mode to the hook adjusting mode. (Refer to (12) Adjusting the needle-to-hook timing and the needle guard.) 2) Remove the presser foot, throat plate, woodruff plate ② and feed dog. 3) Place woodruff plate ② on the surface of the machine bed onto which the throat plate is to be attached. Now, loosen setscrew ① and adjust so that the distance from the top face of woodruff plate ② to the bottom end of the needle bar is equal to the height of the "1" side of the timing gauge as shown in the figure. <p>(Caution) 1. Thickness of the throat plate may be different from that of woodruff plate ②. So, be sure to use woodruff plate ② for the adjustment. (Thickness of woodruff plate ② : 2 mm)</p> <p>2. Perform the adjustment with zigzag width set to "0" and with the needle positioned at the center of the zigzag stroke.</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) 1. 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 up or down the needle bar to adjust the height to the indented part of the needle.</p> <p>2. The state of delivery of LZ-2290A Series is with timing gauge E (Engraved indication E).</p>	

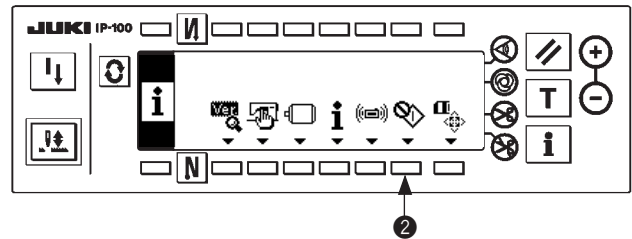
(12) Adjusting the needle-to-hook timing and the needle guard

Standard Adjustment

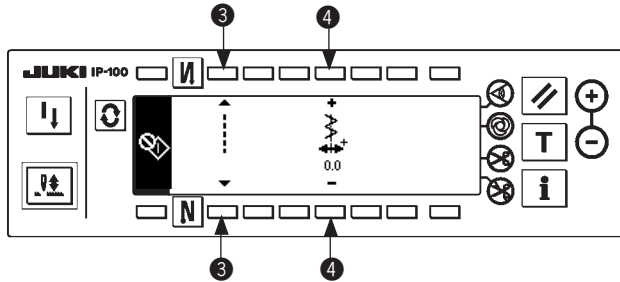
1. Hook adjusting mode



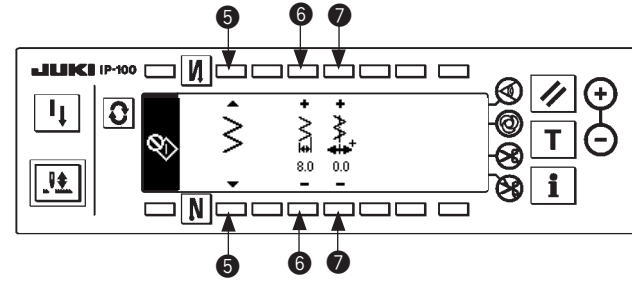
Information screen



Hook adjusting mode setting screen <Straight stitch>



Hook adjusting mode <Standard zigzag stitch>



- Lifting amount of the needle (bar) : 3.4 mm
(Adjust with engraved marker dot 2 of timing gauge E.)

- 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.

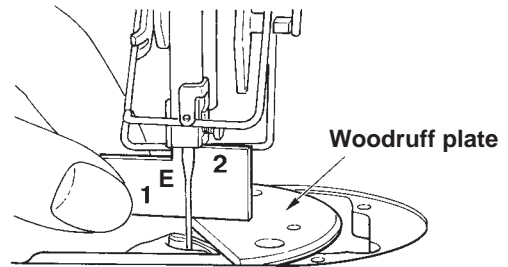
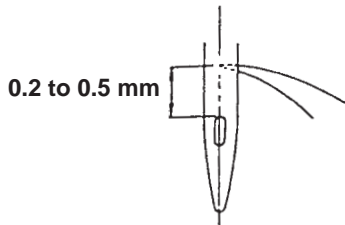


Fig. 1

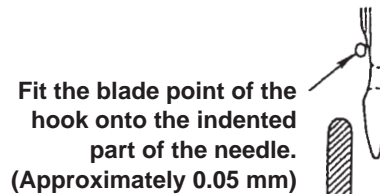


Fig. 2

- 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).

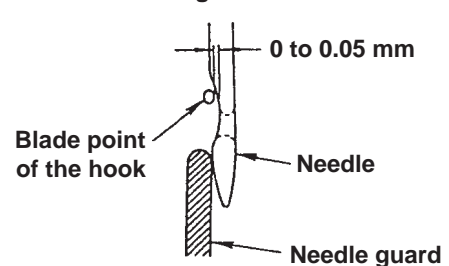
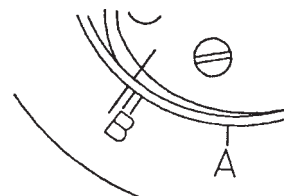







Fig. 3

Remarks Marker lines engraved on the face plate

- The needle-to-hook timing is adjusted using timing gauge E 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 of many functions of the LZ-2290A Series models of sewing machine.

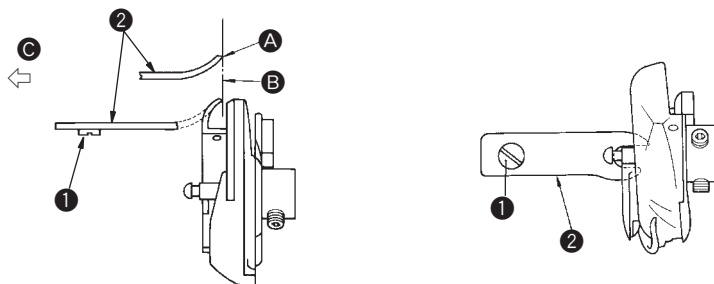


Adjustment Procedures			Results of Improper Adjustment		
<p>1. Hook adjusting mode</p> <p>1) When performing the hook adjusting, turn ON the power. When the needle bar is not in UP position, turn the handwheel to bring the needle bar to its UP position.</p> <p>2) Press switch ❶ for approximately three seconds to display the information screen.</p> <p>3) Press ❷ to enter the hook adjusting mode.</p> <p>4) Zigzag patterns of straight stitch and standard zigzag stitch can be selected in the hook adjusting mode.</p> <p>Straight stitch</p> <p>❸ : Changeover of straight stitch and standard zigzag stitch can be performed.</p> <p>❹ : Position of stitch base line is set with "+" and "-".</p> <p>Standard zigzag stitch</p> <p>❺ : Changeover of straight stitch and standard zigzag stitch can be performed.</p> <p>❻ : Zigzag width is set with "+" and "-". (Initial value is set to 8 mm.)</p> <p>❼ : Position of stitch base line is set with "+" and "-".</p> <p>5) Turn ON/OFF the power to return from the hook adjusting mode to the normal sewing mode.</p> <p>* Sewing machine does not work even when the front part of the pedal is depressed during the hook adjusting mode.</p> <p>* Needle throwing works by turning the handwheel by hand.</p> <p>* Needle bar moves when the set value is changed at needle UP position.</p> <p>(Caution)</p> <p>1. It is possible for zigzag width and position of the stitch base line to set up to the width of 10 mm regardless of the max. zigzag width limitation at the time of the hook adjusting mode.</p> <p>2. When using the hook adjusting mode for the machine to which presser foot, gauge, etc. are attached, be very careful in performing the adjustment.</p> <p>2. Adjusting the hook position</p> <p>○ Adjust the height of the needle bar with engraved marker dot 1 of timing gauge E. At this time, the needle bar is in its lowest position.</p> <p>1) After adjusting the height of the needle bar, set the needle to the position of zigzag width "0" and adjust the hook so that the blade point of the hook is brought to the center of the needle at the height of engraved marker dot 2 of timing gauge E.</p> <p>2) 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. Then tighten the screw in the hook.</p> <p>3. Confirmation</p> <p>1) Confirm that the distance from the top end of needle eyelet to the blade point of the hook is 0.2 to 0.5 mm in case of the leftmost needle throwing position at the time of max. zigzag width.</p> <p>2) When zigzag width 10 mm is used or the indented part of the needle is different in shape, re-adjust the height of the needle bar.</p> <p>4. Adjusting the needle guard</p> <p>1) Maximize the zigzag width (see the table below). Adjust by bending the needle guard so that the needle does not come in contact with the blade point of the hook at both the rightmost and left most 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.</p> <p>2) The needle guard is used so that the blade point of the hook does not come in contact with the needle to prevent the blade point from damage. When you desire to replace the hook, be sure to adjust the position of the needle guard.</p>			<ul style="list-style-type: none"> ○ 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. 		
Name of pattern	Stitch pattern	Max. zigzag width	Name of pattern	Stitch pattern	Max. zigzag width
Standard zigzag		10 mm	Scallop		10 mm
2-step zigzag		10 mm	Blind stitch		10 mm
3-step zigzag		10 mm	Custom pattern	-	10 mm
<p>(Caution)</p> <p>1. Part No. of the hook for LZ-2290ASS Series is 2252877. Part No. for LZ-2290ADS Series is 23557259. Designate the hook with the part No. when replacing it.</p> <p>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.</p> <p>3. The maximum zigzag width is regulated to 8 mm since the standard gauge is 8 mm at the time of delivery.</p>					

(13) Position of the bobbin case stopper

Standard Adjustment

- The bobbin case stopper ② should be located within the range from the position at which top end ① of the bobbin case stopper is aligned with line ③ to the position that is 0.5 mm away from line ③ in direction ④.



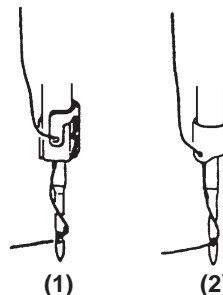
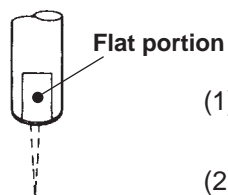
(14) Orientation of the needle bar thread holder

Standard Adjustment

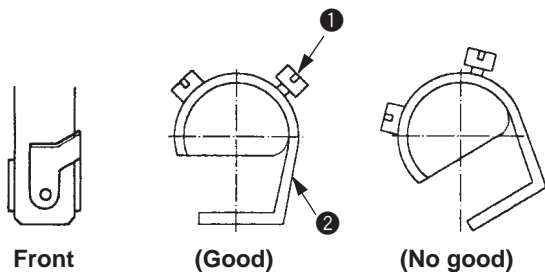
- The needle bar thread holder varies in accordance with the needle bar.
- The orientation of the needle bar is set so that the flat portion of the bottom end of the needle bar faces front of the operator.

- There are two kinds of the needle bar thread holders.

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



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



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 bobbin case stopper ❷ 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 of bobbin case stopper ❷.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen needle bar thread holder screw ❶, and adjust the position of needle bar thread holder ❷ with respect to the needle bar.</p> <p>2) Loosen the screw in the needle bar connection, and adjust the entire unit of the needle bar and needle bar thread holder.</p>	<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) Position of the thread tension

Standard Adjustment

* Felt of the thread tension controller is a consumable part. Replace it when it is consumed. Part No. of felt : 22528509

(16) Position of the pre-tension

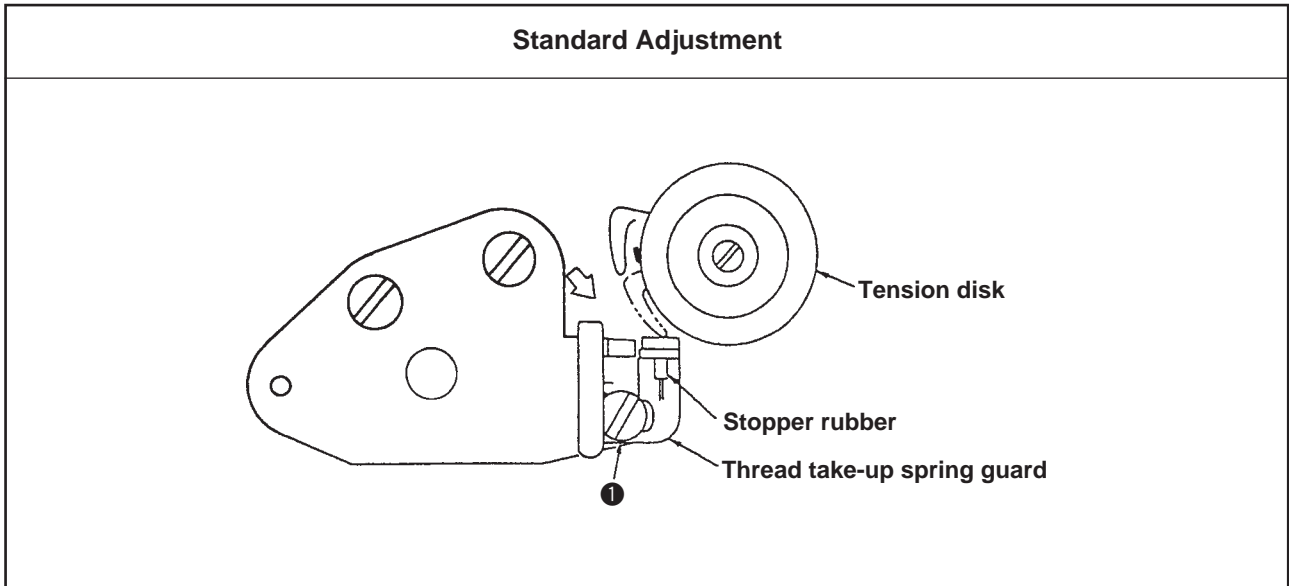
Standard Adjustment

Fig. 1 Longitudinal position Fig. 2 Orientation

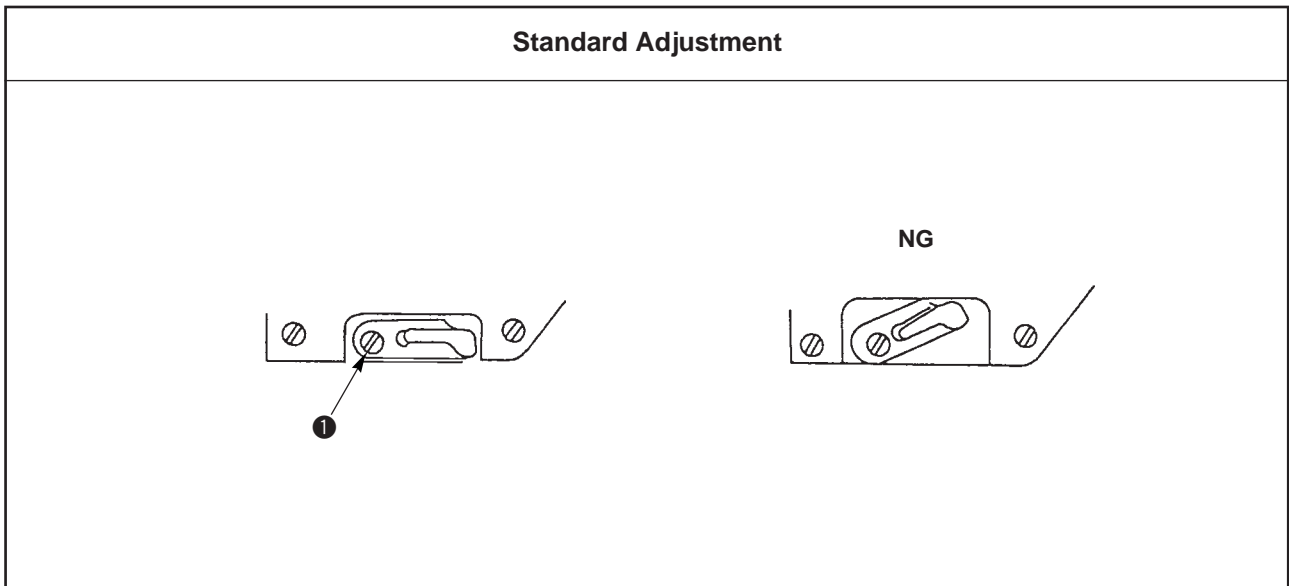
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen screw ❶, and adjust the position of the thread tension in the state that the thread tension controller is pushed to the striking face on the machine arm.</p>	

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 parallel to machine arm as shown in the figure.</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.

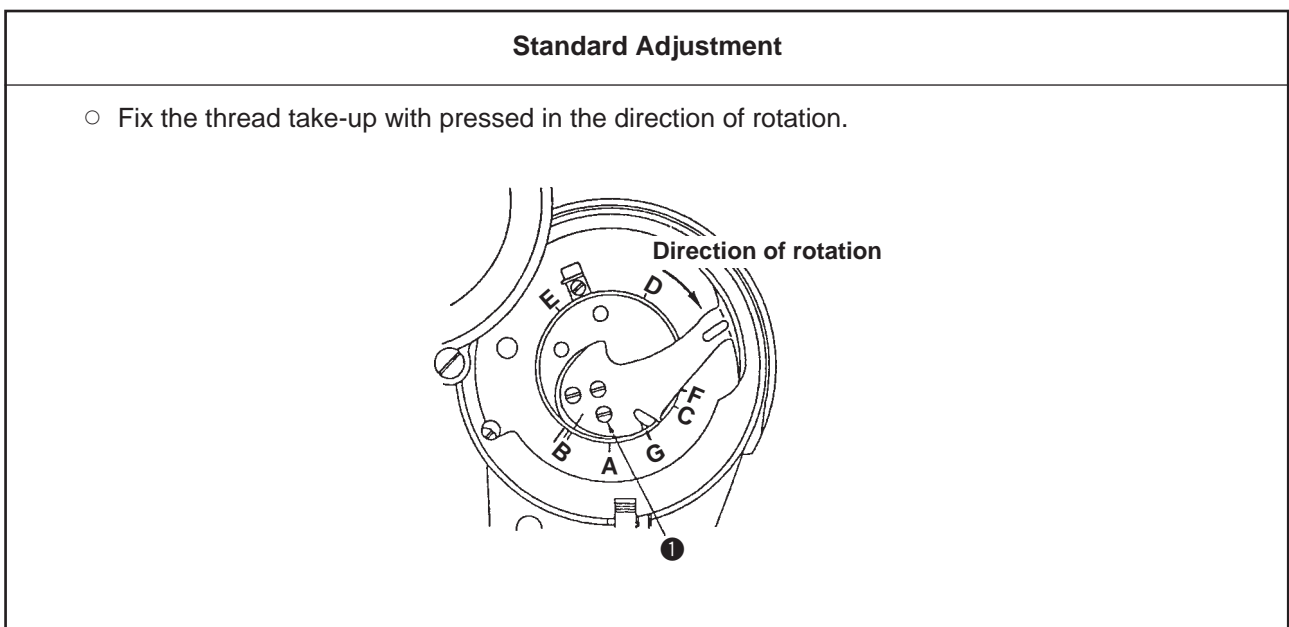
(17) Position of the thread take-up spring guard



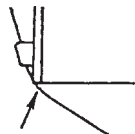
(18) Installing the thread take-up thread guide B



(19) Installing the thread take-up



Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen screw ❶, and adjust the position of the thread take-up spring guard so that the stopper rubber ❷ does not come in contact with the outer periphery of the thread tension disk ❸.</p>	

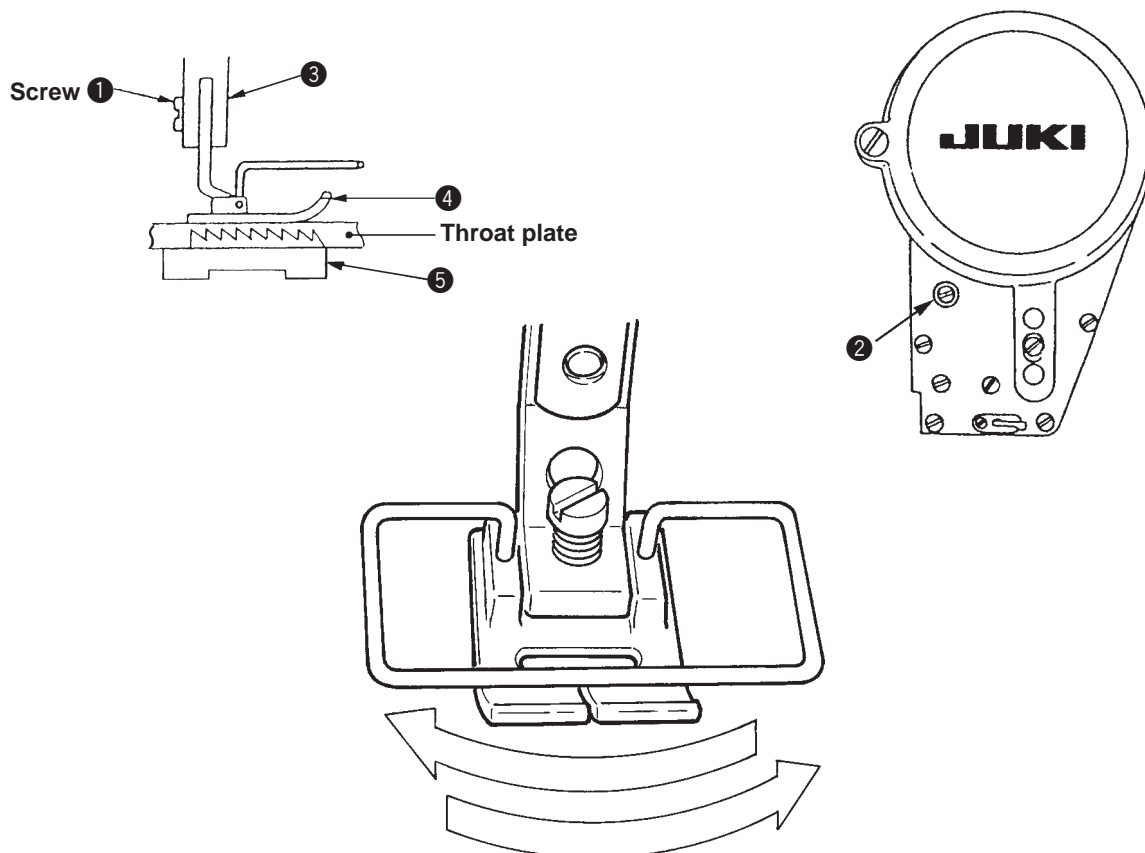
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen the screw ❶, and adjust the position of the thread take-up thread guide B so that is installed with leveled.</p>	<ul style="list-style-type: none"> ○ If the thread take-up guide B is installed with faced upward, the thread will come in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

Adjustment Procedures	Results of Improper Adjustment
<p>1) Slightly tighten three setscrews ❶. Then tighten three setscrews ❶ with the thread take-up pressed in the direction of rotation.</p>	<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.

(20) Installation of the presser foot

Standard Adjustment

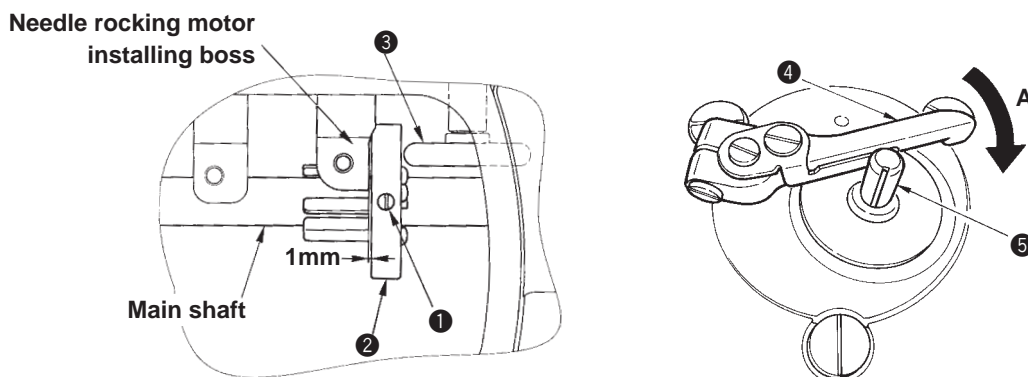
- The top surface of the throat plate should be closely fitted on the reverse side of the presser foot ④.



(21) Installing and adjusting the bobbin winder unit

Standard Adjustment

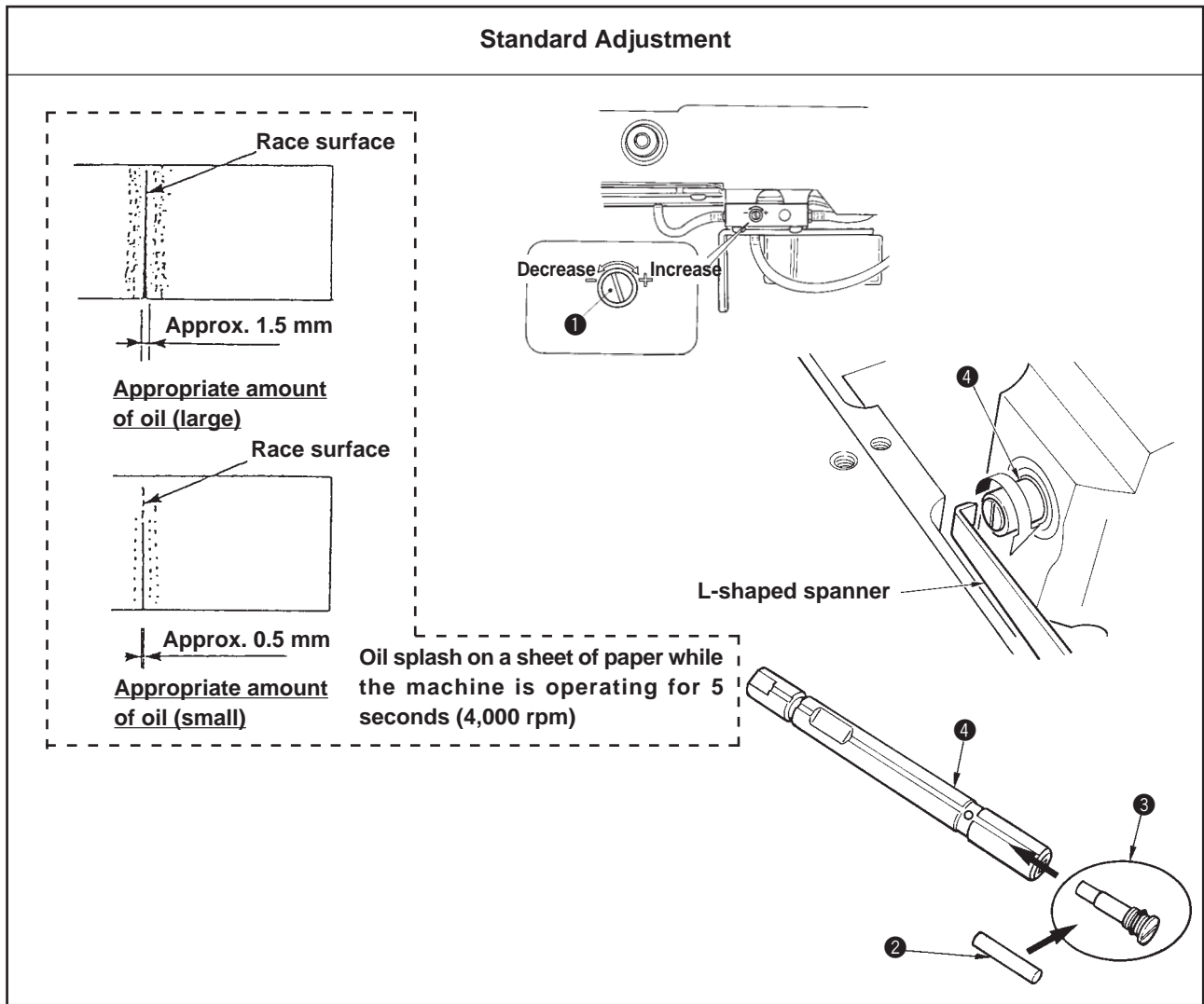
- A clearance of 1 mm should be provided between the end of needle rocking motor installing boss and the bobbin winder driving wheel (asm.) ②.
At this time, tilt the bobbin winder lever ④ in the direction A and adjust so that the bobbin winder shaft ⑤ does not rotate when turning the bobbin winder shaft ⑤ by hand.



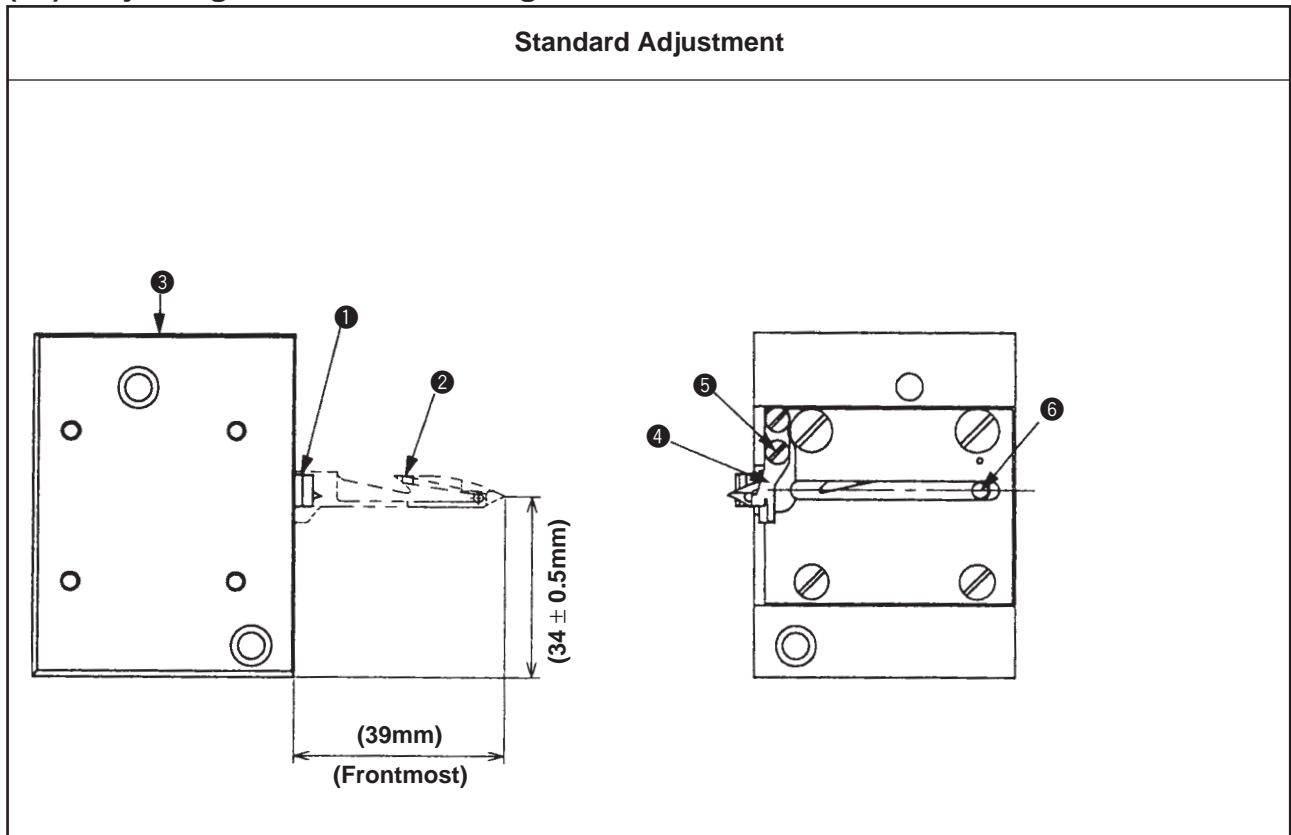
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Put the presser foot ④ in the presser bar ③, and insert screw ①. At this time, do not tighten screw ①. 2) Turn the handwheel until the feed dog ⑤ descends under the top surface of the throat plate. 3) Applying a pressure onto the presser foot, tighten screw ① with the sole of the presser foot closely fitted on the top surface of the throat plate. 3) Apply a pressing pressure onto the presser foot with the presser lifting lever lowered and tighten screw ① with the sole of presser foot ④ closely fitted on the top surface of the throat plate. 4) When using presser foot other than presser foot ④ which is delivered as standard, there is a case where a clearance is provided between presser foot ④ and the throat plate according to presser foot ④ to be used. At this time, fix presser foot ④ to be used with screw ①. Then loosen screw ② and lower presser foot ④. 5) When tightening screw ②, tighten it so as to lower it in the downward direction. 6) Adjustment of the orientation of presser foot ④ can be performed by loosening screw ② and turning presser bar ③. 	<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. ○ When tightening screw ② so as to lift upward, the lifting amount is decreased even when the presser foot is lifted with the presser lifting lever or the like. ○ Be sure to set the orientation of the presser foot to the front. When the orientation is tilted, the needle hole does not align with the throat plate and the needle and the presser foot may interfere with each other.

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1) Loosen screws ①. 2) In the state that bobbin winder lever ④ is tilted in the direction A, slightly press bobbin winder driving wheel ② to rubber ring ③ of the bobbin winder unit. 3) Temporarily tighten screws ① and in the state that bobbin winder lever ④ is tilted in the direction A, turn bobbin winder shaft ⑤ by hand, and check that the bobbin winder shaft does not rotate. If bobbin winder driving wheel ② and rubber ring ③ shift with each other, adjust again. 4) Securely tighten screws ①. 	<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.


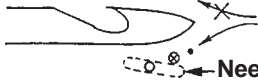
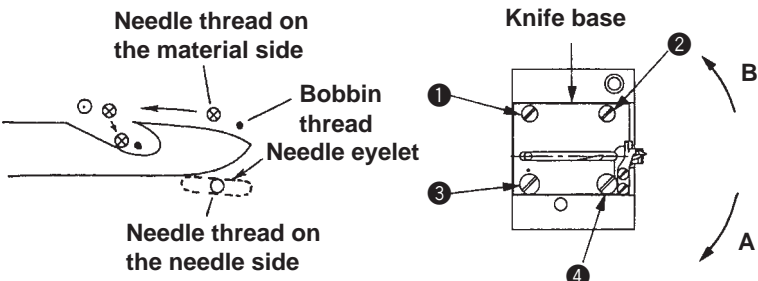
(22) Adjusting the amount of oil in the hook (ASS/-7, ASU/-7)



(23) Adjusting the thread trimming unit



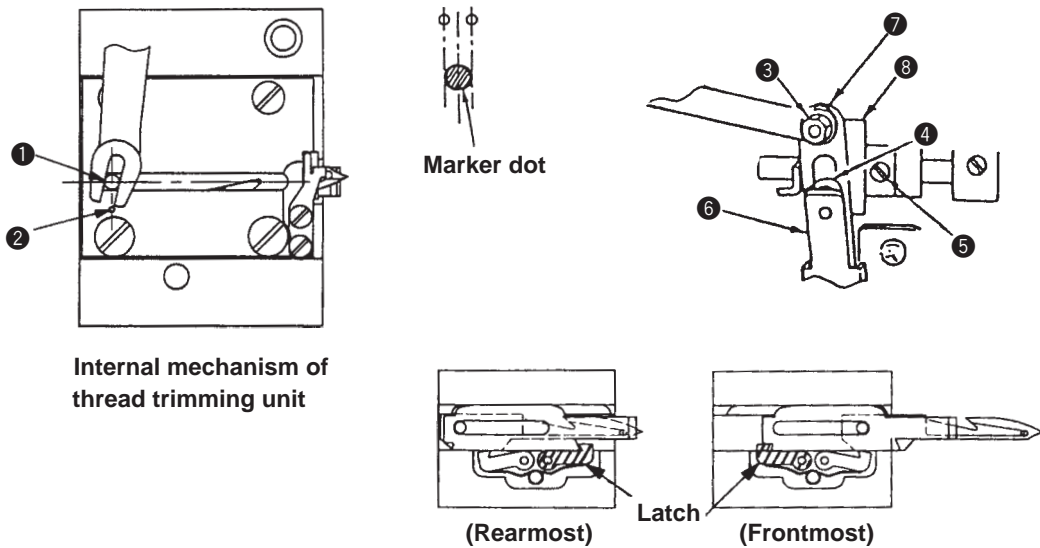
Adjustment Procedures	Results of Improper Adjustment									
<p>The amount of oil in the hook can be adjusted with oil amount adjusting screw ❶.</p> <p>1) Adjusting procedure Turning (clockwise) oil amount adjusting screw ❶ increases the oil amount in the hook and turning (counterclockwise) it decreases the oil amount in the hook.</p> <p>(Caution) 1. When adjusting the amount of oil in the hook, perform the adjustment in a way of reducing the oil amount after somewhat increasing it. 2. The amount of oil in the hook has been adjusted at the max. number of revolution at the time of delivery. When you always use the sewing machine at low speed, there is a possibility that trouble occurs due to the lack of amount of oil in the hook. When the sewing machine is used always at low speed, perform the adjustment of the amount of oil in the hook.</p> <p><<Replacing procedure of hook shaft oil wick>></p> <p>1) Hook shaft oil wick ❷ is a consumable part. To stabilize the oil amount in the hook, it is recommended to periodically replace it. Hook shaft oil wick ❷ is mounted on the top end of hook shaft ❹. Remove the needle and the parts around the needle (presser foot, needle, throat plate, feed dog, hook and woodruff plate), put a spanner, top end of which is L-shaped to screw ❸ section of hook shaft oil wick, turn the handwheel in the normal direction of rotation by hand, and draw out the screw. It is possible to replace hook shaft oil wick ❷ while hook shaft ❹ is not removed. If hook shaft ❹ is drawn out, refer to 5-(9) Protruding amount of the hook shaft.</p> <p>2) Hook shaft oil wick screw ❸ (B1808552000) in which hook shaft oil wick ❷ (11015906) is entered is assembled in hook shaft ❹. Draw out the old hook shaft oil wick ❷ in hook shaft oil wick screw ❸ and push a new hook shaft oil wick ❷. At this time, be sure to check that hook shaft oil wick ❷ has entered up to the end of hook shaft oil wick screw ❸.</p> <ul style="list-style-type: none"> When re-assembling, check that the hole at the top end of hook shaft oil wick screw ❸ is not broken. <p>3) Assemble hook shaft oil wick screw ❸ to the top end of hook shaft ❹.</p> <table border="1" data-bbox="290 1115 847 1225"> <thead> <tr> <th></th> <th>Name of part</th> <th>Part No.</th> </tr> </thead> <tbody> <tr> <td>❷</td> <td>Hook shaft oil wick</td> <td>11015906</td> </tr> <tr> <td>❸</td> <td>Hook shaft oil wick screw</td> <td>B1808552000</td> </tr> </tbody> </table>		Name of part	Part No.	❷	Hook shaft oil wick	11015906	❸	Hook shaft oil wick screw	B1808552000	<ul style="list-style-type: none"> When oil wick is stained, decrease of oil amount in the hook or unstableness of oil amount will result. When hook shaft oil wick ❷ is not entered up to the end of hook shaft oil wick screw ❸, hook shaft oil wick screw ❸ comes off during operation and the oil amount in the hook cannot be adjusted. Besides, hook shaft oiling inlet is closed and oil amount in the hook is hard to be obtained. When the hole is broken, replace the screw with a new one. Oil amount in the hook becomes unstable.
	Name of part	Part No.								
❷	Hook shaft oil wick	11015906								
❸	Hook shaft oil wick screw	B1808552000								

Adjustment Procedures	Results of Improper Adjustment
<ol 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 ❷. Adjust the operating pressure of counter knife ❶ and moving knife ❷ by tightening screw ❸ in clamp plate ❹. At this time, the force to move moving knife pin ❺ in the direction of the arrow is more or less than 600 gf. If screw ❸ is excessively loose, defective thread trimming may occur. 	<ul style="list-style-type: none"> When the moving knife is positioned in the front : 1) In the case where the needle thread is trimmed twice :  Needle eyelet When the moving knife is positioned in the rear : 2) In the case where the needle thread is not trimmed :  Needle eyelet
<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"> 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. 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.

(24) 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.

