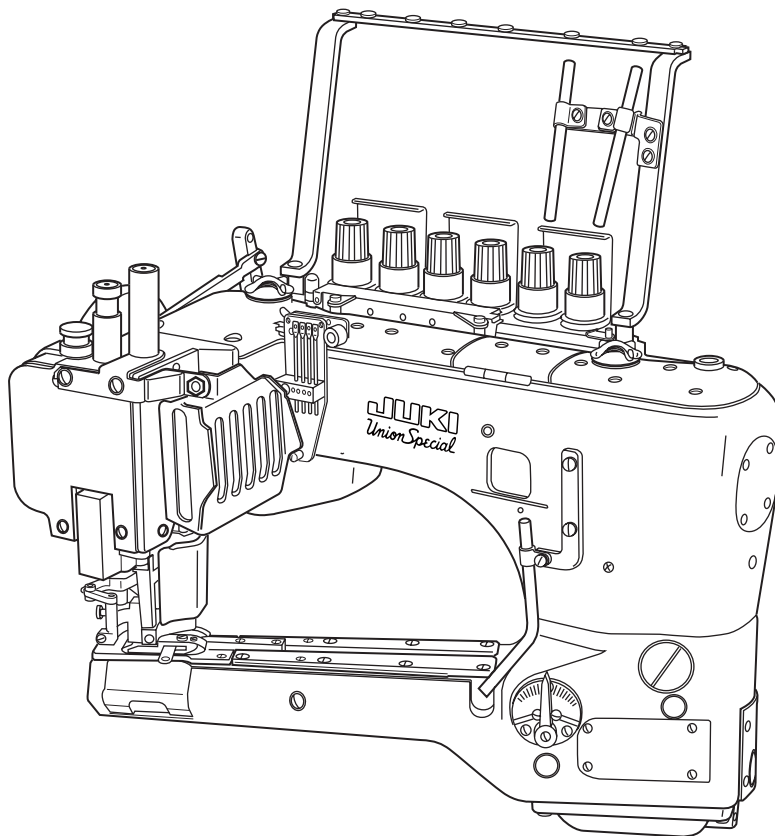


Feed-off-the-arm, 4-needle "Flatseamer" for  
Top and Bottom Coverstitch

**36200 Series** Minute-quantity  
lubrication

# ENGINEER'S MANUAL



## Introduction

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

The maintenance services to be done on this sewing machine should be based on this manual.

This manual gives the "Standard Adjustment" on the former section under which the most basic adjustment value is described and on the latter section the "Results of Improper Adjustment" under which stitching errors and troubles arising from mechanical failures and "How To Adjust" are described.

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# 1. Specifications

No.	Model name Item	Application		
		36200L/36200U	36200T	36200L220
1	Application	General light-weight - medium-weight materials	Intended for taping	For light-weight (swimsuits) materials
2	Sewing type	4-needle both side trim fancy sewing	4-needle one side trim fancy sewing	5-needle both side trim fancy sewing
3	Max. sewing speed (normal)	4,200rpm (normal sewing speed: 3,200rpm)		4,200rpm (normal: 2,500rpm)
4	Stitch length	1.6 to 2.5mm (Standard 2.1mm)		1.6 to 1.8mm (standard 1.6mm)
5	Needle gauge	5.2mm, 6.0mm		6.0mm
6	Needle bar stroke	30mm		
7	Needles to be used (Standard needle count)	UY118GKS065 to 080 (#9 to #12)		UY116GKS065
		* (Standard 70/ #10)	(Standard 80/ #12)	(Standard 65/ #9)
8	Retainer needles to be used (Standard needle count)	36211-060 to 075		
		* (Standard 65/ #9)	(Standard 75/ #11)	
9	No. of threads used	6 pcs.	5 pcs.	7 pcs.
10	Feed control system	Main feed ----- Slide type stitch pitch control system Differential feed ----- Lever control system		
11	Lubrication	Rotary pump type auto lubrication (minute-quantity lubrication to needle bar and looper sections)		
12	Quantity of oil storage	Front oil storage: 70ml to 80ml Rear oil storage: 60ml to 70ml		
13	Lubricating oil	Union Special Specification 175 (equivalent to ISO VG22) or JUKI Oil SUP2000 – 1L		
14	Installation system	Table and Aux. Drive mounting system Pedestal mounting system		
15	Lifting amount of presser	One side trim type 8.0mm, both side trim type 6.0mm		
16	Minute presser lifting	Provided as standard		
17	Needle thread silicone tank	Provided as standard		
18	External dimensions	Height 31.5mm x Width 25.5mm x Depth 42.5mm		
19	Weight of head	22kg		
20	Working temperature/humidity	Temperature : 5°C to 35°C, Humidity : 35% to 85% (no condensation)		
21	Supply voltage/frequency	Rated voltage $\pm 10\%$ 50 / 60Hz		

\* For standard usage in Japan, the needle count is [Standard 65/#9]. The needle count for retainer needles is [Standard 60/#8].

## 2. List of models

The standard models are the lapseamers with 4 needles and 6 threads for vertical fancy stitch.

According to the model names, they are classified into specifications for the specific gauges, step gauges, taping, and multi-purpose.

Model name	Application	Number of needle	Retainer needle	Number of threads	Top fancy	Knife	Lapformer
36200L100-52	General knit goods	4	1	6	With	One side trim	Without
	Light- and medium-weight materials						
36200L100-60	General knit goods	4	1	6	With	One side trim	Without
36200L200-52	General knit goods	4	1	6	With	Both side trim	With
	Light- and medium-weight materials						
36200L200-60	General knit goods	4	1	6	With	Both side trim	With
	Light- and medium-weight materials						
	Swimsuits		0				
36200L202-52	Specific gauges (Thigh patch-up for boxer's briefs, etc.)	4	1	6	With	Both side trim	With
	Medium-weight materials						
36200L202-60	Specific gauges (Thigh patch-up for boxer's briefs, etc.)	4	1	6	With	Both side trim	With
	Medium-weight materials						
36200L210-52	1.27mm step gauges	4	1	6	With	Both side trim	With
	Medium- and heavy-weight materials						
36200L210-60	1.27mm step gauges	4	1	6	With	Both side trim	With
	Medium- and heavy-weight materials						
36200T300-52	Fly taping	4	1	5	Without	One side trim	Without
36200T300-60	Fly taping	4	1	5	Without	One side trim	Without
36200U300-52	Multi-purpose	4	1	6	With	Combined use	Combined use
	Light- and medium-weight materials						
36200U300-60	Multi-purpose	4	1	6	With	Combined use	Combined use
	Light- and medium-weight materials						

**(Caution)** The list shows the models exclusive for 4 needles. It does not include the models for 5 needles.

### 3. Model numbering system

Name: Feed-off-the-arm 4-needle "Flatseamer" for Top and Bottom Coverstitch

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
**3 6 2 0 0** □ △ △ △ △ △ □ — **A A**

6 to 9	Head specifications		
Code	Specifications	Cloth cutting	Applications
L100	Lapseam	One side trim	With edge guide spreader
L200	Lapseam	Both side trim	With lapformer spreader
L202	Lapseam	Both side trim	Specific both side trim gauge lapformer With spreader
L210	Lapseam	Both side trim	Both side trim 1.27mm, step presser, throat plate, feed dog With lapformer spreader
L220	Lapseam	Both side trim	Specific 5-needle presser, lapformer With spreader (for swimsuits)
T300	Taping	Combined use for one side and both side trim	Without spreader, tape reel With tape folder
U300	Multi-purpose	Combined use for one side and both side trim	Multi-purpose specifications

10 to 11	Needle gauge
52	5.2mm
60	6.0mm

\* Head spec. L220 applicable to 60 (6.0mm) only

12	Region
J	Japan
N	North America, Europe
S	Asia

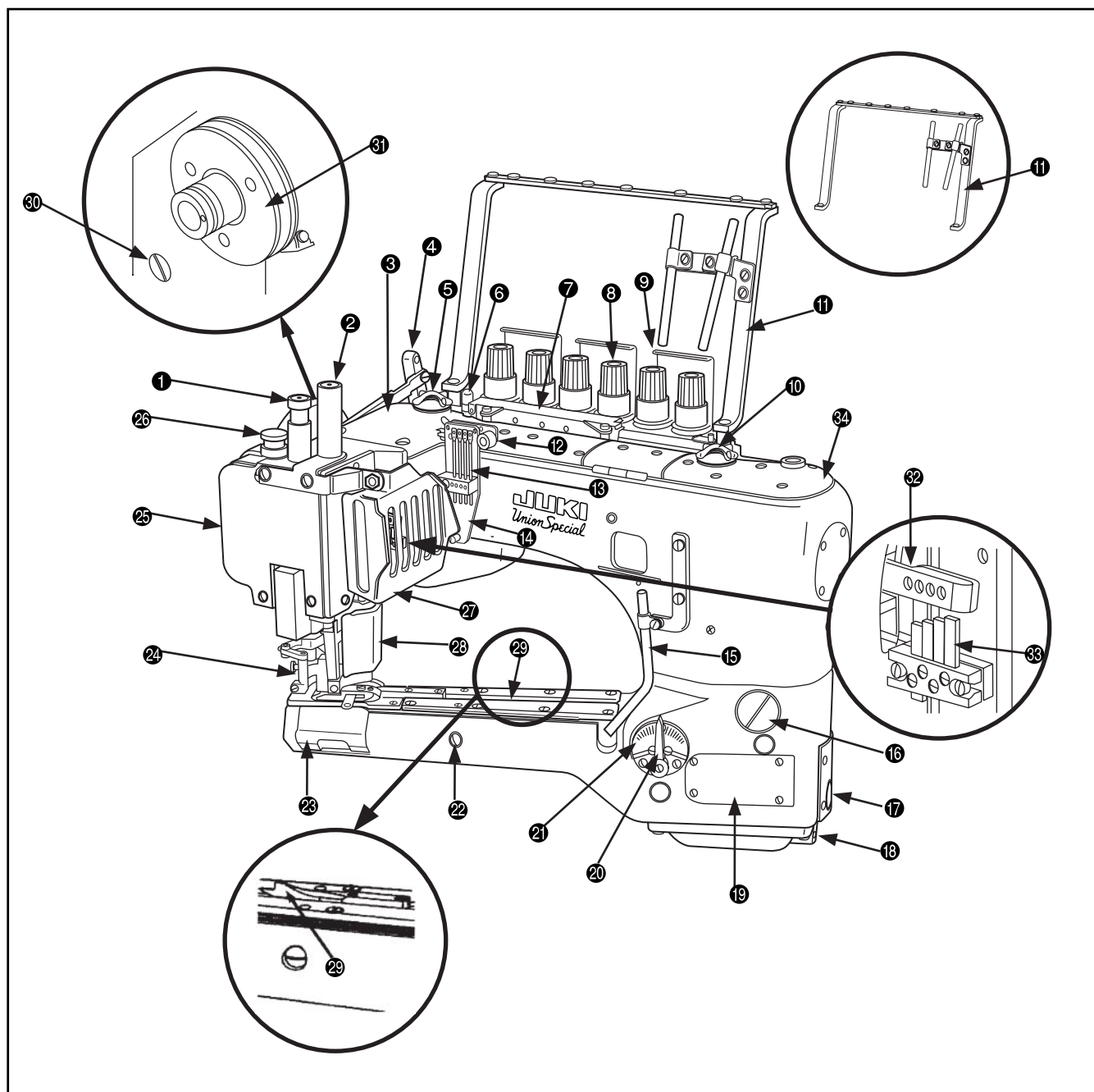
\* Head spec. L100 only, Impossible to select J  
 J (for Japan) of L100 covered by S

14	Place of destination
A	Standard

15	Accessories type
A	Standard

## 4. Configuration

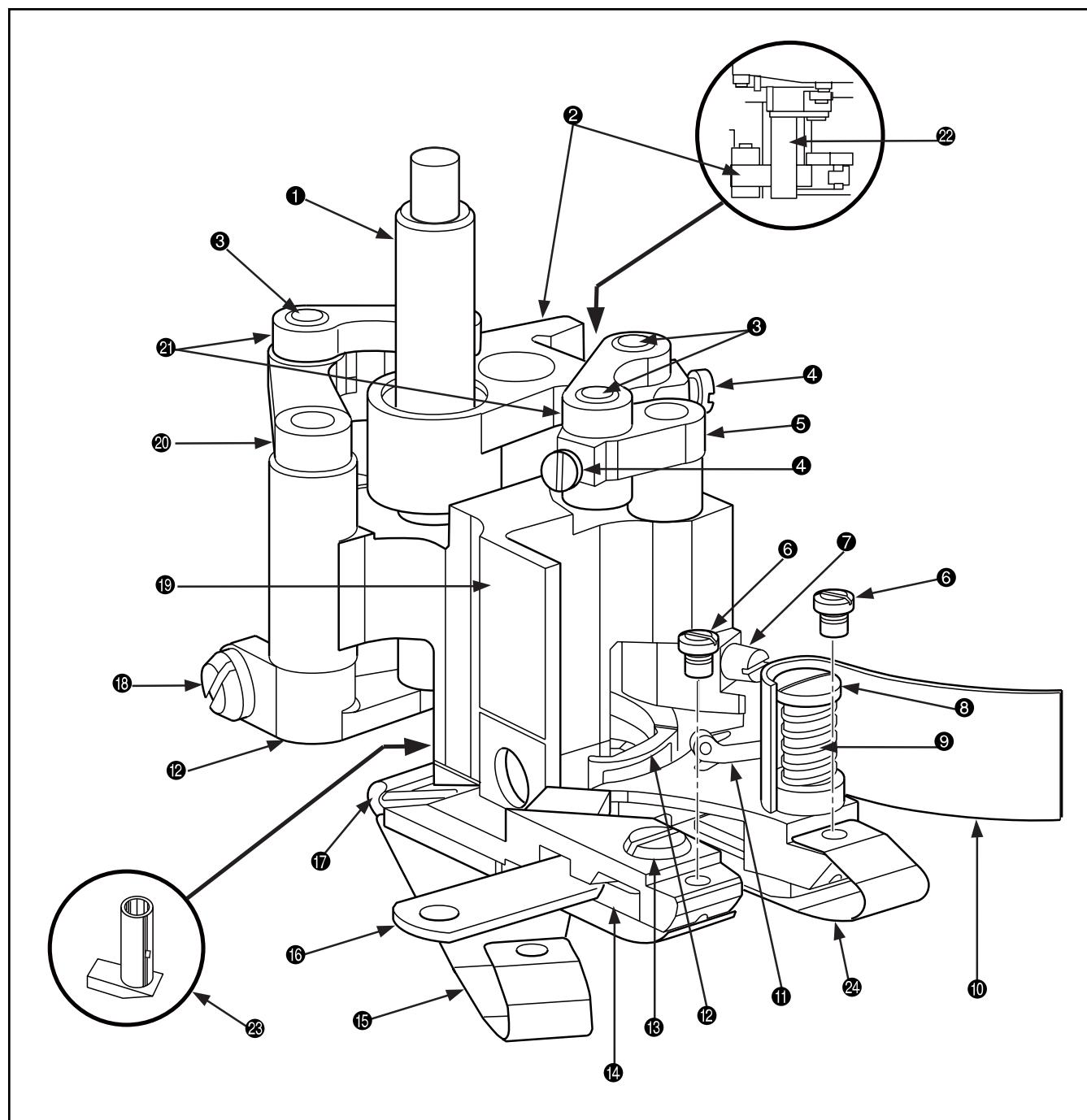
### (1) Head names



- |   |                                      |                                       |
|---|--------------------------------------|---------------------------------------|
| ① Presser pressure stroke adjusting screw | ⑫ Frame needle thread path           | ②③ Looper cover                       |
| ② Needle bar guard                        | ⑬ Needle thread guide bar            | ②④ Presser                            |
| ③ Rear top cover                          | ⑭ Thread path frame                  | ②⑤ Face cover                         |
| ④ Lift lever                              | ⑮ Looper thread guide                | ②⑥ Minute presser lifting             |
| ⑤ Oil circulator check window (rear)      | ⑯ Stitch length control window screw | ②⑦ Swing guard                        |
| ⑥ Oil gauge (rear)                        | ⑰ Oil gauge (front)                  | ②⑧ Protection cover                   |
| ⑦ Needle thread silicone unit             | ⑱ Oil drain screw (front)            | ②⑨ Lapformer                          |
| ⑧ Thread tension knob                     | ⑲ Cylinder side cover                | ③⑩ Oil drain screw (rear)             |
| ⑨ Thread guide                            | ⑳ Differential adjusting lever       | ③① Pulley                             |
| ⑩ Oil circulator check window (front)     | ㉑ Scale plate feed                   | ③② Needle thread rocking guide        |
| ⑪ Threading guard (Assy)                  | ㉒ Feed dog eccentric pin             | ③③ Needle thread holder adjusting pin |
|   |                                      | ③④ Front top cover                    |



## (2) Names of presser body



- |                                 |                               |  |
|---------------------------------|-------------------------------|--|
| ❶ Presser bar                   | ❶❶ Fancy thread carrier       | ❶❶ Drive lever link                                    |
| ❷ Drive link                    | ❶❷ Top fancy looper           | ❶❷ Drive sleeve  |
| ❸ Link pin                      | ❶❸ Lower knife clamp setscrew | ❶❸ Minor presser (Minor presser for stepped materials) |
| ❹ Link pin setscrew             | ❶❹ Lower knife clamp          | ❶❹ Rear spring, right                                  |
| ❺ Drive lever shaft (carrier)   | ❶❺ Rear spring, left          |  |
| ❻ Rear spring setscrew          | ❶❻ Lower knife                |  |
| ❼ Fancy thread carrier setscrew | ❶❼ Rear spring hanger wire    |  |
| ❽ Thread chips guard setscrew   | ❶❽ Fancy looper setscrew      |  |
| ❾ Spring                        | ❶❾ Presser main body          |  |
| ❿ Thread chips guard            | ❶❿ Drive lever shaft (loop)   |  |

## 5. Needles

### (1) Needle types

UNION standard accessory needle GROZ-BECKERT/UY118GKS 070/#10

No.	Needle symbol	Thread groove	Scoop	Strength	Thread available for sewing
①	UY118GKS	Presence of front and rear	With	Weak	Spun thread, wooly thread, Teton thread, cotton thread
②	UY118GAS	Presence of front and rear	Without	Strong	Spun thread
③	UY118GBS	Front only	With	Weak	Wooly thread
④	36211	_____	_____	_____	_____

### (2) Features of needles

No.	Features
①	The front and rear sides of a needle have thread grooves. It is somewhat more difficult to obtain an adequate tension for the needle thread, compared with the 118GAS. Since there is a scoop behind the needle, the effect of prevention against stitch skipping can be expected even for a thread that is inefficient in making loops.
②	There are thread grooves provided to both the front and rear sides of a needle. The needle thread tension tends to be increased. Since no scoop is provided to rear side of the needle, needle bend is minimum at the time of needle entry into the materials. This type of needle is suitable for the products of heavy-weight materials or those that involve thick sections in materials. (General knit goods, etc.) Since no scoop is provided, it is not suitable for applications to wooly or Teton threads.
③	Since no thread grooves are provided to the rear side of a needle, the needle thread tension tends to be decreased. Since there is no thread groove and a scoop is provided to the rear side of the needle, the needle thread can produce loops easily and therefore this type of needle is suitable for applications to wooly threads or the like.
④	If a retainer needle (sacrifice needle) is used, softer stitches can be obtained.

### (3) Needle applications

No.	Applications
①	Used for the products of knit goods and swimsuits.
②	Used for general knit products.
③	Used for ladies' shorts, girdles, etc., made of stretchy textiles.
④	Used for general products of knit products.

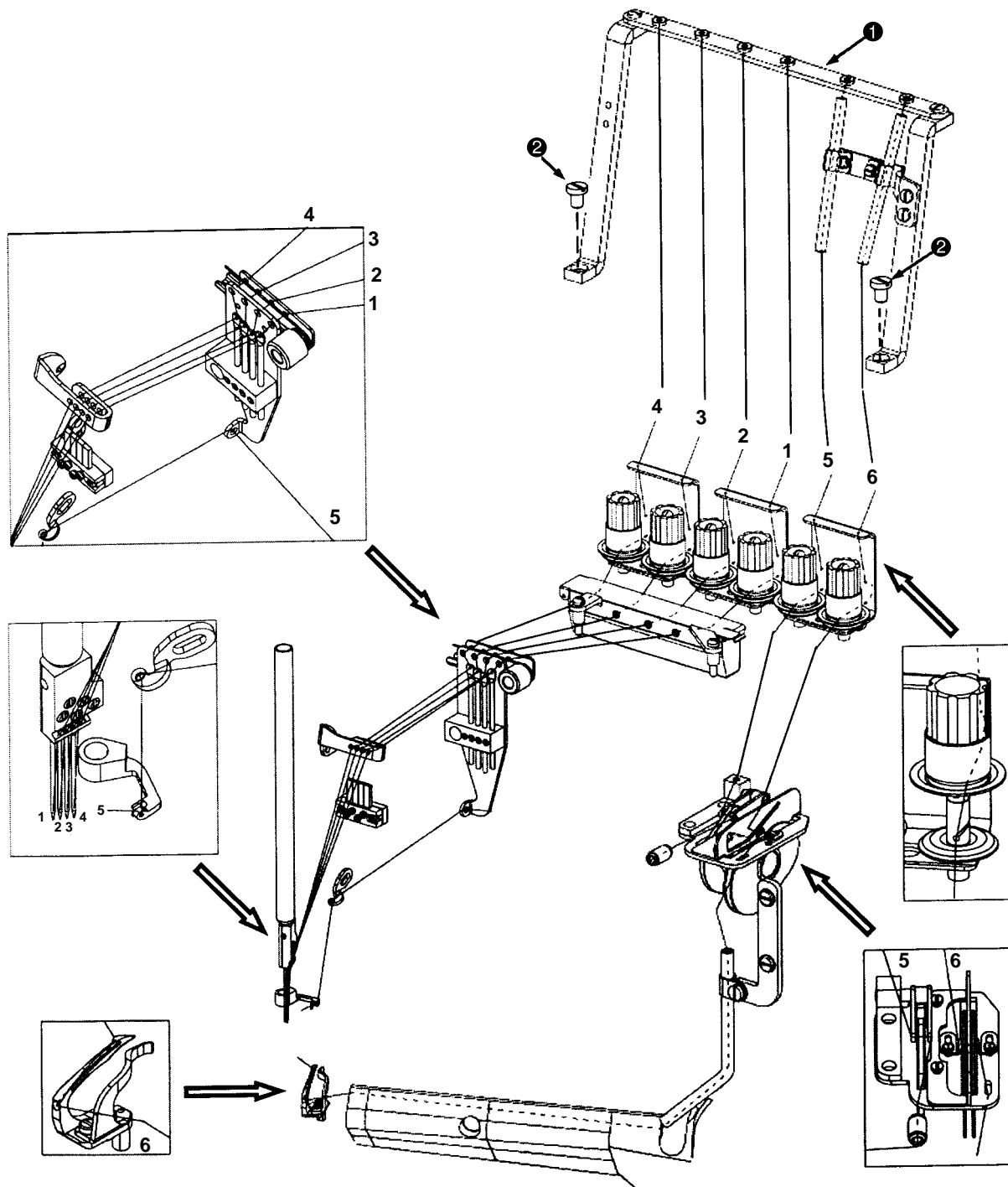
**(Caution)** Standard needles used in Japan are of UY118GKS•GAS, 065 (#9).

## 6. How to conduct threading

### How to make threading for the needle threads and the top and bottom fancy threads

#### Threading illustration and threading guard setup

1. When you want to use the flatseamer machine head, you have to mount the threading guard (Assy) ❶. It can be mounted by means of two setscrews ❷ (2 pcs.).
2. 1 to 4 correspond to the needle thread, 5 to the top fancy thread, and 6 to the bottom fancy thread. Make threading according to the threading illustration.



