

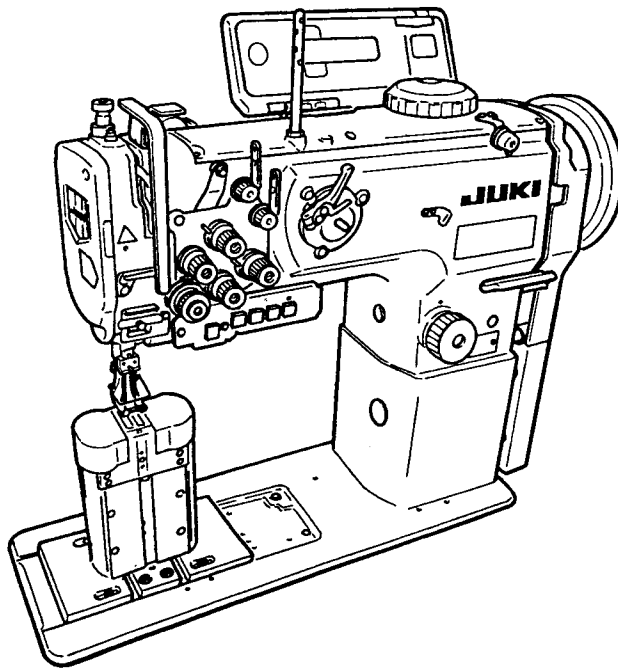
JUKI®

Post-bed, Unison-feed, Lockstitch Machine

PLC-1700 Series

PLC-1710, 1710-7, 1760, 1760-7, 1760L

ENGINEER'S MANUAL



40040656
No.E372-00

Introduction

This Engineer's Manual is for technical service engineers. In the Adjusting instruction manual for the maintenance engineers of sewing machine and sewing workers in a sewing factory, how to operate a sewing machine is also described in detail. However, in this manual, [Adjustment Procedure], [Results of Value change for Adjustment], and the roles of each component are described: these are not included in the Adjusting instructions manual.

When maintenance is performed for our sewing machines, refer not only to this manual, but also to the Adjusting instructions / illustrated parts list.

In regard to the thread trimming machine motor, please refer to the Instruction Manual for the SC-510 motor and the Service Manual, separately furnished. In regard to the control panel also, please refer to the Instruction Manual for the control panel.

This Engineer's Manual describes the basic adjusting values as the reference values in the first page, and the observed events caused by sewing and mechanical faults as the [Results of Value Change for Adjustment], and [Adjustment Procedure] in the second page.

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(Caution) * Adjustments for (18) thread trimming device should conform to the procedures 1) to 9) in this order.

If this adjusting order is changed, the result can differ from the performed in the regular order.

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1. Specifications

No.	Model name Item	Application				
		PLC-1710	PLC-1760	PLC-1710-7	PLC-1760-7	PLC-1760L
1	Specifications for sewing	Post bed, 1-needle, unison-feed lockstitch machine with a vertical-axis large hook	Post bed, 2-needle, unison feed lockstitch machine with vertical-axis large hooks	Post bed, 1-needle, unison feed, lockstitch machine with a vertical-axis large hook, with automatic thread trimmer	Post bed, 2-needle, unison feed, lockstitch machine with vertical-axis large hooks, with automatic thread trimmer	Post bed, 2-needle, unison feed lockstitch machine with vertical-axis large hooks (pachynema/long pitch specification)
2	Application	Heavy-weight material				
3	Max. sewing speed	* For max. sewing speed, refer to 13. List of the sewing speeds.				
4	Applicable needles (Range)	Schmetz 134 x 35 (R) (Nm 110 to Nm 160)				Schmetz 134 x 35 (R) (Nm 140 to Nm 200)
	(Standard needle No.)	(Standard Nm 140)				(Standard Nm 200)
5	Applicable thread size	#30 to #5 (US: #46 to #138, Europe : 20/3 to 60/3)				#8 to #0 (US: 92 to #266, Europe: 15/3 to 30/3)
6	Stitch length	Max. 9mm (for both normal and reverse feed stitching)				Max. 12mm (for both normal and reverse feed stitching)
7	Stitch adjusting system	Using a dial				
8	Thread take-up	Using a slide				
9	Reverse feed stitching	Using hand lever	With air cylinder touch-back switch		Using hand lever	
10	Needle bar stroke	36mm				38mm
11	Work clamp listing system	Using handle lifer : 9mm				
		Using a knee lifter : 16mm	Automatic presser lifter: 16mm			Using a knee lifter : 16mm
12	Alternate vertical amount	2.5 to 6.5mm		1 to 6.5mm		
13	Adjustment of the amount of alternating vertical movement of the walking foot and presser foot	Oblong hole slide adjusting system		Alternate vertical dial adjusting system		
14	DL device (Alternate vertical dial)	Without		Provides as standard (DL-23)		Option (DL-23)
15	Safety unit provided as standard	Provided as standard				
16	Bobbin winder	Arm built-in type				
17	Bottom feed fine adjustment mechanism	Provided as standard				
18	Used hook	1.6-fold all-rotary horizontal hook (latch type)				1.6-fold all-rotary horizontal hook (cap type)
19	Feed mechanism	Box feed				
20	Vertical shaft drive	Using a timing belt				
21	Using a trimmer	—————		Cam-driven pinch-and-cut system		—————
22	Lubrication	Concentrated tank type oil wick lubrication (manual lubrication for the surface of the hook section)				
23	Lubricating oil	JUKI NEW Defrix oil No. 2 (equivalent to ISO VG32)				
24	Space under the needle	255mm (distance from the center of the presser bar to the bottom of the arm)				
25	Hook shaft bed height	161.7mm (Bed top plane to throat plate top plane)				
26	Bed size	517mm x 178mm				
27	Knee presser lifter	Provided as standard		Not		Provided as standard
28	Auto presser lifter	Option (AK-136)		Provided as standard (AK-136)		Option (AK-136)
29	Hand wheel size	Effective diameter of V-belt section: ϕ 93.3mm, outer diameter: ϕ 160mm				Effective diameter of V-belt section: ϕ 93.3mm Outer diameter: ϕ 175mm
30	Motor	2P,400W, 4P,400W		SC-510/M51		2P,400W, 4P,400W
31	Weight (gross weight)	55kg	56kg	55kg	56kg	58kg
32	Air consumption	0.3dm ³ /min (ANR)				
33	Working temperature/humidity	Temperature : 5°C to 35°C, Humidity : 35% to 85% (no condensation)				
34	Supply voltage/frequency	Rated voltage \pm 10% 50 / 60Hz				

2. Model Numbering system

(1) PLC-1710

Model name: Post bed, 1-needle, unsion-feed lockstitch machine with a vertical-axis large hook

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
P L C 1 7 1 0 S □ □ △ △ △ □ — **A A**

8	Type classification
S	Standard

9 to 14	Classification of automatic presser lifter
Space	Nil
AK136B	AK-136B with pedal switch type

16	Place pf destonation
A	Standard

17	Accessories type
A	Standard

(2) PLC-1760

Model name: Post bed, 2-needle, union feed lockstitch machine with vertical-axis large hooks

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
P L C 1 7 6 0 / / /
 19 20 21 22 23 24 25 26
 - **A A**

8	Type clasification
S	Standard
L	Thick-thread long-pitch

9	Needle gauge classification
B	6mm
C	8mm
D	10mm
E	12mm

* For thick-thread long pitch type 'L' is available only the needle gauge D (10mm).

10	Classification of presser
S	Standard
A	With center guide

12 to 16	Classification of units
Space	Nil
BT/DL	With BT/DL23

* Provisions of units are not available if S (Standard) is selected for the classification of specifications.

18 to 23	Classification of automatic presser lifter
Space	Nil
AK136B	AK-136B with pedal switch type

* The AK136B shall be selected if BT/DL is selected for the classification of units.

25	Place pf destonation
A	Standard

26	Accessories type
A	Standard

(3) PLC-1710-7

Model name: Post bed, 1-needle, unison feed, lockstitch machine with a vertical-axis large hook, with automatic thread trimmer

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
P L C 1 7 1 0 S 7 0 B A K 1 3 6 B – A A

8	Type clasification
S	Standard

12 to 17	Classification of automatic presser lifter
AK136B	AK-136B with pedal switch type

19	Place pf destonation
A	Standard

20	Accessories type
A	Standard

(4) PLC-1760-7

Model name: Post bed, 2-needle, unison feed, lockstitch machine with a vertical-axis large hooks, with automatic thread trimmer

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
P L C 1 7 6 0 S **7 0 B A K 1 3 6**
19 20 21 22
B – A A

8	Type clasification
S	Standard

9	Needle gauge classification
B	6mm
C	8mm
D	10mm
E	12mm

10	Classification of presser
S	Standard
A	With center guide

14 to 19	Classification of automatic presser lifter
AK136B	AK-136B with pedal switch type

21	Place pf destonation
A	Standard

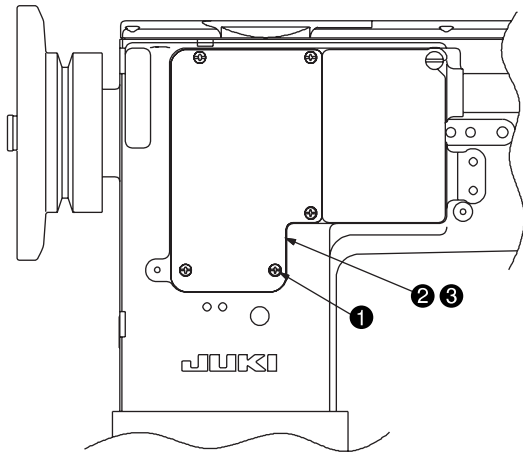
22	Accessories type
A	Standard

3. Standard adjustment

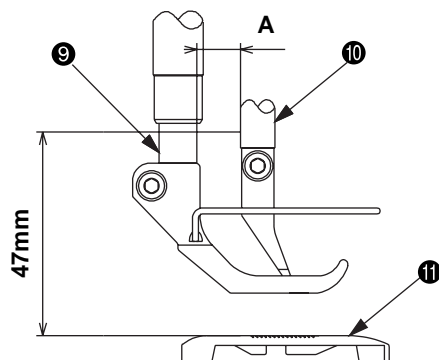
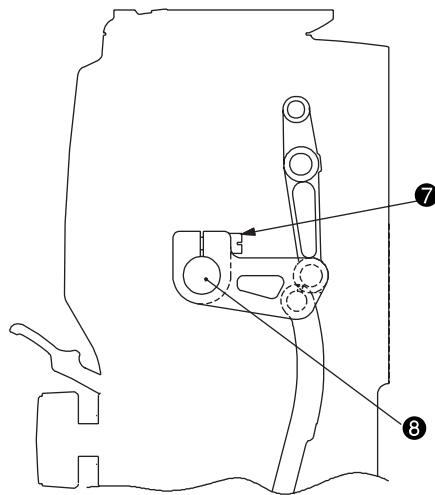
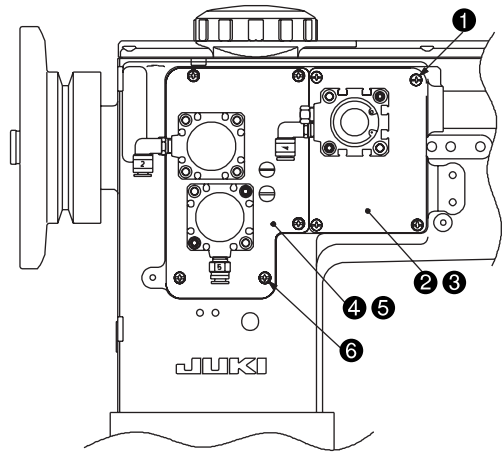
(1) Needle entry position

Standard Adjustment

o PLC-1710, 1760, 1760L



o PLC-1710-7, 1760-7

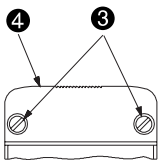
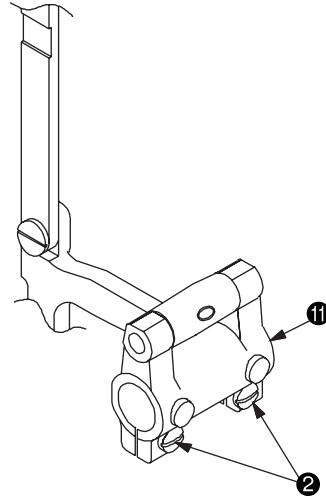
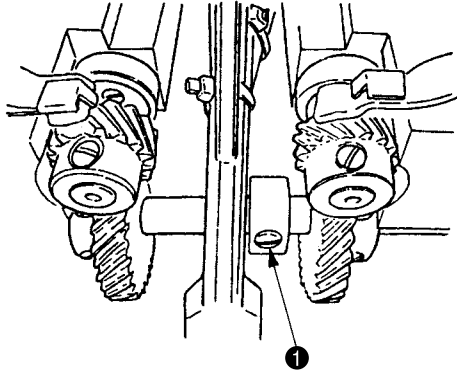


Model	Dimension A
PLC-1710	9.5±0.15mm
PLC-1760	9.5±0.15mm
PLC-1710-7	10.5±0.15mm
PLC-1760-7	10.5±0.15mm
PLC-1760L	9.9±0.15mm

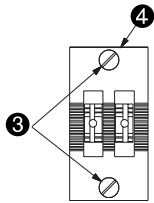
Adjustment Procedures	Results of Improper Adjustment
<p>o For PLC-1710, 1760, and 1760L</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Turn the hand wheel by hand and adjust the needle bar to the lowest position. 3. Loosen the window plate setscrews ❶ (5 positions) located behind the sewing machine. Remove the window plate ❷ and the window plate gasket ❸. 4. Loosen the rear needle bar rocking arm tightening screw ❷. 5. In the state that the presser is lifted, adjust the clearance between the presser bar ❹ and the upper feed bar ❺ to Dimension A at the level 47mm above the upper surface of the throat plate ❶. Since then, tighten the rear needle bar rocking arm tightening screw ❷. 6. Return the window plate ❷ and the window plate gasket ❸ to their former positions, which have been removed as per 3. above. Then, tighten the setscrews ❶ (5 positions). <p>(Caution) After the rear needle bar rocking arm tightening screw ❷ has been tightened, confirm that there is no thrust backlash around the needle bar rocking shaft ❸.</p> <p>o For PLC-1710-7 and 1760-7</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Turn the hand wheel by hand and adjust the needle bar to the lowest position. 3. Loosen the setscrews ❶ (4 positions) of the window plate ❷ located behind the sewing machine. Remove the window plate ❷ and the window plate gasket ❸. At that time, removal can be done easily if the graduations of the alternate vertical dial have been set at the maximum level in advance. 4. Loosen the setscrews ❸ (5 positions) of the window plate ❹ and remove the window plate ❹ and the window plate gasket ❺. 5. Loosen the rear needle bar rocking arm tightening setscrew ❷ (1 position). 6. In the state that the presser is lifted, adjust the clearance between the presser bar ❹ and the upper feed bar ❺ to Dimension A at the level 47mm above the upper surface of the throat plate ❶. Since then, tighten the rear needle bar rocking arm tightening setscrew ❷ firmly. 7. Return the window plates ❷, ❹ and the window plate gaskets ❸, ❺ to their former positions, which have been removed as per 3. and 4. above. Then, tighten the setscrews ❶ (4 positions) and ❸ (5 positions), respectively. <p>(Caution) After the rear needle bar rocking arm setscrew ❷ has been tightened, confirm that there is no thrust backlash around the needle bar rocking shaft ❸.</p>	<ul style="list-style-type: none"> o Stitch skipping or needle breakage will be caused. o Poorly tense stitches will be caused.

(2) Adjustment of the feed dog position

Standard Adjustment

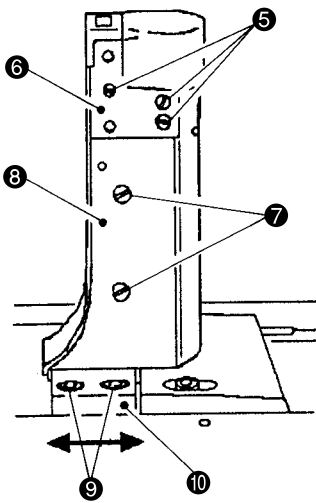


PLC-1710
PLC-1710-7



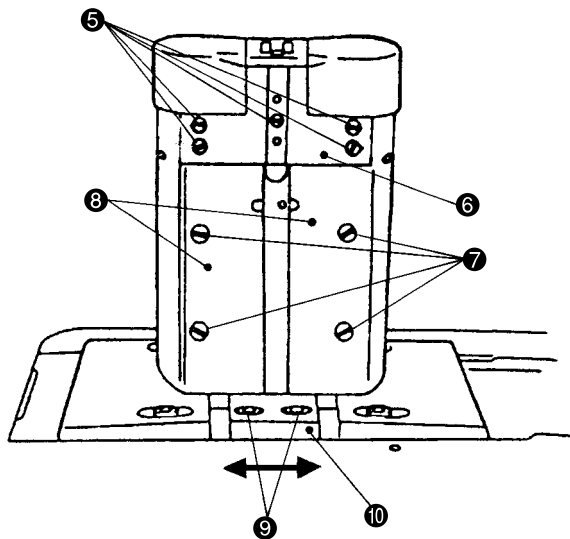
PLC-1760
PLC-1760-7
PLC-1760L

1-needle



PLC-1710
PLC-1710-7

2-needle

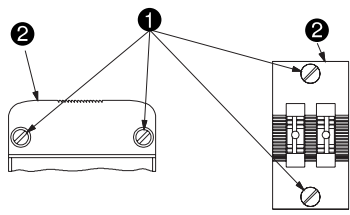


PLC-1760
PLC-1760-7
PLC-1760L

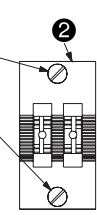
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Let the sewing machine fall down. 3. Loosen the vertical feed cam setscrews ❶ (2 positions). 4. Loosen the feed bracket arm tightening setscrews ❷ (2 positions). 5. Raise the sewing machine. 6. Loosen the throat plate setscrews ❸ (2 positions) and remove the throat plate ❹. 7. Loosen the throat plate holder setscrews ❺ (1-needle: 6 positions, 2-needle: 10 positions) and remove the throat plate holder ❻. 8. Loosen the hook shaft base cover setscrews ❼ (1-needle: 4 positions, 2-needle: 8 positions) and remove the hook shaft base cover ❸. 9. Loosen the feeding lever base setscrews ❾ (4 positions). Turn the hand wheel slowly so that the needle bar is adjusted to the lowest position. 11. Move the feeding lever base ❿ to the right and left so that the needle center can coincide with the needle hole center of the feed dog. At that time, the feed bed arm ⓫ should also be moved. 12. Fix the feeding lever base ❿ with the feeding lever base setscrews ❾ (4 positions). 13. Let the sewing machine fall down. 14. Confirm that there is coincidence between the needle center and the needle hole center of the feed dog and tighten the feed bracket arm tightening setscrews ❷ (2 positions). 15. Tighten the vertical feed cam setscrews ❶ (2 positions). For more details, refer to (11)-3, Vertical feed cam phase. 16. Raise the sewing machine. 17. Fix the throat plate holder ❻ with the throat plate holder setscrews ❺ (1-needle: 6 positions, 2-needle: 10 positions). 18. Fix the throat plate ❹ with the throat plate setscrews ❸ (2 positions). 19. Fix the hook shaft bed cover ❸ with the hook shaft bed cover setscrews ❼ (1-needle: 4 positions, 2-needle: 8 positions). 	<ul style="list-style-type: none"> o If the throat plate ❹ should come in contact with the feed dog, hitting sound will be generated, and the throat plate ❹ and the feed teeth may be broken. o Uneven stitching will be caused.

(3) Clearance between the throat plate and the inner hook clamp section

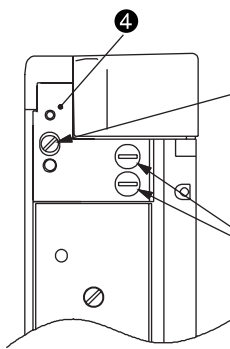
Standard Adjustment



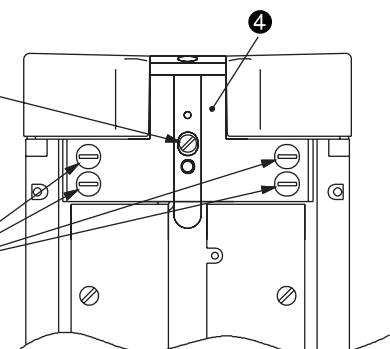
PLC-1710
PLC-1710-7



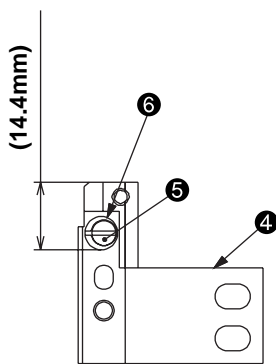
PLC-1760
PLC-1760-7
PLC-1760L



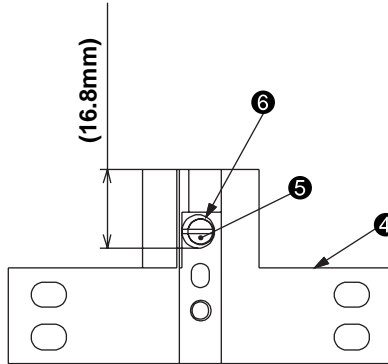
PLC-1710
PLC-1710-7



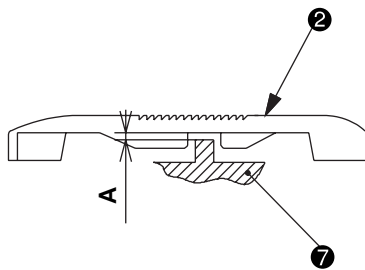
PLC-1760
PLC-1760-7
PLC-1760L



PLC-1710
PLC-1710-7



PLC-1760
PLC-1760-7
PLC-1760L

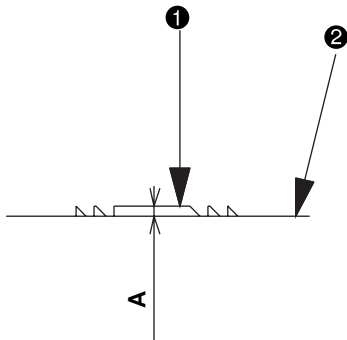


Model	Dimension A
PLC-1710	1.0±0.1mm
PLC-1710-7	
PLC-1760	
PLC-1760-7	1.1±0.1mm
PLC-1760L	

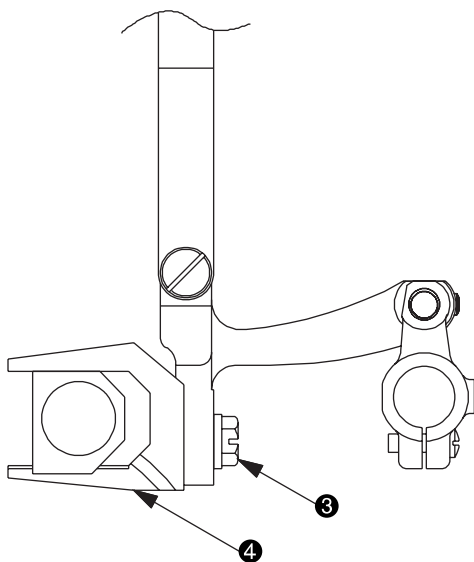
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Loosen the throat plate setscrews ❶ (2 positions) and remove the throat plate ❷. 2. Loosen the throat plate holder setscrews ❸ (1-needle: 6 positions, 2-needle: 10 positions). 3. Remove the throat plate holder ❹ (2 pcs). 4. Slightly loosen the eccentric roller hinge setscrew ❺ (2 positions) that is attached to the throat plate holder ❹ (2 pcs). Turn the eccentric roller ❻ (2 positions) and adjust the distance between the top plane of the throat plate holder ❹ (2 pcs) and the bottom plane of the eccentric roller ❻ (2 positions) until the clearance amounts to Dimension A between the throat plate ❷, inner hook clamp section and the top plane of inner hook ❼. 5. Fix the throat plate holder ❹ (2 pcs) with the throat plate holder setscrews ❸ (1-needle: 6 positions, 2-needle: 10 positions). 6. Fix the throat plate ❷ with the throat plate setscrews ❶ (2 positions). <p>(Caution) 1. For the adjustment of 2-needle sewing machines, compare the clearances of Dimension A between the right and left hooks. The side with a smaller clearance should be adjusted to Dimension A.</p> <p>2. The distance between the top plane of the throat plate holder ❹ (2 pcs) and the bottom end of the eccentric roller ❻ (2 positions) should be adjusted so that the same distance can be secured by the front and rear throat plate holders ❹ (2 pcs).</p> <p>If there is difference in distances between front and rear, the throat plate ❷ comes to be positioned slantwise when it is mounted on the throat plate holder ❹ (2 pcs).</p>	<ul style="list-style-type: none"> o Stitch skipping or needle breakage will be caused. o Thread breakage will be caused. o Uneven stitching will be caused.