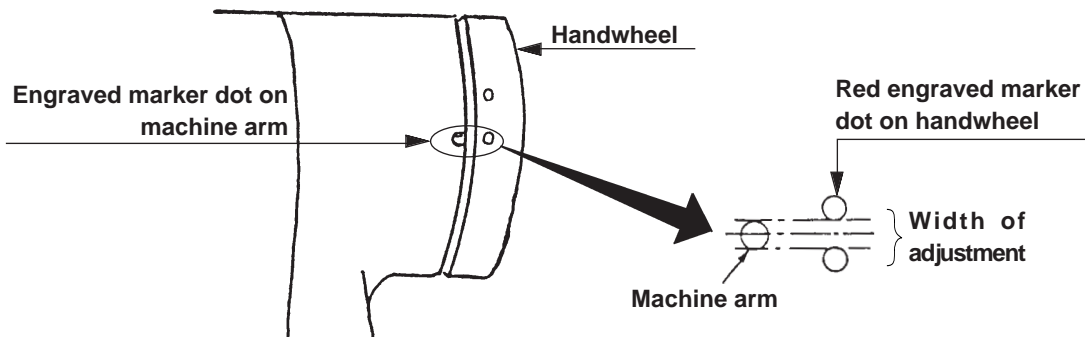


(25) Timing of the thread trimming cam

Standard Adjustment

(See the figure shown above.)

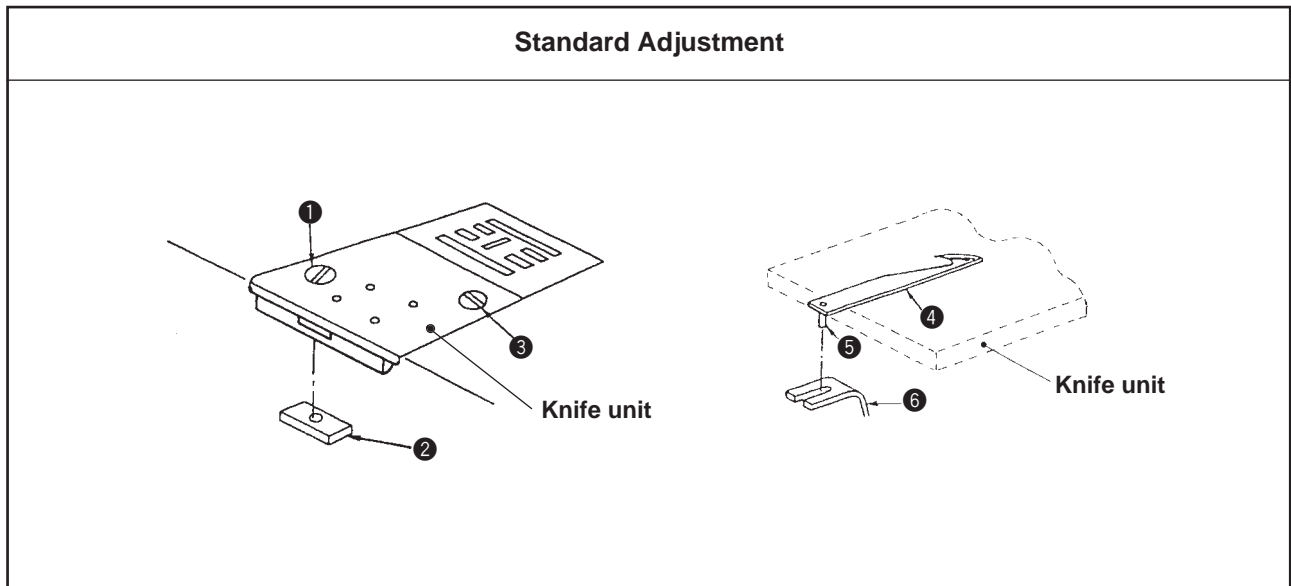
- Press roller arm ⑥ until roller ④ fits in the groove in thread trimming cam ⑧. Now, lightly turn the main shaft handwheel carefully in the reverse direction until it stops. At this time, the marker dot engraved on the machine arm should be aligned with the red marker dot engraved on the handwheel.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



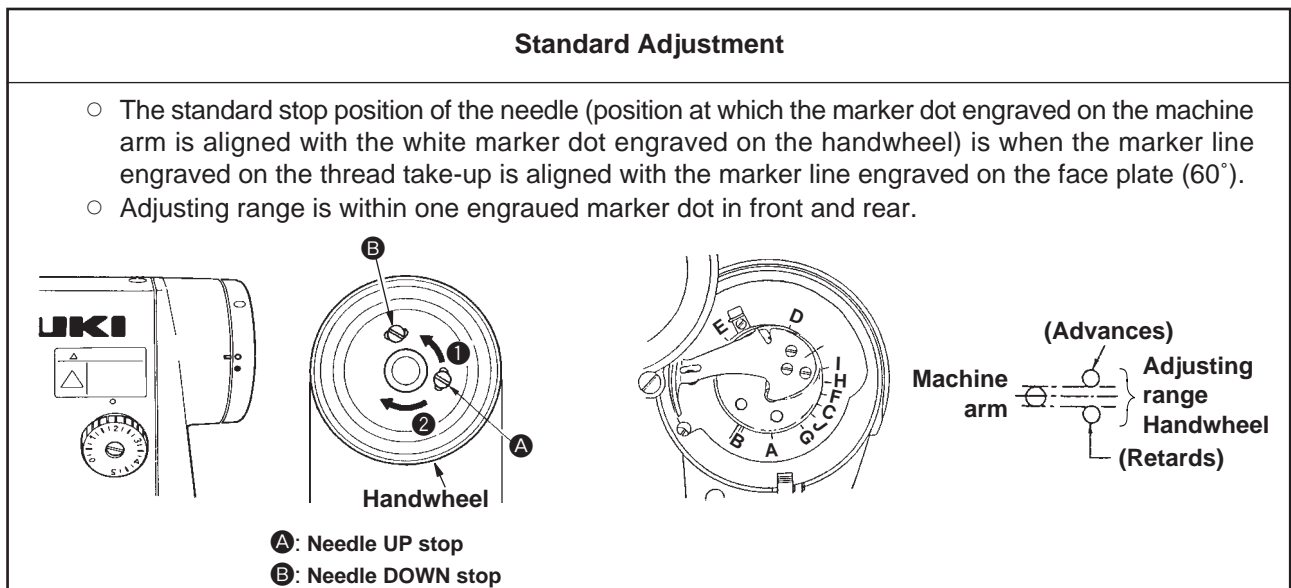
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen nut ③ in the knife driving arm ⑦ , and adjust the initial position of the moving knife. Loosen/tighten nut ③ after roller ④ has fitted in the groove on the thread trimming cam ⑧ by pressing roller arm ⑥ with fingers. This will prevent 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 ⑧ , 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> <p>(Caution) When a feed dog other than that which is delivered as standard is used, there is a case where the feed dog interferes with counter knife according to its shape. In case of interference, move the feed dog to the left side from the engraved dot and check that there is no interference with each other.</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
<p>If the timing of the thread trimming cam is not correct, adjust it in the following steps of procedure.</p> <p>1) Loosen two screws ⑤ in the cam.</p> <p>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.</p> <p>3) Push roller arm ⑥ until roller ④ fits in the groove in thread trimming cam ⑧. Lightly push thread trimming cam ⑧ on the handwheel side and turn it in the reverse direction until it will go no further. Now, tighten two screws ⑤ in the cam.</p>	<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.

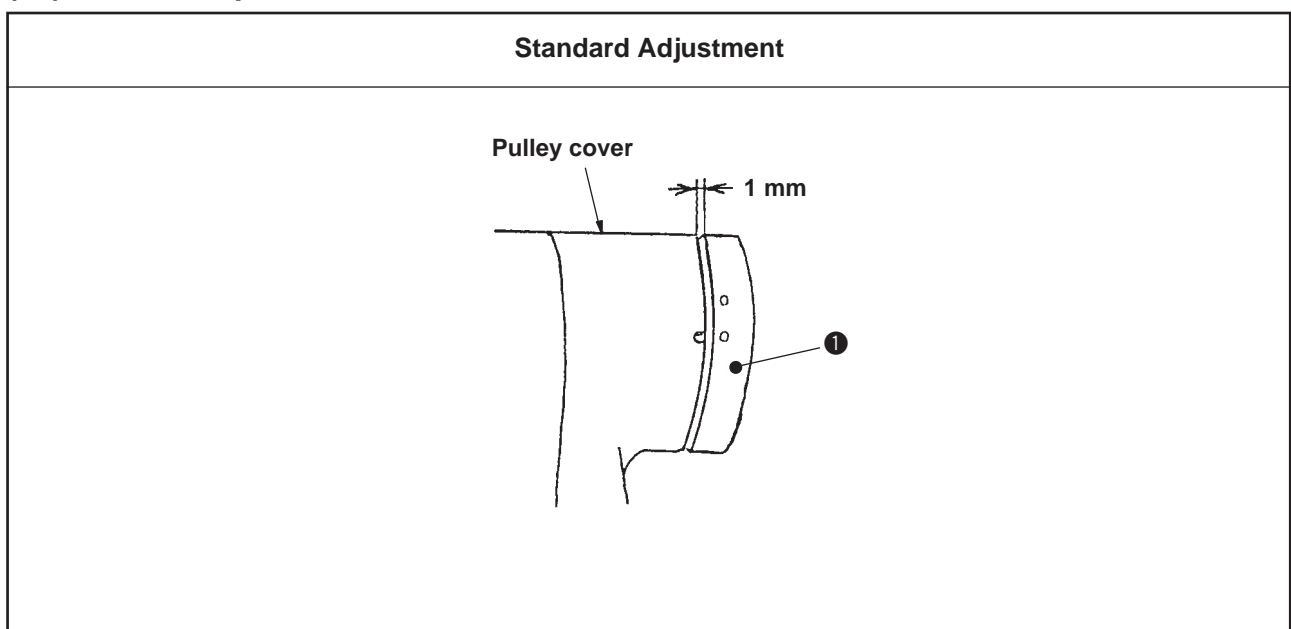
(26) Installing/removing the knife unit



(27) Stop position of the needle after thread trimming (Needle UP stop)



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



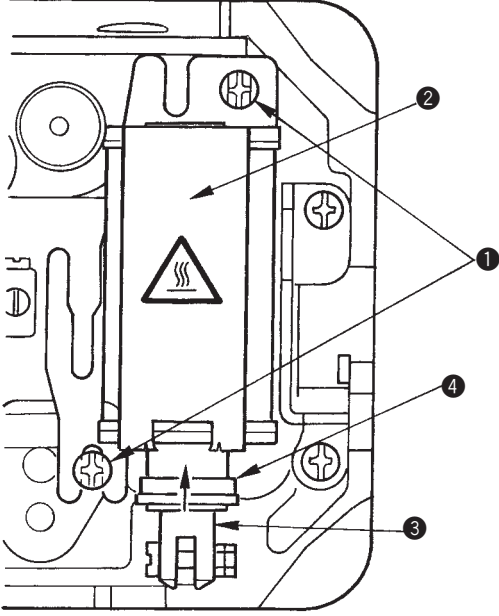
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen screw ❶ and remove fixing plate ❷.</p> <p>2) Remove screw ❸, and the knife unit will come off.</p> <p>Installation is carried out analogously in reverse order.</p> <p>(Caution) When installing the knife unit, take care to allow pin ❺ of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

Adjustment Procedures	Results of Improper Adjustment
<p>1) 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>2) For the lower stop position of the needle, stop the needle in its lower stop position, loosen screw ❷ and adjust the stop position within the slot.</p> <p>(Caution)</p> <ol style="list-style-type: none"> 1. Do not rotate the sewing machine with screws ❶ and ❷ loosened during performing adjustment. 2. Be sure only to loosen screws ❶ and ❷ and not to remove them. 3. Do not adjust needle DOWN stop screw ❷. 	<ul style="list-style-type: none"> ○ When the stop position retards, there is a possibility that wiper interferes with needle in case of with wiper.

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 ❶ to the flat portion of the motor shaft and tighten the screws in the order of No. 1 and No. 2.</p>	

(29) Position of the automatic reverse stitching magnet

Standard Adjustment

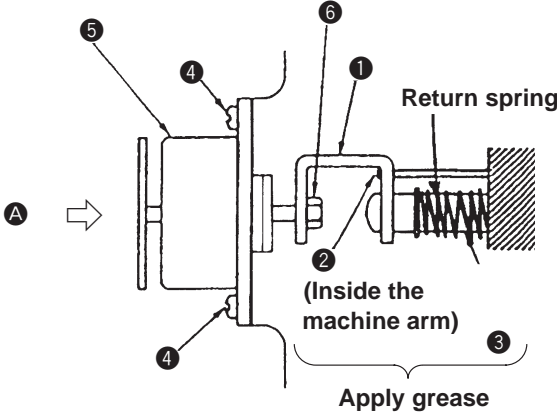


- Max. feed amount
LZ-2290ASS, ADS = 5 mm
LZ-2290ASU, ADU = 2.5 mm
Standard delivery : 2 mm
- Max. reverse feed amount
LZ-2290ASS, ADS = 4 mm
LZ-2290ASU, ADU = 2.5 mm
Standard delivery : 2 mm

(30) Adjusting the thread tension releasing solenoid

Standard Adjustment

- Presser plate of the thread tension releaser ① should be engaged with roll pin ② and auxiliary pin of the thread tension releaser ③.
- 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
<p>1) Loosen two setscrews ❶. Adjust the position by moving automatic reverse stitching magnet ❷ itself.</p> <p>2) When the reverse feed lever is pressed down and plunger ❸ moves in the direction ➡ at the maximum feed amount, cushion rubber ❹ should be able to slightly rotate.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1) If the thread tension releasing solenoid fails to smoothly move when it is pressed in the direction Ⓐ, loosen four setscrews ❷ and adjust the center of thread tension releasing solenoid ❸.</p> <p>2) If the tension disk fails to rise when the thread tension releasing solenoid is pressed in the direction Ⓐ, check first the position of the thread tension controller, then remove thread tension releasing solenoid ❸. Then loosen nut ❹ and adjust the position of presser plate of the thread tension releaser ❶.</p> <p>(Caution) Use grease tube (40006323) supplied as accessories and periodically apply grease.</p>	<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.

(31) 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 explanation in case of (b) Assembling the condensation dial.

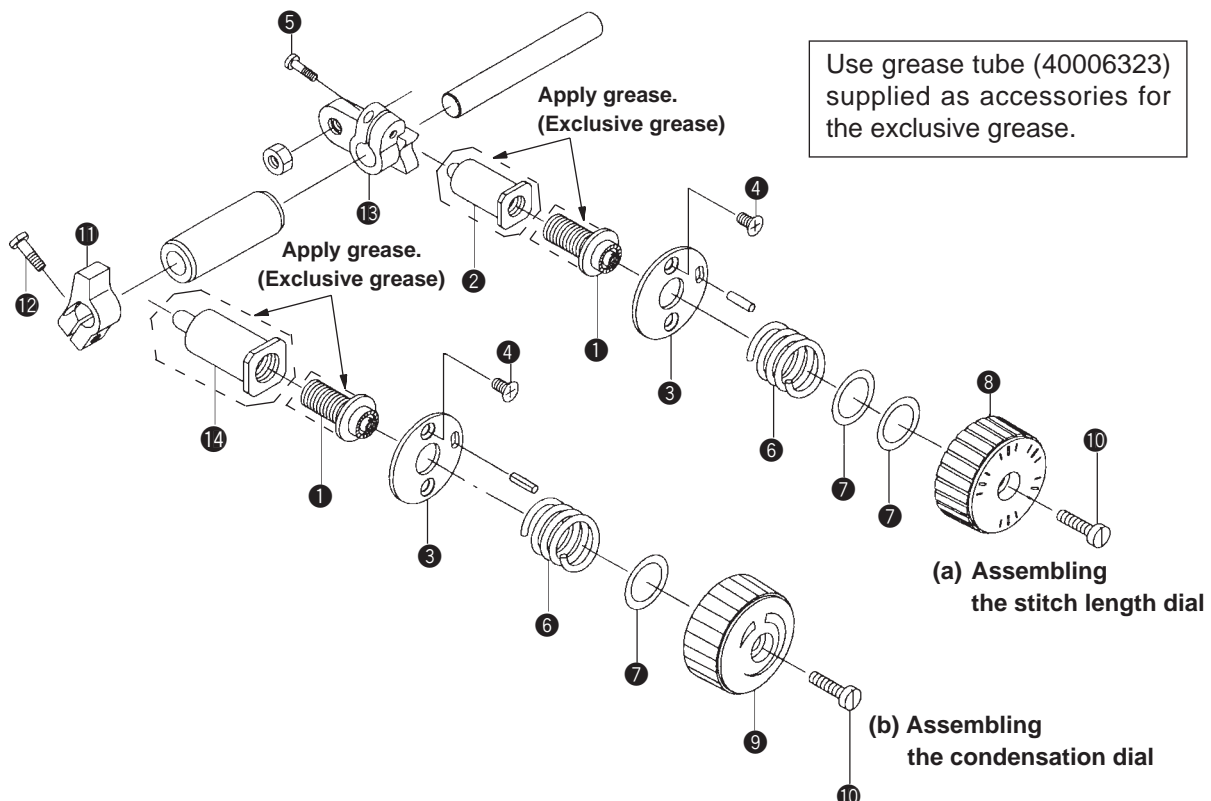
- 1) Apply the exclusive grease to feed adjusting screw ① and feed adjusting shaft ② (condensation adjusting shaft ⑭).
- 2) Screw feed adjusting screw ① in feed adjusting shaft ② (condensation adjusting shaft ⑭) and temporarily connect them.
- 3) Insert feed adjusting screw ① which has been temporarily 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 feed adjusting shaft ② should be flush with that of feed controller ⑬.

- At this time, feed controller ⑬ and the components of 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 stitch length dial spring ⑥ and then flat washer ⑦ (2 pcs. at the stitch length dial section). 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 ⑭ 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

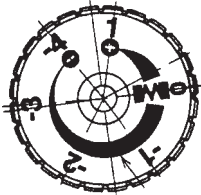
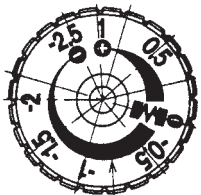
- When the work of step 7) (work of step 9) has been completed, turn stitch length dial ⑧ (condensation dial ⑨) and check that the dial moves as specified in the scale.
- When the marker dot engraved on the machine arm cannot be adjusted, check and re-adjust from the work of step 5).

<REFERENCE>

Max. scale of the stitch length dial

Model	Max. scale	Part No. of stitch length dial
LZ-2290ASS, ADS	5 mm	11071909
LZ-2290ASU, ADU	2.5 mm	26302000

With regard to condensation dial

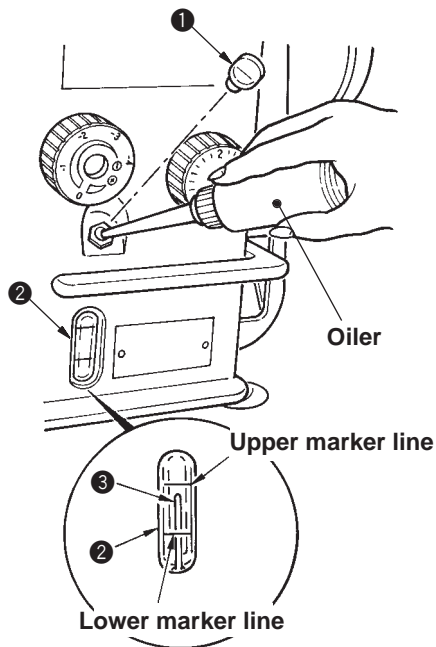
Model	LZ-2290ASS, ADS	LZ-2290ASU, ADU
Shape		
Part No.	23534407	23545007
Max. scale	-4 mm	-2.5 mm

Results of Improper Adjustment

(32) Adjusting the lubrication mechanism (ASS and ASU only)

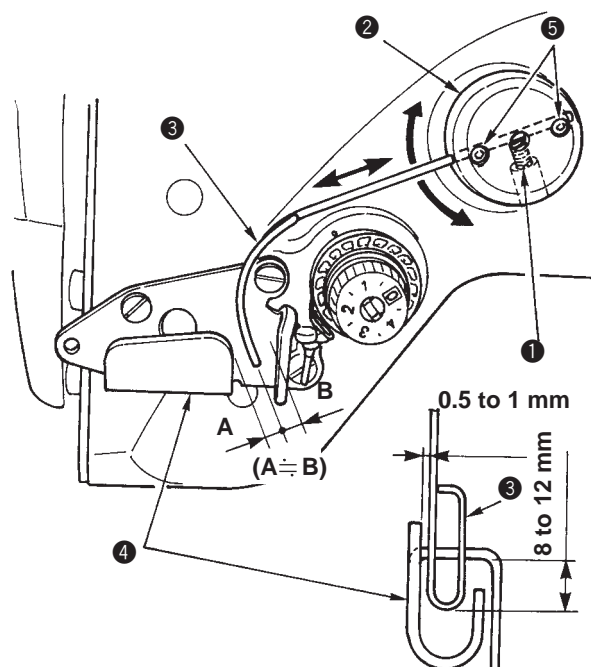
Standard Adjustment

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



(33) Adjusting the position of the thread draw-out wire (For the machine with thread trimmer only)

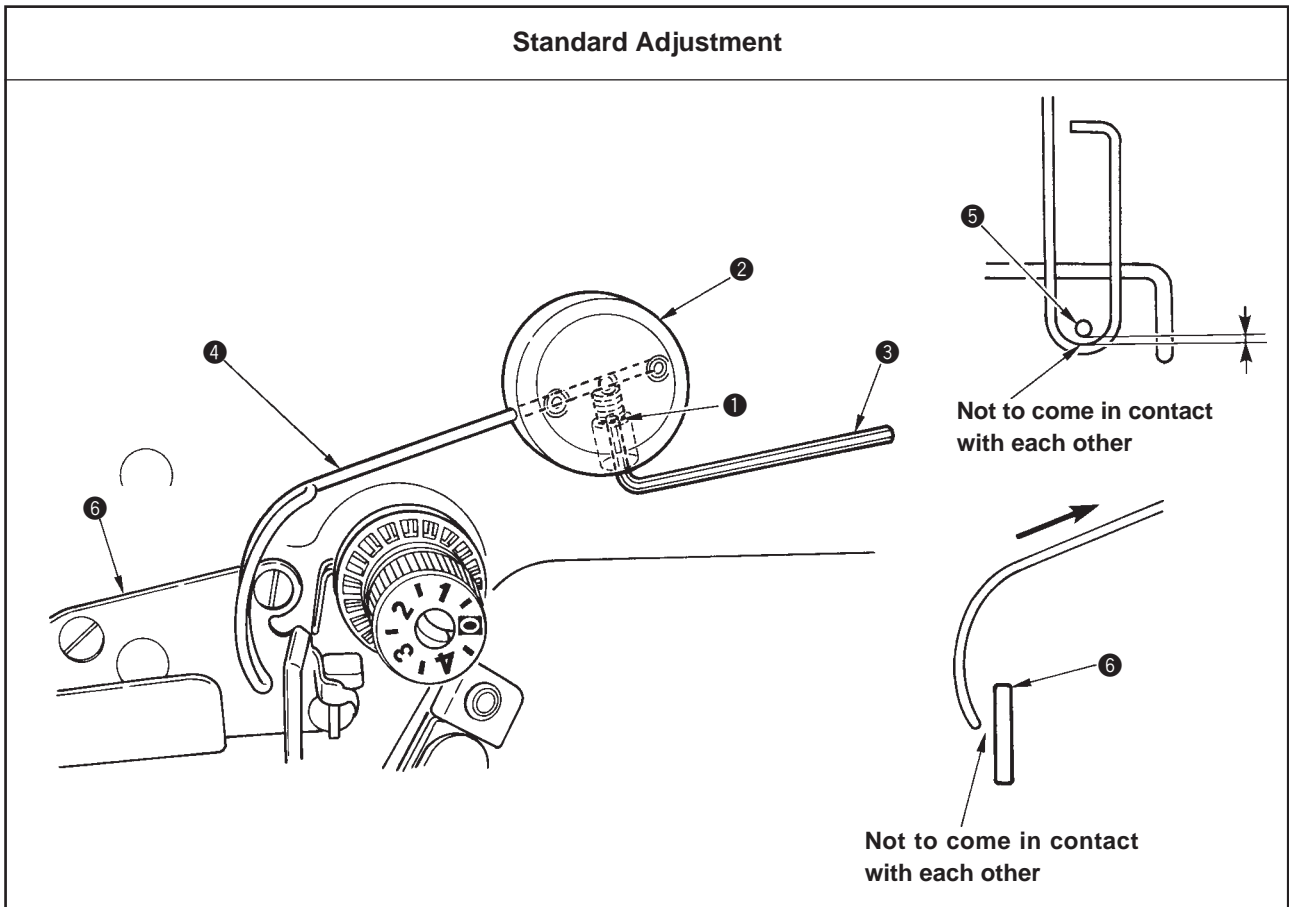
Standard Adjustment



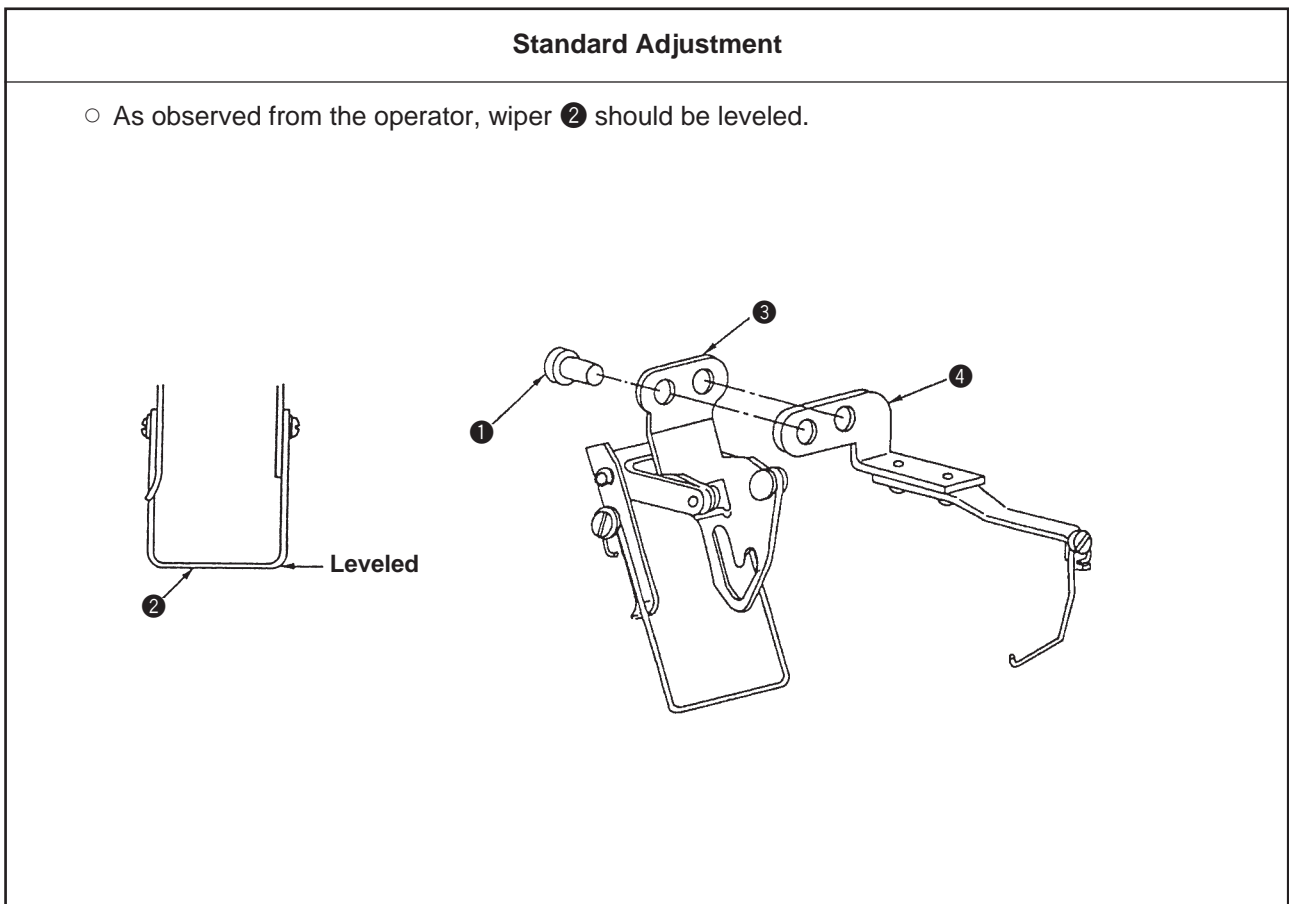
Adjustment Procedures	Results of Improper Adjustment
<p>1) When the top end of oil amount indicating rod ③ comes down to the lower marker line of oil amount indicating window ②, remove oil inlet cap ① and fill oil up to the upper marker line of oil amount indicating window ②.</p> <ul style="list-style-type: none"> ○ The amount of oil to be filled is approximately 150 cc. (Defrix Oil No. 1) ○ Part No. of oil : MDFRX1600C0 <p>(Caution) Oiling is performed with oiler (B19210120A0) supplied as accessories. Be careful that dust such as thread waste and the like is not oiled to the top end section of the oiler when oiling.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1. Standard position of the thread draw-out wire</p> <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) At this time, leave a space of 0.5 to 1 mm between the thread draw-out wire ③ and the top surface of the thread take-up thread guide A ④.</p> <ol style="list-style-type: none"> 3) Finely adjust with setscrews ⑤ so that the top end of thread draw-out wire ③ is placed approximately in the center ($A \doteq B$) of thread take-up thread guide A ④. <p>2. When turning OFF the thread draw-out unit</p> <ol style="list-style-type: none"> 1) It is possible to turn OFF with the function setting No. 89 described in the function setting list. <p>3. When you desire to increase the needle thread draw-out amount</p> <ol style="list-style-type: none"> 1) Loosen setscrew ① and adjust so that $A > B$ is obtained. 	<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.

**(34) Adjusting the stroke of the thread draw-out wire
(For the machine with thread trimmer only)**



(35) Installing the wiper base (WB only)



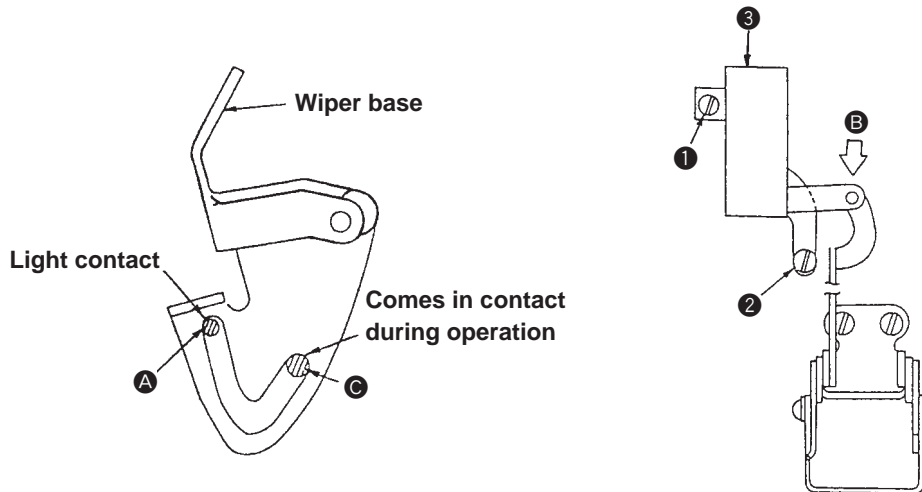
Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen setscrew ❶ with hexagon wrench key ❸ supplied with the machine as accessory.</p> <p>2) Turn the thread draw-out wire together with thread draw-out wire installing base ❷ and adjust up or down the top end of thread draw-out wire ❹.</p> <p>(Caution)</p> <ol style="list-style-type: none"> 1. When making the remaining amount of needle thread longer, adjust the position of thread draw-out wire ❹ to the position where wire ❹ does not come in contact with needle thread ❺. 2. When making the remaining amount of needle thread shorter, take care so that thread draw-out wire ❹ and thread guide ❻ 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
<p>1) Loosen two setscrews ❶ and adjust the installing position of the wiper base.</p> <p>Setscrews ❶ are used commonly to fix wiper base ❸ and auxiliary thread take-up lever installing base ❹. So, it is necessary to adjust the installed state of the wiper base while checking the respective bases for inclination and torsion.</p> <p>2) When the auxiliary thread take-up lever is not used, enter spacer, MAO91003000 as thick as auxiliary thread take-up lever installing base ❹.</p> <p>* For CB type, refer to 2) CB type of (37) Position of the wiper.</p>	

(36) Adjusting the wiper solenoid (WB only)

Standard Adjustment

- When the wiper solenoid ③ is OFF (in the normal state), the pin ① should be lightly fitted onto the leftmost end of the slot while providing no clearance between them. (State ①)
- Confirm that the pin comes in contact with the rightmost end of the slot at position ② when the wiper solenoid is actuated (when it is pressed in direction ③).

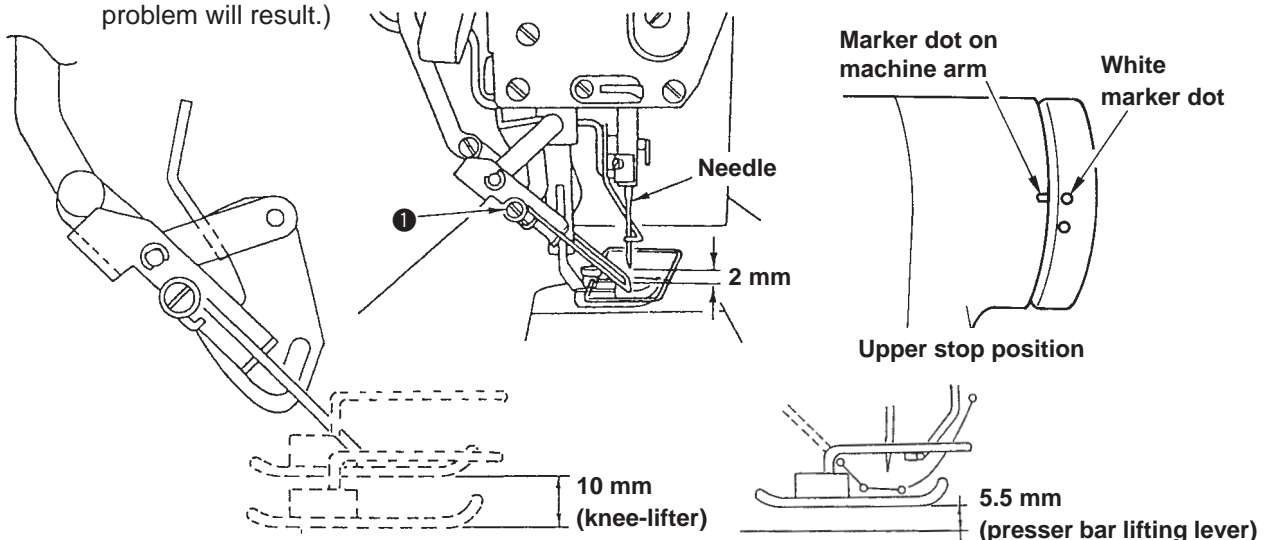


(37) Position of the wiper

1) WB type

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.)