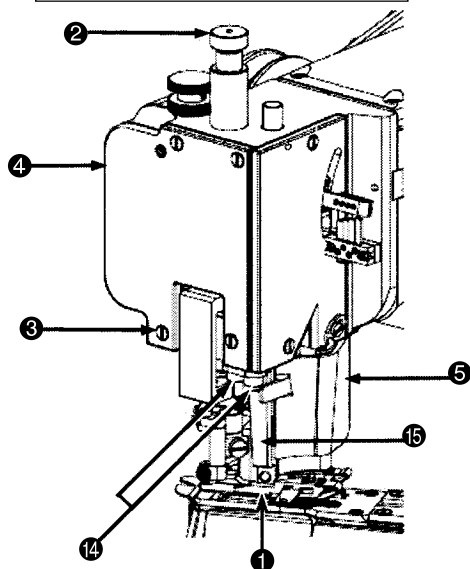
## 7. Standard adjustment

### (1) Presser removal work

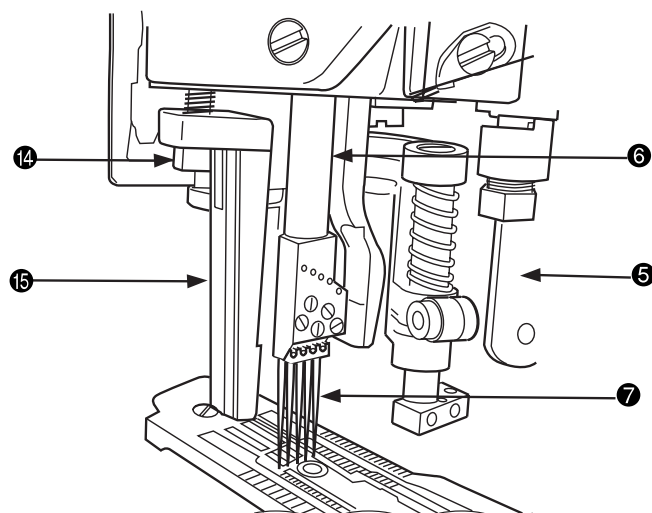
#### Procedures of assembling

1. To make the standard adjustments of the flatseamer, remove the presser main body ❶ first of all.

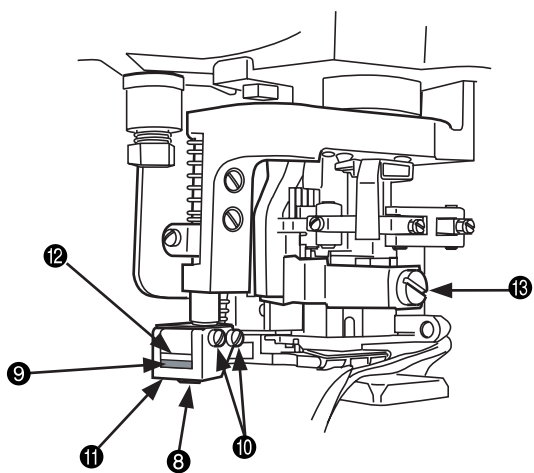
Main body assembly diagram



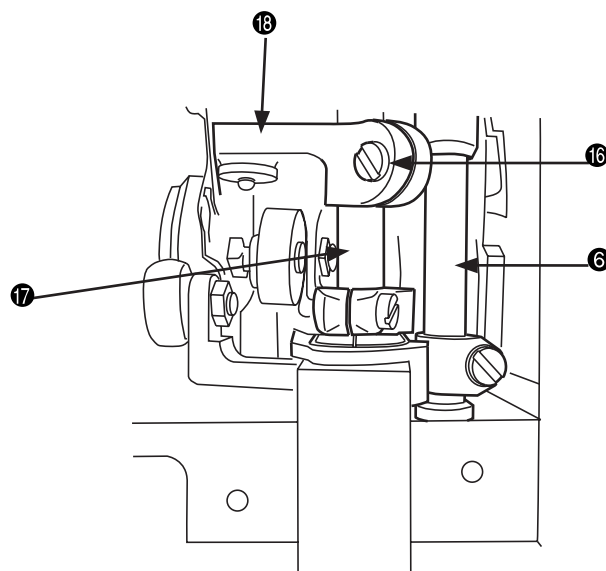
State of the presser removed



Rear side of the presser main body



State of the face cover removed



### Procedures of assembling

Disassembly procedures for the presser main body

1. Loosen the setscrews ③ (4 pcs.) and take out the face cover ④.
2. Open the protection cover ⑤ and take out the needles ⑦ (5 pcs.) with the needle bars ⑥ positioned at the upper dead point.
3. Loosen the upper knife fixing screw ⑧ (key wrench of 3/8) and remove the upper knife ⑨.
4. Loosen the setscrews ⑩ (2 pcs.) and take out the upper knife fixing block ⑪ and the upper knife auxiliary plate ⑫.
5. Loosen the presser bar setscrew ⑬.
6. Loosen the presser guide left setscrews ⑭ (key wrench of 5/32) (2 pcs.) and remove the presser guide left setscrews ⑭ on the operator side. Make the presser guide left ⑮ free.
7. Remove the presser pressure adjusting screw ② and the pressing screw.
8. Loosen the presser bar guide setscrew ⑯ and remove the presser bar guide ⑯ and the presser bar ⑰ while the presser bar ⑰ is pulled out upwards.
9. Remove the presser main body ①.

## (2) Adjusting the height of the needle bar

### Standard Adjustment

- o For a needle gauge of 5.2mm

Mount the right needle ❶ on the needle clamp ❷ with the needle bar positioned at the upper dead point and put the needle bar height gauge ❸ on the upper face of the throat plate ❹. Check this condition in the position of 531. The standard needle bar height is 13.5mm.

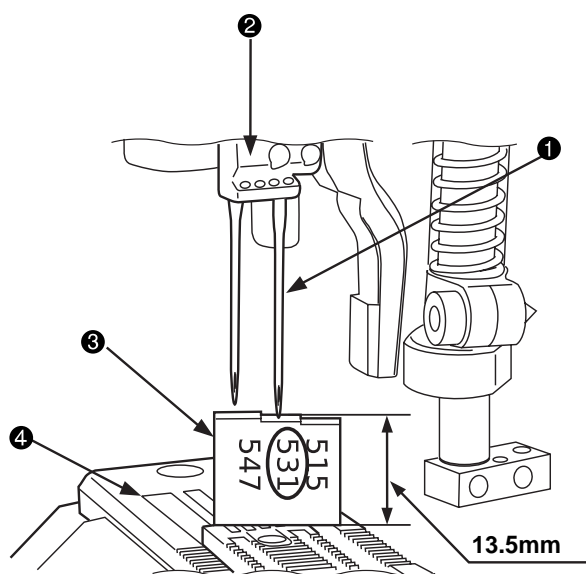
Use the needle bar height gauge (21227BU).

- o For a needle gauge of 6.0mm

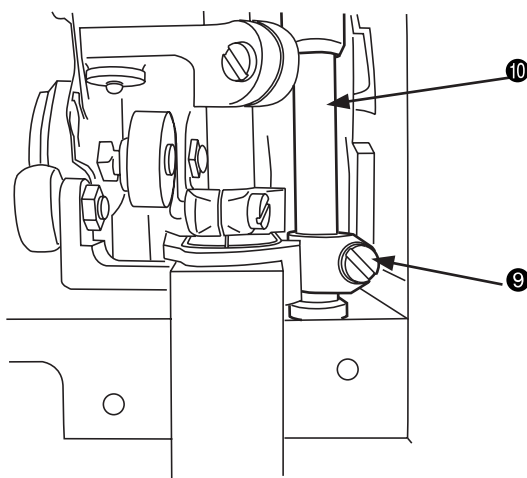
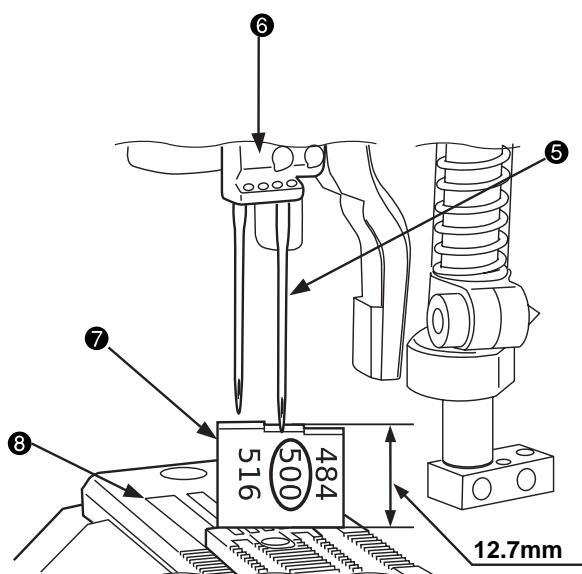
Mount the right needle ❺ on the needle clamp ❻ with the needle bar positioned at the upper dead point and put the needle bar height gauge ❼ on the upper face of the throat plate ❽. Check this condition in the position of 500. The standard needle bar height is 12.7mm.

Use the needle bar height gauge (21227DS).

Needle gauge : 5.2mm



Needle gauge : 6.0mm



Adjustment Procedures	Results of Improper Adjustment
<p>1. Remove the face cover and loosen the needle bar connecting bracket setscrew ⑨ to adjust the needle bar height by the means of the needle bar height gauge ③ or ⑦.</p> <p><b>(Caution)</b> When checking the needle bar height, change the needles ① and ⑤, enter the needles ① and ⑤ in the needle clamps ② and ⑥ to their uppermost ends, and stop them in the correct positions. The needle shank has a flat section. Stop the needle with the flat section positioned in front.</p> <p>2. After the adjustment of the needle bar height, adjustment of the needle array is carried out subsequently. Temporarily fasten the setscrew ⑨ of the needle bar connecting bracket ⑩.</p> <p><b>(Caution)</b> 1. When the needle bar connecting bracket setscrew ⑨ is fastened temporarily, the needle bar is required not to come down even when it is rotated.</p> <p>2. If the needle bar height is changed for a certain reason, readjustment is needed from the beginning, using the needle bar height gauge ③ or ⑦.</p>	<p>When the needle bar height is greatly different</p> <ul style="list-style-type: none"> <li>o This will be a cause of stitch skipping, needle breakage, or thread breakage.</li> </ul>

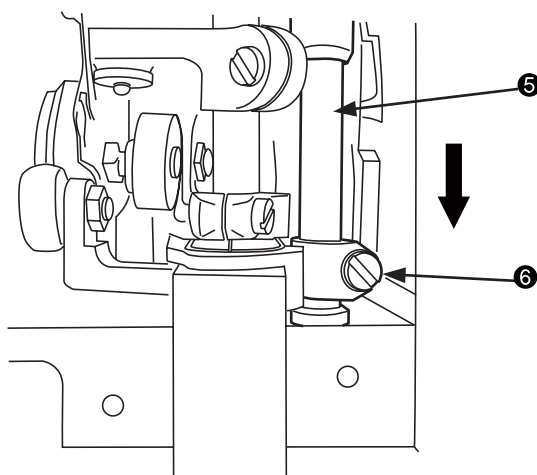
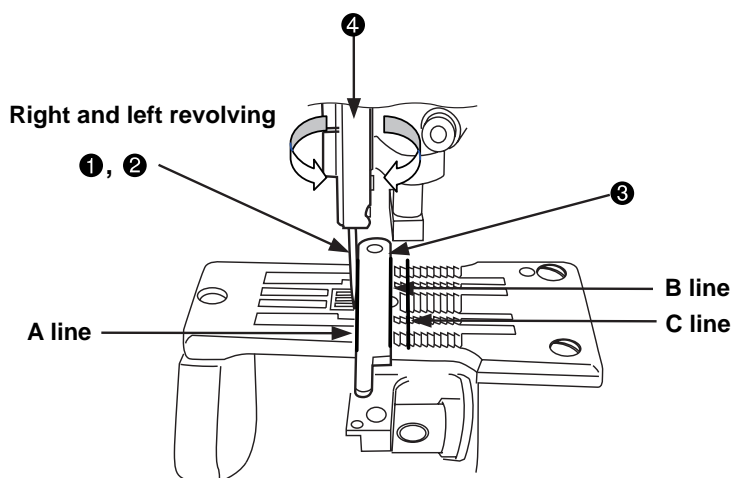
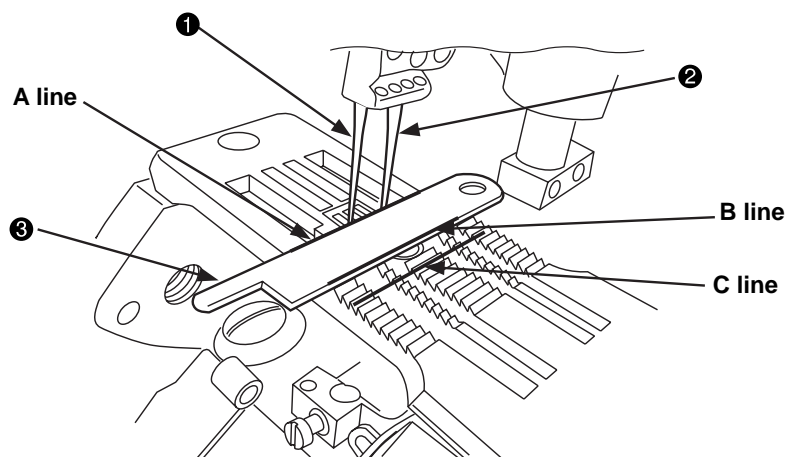
### (3) Adjustment of needle array

#### Standard Adjustment

##### 1. Needle array

Use the left needle ❶ and the retainer needle ❷, and check the needle array based on Line A of the upper knife ❸.

Apply Line A of the upper knife ❸ to the left needle ❶ and the retainer needle ❷ on both sides. In this state, the standard angle is that Line B of the upper knife ❸ is observed in parallel to Line C of the throat plate groove.





Adjustment Procedures	Results of Improper Adjustment
<p>Method of needle array check</p> <ol style="list-style-type: none"> <li>1. Checks on the needle array parallelism are carried out after the completion of needle bar height adjustments.</li> <li>2. When checking the needle array parallelism, the needle bar ⑤ is lowered to the midpoint under the condition that no looper is attached.</li> <li>3. Make Line A of the upper knife ③ come in contact with the left needle ① and the retainer needle ② on both sides. In this state, check the parallelism between Line B of the upper knife ③ and Line C of the throat plate groove.</li> <li>4. If no parallelism is secured, insert a spanner (7mm/9/32) in the needle clamp ④ and try to secure the needle array parallelism by turning the needle bar ⑤ to the right and left.</li> </ol> <p><b>(Caution) If checking is intended without the dislodgment of the looper, do it in the position where the left needle ① and the retainer needle ② do not come in contact with the rear side of the looper.</b></p> <ol style="list-style-type: none"> <li>5. After the confirmation of parallelism, check the needle bar height again and fix the needle bar connecting bracket setscrew ⑥.</li> </ol>	<p>When the needle parallelism is not secured</p> <ul style="list-style-type: none"> <li>o This will be a cause of stitch skipping, needle breakage, thread breakage, or destruction of throat plate claws.</li> </ul>

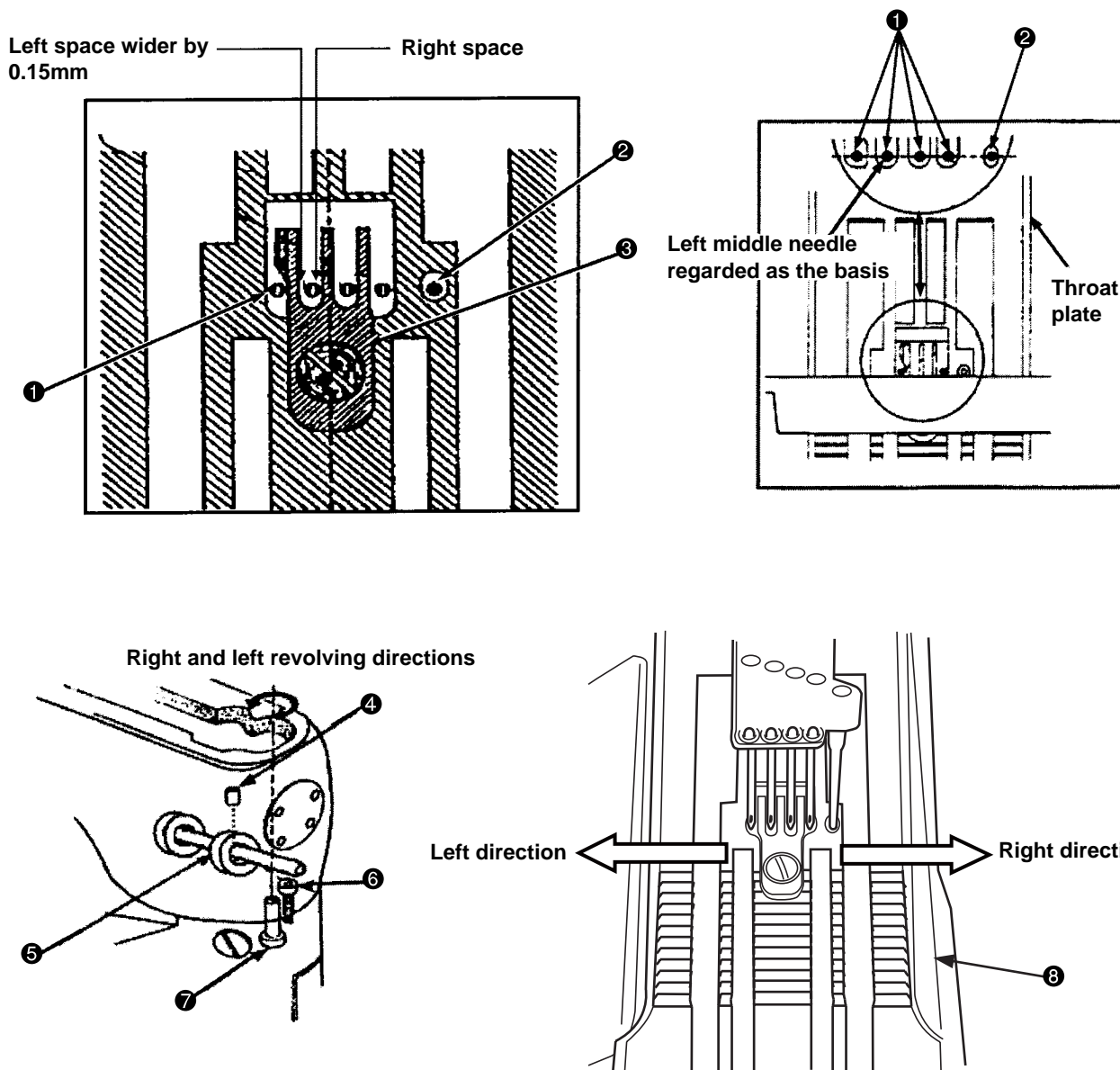
#### (4) Right and left needle entry position adjustments

##### Standard Adjustment

###### 1. Needle entry

Attach the needles ❶ (4 pcs.) and the retainer needle ❷, and check the right and left needle entry spaces in regard to the throat plate claws ❸.

Examine the position where the left space becomes wider by 0.15mm than the right space. In this state, the standard position is that the needles ❶ (4 pcs.) and the retainer needle ❷ (1 pc.), five needles in all, do not touch the right and left throat plate claws ❸.



Adjustment Procedures	Results of Improper Adjustment
<p>Needle entry adjusting positions</p> <ol style="list-style-type: none"> <li>1. When adjusting the right and left needle entry, remove the front top cover and the oil receiver.</li> <li>2. Loosen the collar setscrew ④ and move the collar ⑤ toward the front.</li> <li>3. Loosen the hexagon coupling bolt ⑥ and insert a screwdriver in the eccentric pin ⑦. When the screwdriver is turned to the right and left, the cylinder arm ⑧ moves to the right and left.</li> <li>4. Confirm the result of needle entry position adjustments.</li> <li>5. After adjustments, tighten the hexagon coupling bolt ⑥ to return the collar ⑤ to its initial position. Since then, tighten the collar setscrew ④.</li> </ol> <p>Method of confirmation</p> <ul style="list-style-type: none"> <li>o Turning the eccentric pin ⑦ to the right causes the cylinder arm ⑧ to move to the left.</li> <li>o Turning the eccentric pin ⑦ to the left causes the cylinder arm ⑧ to move to the right.</li> </ul>	<p>When the needle parallelism is not secured</p> <ul style="list-style-type: none"> <li>o This will be a cause of stitch skipping, needle breakage, thread breakage, or destruction of throat plate claws ③ as a result of getting flaws.</li> </ul>

## (5) Looper adjustment

### Standard Adjustment

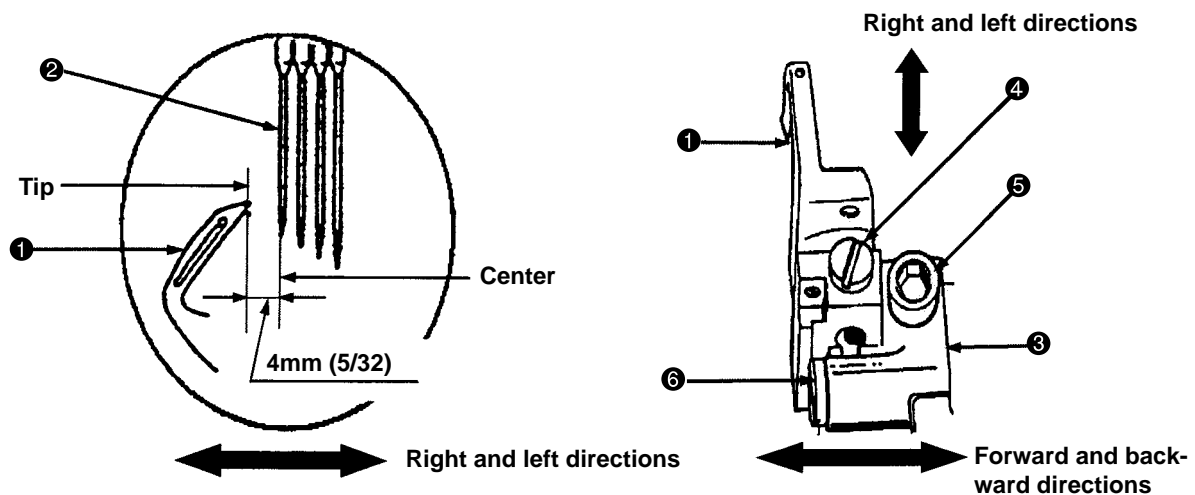
#### 1) Returning amount of the looper

When the looper ❶ is positioned at the leftmost point, adjust the distance to 4mm from the tip of the looper ❶ to the center of the left needle ❷.

The amount of standard looper return is 4mm. However, the amount of return of the looper ❶ may somewhat change according to the type of thread.

The final amount of return of the looper ❶ should be determined by making fine adjustments of the amount of looper ❶ return while making threading and observing the stitches of trial sewing.

4mm shall be regarded as the amount of return of the looper ❶ during adjustments.



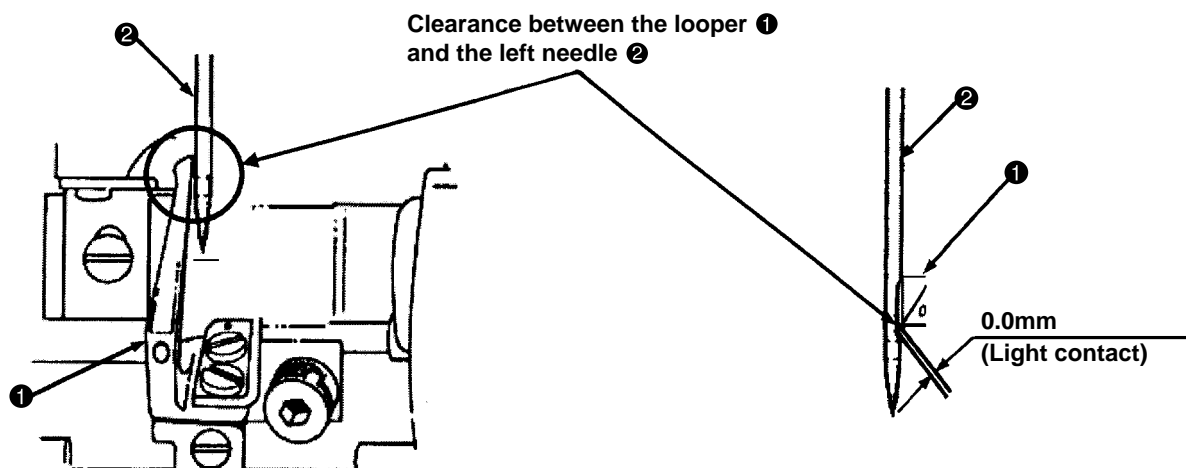
#### 2) Adjustment of a clearance between looper and needle

The standard clearance is 0.0mm (light contact) when the tip of the looper ❶ reaches the center of the left needle ❷.

After rear needle holder adjustments, check the clearance again between the looper ❶ and the left needle ❷. For the final adjustment, this check should be carried out after making threading.