(4) Height of the feed dog

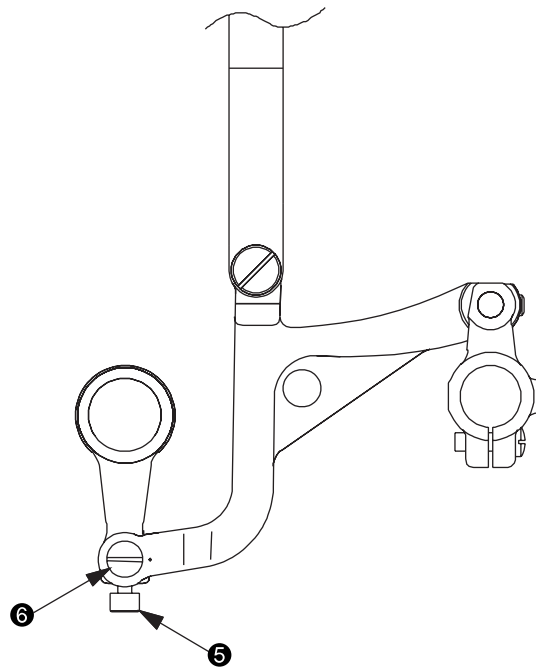
Standard Adjustment



Model	Dimension A
PLC-1710	0.6 to 0.7mm
PLC-1710-7	
PLC-1760	0.7 to 0.9mm
PLC-1760-7	
PLC-1760L	0.9 to 1.1mm



PLC-1710-7
PLC-1760-7

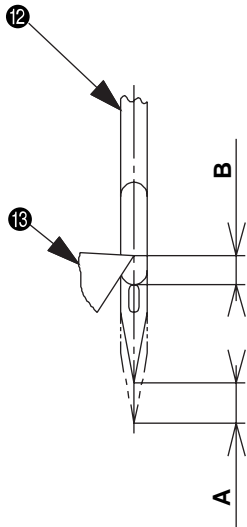
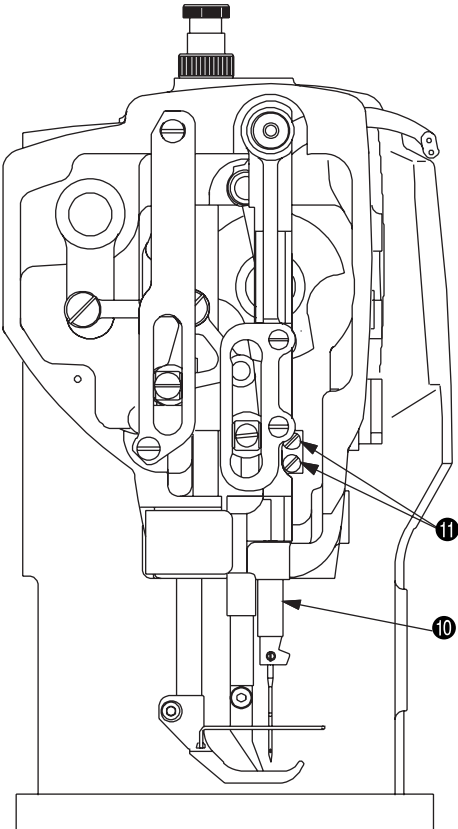
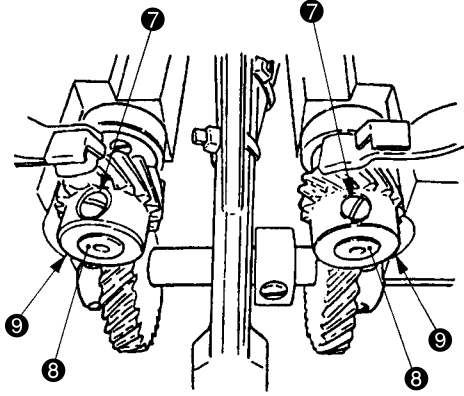
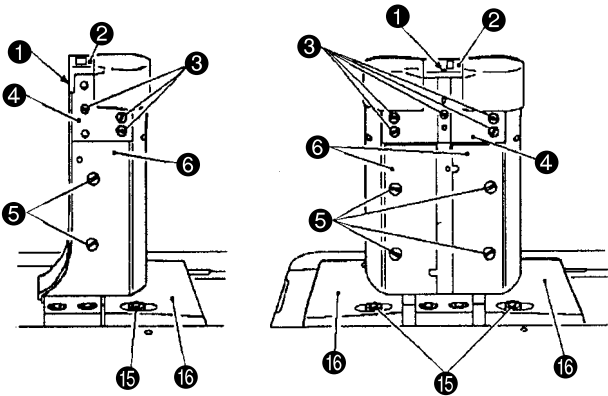


PLC-1710
PLC-1760
PLC-1760L

Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> o For PLC-1710-7 and 1760-7 <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Turn the hand wheel and stop it where the amount of protrusion of the feed dog ❶, appearing from the throat plate top face ❷, becomes maximum. 3. Loosen the setscrew ❸ (1 position) of the feed bar fork and move the feed bar fork ❹ up and down so that the height of the feed dog ❶ can be adjusted to Dimension A. 4. Firmly tighten the setscrew ❸ of the feed bar fork. o For PLC-1710, 1760, and 1760L <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Turn the hand wheel and stop it where the amount of protrusion of the feed dog ❶, appearing from the throat plate top face ❷, becomes maximum. 3. Loosen the setscrew ❺ of the vertical feed link shaft and turn the vertical feed link shaft ❻ until the height of the feed dog ❶ adjusted to Dimension A. 4. Tighten the vertical feed link shaft setscrew ❺ firmly. 	<p>If the height of the feed dog is excessive:</p> <ul style="list-style-type: none"> o The pitches of stitches become greater than the graduations of the feed adjusting dial. o Isolated idling loops will result. o A return of the sewing object is caused. <p>If the height of the feed dog is insufficient:</p> <ul style="list-style-type: none"> o The pitches of stitches become smaller than the graduations of the feed adjusting dial. o The feeding force is weakened.

(5) Timing between the needle and the hook (Except for PLC-1760L)

Standard Adjustment



Model	Dimension A	Dimension B
PLC-1710	2.5mm	2.2mm
PLC-1710-7	2.6mm	2.0mm
PLC-1760	2.5mm	2.2mm
PLC-1760-7	2.9mm	2.0mm

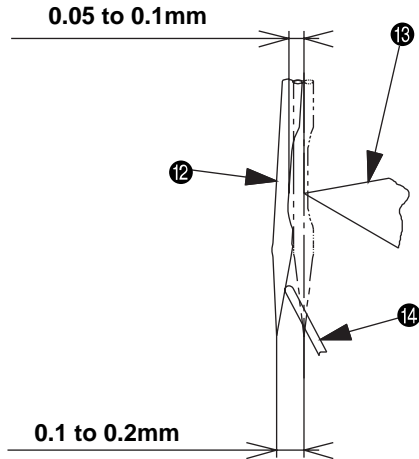
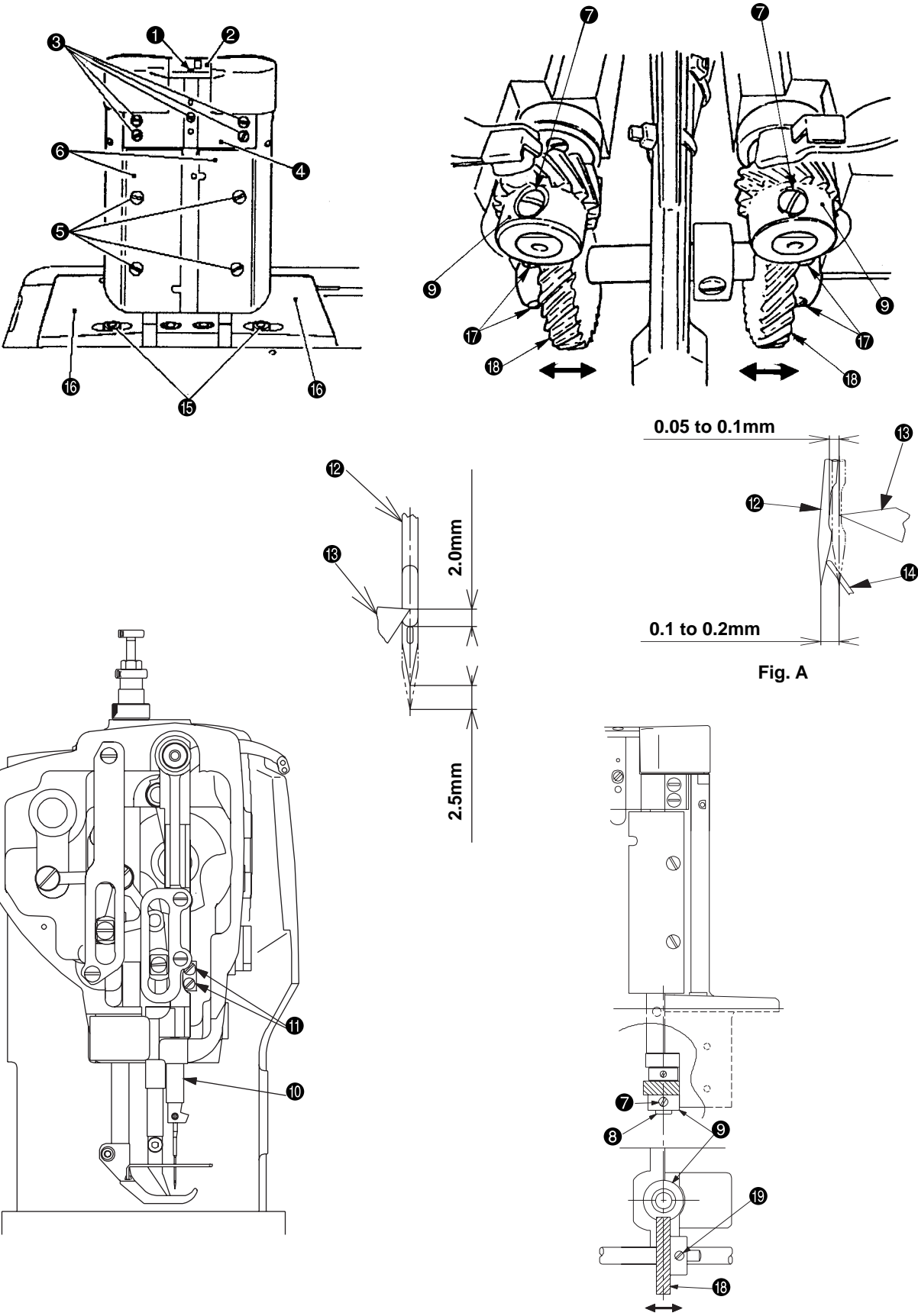


Fig. A

Adjustment Procedures	Results of Improper Adjustment
<p>(Caution) 1. In the case of the 2-needle sewing machine, the same adjusting values should be secured for both right and left.</p> <p>2. In the case of the thread trimming machine, work should be started after the eocking arm and the thread trimmer driving joint plate have been removed. These should be remounted after the completion of this work. Refer to 3.-(18) –1) to 9), Thread trimming device.</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Loosen the throat plate setscrews ❶ (2 positions) and remove the throat plate ❷. 3. Loosen the throat plate holder setscrews ❸ (1-needle: 6 positions, 2-needle: 10 positions) and remove the throat plate holder ❹. 4. Loosen the hook shaft base cover setscrews ❺ (1-needle: 4 positions, 2-needle: 8 positions) and remove the hook shaft base cover ❻. 5. Let the sewing machine fall down and loosen the hook shaft gear setscrews ❼ (1-needle: 3 positions, 2-needle: 6 positions) so that the hook shaft ❽ can be made free. For PLC-1710 and PLC-1760, remove the hook shaft gear ❾. 6. Raise the sewing machine. 7. Turn the hand wheel by hand and raise the needle bar ❿ from the lowest position to Dimension A. 8. Loosen the needle bar connection setscrews ⓫ (2 positions). If they are loosened too much at that time, the needle bar ❿ will come down. Therefore, they should be loosened to a degree where the needle bar ❿ can be moved vertically by hand. 9. Move the needle bar ❿ vertically by hand so that the hook blade tip ⓬ comes to the height of Dimension B, measured from the needle hole upper end of the needle ⓭. 10. Tighten the setscrews ⓫ (2 positions) of the needle bar connection. 11. Bend the hook's needle guard ⓮ in the direction of the hook center so that the effective amount of the needle guard ⓮ is reduced to 0. 12. Loosen the hook shaft base setscrews ⓯ (1-needle: 2 positions, 2-needle: 4 positions). 13. Turn the hand wheel by hand and raise the needle bar ❿ from the lowest position to Dimension A. 14. In the state that there is no contact between the needle ⓭ and the hook's needle guard ⓮, move and adjust the hook shaft base ⓰ to the right and left so that a clearance of 0 to 0.1mm can be secured between the needle ⓭ and the hook blade tip ⓬. 15. After adjustments, tighten the setscrews ⓯ (1-needle: 2 positions, 2-needle: 4 positions) of the hook shaft base. 16. Let the sewing machine fall down again and turn the hook by hand in the state of 13. above. Adjust the hook blade tip ⓬ to the center of the needle ⓭ and fix the hook shaft gear ❾ with the use of the hook shaft gear setscrews ❼ (1-needle: 3 positions, 2-needle: 6 positions). 17. Raise the sewing machine. 18. Confirm that a coincidence is secured between the center of the needle ⓭ and the hook blade tip ⓬ when the needle bar ❿ is raised from the lowest position to Dimension A. Otherwise, the work of 16. should be carried out once more again. 19. Bend the hook's needle guard ⓮ so that the effective amount of the hook's needle guard ⓮ is adjusted to 0.1 to 0.2mm at the tip of the needle ⓭. Refer to Fig. A. 20. Install the throat plate holder ❹ with the throat plate holder setscrews ❸ (1-needle: 6 positions, 2-needle: 10 positions). 21. Install the throat plate ❷ with the throat plate setscrews ❶ (2 positions). 22. Install the hook shaft base cover ❻ with the hook shaft base cover setscrews ❺ (1-needle: 4 positions, 2-needle: 8 positions). 	<ul style="list-style-type: none"> o Stitch skipping or thread breakage will be caused. o Poorly tense stitches will be caused.

(6) Timing between the needle and the hook (PLC-1760L)

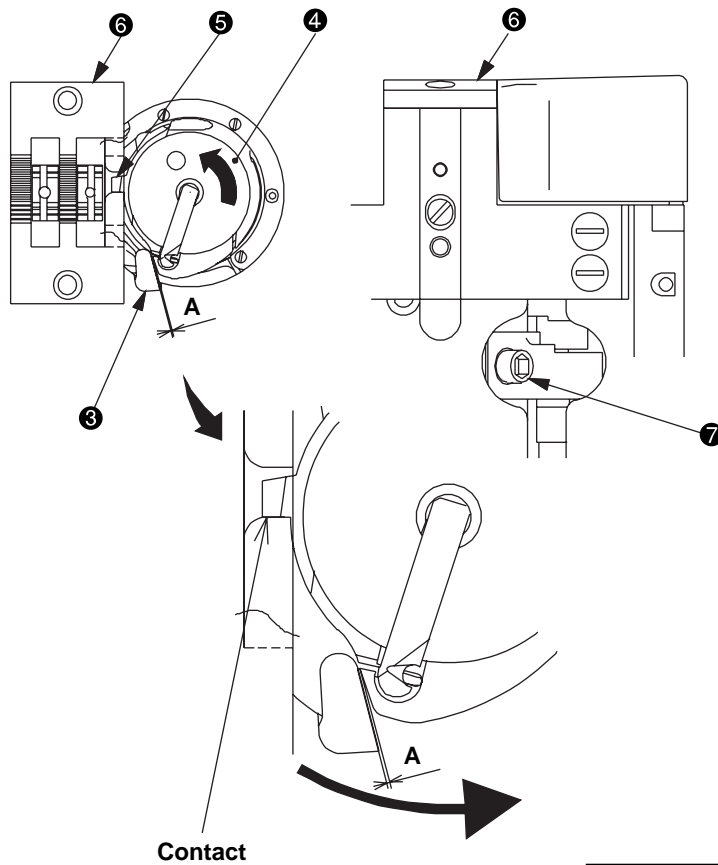
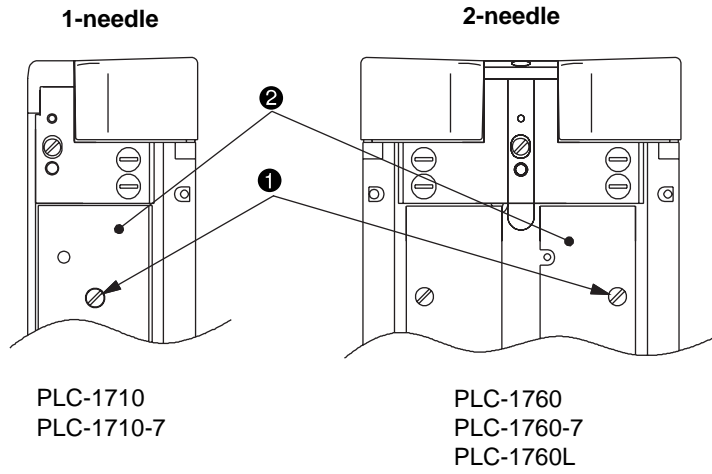
Standard Adjustment



Adjustment Procedures	Results of Improper Adjustment
<p>(Caution) The same adjusting values should be secured for both right and left.</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Loosen the throat plate setscrews ❶ (2 positions) and remove the throat plate ❷. 3. Loosen the throat plate holder setscrews ❸ (10 positions) and remove the throat plate holder ❹. 4. Loosen the hook shaft base cover setscrews ❺ (8 positions) and remove the hook shaft base cover ❻. 5. Lay down the sewing machine body and loosen the hook shaft gear setscrews ❼ (6 positions). Remove the hook shaft gear ❽ and raise the sewing machine body. 6. Loosen the needle bar connection setscrews ❾ (2 positions). If they are loosened too much at that time, the needle bar ❿ will come down. Therefore, they should be loosened to a degree where the needle bar ❿ can be moved vertically by hand. 7. Turn the hand wheel by hand so that the needle bar ❿ is positioned 2.5mm above its lowest position. 8. Turn the hook by hand so that the center of the needle ⓫ coincides with the hook blade tip ⓬. 9. Move the needle bar ❿ vertically by hand so that a distance of 2.0mm can be secured between the needle hole upper end of the needle ⓫ and the hook blade tip ⓬. 10. Tighten the needle bar connection setscrew ❾ (2 positions). 11. Bend the hook's needle guard ⓭ in the direction of the hook center so that the effective amount of the needle guard ⓭ is reduced to 0. 12. Loosen the right and left hook shaft base setscrews ⓮ (4 positions). 13. Turn the hand wheel by hand so that the needle bar ❿ is positioned 2.5mm above its lowest position. 14. In the state that there is no contact between the needle ⓫ and the hook's needle guard ⓭, move and adjust the hook shaft base ⓯ to the right and left so that a clearance of 0.05 to 0.1mm can be secured between the needle ⓫ and the hook blade tip ⓬. 15. After adjustments, tighten the hook shaft base setscrews ⓮ (4 positions). 16. Let the sewing machine fall down and loosen the lower shaft gear setscrews ⓰ (4 positions). Move the lower shaft gear ⓱ so that the center of the hook shaft ⓳ can coincide with that of the gear section of the lower shaft gear ⓱. 17. Temporarily tighten the lower shaft gear ⓱ with the lower shaft gear setscrew ⓱. At that time, tentatively fasten the first screw of the lower shaft gear setscrew ⓱ adjusted to the flat section of the lower shaft. 18. Assume the condition of 13. again and let the center of the needle ⓫ coincide with the hook blade tip ⓬. Mount the hook shaft gear ❽ and firmly tighten it by means of the hook shaft gear setscrews ⓰ (6 positions). At that time, tighten the first screw of the hook shaft gear setscrew ⓰ adjusted to the flat section of the hook shaft ⓳. 19. Loosen the lower shaft gear setscrew ⓰ that has been fastened tentatively as per 17. above so that the lower shaft gear ⓱ can be moved to the right and left. At that time, the first screw of the lower shaft gear setscrews ⓰ should have been loosened to an extent that it is not disengaged from the flat section of the lower shaft. 20. Move and adjust the lower shaft gear ⓱ in the direction of the arrow so that the center of the needle ⓫ can coincide with the hook blade tip ⓬ when the needle bar ❿ is raised by 2.5mm from the lowest position of the needle bar. Tighten the lower shaft gear setscrews ⓰ (4 positions). 21. Raise the sewing machine. 22. Bend the hook's needle guard ⓭ so that the effective amount of the hook's needle guard ⓭ is adjusted to 0.1 to 0.2mm at the tip of the needle ⓫. Refer to Fig. A. 23. Install the throat plate holder ❹ with the throat plate holder setscrews ❸ (10 positions). 24. Install the throat plate ❷ with the setscrews ❶ (2 positions). 25. Install the hook shaft base cover ❻ with the hook shaft base cover setscrews ❺ (8 positions). 	<ul style="list-style-type: none"> o Stitch skipping or thread breakage will be caused. o Poorly tense stitches will be caused.

(7) Adjusting the inner hook guide

Standard Adjustment



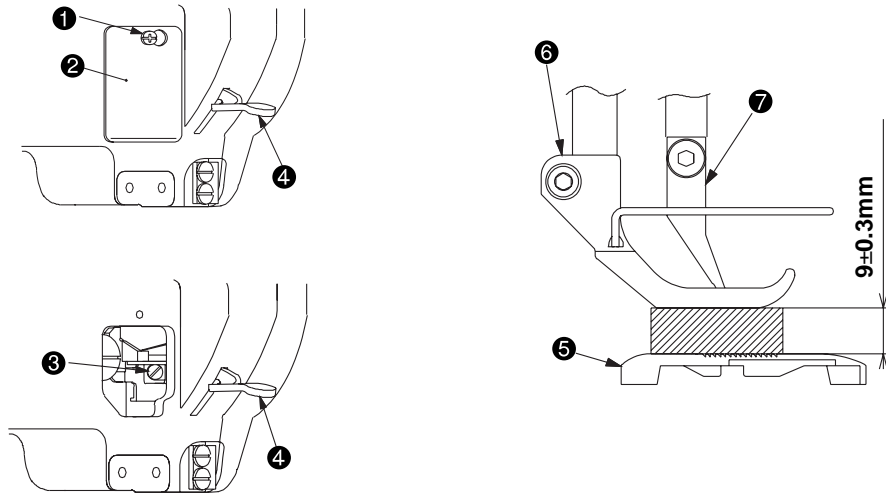
Model	Dimension A
PLC-1710	0.1 to 0.3mm
PLC-1710-7	
PLC-1760-7	
PLC-1760	0.2 to 0.4mm
PLC-1760L	0.3 to 0.5mm

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Loosen the hook shaft base cover setscrews ❶ (1-needle: 2 positions, 2-needle: 4 positions) and remove the hook shaft base cover ❷. (For the left hook, remove the hook shaft base cover ❷ located on the opposite side of the worker.) 2. Turn the hand wheel by hand and adjust the inner hook guide ❸ to the most retreat position. 3. Turn the inner hook ❹ in the direction (of the arrow) against the regular revolving direction and press the inner hook clamp section ❺ against the throat plate ❻. 4. Loosen the tightening screws ❼ (1-needle: 1 position, 2-needle: 2 positions) of the inner hook guide arm and adjust the clearance to Dimension A between the inner hook guide ❸ and the inner hook ❹. 5. After adjustments, tighten the tightening screws ❼ (1-needle: 1 position, 2-needle: 2 positions) of the inner hook guide. At that time, confirm the freedom from the vertical backlash in the inner hook guide ❸. 6. Install the hook shaft base cover ❷ with the hook shaft base cover setscrews ❶ (1-needle: 2 positions, 2-needle: 4 positions). <p>(Caution)</p> <ol style="list-style-type: none"> 1. For the 2-needle version, the same adjustments should be made for the right and left. 2. For the 2-needle version, the inner hook guide arm tightening screw ❼ of the left hook is located on the opposite side of the worker. 	<p>When the clearance is too much :</p> <ul style="list-style-type: none"> o Poorly tense stitches or thread breakage will be caused. <p>When no clearance is secured :</p> <ul style="list-style-type: none"> o The inner hook ❹ or the inner hook guide ❸ may be broken.