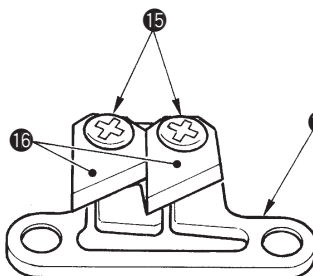
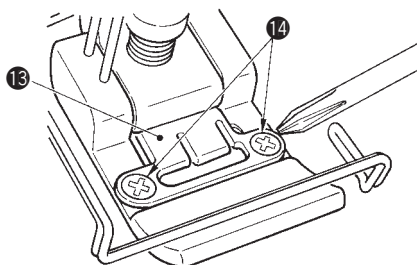
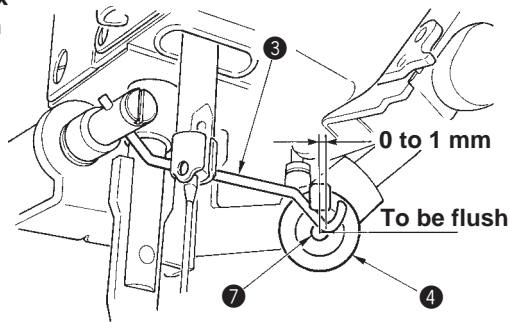
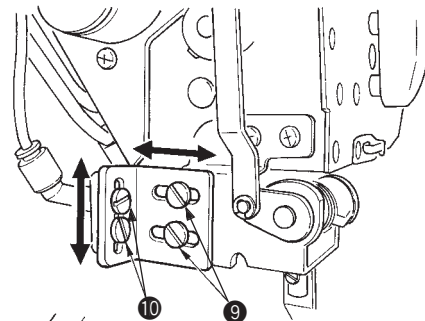
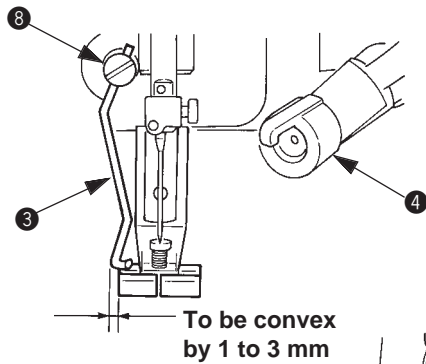
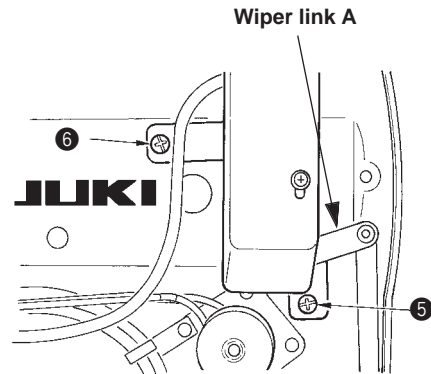
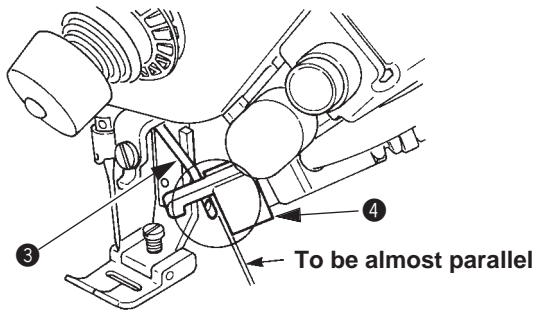
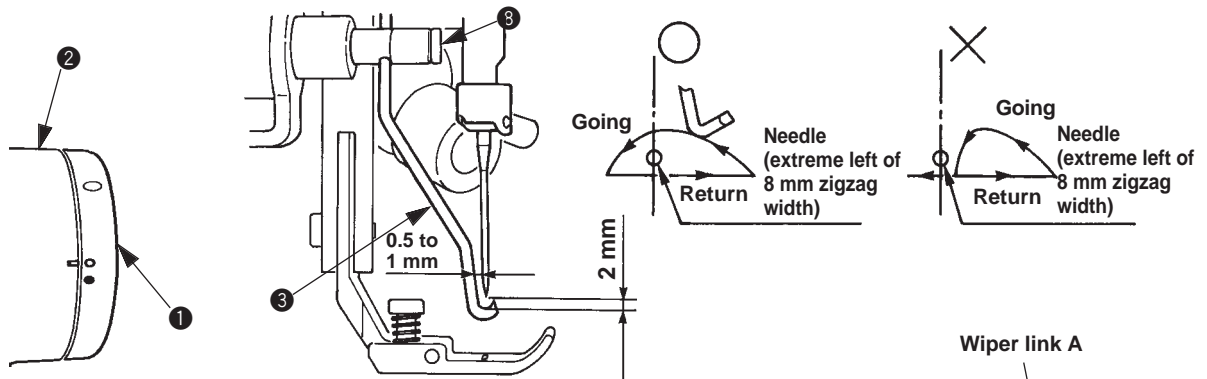


Adjustment Procedures	Results of Improper Adjustment
<p>1) Loosen setscrews ❶ and ❷ when wiper solenoid ❸ is not actuated (OFF). Adjust pin A to state A by moving the entire unit of wiper solenoid ❸.</p> <p>* For CB type, refer to 2) CB type of (37) Position of the wiper.</p>	

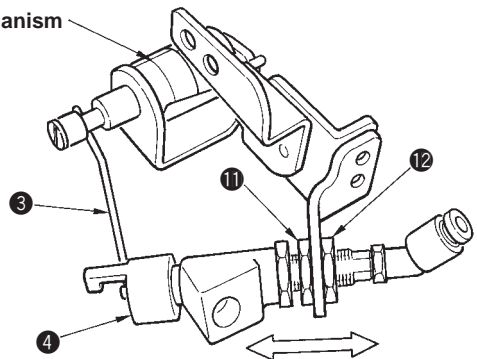
Adjustment Procedures	Results of Improper Adjustment
<p>1. Loosen setscrew ❶ (one each for both sides) and adjust the position of the wiper.</p> <p>(Caution) Carefully tighten setscrews ❶ while preventing the wiper from twisting.</p>	

2) CB type

Standard Adjustment



Ratchet mechanism



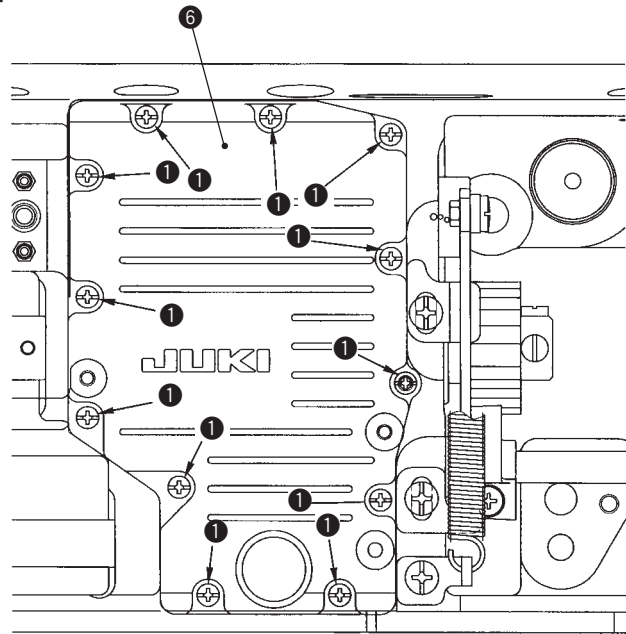
Adjustment Procedures	Results of Improper Adjustment
<p>1. Adjusting the moving path of the wiper</p> <p>1) Set the needle to UP stop position. Adjust the white marker dot of handwheel ❶ to the marker dot of pulley cover ❷. When wiper link A is moved by hand, wiper ❸ slides to and fro by means of ratchet mechanism. At this time, adjust the wiper so that it passes the center of needle when going and moves in front of the center of needle when returning by means of the ratchet mechanism. Loosen wiper setscrew ❸ and move wiper ❸ up and down to adjust so that the vertical clearance between the needle and wiper ❸ is approximately 2 mm when returning. In addition, adjust the clearance between the sides to approximately 0.5 mm to 1 mm.</p> <p>* When wiper setscrew ❸ is loosened, both the directions of vertical and rotation become free.</p> <p>2. Adjusting the wiper stroke</p> <p>1) To adjust the wiper stroke, loosen setscrews ❹ and ❺, and move the wiper up and down to adjust so that it is positioned at approximately 1 to 2 mm from the left end of presser foot (Part No. : 40003542) which is delivered as standard.</p> <p>3. Adjusting the position of the clamp head</p> <p>1) Adjust so that the top end plane of wiper is almost parallel to the edge of clamp head ❻. Loosen setscrews ❽ to adjust the lateral direction, and loosen setscrews ❿ to adjust the vertical direction. Adjust the clearance between clamp head ❻ and wiper ❸ with nuts ⓫ and ⓬.</p> <p>2) Protruding section of clamp head ❻ comes above wiper ❸.</p> <p>4. Adjusting the waiting position of the wiper</p> <p>1) Lateral position : Adjust the lateral position so that the clearance between the suction port of clamp head ❻ (clamp ball section) and the concave of wiper ❸ is approximately 0 to 1 mm.</p> <p>2) Vertical position : Adjust the vertical position so that bottom face of wiper ❸ is almost flush with the suction port of clamp head ❻ (clamp ball section).</p> <p>* For the adjustment of wiper ❸, perform the adjustment work to repeatedly perform items 1. through 4.</p> <p>5. Replacing the presser knife</p> <p>The needle thread cutting knife is mounted on the presser delivered as standard for the bird's nest prevention (CB) type. The needle thread cutting knife is an article of consumption. When the knife becomes dull, replace it with a new one.</p> <p>1) Remove two setscrews ⓭ in the knife fixing plate using a precision screwdriver and remove knife fixing plate ⓮.</p> <p>2) Remove two setscrews ⓯ in the knife using a precision screwdriver and remove knife ⓯(ceramic) from fixing plate ⓮. Then replace the knife.</p> <p>(Caution) 1. When replacing knife ⓯ (ceramic), be careful of the injury to the fingers.</p> <p>2. When replacing knife ⓯ (ceramic), be careful of its direction and position. (It should be almost parallel to knife fixing plate ⓮.)</p> <p>3) When using the bird's nest prevention type as the needle thread clamp type When using as the needle thread clamp type, perform the setting below. [Example of use] • When using as the interlacing failure prevention at the time of sewing from the cloth end. • When using the normal presser. (presser without knife)</p> <ol style="list-style-type: none"> 1. Set the value of function setting No.19 to 1. (Standard "0") 2. Input the setting of number of stitches of releasing needle thread with function setting No. 28. ("0" to 30 stitches) <p>(Caution) Needle thread clamp ratio when needle does not enter the cloth excessively drops in comparison with that when needle enters the cloth. Be sure to operate the wiper on the cloth.</p> <p>4) When using the bird's nest prevention type as the wiper type</p> <ol style="list-style-type: none"> 1. Set the value of function setting No. 18 to "0". (Standard 1) 	<p>○ Wiper ❸ comes close most to the needle when the needle throws to the right. There is a case where the wiper interferes with the needle according to the position of the wiper. In this case, re-adjust the position.</p> <p>○ Adjust so that they slightly come in contact with each other.</p> <p>○ When the protruding section faces the direction other than the upward one, needle thread clamp failure occurs.</p> <p>○ Rate of needle clamp is affected by the adjustment of the wiper waiting position.</p> <p>○ Knife ⓯ (ceramic) Part No : 11434206</p>

4. PROCEDURES OF DISASSEMBLING/ASSEMBLING AND CAUTIONS

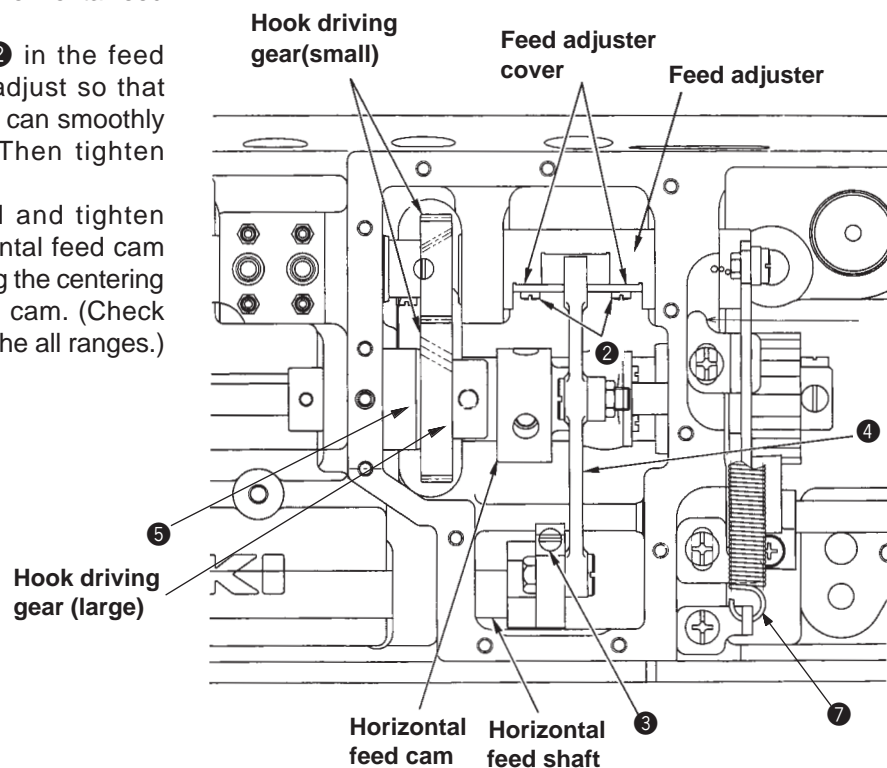
(1) Adjusting and assembling of the gear box (large)

Procedures of disassembling/assembling

- Loosen setscrews ① and remove the gear box large cover ⑥.



- Centering the horizontal feed cam
 - 1) Remove feed spring ⑦.
 - 2) Loosen setscrew ③ in horizontal feed cam rod ④.
 - 3) 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.
 - 4) Turn the handwheel and tighten setscrew ③ in horizontal feed cam rod ④ while performing the centering of the horizontal feed cam. (Check that torque is even in the all ranges.)




(Caution) Clearance provided between hook driving shaft rear metal ⑤ and hook driving gear (large) is 0.05 ± 0.01 mm.

Caution in disassembling

- For removing/installing the gear box cover ⑥, be sure to refer to the item “(4) Removing/installing the gear box cover” and carefully perform the work.

- Hook drive gear (small) is a selective part.

Part No.	Name of part	Dimension (diameter)
23538903	Hook drive gear (small) S	Small  Large
23536303	Hook drive gear (small) A	
23536402	Hook drive gear (small) B	
23536501	Hook drive gear (small) C	
23536600	Hook drive gear (small) D	
23536709	Hook drive gear (small) E	
23536808	Hook drive gear (small) F	

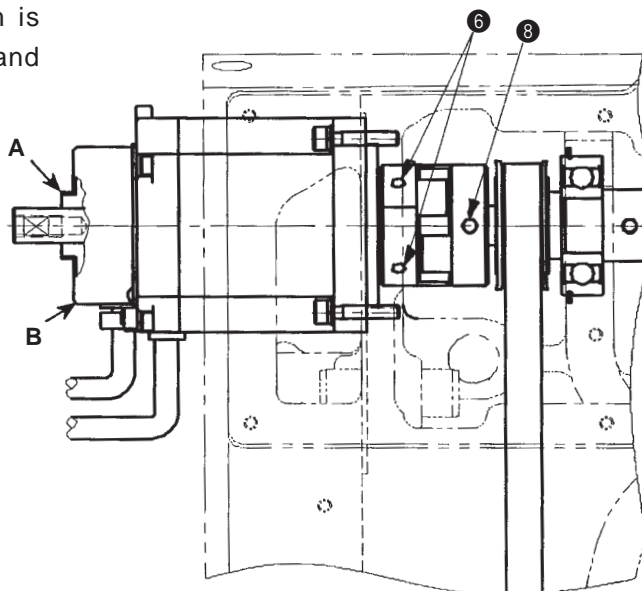
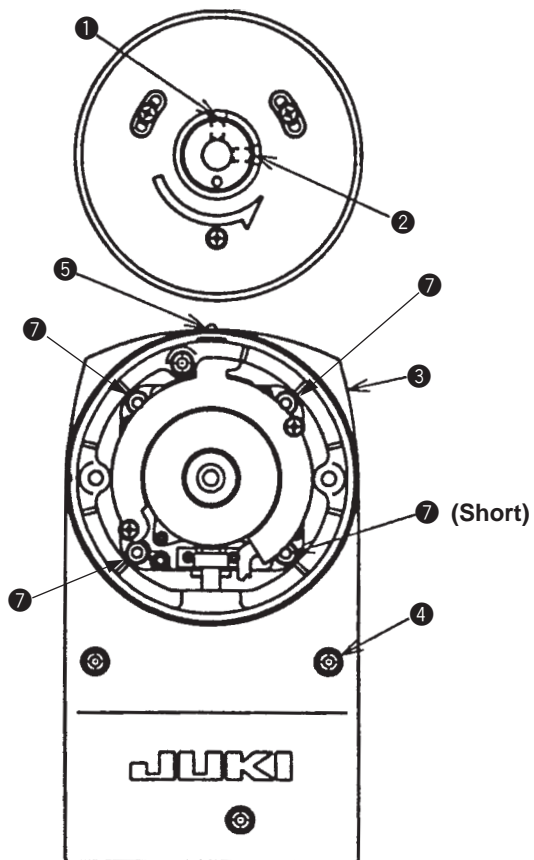
Caution in assembling

- 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.
- Oil used in gear box
Part No. : MDFRX2700C0

(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 ③ 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 pulley cover ③, tighten the setscrews in the order of screw No. 1 ① and screw No. 2 ② at the position where a clearance of approximately 1 mm is provided between the handwheel and pulley cover ③.

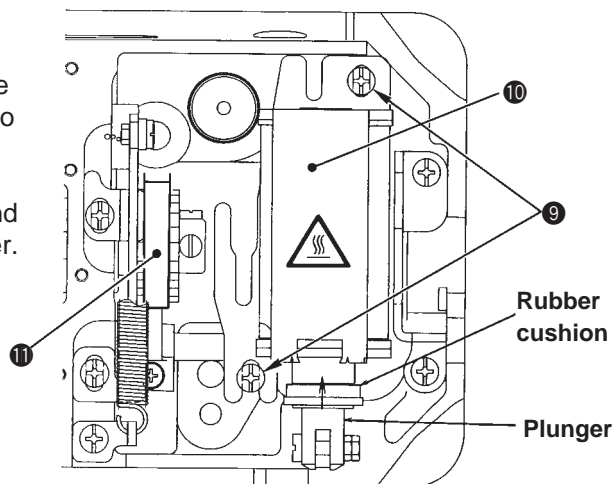


Caution in disassembling	Caution in assembling
<p>(Caution)</p> <ol style="list-style-type: none"><li data-bbox="209 297 762 405">1. There is the release section A at the shaft section of the encoder case B in the rear of the motor.<li data-bbox="209 416 762 607">2. When the handwheel is held removed, dust or the like enters from the part and the sensor section is damaged. As a result, malfunction of the motor may be caused.	<p>(Caution)</p> <ol style="list-style-type: none"><li data-bbox="853 297 1401 367">1. Take care of the dust when replacing the motor and install the handwheel quickly.<li data-bbox="853 378 1401 528">2. When storing the motor itself for a long period, install the encoder cover (installed at the time of delivery of the motor).<li data-bbox="853 539 1401 689">3. Motor setscrew ⑦ (1 pc.) only located in the lower section on the right-hand is shorter in length. Be careful when assembling.

(3) Replacing the timing belt

Procedures of disassembling/assembling

- * The timing belt ⑪ (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 4. - (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. 3) Pressing timing belt ⑪ in the right-hand direction, turn timing belt ⑪ to the front by fingers, then timing belt ⑪ can be removed.
 - 4) Replace timing belt ⑪ with a new one and install again by reversing the above order.



(4) Removing/installing the gear box cover

Procedures of disassembling/assembling

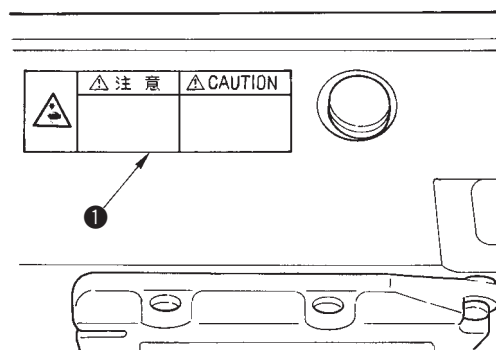
Do not open the gear box cover unless a trouble occurs.

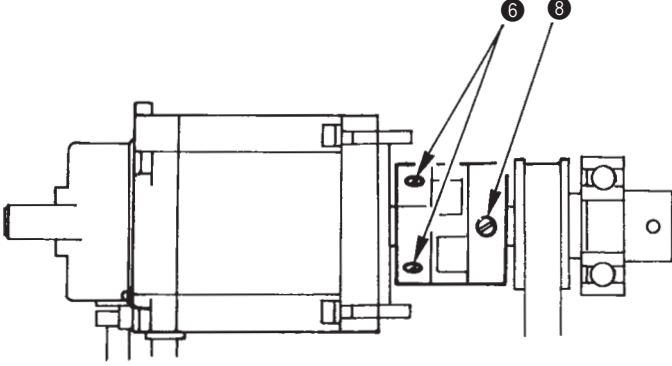
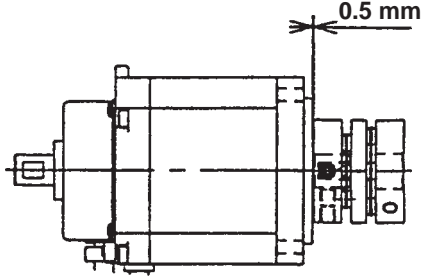
When it is compelled to open it, take care of the following matters.

* Prepare a new gear box large 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) When peeling off safety label ① in the front of machine bed, there is a rubber plug inside. Remove the rubber plug and fill the gear box with 190 cc of (JUKI genuine) Defrix Oil No. 2.

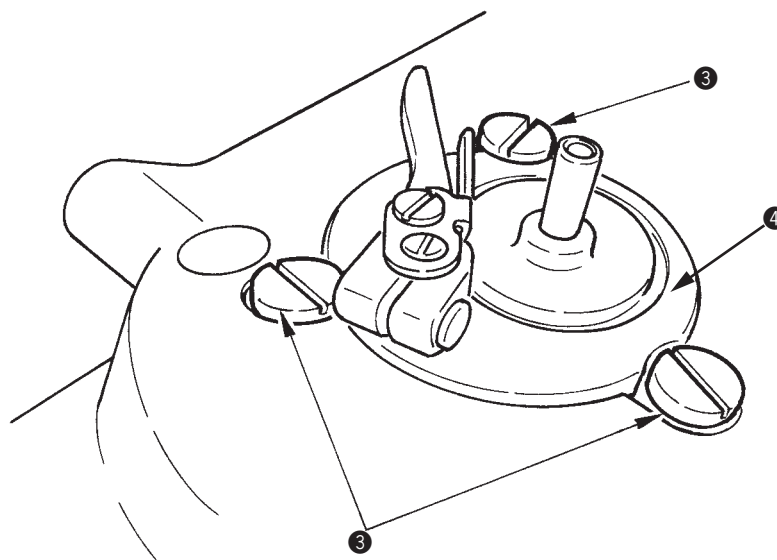
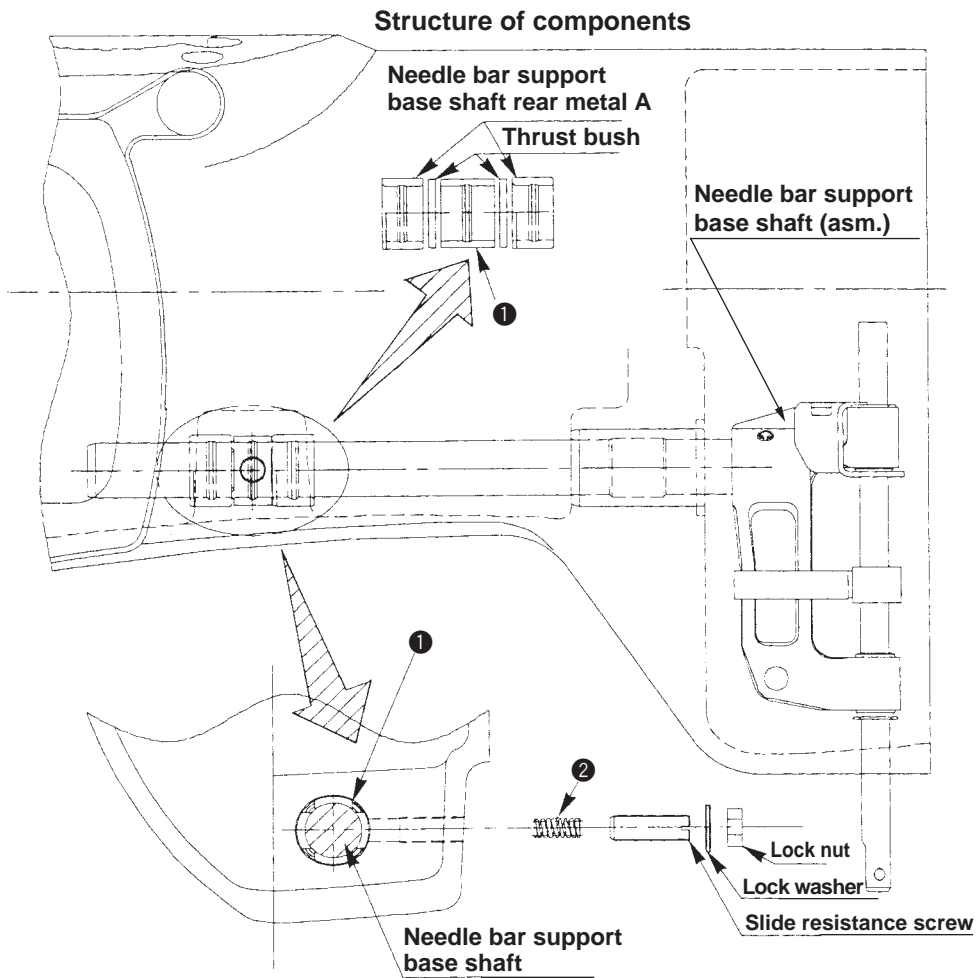


Caution in disassembling	Caution in assembling
<p>○ When removing/installing the motor, unless the motor is defective, loosen coupling setscrew ⑧ without loosening coupling setscrews ⑥ and remove the motor with the coupling installed.</p> 	<p>○ When the motor is separated from the coupling, set the clearance 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
<p>(Caution) Do not open the gear box unless a trouble occurs.</p> <p>* JUKI genuine oil Defrix Oil No. 2 : MDFRX270000</p>	<p>○ Replace the packing with a new one.</p>

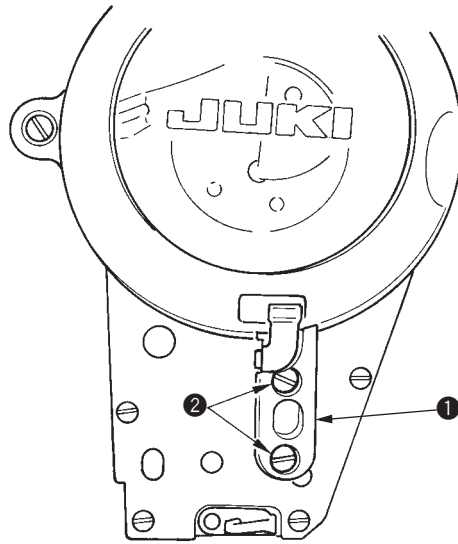
(5) Disassembling/assembling the needle bar support base shaft (asm.)

Procedures of disassembling/assembling

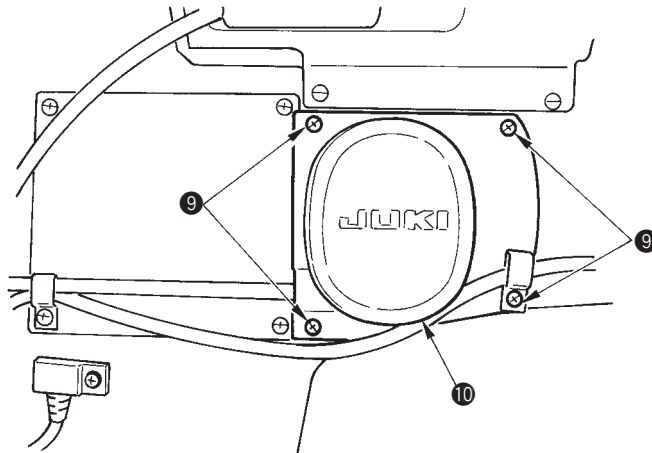
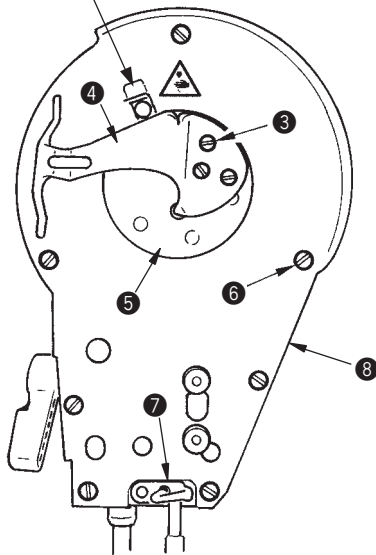


Caution in disassembling	Caution in assembling
<p>* Slide resistance spring ② which greatly affects the needle rocking performance is mounted in needle support base shaft rear metal B ①. Do not perform the adjustment or the like unless it is necessary.</p> <p>< From disassembling to assembling the needle bar support base shaft (asm.)></p> <p>1) Removing the outer components</p> <p>1. Removing the bobbin winder unit Loosen three fitting screws ③ in the bobbin winder unit and remove bobbin winder unit ④.</p>	

Procedures of disassembling/assembling

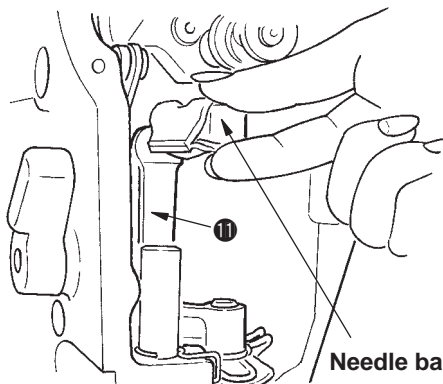
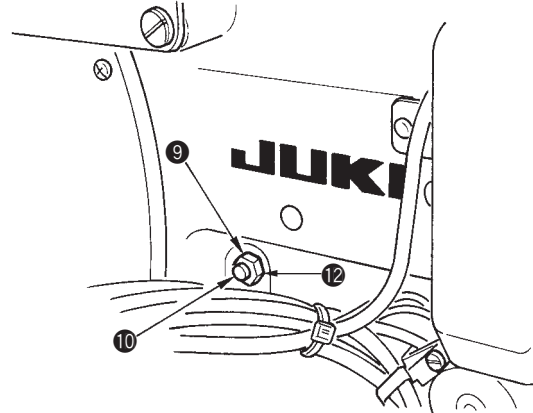
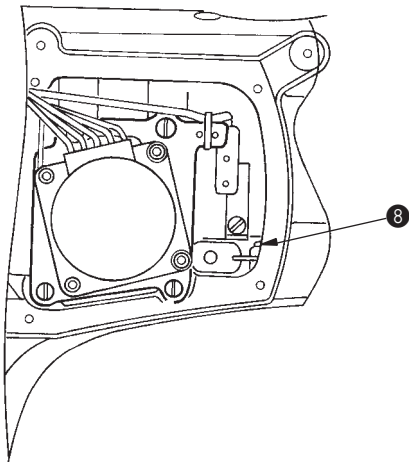
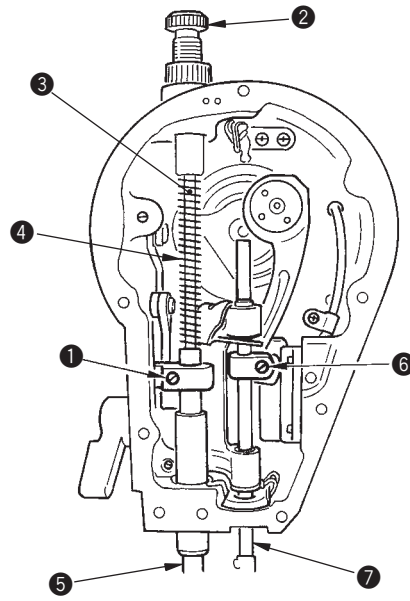


Knife

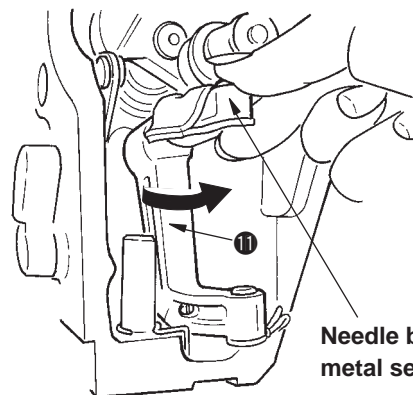


Caution in disassembling	Caution in assembling
<p>2. Removing the thread take-up cover base Loosen two fitting screws ② in thread take-up cover base ① and remove thread take-up cover base ①.</p> <p>3. Removing the thread take-up Loosen three setscrews ③ in the thread take-up and remove thread take-up ④ and thread take-up counter weight ⑤.</p> <p>4. Removing the face plate Loosen 7 setscrews ⑥ in the face plate and setscrew ⑦ in the face plate thread guide, and remove face plate ⑧.</p> <p>5. Removing the needle rocking motor cover Loosen four setscrews ⑨ in the needle rocking motor cover and remove needle rocking motor cover ⑩.</p>	<p>○ Be careful of the thread take-up knife.</p>

Procedures of disassembling/assembling



Needle bar upper metal section



Needle bar upper metal section

Caution in disassembling

Caution in assembling

2) Removing the presser bar components

Remove the presser foot setscrew and remove the presser foot. Loosen presser bar guide bracket screw ❶ and remove presser spring regulator ❷, presser guide bar ❸, presser spring ❹ and presser bar ❺.

3) Removing the needle bar components

Remove the needle clamp screw, and remove the needle and the needle bar thread guide.

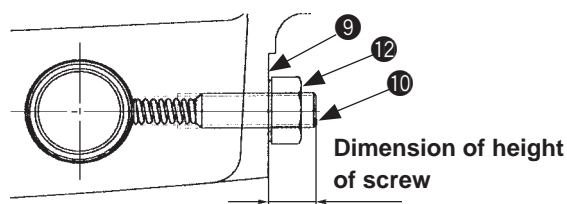
Loosen needle bar guide bracket screw ❻ and remove needle bar ❼.

4) Releasing the joint of the needle bar support base shaft

Insert a screwdriver from the bobbin winder unit section and loosen setscrew ❸ in the needle bar support base shaft bracket.

5) Releasing the slide resistance screw

Make sure of the dimension from the processed plane of machine arm ❾ to the head of screw ❿ using the vernier calipers. Loosen nut ⓫ and release the resistance of the slide release spring.



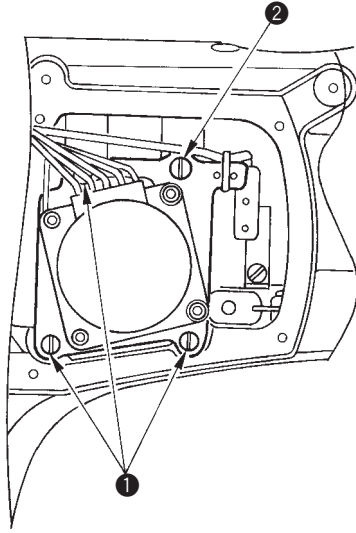
6) Remove the needle bar support base from the machine arm

Hold the needle bar upper metal section of needle bar support base ❾ and draw out needle bar support base ❾ from the machine arm in such a way as pulling the metal section to the front and turn it clockwise.

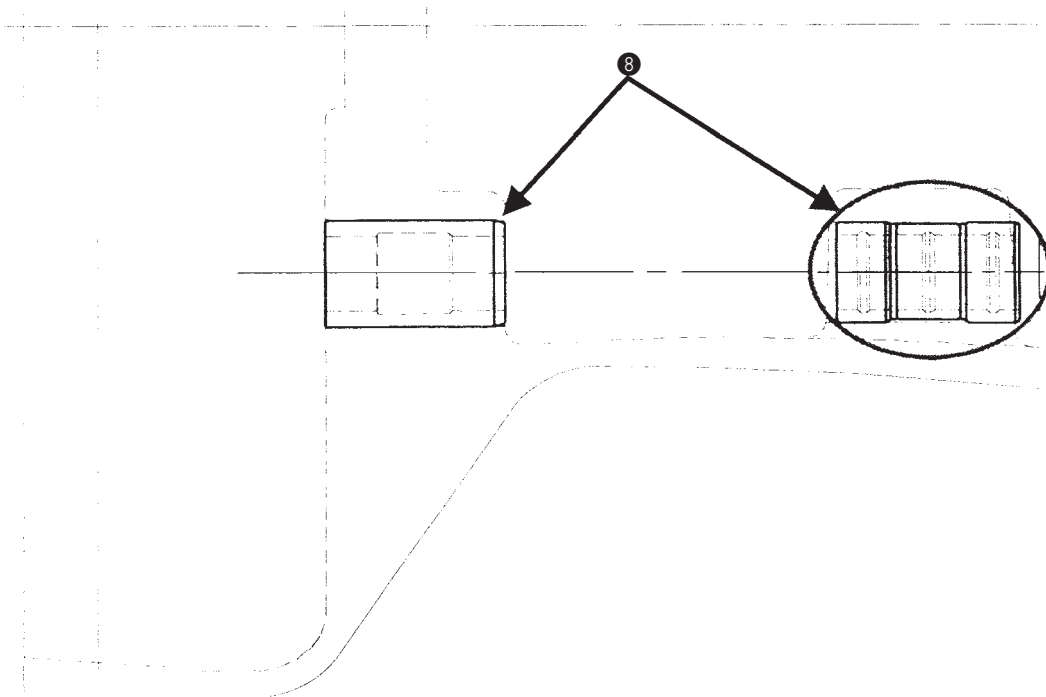
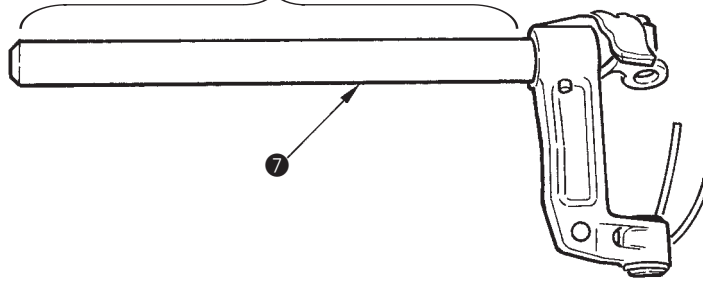
* When needle bar support base ❾ components are not replaced, perform assembling by reversing the order of removing without proceeding to further steps.

* When needle bar support base ❾ components are replaced, proceed to the work of steps after 7).

Procedures of disassembling/assembling

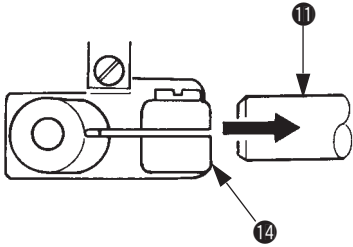
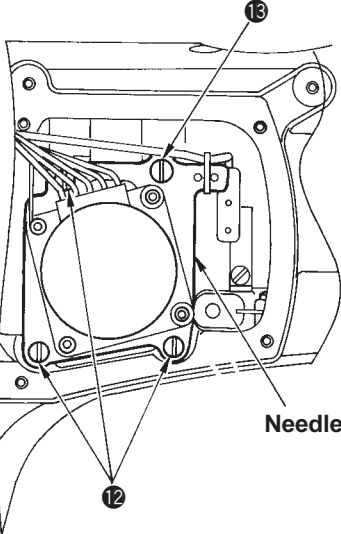
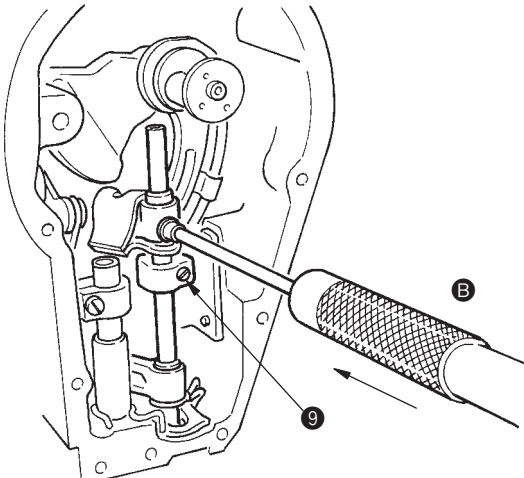
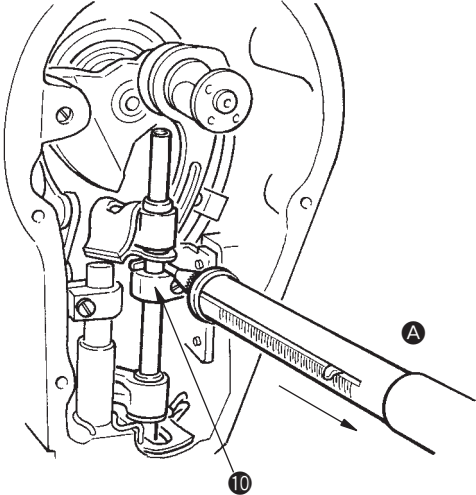
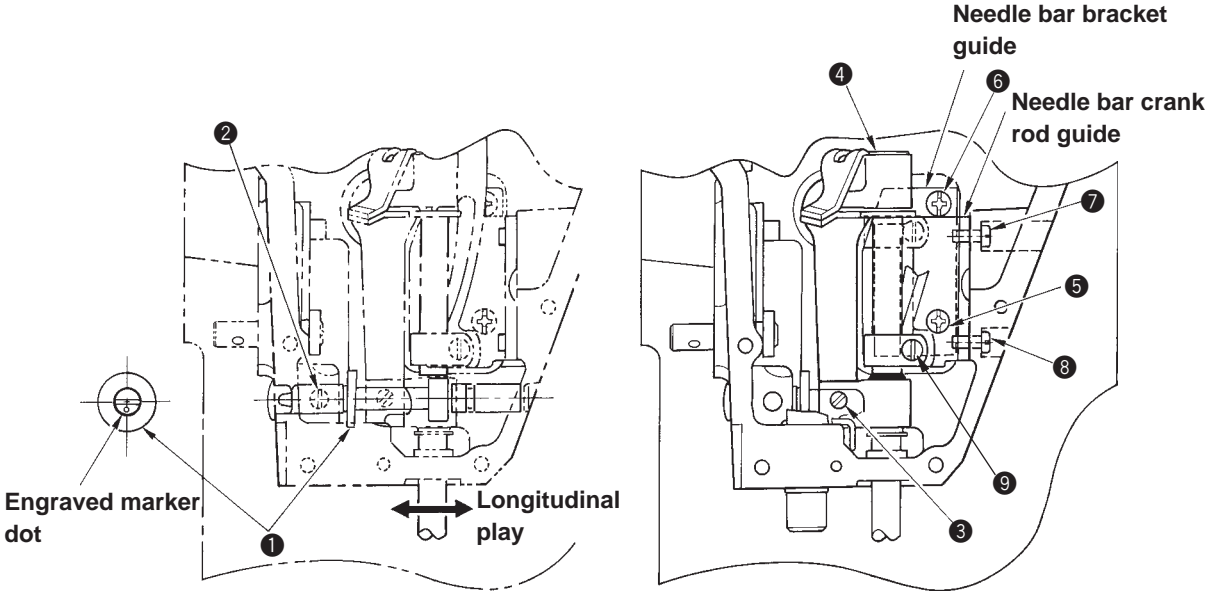


Apply grease.



Caution in disassembling	Caution in assembling
<p>7) Removing the needle rocking motor unit. Remove screws ① and ②, draw out needle bar support base shaft ⑦ from the needle bar support base shaft bracket, and remove the needle rocking motor unit from the machine arm.</p> <p>8) Applying grease in the needle support base shaft front and rear bushings Fill the whole of the support base shaft of needle bar support base shaft (asm.) ⑦ and the grease groove in needle bar support base shaft front and rear bushings ⑧ in the machine frame with exclusive grease (Part No. : 40006323) supplied as accessories.</p>	<p>○ Refer to (5) Applying the exclusive grease of 5. MAINTENANCE as well.</p>

Procedures of disassembling/assembling

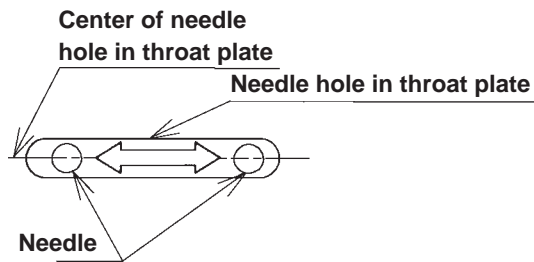


Caution in disassembling

Caution in assembling

9) Adjusting the longitudinal position of the needle bar

1. Attach the throat plate, attach a needle to the needle bar, lightly press support base shaft guide pin B ❶ so as to remove the play of the needle bar, and temporarily tighten setscrew ❷ in the support base shaft guide pin B. Further, temporarily adjust the height of the needle bar at the position of the engraved marker line 1 of timing gauge E. (Tighten setscrew ❸ in the needle bar bracket.)
Tighten setscrew ❹ in the support base shaft guide shaft so that the center of needle hole in the throat plate aligns with the needle entry (center of needle hole).