**(Caution) 1. If no rear needle holder is provided, the above-mentioned checks should be carried out in the state that the tip of the looper ❶ slightly touches the left needle ❷.**

**2. The needles to be used come in two types; with a scoop (118GKS) and without a scoop (118GAS).**



Adjustment Procedures	Results of Improper Adjustment
<p>1) Returning amount of the looper</p> <ol style="list-style-type: none"> <li>1. Mount the looper ❶ on the looper base ❸ and fasten it with the setscrew ❹.</li> <li>2. Loosen the looper base setscrew ❺ and move the looper base ❸ to the right or left for adjustments.</li> <li>3. After adjustments, tighten the looper base setscrew ❺.</li> </ol> <p><b>(Caution) When making adjustments by moving the looper base ❸ to the right or left, the forward and backward positioning of the looper base ❸ is also changed.</b>  <b>During the right-left adjustment of the looper base ❸, make adjustments of "7.-(5)-2), Adjustment of clearance between looper and needle" simultaneously by means of the setscrew ❻.</b></p> <p>2) Adjustment of a clearance between looper and needle</p> <ol style="list-style-type: none"> <li>1. Loosen the looper base setscrew ❺ and turn the setscrew ❻ to adjust the looper base ❸ by moving it forward and backward.</li> <li>2. After adjustments, tighten the looper base setscrew ❺. <ul style="list-style-type: none"> <li>o When the looper base ❸ is moved to the left, the tip of the looper ❶ is separated from the left needle ❷.</li> <li>o When the looper base ❸ is moved to the right, the tip of the looper ❶ comes in contact with the left needle ❷.</li> </ul> </li> </ol> <p><b>(Caution) After the completion of adjustments in accordance with "7.-(6) Adjustment of looper and needle bar timing" and "7.-(7), 7.-(8) Adjustment of looper movement and motion locus", make readjustments, without fail, according to "2) Adjustment of a clearance between looper and needle".</b></p>	<p>When the amount of looper return, changing with the type of thread, is too much</p> <ul style="list-style-type: none"> <li>o Tightness of stitches becomes worse for the left needle thread and the stitches of thread tension are degraded.</li> </ul> <p>When the amount of return is small</p> <ul style="list-style-type: none"> <li>o This can be a cause of stitch skipping when the looper ❶ is re-treated.</li> <li>o The needle thread, second from the right needle, is delayed from the looper ❶ and it comes out simultaneously with the right needle thread. Thus, the stitches of thread tension are degraded.</li> <li>o This is a cause of second stitch skipping as seen from the left needle ❷.</li> </ul>

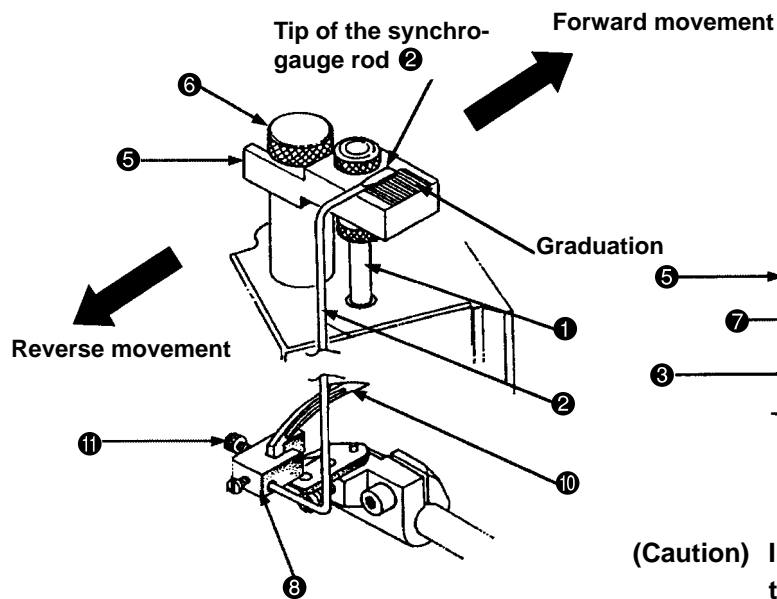
## (6) Adjustment of looper and needle bar timing

### Standard Adjustment

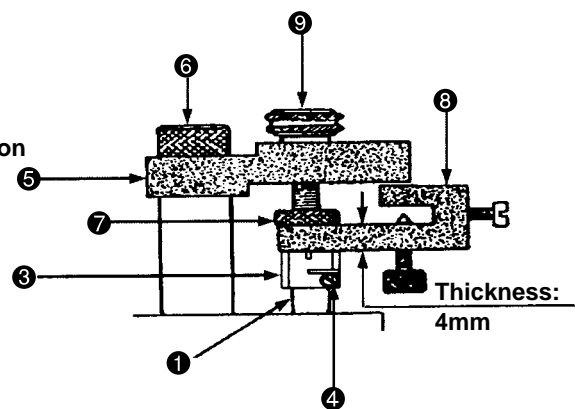
#### 1. Looper and needle bar timing (synchronization)

Synchronization is adjusted after mounting the respective gauge parts. Turn the pulley in the forward direction and adjust the tip of the synchro-gauge rod ② to the graduation after the needle bar ① has been stopped. The standard position is defined when the pulley is turned in the reverse direction and the tip of the synchro-gauge rod ② stops at the same graduation for forward pulley rotation after the needle bar ① has been stopped.

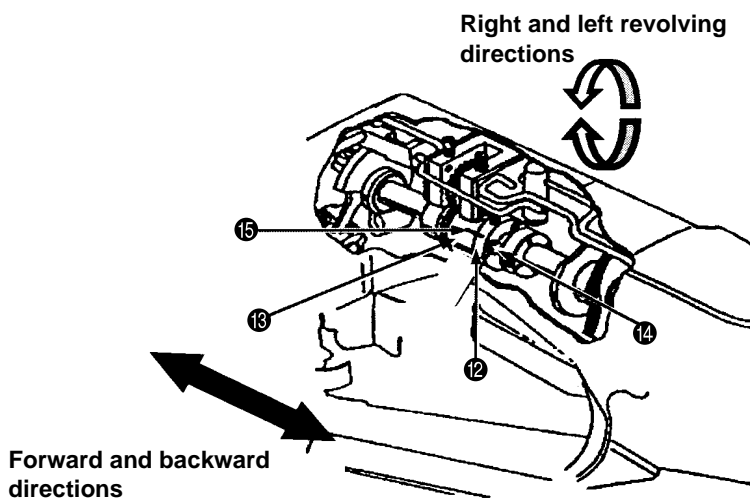
**(Caution)** When the pulley is turned in the forward/reverse direction, the standard value is defined if the obtained figure is different by less than 1 from the graduation of the tip of the synchro-gauge rod ②.



US gauge Part No.	21227CG
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**(Caution)** Installation of the gauge indicated in the above drawing falls on the new 36200L type. In regard to the installation of the gauge for the former type 36200, installation of the needle bar torque tool ③ is not required.



**(Caution)** The main shaft coupling front and rear, ⑫ and ⑬, are provided with the fitting mark ⑮. Gauge check should be carried out after making adjustments to the fitting mark ⑮.

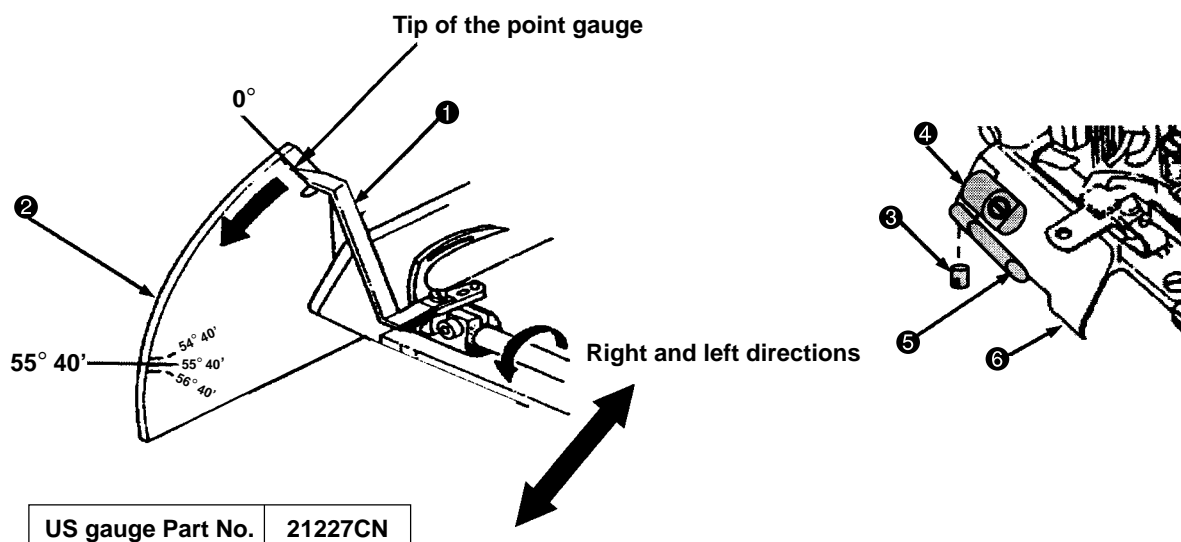
Adjustment Procedures	Results of Improper Adjustment
<p>How to mount and use the synchro-adjust gauge</p> <ol style="list-style-type: none"> <li>1. Attach the needle bar torque tool ③ to top of the needle bar ① and tighten the setscrew ④. Then, move the needle bar ① to the lower dead point.</li> <li>2. Mount the gauge base ⑤ on the presser pressure adjusting spring ⑥ and fix the needle bar height adjusting screw ⑦ just above the needle bar ①.</li> <li>3. Insert the 4mm-thick portion of the synchro-gauge base ⑧ in between the needle bar ① and the needle bar height adjusting screw ⑦. Turn the needle bar height adjusting screw ⑦ until it comes in contact with the synchro-gauge base ⑧. In the state that a dimension (thickness) of 4mm is maintained, tighten and fix the needle bar height adjusting nut ⑨.</li> <li>4. Remove the synchro-gauge base ⑧ and mount it on the looper ⑩. Tighten the setscrew ⑪. When the pulley is turned in forward direction, the needle bar ① rises by 4mm and stops there. At this time, adjust the tip of the synchro-gauge rod ② to the specified graduation position. (Within the scale range)</li> <li>5. When the pulley is turned in reverse direction, the needle bar ① rises, lowers, and stops. Confirm the graduation position of the tip of the synchro-gauge rod ②. If there is any deviation by more than 1 from the graduation position in forward revolution, adjust the main shaft coupling front and rear, ⑫ and ⑬, respectively.</li> </ol> <p>Adjusting positions and method of adjustment</p> <p>To make timing adjustments for the looper ⑩ and the needle bar ①, remove the rear top cover and loosen three nuts ⑭ of the main shaft coupling front and rear, ⑫ and ⑬, respectively. In the state that the main shaft coupling rear ⑬ is held, move the main shaft coupling front ⑫ to the right and left to adjust it.</p> <p>(Spanner 1/4 inches for the nut ⑭)</p> <ul style="list-style-type: none"> <li>o Turning the main shaft coupling front ⑫ to the right causes the tip of the synchro-gauge rod ② to go backward.</li> <li>o Turning the main shaft coupling front ⑫ to the left causes the tip of the synchro-gauge rod ② to go forward.</li> </ul> <p><b>(Caution) To move the main shaft coupling front ⑫, temporarily fasten a nut that is located near the fitting mark ⑮ during adjustment. If the nut ⑭ is not fastened temporarily, position of the tip of the synchro-gauge rod ② cannot be made stable.</b></p>	<ul style="list-style-type: none"> <li>o Incorrect synchro-gauge positioning may cause stitch skipping.</li> </ul>

## (7) Adjustment of looper movement

### Standard Adjustment

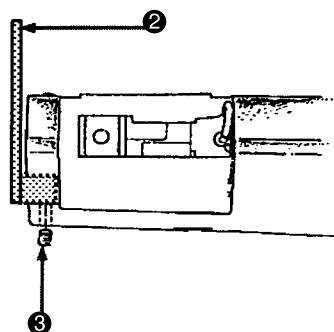
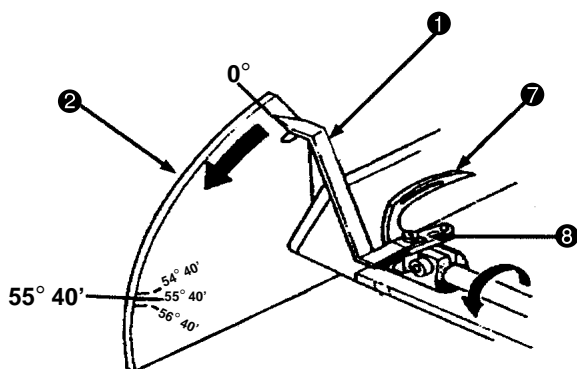
#### 1. Looper movement

The looper movement is regarded as  $0^\circ$  at the rightmost point. When the pulley is turned in forward direction, the tip of the point gauge ❶ moves to the fan-shaped gauge ❷ in the direction of the arrow. In this state, the standard value of  $55^\circ 40'$  is obtained when the tip of the point gauge ❶ reaches the leftmost point.

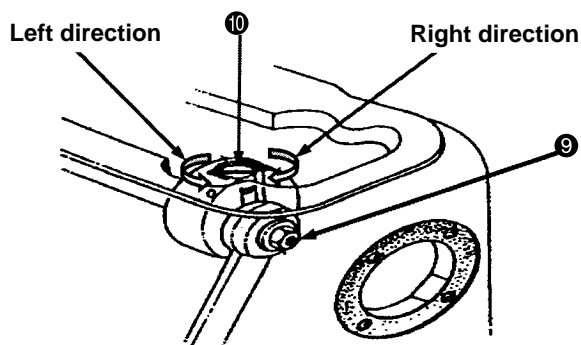


#### 2. Looper movement gauge

Since the point gauge ❶ and the fan-shaped gauge ❷ are used to obtain a correct value of looper movement, the indicated looper movement must be checked each time the head section is adjusted.



(Caution) Check the point gauge ❶ and the fan-shaped gauge ❷ at the time of looper lot replacement.





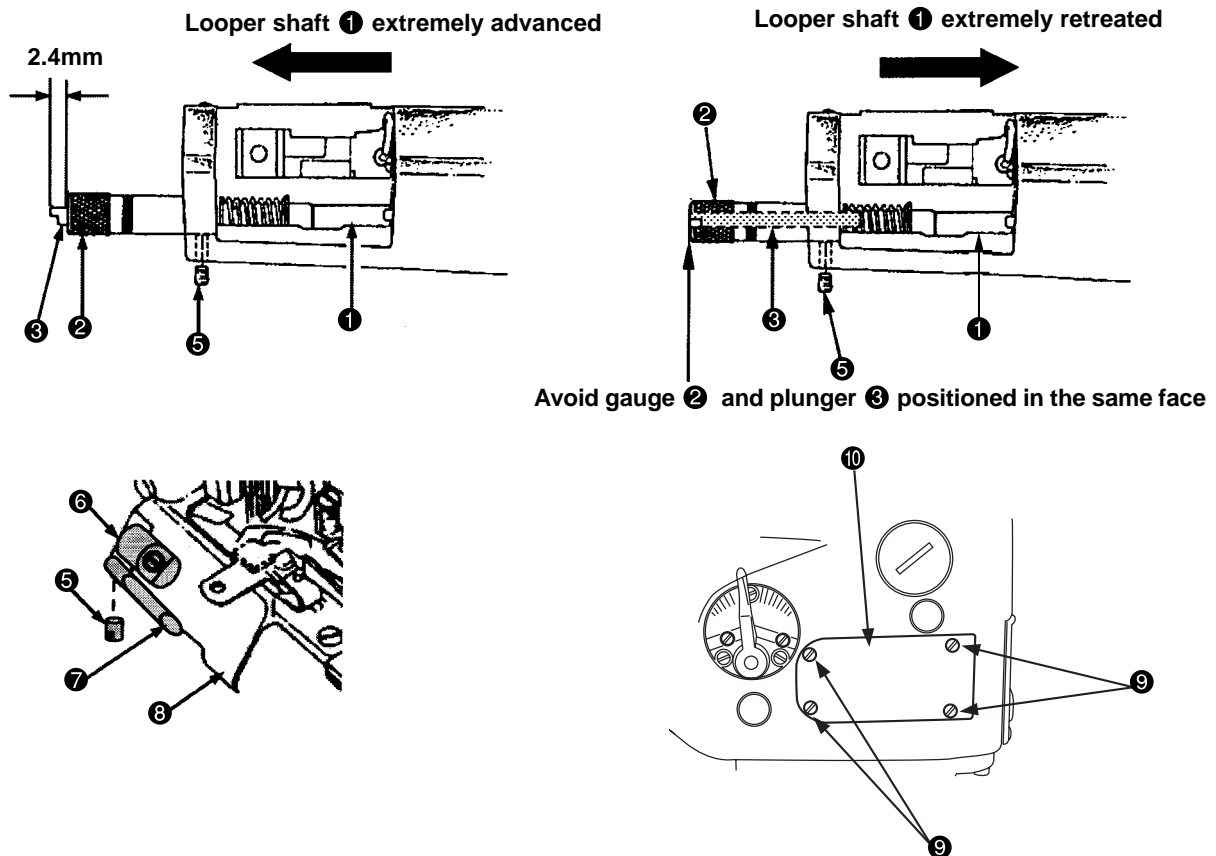
Adjustment Procedures	Results of Improper Adjustment
<p>How to mount and use the gauge</p> <ol style="list-style-type: none"> <li>1. Loosen the setscrew ❸ and take out the spring stud ❹. Loosen the cover setscrew ❺ and take out the looper cover ❻.</li> <li>2. With the looper movement at the leftmost point, fix the point gauge ❶ by means of the setscrew ❸ in the position where the front needle holder of the looper ❷ is installed. Turn the pulley in forward direction toward the rightmost point.</li> <li>3. Install the fan-shaped gauge ❷ where the spring stud ❹ has been dislodged. At that time, the tip of the point gauge ❶ should be adjusted to Position 0∞of the fan-shaped gauge ❷ before tightening the setscrew ❸.</li> <li>4. Turn the pulley further in forward direction and stop it where the looper movement falls on the leftmost point. Check the position where the tip of the point gauge ❶ stops at 55° 40'.</li> <li>5. If the tip of the point gauge ❶ seems to stop on the right or left from the standard position, the following adjustments should be carried out.</li> </ol> <p>Adjusting positions and method of adjustment</p> <p>To adjust the looper movement, remove the front top cover, loosen the nut ❾, and turn the changing screw ❿ to the right or left.</p> <ul style="list-style-type: none"> <li>o Turning the changing screw ❿ to the right causes the looper movement to decrease.</li> <li>o Turning the changing screw ❿ to the left causes the looper movement to increase.</li> </ul> <p><b>(Caution) 1. When loosening the nut ❾, it should be turned to the right. (Reverse turn nut)</b></p> <p><b>2. At the time of looper movement adjustments, temporarily fasten the nut ❾ and confirm the positions of the fan-shaped gauge ❷ and the point gauge ❶.</b></p> <p><b>If the nut ❾ is not fastened temporarily for this check, position of the looper movement may change.</b></p>	<ul style="list-style-type: none"> <li>o If the looper movement deviates from the specified range, this will cause failure in securing the correct tightness of stitches or stitch skipping.</li> </ul>

## (8) Adjustment of looper movement locus

### Standard Adjustment

1. Turn the pulley in forward direction and mount the avoid gauge ② when the looper shaft ① stays in the extremely retreated position. At that time, confirm that the face of the plunger ③ has coincided with that of the avoid gauge ②. Turn the pulley further in forward direction to move the looper shaft ① forward. At the same time, the plunger ③ also moves forward.

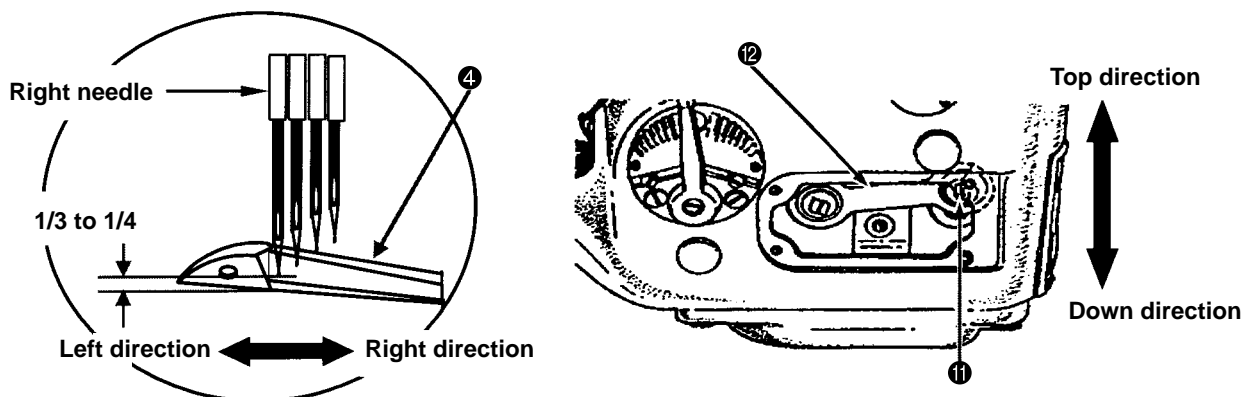
When the looper shaft ① stays in the extremely advanced position, check whether the standard dimension of 2.4mm has been secured in the position where the plunger ③ is protruded extremely.



2. When the looper avoid gauge is not used

When the standard looper ④ is installed and it is moved from the right to the left, the standard condition can be attained when the tip of the right needle touches the point apart by  $\frac{1}{3}$  -  $\frac{1}{4}$  from the rear bottom face of the standard looper ④.

**(Caution)** When the avoid gauge ② is not used, the looper locus cannot be checked unless the presser, the throat plate, and the feed dog are dislodged.



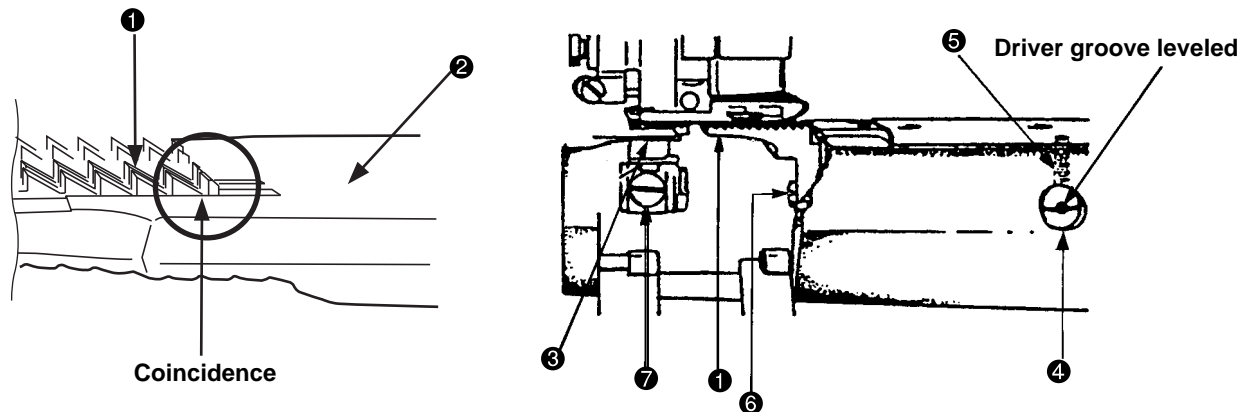
Adjustment Procedures	Results of Improper Adjustment
<p>How to mount and use the gauge</p> <ol style="list-style-type: none"> <li>1. Loosen the setscrew ⑤ and take out the spring stud ⑥. Loosen the cover setscrew ⑦ and take out the looper cover ⑧.</li> <li>2. Turn the pulley in forward direction and move the looper shaft ① to the extremely retreated position. Fasten the avoid gauge ② with the setscrew ⑤ where the spring stud ⑥ has been removed. As a cautionary note for mounting, the avoid gauge ② and the plunger ③ should be fixed so that their faces coincide with each other.</li> <li>3. Turn the pulley in forward direction and move the looper shaft ① to the extremely advanced position. At that time, measure the size of the protrusion of the plunger ③.</li> </ol> <p>For the size other than the standard size of 2.4mm, adjust it to the standard size in the adjusting position.</p>	<p>When the amount of looper movement is insufficient</p> <ul style="list-style-type: none"> <li>o The force of the needle touching the rear side of the looper becomes strong, thus making the needle tip blunt.</li> </ul> <p>When the amount of looper movement is excessive</p> <ul style="list-style-type: none"> <li>o The clearance between the needle and the rear side of the looper becomes excessive, thus easily causing stitch skipping behind the looper.</li> </ul>
<p>Adjusting positions and method of adjustment</p> <ol style="list-style-type: none"> <li>1. Loosen the setscrews ⑨ (4 pcs.) and take out the cylinder side cover ⑩.</li> <li>2. Loosen the fixing screws ⑪ and move the ball joint ⑫ up and down so that the looper movement locus can be adjusted. (Exclusive wrench (TT85) to be used)</li> </ol> <ul style="list-style-type: none"> <li>o Moving the ball joint ⑫ upwards causes the forward/reverse movement to decrease.</li> <li>o Moving the ball joint ⑫ downwards causes the forward/reverse movement to increase.</li> </ul>	

## (9) Adjustment of the feed dog

### Standard Adjustment

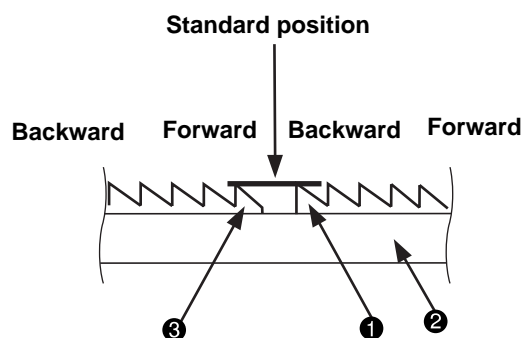
#### 1. Height adjustment of differential feed dog

In the first place, attach the differential feed dog ①. When the differential feed dog ① is positioned at the uppermost level, the standard position is obtained in terms of height where the root the tooth in the front most row of the differential feed dog ① coincides with the upper face of the throat plate ②.



#### 2. Height adjustment of main feed dog

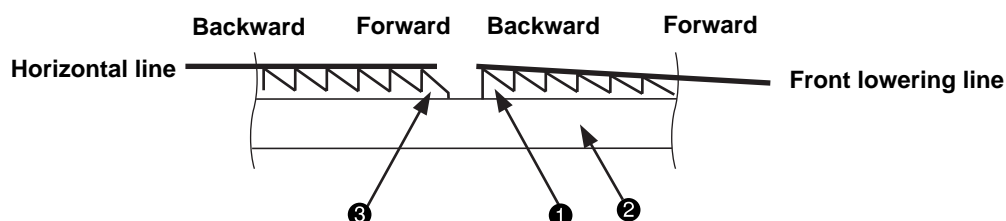
When the main feed dog ③ and the differential feed dog ① are positioned at the uppermost level, adjust the height of the main feed dog ③ so that the crest of the tooth in the front most row of the main feed dog ③ attains the same height of the crest of the tooth in the rearmost row of the differential feed dog ①. This position is a standard height of the main feed dog ③.