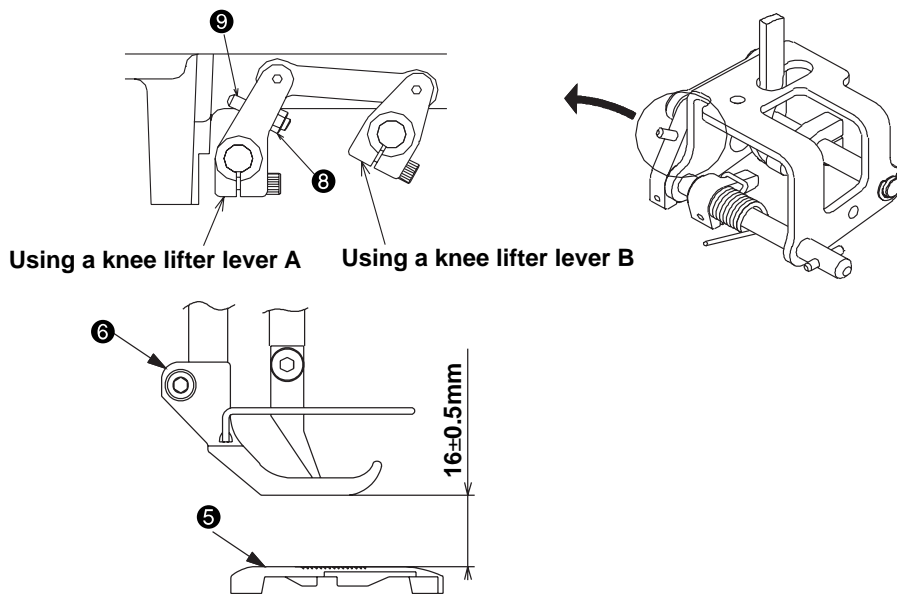
(8) Lifting amount of presser

Standard Adjustment

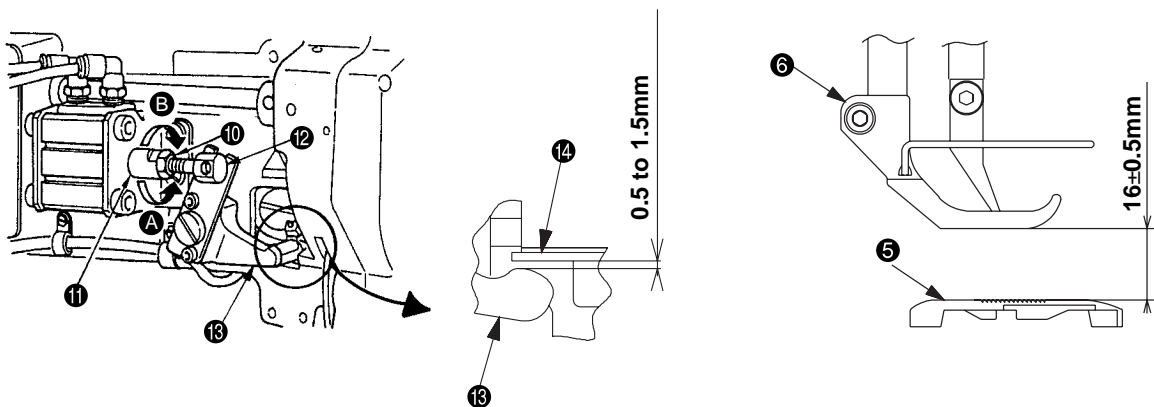
1) Presser lifter lever



2) Using a knee lifter (PLC-1710, 1760, 1760L)



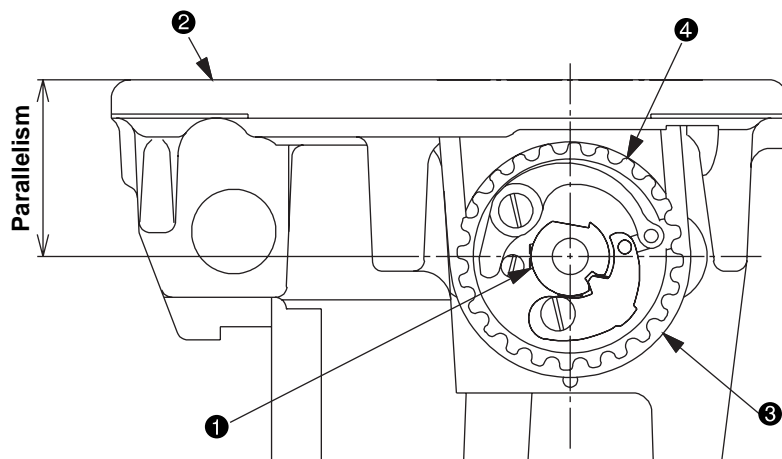
3) Auto presser lifter (PLC-1710-7, 1760-7)



Adjustment Procedures	Results of Improper Adjustment
<p>1) Presser lifter lever</p> <ol style="list-style-type: none"> Loosen the side cover setscrew ❶ (1 position) located on the arm's opposite side of the worker and remove the side cover ❷. (PLC-1710, 1760, 1760L only) Loosen the presser bar connecting bracket tightening screw ❸ (1 position) in the state that the presser lifting lever ❹ is lifted. Adjust the amount of presser rise to $9 \pm 0.3\text{mm}$. In this case, adjustments become easy if a sewing material of 9mm in thickness is inserted in between the top face of the throat plate ❺ and the bottom face of the presser foot ❻. After adjustments, tighten the hook shaft base screw ❸ (1 position). Prior to tightening, confirm that there is no contact between the presser foot ❻ and the feed foot ❼. Remove the object inserted in the clearance between the top face of the throat plate ❺ and the bottom face of the presser foot ❻. Install the side cover ❷ and tighten the side cover setscrew ❶ (1 position). (PLC-1710, 1760, 1760L only) <p>2) Using a knee lifter (PLC-1710, 1760, 1760L)</p> <ol style="list-style-type: none"> Remove the knee patch plate and let the sewing machine fall down. Loosen the stopper nut ❸ (1 position) and adjust the lifting amount by changing the screw-in value of the stopper screw ❹. Adjust the distance to $16 \pm 0.5\text{mm}$ between the top face of the throat plate ❺ and the bottom face of the presser foot ❻. Make sure not to move the stopper screw ❹ while the stopper nut ❸ is tightened. <ul style="list-style-type: none"> o Stopper screw ❹ tightened → Decrease in the amount of rise o Stopper screw ❹ loosened → Increase in the amount of rise <p>3) Auto presser lifter (PLC-1710-7, 1760-7)</p> <ol style="list-style-type: none"> Loosen the cylinder nut ❿ and adjust the screw-in value of the cylinder connecting screw ⓫ by turning the shaft section of the cylinder ⓬ so that the distance can be adjusted to $16 \pm 0.5\text{mm}$ between the top face of the throat plate ❺ and the bottom face of the presser foot ❻. <ul style="list-style-type: none"> Turned in the direction A → Increase in the lifting amount of the presser foot ❻. Turned in the direction B → Decrease in the lifting amount of the presser foot ❻. After adjustments, tighten the cylinder nut ❿. <p>(Caution) After adjustments, confirm that a clearance of 0.5 - 1.5mm is secured between the auto presser lifter lever A ⓭ and the thread tension releasing support plate ⓮ when the presser foot ❻ is lowered.</p>	<p>When the amount of presser rise is too much:</p> <ul style="list-style-type: none"> o The presser foot ❻ is kept clear of the top face of the throat plate ❺ even when the presser lifter lever ❹ is returned to its original position. <p>When the amount of presser rise is too less:</p> <ul style="list-style-type: none"> o Since the rise of the presser is insufficient, the workability can become worse. <p>When the amount of presser rise is too much:</p> <ul style="list-style-type: none"> o When the presser is lifted, the tip of the needle bar may interfere with the feed foot ❼ and the feed foot ❼ may be broken. <p>When the amount of presser rise is too less:</p> <ul style="list-style-type: none"> o Since the rise of the presser is insufficient, the workability can become worse. <p>When the amount of presser rise is too much:</p> <ul style="list-style-type: none"> o When the presser is lifted, the tip of the needle bar may interfere with the feed foot ❼ and the feed foot ❼ may be broken. <p>When the amount of presser rise is too less:</p> <ul style="list-style-type: none"> o Since the rise of the presser is insufficient, the workability can become worse.

(9) Timing belt setup

Standard Adjustment



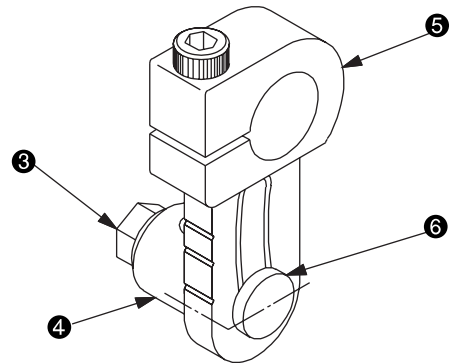
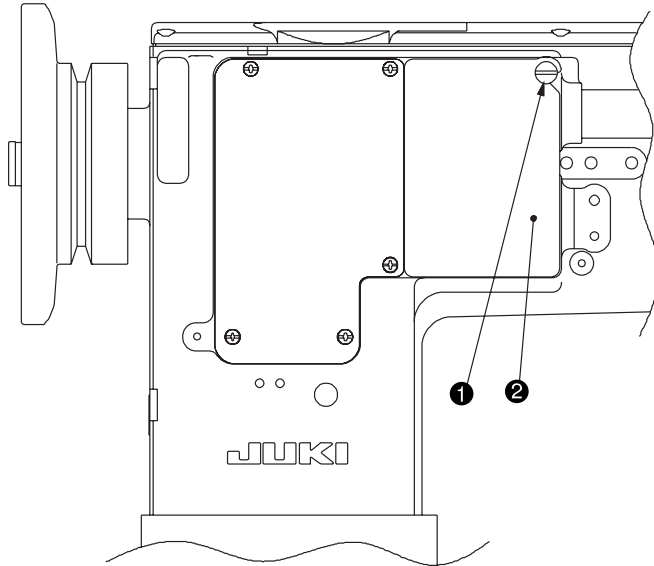
* The figure shows a view as seen from the hand wheel side.

Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Let the sewing machine fall down. 3. Turn the hand wheel by hand and adjust the needle bar to the lowest position. 4. Turn the lower sprocket ④ by hand until the second screw ① of the lower sprocket ④ comes in parallel to the top face of the bed ②. 5. Apply the timing belt ③ to the lower sprocket. This action should be taken in the state that the timing belt ③ is correctly hung on the upper sprocket ④. 6. Raise the sewing machine. 	<ul style="list-style-type: none"> o The tightness of stitches becomes poor. o The feeding phase and the timing between needle and hook may be changed.

(10) Feed motion

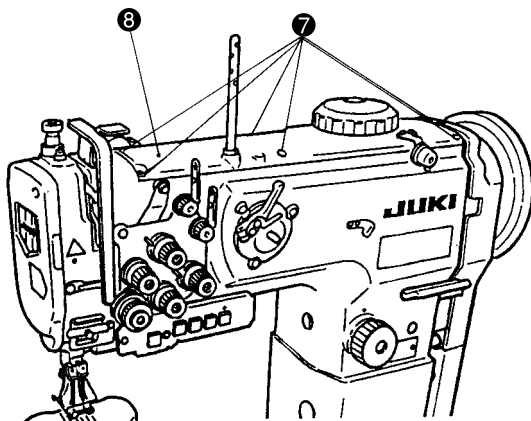
Standard Adjustment

1) Alternate vertical amount



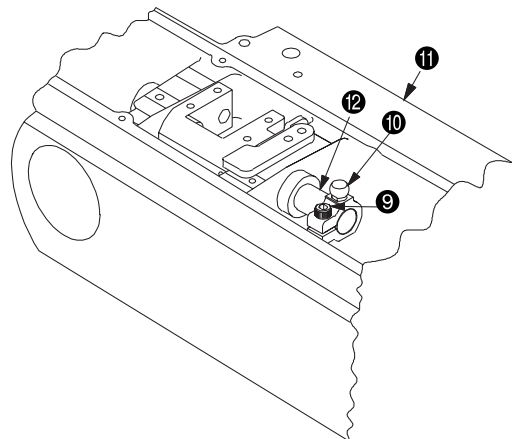
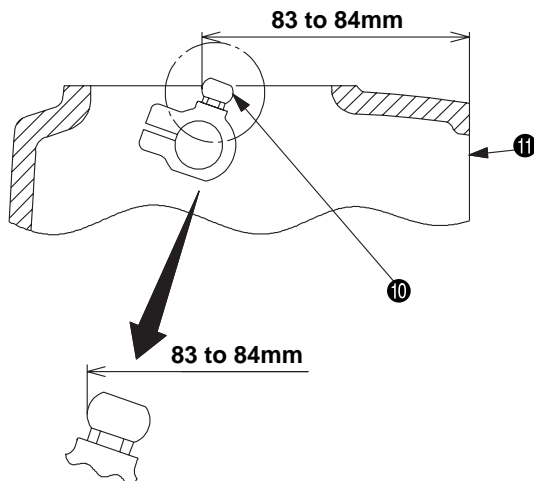
Guideline for the alternate vertical amount
 Upper engraved line : Approx. 5mm
 Middle engraved line : Approx. 4mm
 Lower marker line : Approx. 3mm

Standard Adjustment: Upper feed for the position of the hinge screw ⑥
 The lowest point of the oblong hole in the rear arm ⑤



List of the sewing speeds

Alternate vertical amount	Stitch 6mm or less	Stitch 6mm over 9mm or less
3mm or less	2500rpm	1800rpm
3mm over 4mm or less	1800rpm	1800rpm
4mm over 6.5mm or less	1600rpm	1600rpm

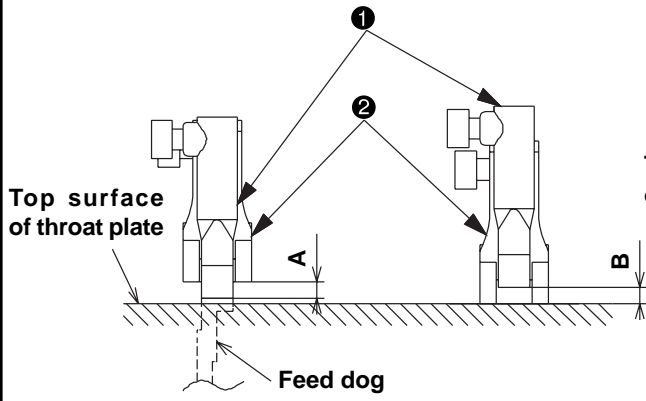


Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> o For PLC-1710 and PLC-1760 1. Loosen the window plate screw ❶ (1 position) and remove the window plate ❷. 2. Loosen the upper feed rod hinge screw nut ❸. 3. Vertically move and adjust the position of the cam rod boss ❹. 4. Tighten the upper feed rod hinge screw nut ❸. 5. Install the window plate ❷ with the window plate setscrews ❶ (2 positions). o Upper section of the oblong hole → Alternate vertical amount: Large o Lower section of the oblong hole → Alternate vertical amount: Small (Caution) The maximum revolving speed has been set according to the sewing conditions. Set the maximum revolving speed according to each sewing condition so that the preset value cannot be exceeded. o For PLC-1710-7, 1760-7, 1760L 1. Set the graduations of the alternate vertical dial at the lowest level. 2. Loosen the top cover setscrews ❷ (6 positions) and remove the top cover ❸. 3. Loosen the Alternate vertical adjusting arm setscrew ❹ (1 position). 4. The position of the alternate vertical adjusting arm pin ❺ is maintained at 83 to 84mm when measured from the arm end face ❻. In the sidewise direction, it is positioned to coincide with the end face of the alternate vertical converter shaft ❼. 5. Tighten the Alternate vertical adjusting arm setscrew ❹ (1 position). 6. Set the graduations of the alternate vertical dial at the lowest level. Use the top cover setscrews ❷ (6 positions) to mount the top cover ❸. 7. Turn the alternate vertical dial and confirm that the dial digits correctly correspond to the alternate vertical amounts. 	<p>For certain types of sewing materials, the working height may be increased.</p> <ul style="list-style-type: none"> o Sewing of sponge materials o Sewing of stepped sections o When the working value is increased, difference may be caused between the stitching pitches and dial graduations. o When the working value is increased, the feeding force may be reduced. Accordingly, the motor speed should be somewhat lowered in such a case. <p>For certain types of sewing materials, the working height may be increased.</p> <ul style="list-style-type: none"> o Sewing of sponge materials o Sewing of stepped sections

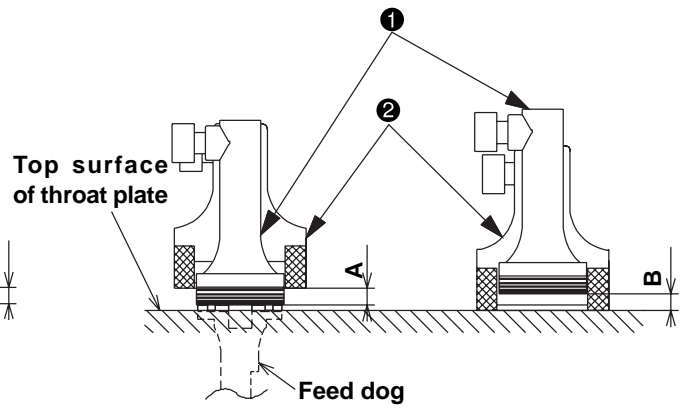
Standard Adjustment

2) Alternate momentum amount

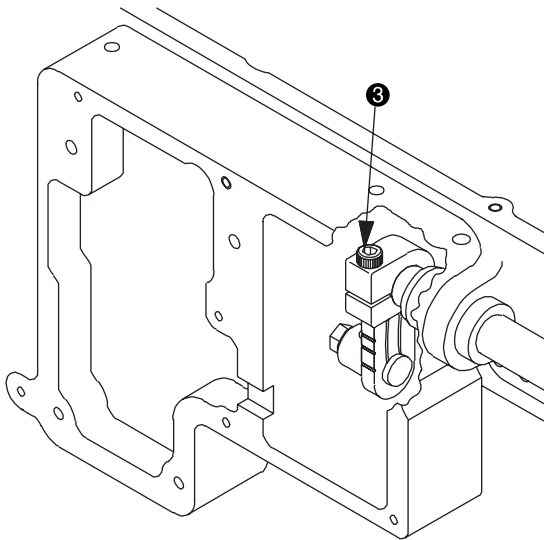
PLC-1710, 1710-7



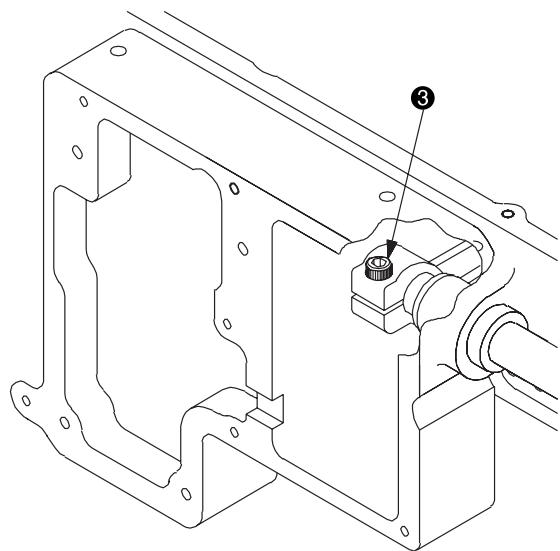
PLC-1760, 1760-7, 1760L



PLC-1710, 1760



PLC-1710-7, 1760-7, 1760L

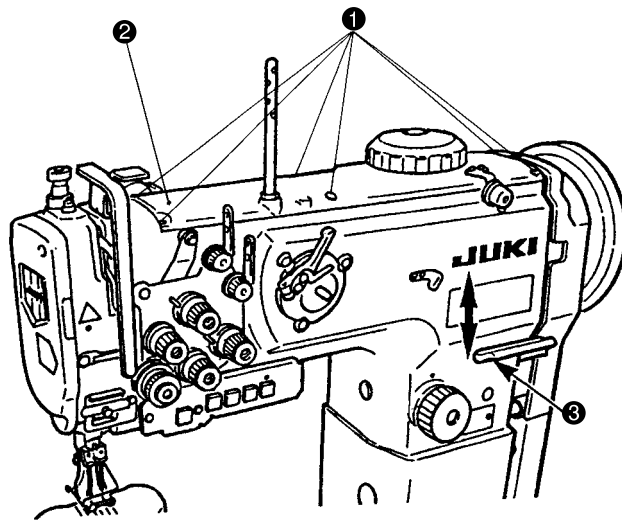


Adjustment Procedures	Results of Improper Adjustment
<p>o For PLC-1710 and PLC-1760</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Turn the hand wheel by hand and confirm whether the vertical amount of motion is kept almost equalized between the feed foot ❶ and the presser foot ❷. 3. If the vertical amount of motion seems to be different, loosen the upper feed rear arm setscrew ❸ until equalized balancing is secured. Make adjustments until the condition of A = B is secured by visual check. <p>When the vertical amount of motion is too much in the feed foot ❶:</p> <ol style="list-style-type: none"> 1. In the state that the feed foot ❶ is somewhat lifted, loosen the upper feed rear arm setscrew ❸ and press the feed foot ❶ against the feed dog. 2. Tighten the upper feed rear arm setscrew ❸ again and examine the vertical amount of motion by turning the hand wheel. <p>When the vertical amount of motion is too much in the presser foot ❷:</p> <ol style="list-style-type: none"> 1. In the state that the presser foot ❷ is somewhat lifted, loosen the upper feed rear arm setscrew ❸ and press the presser foot ❷ against the throat plate. 2. Tighten the upper feed rear arm setscrew ❸ again and examine the vertical amount of motion by turning the hand wheel. <p>o For PLC-1710-7, 1760-7, 1760L</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Set the alternate vertical dial at the graduations [3] in the case of the PLC-1710-7 and 1760-7, and at the graduation [2] in the case of the PLC-1760L. 3. Turn the hand wheel by hand and confirm whether the vertical amount of motion is kept almost equalized between the feed foot ❶ and the presser foot ❷. 4. If the vertical amount of motion seems to be different, loosen the upper feed rear arm setscrew ❸ until equalized balancing is secured. Make adjustments until the condition of A = B is secured by visual check. <p>When the vertical amount of motion is too much in the feed foot ❶:</p> <ol style="list-style-type: none"> 1. In the state that the feed foot ❶ is somewhat lifted, loosen the upper feed rear arm setscrew ❸ and press the feed foot ❶ against the feed dog. 2. Tighten the upper feed rear arm setscrew ❸ again and examine the vertical amount of motion by turning the hand wheel. <p>When the vertical amount of motion is too much in the presser foot ❷:</p> <ol style="list-style-type: none"> 1. In the state that the presser foot ❷ is somewhat lifted, loosen the upper feed rear arm setscrew ❸ and press the presser foot ❷ against the throat plate. 2. Tighten the upper feed rear arm setscrew ❸ again and examine the vertical amount of motion by turning the hand wheel by hand. 	<p>For certain types of sewing materials, the vertical amount of motion of the feed foot should be increased more than that of the presser foot.</p> <ul style="list-style-type: none"> o Sewing of sponge materials o Sewing of stepped sections <p>When the vertical amount of motion is extremely different:</p> <ul style="list-style-type: none"> o The pitches of stitches become different from the graduations of the dial. o Since the feeding force is reduced, the motor speed should be somewhat lowered. <p>For certain types of sewing materials, the vertical amount of motion of the feed foot should be increased more than that of the presser foot.</p> <ul style="list-style-type: none"> o Sewing of sponge materials o Sewing of stepped sections <p>When the vertical amount of motion is extremely different:</p> <ul style="list-style-type: none"> o The pitches of stitches become different from the graduations of the dial. o Since the feeding force is reduced, the motor speed should be somewhat lowered.

(11) Feed cam phase

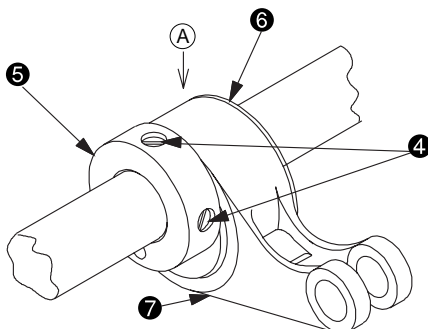
Standard Adjustment

1) Horizontal feed cam phase

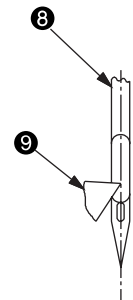
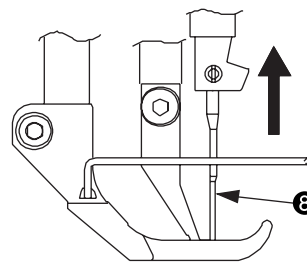
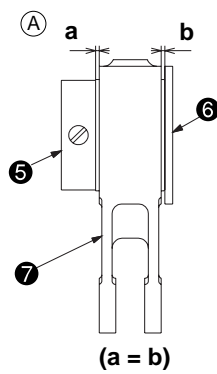


* According to the model type, the shape of the top cover ② will change.