10) Adjusting the lateral position of the needle bar

1. Move bar support base shaft (asm.) ❹ to the right or left, rotate needle bar support base shaft guide pin B ❶ so that the center of right and left motion is obtained and there is no longitudinal play, and tighten setscrew ❷ in the support base shaft guide pin B.
2. Move needle bar support base shaft (asm.) ❹ to the right or left, and tighten setscrews ❺ and ❻ in the needle bar bracket guide when the center is obtained while turning the handwheel.
3. Tighten setscrews ❼ and ❽ in the needle bar crank rod guide when the center is obtained while turning the handwheel.
Apply exclusive grease supplied as accessories to the slide parts.
(For the details of applying section, refer to the item of (5) Applying the exclusive grease of 5. MAINTENANCE.)

11) Checking the lateral slide torque of the needle bar support base

1. Check that the torque of pushing and pulling is less than 5N within the range of 10 mm of needle bar rocking.
Measure at ❶ and ❷ sections using the spring balancer as shown in the figure.

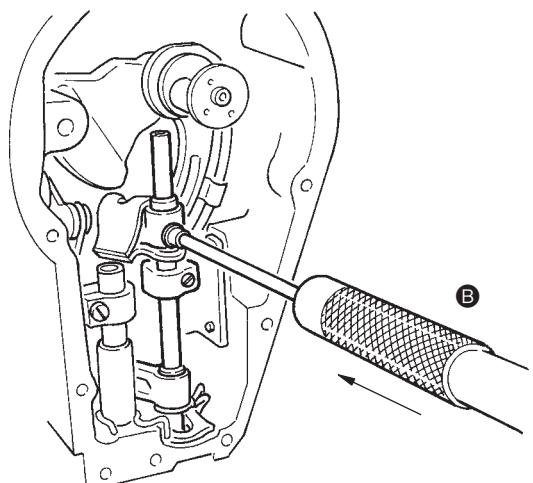
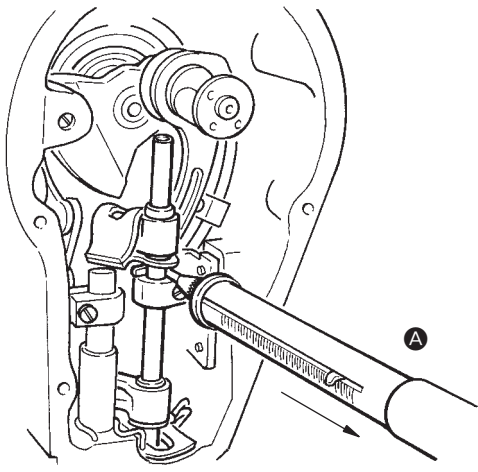
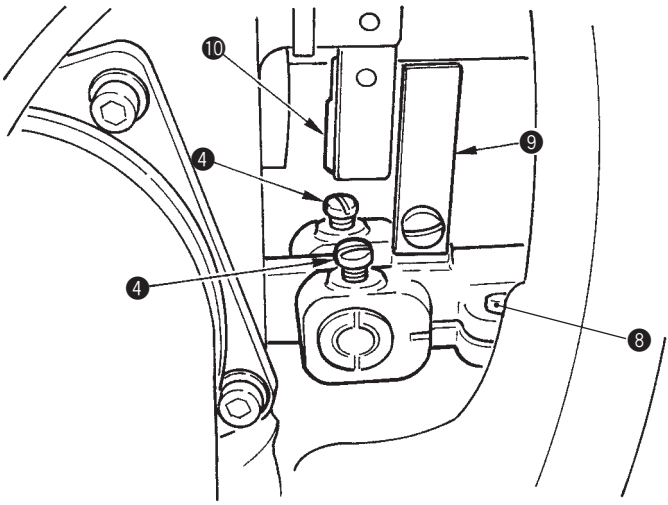
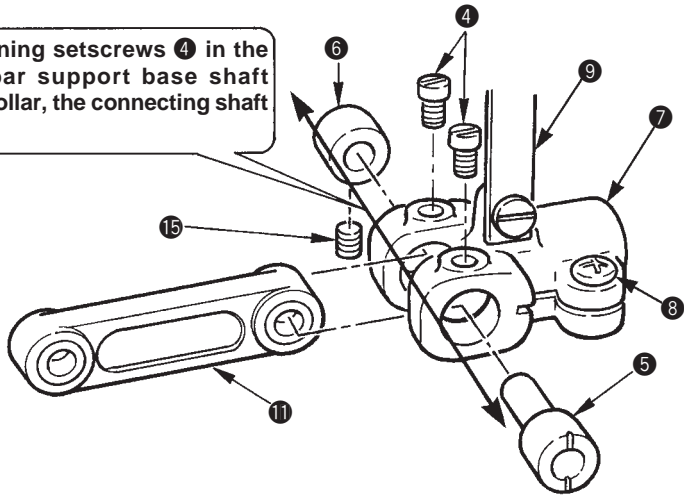
12) Assembling the needle rocking motor unit

1. Removing the needle rocking motor unit
Refer to "1) through 3) of 3. - (6) Adjusting the origin of the needle rocking motor.
2. Adjusting the installation of the needle rocking motor unit
(In case of a new needle rocking unit or re-selection of needle rocking components)
 - 1) Move needle bar support base shaft ❾ to the right side.
 - 2) Temporarily tighten needle rocking motor unit setscrew A ❿ after installing the needle rocking motor unit to the arm installing screw section, and temporarily tighten three motor unit setscrews B ⓫. Then securely tighten in the order of setscrew A ❿ and setscrews B ⓫.
 - 3) Insert needle bar support base shaft ❾ into installing hole in the needle rocking link bracket ⓬.

- It is easy to obtain the center while temporarily tightening setscrews ❺ and ❻ in the needle bar bracket guide and gradually increasing the tightening pressure.
- It is easy to obtain the center while temporarily tightening setscrews ❼ and ❽ in the needle bar crank rod guide and gradually increasing the tightening pressure.
- When the torque is more than 5N within the range of 10 mm of the needle bar rocking, re-adjust from the step 10).
- When the machine is operated with abnormal torque, worn-out or step-out of motor will result.

Procedures of disassembling/assembling

By loosening setscrews 4 in the needle bar support base shaft bracket collar, the connecting shaft slides.



Caution in disassembling

- 4) Loosen setscrews ④ in the needle bar support base shaft bracket collar. By loosening setscrews ④ in the needle bar support base shaft bracket collar, connecting shaft ⑤ slides to the right or left.
- 5) Perform centering while sliding the needle bar support base shaft to the right or left, and set the shaft while temporarily tightening setscrews ④ in the needle bar support base shaft bracket.

<Connecting shaft : disassembling and replacement>

1. In order to improve the needle rocking quality, connecting shaft ⑤ is classified as the selective part.
Select connecting shaft ⑤ which smoothly moves without any play.

No.	Part No.	Name of part	Shaft diameter
⑤	40008119	Connecting shaft A	Large
	40008120	Connecting shaft B	Medium
	40008118	Connecting shaft C	Small

2. For coupling connecting shaft ⑤, insert needle rocking link ⑪ between connecting shaft ⑤ and connecting shaft collar ⑥, and tighten setscrew ⑮ in the connecting shaft collar so that there is no play.

13) Adjusting needle rocking "0" position

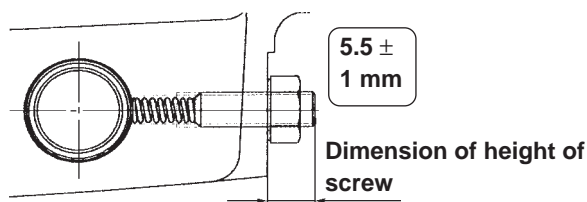
1. Set the mode to the hook adjusting mode (refer to (12) Adjusting the needle-to-hook timing and the needle guard) of 3. STANDARD ADJUSTMENT.), determine needle entry "0", and tighten setscrew ⑧ in the needle bar support base bracket.

14) Checking the lateral torque of the needle bar support base

Check that the torque of pulling and pushing is less than 10N within the range of 10 mm of the needle bar rocking.
Measure at ① and ② sections using the spring balancer as shown in the figure.

15) Tightening the slide resistance screw

1. Adjust the height of the slide resistance screw so that it becomes the height of the spring measured in advance (factory-adjusted value) at 5) Releasing the slide resistance screw or the aimed value of pulling and pushing is 14N to 15N (11N to 18N in the whole region) within the range of 10 mm of the needle bar rocking at ① and ② sections using the spring balancer as shown in the figure.
In addition, the height of the screw can be adjusted to 5.5 ± 1 mm



16) Assembling the outer components

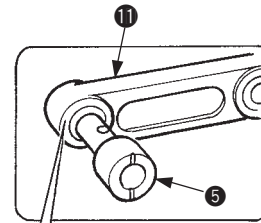
1. Assemble the outer cover removed.

17) Adjusting the hook and the height of the needle bar

1. Perform adjusting of the height of the needle bar, and needle-to-blade point of the hook in the hook adjusting mode (refer to (12) Adjusting the needle-to-hook timing and the needle guard of 3. STANDARD ADJUSTMENT) using timing gauge E.

Caution in assembling

- When centering is not obtained, needle bar support base bracket ⑦ moves, and the lateral needle rocking torque becomes heavy when tightening screw ⑧ in the needle bar support base bracket in the next process, resulting in step-out.
- When tightening setscrews ④ in the needle bar support base shaft bracket collar, be careful so as not to damage sensor slit ⑨ or origin sensor ⑩.



Apply exclusive grease to the grooves of the holes in connecting shaft ⑤ and needle rocking link ⑪.

- When the torque becomes more than 10N within the range of 10 mm of needle bar rocking, perform re-adjustment from step 12).
- When the machine is operated with the abnormal torque, worn-out or step-out will be caused.
- When the adjustment is performed with the value other than the specified value, problems such as step-out, deterioration of sewing performance, worn-out, etc. can be considered. Be sure to use the machine with the specified value.

5. MAINTENANCE

(1) Replacing procedure of the printed circuit board

1. FLT printed circuit board

- 1) Draw out connector cords of CN1, CN2 and CN3 on FLT circuit board.
- 2) Remove green/yellow cord attached to FLT circuit board from the screw of earth mecca at the bottom of the box.
- 3) Remove 6 screws on the side of the pedal sensor side from the outside.
- 4) Assemble by reversing the above removing order.

2. PWR printed circuit board

- 1) Remove FLT printed circuit board by the aforementioned removing procedure of FLT printed circuit board.
- 2) Remove two green/yellow cords attached to PWR printed circuit board from the screw of earth mecca at the bottom of the box.
- 3) Draw out connector cords of CN11, CN25, CN23, CN13, CN22, CN21 and CN38 on PWR printed circuit board.
- 4) Draw out connector cord of CN44 on CTL printed circuit board.
- 5) Remove 9 screws on PWR printed circuit board from the inside of the box.

(Caution) It is not necessary to remove FLT printed circuit board in case of the simple substance of the box.

Remove connectors and FG wire, and replace PWR printed circuit board after removing the front cover.

- 6) Assemble by reversing the above removing order.

3. CTL printed circuit board

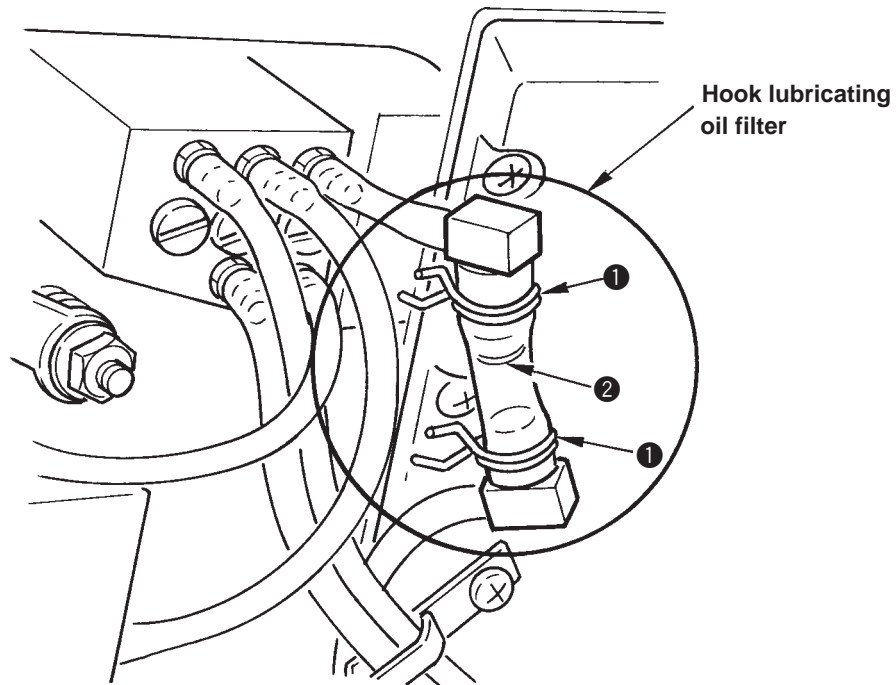
- 1) Draw out all inserted connector cords on CTL printed circuit board.
- 2) Take the draw hook and remove the board together with the rear cover from the main unit of the box.
- 3) Remove 7 screws on CTL printed circuit board.
- 4) Assemble by reversing the above removing order.

(2) Maintenance of the hook lubricating pipe oil filter

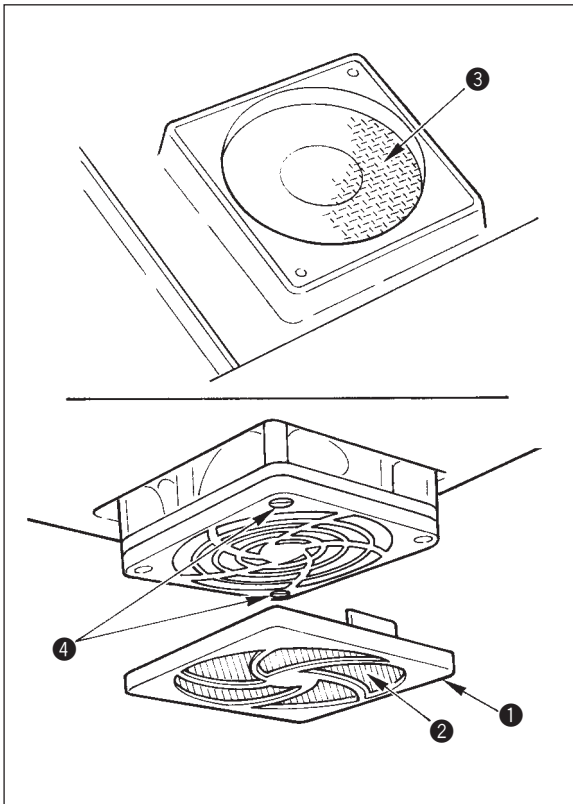
It is recommended to periodically clean the inside of the filter of the hook lubricating pipe oil filter.

Remove pipe stop ring (large) ① and remove thread waste or the like collected to wire netting section ②.

* Be careful of the damage of the lubricating pipe or the like at the time of maintenance of the filter.



(3) Cleaning the cooling fan



1. Cloth waste or the like gathers around the cooling fan filter section installed on the lower part of the under cover, and there is a case where cooling effect is decreased.
2. When cloth waste or the like gathers, remove fan cover ① and remove cloth waste or the like gathered around filter section ②.
3. Besides, when cloth waste or the like gathers around filter section ③ as well, remove filter setscrew ④ and remove cloth waste or the like gathered around filter section ③.

(4) Applying the exclusive grease

- * Exclusive grease (40006323) is applied to the portions other than the lubricating portions to which lubrication is necessary
- 1. 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).
- 2. For applying (filling) grease, it is convenient to apply it using the exclusive lubricator (GDS01007000).

[Note when applying grease]

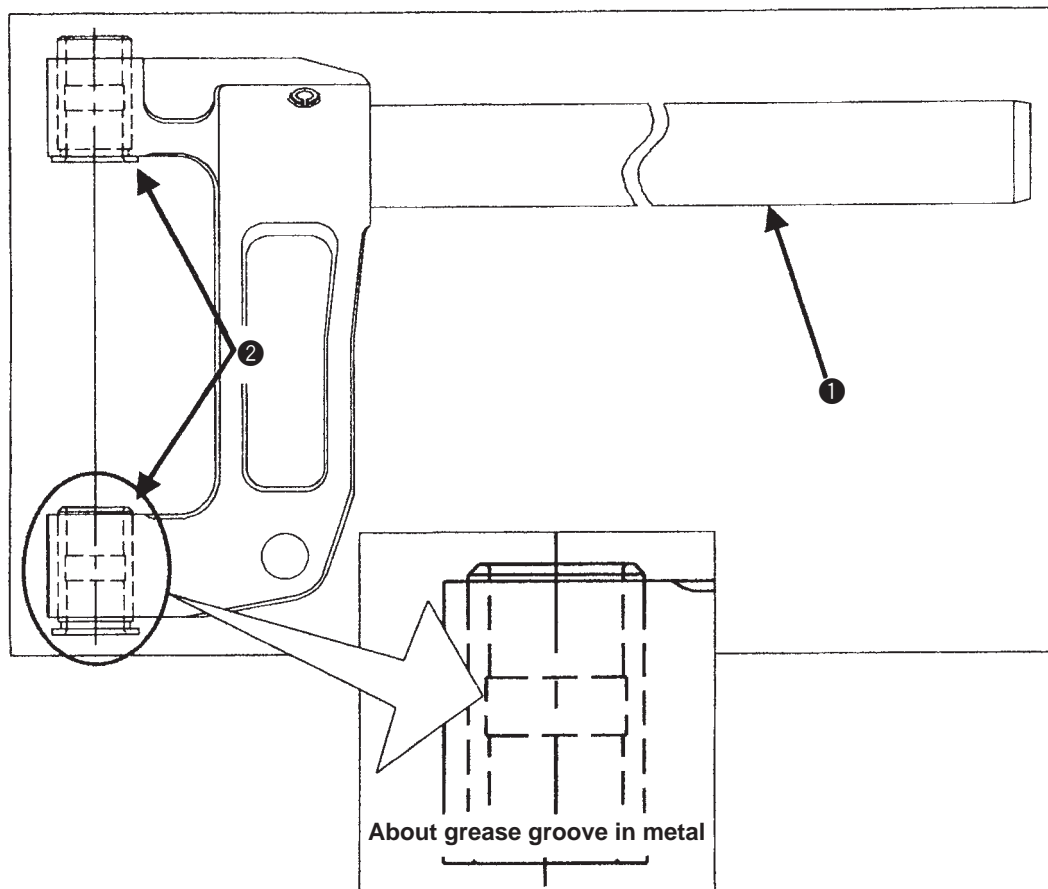
1) Needle bar metal section of the dry-head type machine heads (ADS and ADU)

There are grease grooves in needle bar upper and lower metals ② of the metal section of needle bar support base D (asm.) ①.

Draw out the needle bar and fill the grease grooves with the exclusive grease supplied as accessories.

- * When filling grease, be careful that the inner surfaces of needle bar upper and lower metals ② are not damaged and dust or the like is not mixed.

When newly filling up the grease, make the sewing machine run idle at low speed at 10-second intervals to discharge excess grease which occurs on the needle bar at this time and wipe the grease. Perform this operation several times and use the sewing machine when the excess grease does not occur.



2) Mechanism section of the face plate section

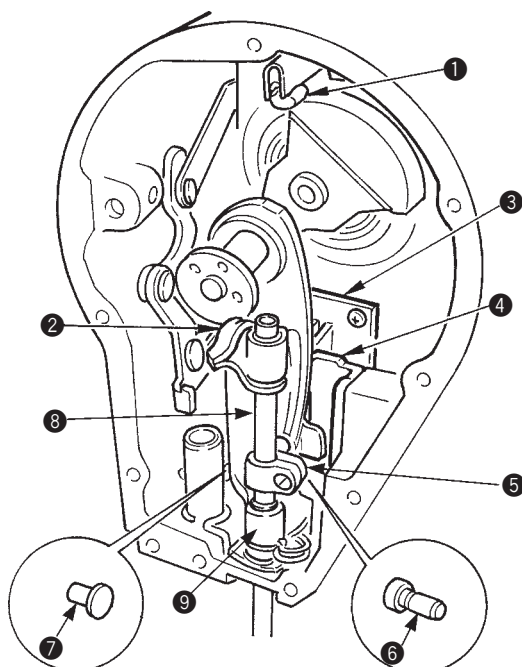
Apply the exclusive grease supplied as accessories to all components of the rocking mechanism in the face plate section.

However, do not apply grease to the needle bar of lubricating type (ASS and ASU).

⇒ When applying grease, the needle bar is stained in black and the sewing product is in danger of being stained.

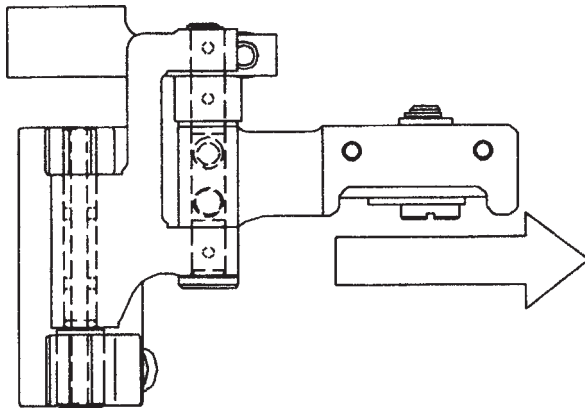
Apply the exclusive grease supplied as accessories to the whole moving components of the mechanism.

No.	Name of part	Lubricating oil	Part No.	Remarks
①	Needle bar crank rod oil wick	Apply JUKI genuine No. 1 oil.	MDFRX1600C0	Excluding dry-head type
②	Needle bar support base shaft upper metal felt	Apply JUKI genuine No. 1 oil.	MDFRX1600C0	Excluding dry-head type
③	Needle bar bracket guide	Exclusive grease	40006323	
④	Needle bar crank rod guide	Exclusive grease	40006323	Apply grease so that the hole for screwdriver of needle bar crank rod guide is filled up as the standard.
⑤	Needle bar bracket	Exclusive grease	40006323	
⑥	Needle bar support base guide pin A	Exclusive grease	40006323	
⑦	Needle bar support base guide pin B	Exclusive grease	40006323	
⑧	Needle bar	Exclusive grease	40006323	Dry-head type only
⑨	Needle bar support base shaft upper/ lower metals	Exclusive grease	40006323	Dry-head type only

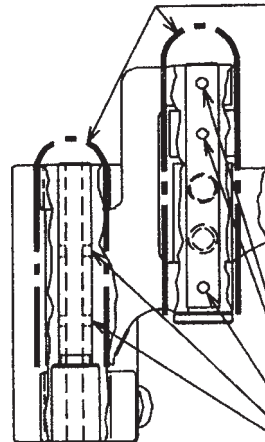


3) Feed mechanism section

Feed mechanism of ASU and ADU

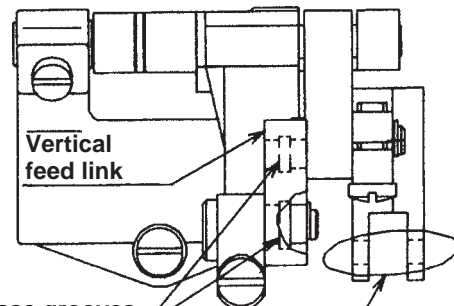


Apply exclusive grease to whole of feed base shafts A and B.



Oiling holes (fill the holes with exclusive grease.)

Apply exclusive grease supplied as accessories.
 1. Fill whole of feed base shafts A and B, and oil holes
 2. Inside of grease groove of bearing of vertical feed link



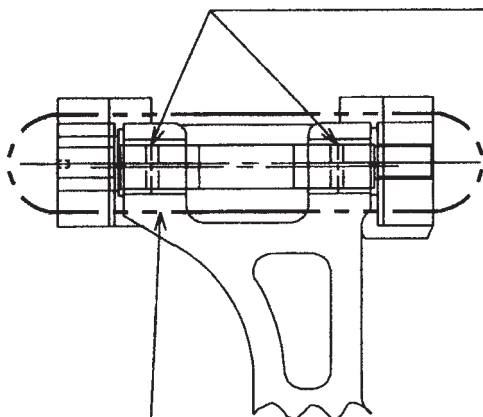
Vertical feed link

Grease grooves

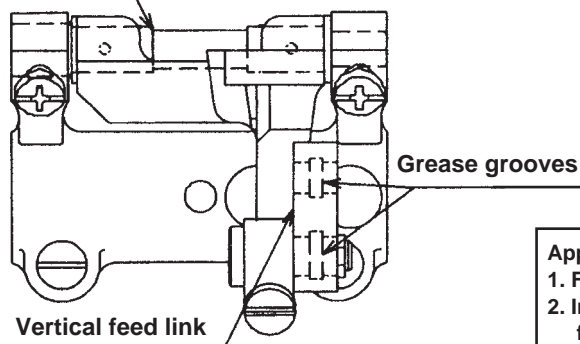
Apply exclusive grease to link coupling section of vertical feed arm.

Feed mechanism of ASS and ADS

Oiling holes (fill exclusive grease supplied as accessories.)



Apply exclusive grease supplied as accessories to whole of feed base shaft.



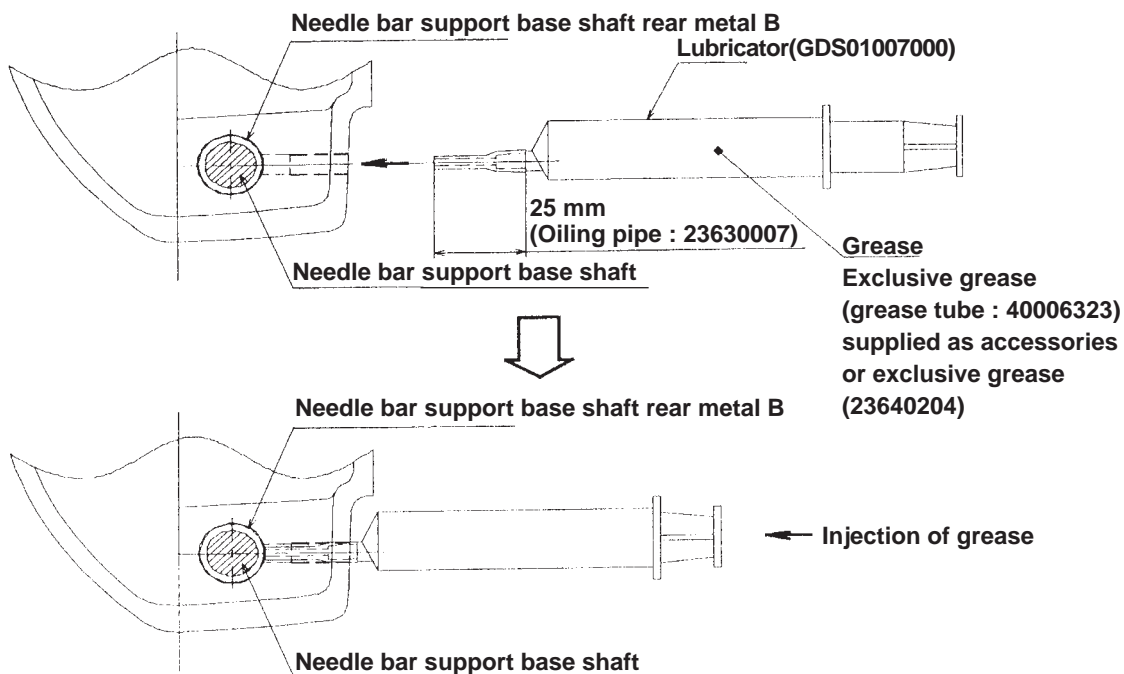
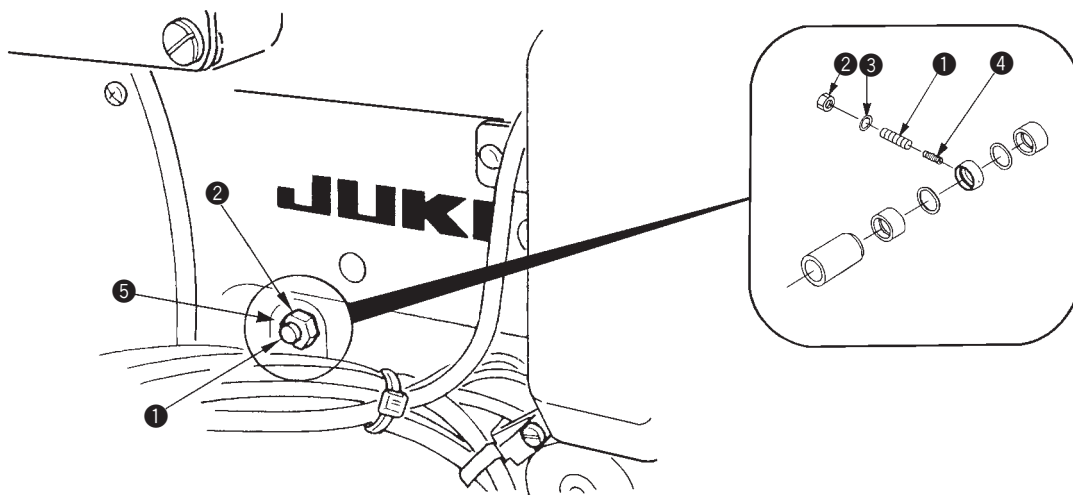
Vertical feed link

Grease grooves

Apply exclusive grease supplied as accessories.
 1. Fill whole of feed base shaft and oil holes.
 2. Inside of grease groove of bearing of vertical feed link

4) Needle rocking slide resistance section

1. Spring ④ for the slide resistance is placed in the rear of setscrew ① and the slide resistance is determined by positioning screw ① at the time of production. Accordingly, measure the dimension from lock nut ② to the top end of screw ① before loosening setscrew ①.
2. Loosen lock nut ② and turn setscrew ① to remove setscrew ①, lock nut ② and lock washer ③.
3. Fill the inside of the metal from the screw hole with the exclusive grease supplied as accessories using the lubricator.
4. Stop lock nut ② and setscrew ① at the dimension measured in the aforementioned step 1.



(5) Hook shaft gear

1. Exclusive grease is filled in the bevel gear section. However, when filling grease in case of maintenance or the like, remove the filled grease once and fill grease (EXSON MOBIL LISTAN 2) of 15 cc.

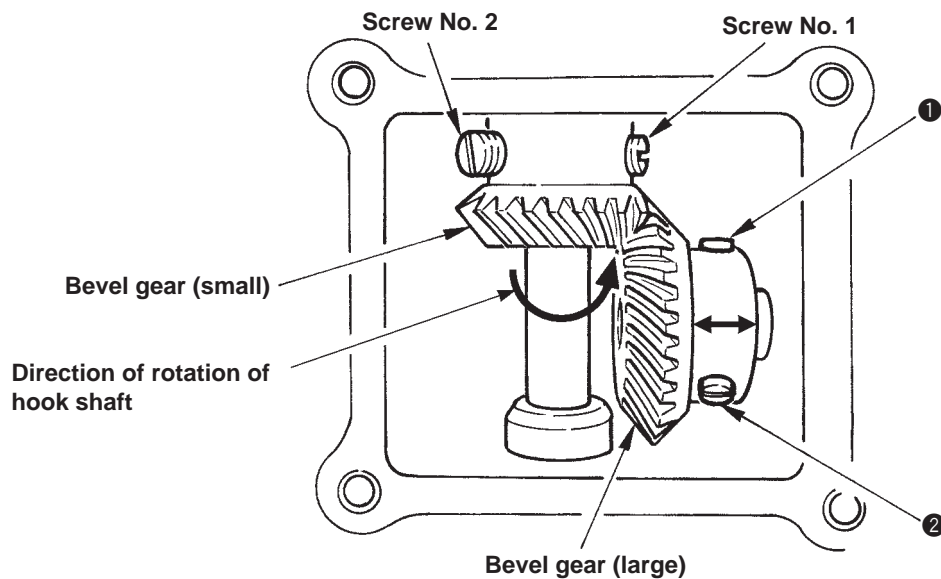
(Caution) 1. Heating, noise or seizure will be caused depending on the amount of grease. Keep filling of 15 cc (approximately 13.8 g).

2. **Do not use the packing which has been removed once and replace it with a new one.**
Packing Part No. : 23526809

2. In case of removing the play at hook shaft due to the play at bevel gear

When backlash of the hook shaft is large while fixing the hook driving shaft, it is considered that backlash of the bevel gear is increased. When closing backlash, loosen the screws in the order of screw No. 2 ② in the bevel gear (large), screw No. 1 ① in the bevel gear (large) and move the gear to the right or left to close the play. When tightening them, tighten in the order of screw No. 1 ① in the bevel gear (large) and screw No. 2 ② in the bevel gear (large).

(Caution) When the backlash is excessively closed, heating or noise will be caused. When the backlash is excessively large, sewing trouble will be caused. Tighten screws at the backlash of approximately 0.1 mm.



(6) Adjusting the needle rocking link

The needle rocking link is handled as the selective parts in order to improve the quality performance of needle rocking. When replacing the parts, take care of the selecting procedure of the selective parts.

1. For needle rocking connecting shaft ❶, there are four kinds from A through D which are different in outer diameter tolerance respectively.

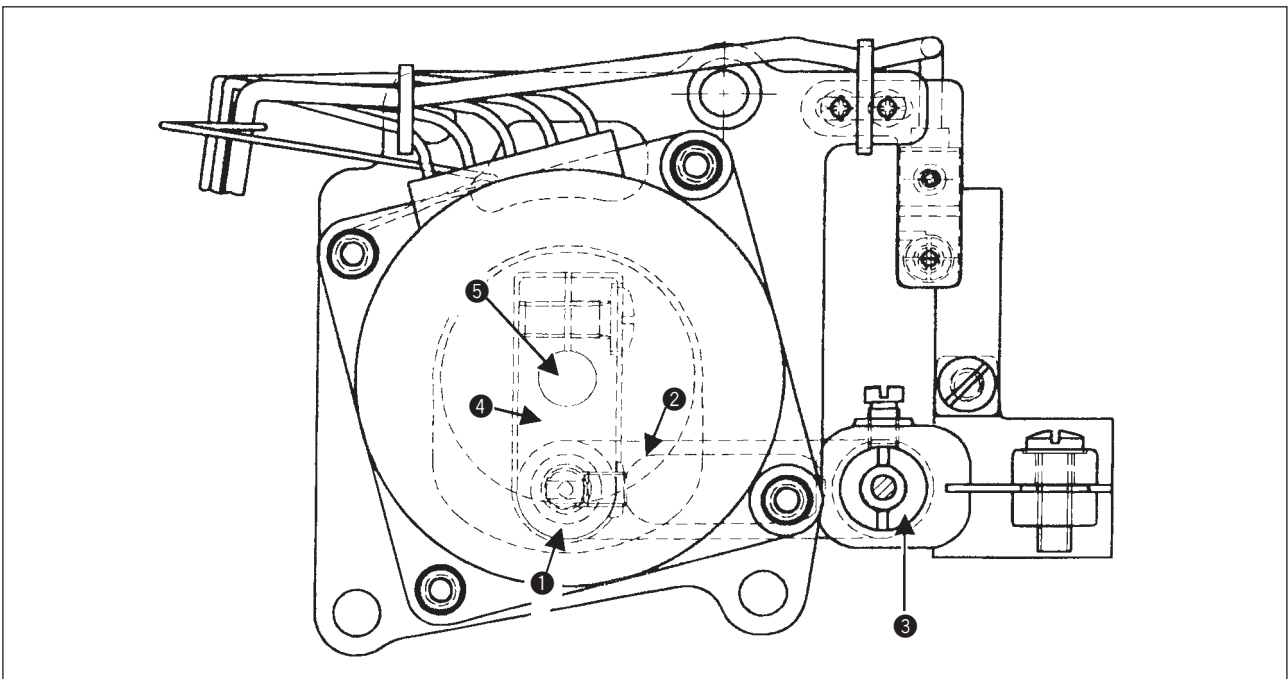
Select the shaft, the play of which is smaller in terms of the hole in needle rocking link ❷.

Name of part	Part No.	Tolerance
Needle rocking connecting shaft A	23544109	Maximum
Needle rocking connecting shaft B	23544208	Large
Needle rocking connecting shaft C	23544307	Medium
Needle rocking connecting shaft D	23544802	Small

2. For needle bar support base shaft bracket pin ❸, there are three kinds from A through C which are different in outer diameter tolerance respectively. Select the pin, the play of which is smaller in terms of the connecting shaft collar hole.

Name of part	Part No.	Tolerance
Needle bar support base shaft bracket pin A	40008119	Large
Needle bar support base shaft bracket pin B	40008120	Medium
Needle bar support base shaft bracket pin C	40008121	Small

3. Reduce the play as small as possible in the shaft direction of motor link ❹ and needle rocking link ❷, and assemble them so that needle rocking link ❷ rotates by light weight when holding motor link ❹ by hand.
4. There are a grease groove at the bush hole section of needle rocking link ❷, a grease hole in needle rocking connecting shaft ❶, and a grease hole in needle bar support base shaft bracket pin ❸. Fill grease (exclusive grease : Part No. 23640204) when replacing them. Apply grease to the outer diameter section as well as the inner diameter section of the rotating parts as well.
5. When installing motor link ❹ to motor shaft ❺, make the end plane of motor shaft ❺ flush with motor link ❹ and fix the link.



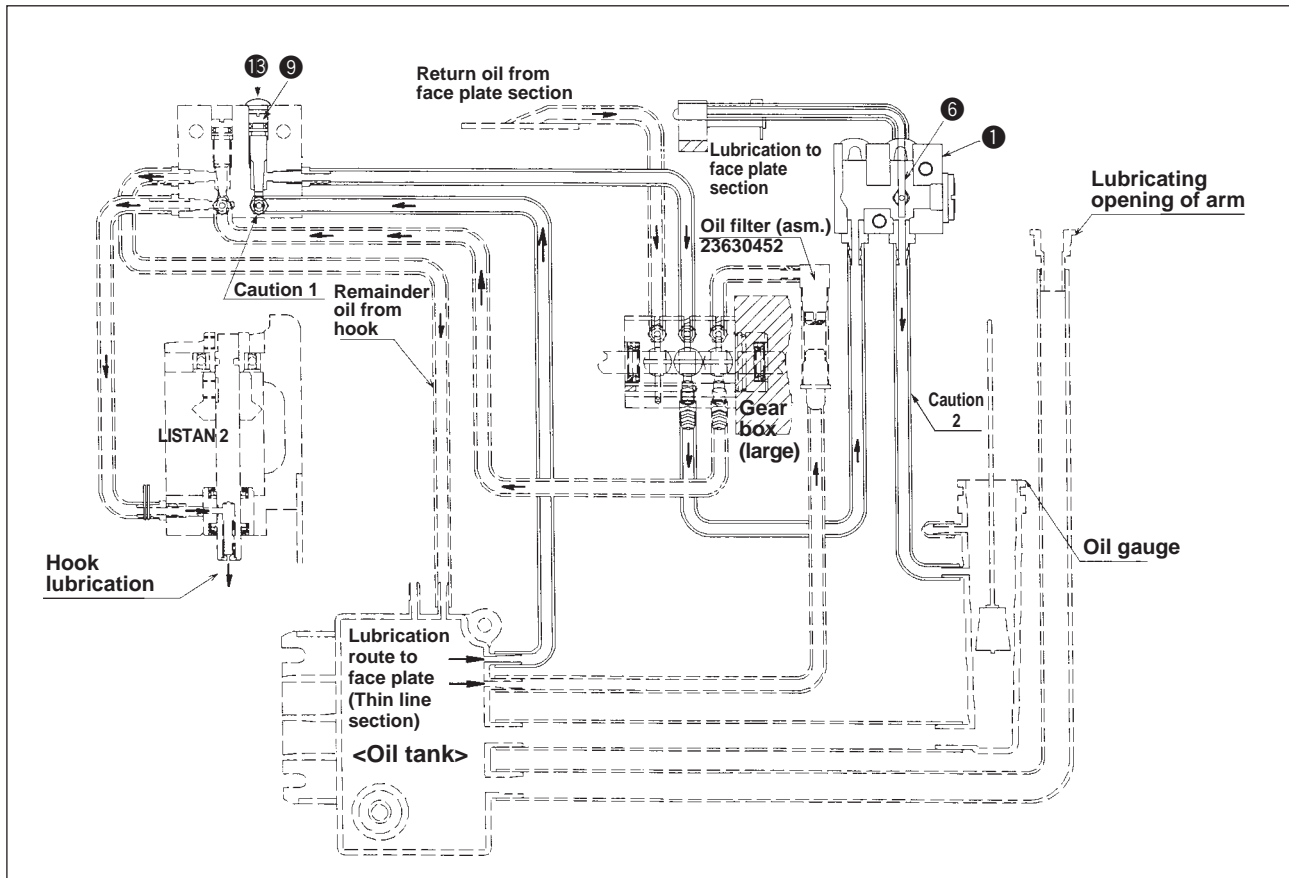
(7) Lubricating to face plate section (ASS and ASU only)

Amount of lubricating to the face plate section has been factory-adjusted and the adjustment is not necessary. When performing adjustment after disassembling and assembling, perform checking and adjustment below.