#### 3. Gradient of the front/rear feed dog

The standard gradient of the front/rear differential feed dog ① is such that it is positioned somewhat lower than the level of the throat plate ②.

The standard gradient of the front/rear main feed dog ③ is such that it is positioned level to the throat plate ②.



Adjustment Procedures	Results of Improper Adjustment
<p>Adjusting positions and method of adjustment</p> <ol style="list-style-type: none"> <li>1. For the eccentric pin ④ of the feed dog, the standard positioning of the driver groove is horizontal. If the driver groove seems to be inclined deviating from the standard positioning, loosen the setscrew ⑤ and adjust the eccentric pin ④ of the feed dog until it assumes its horizontal posture. Since then, tighten the setscrew ⑤.</li> <li>2. In the first place, adjust the height of the differential feed dog ① to the standard position. Then fix it by tightening the setscrew ⑥.</li> <li>3. Then, adjust the height of the main feed dog ③ to the standard position. After that, fix it by tightening the setscrew ⑦.</li> <li>4. For the differential feed dog ① and the main feed dog ③, the front and rear gradients and the horizontality are kept constant and cannot be adjusted.</li> </ol> <p><b>(Caution) The top and bottom heights of the differential feed dog ① and the main feed dog ③ can be changed simultaneously by turning the eccentric pin ④ of the feed dog. In principle, however, this adjustment should not be carried out.</b></p>	<p>When the feed dog height is insufficient</p> <ul style="list-style-type: none"> <li>o The amount of feed is decreased and uneven feeding can occur.</li> <li>o When the height of the rear needle holder is lowered and the margin of the needle contact position is reduced, this will cause breakage of a needle or stitch skipping.</li> </ul> <p>When the feed dog height is sufficient</p> <ul style="list-style-type: none"> <li>o This can be a cause of the materials pushed back to the front side, or of giving rise to feed flaws.</li> <li>o When the height of the rear needle holder is raised and the margin of the needle contact position is increased, this will cause failure in producing loops and stitch skipping.</li> </ul>

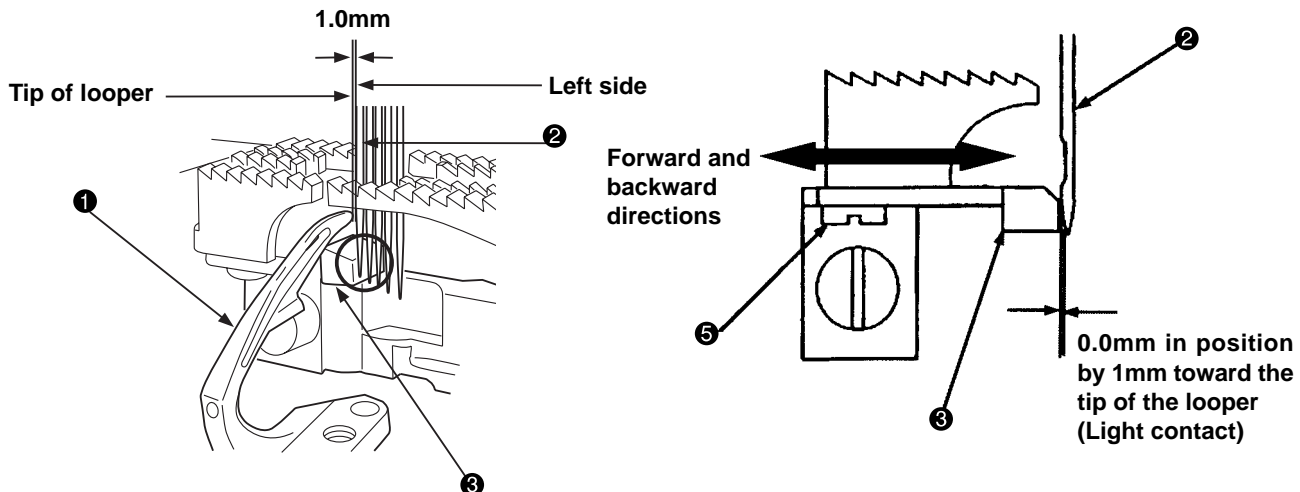
## (10) Adjustment of needle holder

### Standard Adjustment

#### 1) Adjustment of rear needle holder

Make adjustments so that the clearance between the left needle ② and the rear needle holder ③ can attain 0.0mm (light contact) when the sewing machine pulley is turned in forward direction and the tip of the looper ① reaches the position by 1mm toward the left side of the left needle ②.

The standard posture is that the rear needle holder ③ lightly pushes the left needle ②.



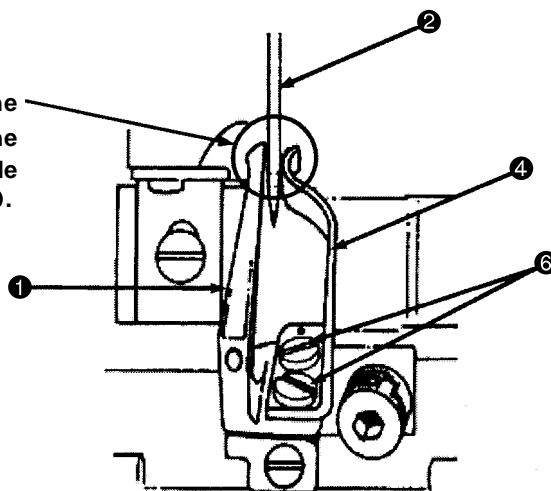
**(Caution)** After the completion of rear needle holder ③ adjustments, check the clearance again between the left end of the looper ① and the center of the left needle ②. The clearance must have been adjusted to 0.0mm (light contact).

#### 2) Adjustment of forward movement needle holder

Make adjustments so that the clearance between the left needle ② and the front moving needle holder ④ can attain 0.0mm (light contact) when the sewing machine pulley is turned in forward direction and the tip of the looper ① reaches the center of the left needle ②.

The standard posture is that the front moving needle holder ④ keeps a light contact with the left needle ② in "0" position.

When the clearance is "0" between the looper ① tip and the left needle ②, the clearance is also 0 between the left needle ② and the front moving needle holder ④.





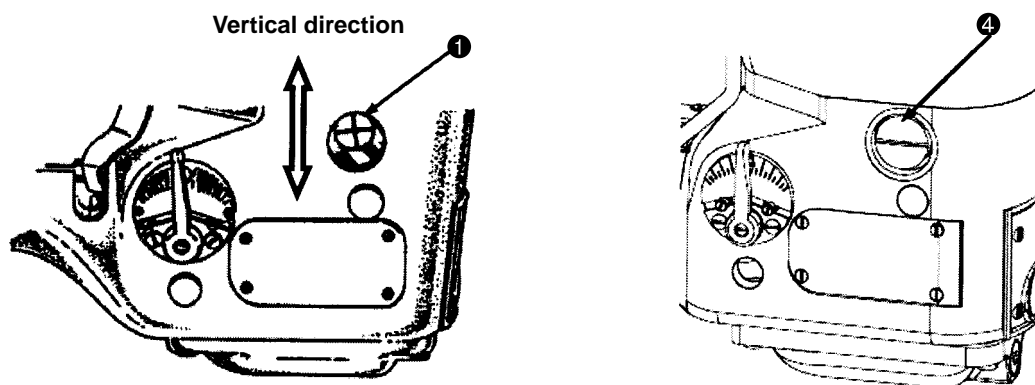
## (11) Adjustment of feed mechanisms

### Standard Adjustment

#### 1) Stitch length adjustment (inch/10SPI-16SPI)

The stitch length can be adjusted within the range of 1.6mm to 2.5mm. Standard adjustment is 2.1mm. For the adjustment of the stitch length, loosen the lever setscrew ❶ and move the lever upwards or downwards until the required length is secured.

**(Caution)** If the stitch length has been changed, check the rear needle holder and make a proper readjustment.

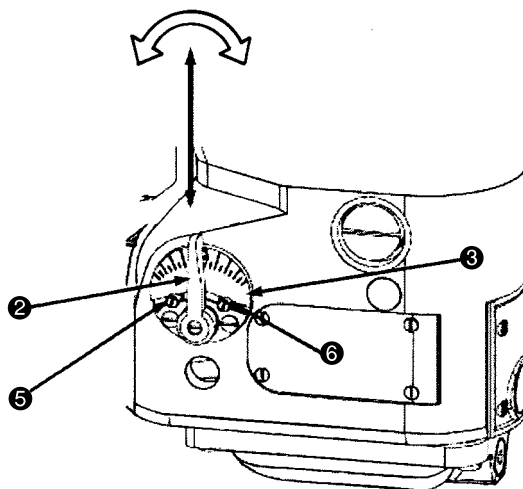


#### 2) Adjustment of differential feed amount

The amount of differential feed can be adjusted by moving the differential adjusting lever ❷ forward or backward.

The graduation plate ❸ is provided with the engraved numbers of 1 to 9. Numbers 1 to 4 denote differential motion, Number 5 denotes no differential motion, and 6 to 9 denote forward differential.

#### Forward and backward directions





Adjustment Procedures	Results of Improper Adjustment
<p>1) Stitch length adjustment</p> <ol style="list-style-type: none"> <li>When the stitch length adjusting window spring ④ is removed, the lever setscrew ① can be seen. <ul style="list-style-type: none"> <li>Loosen the lever setscrew ① to move the lever upwards and fasten the lever setscrew ① there. This action increases the stitch length.</li> <li>Loosen the lever setscrew ① to move the lever downwards and fasten the lever setscrew ① there. This action decreases the stitch length.</li> </ul> </li> </ol> <p><b>(Caution) No graduation is available for the adjustment of the stitch length.</b></p>	<p>When the stitch length is changed</p> <ul style="list-style-type: none"> <li>If the forward or backward movement of the main feed dog is changed, the amount of contact is also changed in regard to the left needle and the rear needle holder. Since this can be a cause of stitch skipping, the rear needle holder should be readjusted.</li> </ul>
<p>2) Adjustment of differential feed amount</p> <ol style="list-style-type: none"> <li>When the differential adjusting lever ② is advanced in the reverse differential direction (1 to 4), the differential ratio is decreased and the sewed materials are extended.</li> <li>When the differential adjusting lever ② is retreated in the forward differential direction (6 to 9), the differential ratio is increased and the sewed materials are shrunk.</li> </ol> <p>* When fixing the differential adjusting lever ②, pinch it with two setscrews ⑤ and ⑥.</p>	

## (12) Adjustment of presser main body mounting

### Standard Adjustment

#### 1. Adjustment of presser main body mounting

After the completion of "7. Standard adjustments (1) to (11)", mount the presser main body ⑦. When mounting the presser main body ⑦, adjust the fancy thread carrier ⑬ so that its claws are positioned in the center of the left needle and the left middle needle. Also make adjustments so that no clearance is secured between the presser main body ⑦ and the presser guide right ⑫ and presser guide left ⑮. The condition should be such that the presser can move lightly in both upward and downward directions.

#### 2. Presser main body assembly procedures

##### (1) Simultaneous mounting of the presser bar ④ and the presser bar guide ②

For presser bar guide ② positioning after the completion of mounting of the presser main body ⑦, secure a gap of 7mm between the presser bar guide ② bottom and the ball joint ⑥ top at the lower dead point of the needle bar ⑤. Since then, tighten the setscrew ③. The specified clearance is 1mm between the presser bar guide ② and the minute-quantity presser adjusting pin ①. If the clearance is found to be other than 1mm, make adjustments by moving the minute-quantity presser adjusting pin ① upward or downward.

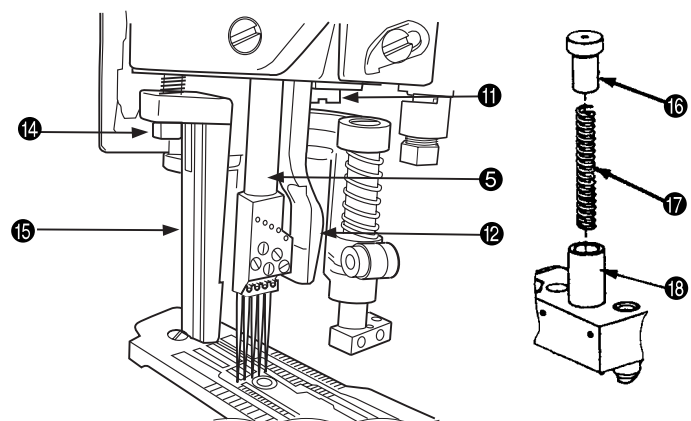
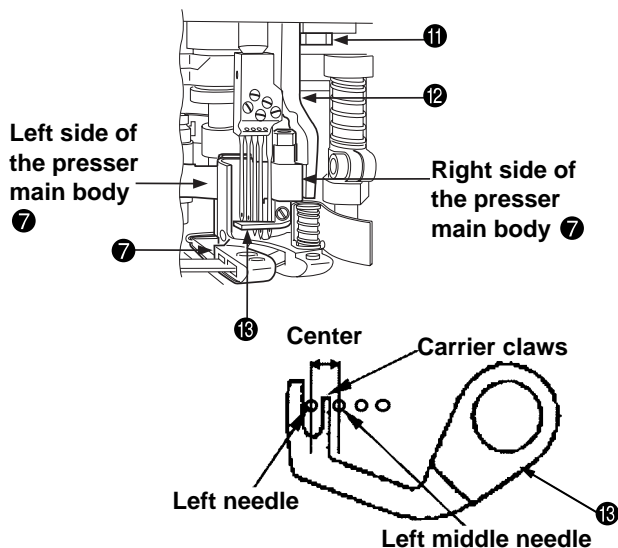
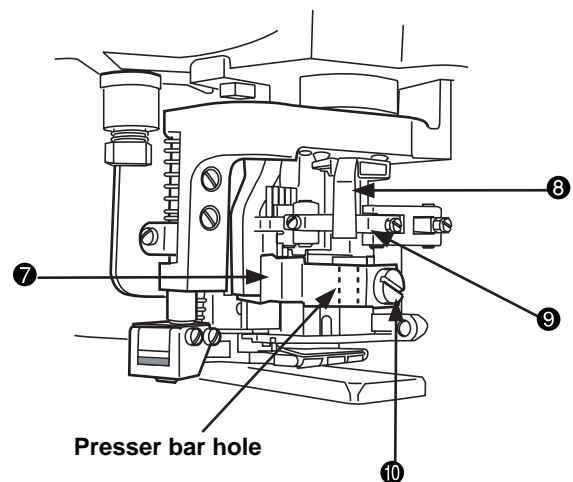
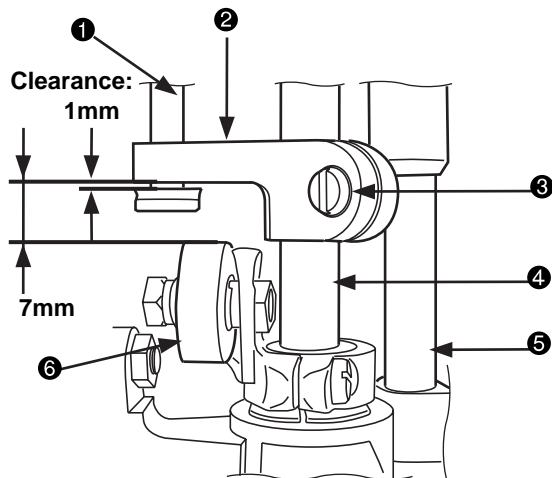
(2) Mount the presser main body ⑦ with the needle bar ⑤ set at the upper dead point.

(3) Check the position of claws of the fancy thread carrier ⑬.

(4) Using the presser guide right ⑫ and the presser guide left ⑮, fix the right and left sides of the presser main body ⑦.

(5) Mount the presser spring ⑰ and the presser pressure adjusting screw ⑯.

(6) After the completion of the above procedures, return to (1) and readjust the presser bar guide ②.



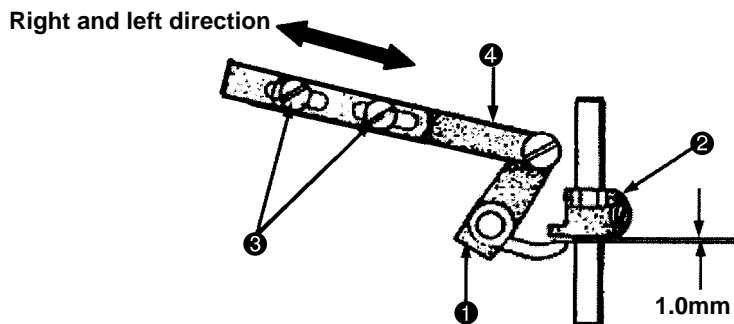
Adjustment Procedures	Results of Improper Adjustment
<p>How to mount the presser main body</p> <ol style="list-style-type: none"> <li>1. Get the minute-quantity presser adjusting pin ❶ inserted in the presser bar guide ❷ and insert the presser bar ❹ in the presser bar bush ❸ and the hole of the presser bar guide ❷. Mount them at the same time and leave the conditions as they are.</li> <li>2. Insert the driving link ❾ of the presser main body ❷ in the driving sleeve ❸. Insert the presser bar ❹ in the driving link ❾ hole and the presser bar hole of the presser main body ❷. Since then, tighten the setscrews ❿.</li> <li>3. Lightly push the left side of the presser main body ❷ until it comes in contact with the presser guide right ❿. In this state, turn the hand pulley in forward direction to confirm that claws of the fancy thread carrier ⓫ are located in the center of the left needle and the left middle needle.</li> </ol> <p><b>(Caution) If claws of the fancy thread carrier ⓫ seem to stay deviating to the right or left against the needle, loosen the setscrew ❶ and move the presser guide right ❿ to the right or left to check positioning. After confirmation, fix this setting by tightening the setscrew ❶.</b></p> <ol style="list-style-type: none"> <li>4. Let the right side of the presser main body ❷ touch the presser guide right ❿ to hold the left side of the presser main body ❷ with the aid of the presser guide left ⓬. Fix them with two setscrews ⓭. At that time, make use not to leave any clearance between the presser main body ❷ and the presser guides right ❿ and left ⓬ so that the presser main body ❷ can move lightly both upward and downward.</li> <li>5. Upon the completion of adjustments of 1 to 4 above, make adjustments of (5) and (6) described at left.</li> </ol>	<ul style="list-style-type: none"> <li>o When the presser bar guide ❷ is installed, actions of adjustments should be taken always at the lower dead point. Otherwise, the presser may float to cause adverse feeding of materials.</li> <li>o If claws of the fancy thread carrier ⓫ deviate to the right or left from the center position, this can be a cause of needle breakage.</li> <li>o If there is any clearance on the right or left of the presser main body ❷, this can be a cause of stitch skipping or needle breakage.</li> </ul>

### (13) Adjustment of the presser main body proper

#### Standard Adjustment

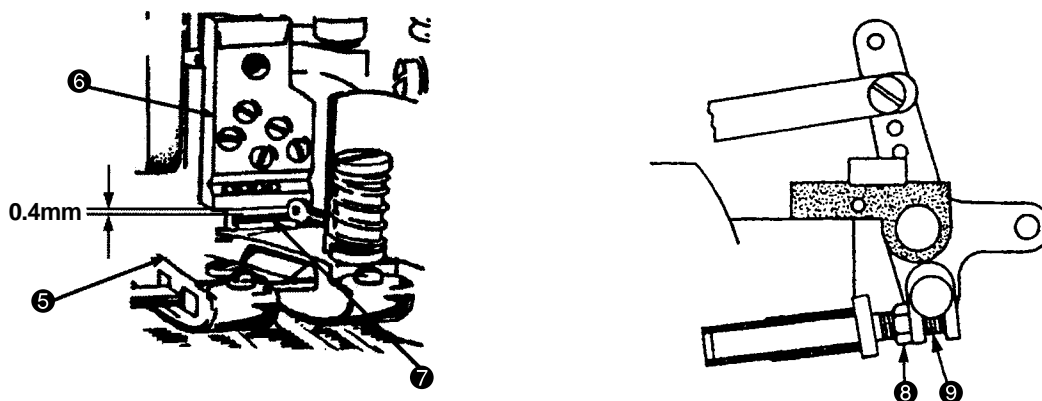
##### 1) Adjustment of presser lifter connecting lever

The standard clearance is 1.0mm between the lever link ❶ and the presser bar guide ❷ while the needle bar is located at the lower dead point.



##### 2) Adjustment of presser lifting strap plunger

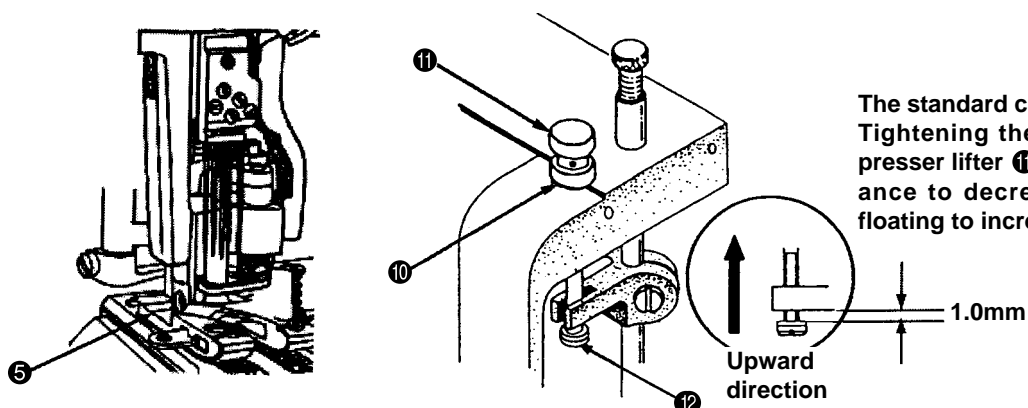
The standard clearance is 0.4mm between the bottom section of the needle clamp ❸ and the top fancy looper ❹ when the presser main body ❺ is lifted while the needle bar is kept located at the lower dead point.



##### 3) Adjustment of minute presser lifting

If feeding flaws or traces seem to remain in the materials, make fine adjustments of the presser main body ❺ in the upward direction. Adjust the height of the presser main body ❺ to avoid feeding flaws or traces in the materials.

**(Caution)** Since the presser main body ❺ is floated during sewing, this function should be utilized adequately according to the type of sewing materials.



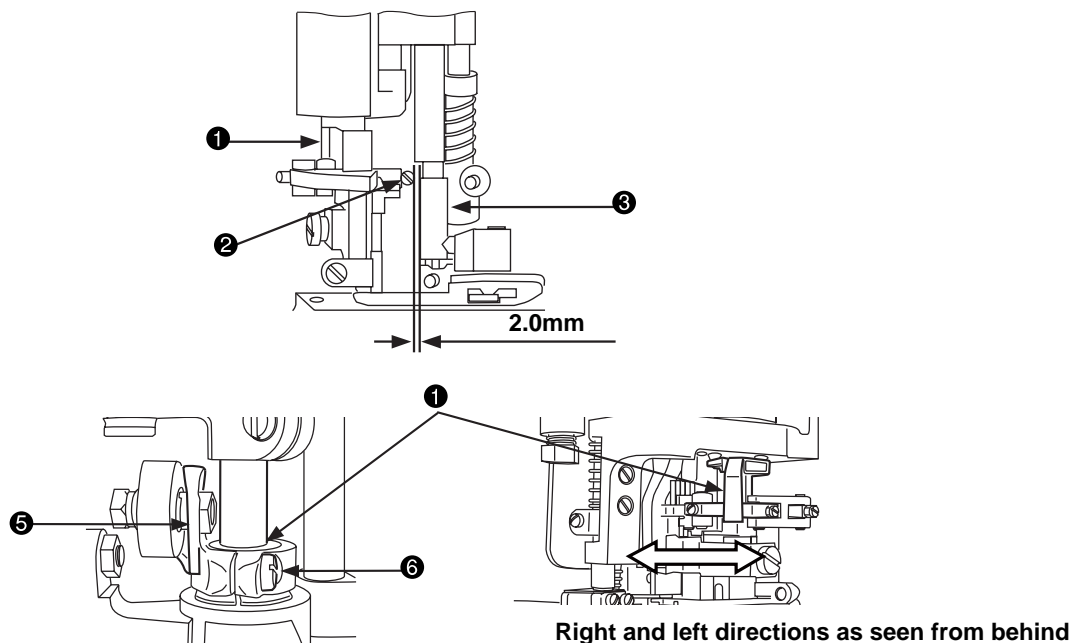
Adjustment Procedures	Results of Improper Adjustment
<p>1) Adjustment of presser lifter connecting lever Loosen the setscrew ❸ and move the lift connecting lever ❹ to the right or left. Confirming the attainment of the standard size of 1.0mm, tighten the setscrew ❸.</p> <p>2) Adjustment of presser lifting strap plunger Loosen the nut ❸ while the needle bar stays at the lower dead point and turn the strap plunger ❹ clockwise until it comes in contact with the balancer. Then, turn it counterclockwise slowly to lift the presser main body ❺. At that time, make adjustments so that the bottom section of the needle clamp ❻ and the top fancy looper ❼ do not touch each other. Since then, tighten the nut ❸.</p> <p>3) Adjustment of minute presser lifting When the lock nut ❿ is loosened and the minute-quantity presser lifter ⓫ is turned, the minute-quantity presser adjusting pin ⓬ rises to float the presser main body ❺. Adjust the presser main body ❺ to the required height and tighten the lock nut ❿.</p> <p><b>(Caution) Too much lifting of the presser main body ❺ will result in a problem of failure in material feeding.</b></p>	<p>o When the clearance is increased between the lever link ❶ and the presser bar guide ❷, the amount of rise in the presser main body ❺ is decreased.</p> <p>o When the presser main body ❺ is lifted while the needle bar stays at the lower dead point, the bottom section of the needle clamp ❻ may come in contact with the top fancy looper ❼. In such a case, there may be a problem of stitch skipping or destruction of parts.</p>

## (14) Adjustment of top fancy looper and fancy thread carrier

### Standard Adjustment

#### 1) Stroke position adjustment of drive sleeve

The standard position of the driving sleeve ❶ can be defined when the hand pulley is turned in forward direction and the standard clearance of 2mm is secured between the head of the link setscrew ❷ and the closest point on the rear side of the needle clamp ❸.