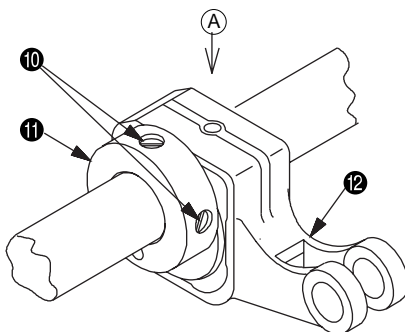
Besides PLC-1760L



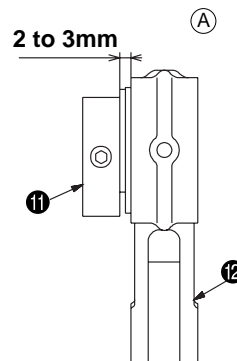
Besides PLC-1760L



Only PLC-1760L



Only PLC-1760L

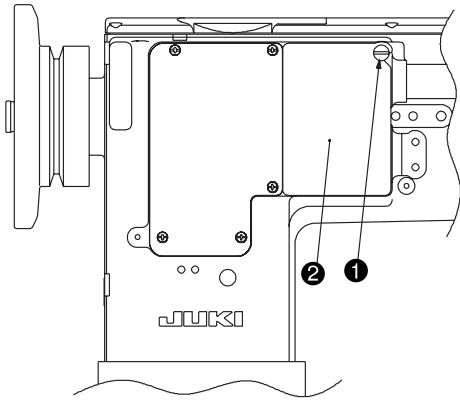


Adjustment Procedures	Results of Improper Adjustment
<p>o For PLC-1710, 1710-7, 1760, 1760-7</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [9]. 2. Loosen the top cover setscrews ❶ (6 positions) on the top of the sewing machine and remove the top cover ❷. 3. Loosen the horizontal feed eccentric cam setscrews ❹ (2 positions). 4. Turn the hand wheel by hand to lift the needle ❸ from its lowest point and stop it where the center of the needle ❸ coincides with the hook blade tip ❾. 5. Turn and adjust the horizontal feed eccentric cam ❺ to the phase where the feed dog does not move even when the reverse feed lever ❸ is moved vertically. 6. Tighten the horizontal feed eccentric cam setscrews ❹ (2 positions) firmly. 7. Install the top cover ❷ with the top cover setscrews ❶ (2 positions). (Guideline) In the position where the center of the needle ❸ coincides with the hook blade tip ❾, the first screw of the horizontal feed eccentric cam ❺ is faced almost above. <p>(Caution) 1. The torque is increased if the horizontal feed rod ❷ comes in contact with the end faces of the horizontal feed cam cover ❻ and the horizontal feed eccentric cam ❺. To avoid this, the horizontal feed rod ❷ should be positioned almost in the center of the end face of the horizontal feed cam cover ❻ and the flange end face of the horizontal feed eccentric cam ❺.</p> <p>2. After the completion of horizontal feed timing adjustments, the top feed timing should also be adjusted again.</p> <p>For more details, refer to (11)-2, Top feed cam phase.</p>	<ul style="list-style-type: none"> o High and low speed pitch errors become worse. o Thread tension changes. o Forward and reverse stitch tightness changes.
<p>o For PLC-1760L</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [12]. 2. Loosen the top cover setscrews ❶ (6 positions) of the top of the sewing machine and remove the top cover ❷. 3. Loosen the horizontal feed triangle cam setscrews ❿ (2 positions). 4. Turn the hand wheel by hand to lift the needle ❸ from its lowest point and stop it where the center of the needle ❸ coincides with the hook blade tip ❾. 5. Turn and adjust the horizontal feed triangle cam ⓫ to the phase where the feed dog does not move even when the reverse feed lever ❸ is moved vertically. 6. Tighten the horizontal feed triangle cam setscrews ❿ (2 positions) firmly. 7. Install the top cover ❷ with the top cover setscrews ❶ (2 positions). (Guideline) In the position where the needle bar is lifted by 4mm above its lowest point, the first screw of the horizontal feed triangle cam ⓫ is faced almost above. <p>(Caution) 1. The torque is increased if the horizontal feed rod ❷ comes in contact with the end face of the horizontal feed triangle cam ⓫. To avoid this, the horizontal feed rod ❷ should be set up so that a clearance of 2 ~ 3mm is secured between the horizontal feed rod ❷ and the flange end face of the horizontal feed triangle cam ⓫.</p> <p>2. After the completion of horizontal feed timing adjustments, the top feed timing should also be adjusted again.</p> <p>For more details, refer to (11)-2, Top feed cam phase.</p>	<ul style="list-style-type: none"> o High and low speed pitch errors become worse. o Thread tension changes. o Forward and reverse stitch tightness changes.

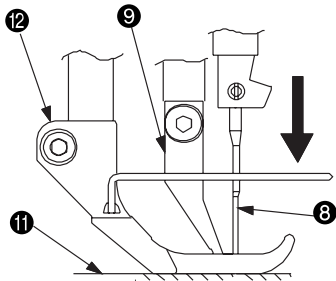
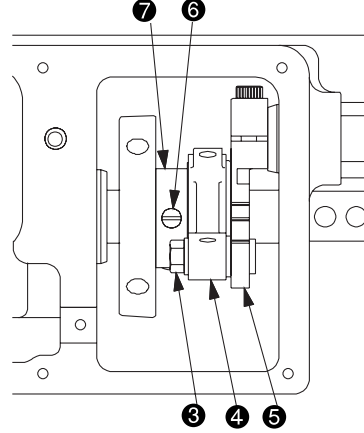
Standard Adjustment

2) Top feed cam phase

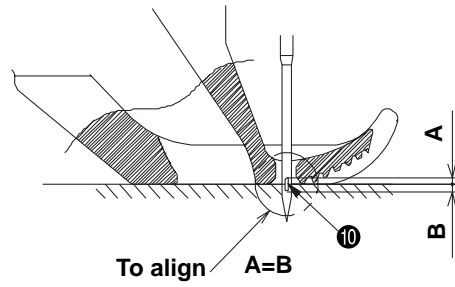
PLC-1710,1760



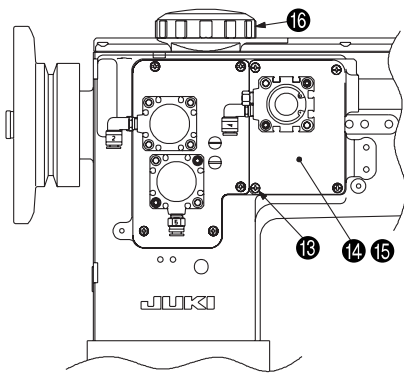
PLC-1710, 1760



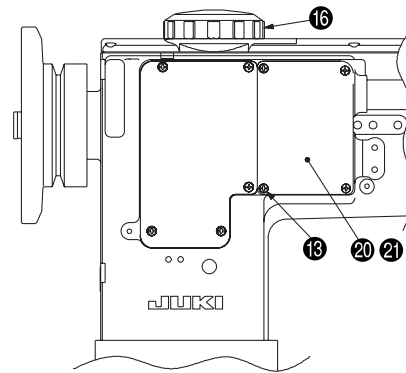
PLC-1710, 1760, 1760L



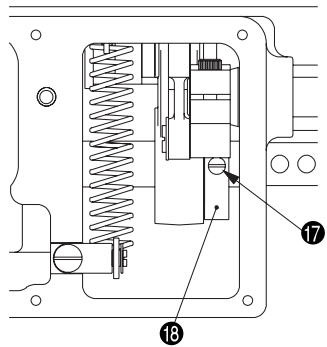
PLC-1710-7, 1760-7, 1760L



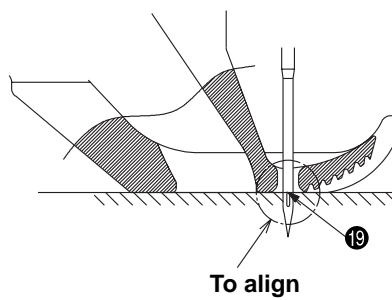
PLC-1710-7, 1760-7, 1760L



PLC-1710-7, 1760-7, 1760L

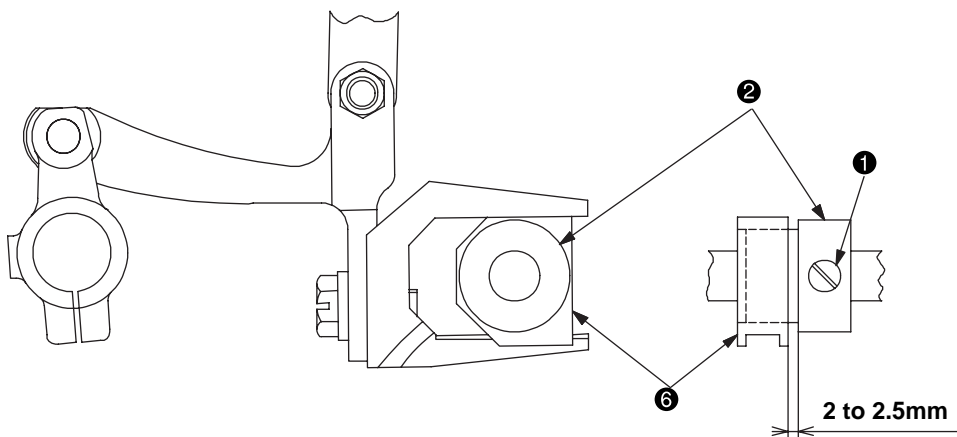
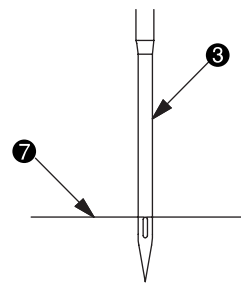
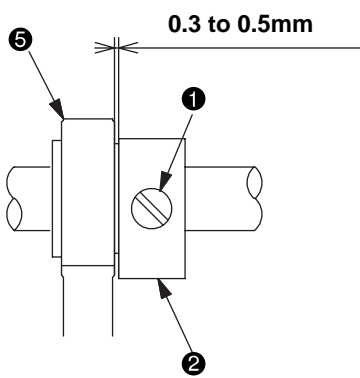
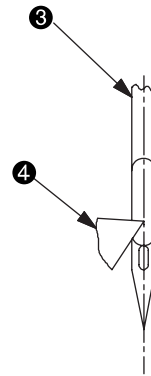
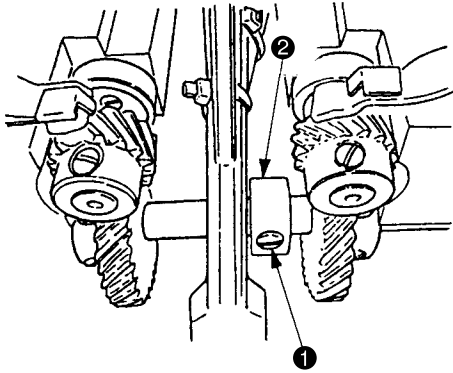


PLC-1710-7, 1760-7



Standard Adjustment

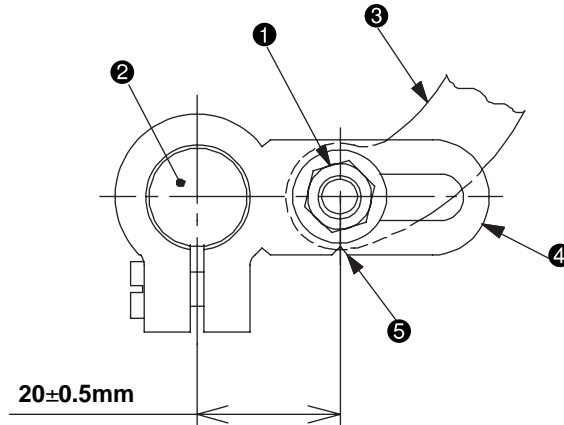
3) Vertical feed cam phase



Adjustment Procedures	Results of Improper Adjustment
<p>o For PLC-1710, 1760, and 1760L</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Let the sewing machine fall down. 3. Loosen the vertical feed cam setscrews ❶ (2 positions). 4. Turn the hand wheel by hand to the position where the needle ❸ coincides with the hook blade tip ❹. 5. Turn the vertical feed cam ❷ by hand to the position where the amount of protrusion of the feed dog becomes maximum from the top face ❺ of the throat plate. 6. Tighten the vertical feed cam setscrews ❶ (2 positions) and fix the vertical feed cam ❷. 7. Raise the sewing machine. <p>(Caution) 1. Secure a clearance of 0.3 to 0.5mm between the end face of the vertical feed link ❺ and the flange end face of the vertical feed cam ❷.</p> <p>2. Prior to making adjustments for this item, confirm whether the feed dog height has been correctly adjusted.</p> <p>For more details, refer to 3.-(4) Height of the feed dog.</p> <p>o For PLC-1710-7 and 1760-7</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Let the sewing machine fall down. 3. Loosen the vertical feed cam setscrews ❶ (2 positions). 4. Turn the hand wheel and adjust it to the position where the top end of the needle hole coincides with the top face of the throat plate ❺ while the needle ❸ is lowering. 5. Turn the vertical feed cam ❷ by hand to the position where the top face of the throat plate ❺ of the throat plate coincides with the highest part of the feed dog. 6. Tighten the vertical feed cam setscrews ❶ (2 positions) and fix the vertical feed cam ❷. 7. Raise the sewing machine. <p>(Caution) 1. Secure a clearance of 2 to 2.5mm between the end face of the vertical feed slide block ❻ and the flange end face of the vertical feed cam ❷.</p> <p>2. Prior to making adjustments for this item, confirm whether the feed dog height has been correctly adjusted.</p> <p>For more details, refer to 3.-(4) Height of the feed dog.</p>	<ul style="list-style-type: none"> o If the throat plate should come in contact with the feed dog, hitting sound will be generated, and the throat plate and the feed dog may be broken. o Uneven stitching will be caused.

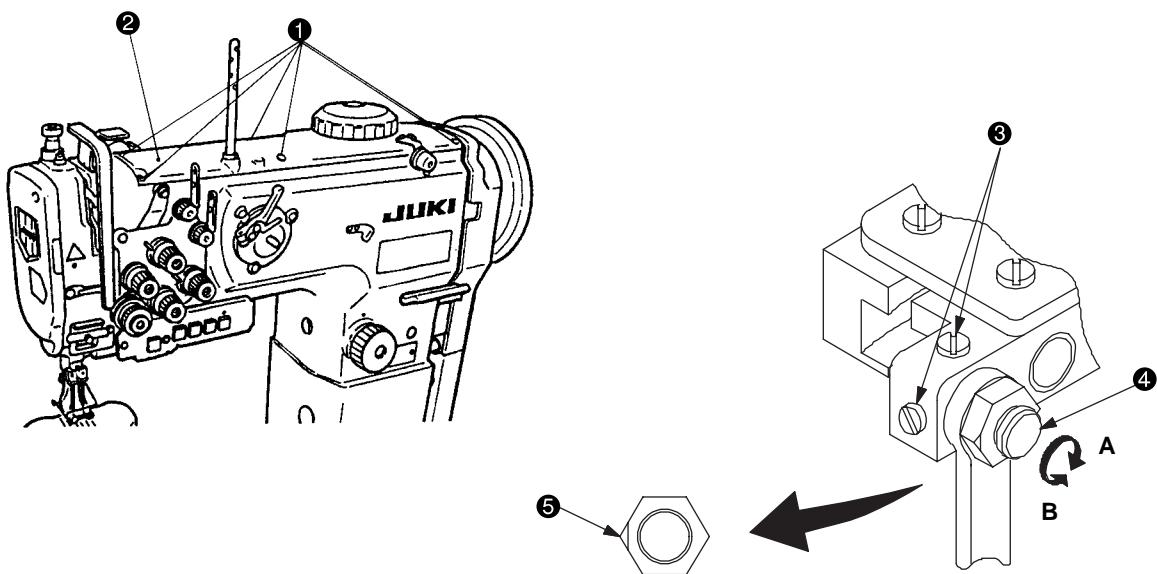
(12) Needle motion

Standard Adjustment



(13) Normal and reverse stitch length

Standard Adjustment

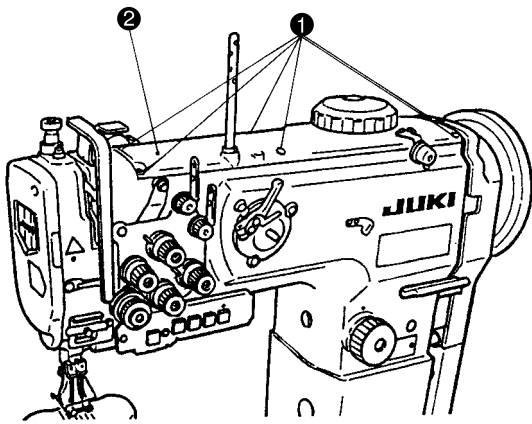


Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the horizontal feed rear arm hinge screw nut ❶. 3. Move the horizontal feed connecting rod ❸ until the distance from the shaft center of the horizontal feed shaft ❷ to the hinge screw center becomes $20 \pm 0.5\text{mm}$. After the horizontal feeding, tighten the rear arm hinge screw nut ❶. 4. Turn the hand wheel and check the needle motion. 5. Raise the sewing machine. <p>(Guideline) 1. The engraved marker line ❺ of the horizontal feed rear arm ❹ coincides with the center of the hinge screw.</p> <ol style="list-style-type: none"> 2. If the distance is increased more than the standard adjusting value ($20 \pm 0.5\text{mm}$), the amount of bottom feed is reduced. 	<ul style="list-style-type: none"> o This can be the cause of needle breakage or stitch skipping.

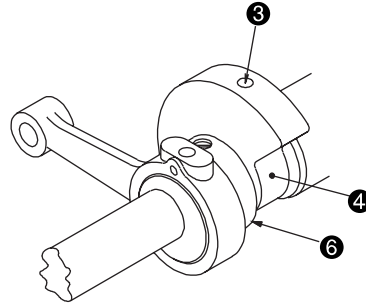
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Loosen the top cover setscrews ❶ (6 positions) and remove the top cover ❷. 2. Adjust the graduations of the feed adjusting dial to [6]. (For the PLC-1760L, adjust it to [12].) 3. Loosen the feed adjusting eccentric pin setscrews ❸ (2 positions). 4. Turn the feed adjusting eccentric pin ❹ and adjust the it. <ul style="list-style-type: none"> o Direction A → Reverse feed pitch increased o Direction B → Forward feed pitch increased 5. Tighten the feed adjusting eccentric pin setscrews ❸ (2 positions). 6. Install the top cover ❷ with the top cover screws ❶ (6 positions). <p>(Guideline) When the notch direction ❺ of the feed adjust eccentric pin ❹ is positioned sidewise, the amount of feed becomes almost the same between forward and reverse.</p>	<ul style="list-style-type: none"> o The stitch length becomes irregular between forward and reverse feed.

(14) Balance

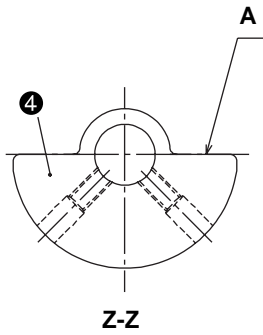
Standard Adjustment



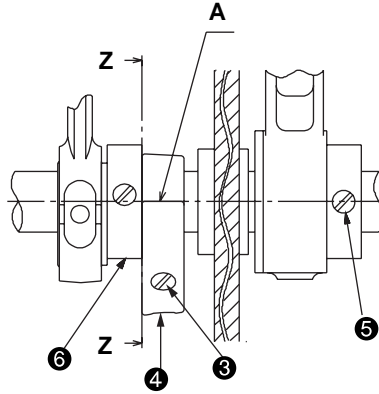
PLC-1710, 1760



PLC-1710, 1760

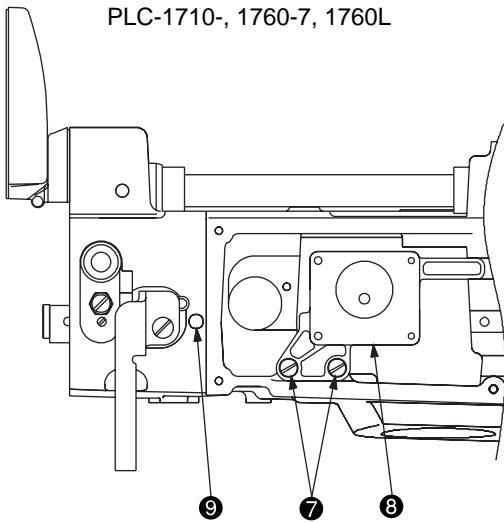


PLC-1710, 1760

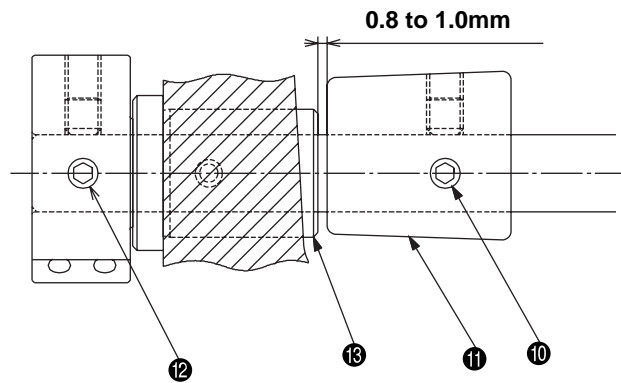


The above illustration shows a view of the arm interior as seen from the worker side.

PLC-1710-, 1760-7, 1760L



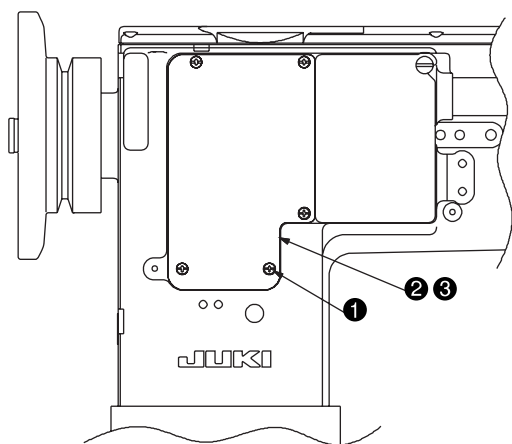
PLC-1710-7, 1760-7, 1760L



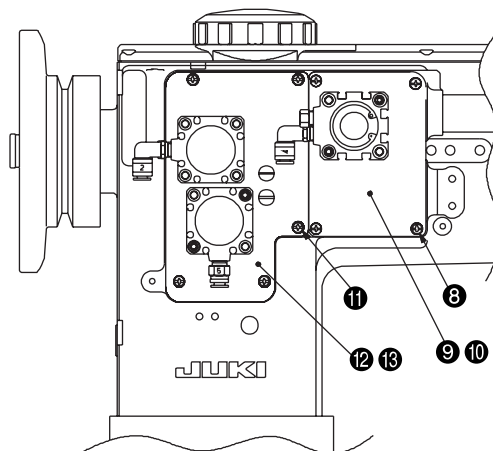
Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> o For PLC-1710, 1760 <ol style="list-style-type: none"> 1. Loosen the top cover setscrews ❶ (6 positions) and remove the top cover ❷. 2. Loosen the balancer setscrews ❸ (2 positions). 3. Adjust Section A of the balancer ❹ to the position where it coincides with the second screw of the horizontal feed cam setscrew ❺. Fix the balancer ❹ by means of the balancer setscrews ❸ (2 positions). At the time of this setup, the end face of the balancer ❹ is required to keep a close contact with that of the top feed cam ❻. 4. Install the top cover ❷ with the top cover setscrews ❶ (6 positions). o For PLC-1710-7, 1760-7, 1760L <ol style="list-style-type: none"> 1. Loosen the top cover setscrews ❶ (6 positions) and remove the top cover ❷. 2. Loosen the oil tank setscrews ❷ (2 positions) and remove the oil tank ❸. 3. Loosen the balancer setscrews ❿ (2 positions). 4. Turn the hand wheel until the first screw of the main shaft counterbalance setscrews ❿ (2 positions) is faced upwards. If a 4mm hexagon head wrench is inserted in the hole ❸ of the sewing machine top face at that time, it becomes easy to check the position of the main shaft counterbalance. 5. Let the first screw of the balancer setscrews ❿ (2 positions) coincides with that of the main shaft counterbalance setscrews ❿ (2 positions), and then tighten the balancer setscrews ❿ (2 positions). At that time, a clearance of 0.8 to 1.0mm should be secured between the balancer ❿ and the main shaft front metal ❿. 6. Install the oil tank ❸ with the oil tank setscrews ❷ (2 positions). 7. Install the top cover ❷ with the top cover setscrews ❶ (6 positions). 	<ul style="list-style-type: none"> o Vibration is increased.