* minute-quantity lubricating system by means of oil wick is utilized for the lubrication in the face plate section. Oil is supplied to face plate section lubricating tank ① which is installed in the rear of the back of machine arm by means of pump ⑧ and the minute-quantity lubrication is performed by means of face plate section oil wick ⑥ in face plate section lubricating tank ①.

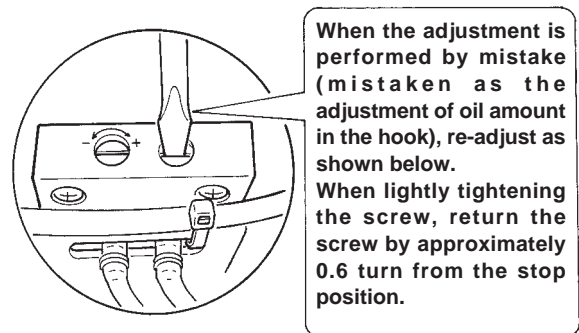
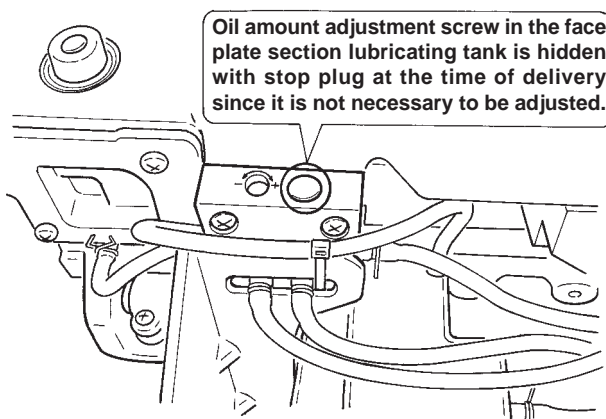
With adjustment screw ⑨, the amount of lubrication by pump can be adjusted. (Already adjusted at the time of delivery from factory)

[Adjustment of lubrication to face plate section of LZ-2290A]



(Caution) 1. Amount of oil pumped up to face plate section lubricating tank ① is limited by means of adjustment screw ⑨,

2. Oil lubricated the oil wick falls the pipe by natural fall and returns to the float case.



<<For adjustment>>

1) Adjusting the amount of lubrication to the face plate section

Remove stop plug ⑬ and return adjustment screw ⑨ by approximately 0.6 turn from the stop position when lightly tightening the screw.

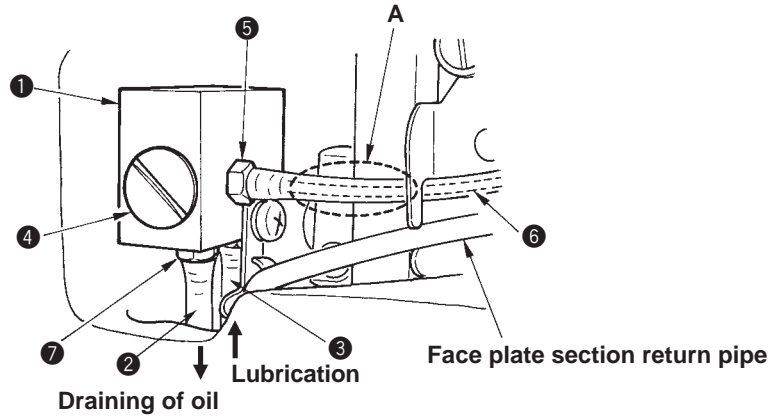
Tightening adjustment screw ⑨ ⇨ Amount of lubrication to face plate section lubricating tank ① is decreased.

Loosening adjustment screw ⑨ ⇨ amount of lubrication to face plate section lubricating tank ① is increased.

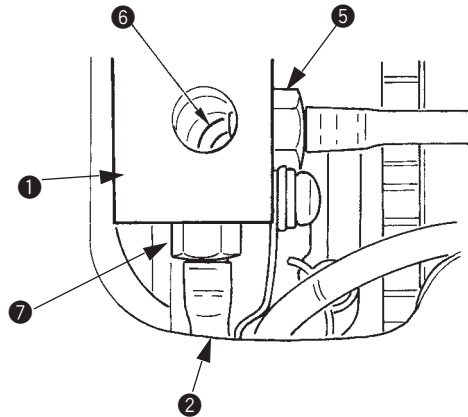
2) Checking lubrication and draining of oil

Check that lubrication and draining of oil are performed in face plate section lubricating tank ① which is installed in the rear of the back of machine arm. Remove the side plate on the back face, and check that oil flows in face plate section lubricating tank ① through oil pipe ③ and drain pipe ② when the sewing machine is operated.

- * When oil enters section A and flows in the direction of face plate section, slightly tighten adjustment screw ⑨.
- When lubrication and draining of oil are not performed, lubrication in the face plate section becomes insufficient and wear-out or seizure will be caused.
- Be careful of being caught in the sewing machine when operating the sewing machine.



- * Remove face plate section lubricating tank screw ④ and drop face plate section oil wick ⑥ in face plate section lubricating tank ① in the hole of lubricating joint ⑦. (Do not cover the hole of lubricating joint ⑦.)
- If the hole of lubricating joint ⑦ is covered, oil flows backward and oil leakage will be caused.

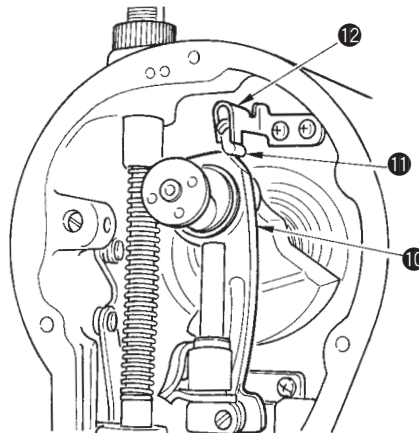


3) Needle bar crank rod oil wick

Oil in face plate section oil wick ⑥ lubricated in face plate section lubricating tank ① is transmitted to needle bar crank rod oil wick ⑪ and the wick performs lubrication in the face plate section when it comes in contact with crank rod end ⑩

Be sure to adjust so that crank rod end ⑩ comes in contact with needle bar crank rod oil wick ⑪ by 1 to 2 mm. Adjust the contact amount by moving face plate section lubrication presser ⑫.

- * In addition, refer to (5) - 2) Mechanism section of the face plate section of 5. MAINTENANCE.
- If they do not come in contact with each other, worn-out or seizure will be caused.

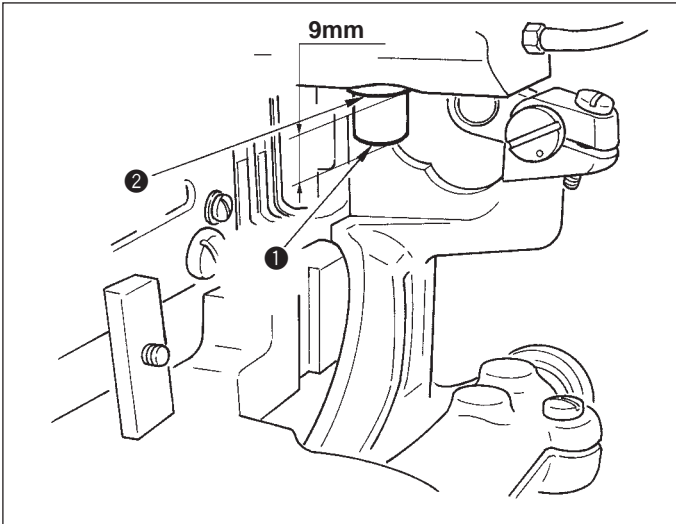


(8) Protruding amount of the hook shaft

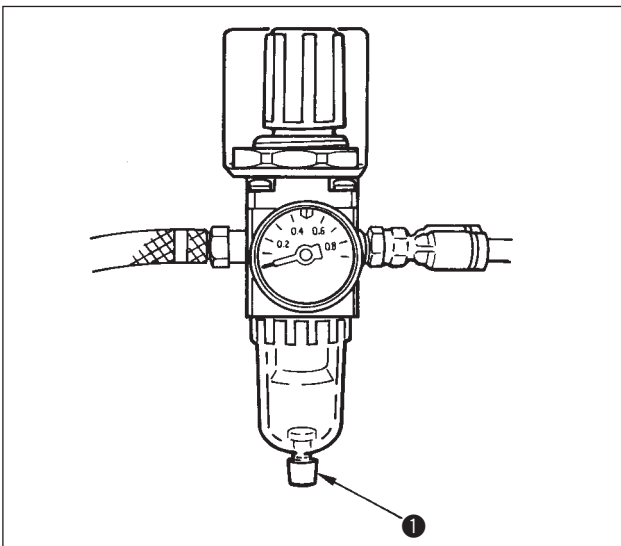
1. Protruding amount of hook shaft ❶ from the end plane of hook shaft front metal ❷ is 9 mm.

(Caution) When the protruding amount is excessively large or small, lubrication failure will occur.

So, be careful.

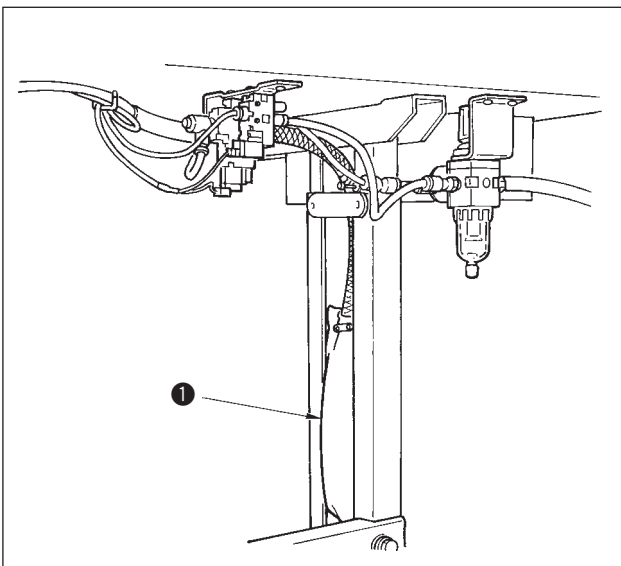


(9) Draining of CB type



When the regulator becomes filled with water, turn knob ❶ for drain counterclockwise.

(10) Cleaning the dust bag of CB type

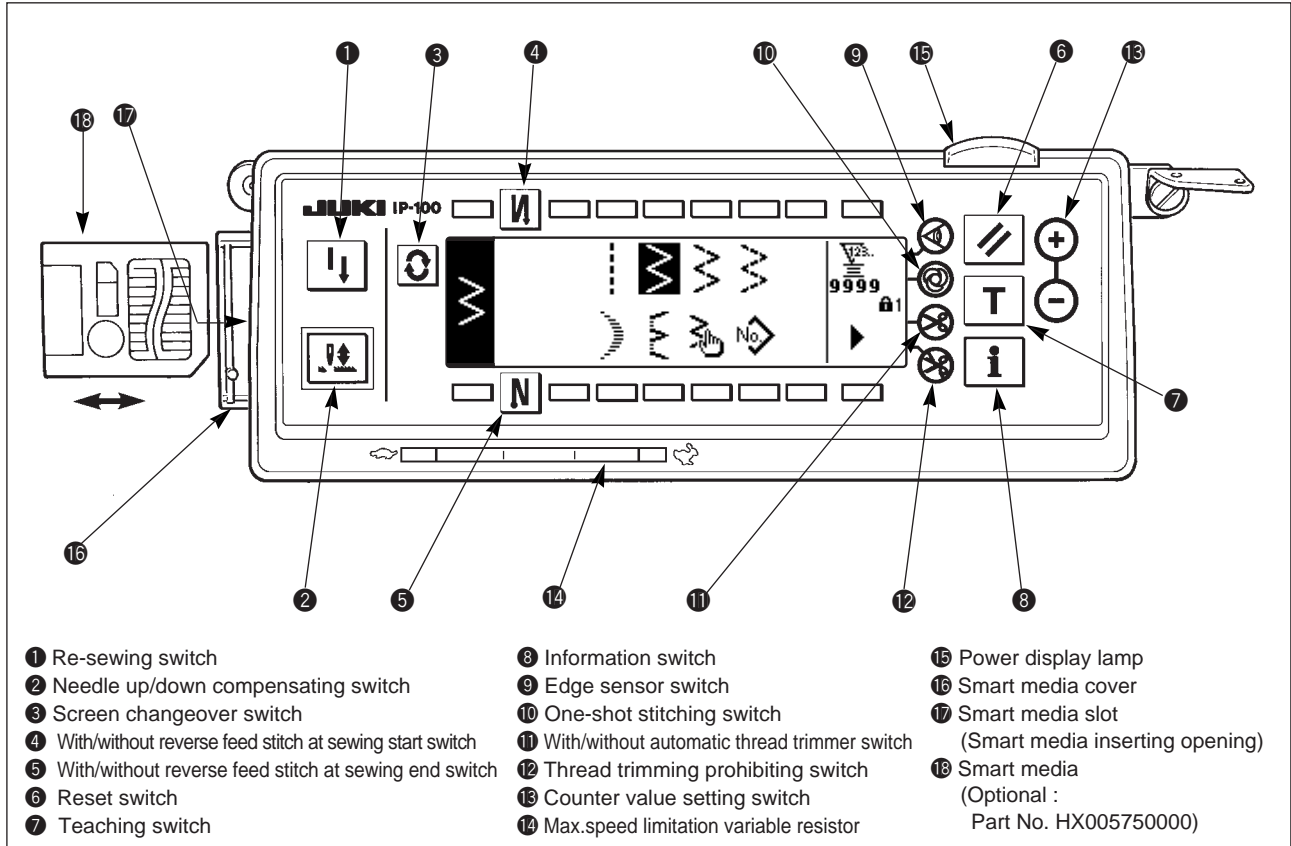








Periodically clean dust bag ❶.








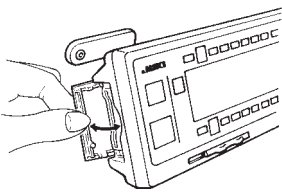
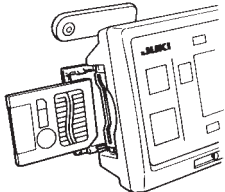
(When the dust bag becomes excessively filled with waste thread, there may be cases where clamp failure occurs.)

6. OPERATION PANEL

(1) Names of the respective sections



<p>① Re-sewing switch</p> 	<p>This switch is used to continue sewing from the step on the way after replacing bobbin thread when bobbin thread has run out during program stitching step.</p>
<p>② Needle up/down compensating switch</p> 	<p>This is the switch to perform needle up/down compensating stitching. (Needle up/down compensating stitching and one stitch compensating stitching can be changed over with function setting No. 22.)</p>
<p>③ Screen changeover switch</p> 	<p>This is the switch to change over the screen.</p>
<p>④ With/without reverse feed stitch at sewing start switch</p> 	<p>This is the switch to turn ON/OFF automatic reverse feed stitch at sewing start.</p> <p>* This switch cannot be used with the sewing machine which is not provided with automatic reverse feed stitching device.</p>
<p>⑤ With/without reverse feed stitch at sewing end switch</p> 	<p>This is the switch to turn ON/OFF automatic reverse feed stitch at sewing end.</p> <p>* This switch cannot be used with the sewing machine which is not provided with automatic reverse feed stitching device.</p>
<p>⑥ Reset switch</p> 	<p>This is the switch to make the value of bobbin thread counter or sewing counter the set value.</p>

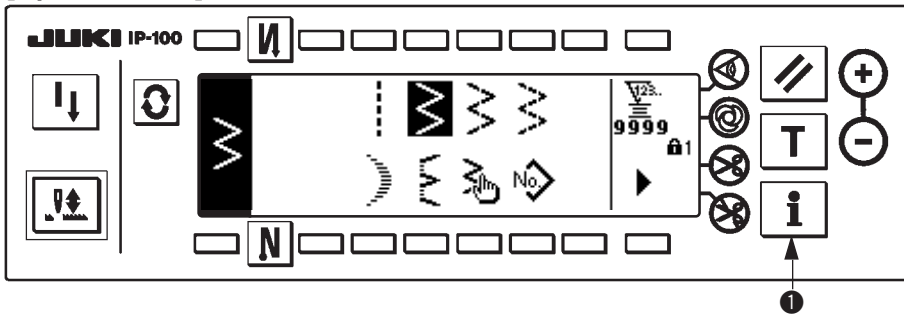
<p>7 Teaching switch</p> 	<p>This is the switch to set the setting of the number of stitches with the value of number of stitches which has been actually sewn.</p>
<p>8 Information switch</p> 	<p>This is the switch to perform various function settings.</p>
<p>9 Edge sensor switch</p> 	<p>This switch cannot be used with LZ-2290A.</p>
<p>10 One-shot stitching switch</p> 	<p>When this switch is set to effective at the time of program stitching, the sewing machine automatically operates up to the specified number of stitches.</p>
<p>11 With/without automatic thread trimmer switch</p> 	<p>When this switch is set to effective at the time of program stitching, the sewing machine automatically performs thread trimming when the specified number of stitches has been completed.</p>
<p>12 Thread trimming prohibiting switch</p> 	<p>This switch prohibits all thread trimmings. * This switch cannot be used with the sewing machine which is not provided with the automatic thread trimming device.</p>
<p>13 Counter value setting switch</p> 	<p>This is the switch to set the value of bobbin thread counter or No. of pcs. counter.</p>
<p>14 Max. speed limitation variable resistor</p>	<p>When moving the resistor in the left direction, max. speed is limited.</p>
<p>15 Power display lamp</p>	<p>This lamp lights up when the power switch is turned ON.</p>
<p>16 Smart media cover</p> 	<p>This is the cover for smart media inserting opening. To open the cover, place your finger on the notch located on the side of the cover as shown in the figure and push the cover in the direction of left slanting rear. Do not close the cover unless smart media is completely inserted.</p>
<p>17 Smart media slot (Smart media inserting opening)</p> 	<p>To set smart media, insert smart media into smart media slot and push it until it is almost hidden. To remove smart media, push it further again and it protrudes to the position where it can be held between your fingers. Now, draw it out. * Be very careful of the inserting direction of smart media.</p>

(2) Information

Setting and checking of various data can be performed with the information.

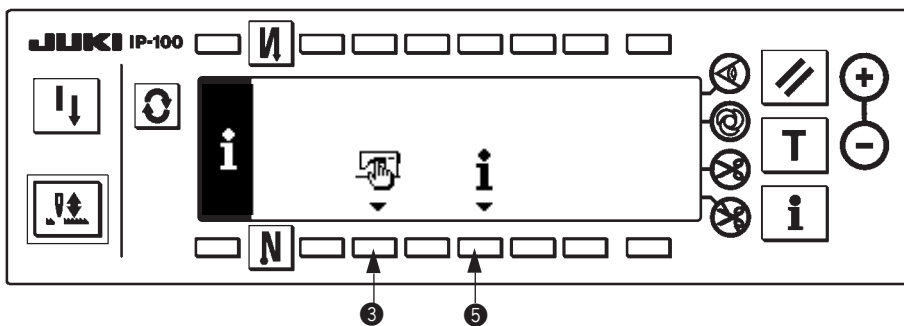
For the information, there are the operator level and the maintenance personnel level.

[Operator level]



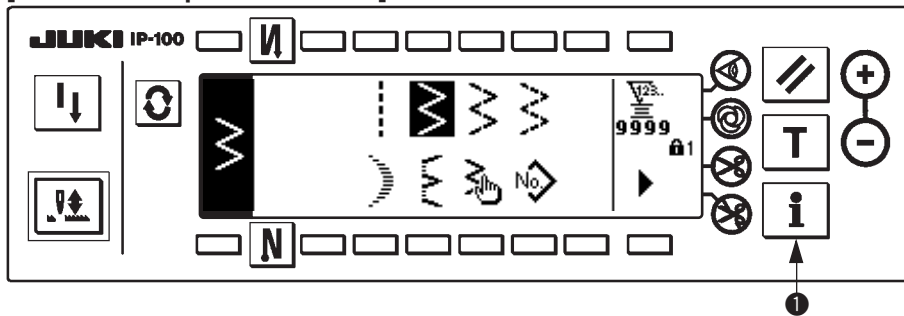
1. Turn ON the power. When the needle bar is not in the UP position, turn the handwheel to bring the needle bar to its UP position.
2. Press switch ① to display the information screen.
3. Press switches ③, ⑤ corresponding to the various functions.

Information screen (Operator level)



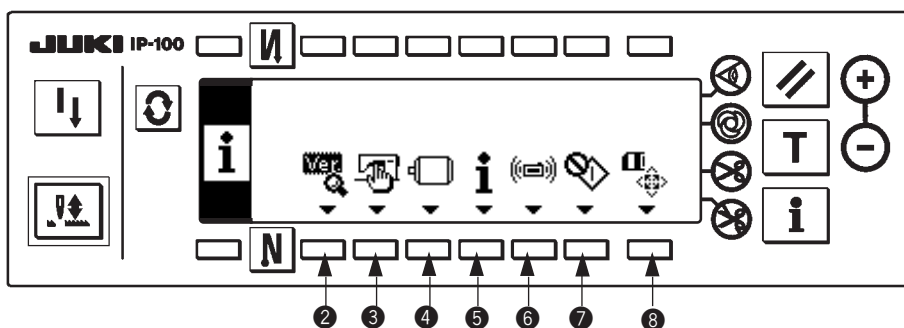
- ③ : Sewing common data
- ⑤ : Sewing management information

[Maintenance personnel level]



1. Turn ON the power. When the needle bar is not in the UP position, turn the handwheel to bring the needle bar to its UP position.
2. Press switch ① to display the information screen.
3. Press switches ② through ⑧ corresponding to the various functions.


Information screen (Maintenance personnel level)



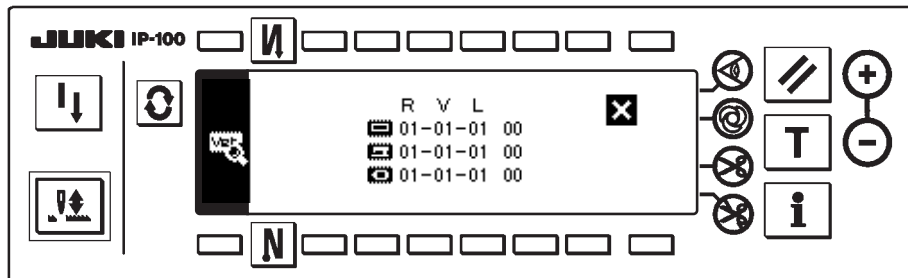
- ② : Ver display
- ③ : Sewing common data
- ④ : Function setting
- ⑤ : Sewing management information
- ⑥ : Communication mode
- ⑦ : Hook adjusting mode
- ⑧ : Smart media format

1) Ver display

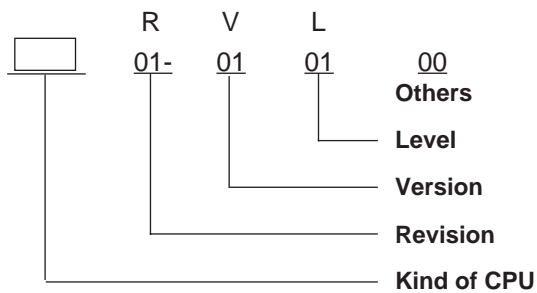
Software version of each CPU is displayed.




Press switch ②  in the information screen (maintenance personnel level).

Ver display screen




Explanation of display

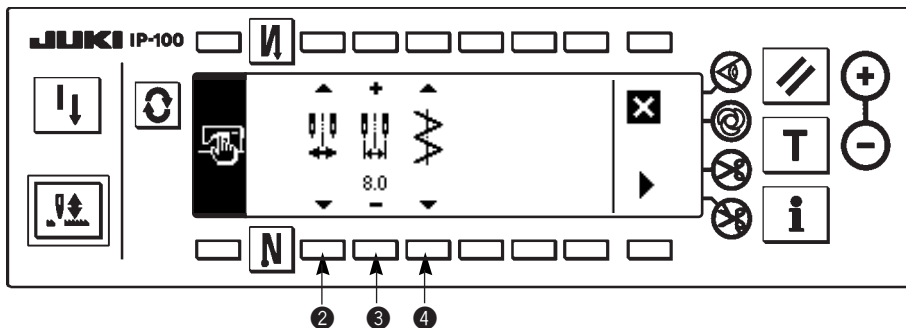


-  Panel software
-  Main software
-  Servo motor software

2) Sewing common data

1. Press switch ③  in the information screen.

The first screen of sewing common data setting



2. Set the items below in the first screen.

- ② : Limiting procedure of max. zigzag width limitation
For the limiting procedure of max. zigzag width limitation, there are two settings below.

- ③ : Max.zigzag width limitation value

* Display varies according to the procedure selected in ②.

- 1) When the center is set in ② :

Max.zigzag width limitation value (center)



- 2) When the left/right is set in ② :

Max.zigzag width limitation value (right)



Max.zigzag width limitation value (left)



- 1) Center



- 2) Left/right



- ④ : Reference of stitch base line

For the reference of stitch base line, there are three settings below.

- 1) Center



- 2) Right

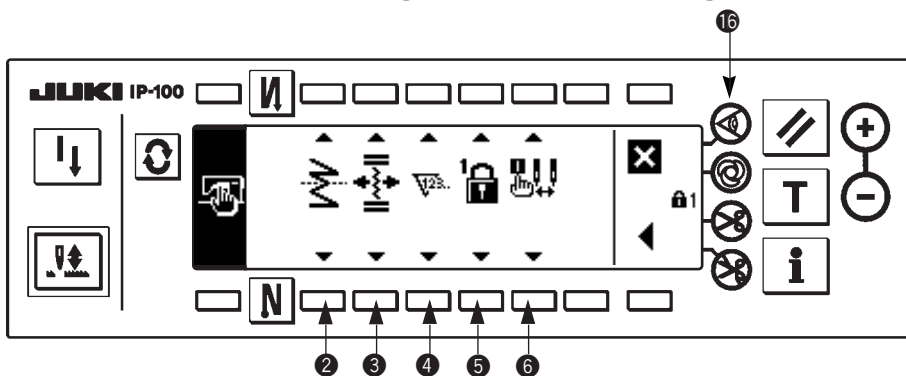


- 3) Left



3. Set the items below in the second screen.

The second screen of sewing common data setting





- ②: Mirror function setting

Mirror inversion means the function that the reverse pattern stitching is performed after pressing the mirror inversion switch during temporary stop of sewing.

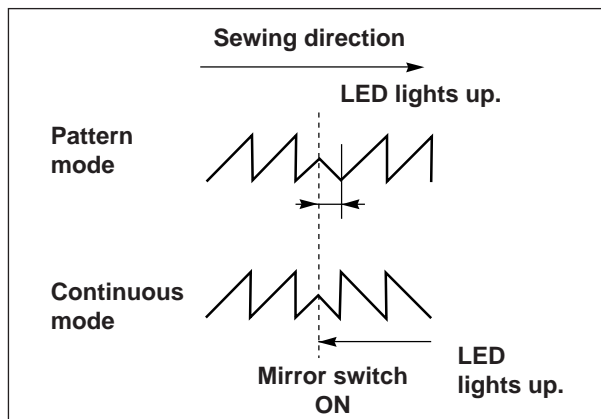
The sewing patterns that the mirror inversion is possible are scallop, custom, continuous stitching and cycle stitching.

For the mirror inversion, there are two settings below.

1) 1 pattern : Mirror inversion is “1” pattern only. After completion of inversion pattern, the pattern returns to the original one.

2) Continuous : The machine continuously operates the inversion pattern after the inversion until thread trimming is performed or, the mirror switch is pressed again.


* For the details, refer to “Mirror switch”, p.15.




③ : Position of the stitch base line of condensation custom



The mode is the operation mode in terms of the stitch base line of condensation custom when the reference of the stitch base line is set to that of center stitch base line.

For the condensation custom, there are two settings below.

1) Travelling together : This is the mode that travels the positions of stitch base line of condensation custom and zigzag pattern together.

2) Fixed : This is the mode that fixes condensation custom to the input data position.


④ : Counter function



ON  / OFF  of the function of thread trimming counter or bobbin thread counter is set. When OFF is set, even the counter display is not performed.

⑤ : Key lock

It is possible to lock the setting switch so that the zigzag width that has been set once or the contents of custom pattern is not changed by mistake. However, it is possible to change ON/OFF of the reverse feed stitch, thread trimming prohibiting switch, specified zigzag stop position and bobbin thread counter.

For the key lock, there are three kinds of settings below.

Level “0”  : All items can be changed.

Level “1”  :  1 is displayed on the right end of the screen.

Kind of sewing



Pattern : Change of pattern and registration

Custom : New creation and edit

Condensation custom : Edit

Continuous stitching : New creation, copy, deletion and edit

Cycle : New creation, copy, deletion and edit cannot be changed.

Level “2”  :  2 is displayed on the right end of the screen.


Items other than reverse feed stitching ON/OFF, thread trimming prohibition switch, specifying zigzag stop position and bobbin thread counter cannot be changed.

(Caution) Level of the standard delivery is “1”. When changing the locked contents of level “1”, it is necessary to set the level to Level “0” once.


⑥ : Selection of max. zigzag width limitation display when the power is turned ON

Whether the max. zigzag width limitation value is displayed or not when the power is turned ON can be selected.

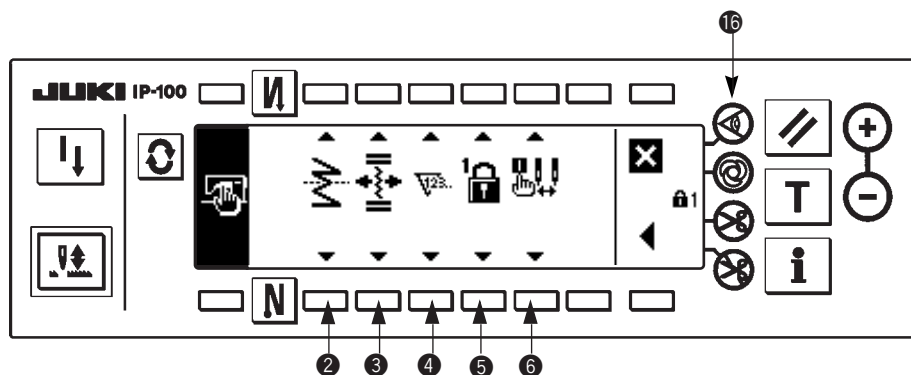
Every time the setting switch is pressed, display/non-display is changed over alternately.

1) Display 

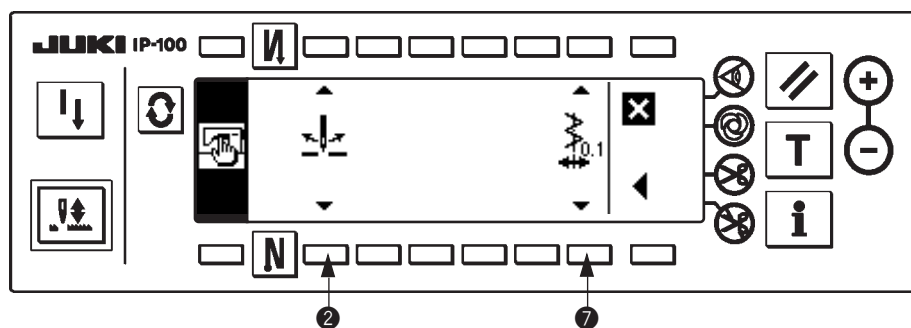
2) Non-display 

- Press switch 16  for approximately three seconds in the second screen of sewing common data setting.

The second screen of sewing common data setting



The third screen of sewing common data setting



② : Change of zigzag timing

Zigzag timing can be changed.

Needle sway can be prevented by delaying timing when sewing heavy-weight materials or the like.

1. Fast : Standard setting

2. Slow : Timing is delayed by approximately 30fl in terms of the standard.

However, to delay timing, conditions below are necessary.

- When the number of rotation is set to less than 4,000 rpm with the function setting No. 96, Max. number of rotation setting.


- When the travelling distance of 1 stitch is less than 4 mm.


In case of more than 4 mm, needle may travel while it is stuck on the cloth.

In case the distance is more than 4 mm and zigzag motion is performed, do not set this function.

⑦ : Alternate changeover of stitch base line unit between 0.1 mm and 0.2 mm

The unit of change of stitch base line position can be changed over to 0.1 mm unit or 0.2 mm unit.


1. 0.1 mm unit : Standard setting

2. 0.2 mm unit : Panel setting is 0.1 mm unit, but actually the position travels every 0.2 mm.


3) Sewing management information

For the sewing management information, there are the operator level and the maintenance personnel level.

[Operator level]

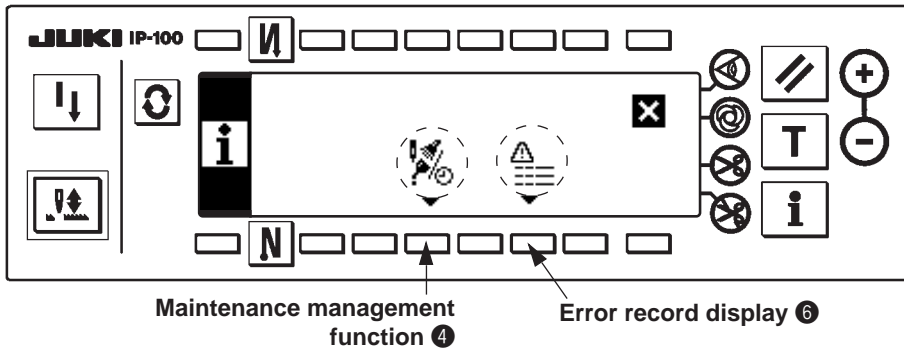
Press switch ⑤  in the information screen.

[Maintenance personnel level]


Press switch ⑤  for approximately three seconds in the information screen.

Pictograph on the left end of the sewing management information is shown in reverse video.

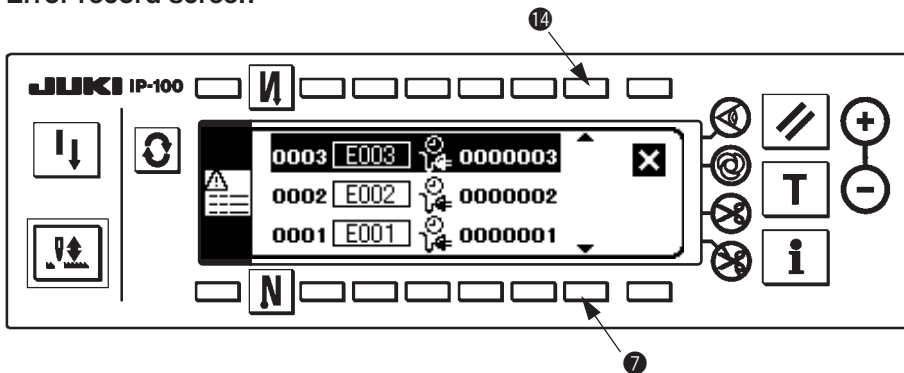
Sewing management information screen (Maintenance personnel level)



1. Error record display

Press error record display switch ⑥  in the sewing management information screen (maintenance personnel level).

Error record screen



When switch ⑦ or ⑭ is pressed, the error record scrolls up or down.

Explanation of display



Error record of approximately 100 cases (depending on the memory capacity) can be stored in memory in the order of the latest.














4) Communication mode


Uploading and downloading of various data with the sewing machine server utility (hereinafter called SU-1) or the smart media can be performed in the communication mode.

For the communication mode, there are the operator level and the maintenance personnel level.


The kind of data which can be handled with the operator level is different from that with the maintenance personnel level.

Communication function table

Kind of data	Operation level	Download	Upload	Extension of file	Remarks
 VDT Custom pattern (Vector form)	Operator			VDT	File is vector form.
 EPD Condensation custom pattern (Parameter form)	Operator			EPD	File is parameter form. For downloading, only overwriting is possible.
 DATA All sewing machine data	Operator			MSP	
 Panel  Main  Servo motor Each program data	Operator		NG	PRG	

 : Panel

 : Smart media

 : SU-1

Operating procedure

[Operator level]

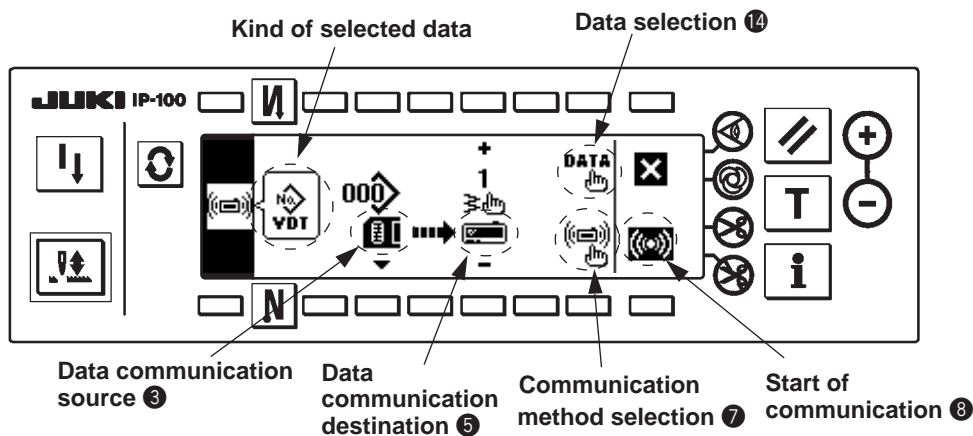
Press communication mode switch  ⑥ in the information screen.

[Maintenance personnel level]

Press communication mode switch  ⑥ for approximately three seconds in the information screen.

ictograph on the left end of the communication screen is shown in reverse video.

Communication screen (Maintenance personnel level)

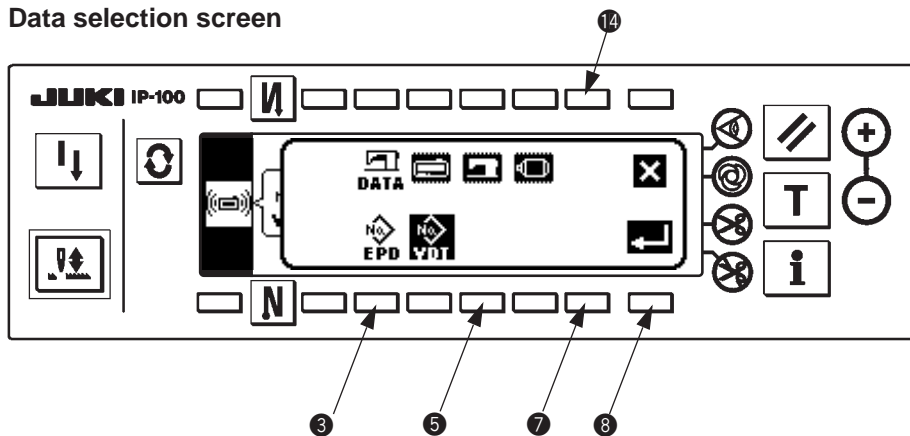


1. Communication setting

① Data selection

Press data selection switch ⑭ in the communication screen.