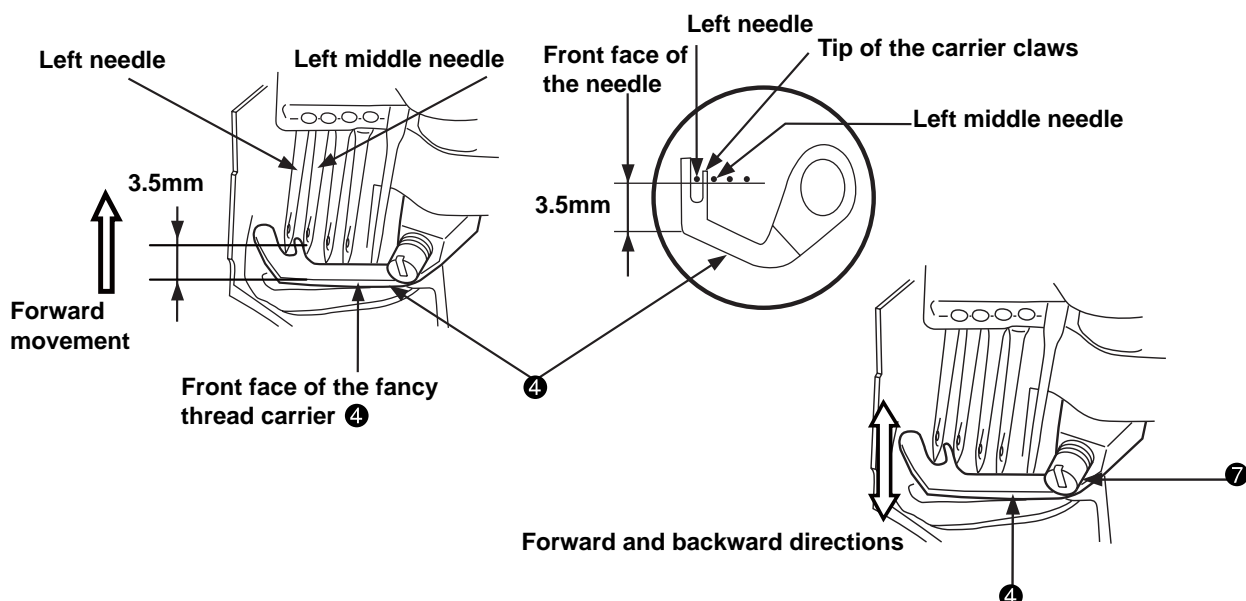


#### 2) Amount of fancy thread carrier injection

Claws of the fancy thread carrier ❹ enter the center of the left needle and the left middle needle. When the tip of the carrier claws is located in the most advanced position, the standard distance is 3.5mm from the needle front to the front face of the fancy thread carrier ❹.

Make a final check by passing the fancy thread. The standard position is secured when the fancy thread at the tip of the fancy thread carrier ❹ is caught by the tip of the right/left needle.

**(Caution)** The right and left positions of the fancy thread carrier ❹ should be adjusted when the presser is installed.



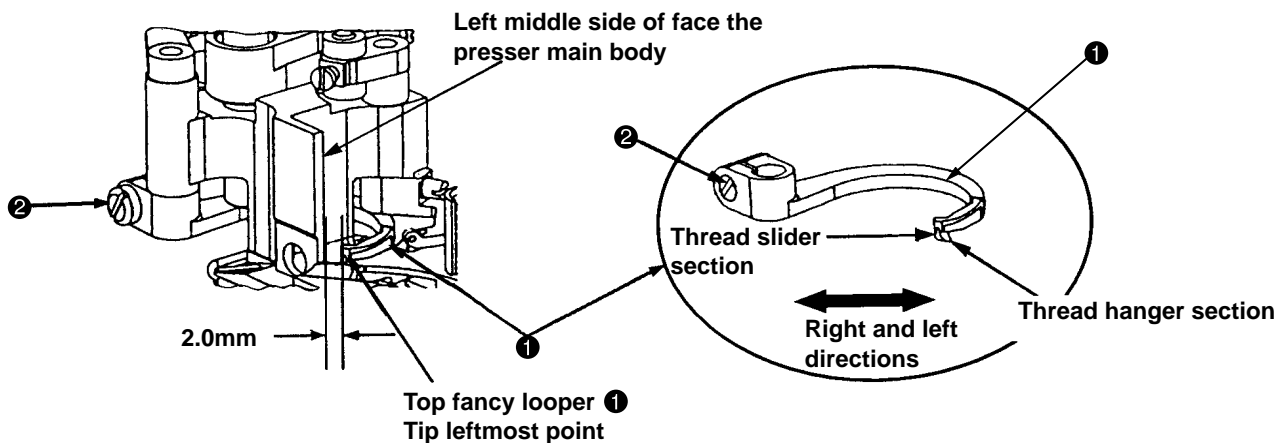
Adjustment Procedures	Results of Improper Adjustment
<p>1) Stroke position adjustment of drive sleeve</p> <p>When the head of the link setscrew ❷ comes closest to the rear face of the needle clamp ❸, loosen the setscrew ❹ of the driving sleeve lever ❺ and move the driving sleeve ❶ to the right and left to secure the standard clearance of 2mm. Since then, tighten the setscrew ❹. When the driving sleeve ❶ is moved to the right and left as seen from behind, the clearance becomes as follows:</p> <ul style="list-style-type: none"> <li>o The clearance is narrowed when the driving sleeve ❶ is moved leftward.</li> <li>o The clearance is widened when the driving sleeve ❶ is moved rightward.</li> </ul> <p><b>(Caution) When the setscrew ❹ is loosened, the driving sleeve ❶ is lowered and a vertical clearance may be developed. Tighten the setscrew after confirming that there is no clearance after adjustments.</b></p>	<p>o If position adjustment is incorrect, this can be a cause of fancy stitch skipping, needle breakage, or destruction of parts.</p>
<p>2) Amount of fancy thread carrier injection</p> <p>Loosen the setscrew ❹ and move the fancy thread carrier ❸ forward and backward to adjust the injection size to 3.5mm. Since then, tighten the setscrew ❹.</p>	<p>o This can be the cause of needle breakage or stitch skipping.</p>

## (14) Adjustment of top fancy looper and fancy thread carrier

### Standard Adjustment

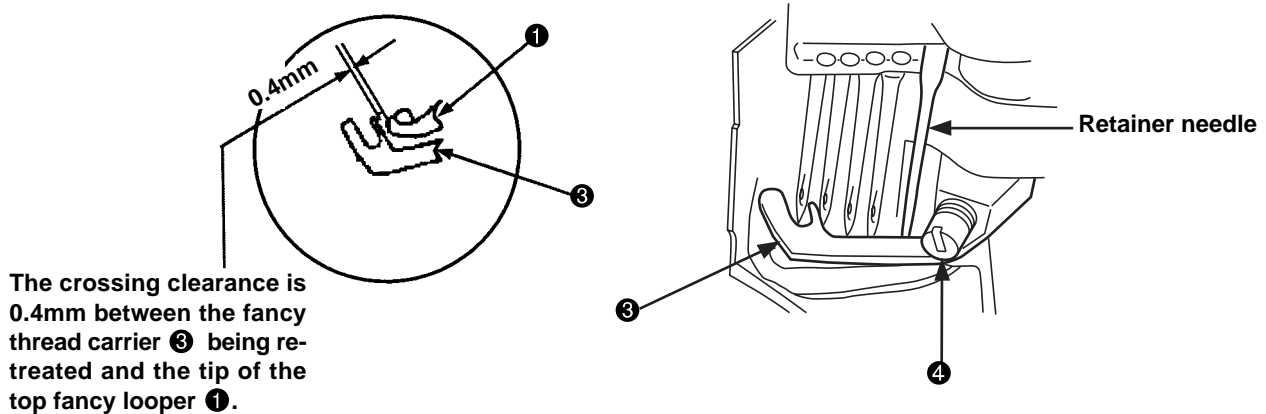
#### 3) Leftmost point of top fancy looper

While the top fancy looper ❶ is moved leftward, the fancy thread passes through the slider section and the position of being hooked on the thread hanger section is located at the extreme left. When the tip of the top fancy looper ❶ reaches the extreme left point, the standard size of 2.0mm from the left middle side face of the presser main body is secured.



#### 4) Clearance developed at the time of crossing between the fancy thread carrier and the tip of the top fancy looper

When the fancy thread carrier ❸ is retreated, it is crossed by the tip of the top fancy looper ❶. The standard clearance is 0.4mm when both items make the closest approach.



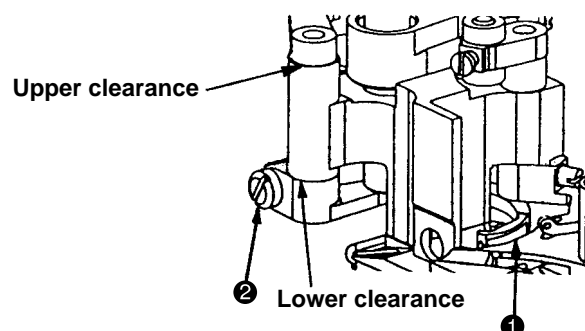
#### 5) Rightmost point of top fancy looper

The needle lowers when the tip of the top fancy looper ❶ reaches the rightmost point and then moves to the left.

The standard positioning is that the fancy thread is not caught by the retainer needle at that time.

#### 6) Height of top fancy looper

The height of the top fancy looper ❶ is kept unchanged.





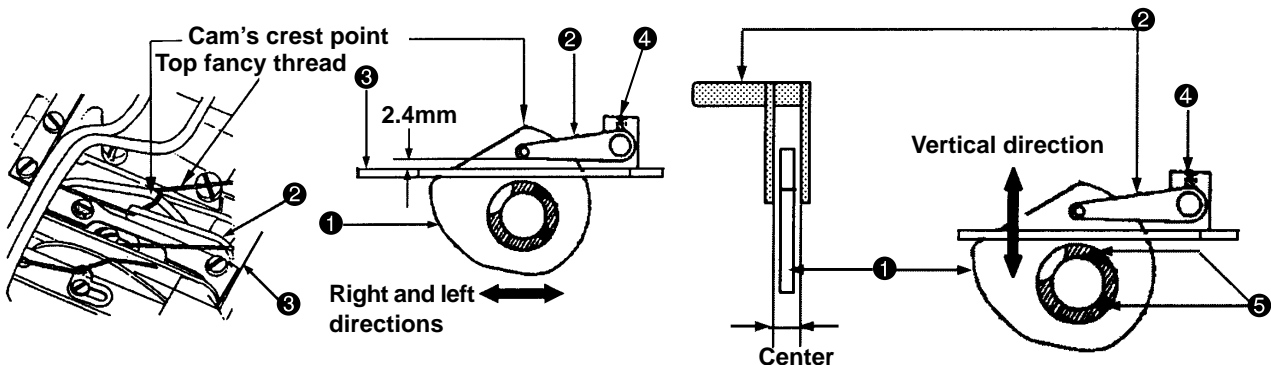
Adjustment Procedures	Results of Improper Adjustment
<p>3) Leftmost point of top fancy looper Loosen the setscrew ❷ when the tip of the top fancy looper ❶ is located at the extreme left, and move the looper to the right and left to secure a dimension of 2.0mm. Since then, tighten the setscrew ❷.</p> <p>4) Clearance developed at the time of crossing between the fancy thread carrier and the tip of the top fancy looper Loosen the setscrew ❹ to adjust the amount of injection of the fancy thread carrier ❸. Then, loosen the top fancy looper setscrew ❷ and secure a dimension of 0.4mm by making right and left fine adjustments for the top fancy looper ❶ simultaneously.</p> <p>5) Rightmost point of top fancy looper If there is no problem in adjustments of the top fancy looper ❶ at the leftmost point and of the fancy thread carrier mechanisms, the rightmost positioning is automatically secured for the top fancy looper.</p> <p>6) Height of top fancy looper If a vertical clearance is developed at the time of adjustment of the top fancy looper ❶, the top fancy looper ❶ is lowered. Tighten the setscrew ❷ to eliminate such a vertical clearance.</p>	<p>o If the fancy thread is not caught by the thread hanger section of the top fancy looper ❶, this can be a cause of top fancy stitch skipping.</p> <p>o If there is a problem in clearance adjustments, this can cause breakage of parts.</p> <p>o If the rightmost position of the top fancy looper ❶ deviates to the right too much, the fancy thread comes out of the right needle.</p> <p>o If vertical rattling is generated in the top fancy looper ❶, this can be a cause of stitch skipping or destruction of parts.</p>

## (15) Adjustment of top fancy cam and bobbin thread cam

### Standard Adjustment

#### 1) Adjustment of top fancy cam

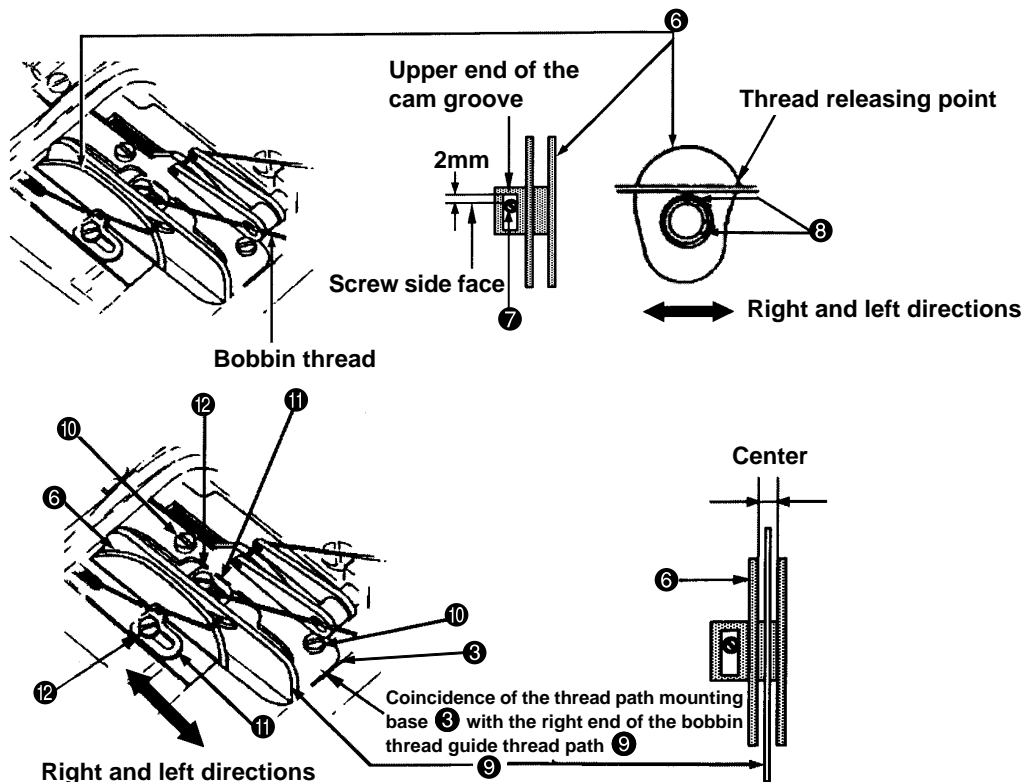
1. While the top decoration cam ① is moved leftward, the decoration thread passes through the thread slider section of the top decoration looper and is caught by the thread hanger section. The standard position is secured when the fancy thread is released from the crest point of the top fancy looper ① after the thread has been hooked on the thread hanger section.
2. The standard height (spun thread) of the top fancy thread path ② is 2.4mm above the top face of the cam thread path mounting base ③.



**(Caution)** The amount of thread drawing out may change according to the type of the thread used. The adjusting height of the top fancy thread path also changes.

#### 2) Adjustment of bobbin thread cam

1. The standard size is 2mm for the position where the bobbin thread (spun thread) is released from the releasing point of the bobbin thread cam ⑥. This size is measured from the side face of the contact screw ⑦ in the cam groove position to the upper end of the cam groove.



**(Caution)** The cam position should be advanced when a wooly thread (high elongation) is used. Since the wooly thread is stretchy, it is necessary to increase the amount of thread draw-out.

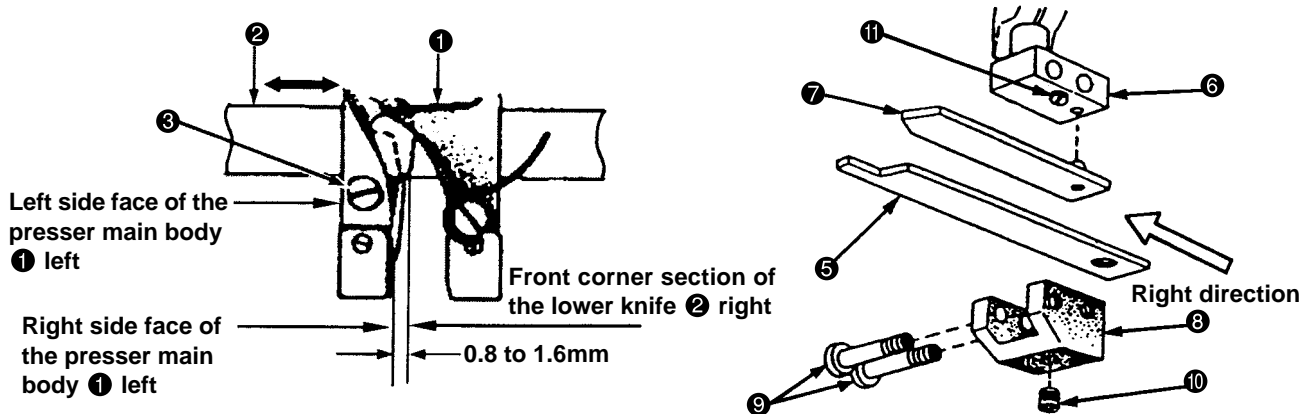
Adjustment Procedures	Results of Improper Adjustment
<p>1) Adjustment of top fancy cam</p> <ol style="list-style-type: none"> <li>1. Check the timing when the upper fancy thread is released from the crest position of the outer periphery of the cam. Loosen the setscrew ⑤ and then tighten it after adjustments.</li> <li>2. For adjustments of the upper fancy thread path ②, loosen the setscrew ④ and adjust the upper fancy thread path ② to the center of the upper fancy cam ① in order to secure the height of 2.4mm. Since then, tighten the setscrew ④.</li> </ol> <p>2) Adjustment of bobbin thread cam</p> <ol style="list-style-type: none"> <li>1. Check the timing when the bobbin thread is released from the thread releasing point on the outer periphery of the bobbin thread cam ⑥. Loosen the cam setscrew ⑧ and then tighten it after adjustments.</li> <li>2. To secure the mounting position for the bobbin thread guide thread path ⑨, adjust it to the center of the bobbin thread cam ⑥ and tighten the setscrew ⑩. Check the right and left positioning, and let the cam thread path mounting base ③ coincide with the right end of the bobbin thread guide thread path ⑨.</li> <li>3. If the amount of thread draw is increased for the bobbin thread path ⑪, loosen the setscrew ⑫ and move the bobbin thread path to the left. Tighten the setscrew ⑫ in the adequate position where the required amount of thread is available. To reduce the amount of thread, move the bobbin thread path ⑪ rightward.</li> </ol>	<p>o If the fancy thread is not caught by the thread hanger section of the top fancy looper, this can be a cause of top fancy stitch skipping.</p> <p>When the upper fancy thread path is too low:</p> <p>o Since the amount of fancy thread becomes small, this can be a cause of needle breakage or stitch skipping of the left middle needle. In addition, the sewing width of the upper fancy thread is narrowed.</p> <p>When the upper fancy thread path is too low:</p> <p>o Since the amount of fancy thread becomes large, this can be a cause of stitch skipping. This can be a cause of stitch skipping of idle loops. There is possibility of clogging due to reduced development of idle loops.</p> <p>o When the bobbin thread cam ⑥ is advanced, the amount of bobbin thread is increased. When it is delayed, the amount of bobbin thread is decreased.</p>

## (16) Knife adjustment

### Standard Adjustment

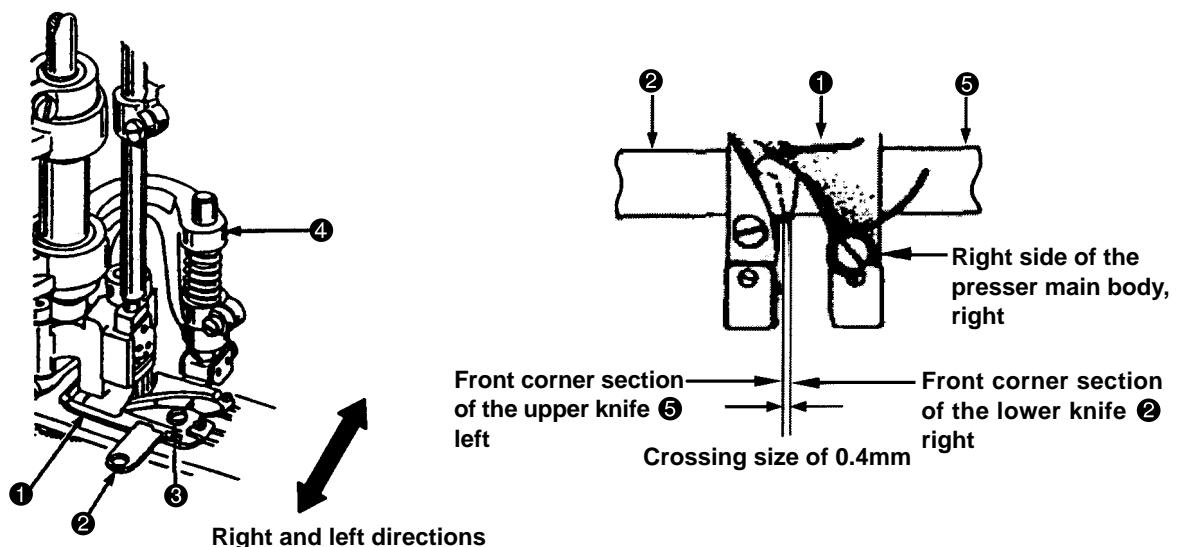
#### 1) Lower knife adjustment

Insert the lower knife ② from the left side of the presser main body, left. The standard size is 0.8 to 1.6mm from the right side of the presser main body left ① to the front corner section of the lower knife ② right.



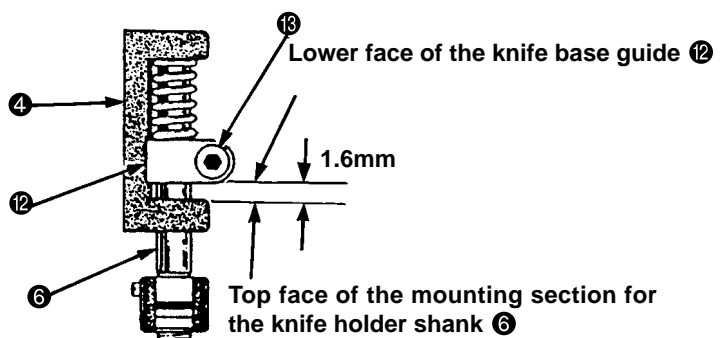
#### 2) Upper knife adjustment

Turn the hand pulley in forward direction and stop the upper knife driving bracket ④ in the leftmost position. Insert the upper knife ⑤ from the right side of the presser main body ① right and let it cross the lower knife ②. The standard crossing size is 0.4mm between the front corner section of the lower knife ② right and the front corner section of the upper knife ⑤ left.



#### 3) Pressure adjustment of upper knife

When the upper and lower knives ⑤ and ② are crossing, the standard size is 1.6mm between the lower face of the knife base guide ⑫ and the top face of the mounting section for the knife holder shank ⑥.