(15) Position of reverse feed lever

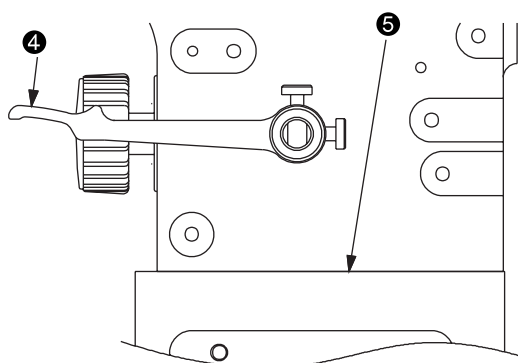
Standard Adjustment



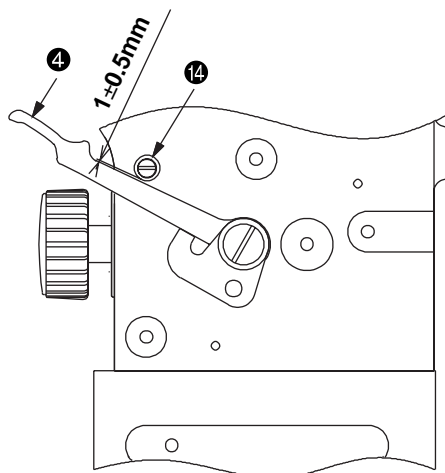
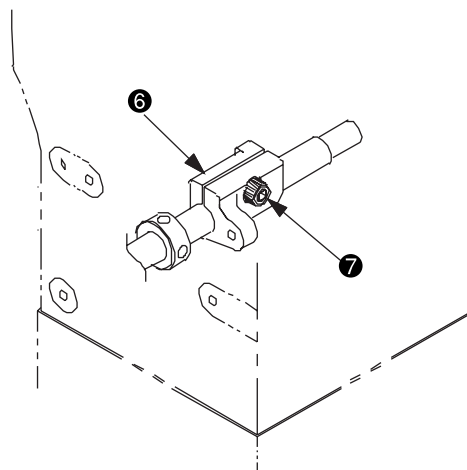
PLC-1710, 1760



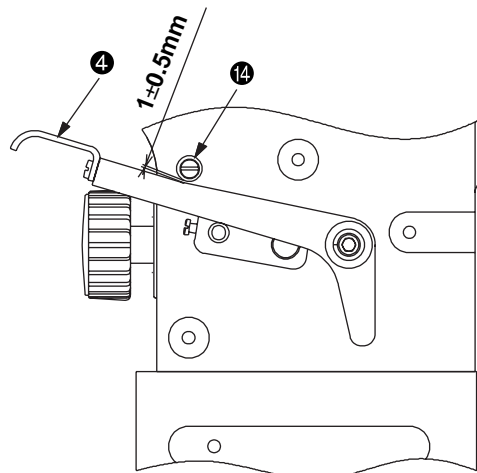
PLC-1710-7, 1760-7, 1760L



PLC-1710, 1760



PLC-1710-7, 1760-7

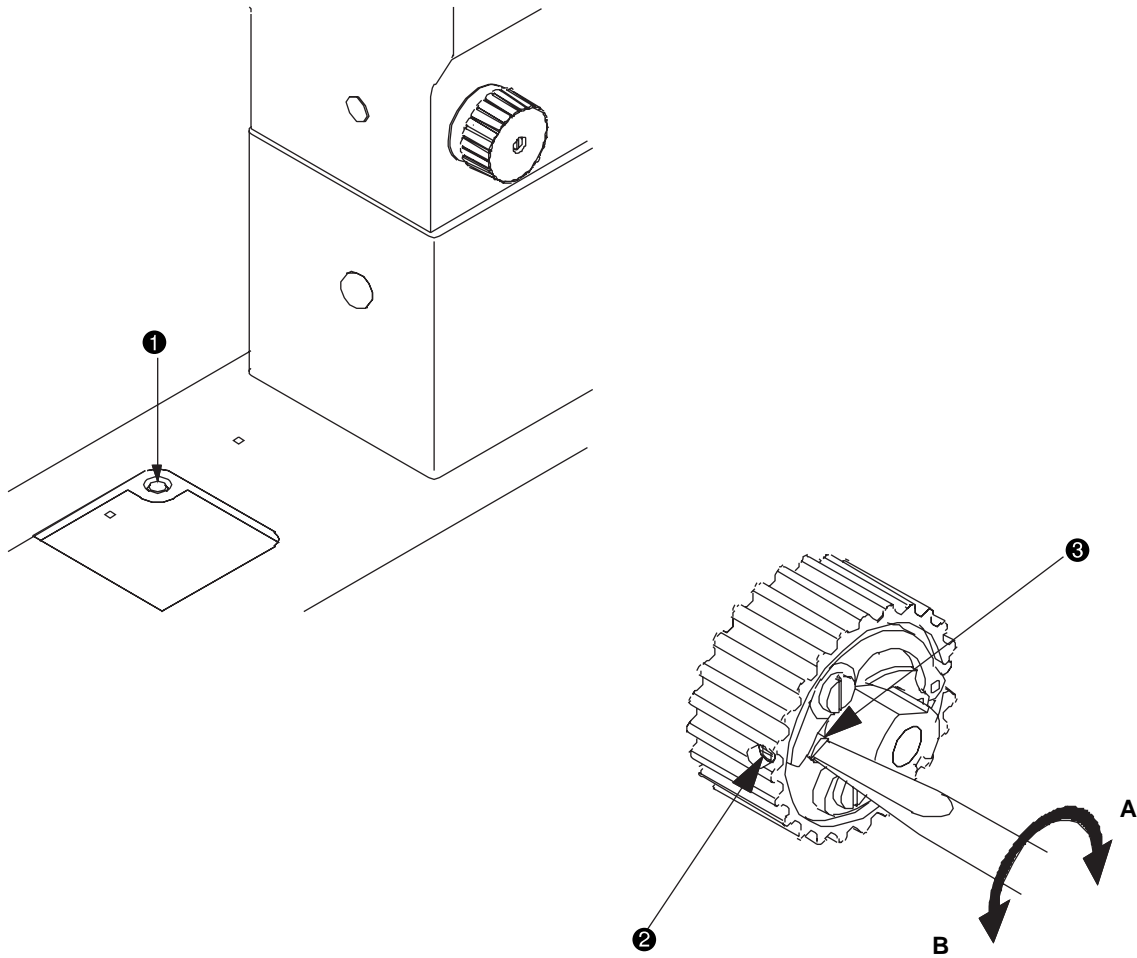


PLC-1760L

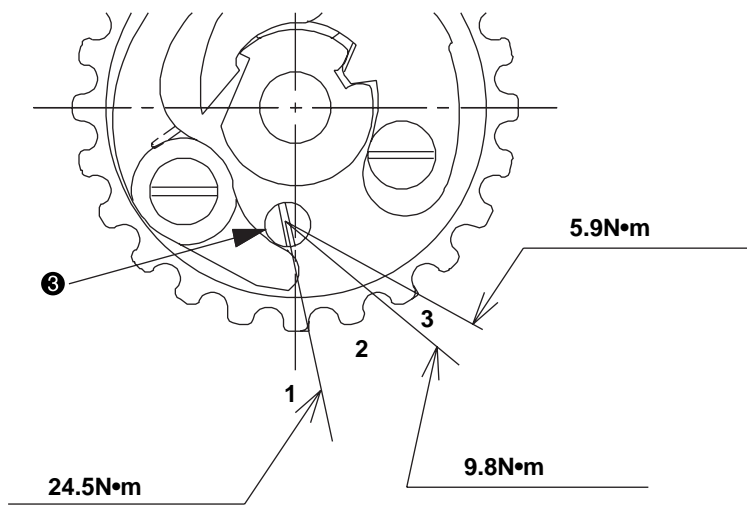
Adjustment Procedures	Results of Improper Adjustment
<p>o For PLC-1710, 1760</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to [0]. 2. Loosen the window plate setscrews ❶ (5 positions) located behind the sewing machine. Remove the window plate ❷ and the window plate gasket ❸. 3. Loosen the hexagon head bolt ❷ to adjust the feed adjuster ❸ so that the top face of the reverse feed lever ❹ is positioned approximately in parallel to the junction face ❺ between the arm and the post. After adjustments, tighten this bolt ❷. 4. Install the window plate ❷ and the window plate gasket ❸ with the window plate setscrews ❶ (5 positions). <p>(Caution) Confirm that the reverse feed lever ❹ does not interfere with the arm or the post when the graduations of the feed adjuster dial are set at [9].</p> <p>o For PLC-1710-7, 1760-7, 1760L</p> <ol style="list-style-type: none"> 1. Adjust the graduations of the feed adjusting dial to maximum value. 2. Loosen the window plate setscrews ❸ (4 positions) located behind the sewing machine. Remove the window plate ❹ and the window plate gasket ❺. 3. Loosen the window plate setscrews ❶ (5 positions) located behind the sewing machine. Remove the window plate ❷ and the window plate gasket ❸. 4. Loosen the hexagon head bolt ❷ to adjust the feed adjuster ❸ so that a clearance of $1 \pm 0.5\text{mm}$ can be secured between the reverse feed lever ❹ and the reverse feed lever stopper ❻. After adjustments, tighten this bolt ❷. 5. Install the window plate ❷ and the window plate gasket ❸ with the window plate setscrews ❶ (5 positions). 6. Install the window plate ❹ and the window plate gasket ❺ with the window plate setscrews ❸ (4 positions). <p>(Caution) Confirm that the reverse feed lever ❹ does not interfere with the arm or the post when the graduations of the feed adjuster dial are set at the maximum position.</p>	<p>When the reverse feed lever is positioned too low:</p> <ul style="list-style-type: none"> o At the time of reverse feed stitching, the reverse stitch pitches may be decreased as a result of interference between the reverse feed lever ❹ and the post. <p>When the reverse feed lever is positioned too high:</p> <ul style="list-style-type: none"> o The forward feed stitch pitches may be decreased as a result of interference between the reverse feed lever ❹ and the arm. <p>When the clearance is too large between the reverse feed lever and the stopper:</p> <ul style="list-style-type: none"> o In the case of reverse feed stitching with the reverse feed lever ❹, the reverse feed lever ❹ may interfere with the post, thus decreasing the reverse feed stitch pitches. <p>When the clearance is too small between the reverse feed lever and the stopper:</p> <ul style="list-style-type: none"> o The reverse feed lever ❹ may interfere with the reverse feed lever stopper ❻, thus decreasing the forward feed stitch pitches.

(16) Safety mechanism

Standard Adjustment



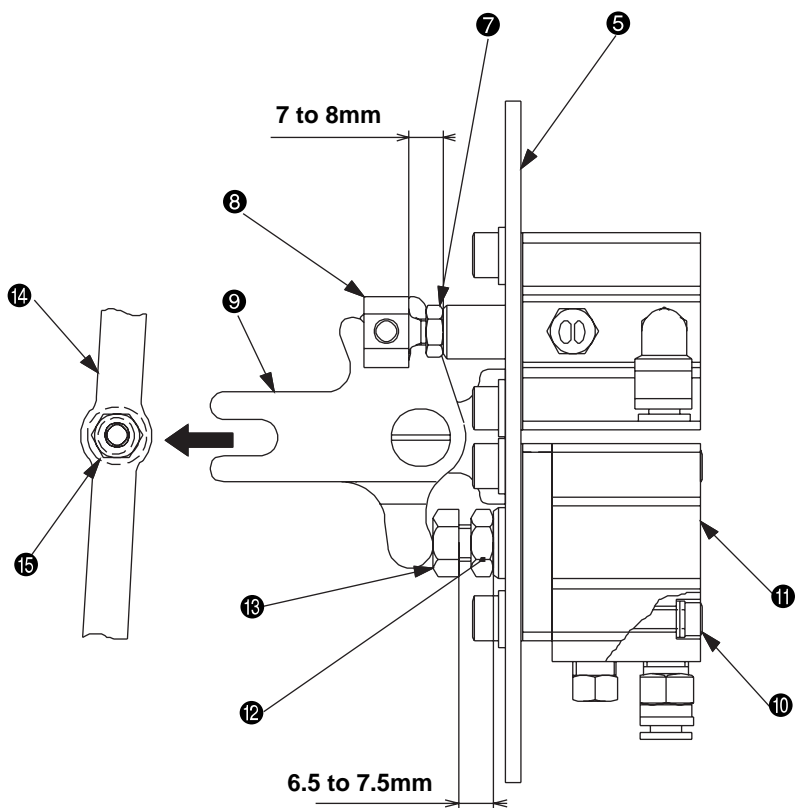
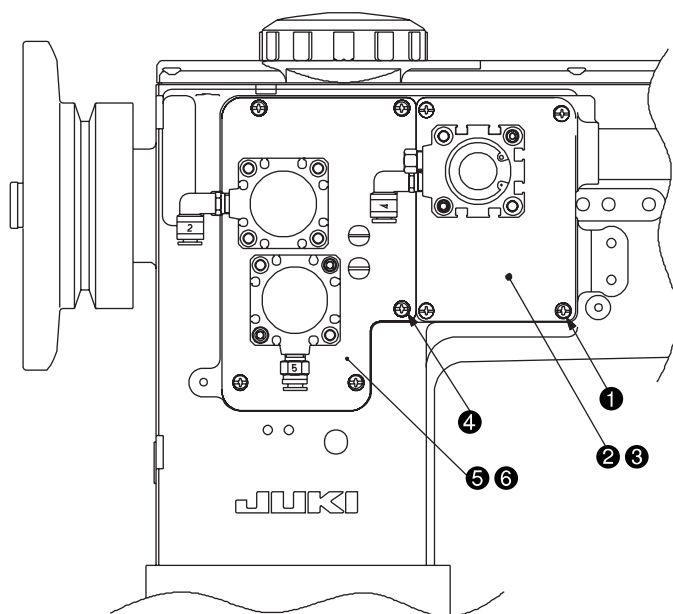
(Guideline for the release pressure)



Adjustment Procedures	Results of Improper Adjustment
<p>The safety device will be actuated if unreasonable forces are exerted on the lower shaft and others during operation.</p> <p>If the safety device is actuated, no power is transmitted to the lower shaft and the hook does not rotate even when the hand wheel is turned. In such a case, the lower shaft sprocket only makes idling.</p> <ul style="list-style-type: none"> o Method of resetting: <ol style="list-style-type: none"> 1. Check the moving section of the sewing machine to look for the reason why the safety device has been actuated. Remove the possible cause. 2. Pressing the push button switch ❶ that is located on the top face of the bed. Strongly turn the hand wheel by hand in the reverse direction. 3. When the "click" sound is heard and the hand wheel cannot be turned any more, this is the sign for the completion of the resetting work for the safety device. o Adjustment of the safety device actuating torque: <ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the setscrew ❷ (1 position) that is located on the outer periphery of the lower shaft sprocket, and turn the release pressure adjuster pin ❸ to adjust the release torque. 3. Fix the release pressure adjuster pin ❸ by means of the setscrew ❷ (1 position). <p>(Guideline for the release pressure)</p> <p>When the direction of the slot of the release pressure adjuster pin ❸ is located near the position specified below, it corresponds to the release pressure in that case.</p> <ul style="list-style-type: none"> o 24.5N•m : First tooth crest of the sprocket o 9.8N•m : In the center between the second and third tooth roots of the sprocket o 5.9N•m : Third tooth crest of the sprocket <p>This value is set at 9.8N•m at the time of shipment from the factory.</p>	<p>When the release torque is too high:</p> <ul style="list-style-type: none"> o The hook, lower shaft gears, and such parts may be broken. <p>When the release torque is too low:</p> <ul style="list-style-type: none"> o Since the safety device is easily actuated, smooth sewing work may be disturbed.

(17) Reverse feed cylinder and condensation cylinder

Standard Adjustment

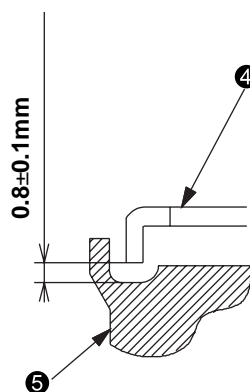
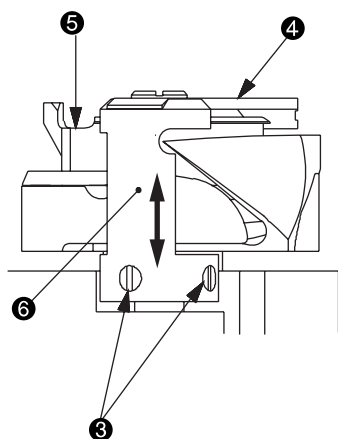
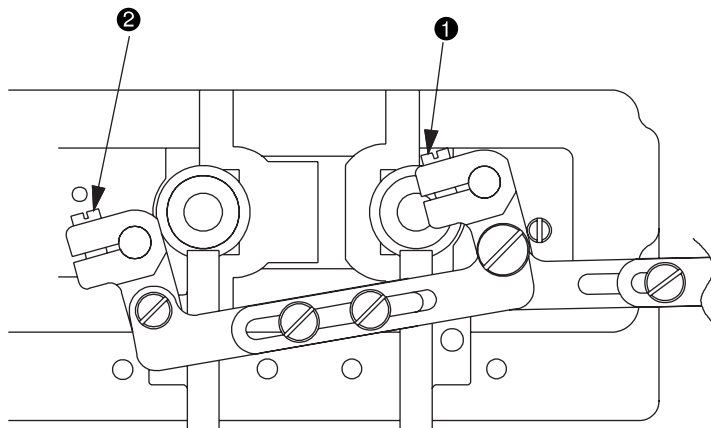


Adjustment Procedures	Results of Improper Adjustment
<ul style="list-style-type: none"> o PLC-1710-7, 1760-7 only o Reverse feed cylinder 1. Loosen the window plate setscrews ❶ (4 positions) located behind the sewing machine. Remove the window plate ❷ and the window plate gasket ❸. 2. Loosen the window plate setscrews ❹ (5 positions) and remove the window plate ❺ and the window plate gasket ❻. 3. Loosen the nut ❼. 4. Adjust the distance to 7 to 8mm between the end face of the cylinder shaft and the cylinder connecting screw ❽. 5. Tighten the nut ❼. 6. Install the window plate ❺ and the window plate gasket ❻ with the window plate setscrews ❹ (5 positions). 7. Install the window plate ❷ and the window plate gasket ❸ with the window plate setscrews ❶ (4 positions). <p>(Caution) When installing the window plate ❺ and the window plate gasket ❻ in the sewing machine, the fork section of the reverse feed link ❾ has to be entered in the stepped part of the hinge screw ❿ that is mounted on the feed adjuster rod ⓫.</p> <ul style="list-style-type: none"> o Condensation cylinder 1. Loosen the cylinder setscrews ❿ (2 positions) and remove the cylinder ⓫ from the window plate ❺. 2. Loosen the nut ⓬. 3. Adjust the distance to 6.5 to 7.5mm between the end face of the cylinder shaft ⓫ and the condense cylinder screw ⓭. 4. Tighten the nut ⓬. 5. Mount the cylinder ⓫ on the window plate ❺ by means of the setscrews ❿ (2 positions). 	<ul style="list-style-type: none"> o If it is not entered in the hinge screw ❿, reverse feed stitches may fail to be obtained. o If the distance between the cylinder ⓫ and the condense cylinder screw ⓭ deviates from the specified value, there may be a failure in thread trimming.

(18) Thread trimming device (PLC-1710-7, 1760-7)

Standard Adjustment

1) Adjusting the height of the moving knife

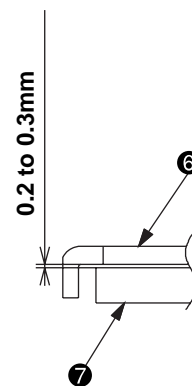
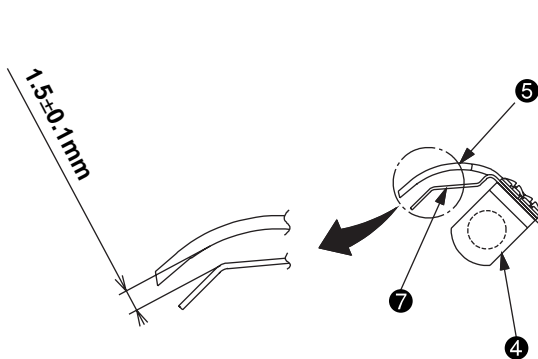
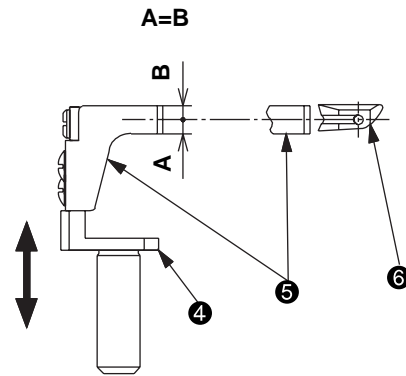
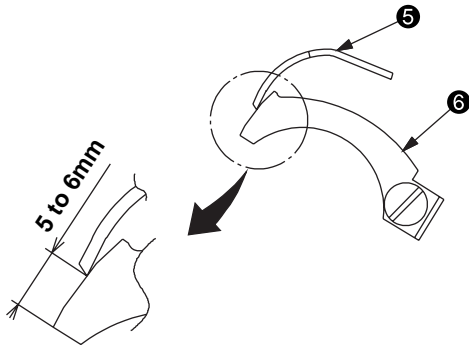
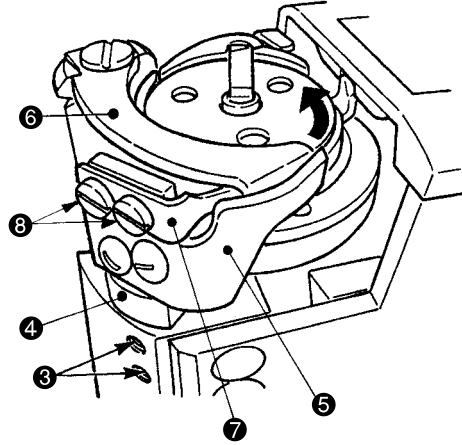
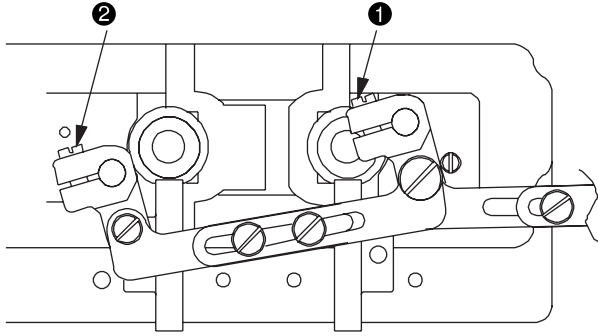


Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the rocking arm (R) tightening screw ❶ and the rocking arm (L) tightening screw ❷ (1710-7: ❶ only). 3. Raise the sewing machine. 4. Loosen the moving knife installing base setscrews ❸ (1710-7: 2 positions, 1760-7: 4 positions). 5. Move the moving knife installing base ❹ vertically so that a clearance of 0.8 ± 0.1mm can be secured between the inner hook ❺ and the bottom face of the moving knife ❻. 6. Tighten the moving knife installing base setscrews ❸ (1710-7: 2 positions, 1760-7: 4 positions). 7. Let the sewing machine fall down. 8. Tighten the rocking arm (R) tightening screw ❶ and the rocking arm (L) tightening screw ❷ (1710-7: ❶ only). In this case, refer to 3.-(18) -8), -9) Adjusting the position of the moving knife (Right), (Left). 	<p>When the clearance is too much:</p> <ul style="list-style-type: none"> o There will be a failure in clamping the needle thread or the bobbin thread at the time of thread trimming. <p>When the clearance is too less:</p> <ul style="list-style-type: none"> o The moving knife may come in contact with the bobbin.