Data selection screen

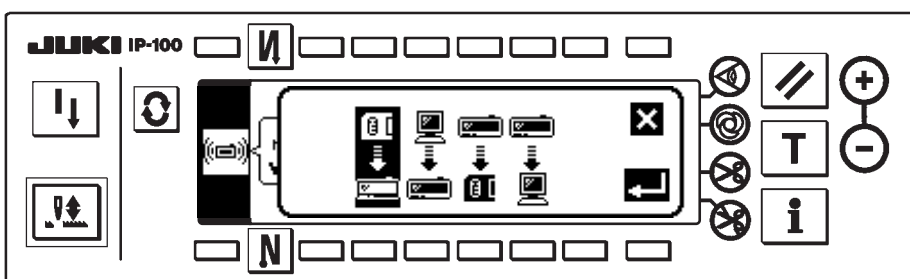


Select the data to perform communication, and press set key switch ⑧ .

② Communication method selection

Press communication method selection switch ⑦ in the communication screen.

Communication method selection screen



Select the method to perform communication and press set key switch ⑧  .

Reference : Communication method cannot be selected by downloading of program.


③ Data communication source ③

④ Data communication destination ⑤

Set data communication source ③ and data communication destination ⑤ in the ten key screen, or "+" or "-" key.

(Ten key input, or "+" or "-" key input is changed according to the kind of data.)

2. Start of communication

After all settings have been completed, press communication start key switch ⑧  to start communication.

When the screen returns to the communication setting screen after display of the during communication screen, communication is completed.

However, It is necessary to turn OFF the power after ending the communication of all sewing machine data or program data.

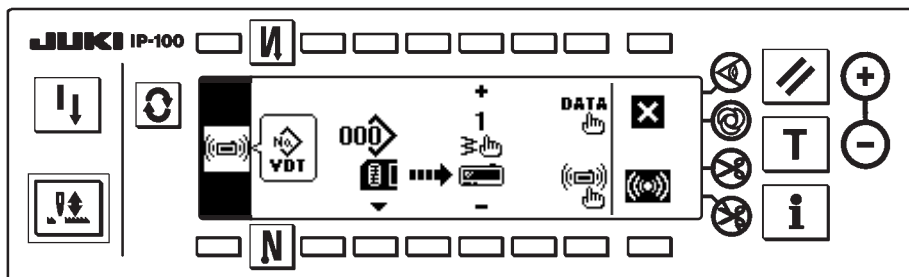
(Caution) Never turn OFF the power during communication.

In case of OFF, operation cannot be guaranteed.

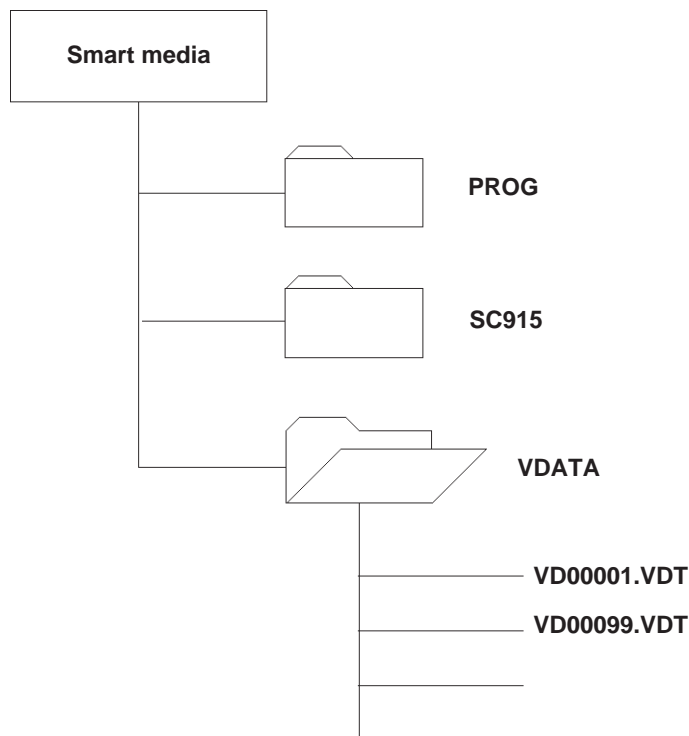
5) Vector form data (Custom pattern data)

1. The custom pattern created with the panel can be stored as the vector form data.
2. The same custom pattern can be used with other sewing machines by downloading the vector form data which has been stored.
3. The vector form data created with PM-1 can be downloaded as the custom pattern.
4. The vector form data which has been stored can be edited with PM-1.

Communication screen (Download of vector form)



Folder structure of vector form (* .VDT) file in the smart media



Upload : Uploading to the smart media is written in the folder of "VDATA".

In case there is no folder, the folder of "VDATA" is automatically created.

Download : Downloading from the smart media is read from the folder of "VDATA".

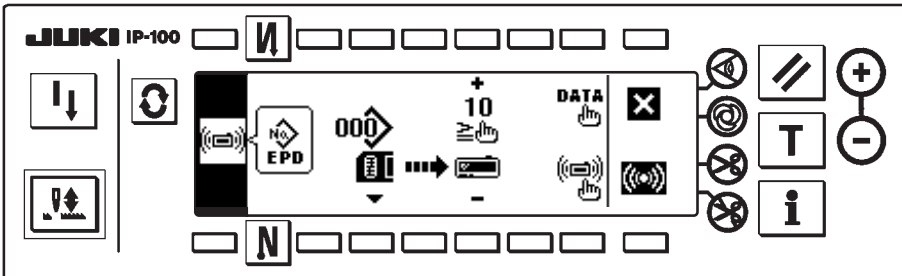
When creating the pattern with PM-1, store it in the folder of "VDATA".

- ① Create folder "VDATA" in the smart media.
(It is not necessary to create the folder when it already exists.)
- ② Copy the file (extension VDT).

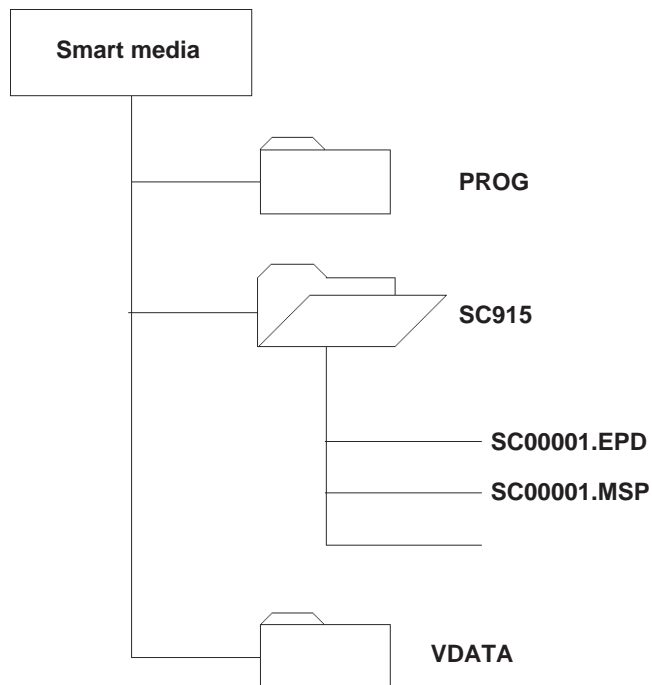
6) Parameter form data (Condensation custom pattern)

1. The condensation custom pattern created with the panel can be stored as the parameter form data.
2. The same condensation custom pattern can be used with other sewing machines by downloading the parameter form data which has been stored.

Communication screen (Download of parameter form)



Folder structure of parameter form (* .EPD) file in the smart media



Upload : Uploading to the smart media is written in the folder of "SC915".

In case there is no folder, the folder of "SC915" is automatically created.

Download : Downloading from the smart media is read from the folder of "SC915".

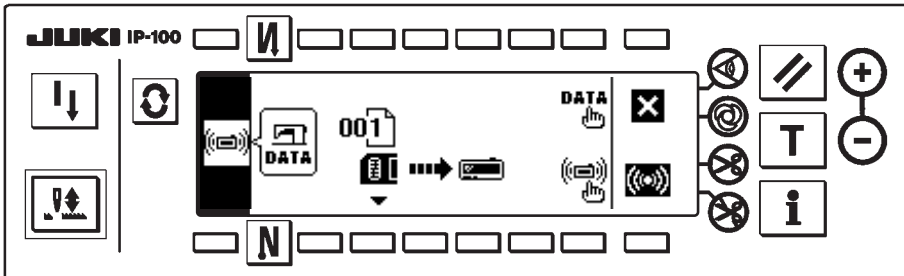
Store the copy from other media or the like in the folder of "SC915".

- ① Create folder "SC915" in the smart media.
(It is not necessary to create the folder when it already exists.)
- ② Copy the file (extension EPD).

7) All sewing machine data

1. Data such as sewing setting data, adjustment data, etc. which are memorized in the sewing machine can be stored in one package.
2. It is possible to download the all sewing machine data to the other sewing machines to make the same setting.

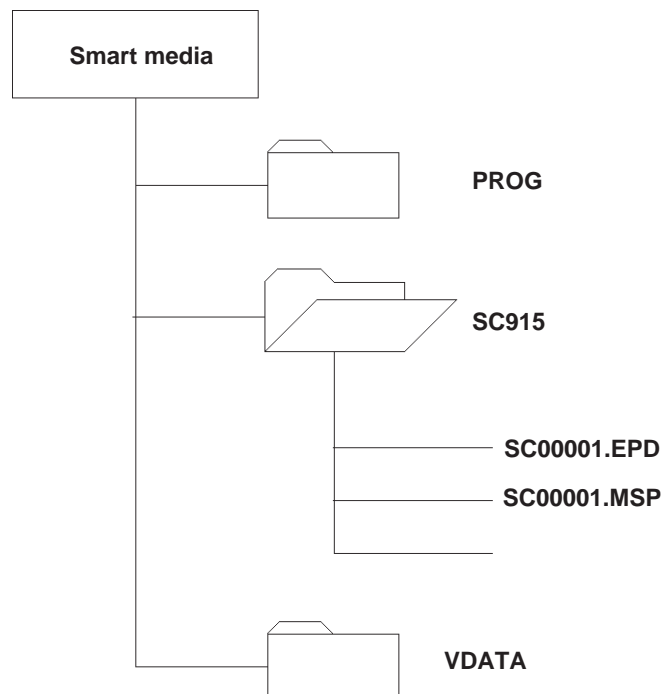
Communication screen (Download of all sewing machine data)



Reference : When downloading the all sewing machine data, it is necessary that the file and the Ver of the sewing machine have to agree with each other. An error occurs when the file of different Ver is downloaded.

(Caution) It is not possible to store and copy the function setting of the servo motor.

Folder structure of all sewing machine data (* .MSP) file in the smart media



Upload : Uploading to the smart media is written in the folder of "SC915".

In case there is no folder, the folder of "SC915" is automatically created.

Download : Downloading from the smart media is read from the folder of "SC915".

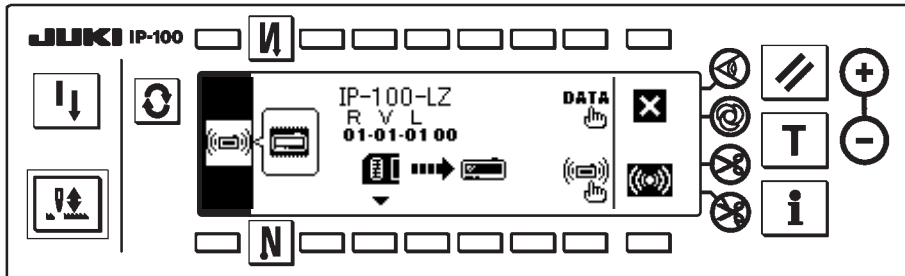
Store the copy from other media or the like in the folder of "SC915".

- ① Create folder "SC915" in the smart media.
(It is not necessary to create the folder when it already exists.)
- ② Copy the file (extension MSP).

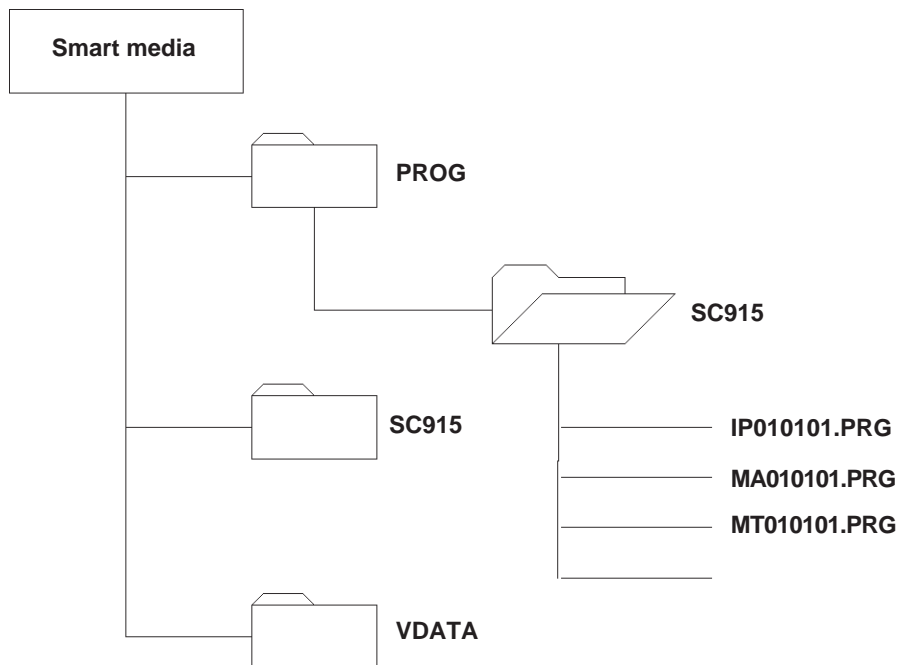
8) Program data

1. When the change of software occurs in the future due to Ver-up or the like, rewriting of the program can be performed. Rewriting of the program is performed with each CPU.

Communication screen (Download of IP-100 program data)



Folder structure of program (* .PRG) file in the smart media



Upload : Downloading from the smart media is read from the folder of "PROG\SC915".

Download : Store the copy from other media or the like in the folder of "PROG\SC915".


- ① Create folder "PROG" in the smart media.
- ② Create folder "SC915" in the PROG folder.
(It is not necessary to create the folder when it already exists.)
- ③ Copy the program file (extension PRG).

9) Smart media format

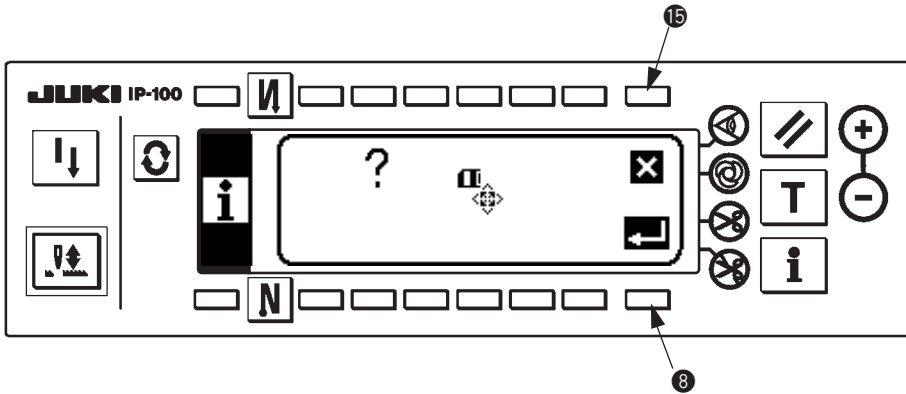
Perform formatting of the smart media.

The media formatted with the personal computer or the like may not be used.

When using the media with IP-100, be sure to perform formatting with IP-100.

Press smart media format switch  ⑧ in the information screen (maintenance personnel level)

Smart media format confirmation screen



⑧ : Formatting is performed.

Confirm again whether formatting can be performed before pressing the switch.

⑮ : The screen returns to the information screen.

(Caution) When formatting is performed, all data stored in the smart media are deleted. Take the back-up of necessary data beforehand.

(3) Matters that demand special attention regarding the operation panel, IP-100

1) Kind of IP-100

For the operation panel, IP-100, there are several kinds of types in accordance with the specifications. The type which can be used for LZ-2290A is TYPE-A only.

The product of TYPE A0A or TYPE A0B which is indicated on the type name plate seal in the rear of the panel case can be used.

Both are compatible in the state of the complete set of the panel. However, when replacing the printed circuit board only, use the printed circuit board after function Rev03 and pattern Rev F/R2 since there are the change of the structure components.

In addition, it is necessary to change and set jumper wire W1 (located on the side of RVR1 variable resistor) of the printed circuit board according to the type.

Type name plate seal	Setting of W1
TYPE A0A	1-2 pin setting (upper side)
TYPE A0B	2-3 pin setting (lower side)



Set W1 by changing the jumper post.

(Caution) When setting is wrong, LCD screen display is not properly performed.

2) Matters that demand special attention when disassembling the operation panel

Operation panel, IP-100 is constructed with precision components.

Leave the action such as disassembling the panel case or the like to our service department since injury by electric shock or failure of panel will be caused.

If the force more than expected is applied when disassembling the panel case, it may be damaged since it is made of the plastic molding.

Especially when performing disassembling (opening/closing) the front panel and the rear panel in the state that the smart media cover attached to the rear case is closed, the small-sized switch mounted on the inside of the printed circuit board interferes with the smart media cover and may be damaged. So, be careful.

It is necessary to assemble all screws used in the operation panel with tightening torque of 0.56Ncm. (Excluding screws to fix it on the machine head and to fix the earth wire.)

3) Prohibition of the change of DIP switch setting

Do not perform the changeover of DIP switches since the guarantee of control program and stored data cannot be performed.

It is not necessary to operate these switches since they are all changeover switches for the production by the manufacturers.

(Caution) The 4-string DIP switches are not exposed unless the operation panel case is disassembled.

7. SPECIFICATIONS OF SC-915

(For use in Japan)

Supply voltage	Single phase 100V	3-phase 200V
Frequency	50 Hz / 60 Hz	
Rated currency	8A	3A
Operating environment	Temperature : 0 to 40°C Humidity : 90% or less	

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

Destination	For CE	
Item		
Supply voltage	Single phase 220V/230V/240V	
Frequency	50 Hz / 60 Hz	
Rated currency	4.3A/4.2A/4.0A	
Operating environment	Temperature : 0 to 40°C Humidity : 90% or less	

Destination	For JUS	
Item		
Supply voltage	Single phase 100V/110V/120V	3-phase 200V/ 220V/240V
Frequency	50 Hz / 60 Hz	
Rated currency	8.0A/7.5A/7.0A	3.0A/2.7A/2.3A
Operating environment	Temperature : 0 to 40°C Humidity : 90% or less	

8. FUNCTION SETTING PROCEDURE OF SC-915

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

- (Caution) 1. Do not perform switch operations other than those described in the following explanations.
2. Be sure to re-turn the power switch ON after one second or more has passed.
3. 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.

There are two kinds of function settings, Level 1 and Level 2.

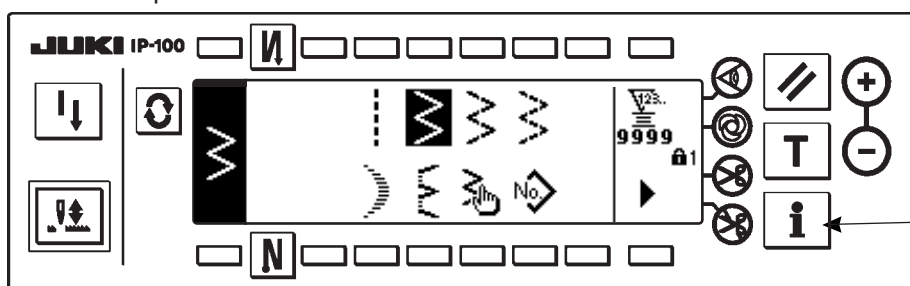
Level 1 : Change of setting can be performed without turning OFF the power switch.

Level 2 : It is necessary to turn OFF the power switch after change of setting.

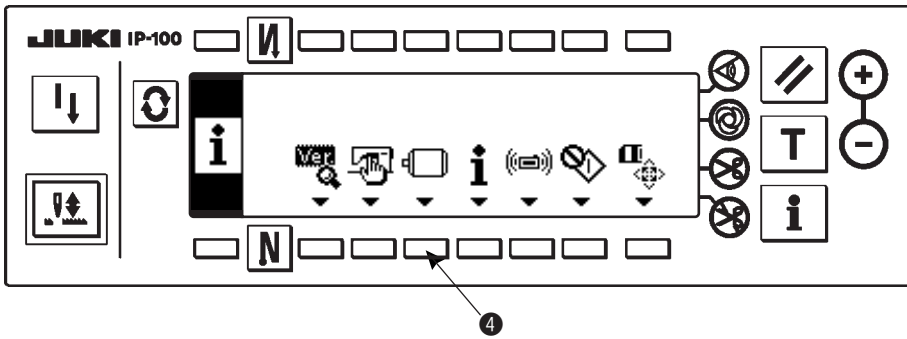
For the details, refer to "9. FUNCTION SETTING LIST".

[Setting procedure of Level 2]

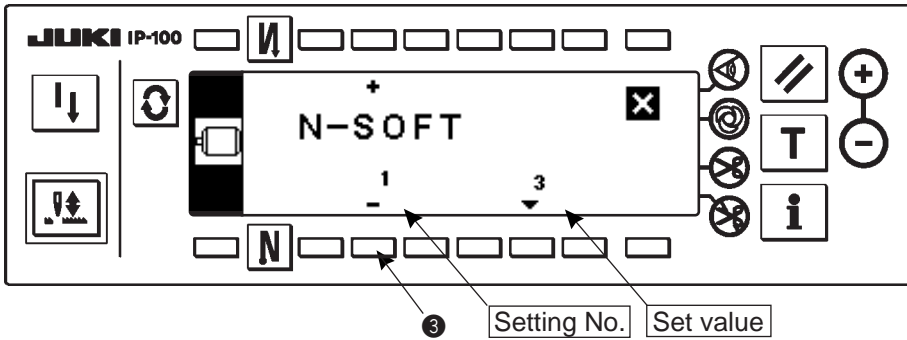
- 1) Turn ON the power. When the needle bar is not in its UP position, turn the handwheel to bring the needle bar to its UP position.



- 2) Press switch ① for approximately three seconds.

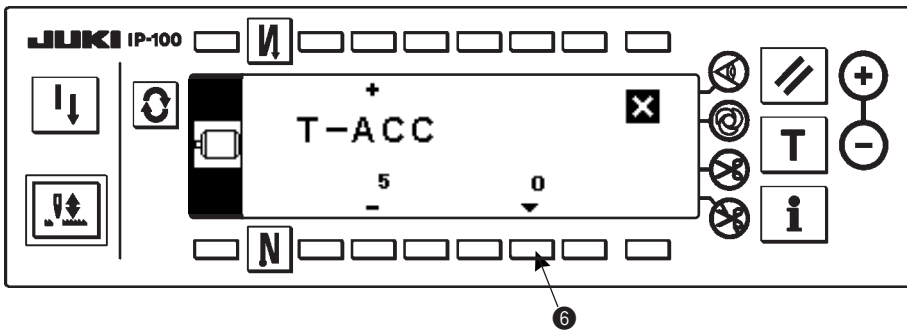


3) Press switch ④ for approximately three seconds.



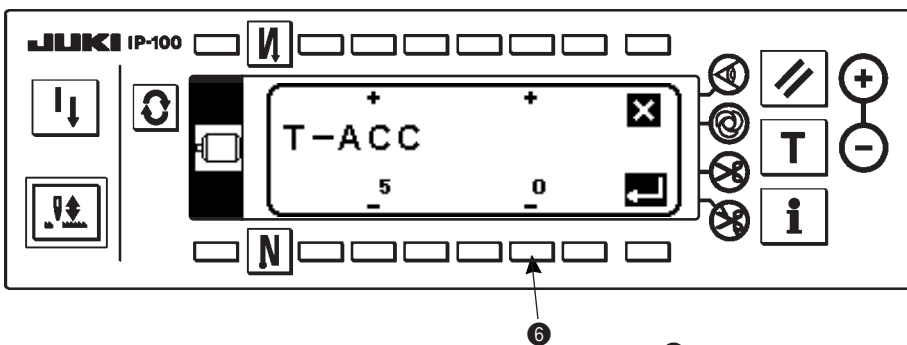
4) This screen is the function setting screen.
Change the setting No. with “+/-” Key of switch ③.
For the details of setting No., refer to 9. FUNCTION SETTING LIST.

Example) Changing the flicker reducing function (Setting No. 5)

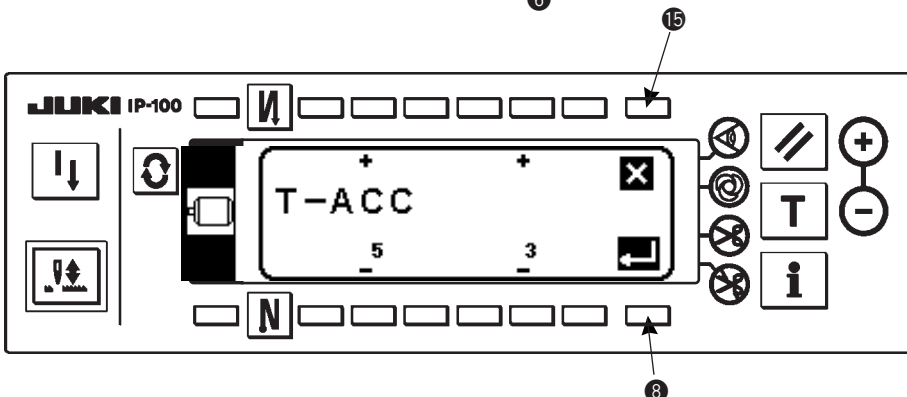


Change the setting No. to “5” with “+” Key of switch ③ in the figure above.

○ Press switch ⑥.

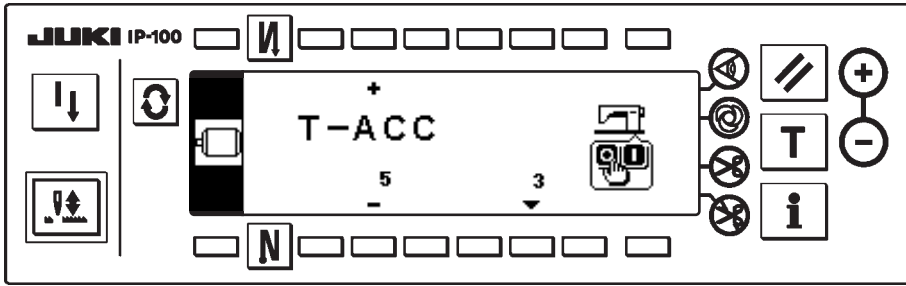


○ Change set value with “+/-” Key of switch ⑥.



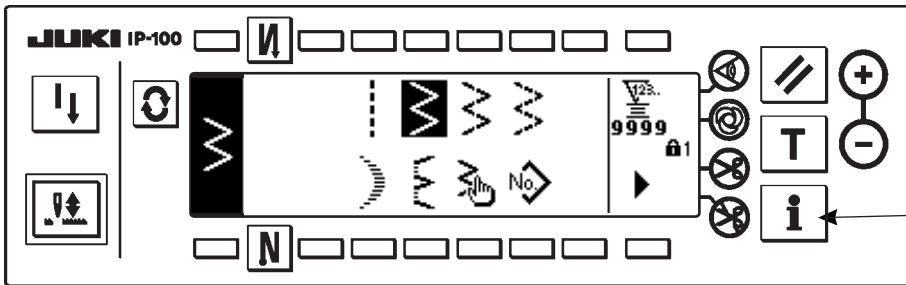
The set value has been changed from “0” to “3”.

○ When this changed value is acceptable, press switch ⑧.
When you desire to return the value to the previous one, press switch ⑮.

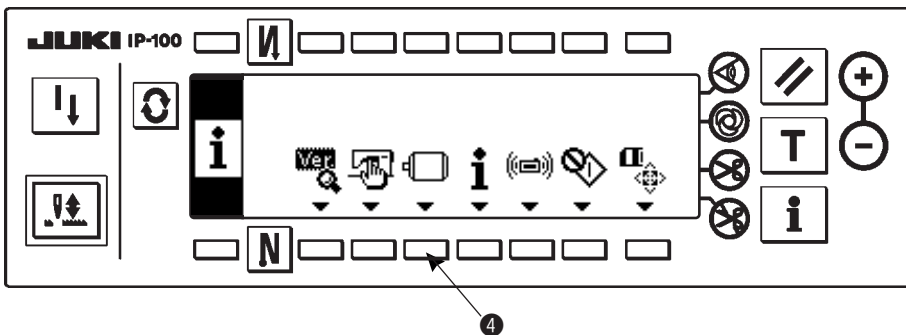


- Turn OFF the power switch and turn ON the power switch after approximately one second.
- Change of the set value is determined by turning OFF the power switch.

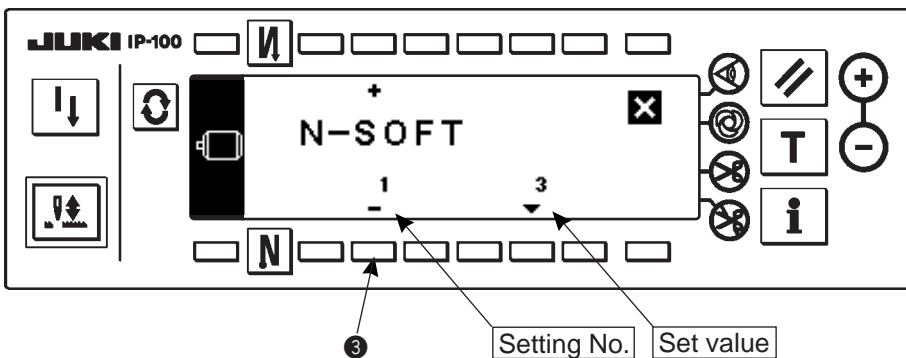
[Setting procedure of Level 1]



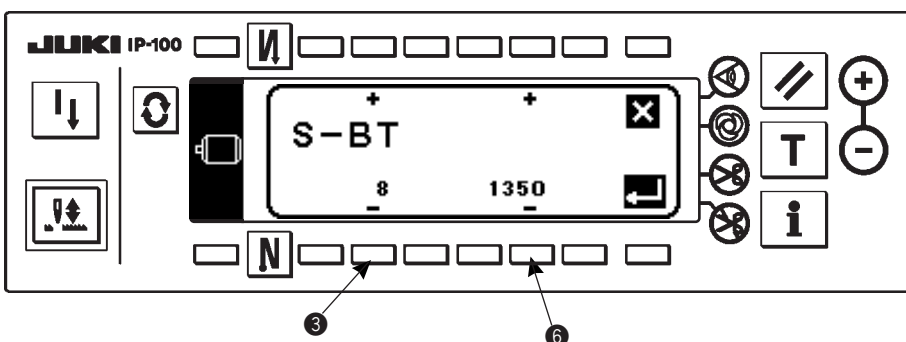
- 1) Press switch ❶ for approximately three seconds.



- 2) Press switch ❷.



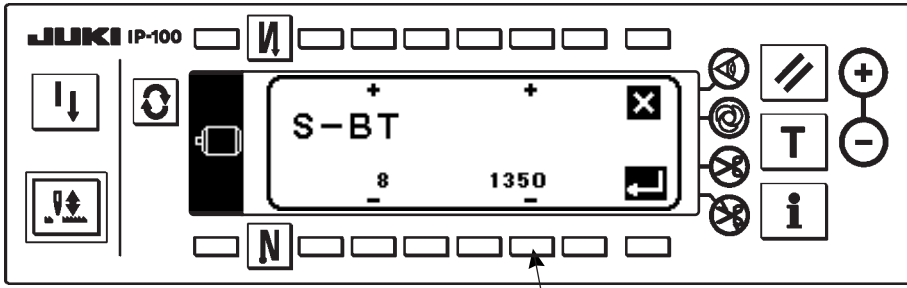
- 3) This screen is the function setting screen.
Change the setting No. with “+/-” Key of switch ❸.
For the details of setting No., refer to 9. FUNCTION SETTING LIST.



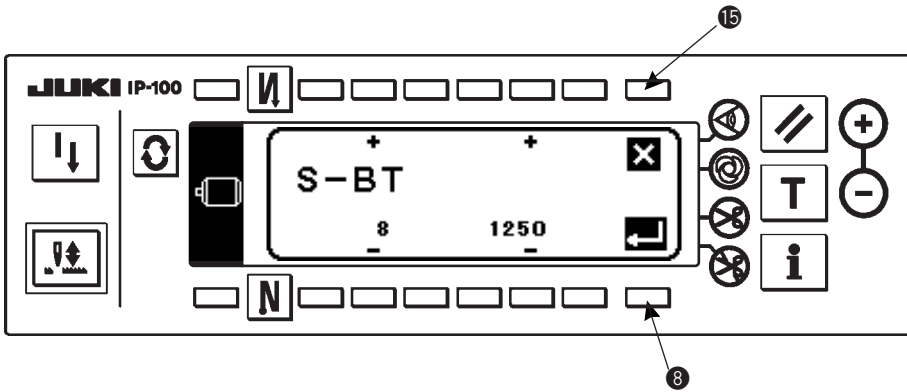
Example) Changing the number of rotation of reverse feed stitching (Setting No. 8)

Change the setting No. to “8” with “+” Key of switch ❸ in the figure above.

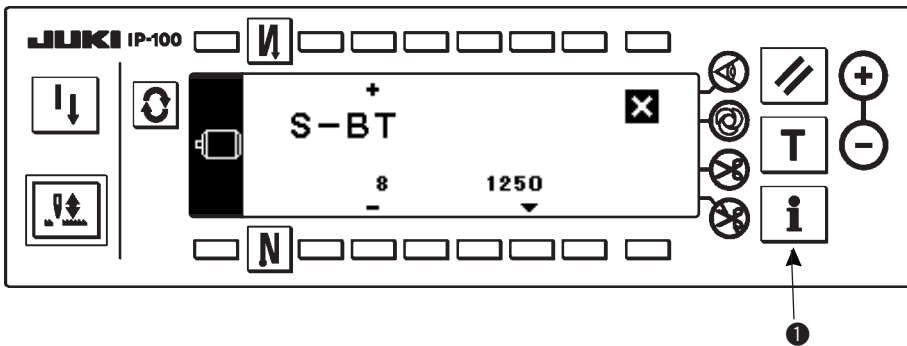
- Press switch ❹.



- Change the set value with “+/-” Key of switch ⑥.



- Set value has been changed from 1350 to 1250.
- When this changed value is acceptable, press switch ⑧. Press switch ⑮ when you desire to return the value to the former one.



- Press switch ① in case of sewing.

9. FUNCTION SETTING LIST

No.	Item	Description	Setting level	Setting range	Panel display Standard set value	Ref. Page
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	1	0 to 9	N-SOFT 3	101
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	2	0 to 8	T-ACC 0	101
7	Unit of bobbin thread counting down	Unit of bobbin thread counting down 0 : Count/10 stitches 1 : Count/15 stitches 2 : Count/20 stitches	1	0/1/2	RATIO 0	
*	8	Number of rotation of reverse feed stitching	1	150 to 3000	S-BT 1350	
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	2	1/0	NPS 0	101
11	Click sound of panel switch	Click sound of panel switch is specified. 0 : Without click 1 : With click	2	1/0	SOUND 1	101
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 8 : Pedal neutral presser lifting function selection Do not set to 2, 3 and 7. If these numbers are set, trouble or accident will be caused.	2	0 to 8	SW2 0	101
13	Function of prohibiting start of the sewing machine by bobbin thread counter	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)	2	0/1/2	ASCNT 0	
18	Bird's nest prevention function	Effective in combination with machine head with bird's nest prevention function 0 : Without bird's nest prevention function 1 : With bird's nest prevention function 2 : With bird's nest prevention function and thread release function	2	0/1/2	BNC 0	
19	Needle thread release at sewing start function	Effective in combination with machine head with bird's nest prevention function 0 : Without needle thread release function 1 : With needle thread release function	2	1/0	THOLD 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.	2	1/0	N-NPL 0	101
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	2	1/0	F-CMSP 0	102
23	Presser lifting function selection	Presser lifting function selection 0 : Ineffective 1 : Effective	2	1/0	F-AFL 0	
*	24	Function of fine adjustment of number of rotation	2	± 15%	F-FAS 0	
28	Number of stitches of bird's nest needle thread release	Effective in combination with machine head with bird's nest prevention function Number of stitches from start of sewing to release of needle thread can be set.	1	0 to 30	F-UTHR 1	

* Do not change the set values with asterisk (*) 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.

No.	Item	Description	Setting level	Setting range	Panel display Standard set value	Ref. Page	
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.	2	1/0	OBT 0	102	
31	Number of stitches of reverse feed stitching on the way	Number of stitches of reverse feed stitching on the way.	2	0 to 19	N-OBT 4	102	
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.	2	1/0	OBTS 0	102	
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.	2	1/0	OBTT 0	102	
*	35	Number of rotation at a low speed	Lowest speed by pedal	1	20 to 400	S-POS 200	
*	36	Number of rotation of thread trimming	Thread trimming speed	2	20 to 250	S-TRM 180	
	37	Number of rotation of soft-start	Sewing speed at the start of sewing (soft-start)	1	150 to 5500	S-SOFT 1200	
	38	One-shot speed	Setting of number of revolution at the time of one-shot automatic sewing	1	200 to 5500	S-ASS 2000	
*	39	Pedal stroke at the start of rotation	Position where the sewing machine starts rotating from pedal neutral position (Pedal stroke)	2	10 to 50	P-SSP 30	
*	40	Low speed section of pedal	Position where the sewing machine starts accelerating from pedal neutral position (Pedal stroke)	2	10 to 100	P-LSA 60	
*	41	Starting position of lifting presser foot by pedal	Position where the cloth presser starts lifting from pedal neutral position (Pedal stroke)	2	-60 to -10	P-FLW -21	
*	42	Starting position of lowering presser foot	Starting position of lowering presser foot Stroke from the neutral position	2	8 to 50	P-FLD 10	
*	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)	2	-60 to -10	P-TRM2 -51	
*	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)	2	10 to 150	P-MAX 150	
*	45	Compensation of neutral point of the pedal	Compensation value of the pedal sensor	2	-15 to 15	P-ANP 0	
*	46	Auto-lifter selecting function	Auto-lifter selection 0 : Solenoid drive system 1 : Pneumatic drive system	2	1/0	FLSEL 0	
*	47	Holding time of lifting auto-lifter	Limitation time of waiting for lifting solenoid type auto-lifter device	2	10 to 600	T-FL 60	103
*	48	Pedal stroke 1 for starting thread trimming	Position where thread trimming starts from pedal neutral position (Standard pedal) (Pedal stroke)	2	-60 to -10	P-TRM1 -35	
*	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.)	2	0 to 250	T-FLWT 140	105

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No.	Item	Description	Setting level	Setting range	Panel display Standard set value	Ref. Page
* 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.	1	-36 to 36	T-SON 0	103
* 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.	1	-36 to 36	T-SOFF 0	103
* 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.	1	-36 to 36	T-EOFF 0	103
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	2	1/0	FLAT 1	104
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	2	1/0	RATRM 0	104
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	2	1/0	HPOS 0	104
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).	2	1/0	SBTO 1	104
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.	2	1/0	SBTQ 0	104
* 64	Change-over speed of condensation stitch or EBT (end back tack)	Initial speed when starting EBT	2	0 to 250	S-WAIT 170	
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.	2	0/1	F-SDFL 0	105
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.	2	0 to 5	F-ACRA 0	105
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.	1	0 to 5	F-ACR 1	105
73	Retry function	This function is used when needle cannot pierce materials . 0 : Normal 1 : Retry function is provided.	1	1/0	F-RET 1	105
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	2	1/0	F-SCS 0	105

* Do not change the set values with asterisk (*) 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.