Adjustment Procedures	Results of Improper Adjustment
<p>1) Lower knife adjustment</p> <ol style="list-style-type: none"> <li>1. Loosen the setscrew ❸ and move the lower knife ❷ to secure the standard size of 0.8 to 1.6mm. Since then, tighten the setscrew ❸.</li> </ol> <p>2) Upper knife adjustment</p> <ol style="list-style-type: none"> <li>1. Attach the upper knife auxiliary plate ❷ to the knife holder shank ❹ and install the upper knife fixing block ❸. Since then, tighten the setscrew ❹.</li> <li>2. Turn the hand pulley in forward direction to the leftmost position of the upper knife driving bracket ❶. Insert the upper knife ❺ from the right side of the upper knife fixing block ❸ and tighten the setscrew ❿ after confirming that the standard crossing size of 0.4mm has been secured in conjunction with the lower knife ❷.</li> <li>3. If the right to left angle of the upper knife ❺ seems to be inadequate for the lower knife ❷ in regard to the meshing condition between the upper and lower knives ❺ and ❷, loosen the screw ⓫ and change the angle of the upper knife ❺.</li> </ol> <p>3) Pressure adjustment of upper knife</p> <ol style="list-style-type: none"> <li>1. At the time of crossing of the upper and lower knives ❺ and ❷, loosen the setscrew ⓬ and measure the distance of 1.6mm between the upper face of the knife holder shank ❹ of the upper knife driving bracket ❶ and the lower face of the knife base guide ⓭. After this distance has been confirmed, tighten the setscrew ⓬.</li> </ol>	<ul style="list-style-type: none"> <li>o According to the right and left positioning mesh between the upper and lower knives ❺ and ❷, the amount of material stacks is changed.</li> <li>o If the knives become blunt, stitches at the edge of material cloth become unstable. This can be a cause of stitch skipping.</li> <li>o If the spring pressure is too strong for the upper knife ❺, the sharpness of the knife will soon be lowered.</li> </ul>

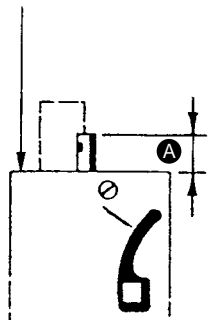
## (17) Adjustment of upper knife drive lever

### Standard Adjustment

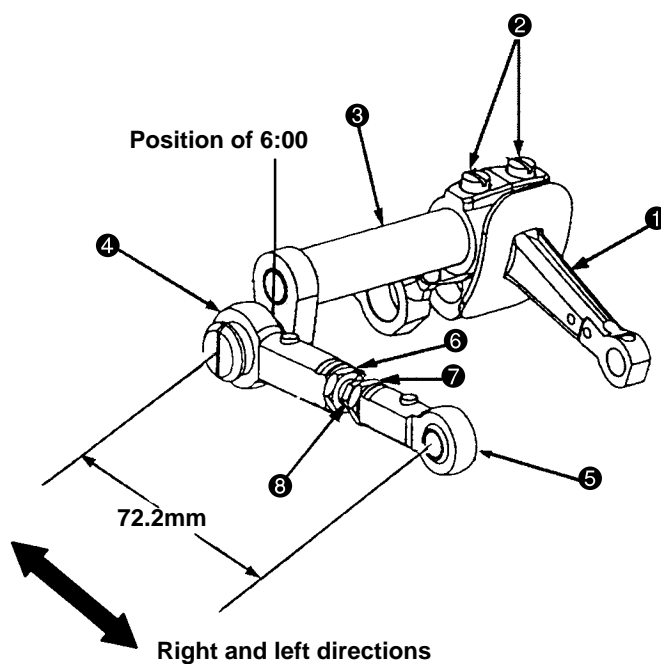
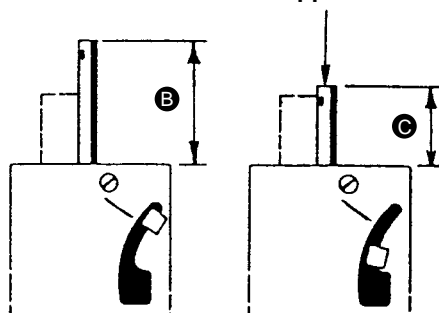
Position of upper knife drive lever

1. When the hand pulley is turned in forward direction and Size **C** is secured for the needle bar height, the standard position is located at 6:00 for the upper knife driving lever **3**.

Upper face of the machine head section



Upper face of the needle bar



Adjustment Procedures	Results of Improper Adjustment
<p>How to determine Size ❸</p> <ol style="list-style-type: none"> <li>1. Set the needle bar at the lower dead point and measure Size ❶ from the upper face of the needle bar to the upper face of the machine head.</li> <li>2. Then, with the needle bar set at the upper dead point, measure Size ❷ from the upper face of the needle bar to the upper face of the machine head.</li> <li>3. Make a calculation of <math>❷ - ❶ \div 2 = ❸</math> to determine Size ❸. The required Size ❸ is obtained from <math>❸ + ❶</math>.</li> </ol> <p>Adjustment procedures</p> <ol style="list-style-type: none"> <li>1. Loosen the setscrew ❷ of the needle bar lever ❶ and adjust the upper knife driving lever ❸ to the position of 6:00. Then, tighten the setscrew ❷.</li> <li>2. The standard size is 72.2mm from the center of the ball joint ❹ to the center of the ball joint ❺.</li> <li>3. To adjust the right and left ball joints ❹ and ❺, loosen the right and left nuts ❻ and ❼, and turn the joint rod ❽. Confirm the size of 72.2mm and tighten the right and left nuts ❻ and ❼.</li> </ol>	<ul style="list-style-type: none"> <li>o If the mounting posture of the upper knife driving lever ❸ is incorrect, the sharpness of the knife will soon be lowered.</li> <li>o If the right and left ball joints ❹ and ❺ have wrong sizes, it is impossible to adjust the top fancy looper and the fancy thread carrier.</li> </ul>

(18) Adjustment of needle thread path

Standard Adjustment

1) Adjustment of needle thread guide bar

The standard height (spun thread) of the needle thread guide bar ❶ is defined by Table ❶ to ❷ below from the upper face of the needle thread guide base ❷ to the lower end of the hole. If the needle thread tension is needed according to the type of the thread, lower the needle thread guide bar ❶.

Dimensions of needle thread guide bar

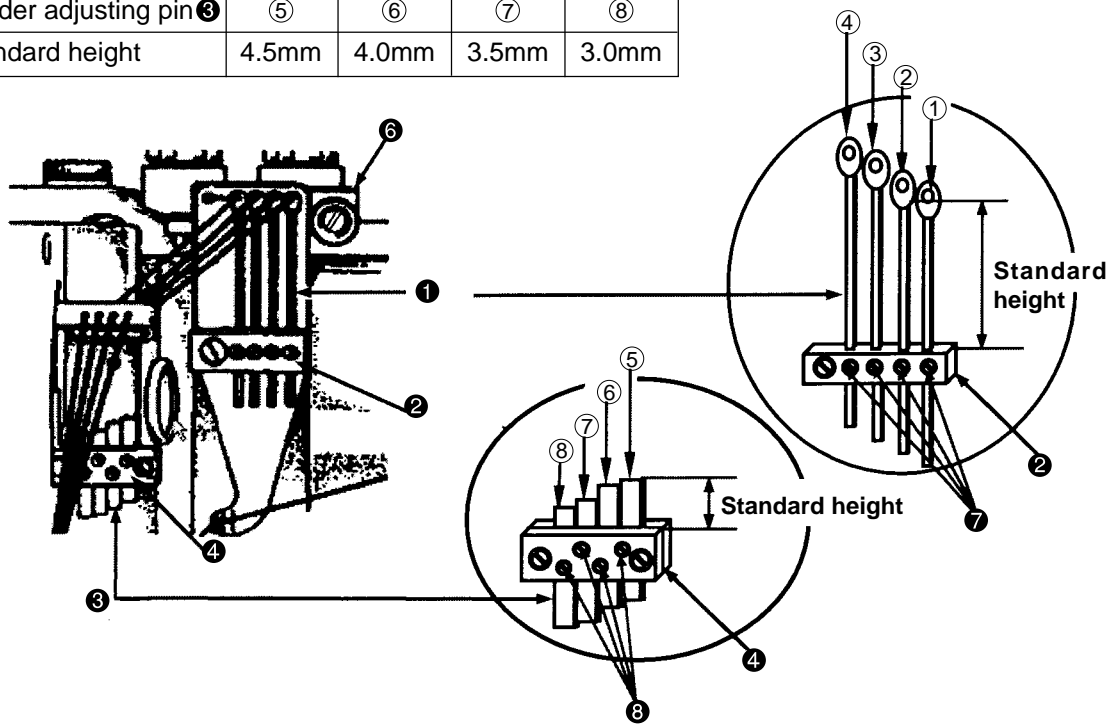
Needle thread guide bar ❶	❶	❷	❸	❹
Standard height	28mm	30mm	32mm	40mm

2) Adjustment of needle holder adjusting pin

The standard height (spun thread) of the needle thread holder adjusting pin ❸ is defined by Table ❸ and ❹ below from the upper face of the needle thread holder base ❹ to the crest point of the needle thread holder adjusting pin ❸.

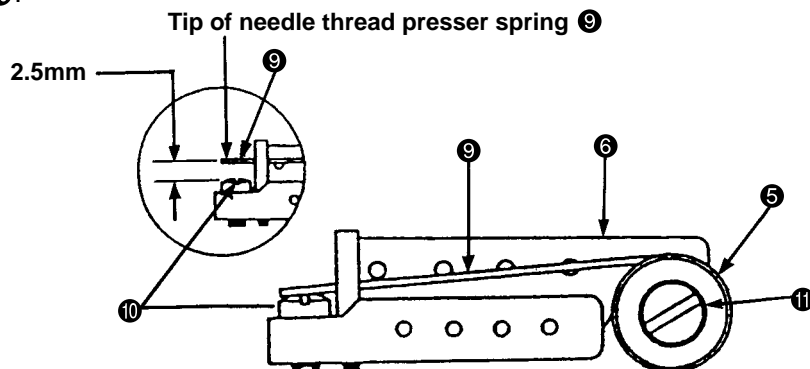
Dimensions of needle holder adjusting pin

Needle holder adjusting pin ❸	❸	❹	❺	❻
Standard height	4.5mm	4.0mm	3.5mm	3.0mm



3) Adjustment of needle thread presser spring

In regard to the height of the needle thread presser spring ❹ mounted on the needle thread path base ❺, the standard size is 2.5mm between the tip section of the needle thread presser spring ❹ and the head top of the screw ❺.





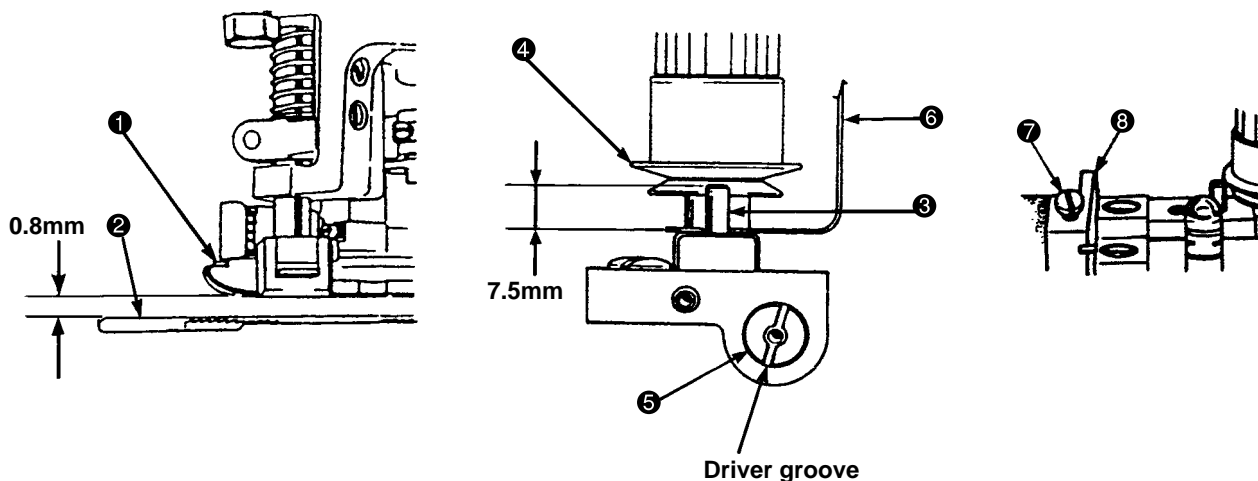
Adjustment Procedures	Results of Improper Adjustment
<p>1) Adjustment of needle thread guide bar Loosen the setscrew ⑦ of the needle thread guide bar ① of ① to ④ to adjust the height. After adjustments, fix the setscrew ⑦.</p> <ul style="list-style-type: none"> <li>o Lowering the needle thread guide bar ① causes the needle thread to be tightened.</li> <li>o Raising the needle thread guide bar ① causes the needle thread to be loosened.</li> </ul> <p>2) Adjustment of needle holder adjusting pin Loosen the setscrew ③ of the needle thread holder adjusting pin ③ of ⑤, ⑥ to adjust the height. After adjustments, fix the setscrew ③. Size ⑦, ⑧ is for reference.</p> <ul style="list-style-type: none"> <li>o Raising the needle thread holder adjusting pin ③ causes the needle thread loop to be enlarged.</li> <li>o Lowering the needle thread holder adjusting pin ③ causes the needle thread loop to be diminished.</li> </ul> <p>3) Adjustment of needle thread presser spring Loosen the setscrew ⑪ to turn the spring holder ⑤ and make adjustments to secure the size of 2.5mm between the tip section of the needle thread presser spring ⑨ and the head top of the screw ⑩. Then, tighten the setscrew ⑪.</p> <p>* Role of the needle thread presser spring The needle thread resistance is effective in stabilizing loop formation. When the hand pulley is turned in reverse direction and then in forward direction for starting, the needle thread once loosened is tensed again by the function of the needle thread presser spring ⑨. For this reason, stitch formation is improved at the time of starting.</p>	<ul style="list-style-type: none"> <li>o More precise adjustment to the standard size is needed for the needle thread guide bar ① as it is positioned closer to the looper. Otherwise, the thread tension may become worse.</li> <li>o Since the left and left middle needles are located near the looper, the needle thread holder adjusting pin ③ has to be adjusted to the standard size correctly. Otherwise, loop formation will get worse and stitch skipping may occur.</li> <li>o If the needle thread presser spring ⑨ has no needle thread resistance, stitch skipping may be caused at the time of starting.</li> </ul>

## (19) Adjustment of tension disk rise and protection cover

### Standard Adjustment

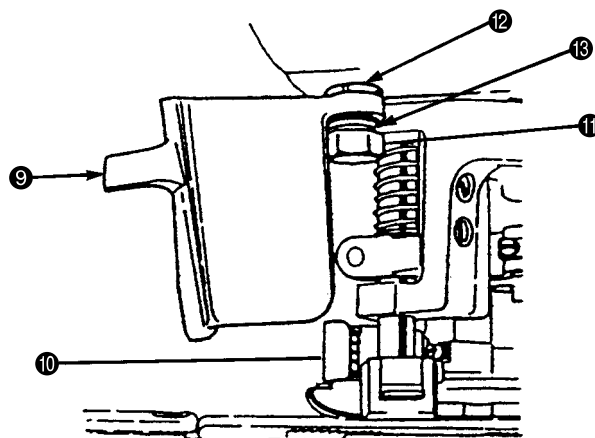
#### 1) Adjustment of tension disk rise

The standard positioning is that the tip of the disk rise pin ③ keeps contact with the top tension disk ④ when the presser main body ① rises by 0.8mm above the upper face of the throat plate ② and that the top tension disk ④ keeps rising when the presser main body ① is located at the crest point. The standard size is 7.5mm between the tip of the disk rise pin ③ and the upper face of the tension thread path ⑥.



#### 2) Adjustment of protection cover

When the protection cover ⑨ is shut, this protection cover ⑨ holds the chips guard ⑩. The standard mounting posture is that there is no front and rear play around the chips guard ⑩.



Adjustment Procedures	Results of Improper Adjustment
<p>1) Adjustment of tension disk rise Insert a screwdriver in the driver groove of the tension disk rise shaft ⑤. Loosen the setscrew ⑦ of the lift lever ③ and turn the screwdriver to adjust the height of the disk rise pin ③ to 7.5mm. Since then, tighten the setscrew ⑦.</p> <p>2) Adjustment of protection cover Loosen the hexagon head bolt ⑪ and make the stepped position of the washer ⑫ coincide with the stepped position of the protection cover ⑨. Turn the bolt where the protection cover ⑨ is tightened. Use a spanner wrench (21388Y) to fix the washer ⑫ and tighten the hexagon head bolt ⑪. The spring ⑬ settles in the hole of the protection cover ⑨ and makes it stabilized.</p>	<p>o When pulling out the needle thread as well as the top and bottom fancy threads, it is necessary to lift the top tension disk ④.</p> <p>o The protection cover ⑨ is used to protect the operator when a needle is broken and pointed objects fling out.</p> <p>o When the chips guard ⑩ is stabilized, the presser and the needle section can be protected against chips.</p>

## (20) Adjustment of lapformer

### Standard Adjustment

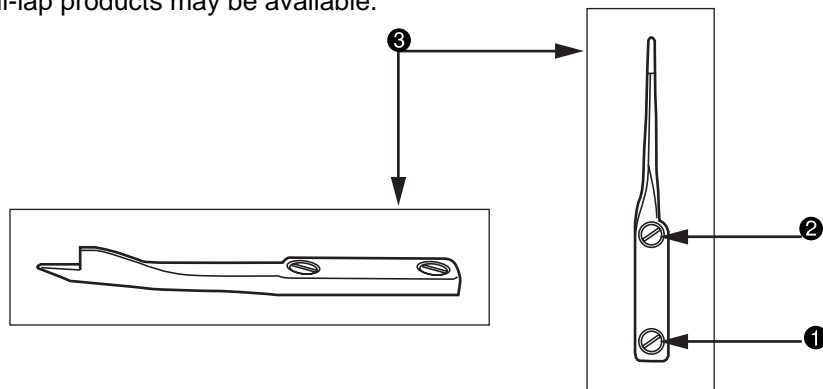
#### 1. Adjustment of lapformer

This is an exclusive both side trim center guide used to adjust the right and left width of the materials in stack. When the setscrews ① and ② are loosened and the lapformers ③, ④, and ⑤ are moved to the right or left, it is possible to change the tip position and adjust the stack width of materials.

Since the standard value is changed by the lapformers ③, ④, and ⑤ specified below, the presser main body, the types of rear spring parts, and material cloth, adjustments are carried out by repeating sewing several times.

#### 2. Union Special standard lapformer (B) ③ (Part No: 23420DB)

This is the universal type that is applicable to both light and medium heavy materials. The material stacks do not come in full laps. Lapping is possible up to approximately three stitches on the front and rear. According to materials, full-lap products may be available.

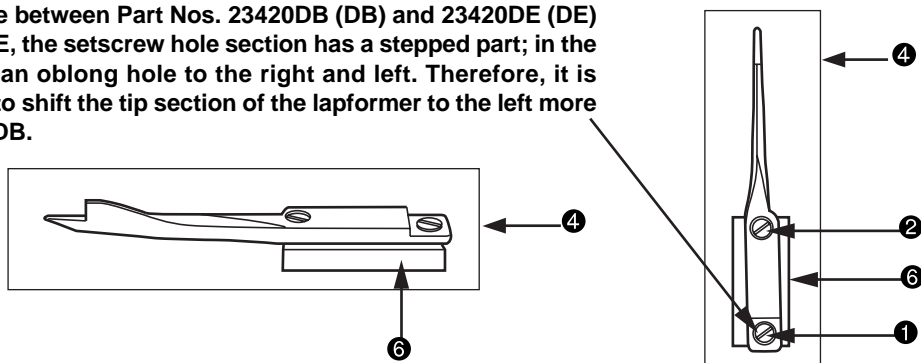


#### 3. Domestic standard lapformer ④ (C) (Part No: 23420DE)

This is the universal type that is applicable to both light and medium heavy materials. The tip section of the lapformer ④ can be shifted very much to the left so that the width of material laps can be increased. A condition close to a full lap (fourth stitch on the front and rear) can be attained. To increase the width of laps, it is important to select the rear spring correctly. Selection should conform to the nature of raw materials.

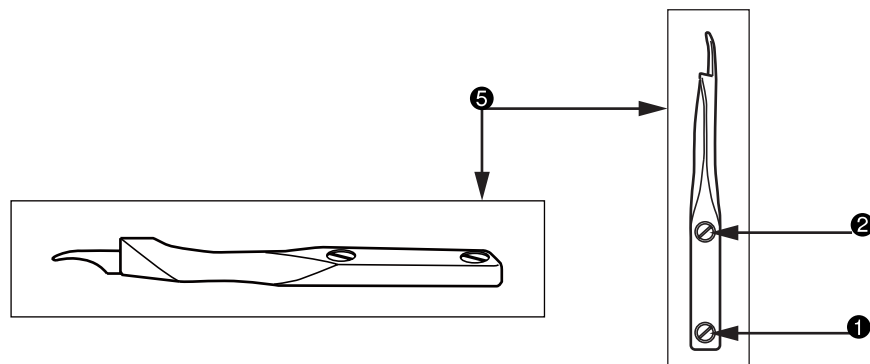
##### **Difference between Part Nos. 23420DB (DB) and 23420DE (DE)**

For the DE, the setscrew hole section has a stepped part; in the shape of an oblong hole to the right and left. Therefore, it is possible to shift the tip section of the lapformer to the left more than the DB.

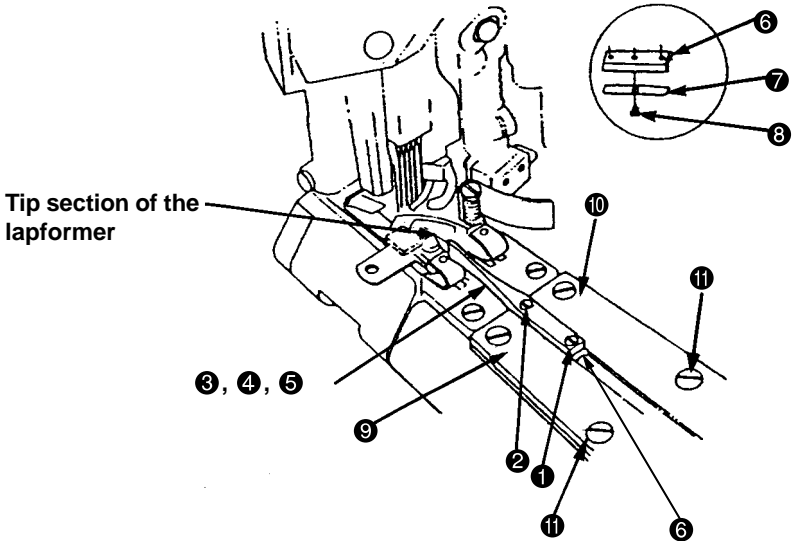


#### 4. Lapformer exclusive for light weight materials (D) ⑤ (Part No: 23420CZ)

This type is most suitable in the case when the amount of laps of light weight raw materials has to be applied to a full lap.



**(Caution)** Even the light weight materials cannot be sewn if the goal product has steps on the way.

Adjustment Procedures	Results of Improper Adjustment
<p>How to mount and adjust the lapformer</p> <ol style="list-style-type: none"> <li>1. Fix the leaf spring ⑦ to the bottom face of the slide block ⑥ by means of the setscrew ⑧.</li> <li>2. Put the slide block ⑥ in between the right and left slide plates ⑨ and ⑩. Temporarily fasten the right and left slide plates ⑨ and ⑩ by means of the setscrews ⑪ (6 pcs.).</li> <li>3. Shift the tip sections of the lapformers ③, ④, and ⑤ respectively to the left and tighten the setscrews ① and ②.</li> <li>4. Tighten the setscrews ⑪ (6 pcs.) of the right and left slide plates ⑨ and ⑩ so that the slide block ⑥ can move forward and backward.</li> <li>5. Upon the completion of the above, advance the slide block ⑥ until it stops.</li> <li>6. Try to sew the raw materials several times and examine the right to left lap width of the materials. If the lap conditions seem to be inadequate, loosen the setscrews ① and ② and move the tip sections of the lapformers ③, ④, and ⑤ to the right or left. After readjustment, tighten the setscrews ① and ②.</li> </ol> 	<ul style="list-style-type: none"> <li>o When the tip sections of the lapformers ③, ④, and ⑤ are moved to the left, the lap width is increased.</li> <li>o When the tip sections of the lapformers ③, ④, and ⑤ are moved to the right, the lap width is decreased.</li> </ul>

## 8. Lubrication

### 1. Oil lubrication and check point

The sewing machine head section is of the rotary pump type auto lubrication system.