Standard Adjustment

2) Adjusting the position of the counter knife and knife pressure

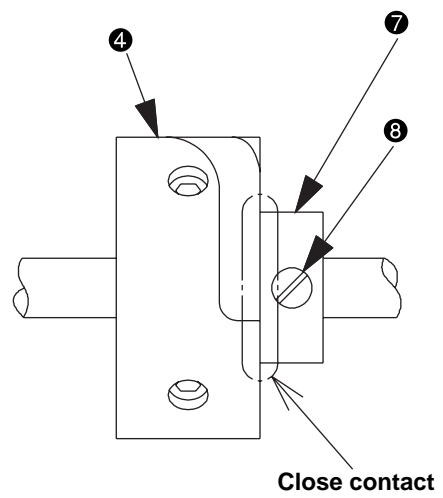
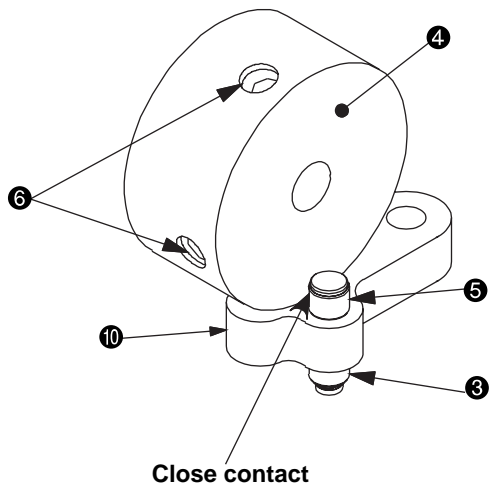
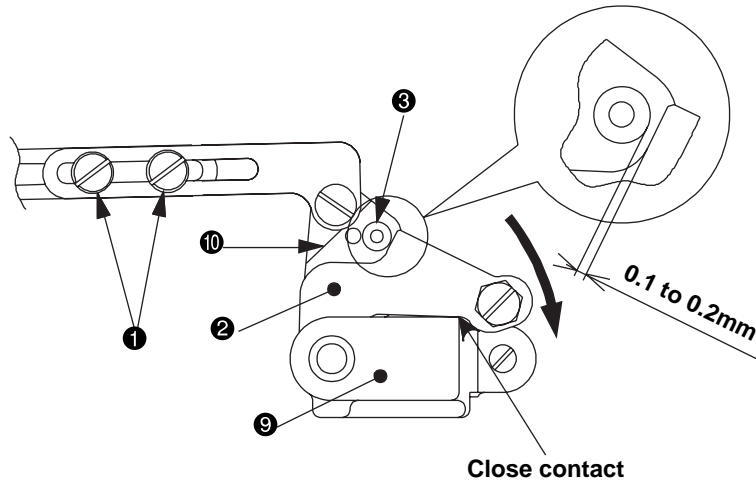
3) Adjusting the clamp spring



Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the rocking arm (R) tightening screw ❶ and the rocking arm (L) tightening screw ❷ (1710-7: ❶ only). 3. Raise the sewing machine. 4. Loosen the counter knife installing base setscrews ❶ (1710-7: 2 positions, 1760-7: 4 positions). 5. Turn the moving knife ❸ by hand and move the counter knife installing base ❹ so that the contact position between the blade tip of the counter knife ❺ and the moving knife ❸ can be maintained 5 to 6mm from the tip of the moving knife. At that time, adjust the vertical positioning of the counter knife installing base ❹ so that the blade center of the counter knife ❺ coincides with that of the moving knife ❸. 6. Tighten the counter knife installing base setscrews ❸ (1710-7: 2 positions, 1760-7: 4 positions). 7. Tighten the rocking arm (R) tightening screw ❶ and the rocking arm (L) tightening screw ❷. In this case, refer to 3.-(18) –8), -9) Adjusting the position of the moving knife (Right), (Left). 	<p>When the knife pressure is too much:</p> <ul style="list-style-type: none"> o An excessively high burden is generated around the blade sections of the counter knife ❺ and the moving knife ❸. This can result in the reduction of knife's operational life. <p>When the knife pressure is too less:</p> <ul style="list-style-type: none"> o Poor thread trimming may occur.
<p>(Caution) The knife pressure should be kept as low as possible.</p> <ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the rocking arm (R) tightening screw ❶ and the rocking arm (L) tightening screw ❷ (1710-7: ❶ only). 3. Raise the sewing machine. 4. Move the moving knife ❸ by hand in the direction of the arrow until the clamp spring ❹ can be seen. 5. Loosen the clamp spring setscrews ❸ (1710-7: 2 positions, 1760-7: 4 positions). 6. Adjust the position of the clamp spring ❹ so that a clearance of $1.5 \pm 0.1\text{mm}$ can be secured between the counter knife ❺ and the clamp spring ❹. At that time, adjustments should be carried out so that a clearance of 0.2 to 0.3mm can be secured between the bottom face of the moving knife ❸ and the top face of the clamp spring ❹. 7. Tighten the clamp spring setscrews ❸ (1710-7: 2 positions, 1760-7: 4 positions). 8. Tighten the rocking arm (R) tightening screw ❶ and the rocking arm (L) tightening screw ❷ (1710-7: ❶ only). In this case, refer to 3.-(18) –8), -9) Adjusting the position of the moving knife (Right), (Left). 	<p>When the clearance is too much:</p> <ul style="list-style-type: none"> o Since it is difficult to clamp the trimmed bobbin thread after the completion of thread trimming work, stitch skipping may be caused at the beginning of sewing. <p>When the clearance is too less:</p> <ul style="list-style-type: none"> o Since the clamping force is too strong for the trimmed bobbin thread after the completion of thread trimming work, stitch skipping may be caused at the beginning of sewing. o When the moving knife ❸ interferes with the clamp spring ❹, this clamp spring ❹ may be broken.

Standard Adjustment

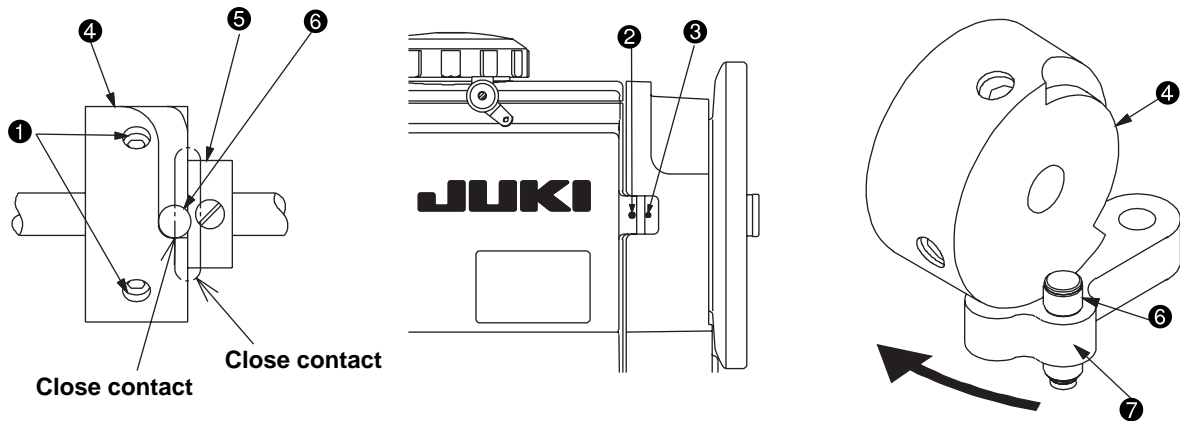
4) Adjust the thread trimming cam position



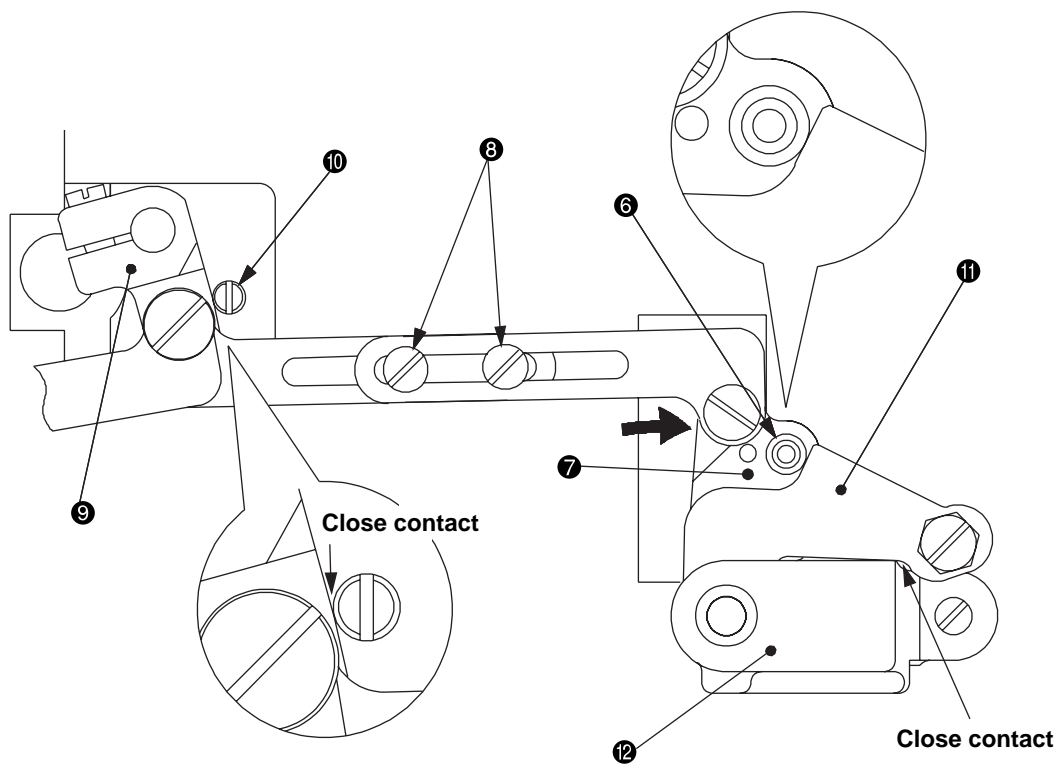
Adjustment Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the connecting plate setscrews ❶ (2 positions) of the thread trimming driving joint plate. 3. In the state that the thread trimmer driving plate ❷ is pressed in the direction of the arrow to keep contact with the vertical fitting basis ❸, move the thread trimmer roller arm ❹ so that a clearance of 0.1 to 0.2mm can be secured between the thread trimmer driving plate ❷ and the cam roller ❺. 4. While the state of 3. above is kept as it is, loosen the thread trimmer cam setscrews ❻ (2 positions). Keep a close contact between the end face of the thread trimmer cam ❼ and the cam roller ❺, and temporarily tighten the thread trimmer cam setscrews ❻ (2 positions). (These setscrews are temporarily tightened because timing adjustments are needed for the thread trimmer cam ❼ afterwards.) 5. Loosen the safety device disc setscrews ❽ (2 positions). Let the safety device disc ❼ keep a close contact with the thread trimmer cam ❼ and firmly tighten the safety device disc setscrews ❽ (2 positions). 6. In the state that the thread trimmer roller arm ❹ is pressed in the direction of the arrow and that the vertical fitting basis ❸, the thread trimmer driving plate ❷, and the cam roller ❺ are keeping contact with each other, tighten the thread trimmer driving joint plate setscrews ❶ (2 positions). In this case, refer to 3.-(18) –6) Connection of the rocking arm and the thread trimmer roller arm. 	<p>When no clearance is secured between the cam roller and the driving plate:</p> <ul style="list-style-type: none"> o The thread trimmer cam ❼ interferes with the cam roller ❺ and this can be a cause of breakage or machine lock. <p>When a large clearance is secured between the cam roller and the driving plate:</p> <ul style="list-style-type: none"> o The cam roller ❺ enters the thread trimmer cam ❼ during machine operation and this can be a cause of machine lock.

Standard Adjustment

5) Timing adjustment for the thread trimming cam



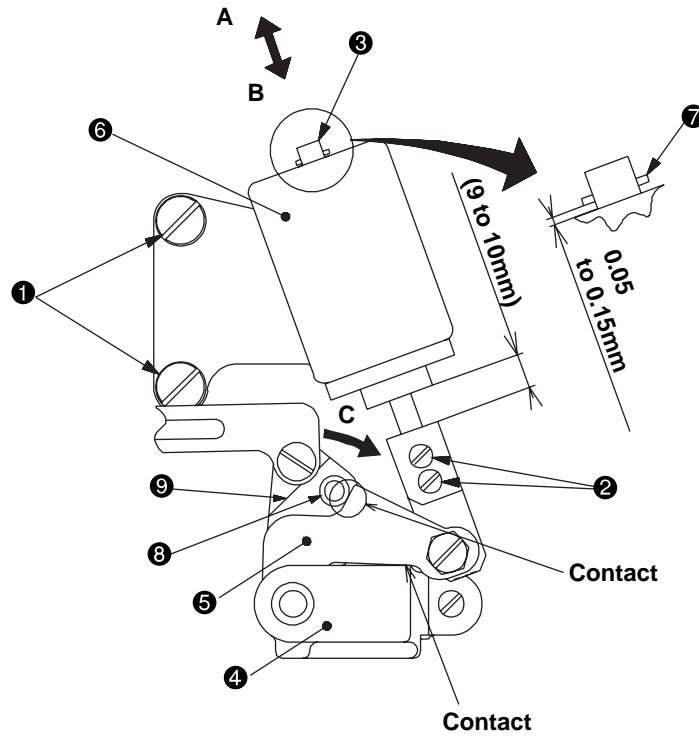
6) Connection of the rocking arm and the thread trimmer roller arm



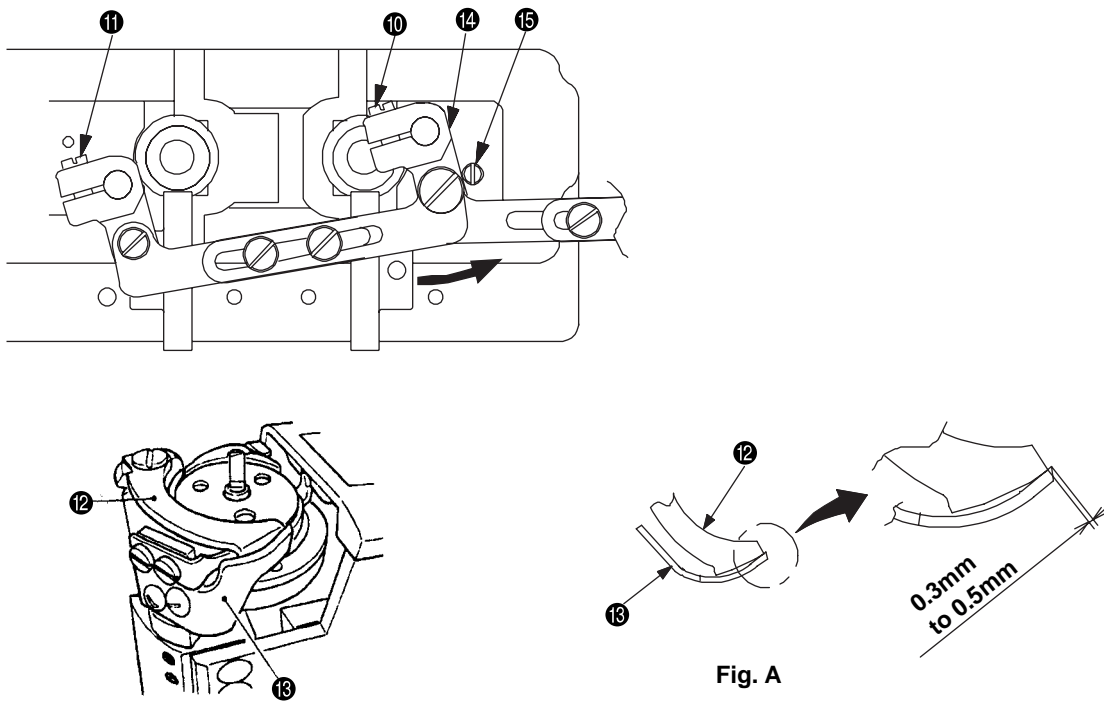
Adjustment Procedures	Results of Improper Adjustment
<p>5) Timing adjustment for the thread trimming cam</p> <ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the thread trimmer cam setscrews ❶ (2 positions) that have been temporarily tightened during the positional adjustment of the thread trimmer cam ❷. 3. Turn the hand wheel to secure a coincidence between the engraved marker point ❸ of the arm and the red engraved marker point ❹ of the hand wheel. 4. In the state that the thread trimmer cam ❷ and the safety device disc ❺ are keeping a close contact with each other, turn the thread trimmer cam ❷ by hand until the thread trimmer cam roller ❻ comes to contact the R section at the beginning of the cam groove in the thread trimmer cam ❷. 5. Firmly tighten the thread trimmer cam setscrews ❶ (2 positions). 6. Raise the sewing machine. <p>(Caution) Confirm that the end face of the thread trimmer cam ❷ and that of the safety device disc ❺ are keeping a close contact with each other.</p> <p>6) Connection of the rocking arm and the thread trimmer roller arm</p> <ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the connecting plate setscrews ❸ (2 positions) of the thread trimming driving joint plate. 3. Keep the close contact with the rocking arm ❹ and the thread trimming stopper ❺. 4. Push the thread trimmer roller arm ❻ in the direction of the arrow and let it contact with the thread trimmer cam roller ❼, the thread trimmer driving plate ❽, and the vertical fitting basis ❾. 5. Tighten the connecting plate setscrews ❸ of the thread trimming driving joint plate. 6. Raise the sewing machine. 	<p>When the timing for thread trimming is too slow:</p> <ul style="list-style-type: none"> o Operation of thread trimming is not finished even at the upper stop position. This can be a cause of thread trimming deficiency. <p>When the timing for thread trimming is too fast:</p> <ul style="list-style-type: none"> o It can be a cause of thread trimming deficiency. o The remaining length of the needle thread becomes short. In this case, the needle thread may come off the needle after thread trimming or at the beginning of sewing. o This can be a cause of stitch skipping at the beginning of sewing.

Standard Adjustment

7) Thread trimming solenoid

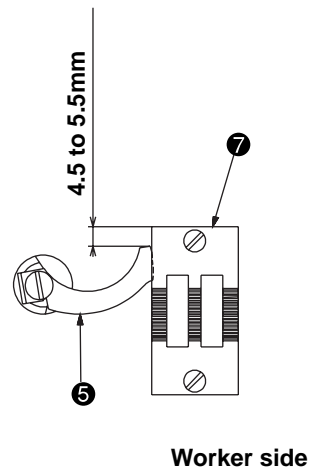
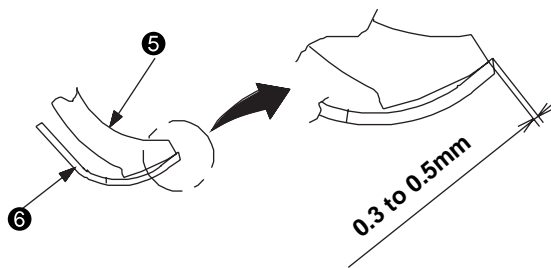
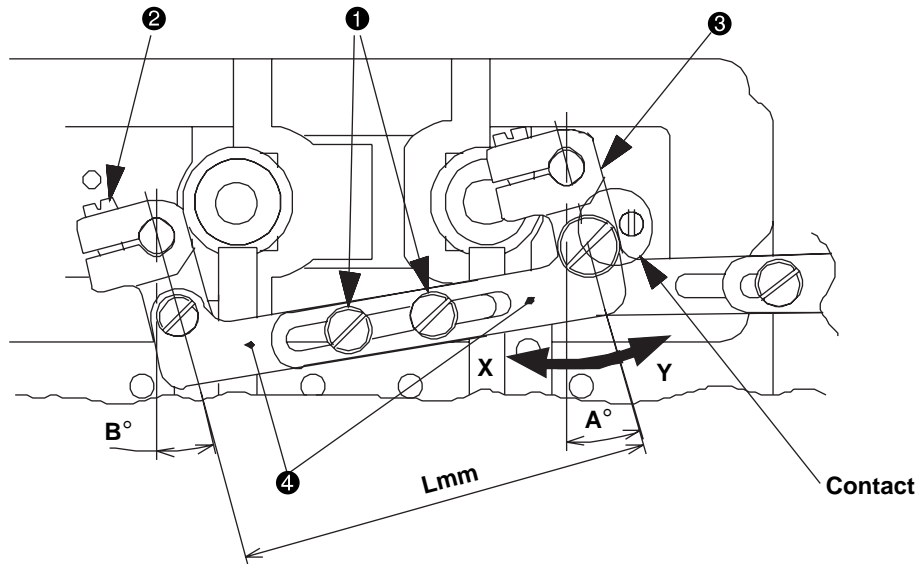


8) Adjusting the position of the moving knife (Right) (PLC-1710-7, 1760-7)



Standard Adjustment

9) Adjusting the position of the moving knife (Left) (PLC-1760-7 only)

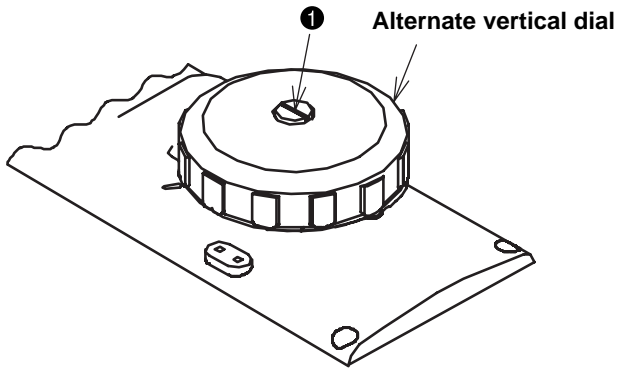


Adjustment Procedures	Results of Improper Adjustment
<p>(Caution) Prior to adjustments, refer to 3.-(18) –8), Adjusting the position of the moving knife (R) and confirm that the position of the moving knife (R) has been adjusted correctly.</p> <ol style="list-style-type: none"> 1. Let the sewing machine fall down. 2. Loosen the rocking arm (left) tightening screw ② (1 position). 3. Loosen the setscrews ① (2 positions) of the thread trimmer driving joint plate. 4. Raise the sewing machine. 5. Move the moving knife ⑤ by hand and adjust it to the position where the tip of the moving knife ⑤ is withdrawn by 0.3 to 0.5mm from the blade tip of the counter knife ⑥. 6. Let the sewing machine fall down. 7. Adjust the center-to-center distance (Lmm) between the right and left thread trimmer driving joint plate ④ so that the gradient (A°) of the rocking arm (R) ③ when it is pushed in the direction of [Y] becomes identical with that (B°) of the rocking arm (L). When this condition is assumed, tighten the setscrews ① (2 positions) of the thread trimmer driving joint plate. 8. Tighten the rocking arm (L) tightening screw ② (1 position) while the rocking arm (R) ③ is pushed in the direction of [Y]. 9. Turn the hand wheel by hand to move the moving knife ⑤ to its front most position while the rocking arm (R) ③ is pushed in the direction of [X]. 10. Confirm that the distance has attained 4.5 to 5.5mm between the tip of the moving knife ⑤ and the end face of the throat plate ⑦. If this distance has not attained 4.5 to 5.5mm, make adjustments in the procedures specified below. <ul style="list-style-type: none"> o When the distance is greater than 4.5 to 5.5mm: <ol style="list-style-type: none"> 1) Loosen the rocking arm (left) tightening screw ② (1 position). 2) Loosen the setscrews ① (2 positions) of the thread trimmer driving joint plate. 3) Shorten the center-to-center distance (Lmm) between two thread trimmer driving joint plates ④. 4) Refer to 5. 5) Refer to 9. 6) Refer to 10. o When the distance is shorter than 4.5 to 5.5mm: <ol style="list-style-type: none"> 1) Loosen the rocking arm (left) tightening screw ② (1 position). 2) Loosen the connecting plate setscrews ① (2 positions) of the thread trimmer driving joint plate. 3) Lengthen the center-to-center distance (Lmm) between two thread trimmer driving joint plates ④. 4) Refer to 5. 5) Refer to 9. 6) Refer to 10. 11. Raise the sewing machine. 	