No.	Item	Description	Setting level	Setting range	Panel display Standard set value	Ref. Page
87	Function of pedal curve selection	Pedal curve is selected. (Improving pedal inching operation) 	2	0/1/2	F-PCS 0	106
89	Return of needle thread feed	Return of feed function 0 : Without function 1 : With function	2	1/0	TRS 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.	2	1/0	F-PMAT 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.	2	1/0	F-DSBT 0	105
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)	2	1/0	F-MADF 0	106
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.	2	50 to MAX	S-MAX 4000	106
100	Thread release at sewing start function	Thread release at sewing start function Setting of number of stitches to actuate thread release function at the start of sewing	2	0 to 9	F-THLS 0	
101	Counter function selection	Counter function selection Whether counter operates every thread trimming or manually is selected. 0 : Every thread trimming 1 : By manual SW	2	1/0	F-MAC 0	
103	Pedal sensor neutral compensation function	Pedal sensor neutral compensation function 0 : Pedal sensor neutral compensation function is ineffective 1 : Pedal sensor neutral compensation function is effective.	2	1/0	F-ANP 0	

* Do not change the set values with asterisk (*) 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.

10. DETAILED EXPLANATION OF SELECTION OF FUNCTIONS

(1) Selection of the soft-start function (Function setting No.1 N-SOFT)

The needle thread may fail to interlace with the bobbin thread at the start of sewing when the stitching pitch (stitch length) is small or a thick needle is used. To solve such problem, this function (called "soft-start") is used to limit the sewing speed, thereby assuring successful formation of the starting stitches.

0 : The function is not selected.

1 to 9 : The number of stitches to be sewn under the soft-start mode.

The sewing speed limited by the soft-start function can be changed. (Function setting No.37 S-SOFT)

Data setting range

150 to 5,500 rpm <50 rpm>

(2) Flicker reducing function (Function setting No.5 T-ACC)

The function reduces flickering of the hand lamp at the start of sewing. The higher the set value increases, the more effective the function will work.

Setting range

0 to 8

0 : Flicker reducing function does not work.

to

8 : Flickering is effectively reduced.

Reference : The more effective the flicker reducing function works (the more the set value is made), the lower the start-up speed of the sewing machine will become.

(3) Setting of the needle bar stop position when the sewing machine stops (Function setting No.10 NPS)

The position of the needle bar when the pedal is in its neutral position is specified.

0 : Down The needle bar stops in the lowest position of its stroke.

1 : Up The needle bar stops in the highest position of its stroke.

Reference : If the stop position of the needle bar is set to the highest position, the thread trimming action will be taken after the needle bar comes down once to the lowest position.

(4) Sound of click of the key switch mounted on the PSC box (Function setting No.11 SOUND)

This function selects whether the sound is effective or ineffective when operating the four key switches mounted on the PSC box.

0 : off The sound of click is ineffective.

1 : on The sound of click is effective.

(5) Optional switch function selection (Function setting No.12 SW 2) : It is used only when it is combined with the machine head provided with the optional switch.

Functions to be assigned to the optional switch can be selected from the following functions.

0 : No function (Standard setting)

1 : Needle up / down compensating stitching : Every time the switch is pressed, normal feed stitching by half stitch is performed. (Same operation as that of up/down compensating stitching switch on the panel.)

2 : No function

3 : No function

4 : Thread trimming function : This function is actuated as the thread trimming switch.

5 : Presser foot lifting function : This function is actuated as the foot lifter switch.

6 : One stitch compensating stitch : Every time the switch is pressed, one stitch stitching operation is executed.

7 : No function

8 : Pedal neutral presser lifting function selection

Do not set to 2, 3, and 7. If these numbers are set, trouble or accident will be caused.

(6) Neutral automatic presser lifting function (with AK device only) (Function setting No.21 N-NPL)

This function can automatically lift the presser foot when the pedal is in the neutral position.

Automatic lifting time of the pedal depends on the automatic lifting time after thread trimming and when the presser foot is automatically lowered, it is automatically lifted at the second neutral position after it has come off the neutral position once.

0 : off Function of neutral automatic presser lifting is not operative.

1 : on Selection of function of neutral automatic presser lifting

(7)Function of changeover of needle up/down compensating switch on the operation panel function (Function setting No. 22 F-CMSP)

Function of needle up/down compensating switch on the panel of IP-100 can be changed over to needle up/down compensating stitching or one stitch compensating stitching.

- 0 : Needle up/down compensating stitching
- 1 : One stitch compensating stitching

(8)Function of reverse feed stitching on the way (Function setting Nos. 30 to 33 OBT, OBTS, OBTT)

Functions of the limit of number of stitches and thread trimming command can be added to the touch back switch on the sewing machine head.

Function setting No. 30 Function of reverse feed stitching on the way is selected.

- 0 : off Normal back-tack function
- 1 : on Function of reverse feed stitching on the way

Function setting No. 31 Number of stitches performing reverse feed stitching on the way is set.
0 to 19 stitches <1 / stitch>

Function setting No. 32 Effective condition of reverse feed stitching on the way

- 0 : off Inoperative when the sewing machine stops.
(Reverse feed stitching on the way functions only when the sewing machine is running.)
- 1 : on Operative when the sewing machine stops.
(Reverse feed stitching on the way functions both when the sewing machine is running and stops.)

Reference : Either condition is operative when the sewing machine is running.

Function setting No. 33 Thread trimming is performed when reverse feed stitching on the way is completed.

- 0 : off Without thread trimming
- 1 : on Thread trimming is executed.

Actions under each setting state

Application	Function setting			Output function
	No.30	No.32	No.33	
	0	0 or 1	0 or 1	It works as normal touch-back switch.
	1	0	0	When operating touch-back switch at the time of depressing front part of the pedal, reverse feed stitching as many as the number of stitches specified by the function setting No. 31 can be performed.
	1	1	0	When operating touch-back switch at the time of either stop of the sewing machine or depressing front part of the pedal, reverse feed stitching as many as the number of stitches specified by the function setting No. 31 can be performed.
	1	0	1	When operating touch-back switch at the time of depressing front part of the pedal, automatic thread trimming is performed after reverse feed stitching as many as the number of stitches specified by the function setting No. 31 has been performed.
	1	1	1	When operating touch-back switch at the time of either stop of the sewing machine or depressing front part of the pedal, automatic thread trimming is performed after reverse feed stitching as many as the number of stitches specified by the function setting No. 31 has been performed.

Used as the normal reverse feed stitching touch-back switch.

Used for reinforcing seam (press sewing) of the pleats. (It works only when the sewing machine is running.)

Used for reinforcing seam (press sewing) of the pleats. (It works either when the sewing machine stops or when the sewing machine is running.)

Used as starting switch for reverse feed stitching at the sewing end. (Used as the substitute for thread trimming by depressing back part of the pedal. It works only when the sewing machine is running. It is especially effective when the sewing machine is used as the standing-work machine.)

Used as starting switch for reverse feed stitching at the sewing end. (Used as the substitute for thread trimming by depressing back part of the pedal. It works either when the sewing machine stops or when the sewing machine is running. It is especially effective when the sewing machine is used as the standing-work machine.)

(Caution) It is not possible with LZ-2290A.

Touch-back kit (separately sold, Part No. 40003526) is necessary.

(9)Holding time of lifting presser foot (Function setting No.47 T-FL)

Solenoid type presser foot lifter (No. 46 0) can adjust the holding time control of lifting presser foot. This function automatically lowers the presser foot when the time set with the setting No. 47 has passed after lifting the presser foot.

When the pneumatic type presser foot lifter (No. 46 1) is selected, the holding time control of lifting presser foot is limitless regardless of the set value.

Setting range
10 to 600 sec <10 / sec>

(10) Compensation of timing of the solenoid for reverse feed stitching (Function setting Nos.51 to 53 T-SON, T-SOFF, T-EOFF)

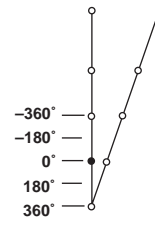
When the normal and reverse feed stitches are not uniform under the automatic reverse feed stitching action, this function can change the ON/OFF timing of the solenoid for back tack and compensate the timing.

1) Compensation of on-timing of solenoid for reverse feed stitching at the start of sewing (Function setting No. 51)

On-timing of solenoid for reverse feed stitching at the start of sewing can be compensated in the increments of 10°.

Adjusting range
-36 to 36 <1/10°>

Set value	Compensation angle	Number of stitches of compensation
-36	-360°	-1
-18	-180°	-0.5
0	0°	0
18	180°	0.5
36	360°	1



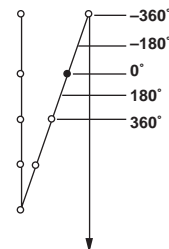
When the point before 1 stitch is regarded as 0°, compensation is possible by 360° (1 stitch) in front and in the rear.

2) Compensation of off-timing of solenoid for reverse feed stitching at the start of sewing (Function setting No. 52)

Off-timing of solenoid for reverse feed stitching at the start of sewing can be compensated in the increments of 10°.

Adjusting range
-36 to 36 <1/10°>

Set value	Compensation angle	Number of stitches of compensation
-36	-360°	-1
-18	-180°	-0.5
0	0°	0
18	180°	0.5
36	360°	1

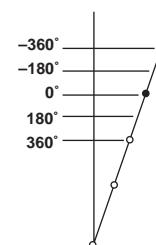


3) Compensation of off-timing of solenoid for reverse feed stitching at the end of sewing (Function setting No. 53)

Off-timing of solenoid for reverse feed stitching at the end of sewing can be compensated in the increments of 10°.

Adjusting range
-36 to 36 <1/10°>

Set value	Compensation angle	Number of stitches of compensation
-36	-360°	-1
-18	-180°	-0.5
0	0°	0
18	180°	0.5
36	360°	1



(11) Foot lift function after thread trimming (Function setting No.55 FLAT)

This function can automatically lift the presser foot after thread trimming. This function is effective only when it is used in combination with the AK device.

- 0 : off Function of automatically lifting the presser foot is not provided.
(Presser foot does not automatically go up after thread trimming.)
- 1 : on Function of automatically lifting the presser foot is provided.
(Presser foot automatically goes up after thread trimming.)

(12) Reverse revolution to lift the needle after thread trimming (Function setting No.56 RATRM)

This function is used to make the sewing machine rotate in the reverse direction after thread trimming to lift the needle bar almost to highest position. Use this function when the needle appears under the presser foot and it is likely to make scratches on the sewing products of heavy-weight material or the like.

- 0 : off Function of making the sewing machine rotate in the reverse direction to lift the needle after thread trimming is not provided.
- 1 : on Function of making the sewing machine rotate in the reverse direction to lift the needle after thread trimming is provided.

(Caution) The needle bar is raised, by rotating the machine in the reverse direction, almost to the highest dead point. This may result in slip-off of the needle thread. It is therefore necessary to adjust the length of thread remaining after thread trimming properly.

Reference : When the function of reverse revolution to lift the needle after thread trimming is set, the needle bar is out of the UP position after thread trimming. It is necessary to turn the handwheel by hand when turning ON the power next time. It is not possible to enter the edit screen at the time of reverse revolution to lift the needle after thread trimming. It is necessary to adjust the position to UP position by turning the handwheel by hand before entering the edit screen.

(13)Function of holding predetermined upper / lower position of the needle bar (Function setting No.58 HPOS)

When the needle bar is in the upper position or in the lower position, this function holds the needle bar by applying a brake slightly.

- 0 : off Function of holding predetermined upper/lower position of the needle bar is ineffective.
- 1 : on Function of holding predetermined upper/lower position of the needle bar is effective.

(14)Change-over function of AUTO/Pedal for sewing speed of the reverse feed stitching at the start of sewing (Function setting No.59 SBTO)

This function selects whether the reverse feed stitching at the start of sewing is performed without a break at the speed set by the function setting No. 8 or the stitching is performed at the speed by the pedal operation.

- 0 : Manu The speed is indicated by the pedal operation.
- 1 : Auto Automatic stitching at the specified speed

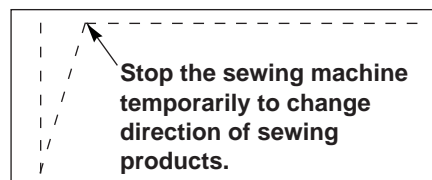
**(Caution) 1. The max. sewing speed of the reverse feed stitching at the start of sewing is limited to the speed set by the function setting No. 8 regardless of the pedal.
2. When "0" is selected, stitches of reverse feed stitching may not match those of normal feed stitching.**

(15) Function of stop immediately after the reverse feed stitching at the start of sewing (Function setting No.60 SBTQ)

This function temporarily stops the sewing machine even when keeping depressing the front part of the pedal at the time of completion of process of reverse feed stitching at the start of sewing.

It is used when sewing a short length by reverse feed stitching at the start of sewing.

- 0 : Not provided with the function of temporary stop of the sewing machine immediately after the reverse feed stitching at the start of sewing
- 1 : Provided with the function of temporary stop of the sewing machine immediately after the reverse feed stitching at the start of sewing



(16) Function of soft-down of presser foot (with AK device only)

(Function setting Nos.70 and 49 F-SDFL, T-FLWT)

This function can softly lower the presser foot.

This function can be used when it is necessary to decrease contact noise, cloth defect, or slippage of cloth at the time of lowering the presser foot.

(Caution) Change the time of function setting No. 49 together at the time of selecting the function of soft-down since the sufficient effect cannot be obtained unless the time of function setting No. 49 is set longer when lowering the presser foot by depressing the pedal.

0 to 250 ms

10 ms/Step

0 : Function of soft-down of presser foot is not operative. (Presserfoot is rapidly lowered.)

1 : Selection of function of soft-down of presser foot

(17) Function of improving inching operation

(Function setting Nos.71 and 72 F-ACRA, F-ACR)

This function improves operability of one-stitch sewing by operating the high-speed switch for the pedal or sewing machine for standing work.

The more the set value becomes, the more the speed limitation at the start of rotation is remarkably added and operability of one-stitch sewing is improved.∞

Function setting No. 71 limits the speed at the time of re-acceleration on the way of reducing speed.

Function setting No. 72 limits acceleration from the stop state.

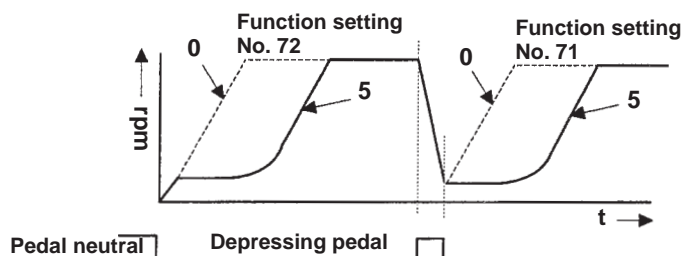
(Caution) This function fails to work when turning ON the power or starting sewing immediately after thread trimming.

0 to 5

1/Step

0 to 5

1/Step



(18) Function of reducing speed of reverse feed stitching at the start of sewing

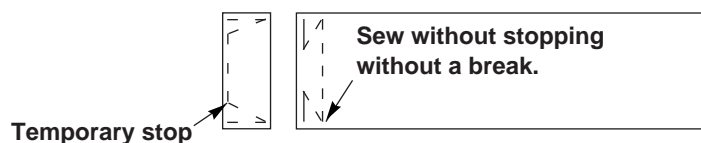
(Function setting No.92 F-DSBT)

Function to reduce speed at the time of reverse feed stitching at the start of sewing. : Normal use depending on the pedal condition (Speed is accelerated to the highest without a break.)

This function is used when temporary stop is used properly. (Cuff and cuff attaching)

0 : Speed is not reduced.

1 : Speed is reduced.



(19) Retry function (Function setting No.73 F-RET)

When the retry function is used, if the sewing material is thick and not pierced with needle, this function makes the needle pierce in the material with ease.

0 : Normal

1 : Retry function is provided.

(20) Function to select the start-up speed of the sewing machine

(Function setting No.76 F-SCS)

This function is selected in the case where the speed of the sewing machine is desired to be more at the time of start-up. (Time required to start is shortened by approximately 10%.)

0 : Normal curve

1 : More sharp curve

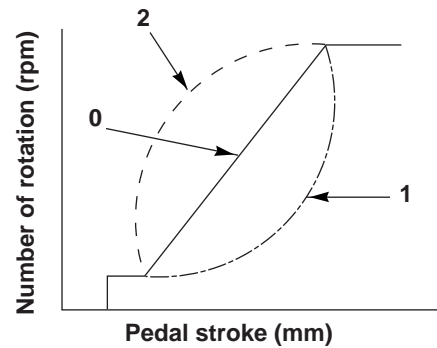
(Caution) If "1" is set, motor may move irregularly. In addition, noise may occur when the sewing machine is running or noise may increase when the sewing machine is running.

(21) Function of pedal curve selection (Function setting No.87 F-PCS)

This function can perform the selection of the curve of number of rotation of the sewing machine against the depressing amount of the pedal.

Change to this function when you feel that inching operation is hard or that pedal response is slow.

- 0 : Number of rotation of the sewing machine in terms of the depressing amount of the pedal increases linearly.
- 1 : Reaction to intermediate speed in terms of the depressing amount of the pedal is delayed.
- 2 : Reaction to intermediate speed in terms of the depressing amount of the pedal is advanced.



(22) Function added to the needle up / down compensating switch (Function setting No.93 F-MADF)

One stitch operation can be performed only when the needle up / down compensating switch is pressed at the time of upper stop immediately after turning ON the power switch or upper stop immediately after thread trimming.

- 0 : Normal (Only needle up / down compensating stitching operation)
- 1 : One stitch compensating stitching operation (upper stop $\hat{=}$ upper stop) is performed only when aforementioned changeover is made.

(23) Setting of max. number of rotation of the sewing machine head (Function setting No.96 S-MAX)

This function can set the max. number of rotation of the sewing machine head you desire to use.

Upper limit of the set value varies in accordance with the sewing machine head to be connected.

50 to Max. [rpm]

11. EXTERNAL OUTPUT/INPUT CONNECTORS

The following convenient signals are prepared to CN56 on CTL circuit board 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.

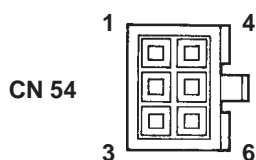
Table of allocation of the connector and signal

CN56	Name of signal	Output/input	Description	Electric spec.
1	+5V			DC5V, 50 mA
2			Prohibited to use	
3			Prohibited to use	
4	UDET	Output	"L" is output when the needle bar is in its upper position.	DC5V, 1 mA
5	DDET	Output	"L" is output when the needle bar is in its lower position.	DC5V, 1 mA
6	HS/LS	Output	Rotation pulse output of 360 and 45 rotation by changeover of W2	DC5V, 1 mA
7	BT	Output	"L" is output when the back solenoid is driven.	DC5V, 1 mA
8	TRM	Output	"L" is output when the thread trimming solenoid is driven.	DC5V, 1 mA
9	LSW	Output	"H" is output when the rotation is commanded.	DC5V, 1 mA
10	S.STATE	Output	"L" is output when the sewing machine is in stopping state.	DC5V, 1 mA
11	LSWINH	Input	Rotation by pedal is prohibited while "L" signal is inputted.	DC5V, -5 mA
12	SOFT	Input	Speed of rotation is limited to soft-speed while "L" signal is inputted.	DC5V, -5 mA
13	GND			

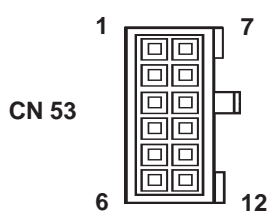
JUKI genuine Part No.	Part No. of connector : HK016510130	Part No. of pin contact : HK016540000
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(1) Connector connection diagram

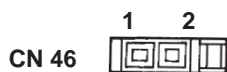
Machine head solenoid



- 1-4 TRM (Thread trimming) Approx. 7.5 Ω
- 2-5 BT (Reverse feed stitching) Approx. 6.5 Ω

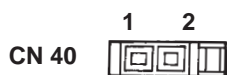


- 5-11 WP (Wiper) Approx. 8.5 Ω
- 6-12 TL (Thread release) Approx. 12.5 Ω



- 1-2 TLSUB (Thread feeding) Approx. 27 Ω

Presser lifting solenoid



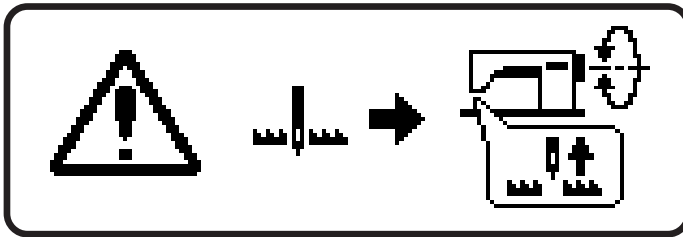
- 1-2 FL (Presser lifting) Approx. 5.4 Ω

12. ERROR DISPLAY

(1) ERROR DISPLAY

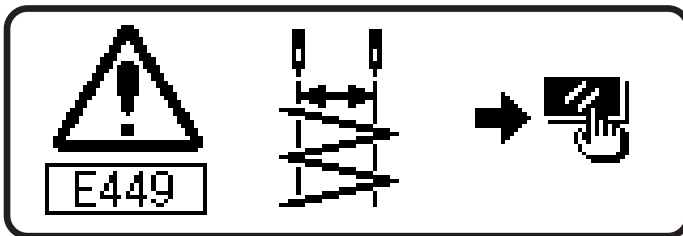
- * Error is informed by means of the panel display, machine head mirror LED blink and control box buzzer.

Three different kinds of screens of the panel display screen appear due to the difference of the procedures.



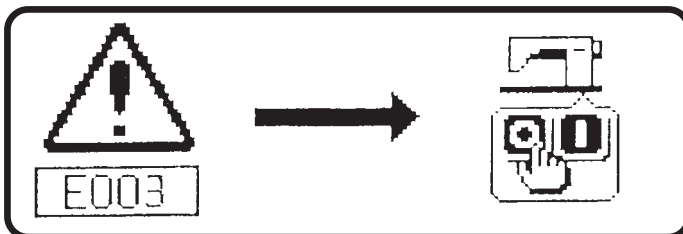
- 1) Error screen disappears when the operator removes the cause.

Example) The needle position is not in its UP position.
Make the needle position UP by turning the handwheel by hand.



- 2) Press the reset switch, and remove the cause of error after erasing the error screen.



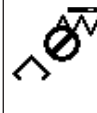
Example) E449 Max. zigzag width limitation error.
Press the reset switch.





- 3) Remove the cause of error after turning OFF the power.

(2) Error code list (Error display in panel)

There are the following error codes in this device. These error codes interlock (or limit function) and inform the problem so that the problem is not enlarged when any problem is discovered. When you request our service, please confirm the error codes.

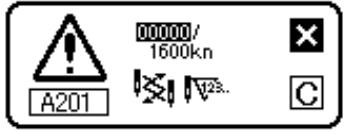
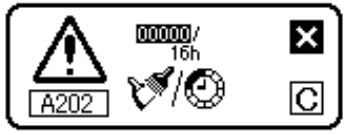
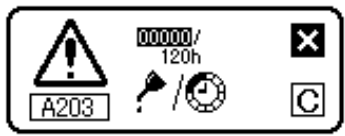
No.	Description of error detected	Cause	Item to be checked or corrective measure	Mirror LED flash	Pictograph display
-	UP position detection error when turning ON the power	<ul style="list-style-type: none"> When needle position is not UP position at the time of turning ON the power. 	<ul style="list-style-type: none"> Set to UP position by turning handwheel by hand. Connect synchronizer connector. 	-	
-	Smart media cover open	<ul style="list-style-type: none"> Lid of smart media slot is open. 	<ul style="list-style-type: none"> Close the lid. 	-	
003	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 (CN30) for loose connection and disconnection. Check whether the synchronizer cord has broken since the cord is caught in the machine head or the like. 	-	
004	Synchronizer lower position sensor failure				
005	Synchronizer upper position sensor failure				
007	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. 	-	
008	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 (CN54) for loose connection and disconnection. 	-	
011	Smart media not inserted	<ul style="list-style-type: none"> Smart media is not inserted. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
012	Read error	<ul style="list-style-type: none"> Data read from smart media is not possible. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
013	Write error	<ul style="list-style-type: none"> Data write to smart media is not possible. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
014	Write protect	<ul style="list-style-type: none"> Smart media is in write prohibition state. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
015	Format error	<ul style="list-style-type: none"> Formatting cannot be performed. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
016	External media capacity over	<ul style="list-style-type: none"> Media capacity of smart media is short. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
019	File size over	<ul style="list-style-type: none"> File is too big. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
024	Pattern data size over	<ul style="list-style-type: none"> Number of stitches and data amount which can be handled with device are over. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
032	File compatibility error	<ul style="list-style-type: none"> There is no file compatibility. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
040	Travel limit over	<ul style="list-style-type: none"> Sewing data has exceeded sewing possible area. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
042	Operation error	<ul style="list-style-type: none"> Operation of sewing data cannot be performed. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
302	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. 	-	
490	Pattern setting error of continuous stitching and cycle stitching	<ul style="list-style-type: none"> When pattern No. is not set to continuous stitching. When the number of stitches of 1st step of continuous stitching is '0'. When pattern No. is not set to cycle stitching. 	<ul style="list-style-type: none"> Re-enter data after reset operation. Set pattern No. and number of stitches. 	7 times flash	
491	Cycle stitching pattern error	<ul style="list-style-type: none"> When pattern to be used in cycle stitching becomes error. 	<ul style="list-style-type: none"> Re-enter data after reset operation. Correct data of pattern which becomes error. 	7 times flash	

No.	Description of error detected	Cause	Item to be checked or corrective measure	Mirror LED flash	Pictograph display
492	Data deletion impossible	<ul style="list-style-type: none"> When data to be deleted is used in pattern sewing, continuous stitching or cycle stitching. 	<ul style="list-style-type: none"> Reset operation In case of deletion, release the use of pattern sewing, continuous stitching or cycle stitching used, and perform again deletion. 	-	
493	Condensation custom pattern width error	<ul style="list-style-type: none"> When zigzag width of condensation custom pattern is larger than max. zigzag width limitation. 	<ul style="list-style-type: none"> Re-enter data after reset operation. Set zigzag width of condensation custom pattern within max. zigzag width limitation. 	7 times flash	
498	Position of stitch base line error	<ul style="list-style-type: none"> When the set zigzag width is within max. zigzag width limitation, but zigzag position exceeds max. zigzag width limitation according to the position of stitch base line. 	<ul style="list-style-type: none"> Re-enter data after reset operation. Set the position of stitch base line within max. zigzag width limitation. When condensation custom is selected, check and correct the position of condensation. 	7 times flash	
499	Max. zigzag width error	<ul style="list-style-type: none"> When specified zigzag width is within max. zigzag width limitation, but zigzag position exceeds max. zigzag width limitation according to the position of stitch base line. 	<ul style="list-style-type: none"> Re-enter data after reset operation. Set the position of stitch base line within max. zigzag width limitation. 	7 times flash	
703	Connection of panel which is not supposed	<ul style="list-style-type: none"> When panel connected to the sewing machine is the kind which is not supposed. 	<ul style="list-style-type: none"> Turn OFF the power. Connect the proper panel. 	-	
704	Inconsistency of system versions	<ul style="list-style-type: none"> When system versions are inconsistent. 	<ul style="list-style-type: none"> Turn OFF the power. Consist system versions with each other. 	-	
730	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 (CN38) 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. broken since the cord is caught in the machine head or the like. 	-	
731	Motor hole sensor failure				
733	Reverse rotation of main shaft motor	<ul style="list-style-type: none"> State that the sewing machine is rotating in the different direction from the normal rotating direction at 500 rpm or more continues 40 times or more while motor is running (excluding holding of needle position). 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
810	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. 	-	
811	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. 	-	
813	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. 	-	
838	85V low voltage error	<ul style="list-style-type: none"> When 85V detection sensor judges that voltage is low. 	<ul style="list-style-type: none"> Turn OFF the power. 	-	
907	Zigzag drive origin error	<ul style="list-style-type: none"> Origin sensor of zigzag drive motor is not detected. 	<ul style="list-style-type: none"> Turn OFF the power. Trouble of origin sensor of zigzag drive motor Disconnection of relay cable of zigzag drive motor Trouble of zigzag drive circuit 	-	

No.	Description of error detected	Cause	Item to be checked or corrective measure	Mirror LED flash	Pictograph display
915	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 (CN34) 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. 	4 times flash	
916	Communication failure between MAIN and main shaft control CPU	<ul style="list-style-type: none"> • When main shaft fails to communicate with MAIN. • When MAIN fails to communicate with main shaft. 	<ul style="list-style-type: none"> • Turn OFF the power. • Turn OFF the power. 	-	
917	Communication failure between panel and personal computer	<ul style="list-style-type: none"> • Panel fails to communicate with personal computer. 	<ul style="list-style-type: none"> • Turn OFF the power. 	-	
919	Overheat error	<ul style="list-style-type: none"> • When temperature of inside of electrical box has abnormally risen. 	<ul style="list-style-type: none"> • Turn OFF the power. • Cleaning of fan filter • Removal of cause of temperature rise of electrical box 	-	
922	Main shaft motor control is impossible.	<ul style="list-style-type: none"> • When main shaft motor cannot be controlled. 	<ul style="list-style-type: none"> • Turn OFF the power. 	-	
924	Motor driver failure	<ul style="list-style-type: none"> • Motor driver has broken. 		-	
940	Bird's nest sequence error	<ul style="list-style-type: none"> • Bird's nest prevention sequence is not completed. 	<ul style="list-style-type: none"> • Turn OFF the power. 	-	
942	Main shaft EEPROM failure	<ul style="list-style-type: none"> • Writing is not completed even after the lapse of 10 [ms] or more. 	<ul style="list-style-type: none"> • Turn OFF the power. 	-	
943	MAIN EEPROM failure	<ul style="list-style-type: none"> • Writing is not completed even after the lapse of 10 [ms] or more. 	<ul style="list-style-type: none"> • Turn OFF the power. 	-	
948	FROM failure	<ul style="list-style-type: none"> • Deletion or writing of FROM cannot be performed at the time of downloading program. 	<ul style="list-style-type: none"> • Turn OFF the power. 	-	
-	Servo motor RAM error	<ul style="list-style-type: none"> • RAM check error when the power is turned ON. 	<ul style="list-style-type: none"> • Turn OFF the power. 	LED flash (Caution) 1	
-	Main RAM error	<ul style="list-style-type: none"> • RAM check error when the power is turned ON. 	<ul style="list-style-type: none"> • Turn OFF the power. 	LED is lit up.	

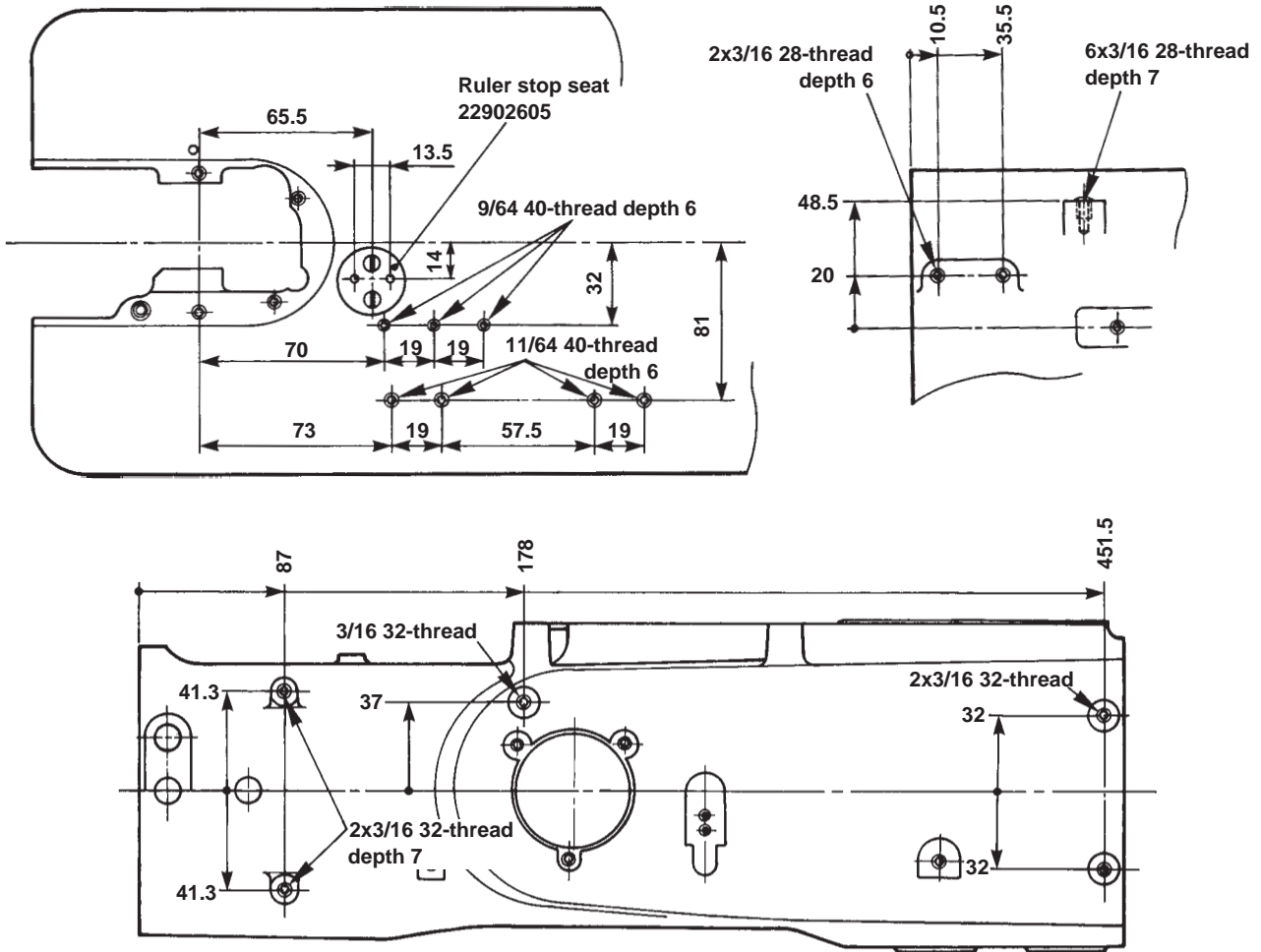
(Caution) 1 Flash of LD 2 on the circuit board

(3)Warning list

No	Contents and display of warning	Corrective measure	Remarks
A201	Replacement of needle warning 	<ul style="list-style-type: none"> • Press X to close warning screen, and perform replacement of needle. Then clear the value in the clear screen. • Press C to clear the value, and perform replacement of needle. 	Refer to Instruction Manual 6-15-(2) Sewing management information.
A202	Cleaning warning 	<ul style="list-style-type: none"> • Press X to close warning screen, and perform cleaning. Then clear the value in the clear screen. • Press C to clear the value, and perform cleaning. 	Refer to Instruction Manual 6-15-(2) Sewing management information.
A203	Replacement of oil warning 	<ul style="list-style-type: none"> • Press X to close warning screen, and perform replacement of oil. Then clear the value in the clear screen. • Press C to clear the value and perform replacement of oil. 	Refer to Instruction Manual 6-15-(2) Sewing management information.

13. 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.

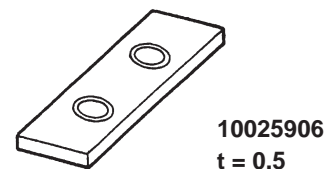


14. SPARE PARTS

1) Without the thread trimmer

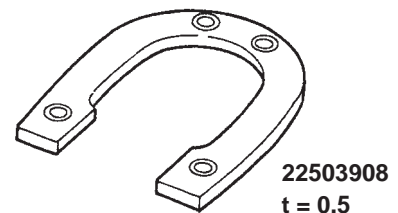
Feed base spacer (Part No. : 10025906)

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.



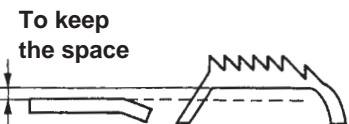
2) With the thread trimmer

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)

* Spacers are supplied as accessories for ASS and ADS. Spacers are installed at the time of delivery for ADU and ASU.



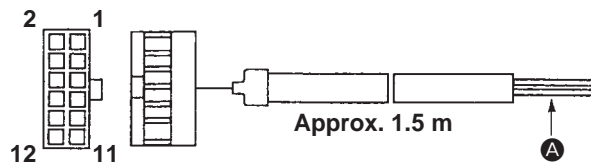
3) Exclusive grease

* 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.2. (Accessories : JUKI grease A tube Part No. : 40006323 containing 10g)

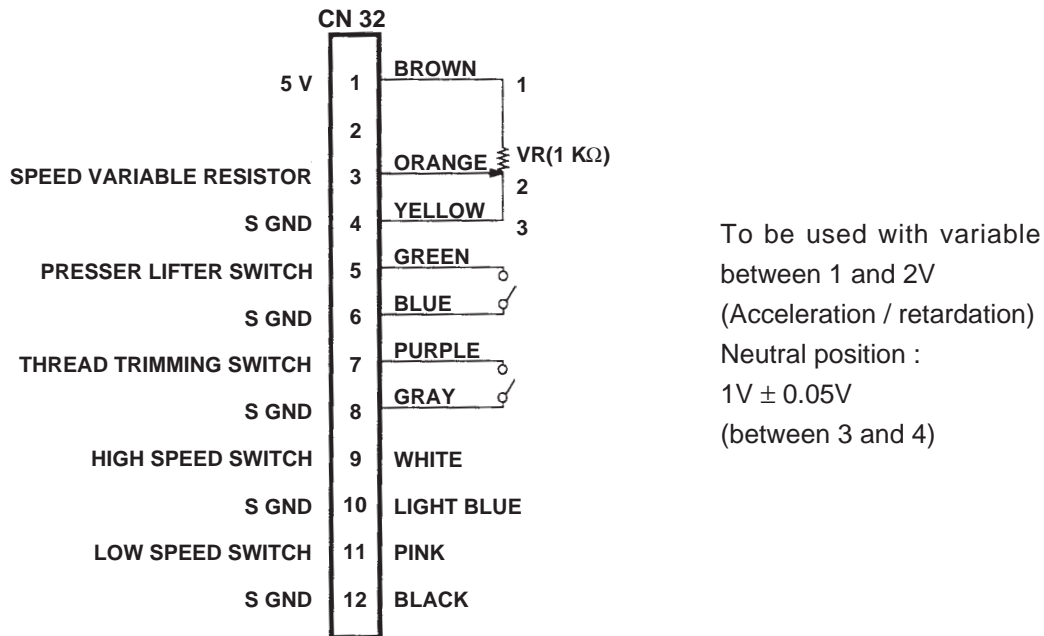
Addition of the grease is not necessary for general use of the sewing machine. In the case where the sewing machine is used under the specially severe conditions, it is effective to periodically fill the exclusive grease (once in one to two years).

15. OPTIONAL CORD

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

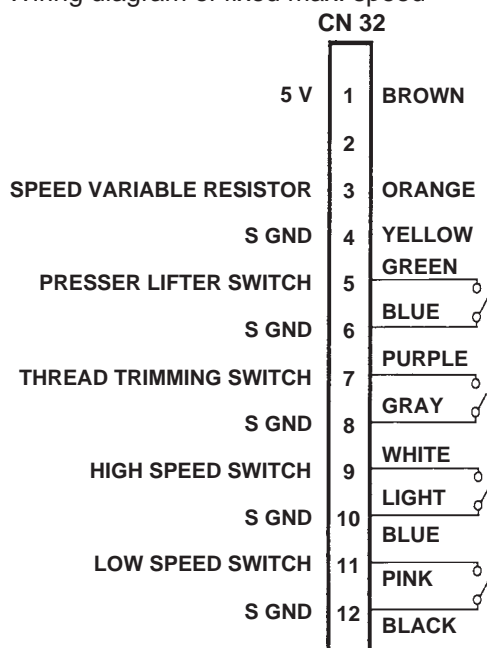


1) Wiring diagram of variable pedal PK-70, -71



- Power source section **A** 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 (CN32) of pedal for standing machine in PSC box.