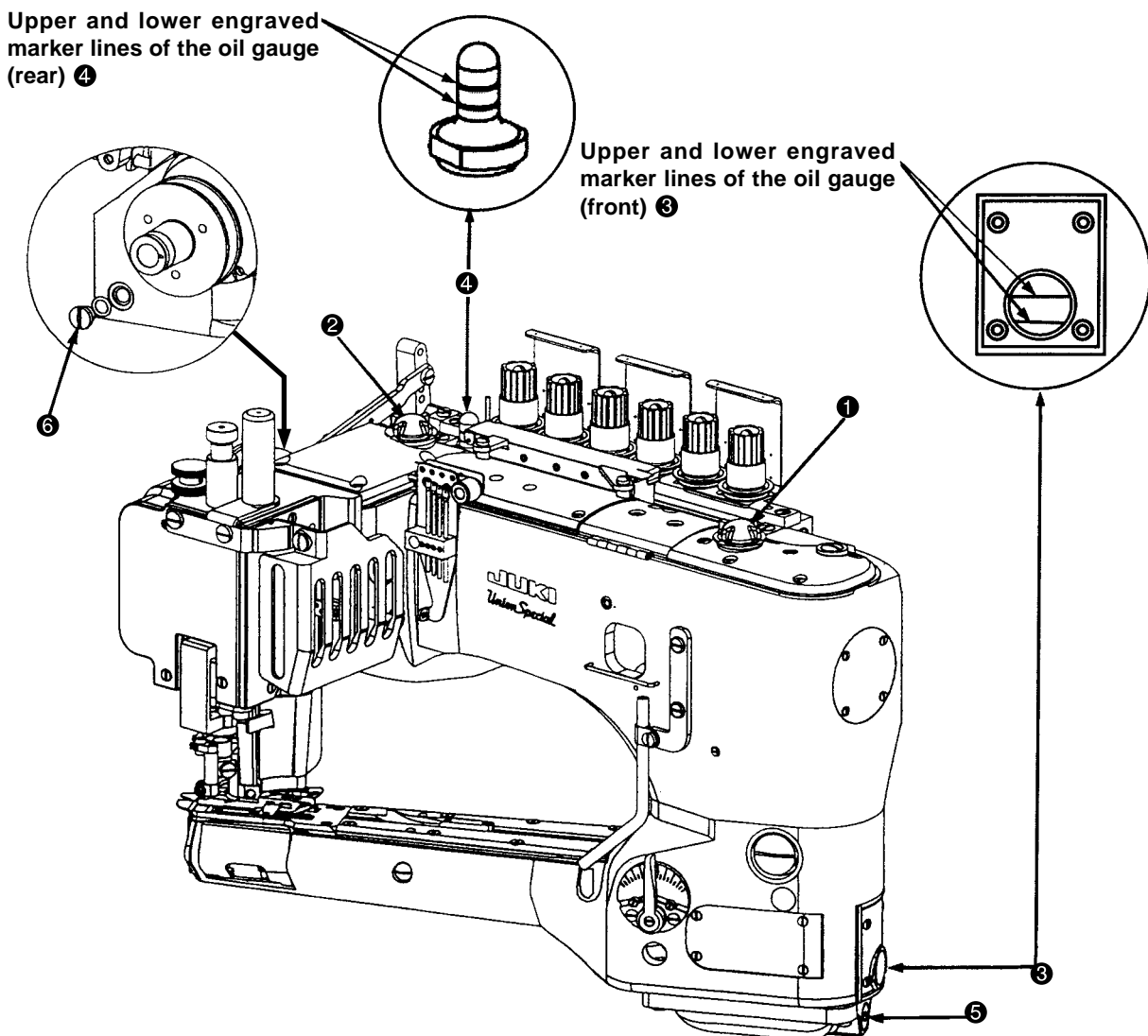
Remove the oil circulation check windows (front) and (rear), ① and ②, and feed a lubricant as high as the level between the upper and lower engraved marker lines of the oil gauges (front and rear), ③ and ④.

When the lubricant has been replenished, mount the oil circulation check windows (front) and (rear), ① and ②.

### 2. Oil drain spot

To replace the lubricant, remove the oil drain (front) and (rear) screws ⑤ and ⑥. Upon the completion of oil drainage, tighten the oil drain (front) and (rear) screws ⑤ and ⑥.

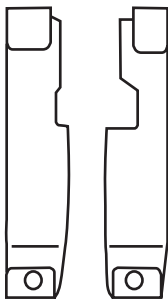
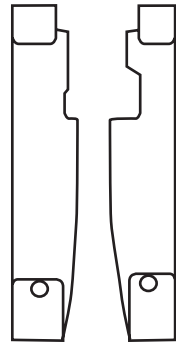
**(Caution)** To confirm the amount of oil at the oil gauge (rear) ④, check the crest point of the oil level indicator that is actuated by an oil float. In some cases, the oil level indicator does not come up immediately. Make sure not to commit overfilling of the oil in such a case.

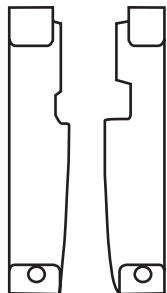
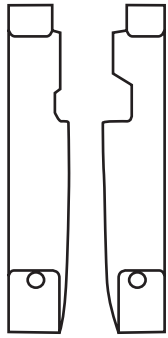
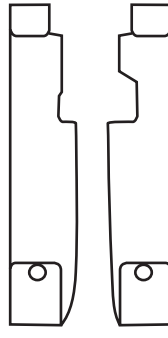


## 9. List of rear spring

### (1) One side trim

Model name	Part No. of standard presser
36200L100-52 36200U300-52	36220A
36200L100-60 36200U300-60	36220K

	Standard	Accessories in the same package
	36231AY, 36232AY	36231AZ, 36232AZ
		
Length	Short	Long
Hardness	Weak	Weak

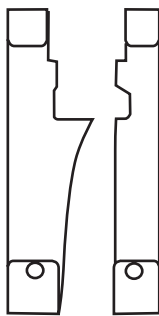
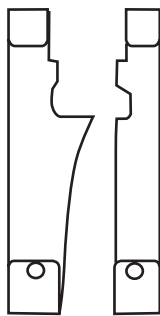
	Option		
	36231AH, 36232AH	36231AJ, 36232AJ	36231AD, 36232AD
			
Length	Short	Long	Long
Hardness	Strong	Strong	Strong
		Right material cutting	Left material cutting

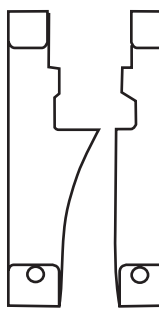
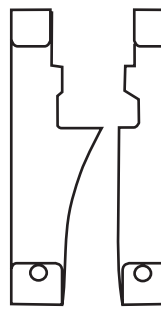
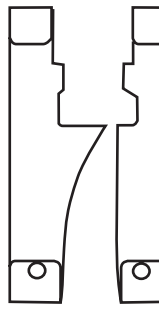
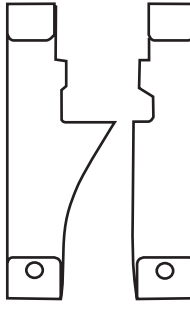
#### Features

- \* If the length is short, the property of tight turns is available and raw materials can be handled as closer as possible to the knife position. Therefore, the effect is substantial in regard to right and left material shifts. ... For thigh patch-up for ladies' shorts, etc.
- \* If the length is long, favorable factors can be expected in regard to biting at the beginning of sewing. The feeding force is favorable and the stepped sections can be processed smoothly. ... Applicable to taped parts in trainers and men's briefs and underwear
- \* Feeding flaws are hardly attached to soft materials. This is effective for light weight materials. (Thickness: 0.36mm)
- \* The feeding force is favorable for hard materials. This is effective for coarse materials. (Thickness: 0.5mm)

## (2) Both side trim

Model name	Part No. of standard presser
36200L200-52 36200U300-52	36220E
36200L200-60 36200U300-60	36220W

	Standard	Accessories in the same package
	36231AW, 36232AW	36231AK, 36232AK
		
Length	Long	Long
Hardness	Weak	Strong

	Option			
	J36231C, J36232C	J36231ZC, J36232ZC	J36231ZCW, J36232ZC	J36231ZCW2, J36232ZC
				
Length	Short	Short	Short	Short
Hardness	Weak	Weak	Weak	Weak

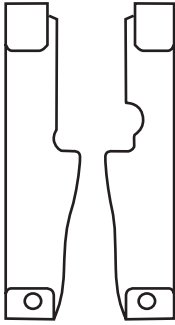
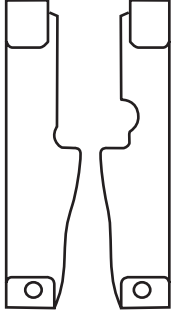
### Features

- \* If the length is short, the property of tight turns is available and raw materials can be handled as closer as possible to the knife position. Therefore, the effect is substantial in regard to right and left material shifts. ... For thigh patch-up for ladies' shorts, swimsuits, etc.
- \* If the length is long, favorable factors can be expected in regard to biting at the beginning of sewing. The feeding force is favorable and the stepped sections can be processed smoothly. ... Applicable to trainers, parkas, etc.
- \* Feeding flaws are hardly attached to soft materials. This is effective for light weight materials. (Thickness: 0.36mm)
- \* The feeding force is favorable for hard materials. This is effective for coarse materials. (Thickness: 0.5mm)
- \* The three types of J36231ZC, ZCW, and ZCW2 processed with fluorocarbon polymers. Therefore, sliding performance of raw materials is outstanding and it is suitable for the materials that are difficult to handle for feeding.
- \* The J36231ZCW and ZCW2 are most suitable when the behavior of raw material lapping is adverse or the material cloth tends to be rolled up easily.
- \* The J36231ZCW2 is used mainly for swimsuits.



### (3) Taping

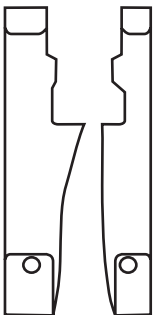
Model name	Part No. of standard presser
36200T300-52 36200T300-60	36220E

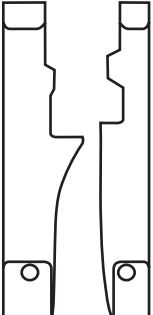
	Standard	Option
	36231BA, 36232BA	36231AL, 36232AL
		
Length	Short	Short
Hardness	Weak	Strong

#### Features

- \* Exclusively used for fly taping of men's briefs.

### (4) Step gauge

1.27mm step gauges 5.2mm	Standard
	36231AM, 36232AM
Model name	
36200L210-52	
Part No. of standard presser	
36220H	
Length	Long
Hardness	Strong

1.27mm step gauges 6.0mm	Standard
	36231AP, 36232AP
Model name	
36200L210-60	
Part No. of standard presser	
36220M	
Length	Long
Hardness	Strong

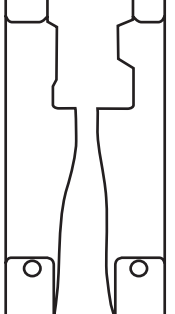
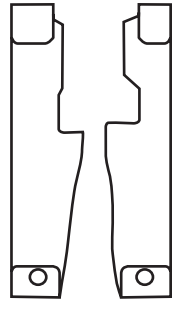
#### Features

- \* Effective when the materials with different thickness on the right and left and when heavy-weight materials are handled to produce wetsuits, etc.

**(Caution)** For sewing non-smooth materials such as wetsuits, make the left rear spring straight.

### (5) Butted seam

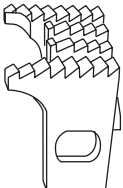
Model name	Part No. of standard presser
36200L100-52 36200U300-52	36220A
36200L100-60 36200U300-60	36220K

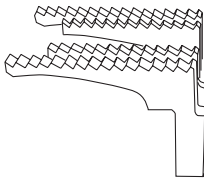
	Option	
	36231AF, 36232AF	36231AG, 36232AG
		
Length	Long	Short
Hardness	Strong	Strong

- \* Select the rear spring from the drawing shown at right when the above-mentioned presser is used for butted seam.

## 10. Types of feed dogs

### 1. Classification of specifications for the machine head of the standard feed dog (made of steel): 36200L100/L200

Main feed dog	Part No.: 36205A
	

Differential feed dog	Part No. : 36226A
	

#### Details

- \* Standard number of teeth: 14-inch crest
- \* Most suitable for the products of general looped fabric, knitted goods, etc., applicable to both light-weight and medium-heavy-weight materials.

### 2. Standard feed dog with steps (steps: 1.27mm, made of steel): Classification of specifications for the machine head: 36200L210

Main feed dog	Part No.: 36205H
---------------	------------------

Differential feed dog	Part No.: 36226H
-----------------------	------------------

#### Details

- \* Standard number of teeth: 14-inch crest
- \* Most suitable for the products of medium-heavy-weight knit materials.

### 3. Classification of specifications for the machine head of the specific gauge feed dog (made of steel): 36200L202

Main feed dog	Part No.: 36205N
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Differential feed dog	Part No.: 36226K
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#### Details

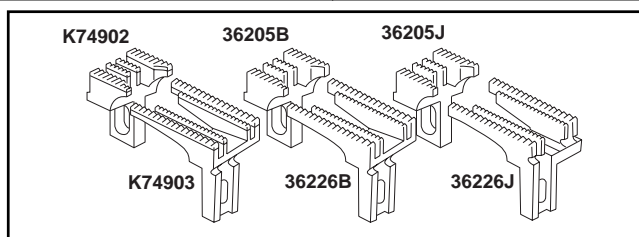
- \* Standard number of teeth: 16-inch crest
- \* Most suitable for the products of boxer's briefs, applicable to light-weight and medium-heavy-weight materials.

### 4. Exclusive feed dog for light-weight materials

Name	Made of urethane (flat)	Made of steel (flat)	Made of steel (with steps)
Main feed dog	Part No.: K74902	Part No.: 36205B	Part No.: 36205J
Differential feed dog	Part No.: K74903	Part No.: 36226B	Part No.: 36226J

#### Details

- \* Standard number of teeth for light-weight materials: 16-inch crest
- \* Three items are applicable exclusively to light-weight materials.
- \* Most suitable for the fabric easily getting feed flaws.
- \* Difference in step of the stepped part: 1.27mm
- \* Part No. K is applicable to the specific parts.

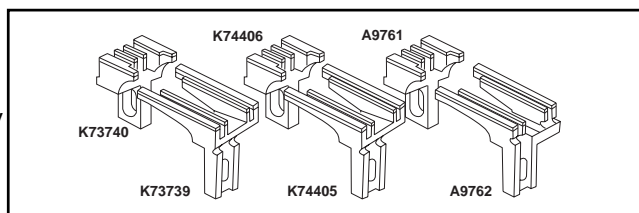


### 5. Exclusive feed dog for light-weight materials

Name	Made of urethane and metal (flat)	Made of urethane (with steps)	Made of urethane (flat)
Main feed dog	Part No.: K73740	Part No.: K74406	Part No.: A97761
Differential feed dog	Part No.: K73739	Part No.: K74405	Part No.: A97762









#### Details

- \* Applicable exclusively to delicate fabric.
- \* The crest of rubber type is flat.
- \* The main feed dog of the K73740 has teeth only in two middle rows.
- \* Difference in step of the stepped part: 1.27mm
- \* Part No. K is applicable to the specific parts.



# 11. Maintenance

## (1) Spare parts

														
No.	Model name	Application	Cloth cutter	Sub-model	Needle gauge	Presser foot (main body)	Throat plate	Main feed dog	Differential feed dog	Needle clamp	Lapformer	Edge guide	Tape holder	
1	36200L100-52	Lapseam	One side trim	Standard flat gauge	5.2mm	36220A	C36224A	36205A	36226A	36218-52		36203		
2	36200L100-60				6.0mm	36220K	C36224J	36205A	36226A	36218-60		36203		
3	36200L200-52		Both side trim		5.2mm	36220E	C36224A	36205A	36226A	36218-52	23420DB			
4	36200L200-60				6.0mm	36220W	C36224J	36205A	36226A	36218-60	23420DB			
5	36200L202-52			Presser with guide plate	5.2mm	36220X	C36224P	36205N	36226K	36218-52	23420DH			
6	36200L202-60				6.0mm	36220Y	C36224Q	36205N	36226K	36218-60	23420DH			
7	36200L210-52			1.27mm stepped gauge	5.2mm	36220H	36224H	36205H	36226H	36218-52	23420DB			
8	36200L210-60		6.0mm		36220M	36224K	36205J	36226J	36218-60	23420DB				
9	36200L220-60		5-needle version for swimsuits	6.0mm	J35620W	J35640M5	J35605M	J35626M	J35618-5	23420DE				
10	36200T300-52	Taping	Combined use for one side and both side trim	Standard flat gauge	5.2mm	36220B	C36224A	36205A	36226A	36218-52		36203	23401P-7/16	
11	36200T300-60				6.0mm	36220B	C36224J	36205A	36226A	36218-60		36203	23401P-7/16	
12	36200U300-52	Multi-purpose			5.2mm	36220A	C36224A	36205A	36226A	36218-52		36203		
						36220E					23420DB			
13	36200U300-60	Multi-purpose				6.0mm	36220K	C36224J	36205A	36226A	36218-60		36203	
							36220W					23420DB		

(Caution) The lap former of US Part No: 23420DB is not used in Japan.

Products of US Part No: 23420DE are used in Japan. The model type is the same as that of parts used in the 23420DB. However, since the tip section of the lap former is made to swing to the right and left, the hole section of the setscrew is made to have an oblong hole. This is the part that has a wide swinging width for the tip section.

## 12. Troubles and corrective measures

Trouble	Cause (1)	Cause (2)	Check and corrective measures
1. Thread breakage	1-1) Threading	1-A) Thread jamming at thread guide, threading error	Refer to "6. How to conduct threading".
	1-2) Thread path	2-A) Resistance is developed when there is a scratch, a burr, or rust on the throat plate stitch tongue, upper fancy looper, fancy thread carrier, lower looper, needle damper thread path section, needle thread rocking path, needle, upper and lower fancy thread guides, or thread tension disc.	Remove the scratch, burr, or rust and finish the thread path. However, replace the old parts with new ones if the parts are important and the shapes of the parts are changeable such as lower looper and throat plate stitch tongue.
	1-3) Rear needle guide	3-A) If contact between the needle and rear needle guide is excessive, needle grooves are created on the rear needle guide, resulting in thread cut.	Replace the needle, and replace the part if the rear needle guide is worn.
	1-4) Needle	4-A) The needle is too thin for the thread that is now used.	Use an appropriate needle.
	1-5) Needle heat	5-A) Thread cut occurs because of heated needle depending on the material type, the number of superimposed materials, and sewing speed.	Use a thinner needle, or reduce the sewing speed. Use the silicone oil lubricating unit.
	1-6) Thread	6-A) Poor quality of the thread	Use a high-quality thread.
	1-7) Thread tension	7-A) Excessive thread tension	Reduce the thread tension. The tension is too strong because the needle thread guide bar is placed too low.
	1-8) Contact	8-A) The lower looper touches the feed dog or throat plate because of an improper lower looper position. The looper touches the rear needle guide because of insufficient looper return.	Set the lower looper in the proper position.
	1-9) Problems with chain-off thread	9-A) The positions of upper fancy looper or fancy thread carrier is not proper. The mounting angle of the lower looper is not proper. There is a scratch on the throat plate stitch tongue, feed dog, or small presser.	Set the parts in the proper positions. Remove the scratch.

Trouble	Cause (1)	Cause (2)	Check and corrective measures
2. Thread cut at upper fancy looper	2-1) Thread path	1-A) Resistance is developed when there is a scratch, a burr, or rust on the throat plate stitch tongue, upper fancy looper, upper fancy thread cam, thread guide, or thread tension disc.	Remove the scratch, burr, or rust and finish the thread path. However, replace the old parts with new ones if the parts are important and the shapes of the parts are changeable such as throat plate stitch tongue, looper, and upper fancy cam.
	2-2) Adjustment of upper fancy thread cam	2-A) Excessive tension is provided because of improper timing of the upper fancy thread cam or improper position of the thread guide.	Refer to the standard adjustment values.
	2-3) Thread tension	3-A) Excessive thread tension	Reduce the tension in consideration of the tension balance with the needle thread and lower fancy thread.
	2-4) Thread	4-A) Poor quality of the thread	Use a high-quality thread.
	2-5) Adjustment of fancy thread hook	5-A) Thread cut is caused by the contact between the thread and upper fancy looper after withdrawal of the fancy thread carrier.	Refer to the standard adjustment values.
	2-6) Needle heat	6-A) Thread cut occurs when the fancy thread touches the left-sided right or left needle at sewing stop due to needle heat.	Reduce the sewing speed.
3. Thread cut at lower looper	3-1) Thread path	1-A) Resistance is developed when there is a scratch, a burr, or rust on the throat plate stitch tongue, lower looper bobbin thread cam, thread guide, or thread tension disc.	Remove the scratch, burr, or rust and finish the thread path. However, replace the old parts with new ones if the parts are important and the shapes of the parts are changeable such as throat plate stitch tongue, looper, and lower thread cam.
	3-2) Adjustment of bobbin thread cam	2-A) Excessive tension is provided because of improper timing of the lower thread cam or improper position of the thread guide.	Refer to the standard adjustment values.
	3-3) Thread tension	3-A) Excessive thread tension	Reduce the tension in consideration of the tension balance with the needle thread and upper fancy thread.
	3-4) Thread	4-A) Poor quality of the thread	Use a high-quality thread.
	3-5) Needle heat	5-A) Thread cut occurs when the thread touches the right needle at sewing stop due to needle heat.	Reduce the sewing speed.

Trouble	Cause (1)	Cause (2)	Check and corrective measures
4. Needle breakage	4-1) Needle entry	1-A) Interference between the right needle and throat plate stitch tongue or the left needle and throat plate stitch tongue	Refer to the standard adjustment values.
	4-2) Fancy thread carrier	2-A) The fancy thread carrier interferes with the needle if the carrier is not located in the center between the left-sided right and left needles or in the proper position of the front-to-rear direction.	Refer to the standard adjustment values.
	4-3) Upper fancy looper	3-A) The upper fancy looper interferes with the retainer needle if the swing position of the upper fancy looper is too far right side.	Refer to the standard adjustment values.
	4-4) Interference between lower looper and blindstitch of needle	4-A) The needle breaks because of the interference between the tip of the lower looper and the needle.	Adjust the lower looper to prevent the interference. Refer to the standard adjustment values.
	4-5) Interference between rear of lower looper and needle tip	5-A) The needle breaks because of the strong interference between the rear of the lower looper and the needle tip.	(8) Adjust the looper movement locus. Refer to the standard adjustment values.
	4-6) Rear needle guide	6-A) Excessive clearance between the needle and rear needle guide causes needle shaking and then interference between the needle and the lower looper tip resulting in needle breakage.	Adjust the clearance between the needle and rear needle guide. Refer to the standard adjustment values.
	4-7) Front movable needle guide	7-A) Excessively pressing the needle with the front movable needle guide causes the interference between the needle and lower looper tip resulting in needle breakage.	Adjust the pressing level of the front movable needle guide. Refer to the standard adjustment values.
	4-8) Needle size	8-A) For the case that the needle is too thin for the material that is now used	Use a thicker needle.
	4-9) Thread tension	9-A) Excessive needle thread tension	Reduce the needle thread tension.
	4-10) Feed dog height	10-A) Too high feed dog causes needle sidewise movement resulting in needle breakage.	Refer to the standard adjustment values.
5. Needle edge blunting	5-1) Rear needle guide	1-A) Improper height or position of the front-to-rear direction	Check the height of needle guide (feed dog) and the clearance between the needle and rear needle guide. Refer to the standard adjustment values.
	5-2) Contact with the rear of the looper	2-A) Too often contact between the rear of the lower looper and the needle tip	(8) Adjust the looper movement locus to make the contact level appropriate when the lower looper moves backward. Refer to the standard adjustment values.

Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
6. Stitch skipping	6-1) The lower looper does not pick up the left needle thread.	1-A) Looper	A-1) The blade shape is not proper.	Use an authorized part.
		1-B) Needle	B-1) Needle bent or wrong mounting direction	Replace the needle or mount the needle again so that the flat section of the needle shank faces the front. UY118GKS/UY118GAS
		1-C) Needle thread support plate	C-1) Improper loop timing due to no use of the needle thread support plate	Use the needle thread support plate to adjust the height properly. Refer to the standard adjustment values.
		1-D) Needle thread guide bar	D-1) Excessive height of the needle thread guide bar	Adjust the height properly. Refer to the standard adjustment values.
		1-E) Needle height	E-1) Improper needle bar height	Use the needle bar height gauge to adjust the height. Refer to the standard adjustment values.
		1-F) Threading	F-1) Threading error	Refer to "6. How to conduct threading".
		1-G) Upper fancy looper	G-1) Excessive thread tension of the upper fancy looper	Reduce the thread tension. Refer to the standard adjustment values.
		1-H) Needle heat	H-1) Error-prone in artificial fiber	Use the silicone oil lubricating unit.
		1-I) Lower looper adjustment	I-1) Improper clearance or excessive looper return	Refer to the standard adjustment values. Reduce the looper return.
		1-J) Rear needle guide	J-1) Improper height or contact level	Check the height of the main feed dog. Refer to the standard adjustment values.
		1-K) Front movable needle guide	K-1) No contact between the needle and front movable needle guide	Make contact between them in a proper level. Refer to the standard adjustment values.
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Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
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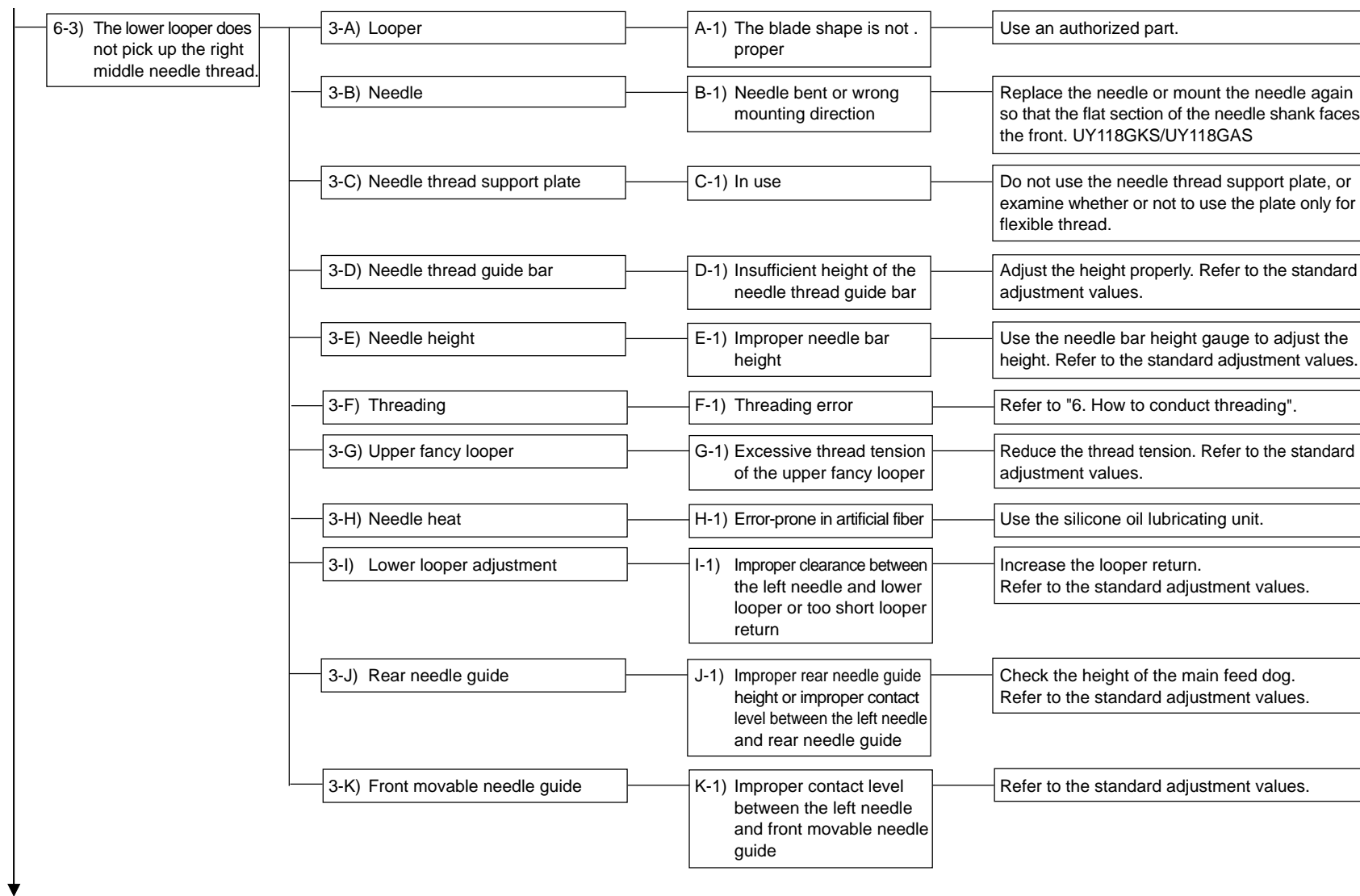
<p>6-2) The lower looper does not pick up the left middle needle thread.</p>	2-A) Looper	A-1) The blade shape is not proper.	Use an authorized part.
	2-B) Needle	B-1) Needle bent or wrong mounting direction	Replace the needle or mount the needle again so that the flat section of the needle shank faces the front. UY118GKS/UY118GAS
	2-C) Needle thread support plate	C-1) Improper loop timing due to no use of the needle thread support plate	Use the needle thread support plate to adjust the height properly. Refer to the standard adjustment values.
	2-D) Needle thread guide bar	D-1) Excessive height of the needle thread guide bar	Adjust the height properly. Refer to the standard adjustment values.
	2-E) Needle height	E-1) Improper needle bar height	Use the needle bar height gauge to adjust the height. Refer to the standard adjustment values.
	2-F) Threading	F-1) Threading error	Refer to "6. How to conduct threading".
	2-G) Upper fancy looper	G-1) Excessive thread tension of the upper fancy looper	Reduce the thread tension Refer to the standard adjustment values.
	2-H) Needle heat	H-1) Error-prone in artificial fiber	Use the silicone oil lubricating unit.
	2-I) Lower looper adjustment	I-1) Improper clearance between the left needle and lower looper or too short looper return	Refer to the standard adjustment values. Increase the looper return.
	2-J) Rear needle guide	J-1) Improper contact level between the left needle and rear needle guide	Refer to the standard adjustment values.
	2-K) Front movable needle guide	K-1) Improper contact level between the left needle and front movable needle guide	Refer to the standard adjustment values.

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Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
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From the previous page



To the next page

Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	6-4) The lower looper does not pick up the right needle thread.	4-A) Looper	A-1) The blade shape is not proper.	Use an authorized part.
		4-B) Needle	B-1) Needle bent or wrong mounting direction	Replace the needle or mount the needle again so that the flat section of the needle shank faces the front. UY118GKS/UY118GAS
		4-C) Needle thread support plate	C-1) In use	Do not use the needle thread support plate, or examine whether or not to use the plate only for flexible thread.
		4-D) Needle thread guide bar	D-1) Insufficient height of the needle thread guide bar	Adjust the height properly. Refer to the standard adjustment values.
		4-E) Needle height	E-1) Improper needle bar height	Use the needle bar height gauge to adjust the height. Refer to the standard adjustment values.
		4-F) Threading	F-1) Threading error	Refer to "6. How to conduct threading".
		4-G) Upper fancy looper	G-1) Excessive thread tension of the upper fancy looper	Reduce the thread tension. Refer to the standard adjustment values.
		4-H) Needle heat	H-1) Error-prone in artificial fiber	Use the silicone oil lubricating unit.
		4-I) Lower looper adjustment	I-1) Improper clearance between the left needle and lower looper or too short looper return	Refer to the standard adjustment values.
		4-J) Rear needle guide	J-1) Improper contact level between the left needle and rear needle guide	Refer to the standard adjustment values.
		4-K) Front movable needle guide	K-1) Improper contact level between the left needle and front movable needle guide	Refer to the standard adjustment values.
To the next page				

Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
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From the previous page

6-5) Stitch skipping in upper fancy sewing (left)	5-A) Upper fancy looper	A-1) Fancy thread disengagement due to improper thread rack angle	Use an authorized part.
	5-B) Needle	B-1) Needle bent or wrong mounting direction	Replace the needle or mount the needle again so that the flat section of the needle shank faces the front. UY118GKS/UY118GAS
	5-C) Upper fancy looper adjustment	C-1) The phase positions are different between right and left swing ranges.	Refer to the standard adjustment values (14).
	5-D) Upper fancy cam adjustment	D-1) The thread rack of the upper fancy looper does not catch the fancy thread.	Adjust the timing of fancy thread disengagement from the top of the fancy thread cam. Refer to the standard adjustment values.
	5-E) Fancy thread carrier device	E-1) Insufficient insertion amount of the carrier pawl between the left needle and left middle needle	Refer to the standard adjustment values (14) – 2).
	5-F) Threading	F-1) Threading error	Refer to "6. How to conduct threading".
	5-G) Needle height	G-1) Improper needle bar height	Use the needle bar height gauge to adjust the height. Refer to the standard adjustment values.
	5-H) Fancy thread tension	H-1) The thread tension of the upper fancy looper is too low.	Increase the tension.
6-6) Stitch skipping in upper fancy sewing (right)	6-A) Upper fancy looper	A-1) Fancy thread disengagement due to improper thread rack angle	Use an authorized part.
	6-B) Needle	B-1) Needle bent or wrong mounting direction	Replace the needle or mount the needle again so that the flat section of the needle shank faces the front.
	6-C) Upper fancy looper adjustment	C-1) The phase positions are different between right and left swing ranges.	Refer to the standard adjustment values (14).
	6-D) Threading	D-1) Threading error	Refer to "6. How to conduct threading".
	6-E) Needle height	E-1) Improper needle bar height	Use the needle bar height gauge to adjust the height. Refer to the standard adjustment values.
	6-F) Fancy thread tension	F-1) The thread tension of the upper fancy looper is too low.	Increase the tension.

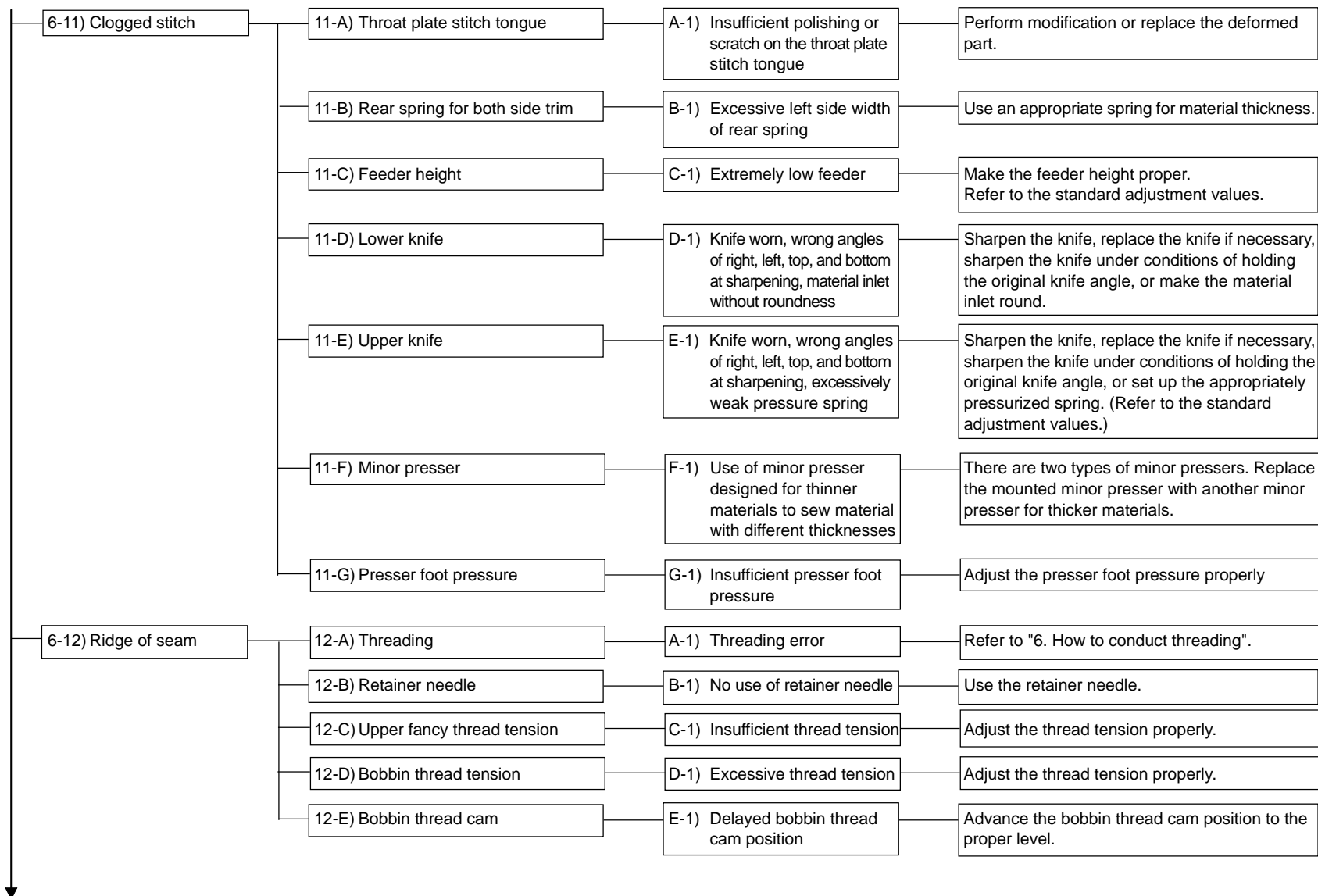
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Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
From the previous page				
	6-7) Chain stitch unthreading (left, left middle, right middle right)	7-A) Needle	A-1) Needle bent or mounting error	Replace the needle, or mount the needle again so that the flat section of the needle shank faces the front and insert the needle to the up end of the needle mounting hole. UY118GKS/UY118GAS
	(Chain stitch) The needle thread caught on the looper is unthreaded before the needle lowers and enters the needle thread loop. ----- (Unthreading) The needle thread loop caught on the looper is fully unthreaded before the needle lowers.	7-B) Needle height	B-1) Improper needle bar height	Use the needle bar height gauge to adjust the height. Refer to the standard adjustment values.
		7-C) Threading	C-1) Threading is improper.	Refer to "6. How to conduct threading".
		7-D) Lower looper	D-1) Improper lower looper mounting angle or insufficient lower looper drawing amount	Make the lower looper mounting angle proper or increase the drawing amount (in the flat mounting range).
		7-E) Lower looper adjustment	E-1) Insufficient contact level between the needle and the rear of the lower looper	Adjust the contact level with the avoid gauge. Refer to the standard adjustment values.
		7-F) Thread tension	F-1) Insufficient thread tension	Increase the tension.
		7-G) Needle thread support plate	G-1) Excessive height of thread support position	Refer to the standard adjustment values.
		7-H) Looper thread cast-off	H-1) Excessive take-up amount of the bobbin thread	Reduce the take-up amount of the bobbin thread.
	6-8) Double stitch (left middle, right middle, right)	8-A) Needle	A-1) Needle bent or mounting error	Replace the needle, or mount the needle again so that the flat section of the needle shank faces the front and insert the needle to the up end of the needle mounting hole. UY118GKS/UY118GAS
	The left needle enters the left middle needle thread loop. ----- The left middle needle enters the right middle needle thread loop. ----- The right middle needle enters the right needle thread loop.	8-B) Lower looper	B-1) Improper lower looper mounting angle or scratch on the lower looper	Make the lower looper mounting angle proper or replace the deformed part (in the flat mounting range).
		8-C) Needle height	C-1) Improper needle bar height	Adjust the contact level with the avoid gauge. Refer to the standard adjustment values.
		8-D) Threading	D-1) Threading is improper.	Refer to "6. How to conduct threading".
		8-E) Needle thread tension	E-1) Excessive thread tension	Reduce the thread tension.
		8-F) Needle thread guide bar	F-1) Extremely low position of thread spreading device	Adjust the height of the thread spreading device properly. Refer to the standard adjustment values.
To the next page				

Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
From the previous page				
	6-9) Irregular stitch	9-A) Throat plate stitch tongue	A-1) Insufficient polishing	Plish the throat plate stitch tongue well.
		9-B) Upper fancy looper	B-1) Right-shifted right and left swing range	Refer to the standard adjustment values (14).
		9-C) Lower looper	C-1) Lower looper brade point blunting or insufficient polishing	Perform modification or replace the deformed part.
		9-D) Fancy thread carrier	D-1) Mismatch between insertion amount of fancy thread carrier and intersection position with upper fancy looper	Refer to the standard adjustment values.
		9-E) Needle thread tension	E-1) Insufficient tension	Increase the tension.
		9-F) Upper fancy thread tension	F-1) Extremely low or high thread tension	Make the thread tension proper.
		9-G) Looper thread cast-off	G-1) Excessive take-up amount of the bobbin thread	Reduce the take-up amount of the bobbin thread.
		9-H) Bobbin thread cam	H-1) Excessively advanced bobbin thread cam position	Delay the bobbin thread cam position to the proper level.
	6-10) Poorly tense stitches	10-A) Throat plate stitch tongue	A-1) Insufficient polishing or scratch on the throat plate stitch tongue	Perform modification or replace the part.
		10-B) Needle	B-1) Brade top blunting, needle bent, check the needle in use.	Replace the needle. Use 2 different types of needles. UY118GKS/UY118GAS
		10-C) Lower looper	C-1) Lower looper brade point blunting or insufficient polishing	Perform modification or replace the deformed part.
		10-D) Needle height	D-1) Improper needle bar height	Refer to the standard adjustment values.
		10-E) Threading	E-1) Threading is improper.	Refer to "6. How to conduct threading".
		10-F) Needle thread tension	F-1) Insufficient thread tension	Increase the thread tension.
		10-G) Lower looper thread tension	G-1) Excessive thread tension	Reduce the thread tension.
		10-H) Looper thread cast-off	H-1) Insufficient take-up amount of the bobbin thread	Increase the take-up amount of the bobbin thread.
		10-I) Bobbin thread cam	I-1) Delayed bobbin thread cam position	Advance the bobbin thread cam position to the proper level.
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Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
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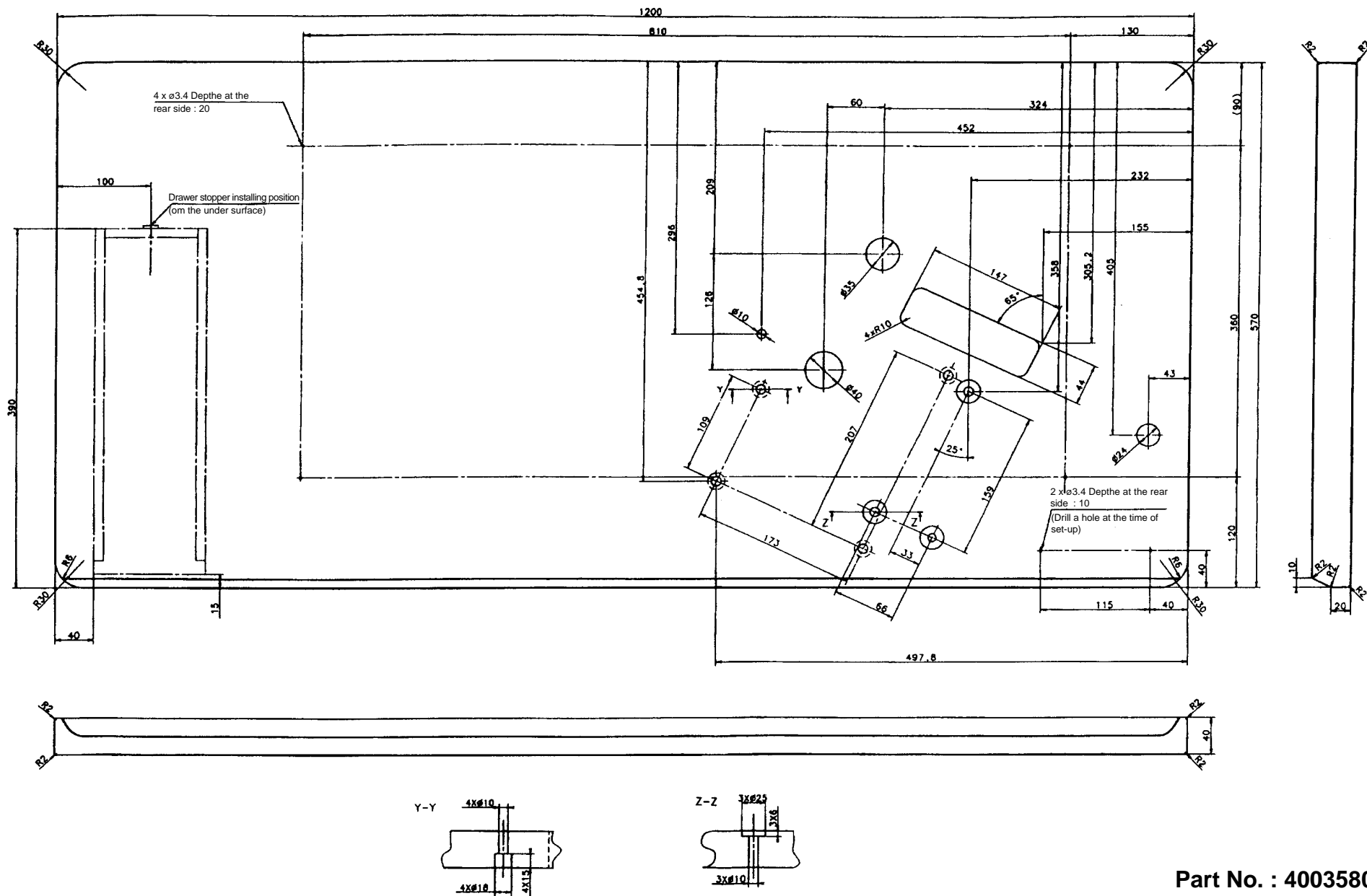


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Trouble (1)	Trouble (2)	Cause (1)	Cause (2)	Check and corrective measures
	From the previous page			
	6-13) Problems with chain-off thread	13-A) Throat plate stitch tongue	A-1) Not smooth thread running due to blunt throat plate stitch tongue	Perform modification or replace the deformed part.
		13-B) Upper fancy looper adjustment	B-1) Upper fancy stitch skipping due to insufficient fancy thread carrier adjustment	Refer to the standard adjustment values.
		13-C) Fancy thread carrier adjustment	C-1) Upper fancy stitch skipping due to insufficient fancy thread carrier adjustment	Refer to the standard adjustment values.
		13-D) Lower looper adjustment	D-1) Lower fancy stitch skipping due to insufficient lower looper adjustment	Refer to the standard adjustment values.
		13-E) Upper fancy cam position	E-1) Stitch skipping due to improper upper fancy removal position from cam top point	Refer to the standard adjustment values.
		13-F) Minor presser	F-1) Use of minor presser designed for thinner materials to sew material with different thicknesses, dust accumulated inside minor presser	There are two types of minor pressers. Replace the mounted minor presser with another minor presser for thicker materials. Remove the dust.
		13-G) Needle thread tension	G-1) Insufficient needle thread tension	Increase the thread tension.
		13-H) Threading	H-1) Threading error	Refer to "6. How to conduct threading".
		13-I) Upper fancy thread tension	I-1) Insufficient thread tension	Increase the thread tension.
		13-J) Presser foot pressure	J-1) Insufficient presser foot pressure	Adjust the presser foot pressure properly.
		13-K) Feed dog	K-1) Scratch on the feed dog	Perform modification or replace the part.

# 13. Table drawing

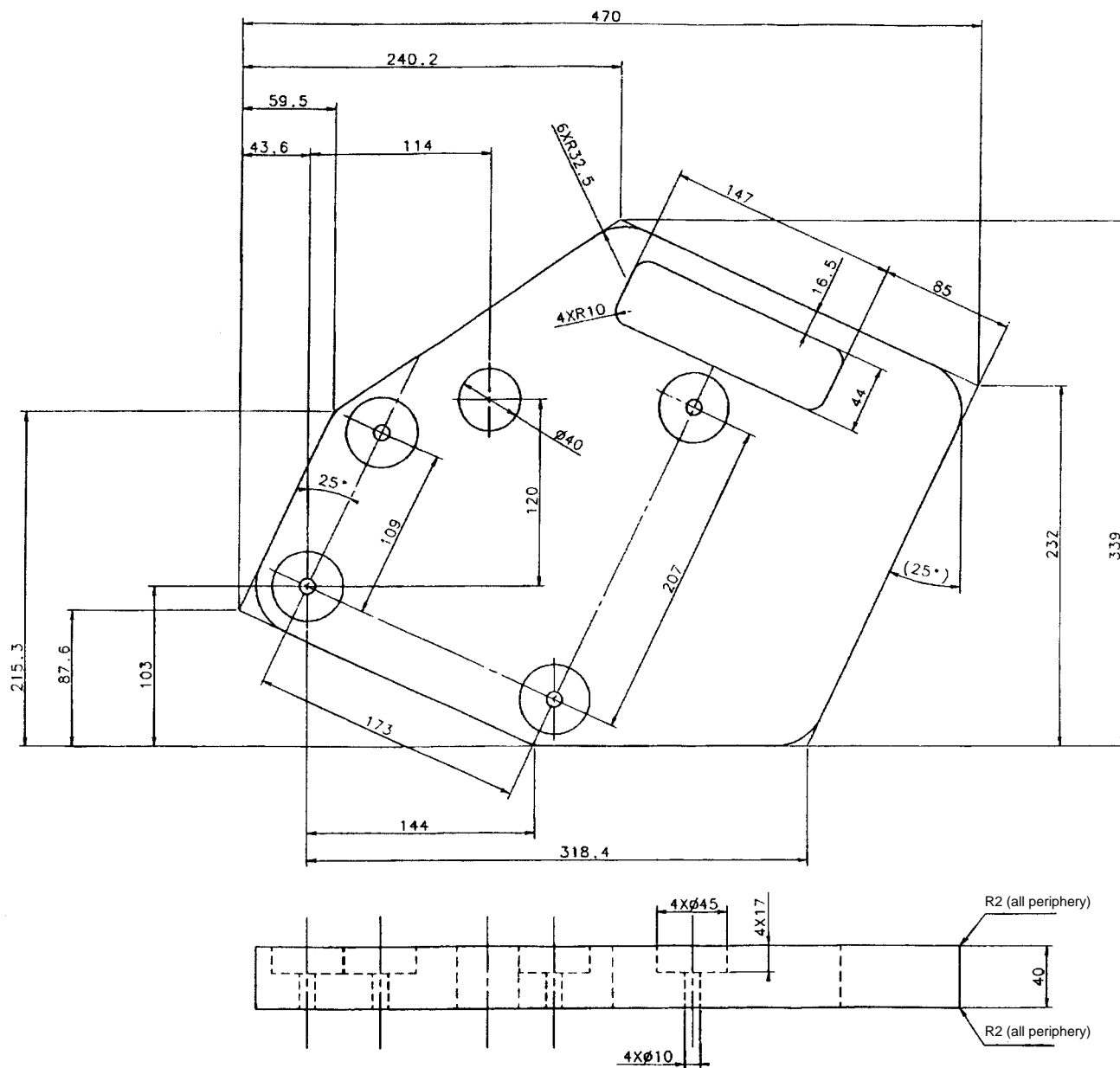
## (1) Auxiliary drive table



Part No. : 40035801



## (2) Auxiliary drive sub-table



Part No. : 40036113

# MEMO

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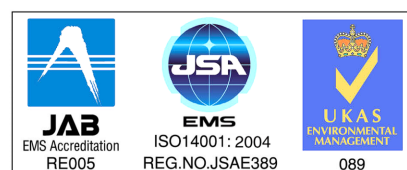
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