(19) Alternate vertical dial (PLC-1710-7, 1760-7)

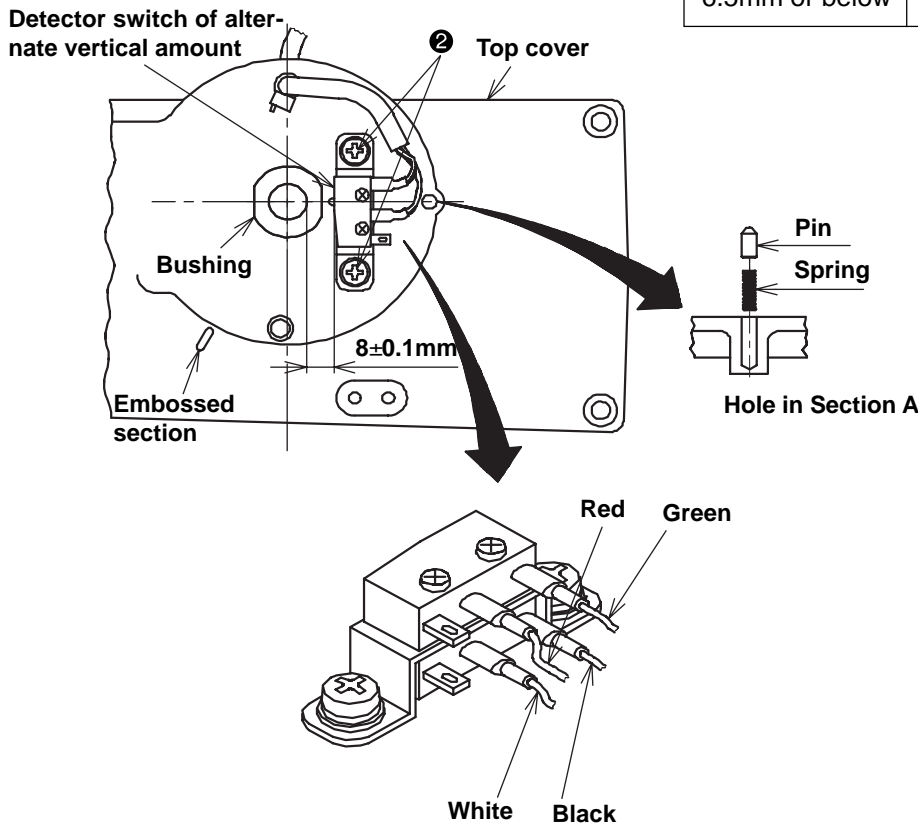
Standard Adjustment

1) Mounting position of the alternate vertical amount detector switch



Sewing speed

Alternate vertical amount	Stitches: 6mm or below	Stitches: Over 6mm and 9mm or below
~ 2.5mm or below	2500rpm	1800rpm
Over 2.5mm and 4mm or below	2200rpm	1800rpm
Over 4mm and 4.75mm or below	1800rpm	1800rpm
Over 4.75mm and 6.5mm or below	1600rpm	1600rpm



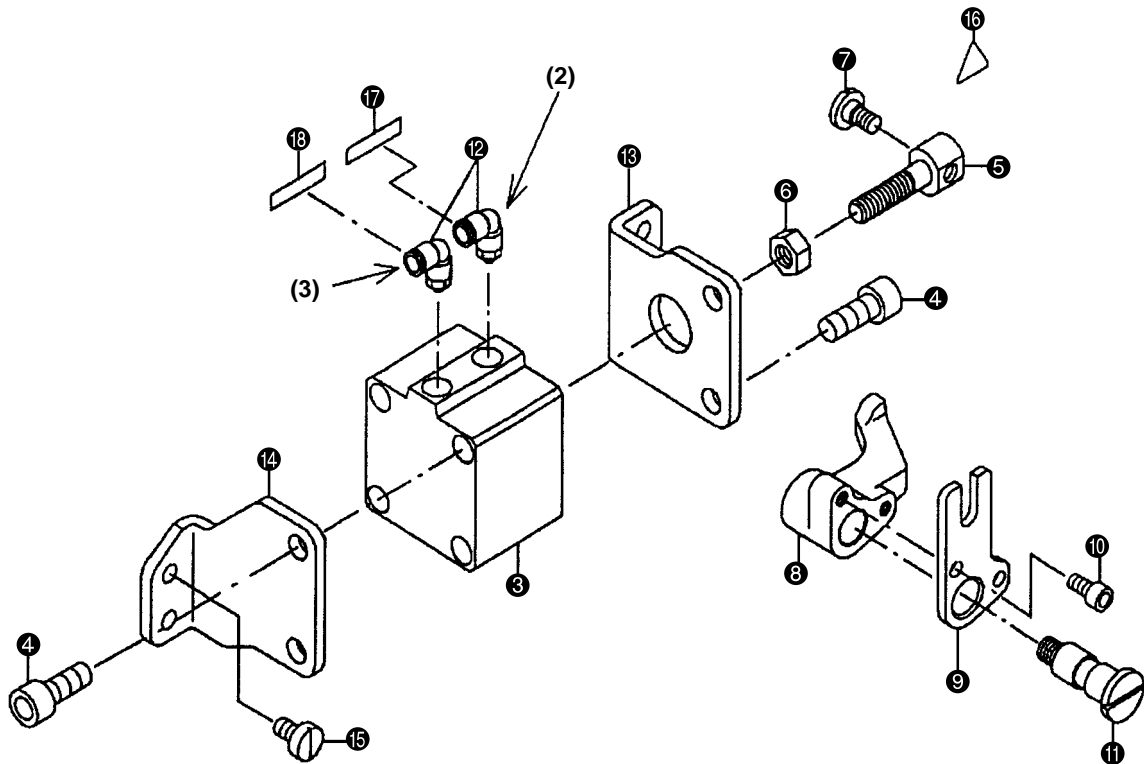
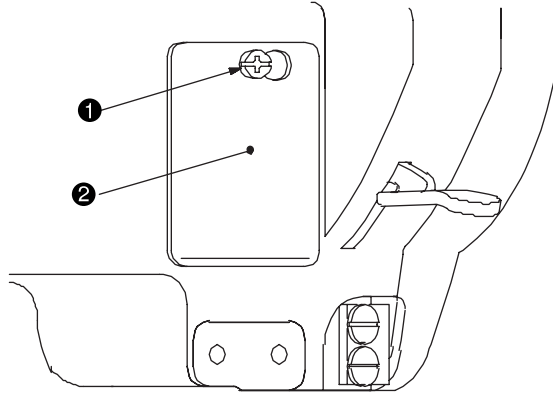
Graduations of the alternate vertical dial	Switch (Top) (Red & Green lines)	Switch (Bottom) (White & Black lines)
1 to 2.5	OFF	OFF
2.625 to 4	OFF	ON
4.125 to 4.75	ON	ON
4.875 to 6.5	ON	OFF

Adjustment Procedures	Results of Improper Adjustment
<p>o PLC-1710-7, 1760-7</p> <ol style="list-style-type: none"> 1. Turn the alternate vertical dial to adjust the graduations [1] to the marking (embossed section) of the top cover. 2. Loosen the alternate vertical dial setscrew ❶ (1 position) and remove the alternate vertical dial. Be careful in this case that there is a set of pin and spring inserted in the hole of Section A. 3. Loosen the mounting screws ❷ (2 positions) of the alternate vertical amount detector switch and then tighten these alternate vertical amount detector switch mounting screws ❷ (2 position) after the distance has been adjusted to $8 \pm 0.1\text{mm}$ between the bush inner diameter and the end face of the switch main body. 4. Let the graduations [1] of the alternate vertical dial coincide with the embossed section of the top cover and mount this alternate vertical dial after inserting the set of pin and spring has been inserted in the hole of Section A. Since then, tighten the alternate vertical dial setscrew ❶. <p>(Caution)</p> <ol style="list-style-type: none"> 1. If the position of the alternate vertical amount detector switch has been changed, confirm whether the correct relationship is secured between the alternate vertical dial and the number of revolutions. 2. The PLC-1760L is provided with the alternate vertical dial. However, no alternate vertical amount detector switch is mounted. 	<p>o There may be no changes in the sewing speed even though the alternate vertical dial is turned.</p>

4. Mounting the optional parts

(1) Auto-presser lifting

1) Assembling the automatic presser lifting device



(Caution) Confirm that the motor power supply is turned off.

1. Loosen the side cover setscrew ❶ (1 position) and remove the side cover ❷.
2. Install the elbow on the Auto-presser lifting cylinder ❸.
3. Stick the wire marks ❶⑰ and ❶⑱ to the elbow ❶⑲.
(Elbow ❶⑲ [2] is positioned on the face side and Elbow ❶⑲ [3] on the hand wheel side.)
4. Mount the hinge screw ❶⑳ on the cylinder connecting screw ❶㉑.
At that time, Lock Tight 243 shall be applied after the degreasing of the threaded section of the hinge screw.
5. Install the cylinder connecting screw ❶㉑ and the nut ❶㉒ on the Auto-presser lifting cylinder ❸
(Guideline) Tighten the nut after the distance has been adjusted to 24mm between the piston rod end face of the Auto-presser lifting cylinder ❸ and the end face of the cylinder connecting screw ❶㉑.
6. Tighten the cylinder stay (front) ❶㉓ and cylinder stay (rear) ❶㉔ on the Auto-presser lifting cylinder ❸ with the setscrews ❶㉕ (each 2 positions).
7. Mount the Auto-presser lifting cylinder ❸, which has been assembled as per 6. above, on the arm by means of the setscrews ❶㉖ (4 positions).
8. Assemble the Auto-presser lifting lever B ❶㉗ in the Auto-presser lifting lever A ❶㉘.
(Insert the Auto-presser lifting lever shaft ❶㉙ and tighten it with the hexagon head bolts ❶㉚ (2 positions).)
9. Mount the Auto-presser lifting lever A ❶㉘, which has been assembled as per 8. above, on the arm by means of the Auto-presser lifting lever shaft ❶㉙.
When the Auto-presser lifting lever A ❶㉘ is mounted on the arm, the hinge screw ❶⑳ is required to settle in the groove of the Auto-presser lifting lever B ❶㉗.
Apply grease to the hinge section of the Auto-presser lifting lever shaft ❶㉙ and apply Lock Tight 243 to the threaded section after the degreasing.

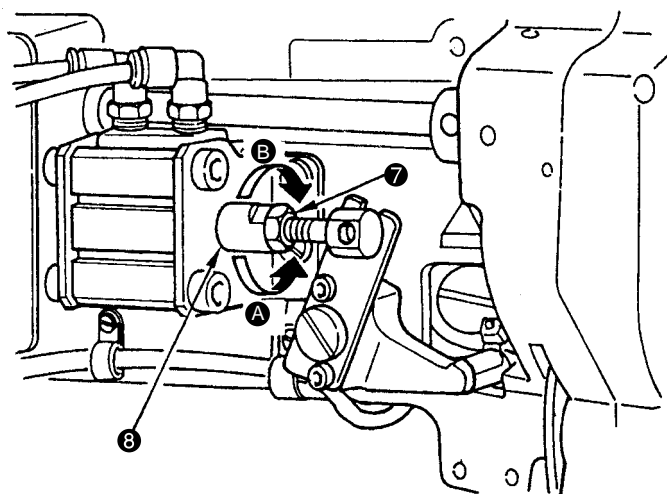
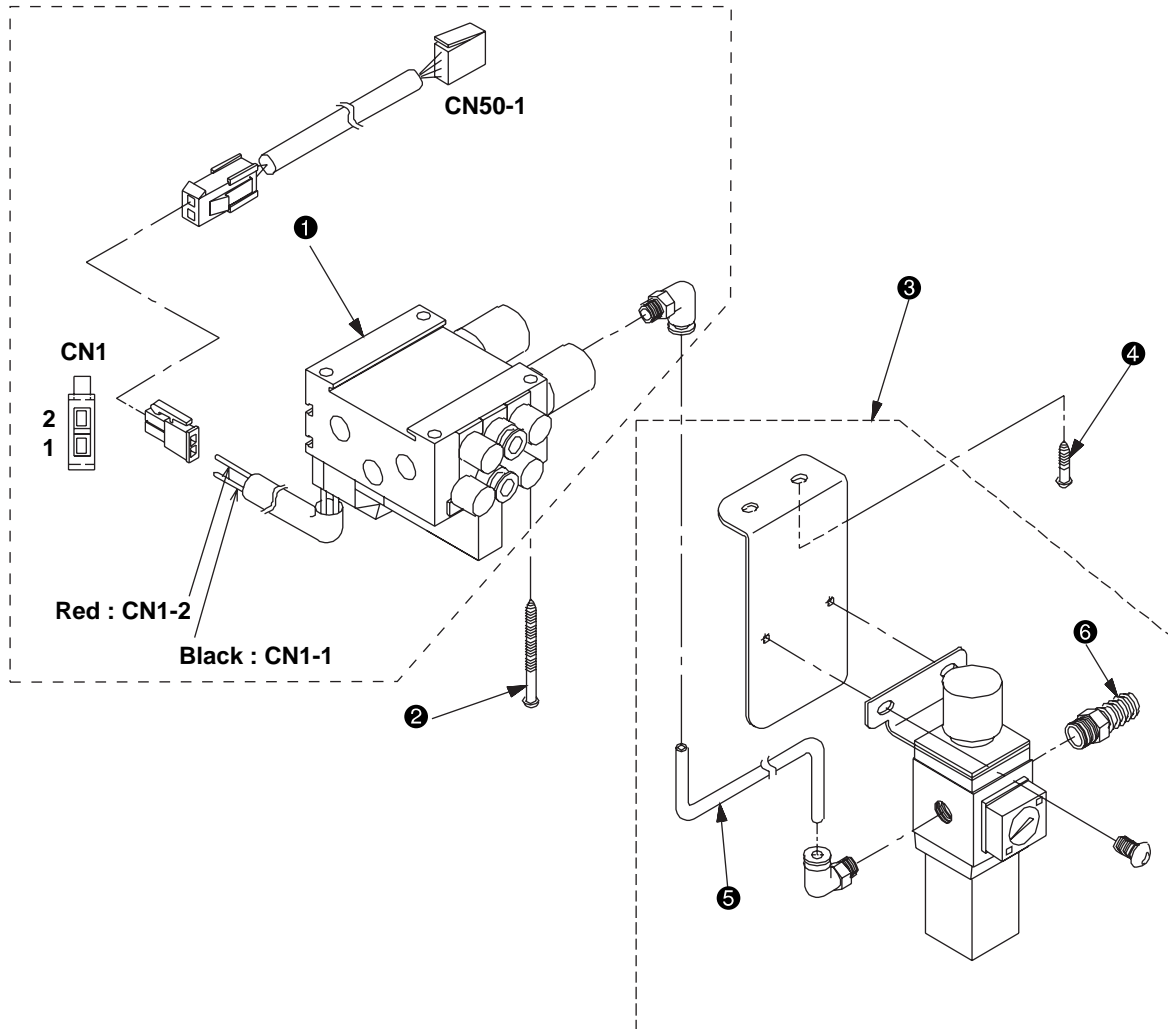
Automatic presser lifter device: Deletion parts list

No.	Part No.	Names of part	Q'ty
❶	SS4110815SP	Side cover setscrew	1
❷	21331806	Side cover	1

Automatic presser lifter device: Additional parts list (List A)

No.	Part No.	Names of part	Q'ty
❸	PA400150100	Auto-presser lifting cylinder	1
❶⑳	SM6082002SP	Setscrew	4
❶㉑	21356506	Cylinder connecting screw	1
❶㉒	NM6080001SE	Nut	1
❶⑳	SD0720331SP	Hinge screw	1
❶㉘	21388509	Auto-presser lifting lever A	1
❶㉗	21356803	Auto-presser lifting lever B	1
❶㉚	SM6051002TP	Hexagon socket head cap screw	2
❶㉙	21356704	Presser auto-lifting lever shaft	1
❶⑲	PJ304065102	Elbow	2
❶㉓	21356308	Cylinder stay (front)	1
❶㉔	21356407	Cylinder stay (rear)	1
❶㉕	SS6151040SP	Setscrew	4
❶㉖	CM300200001	Finger injury caution seal	1
❶⑰	HX00295000A	Wire mark (2)	1
❶⑱	HX00295000B	Wire mark (3)	1

2) Assembly of the air device



1. Install the air device (P) (Assy) ❶ on the table with the wood screw ❷.
2. Install the filter regulator (Assy) ❸ on the table with wood screw ❹.
3. Insert the connector (CN50-1) of the air device (P) (Assy) ❶ in the (CN50-1) block of the motor panel. (Motor: For SC-510)
4. Connect the air device (P) (Assy) ❶ and the filter regulator (Assy) ❸ through an air hose ❺.
5. Connect the air device (P) (Assy) ❶ and the auto-presser lifting cylinder through an air hose. At that time, the elbow with the same number shall be connected to the joint.

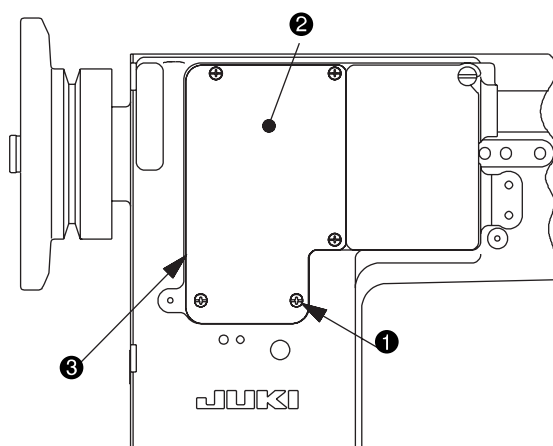
Automatic reverse feed device: Additional parts list (List B)

No.	Part No.	Names of part	Q'ty
❶	40038906	Air device (P) (Assy)	1
❷	SK3415001SE	Wood screw	4
❸	40038722	Filter regulator (Assy)	1
❹	SK3482501SE	Wood screw	2

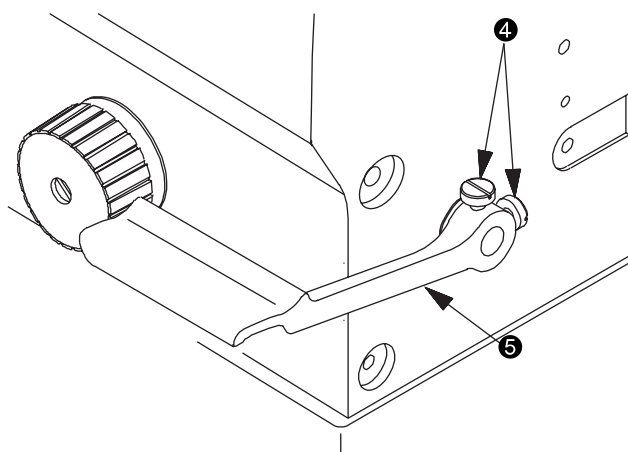
6. Check the function of the auto-presser lifting device.
 - 1) Turn the motor power supply ON.
 - 2) Connect the air supply pipe to the air joint ❻.
 - 3) Actuate the auto-presser lifting device to lift the presser foot and confirm whether a clearance of $16 \pm 0.5\text{mm}$ is secured between the bottom face of the presser foot and the top face of the throat plate. For more details, refer to 3.-(8)-2) using a knee lifter.
 - 4) If any adjustment is required, loosen the nut ❼ and the cylinder shaft ❸.
 - o Turned in the direction Ⓐ Increase in the lifting amount of the presser foot
 - o Turned in the direction Ⓑ decrease in the lifting amount of the presser foot
 - 5) After adjustments, tighten the nut ❼.
7. When the presser foot is lowered, confirm whether a clearance of 0.5 to 1.5mm is secured between the auto-presser lifting lever A and the thread tension releasing plate. For more details, refer to 3.-(8)-3) Automatic presser lifting.

(2) Automatic reverse feed device

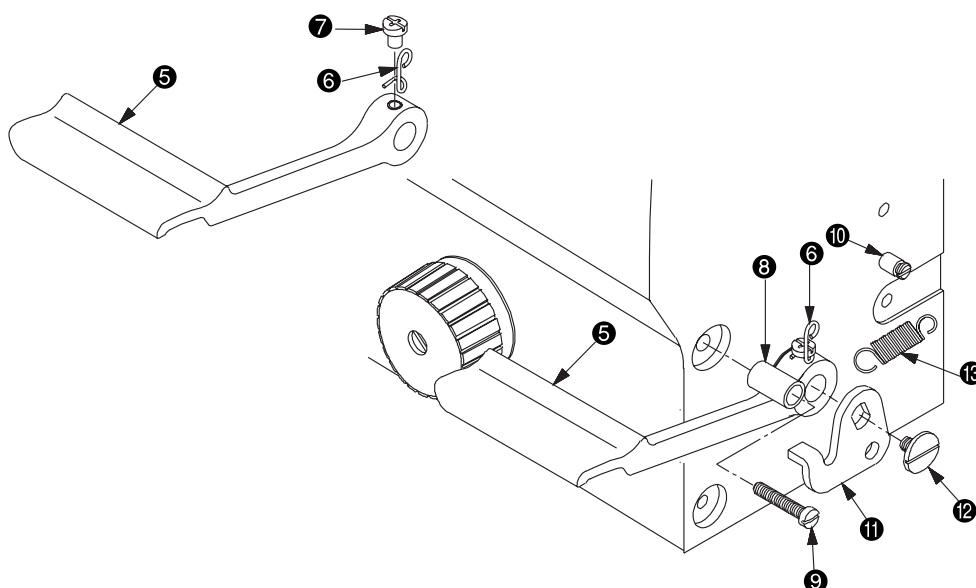
1) Removing the window plate



2) Removing the reverse feed lever (PLC-1710, 1760)



3) Installing the reverse feed lever (PLC-1710, 1760)



(Caution) 1. The auto-reverse feed device can be mounted only on the sewing machine that is equipped with the auto-presser lifting device.

2. Prior to the work, confirm that the motor power supply has been turned OFF.

3. This work should be carried out in the state that the air pressure in the regulator is zero.

1) Removing the window plate

1. Remove the window plate B setscrews ❶ (5 positions), which are located in the arm opposite the worker side.
2. Remove the window plate B ❷ and the window plate gasket B ❸.

2) Removing the reverse feed lever (PLC-1710, 1760)

1. For the PLC-1710 and 1760, loosen each setscrew of the belt cover to remove the belt cover. Then, loosen the reverse feed lever setscrews ❹ (2 positions) to remove the reverse feed lever ❺.

Automatic reverse feed device: Deletion parts list

No.	Part No.	Names of part	Q'ty
❷	21331806	Window plate B	1
❹	SS6120930SP	Reverse feed lever setscrew	2

3) Installing the reverse feed lever (PLC-1710, 1760)

1. Mount the lever spring hanger ❻ on the removed reverse feed lever ❺, using the setscrew ❼ (1 position).
2. Install the reverse feed lever stopper ❸ on the arm with the setscrew ❾ (1 position).
3. Mount the lever return spring hanger ❿ on the arm.
4. The lever spring hanger ❻ has been mounted on the reverse feed lever ❺ as per 1. above. Insert this lever in the reverse feed lever shaft and mount the reverse feed shaft link ⓫ by means of a setscrew ⓬ (1 position).

(This mounting work shall be done so that the embossed section of the reverse feed shaft link ⓫ can enter the bottom side of the reverse feed lever ❺.)

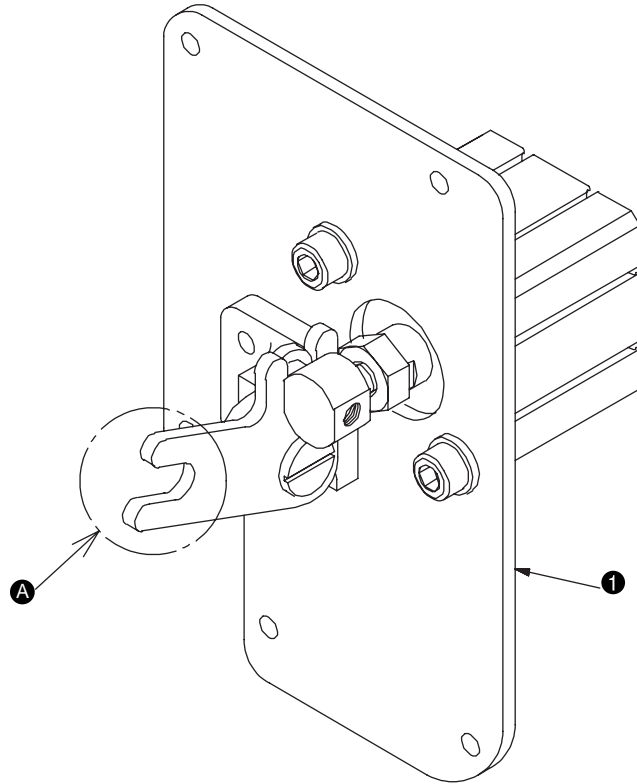
5. Hook the lever return spring ⓭ on the lever spring hanger ❻ and the lever return spring hanger ❿.
6. Adjust the position of the reverse feed lever ❺.

For more details, refer to 3.-(15) Position of reverse feed lever.