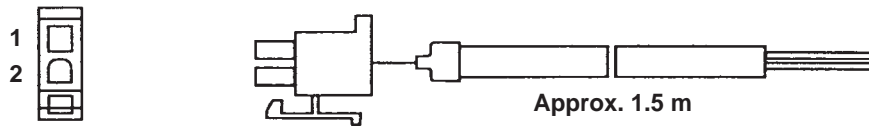
2) Wiring diagram of fixed max. speed



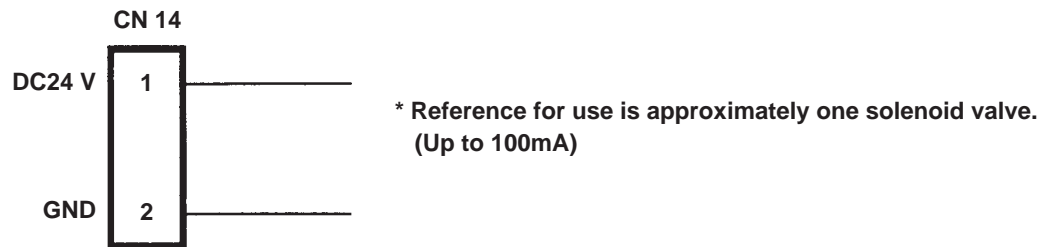
Use this cord by inserting it into the connector (CN32) of pedal for standing machine in PSC box.

(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 (CN14 2P) of 24V of PWR printed circuit board in PSC box.

16.TROUBLES AND CORRECTIVE MEASURES

(1) With regard to lubrication

1) There is worn-out or play at mechanical section of the face plate section.

Trouble	Cause and corrective measure
1. Inside of the face plate section has dried out.	<ul style="list-style-type: none"> • Check whether crank rod and face plate section oil wick come in contact with each other. → Refer to "(8) Lubricating to face plate section of 5. MAINTENANCE". • Fill the oil wick with oil as pump priming in case of a long period of disuse. • Check whether oil is supplied to the face plate section lubricating tank. → Refer to "(8) Lubricating to face plate section of 5. MAINTENANCE". • Check whether the oil wick in the face plate section lubricating tank comes in contact with oil. → Refer to "(8) Lubricating to face plate section of 5. MAINTENANCE".
2. Grease is insufficient.	<ul style="list-style-type: none"> • Apply or fill the exclusive grease. → Refer to (9) Protruding amount of the hook shaft of 5. MAINTENANCE".

2) Oil leaks from the face plate section.

Trouble	Cause and corrective measure
1. Oil fails to circulate.	<ul style="list-style-type: none"> • Plunger is not fitted in the groove of plunger. → Adjust so that they are fitted with each other. • Check whether there is an air hole in the pipe. → Replace the pipe with a new one.
2. Oil amount in the face plate section is excessive.	<ul style="list-style-type: none"> • Oil is excessively supplied to the face plate section oil wick when performing the continuous operation. → Refer to "(8) Lubricating to face plate section of 5. MAINTENANCE".


3) Oil amount in the hook is unstable.

Trouble	Cause and corrective measure
1. Oil amount in the hook cannot be obtained.	<ul style="list-style-type: none"> • Check whether the hook shaft oil wick is stained. → Refer to "(22) Adjusting the amount of oil in the hook of 3. STANDARD ADJUSTMENT". • Check whether the position of hook shaft oil wick is proper. → Refer to "(22) Adjusting the amount of oil in the hook of 3. STANDARD ADJUSTMENT". • Check whether the position of hook shaft is proper. → Refer to "(9) Protruding amount of the hook shaft of 5. MAINTENANCE". • Check whether the hook lubricating pipe oil filter is stained. → Refer to "(3) Maintenance of the hook lubricating pipe oil filter of 5. MAINTENANCE". • Check whether the hook lubricating oil is contained. → Refer to "(32) Lubrication of 3. STANDARD ADJUSTMENT".
2. Plunger pump fails to work.	<ul style="list-style-type: none"> • Plunger is not fitted in the groove of plunger. → Adjust so that they are fitted with each other.
3. Oil in the pipe does not move.	<ul style="list-style-type: none"> • Check whether there is an air hole in the pipe. → Replace the pipe with a new one.
4. Oil amount in the hook is not stable.	<ul style="list-style-type: none"> • Check whether air is mixed. → Draw out the air. • Adjust the oil amount in the direction of reducing after once excessively increasing the amount. → Refer to "(22) Adjusting the amount of oil in the hook of 3. STANDARD ADJUSTMENT".

3) Gear is noisy.

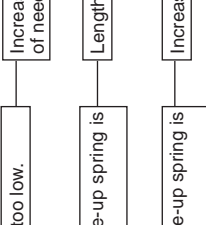


Trouble	Cause and corrective measure
1. Bevel gear section (Gear Box small)	<ul style="list-style-type: none">• Check the oil in the gear box. → Refer to "(6) Hook shaft gear of 5. MAINTENANCE".• Check the backlash amount. → Refer to "(6) Hook shaft gear of 5. MAINTENANCE".
2. Spur gear section (Gear Box large)	<ul style="list-style-type: none">• Check the backlash amount. → Refer to "(1) Adjusting and assembling of the gear box (large) of 4. DISASSEMBLING/ASSEMBLING".• Check whether the air vent cap for transportation is removed. → Air is not extracted and oil leaks. Adjust the oil amount to the normal one. Refer to "(4) Removing/installing the gear box cover of 4. DISASSEMBLING/ASSEMBLING".

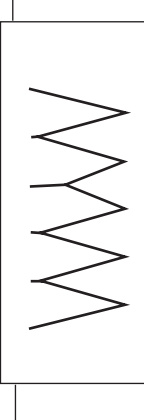
(2) With regard to sewing


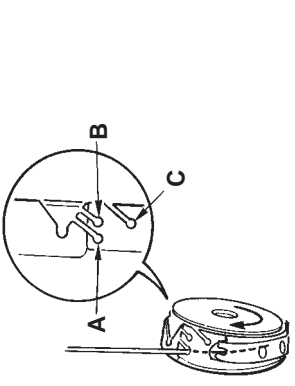
Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure
1. Thread breakage	<p>1-1) Stitches are not properly formed. (Lower cloth)</p>  <p>Thread knots are made.</p>	Smaller thread loops are produced.	Stroke of the thread take-up spring is too large.	Reduce the stroke of the thread 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.
		Thread breakage occurs when the needle throws to the left.	The auxiliary thread take-up lever excessively works.	Lower the auxiliary thread take-up lever.
		Larger thread loops are produced and they tilt.	Both the needle thread tension and bobbin thread tension are too high.	Reduce the tension to balance the needle thread and bobbin thread.
		Thread breakage occurs when the needle throws to the left.	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.	Stroke of the thread take-up spring is too small.	Lengthen the stroke of the thread take-up spring.
		The material flops.	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.
			If the needle guard works excessively, raise the needle guard.	
			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.	

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Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure
From the previous page	From the previous page			
		Blade point of the hook is defective.		Correct the blade point of the hook or replace the hook with a new one.
		The needle vibrates during sewing.		Adjust the needle guard so that it works more effectively.
1-2)	The thread breaks when the needle reaches the lowest position of its stroke.  (Lower cloth)	The time when the needle and bobbin threads go over the hook is too late. As a result the threads break under the hook.	The needle thread tension is too low.	Increase the needle thread tension. Then balance the tension of needle and bobbin threads.
			The stroke of the thread take-up spring is too small.	Lengthen the stroke of the thread take-up spring.
			The tension of the thread take-up spring is too low.	Increase the tension of the thread take-up spring.
			The tension provided by the pre-tension disk is too low.	Increase the tension provided by the pre-tension disk.
			The bobbin case holder stopper is positioned too near to the needle.	Adjust the position of the bobbin case stopper by moving it away from the needle.
1-3)	Miscellaneous Thread breakage occurs when sewing joining section between scallops 	The sewing machine fails to perform sewing with consistency because of excessively low thread tension.		Set the thread tension at a higher value. (F or reference, 65 g for the needle thread and 25 g for the bobbin thread)
2. Stitch skipping		Same causes as "1-1) Stitches are not properly formed."		
3. Isolated idling loops		Presser foot components are defective.	The needle slot in the presser foot is located this side of the needle slot in the throat plate.	Replace the presser foot with a new one, or correct the presser bar.
			The presser foot rises.	Return the micro-lifting mechanism to the home position, or readjust the position of the presser bar bracket.
			Recess on the sole of the presser foot is smaller for the stitch length employed.	Replace the presser foot with a new one.
				Increase the needle thread tension.
		The thread take-up spring has been improperly adjusted.	The stroke of the thread take-up spring is too small.	
			Tension of the thread take-up spring is too low.	
		The bobbin case holder stopper is defective.		Maximize the distance between the bobbin case and the hook as long as the bobbin case does not rotate.

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>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>
		<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>	

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> 	The needle thread tension and bobbin thread tension are too high.	<p>Thread path has been poorly finished.</p> <p>Feed timing is excessively advanced.</p> <p>Thread enters in hole B or C in the bobbin case.</p>	<p>Finish the thread path to smoothen its surface.</p> <p>Adjust the feed timing to the proper one.</p> <p>Enter thread in hole A of the bobbin case.</p> 
6. Uneven material feed	<p>The upper cloth and lower cloth shift in the feeding direction.</p>	The presser foot is defective.	<p>The presser foot pressure is too low.</p> <p>Failed parallelism of the presser foot</p> <p>Needle slot in the throat plate is too large.</p> <p>The recess on the sole of the presser foot is too large.</p> <p>The needle has a blunt tip.</p>	<p>Increase the presser foot pressure.</p> <p>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>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>Replace the presser foot with another one which has a smaller recess or no recess.</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>	The presser foot is defective.	<p>Presser foot pressure is too high.</p> <p>The sole of the presser foot has been poorly finished.</p> <p>Failed inclination of the feed dog.</p> <p>Height of the feed dog is excessive.</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>Buff up the sole of the presser foot to enable the material to be smoothly fed under the presser foot.</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>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>

Trouble	Cause 1	Cause 2	Corrective measure and
7. Needle thread is not trimmed at the time of idle stitching.	Stroke of the thread take-up spring is too large.	Rough motion of needle thread occurs at the time of thread trimming and knife misses needle thread and does not trim it.	Decrease the stroke of thread take-up spring. (When decreasing the stroke, be careful of the isolated idling loops.)
8. Wiper fails to sweep thread.	When sewing product is thin and needle thread tension is low, thread draw-out amount is excessive and wiper fails to sweep the thread.		Adjust the needle thread draw-out unit so that the needle thread draw-out amount is reduced.
(Bird's nest prevention type)			
9. Defective needle thread clamp	Remaining length of needle thread is too short.	Thread is swept with the wiper and brought to the suction port. However, needle thread is too short and comes off the wiper on the way or fails to be sucked.	Adjust the length of remaining thread so that the length of needle thread after thread trimming is adjusted to approximately 15 mm of suction amount.
	Position of the wiper is improper.		Place the wiper at the proper position.
	Air pressure is decreased, suction force is decreased and thread is not sucked.		Adjust to the standard pressure, 0.6MPa.
		Air consumption in the factory is increased and the pressure is decreased.	Install more air compressors.
	Air pressure is decreased and thread is not sucked since dust bag clogs with too much thread waste.		Remove thread waste or the like in the dust bag.
10. Air pressure is decreased, suction force is decreased and thread is not sucked.	When remaining amount (thread take-up lever) of needle thread after completion of needle thread clamp is small, bobbin thread is brought to the position above the cloth at the first stitch of the start of sewing.		Adjust the needle thread draw-out unit to increase the needle thread draw-out amount.
			Perform thread tension release at the start of sewing. (Function setting No. 100)
			Make needle thread draw-out motion again after needle thread clamping. (Function setting No.18 : 2.)
			Make function both function setting No. 100 and No. 18 : 2.
11. Air pressure is decreased and thread is not sucked since dust bag clogs with too much thread waste.	Knife built in the cloth presser has become dull.		Replace the needle thread trimming knife.
	Needle thread holding is weak and thread on the needle thread holding side is drawn out at the time of needle thread trimming. As a result, remaining length of needle thread is lengthened.	Clamping force is decreased due to the decrease of air pressure.	Adjust air pressure to 0.6MPa.

(3) 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.
		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.
	1-3) Thread trimming failure because the bobbin thread is too short.	3)-A Bobbin thread tension is too high.	Reduce bobbin thread tension to such an extent that thread tension is sufficiently obtained.
	1-4) Failed clamp of the bobbin thread	4)-A	
	1-5) The needle thread and bobbin thread do not neatly interlace with each other at the start of sewing.	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.	Enter 4 stitches at soft start (1,600 rpm).
	1-6) The needle thread is not under the presser foot when the wiper sweeps the thread and is free.	6)-A Needle thread is not early retained with the presser foot and the throat plate.	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.
			
	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.

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Trouble	Cause 1	Cause 2	Corrective measure and adjusting procedure
From the previous page	1-7) Length of thread remaining at the needle eyelet after thread trimming is uneven.	7)-A Thread is squeezed by the counter knife and breaks before moving knife and counter knife are engaged with each other.	Re-sharpen the counter knife or replace it with a new one.
	1-8) Idle stitches are made at the start of sewing.	8)-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 at the start of sewing under the presser foot and start the sewing while holding the threads there.
2. Needle thread end rests on the material at the start of sewing.	2-1) Length of thread remaining at the needle eyelet is excessive.	1)-A Tension applied by the pre-tension disk is too low.	Increase the tension applied by the pre-tension disk.
		1)-B Thread trimming cam timing has been excessively retarded.	Adjust the thread trimming cam timing to the correct value.
	2-2) Top end of tangled-up thread on the wrong side of the material appears on the right side of the material.		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)
3. Thread slips off the needle eyelet immediately after thread trimming.	3-1) The moving knife fails to separate the threads and trims the thread at the needle.	1)-A Thread trimming cam timing has been excessively advanced.	Properly adjust the thread trimming cam timing.
		1)-B Locus of the moving knife is defective.	Re-install the knife unit or replace the knife unit with a new one.
4. Thread breaks at the start of sewing.	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.		Reduce the needle thread feeding amount.
	4-2) Stitch length is too short	2)-A The thread slacks because of small stitch length.	To start sewing with a small stitch length, place the needle thread end under the presser foot and start the sewing machine.
		2)-B The needle repeatedly enters the same point since the stitch length is small.	
		2)-C Thread tension fluctuates because of tangle-up thread.	

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."	
		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)
	6-2) The moving knife spreads the thread loops.	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.
8. Clicks occur when needle rocking is performed at low speed.	8-1) Three metals are set to the needle bar support base shaft rear metal section for slide resistance. One located in the center is free and grease on it is used up.	1)-A The metal in the center is free and moves to the right or left. Then it comes in contact with other components at the time of needle rocking. As a result, clicks occur.	Refer to (5) Removing/installing the needle bar support base shaft (asm.).

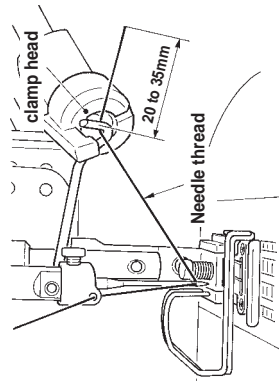
For LZ-2290ASU only

Trouble	Description	Cause 1	Cause 2	Corrective measure and adjusting procedure	
9. Adjustment of slippage of cloth is difficult.	9-1) 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.	
	9-2) 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.		
	Height of the feed dog is too high.		Change the position to the rear.		
	10. Straight sewing of cloth is difficult.	10-1) Sewing products flop.			Adjust vertical feed link shafts lower the height of the feed dog.

(Caution) For the details, refer to "3. - (5) Adjusting the slippage of materials and the feed timing".

For the bird's nest prevention type

Trouble	Cause 1	Cause 2	Corrective measure and adjusting procedure
11. Needle thread clamp failure	11-1) Position of the wiper is improper.		Place the wiper at the proper position.
	11-2) Air pressure is decreased.		Adjust the air pressure to 0.6MPa.
	11-3) Dust bag is clogged with excessive thread waste.		Remove thread waste or the like from the dust bag.
	11-4) Thread trimming or wiper is performed at the position where there is no sewing product.		Perform thread trimming or wiper on the cloth.
	11-5) Needle thread length is short. Thread does not reach the clamp head.		Adjust the pre-tension and lengthen needle thread length. (Adjust the needle thread length from the clamp head to approximately 20 to 35 mm.)
	11-6) Length of left/right needle threads is uneven. (Thread such as cotton thread or the like which is not elastic is used.)		Change the kind of thread.
12. Bobbin thread is pulled up on the cloth at the start of sewing.	12-1) When remaining amount of needle thread (thread take-up lever) after completion of needle thread clamp is small, bobbin thread is brought to the position above the cloth at the first stitch of the start of sewing.		① Refer to (33) Adjusting the position of the thread draw-out wire. (When the amount of needle thread draw-out is desired to be increased)
			② Perform thread tension release at the start of sewing. (Refer to function setting No. 100)
			③ Make needle thread draw-out motion again after needle thread clamping. (Refer to function setting No. 18 : 2.)
			Make function all items ①, ② and ③.
13. Needle thread cutting is dull.	13-1) Worn-out of needle thread cutting knife		Replace the knife with a new one. (Refer to Instruction Manual, p.103.)
	13-2) Installing position of knife is improper.		Adjust it to the proper position. (Refer to Instruction Manual, p.103.)
14. Interference of wiper with needle	14-1) Needle UP stop position is improper.		Refer to (27) Stop position of the needle after thread trimming (Needle UP stop).
	14-2) Moving path of the wiper is improper.		Re-adjust following 2) CB type of (37) Position of the wiper.
	14-3) Position of the wiper is improper.		



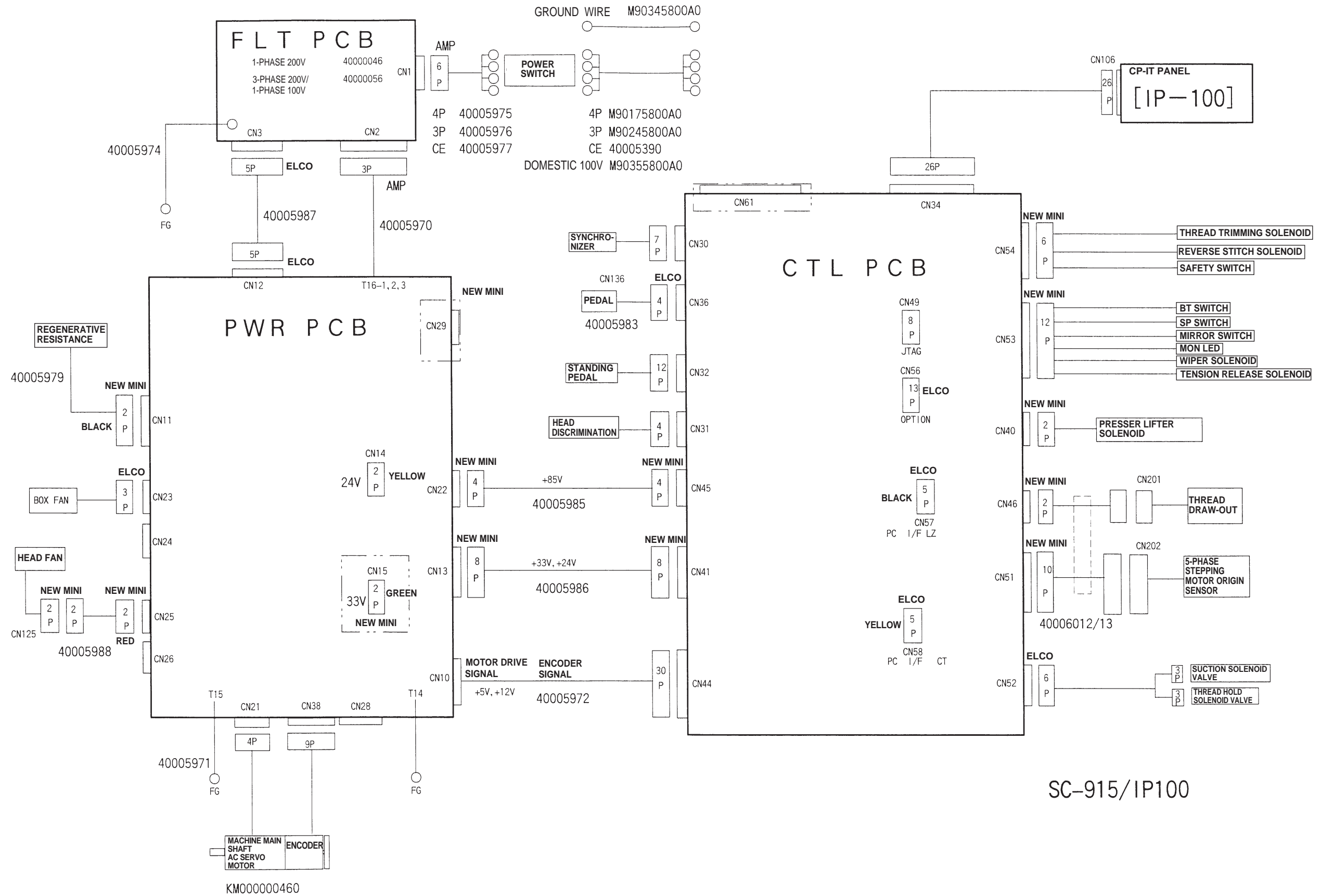
17. CONFIRMATION

In case of the following, check again before you judge the case as trouble.

Phenomenon	Cause	Corrective measure
Buzzer peeps and the sewing machine fails to operate when the machine head is tilted.	The measures described on the left are taken for safety when tilting the machine head without turning OFF the power.	Tilt the machine head after turning OFF the power.
Solenoids for thread trimming, reverse stitching, wiper, etc. fail to work.	In case the fuse has blown.	Check the fuse.
The sewing machine fails to run even when depressing the pedal immediately after turning ON the power. The sewing machine runs when depressing the pedal again after depressing the back part of pedal.	Neutral position of the pedal is slipped. (When changing the spring pressure of pedal, the neutral position may be slipped.)	Execute automatic compensation of neutral position of pedal sensor. (Function setting No. 103)
The sewing machine fails to stop even when the pedal is returned to its neutral position.		
Stop position of the sewing machine varies. (Irregular)	In case the screw of handwheel of the machine is forgotten to be tightened when adjusting the stop position of needle.	Securely tighten the screw of handwheel.
Presser foot does not lift although auto-lifter is installed.	Auto-lifter function is set to OFF.	Select "FL ON" by means of auto-lifter function setting selection. (Function setting No. 12)
	Pedal type is set to KFL.	Change the jumper to PFL setting when lifting the presser foot by depressing the back part of pedal.
	Cord of auto-lifter is not connected to connector.	Correctly connect the cord.
Reverse feed stitching switch fails to work.	Presser foot is lifting by means of auto-lifter.	Operate the switch after the presser foot has come down.
	Auto-lifter function is set to ON although auto-lifter is not installed.	Select "FL OFF" when auto-lifter is not installed. (Function setting No. 12)
The sewing machine fails to run.	Motor output cord (4P) is disconnected.	Correctly connect the cord.
	Connector of motor signal cord is disconnected.	Correctly connect the cord.

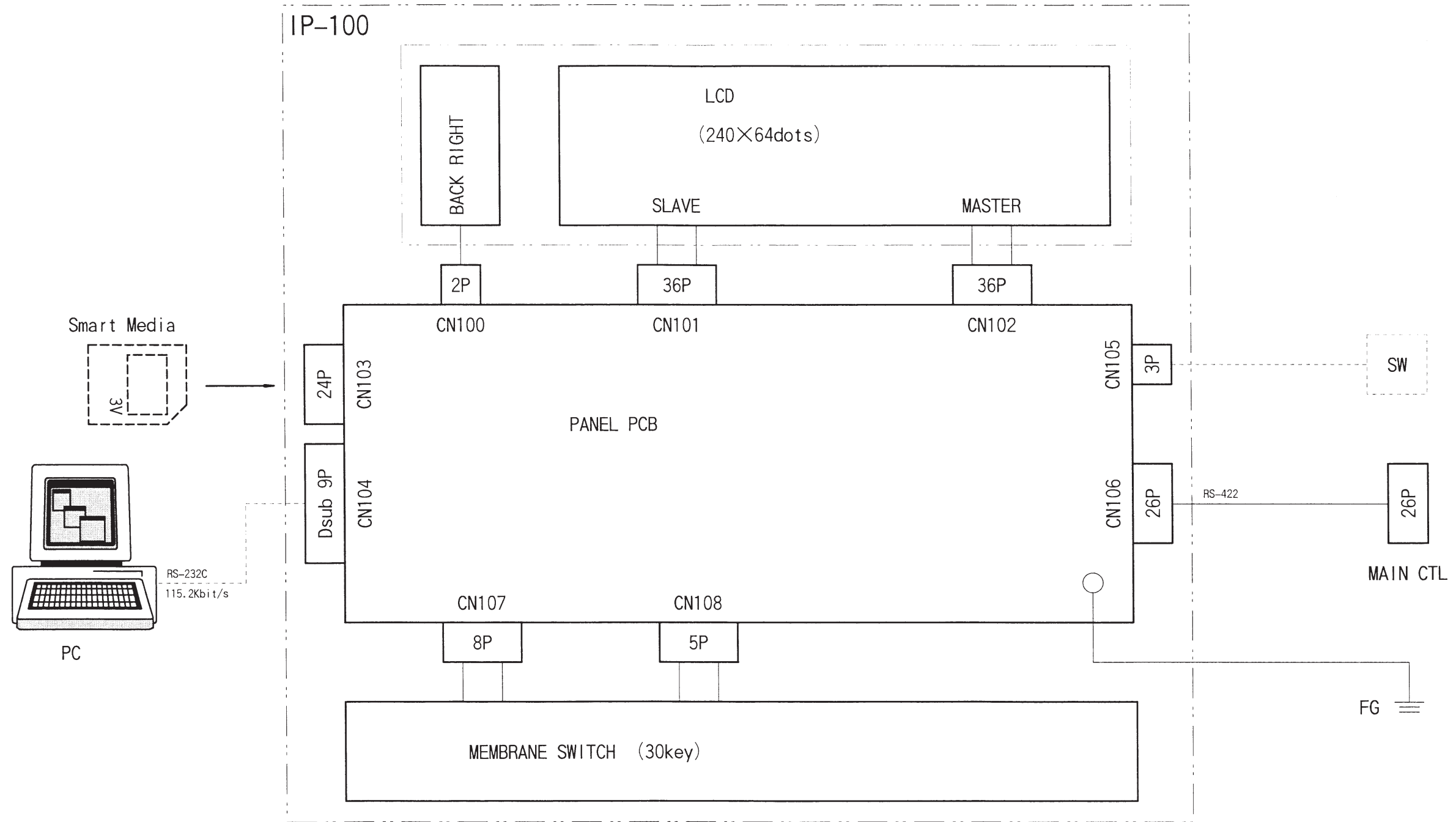
18. BLOCK DIAGRAM

(1) Block diagram A



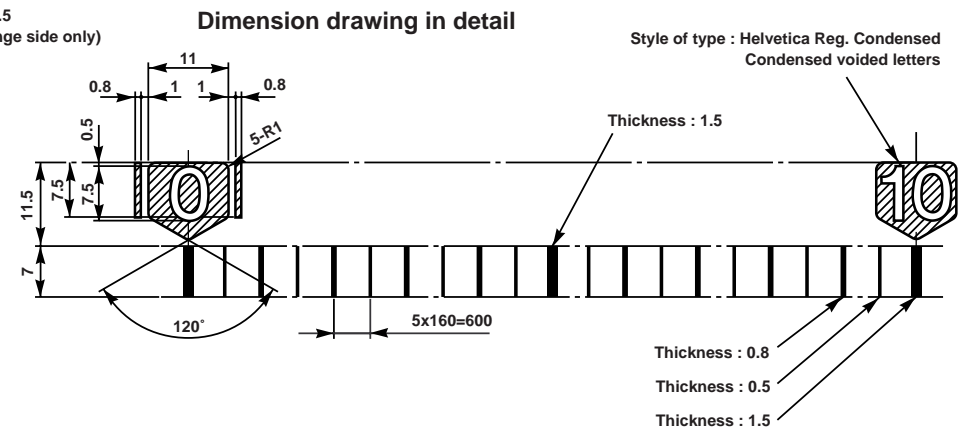
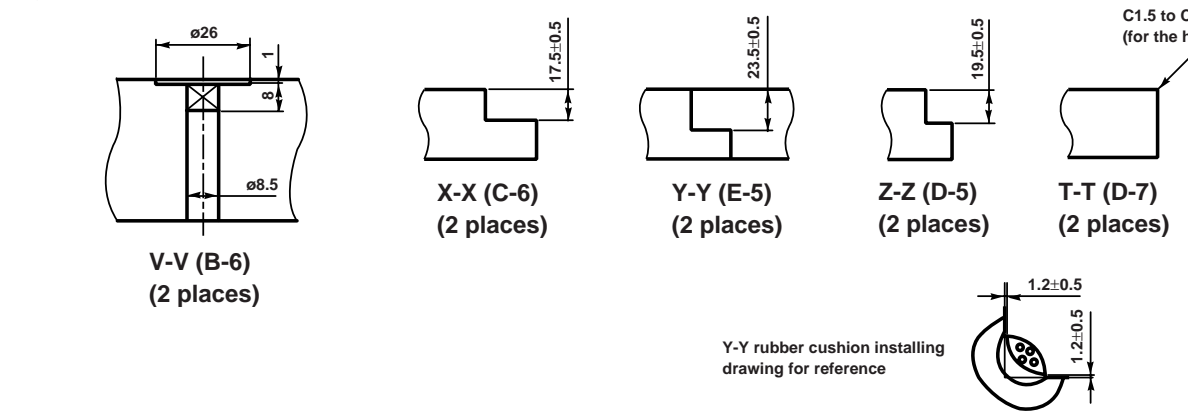
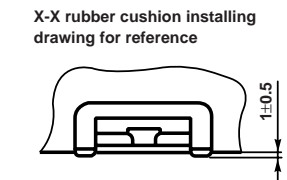
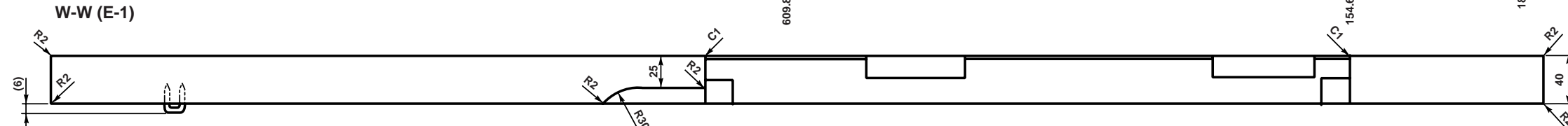
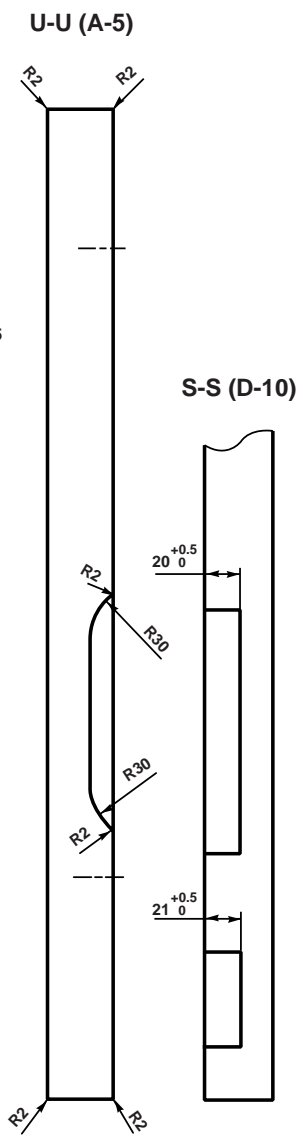
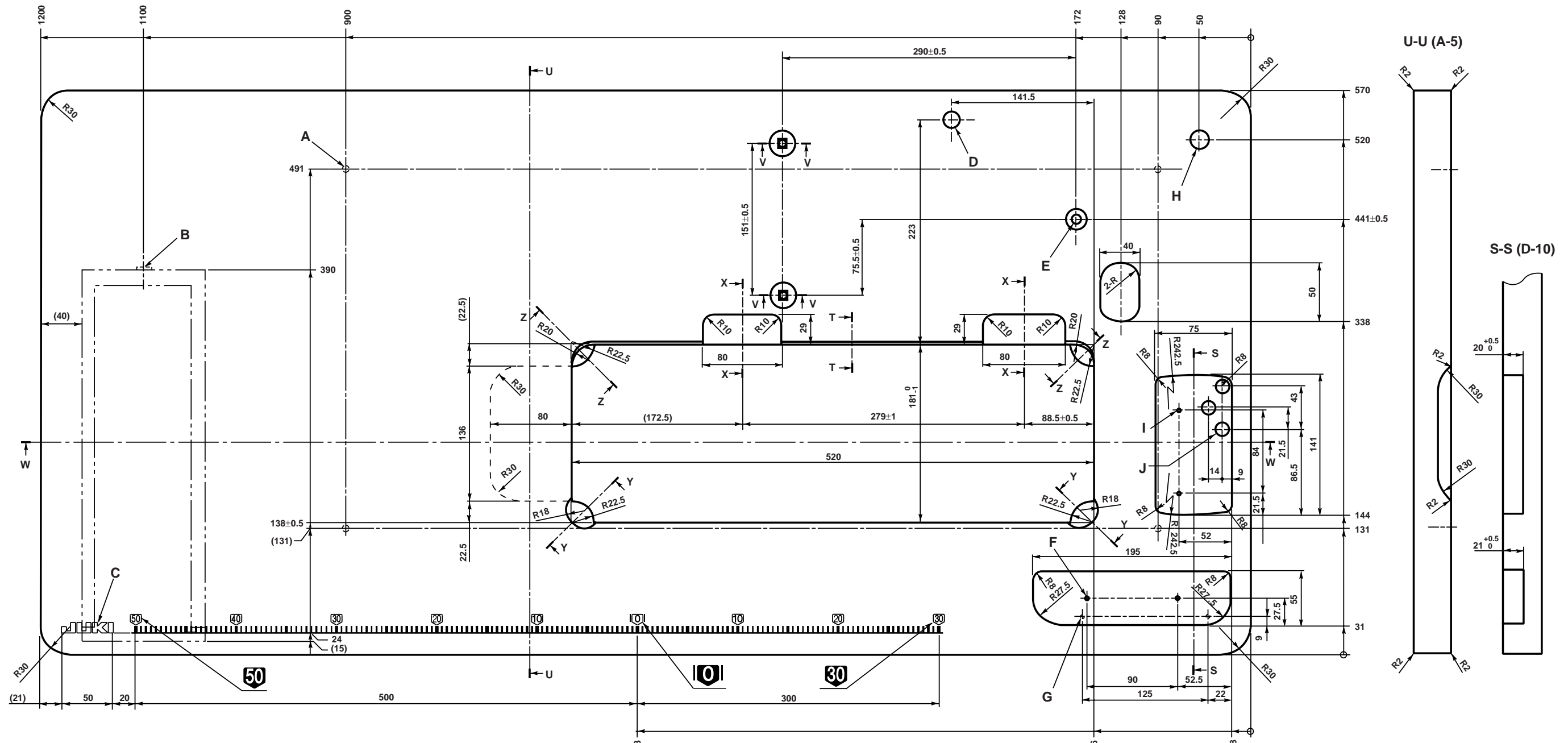
SC-915/IP100

(2) Operation panel block diagram



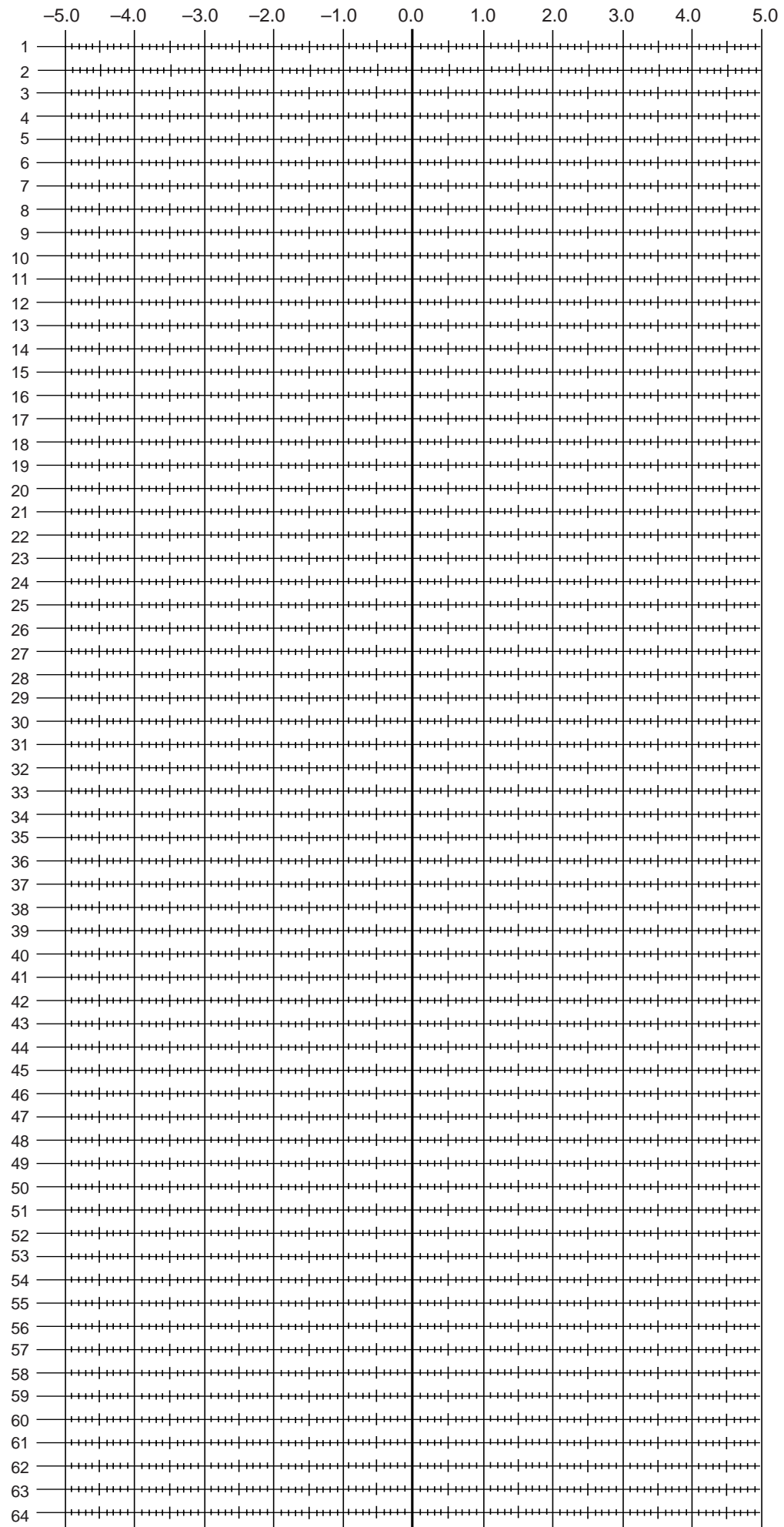
19. DRAWING OF TABLE

Part No. : 23544000



- A : 4 x 3.4 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 : $\phi 16$, depth 30
- E : 9 drill x $\phi 20$ chamfered, depth 17
- F : 2 x $\phi 3$, depth 10
- G : 2 x $\phi 3.4$ depth 10 (on the bottom surface)
(Drill a hole at the time of set-up)
- H : $\phi 18$ drilled hole
- I : 2 x $\phi 3$ depth 10
- J : 3 x $\phi 13$ drilled hole
- K : Bird's nest prevention device (installing solenoid valve) $\phi 3.4$ on the bottom surface, depth 20
- L : Bird's nest prevention device (installing regulator) $\phi 3.4$ on the bottom surface, depth 20
- M : Bird's nest prevention device solenoid valve cord
Installing position of staples for passing air pipe

CUSTOM PATTERN NEEDLE ENTRY POSITION DATA SHEET



Step No	Needle entry position	Feed direction
1		
2		
3		
4		
5		
6		
7		
8		
9		
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11		
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