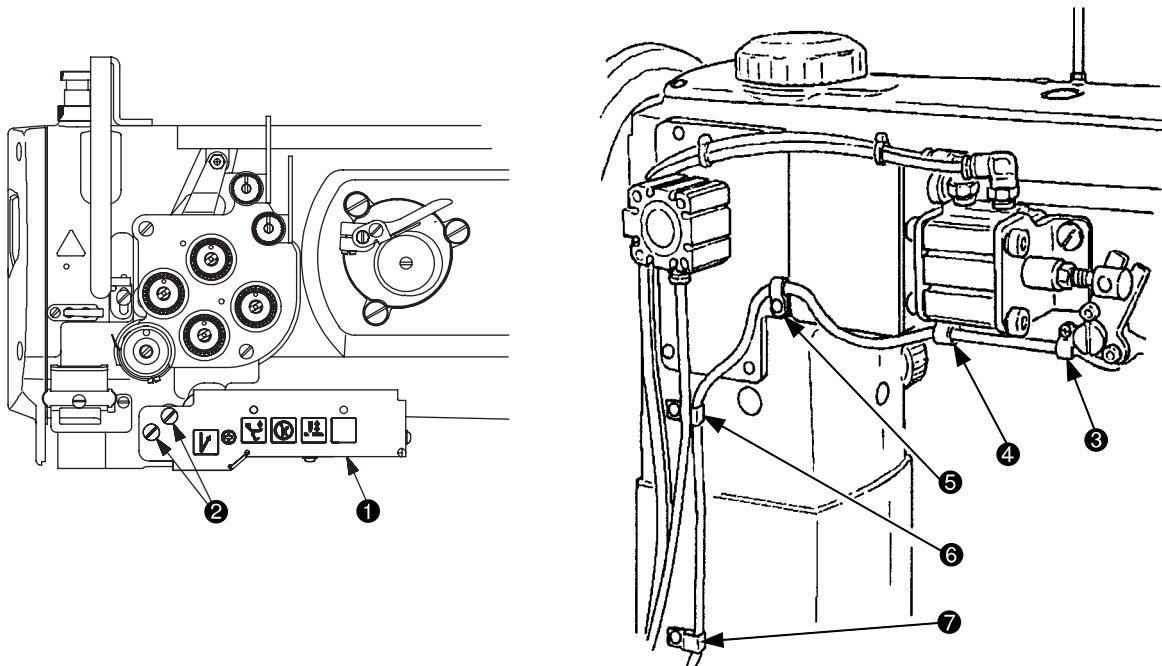
Automatic reverse feed device: Additional parts list (List C)

No.	Part No.	Names of part	Q'ty
❻	22656003	Lever spring hanger	1
❼	SS4120615SP	Setscrew	1
❸	22952501	Reverse feed lever stopper	1
❾	SS7111810SP	Setscrew	1
❿	10120004	Lever return spring hanger	1
⓫	22656102	Reverse feed shaft link	1
⓬	SS7120760SP	Pushing screw	1
⓭	13515606	Lever return spring	1

4) Installing the automatic reverse feed device



5) 5-gang switch mounting



4) Installing the automatic reverse feed device

1. Install the automatic reverse feed device together with the window plate gasket B from which the window plate (Assy) ❶ has been removed, using the window plate setscrews (5 positions).

At the time of installation, Section A of the window plate (Assy) ❶ shall be entered in the hinge screw of the feed adjusting rod that is located in the arm.

For more details, refer to 3.-(17) Reverse feed cylinder and condensation cylinder.

Automatic reverse feed device: Additional parts list (List D)

No.	Part No.	Names of part	Q'ty
❶	40040660	Window plate (Assy)	1
	40043357	Window plate H	(1)
	PA320150200	Reverse feed cylinder	(1)
	SM6061602TP	Setscrew	(2)
	WP0641601SD	Washer	(2)
	21348602	Cylinder connecting screw	(1)
	NM6060003SC	Nut	(1)
	21348503	Reverse feed link mounting base	(1)
	SS7151210SP	Setscrew	(2)
	21348701	Reverse feed link	(1)
	SD0800352SP	Hinge screw	(2)
	PJ301065104	Straight joint	(1)
	PX015101000	Muffler	(1)
	21349105	Cylinder gasket	(1)
	HX002950000	Wire mark (1)	(1)

5) 5-gang switch mounting

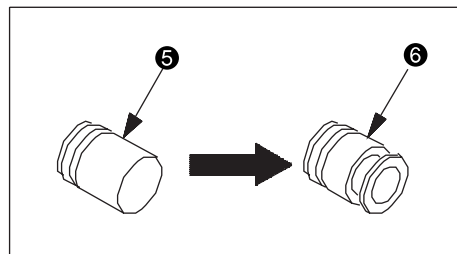
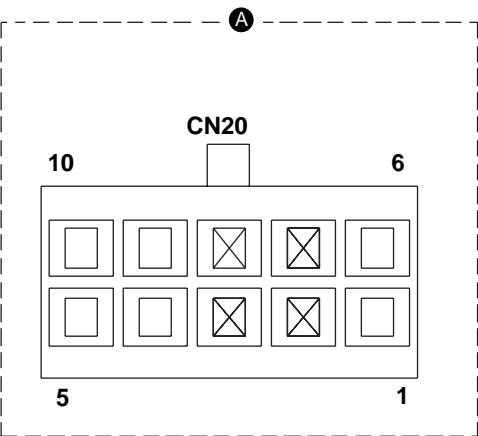
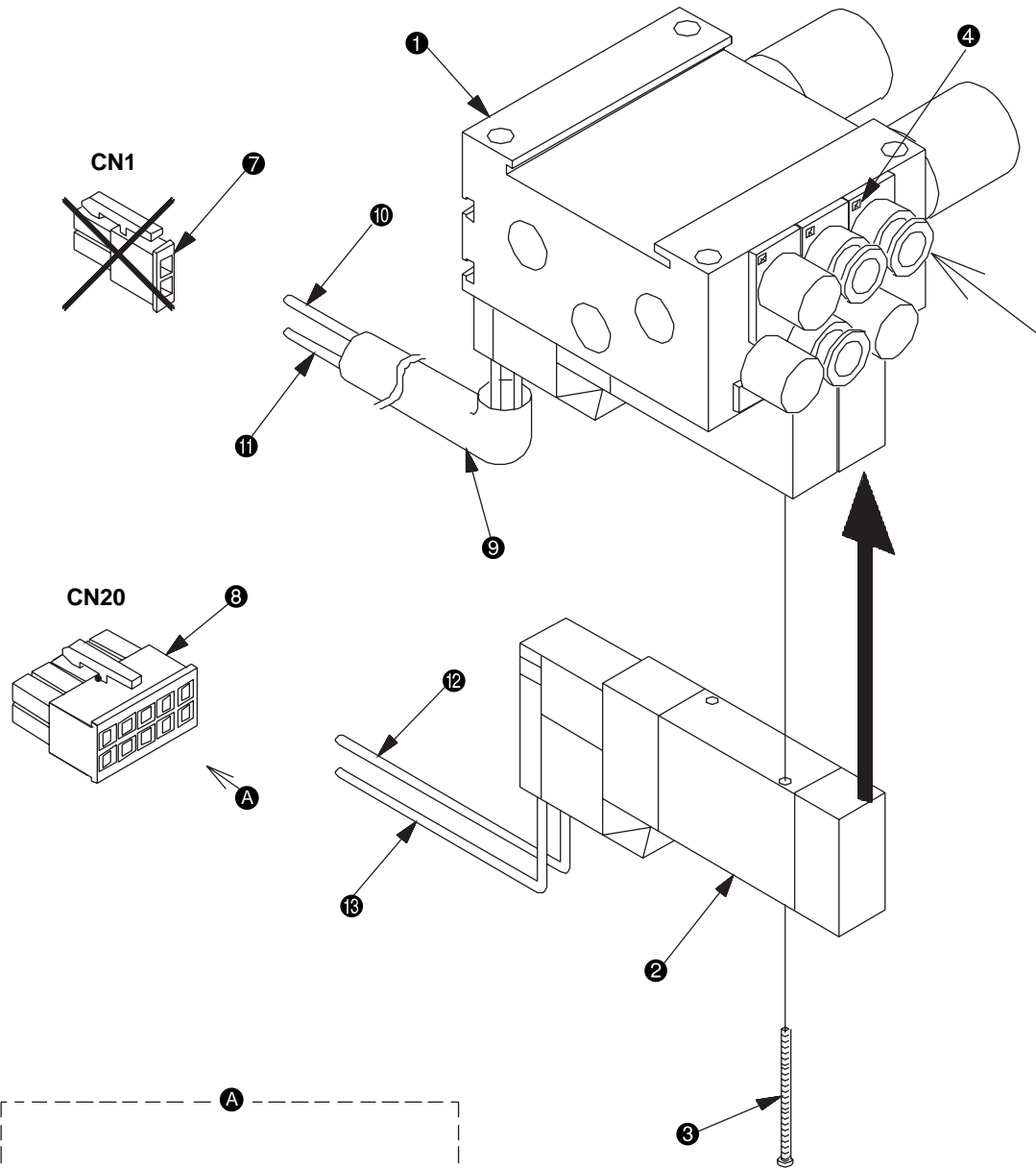
1. Mount the 5-gang switch (Assy) ❶ on the arm by means of the setscrews ❷ (2 positions).

2. The cord of the 5-gang switch (Assy) ❶ shall be fixed to the rear side of the arm by means of the cable clips and setscrews (fixing positions: ❸ to ❺) as well as cord stopper fittings and setscrews (fixing positions: ❻ and ❼)

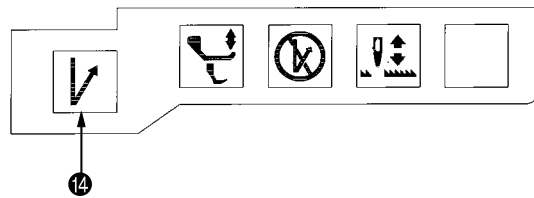
Automatic reverse feed device: Additional parts list (List E)

No.	Part No.	Names of part	Q'ty	Remarks
❶	40024849	5-gang switch (Assy)	1	
❷	SS7110840SP	Setscrew	2	
	HX00123000A	Cable clip	3	Fixing positions: ❸ to ❺
	SS4110815SP	Setscrew	3	Setscrews for ❸ to ❺
	D2112555B00	Cord stopper fittings	2	Fixing positions: ❻ and ❼
	SS6111140SP	Setscrews for cord stopper fittings	2	Setscrews for ❻ and ❼

6) Installation of the air-related devices



5-gang switch



1. Using the setscrews ③ (2 positions), mount the solenoid valve (Assy) ② on the solenoid valve (P) (Assy) ① that is presently used.
In this case, a cover is mounted on the solenoid valve (P) (Assy) ① by means of the setscrews (2 positions). Therefore, these setscrews (2 positions) and the cover must be removed first of all.
2. Loosen the setscrews ④ (2 positions) and mount the replaced stop plug ⑤ on the one-touch joint ⑥.
3. Disconnect the connector (CN1) ⑦ from the solenoid valve (P) (Assy) ①.
4. Insert the cords ⑩ to ⑬, which are extended from the solenoid valve (P) (Assy) ① and the solenoid valve (Assy) ②, in the connector (CN20) ⑧.
(The cord of the solenoid valve (P) (Assy) ① shall be passed through the tube ⑨, and then inserted in the connector (CN20) ⑧.)

Solenoid valve already attached	Cord ⑩: (Red) → CN20-7	(Solenoid valve (P) (Assy) ①)
	Cord ⑪: (Black) → CN20-2	
Solenoid valve newly attached	Cord ⑬: (Red) → CN20-8	(Solenoid valve (Assy) ②)
	Cord ⑫: (Black) → CN20-3	

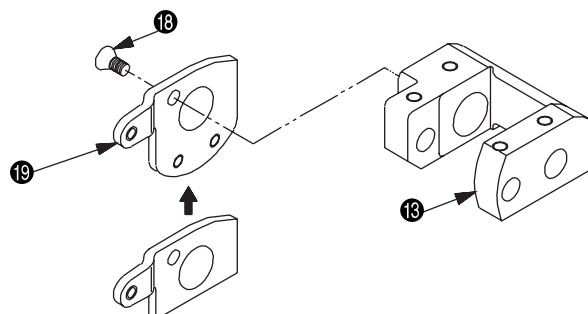
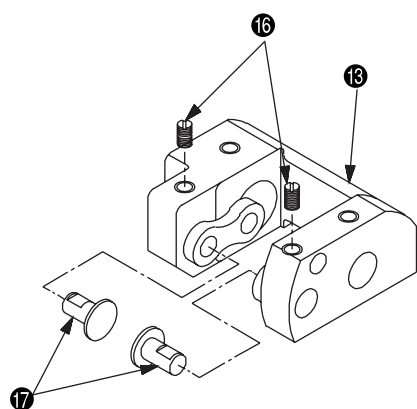
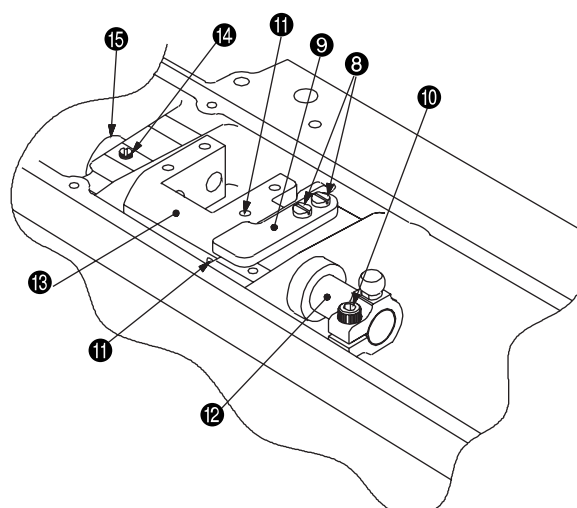
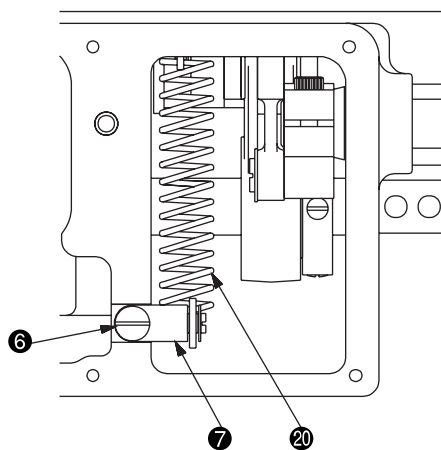
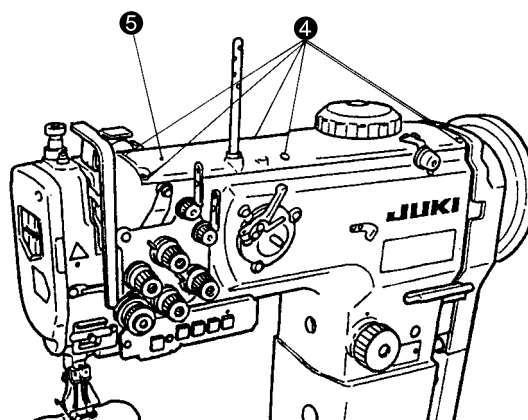
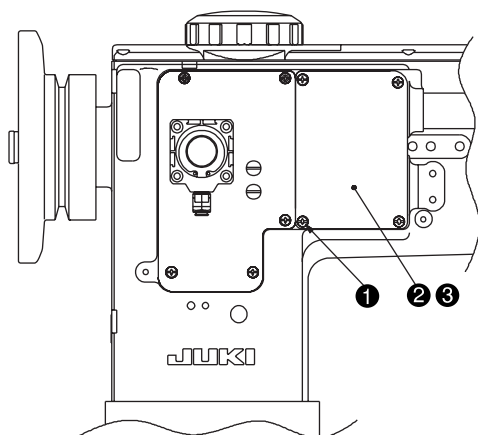
5. Using the relay cords, make connections among SC-510 (inside the front cover), the 5-gang switch, and the solenoid valve (P) (Assy).
6. For the one-touch joint ⑥ mounted as per 2. above and the straight joint of the reverse feed cylinder, connect them through the air hose (Assy) (for BT).
7. Check the function of the automatic reverse feed device.
 - 1) Connect the pipe of the air supply source and turn the motor power supply ON.
 - 2) Press the leftmost switch ⑭ of the 5-gang switch and confirm that the automatic reverse feed device is actuated.

Automatic reverse feed device: Additional parts list (List F)

No.	Part No.	Names of part	Q'ty	Remarks
①	40040419	Solenoid valve (P) (Assy)	1	
⑧	HK034610100	Connector	1	CN20 connector
	40024864	Relay cord	1	
	40040671	Air hose (Assy) (for BT)	1	

(3) DL device (PLC-1760L only)

1) Installing the DL device



(Caution) 1. The DL device can be mounted only on the PLC-1760L where the auto-presser lifting device and the automatic reverse feed device are installed.

2. Prior to the work, confirm that the motor power supply has been turned OFF.

3. This work should be carried out in the state that the air pressure in the regulator is zero.

1. Loosen the window plate E setscrews ❶ (4 positions) located behind the sewing machine. Remove the window plate E ❷ and the window plate gasket E ❸.

(Remember that the window plate gasket E ❸ and the window plate E setscrew ❶ will be used again.)

2. Loosen the top cover setscrews ❹ (6 positions) and remove the top cover ❺.

3. Loosen the alternate vertical shaft spring setscrew ❻ (1 position) and remove the alternate vertical shaft spring hanger ❼.

4. Loosen the top feed stopper plate setscrews ❸ (2 positions) and remove the top feed stopper plate ❾.

5. Loosen the alternate vertical amount changer arm tightening screw ❿ (1 position).

6. Loosen the alternate vertical amount changer shaft setscrews ⓫ (2 positions) and move the alternate vertical amount changer shaft ⓬ toward the hand wheel. (Move it until it comes off the alternate vertical amount changer ⓭.)

7. Loosen the support shaft setscrew ⓮ (1 position) and move the support shaft ⓯ toward the face section. (Move it until it comes off the alternate vertical amount changer ⓭.)

8. Loosen the setscrews ⓰ (2 positions) to remove the connector link support pins ⓱ (2 positions) and take out the alternate vertical amount changer ⓮.

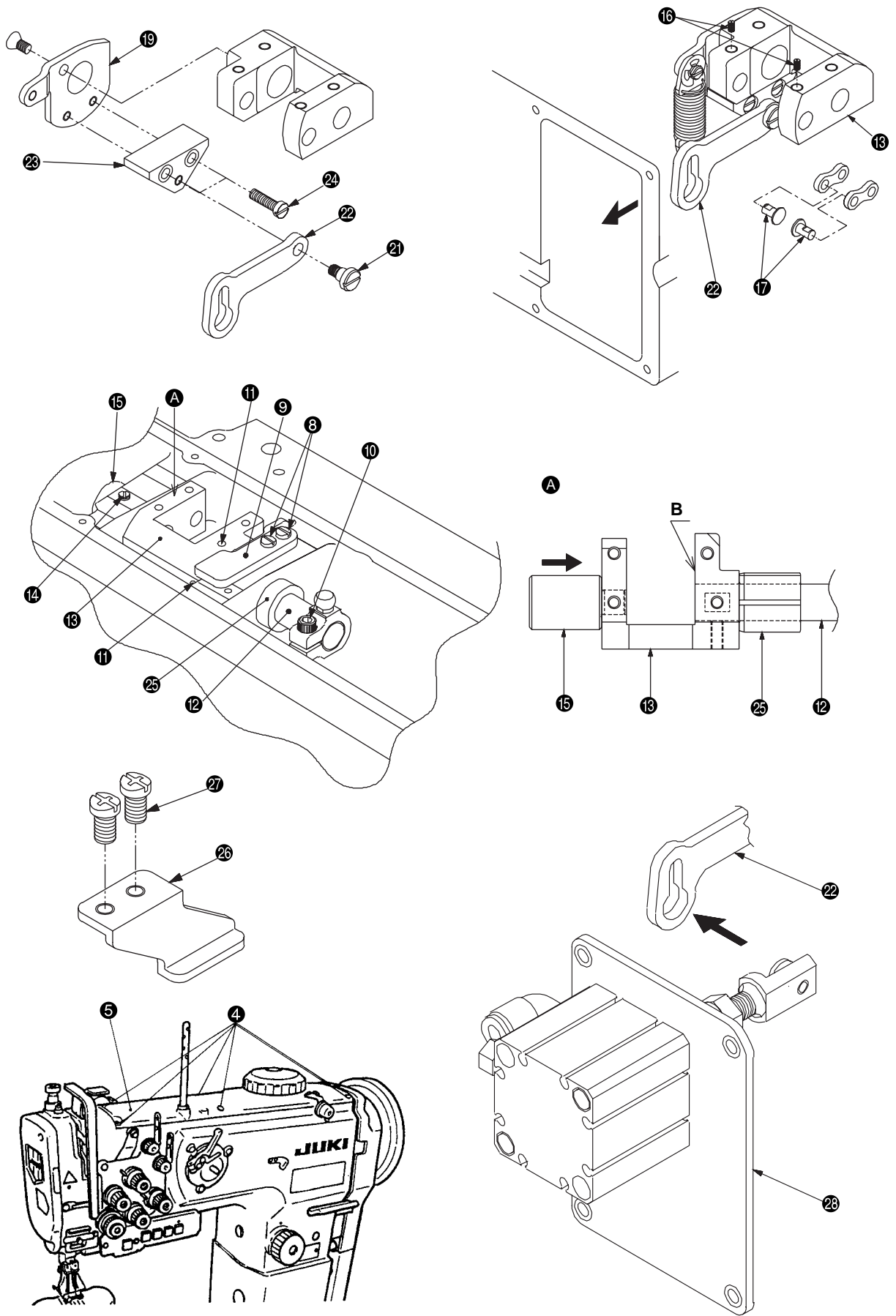
9. Loosen the stopper plate setscrew ⓲ (1 position) and replace it with a new stopper plate B ⓳.

At that time, the alternate vertical shaft spring ⓴ shall be removed and mounted on the new stopper plate B ⓳.



Continued to the next page

1) Installing the DL device



10. Using the alternate vertical link hinge screw ②①, mount the alternate vertical link ②② on the alternate vertical link spacer ②③.
At that time, Lock Tight 243 shall be applied after the degreasing of the threaded section of the alternate vertical link hinge screw ②①.
11. Mount the alternate vertical link spacer ②③, on which the alternate vertical link ②② has been mounted as per 10. above, on the newly mounted stopper plate B ①⑨ by means of the setscrews ②④ (2 positions).
12. In the reverse procedures for the disassembly work described in 8. on the previous page, mount the alternate vertical amount changer ①⑩ on the sewing machine.
When the alternate vertical link pins ①⑦ (2 positions) are fixed with the setscrews ①⑥ (2 positions), note that these setscrews ①⑥ are arranged to come in contact with the flat section of the alternate vertical link pins ①⑦. In addition, it must be noted that the oblong hole section of the alternate vertical link ②② is made to face the direction of the window plate mounting face.
13. Insert the alternate vertical amount changer shaft ①② in the alternate vertical amount changer ①⑩ so that its flat section is made to face upwards, and then fix it with the setscrews ①① (2 positions: either one keeping in touch with the flat section).
At that time, make sure not to protrude the alternate vertical amount changer shaft ①② from Face B of the alternate vertical amount changer ①⑩.
14. Insert the support shaft ①⑤ in the alternate vertical amount changer ①⑩ and remove a backlash by pressing the alternate vertical amount changer ①⑩ lightly against the metal ②⑤.
15. In the state of 14. above, tighten the setscrew ①④ (1 position).
At that time, apply Lock Tight 243 to the setscrew ①④ after the degreasing.
16. Mount the top feed stopper plate ①⑨ of the kit by means of the setscrews ①⑧ (2 positions).
17. Tighten the changer arm tightening screw ①⑩ (1 position).
For more details, refer to the item in regard to the 3.-(10)-1) Alternate vertical amount.
18. Mount the alternate vertical link support ②⑥ of the kit on the arm by means of the setscrews ②⑦ (2 positions). (A rubber plug is attached to the mounting section. Therefore, remove this rubber plug in advance.)
19. Install the top cover ①⑤ with the top cover screws ①④ (6 positions).
20. Using the window plate E setscrews ①① (4 positions), mount the window plate F (Assy) ②③ of the kit and the window plate gasket E ①③ on the arm.
In this case, the alternate vertical link hinge screw ②① shall be entered in the oblong hole section of the alternate vertical link ②②.
Apply grease to the hinge section of the alternate vertical link hinge screw ②①.
(If the alternate vertical dial is adjusted to the maximum value in advance, the workability is improved because the alternate vertical link ②② is protruded to the outside.)

DL device: Additional parts list (List G)

No.	Part No.	Names of part	Q'ty
①⑨	21438106	Upper feed stopper plate	1
①⑨	21438205	Stopper plate B	1
②①	SD0600454TP	Alternate vertical link hinge screw	1
②②	21438502	Alternate vertical link	1
②③	21438601	Alternate vertical link spacer	1
②④	SS6111610SP	Setscrew	2
②⑥	21438700	Alternate vertical link support	1
②⑦	SS4110815SP	Setscrew	2

DL device: Additional parts list (List H)

No.	Part No.	Names of part	Q'ty
②③	40040663	Window plate F (Assy)	1
	PA320200100	Jig cylinder	(1)
	PJ304065102	Elbow	(1)
	PX015101000	Muffler	(1)
	21438403	Cylinder connecting screw	(1)
	SD0600403TP	Hinge screw attaching to cylinder connecting screw	(1)
	NM6080721SE	Cylinder connecting screw nut	(1)
	21437207	Window plate F	(1)
	SM6044002TP	Jig cylinder setscrew	(2)
	HX00295000C	Wire mark (4)	(1)

1. A cover and setscrews (2 positions) are mounted on the mounting face of the solenoid valve (P) (Assy) ②.
2. Mount the solenoid valve (Assy) ② of the kit by means of the setscrews ③ (2 positions).
3. Loosen the setscrews ④ (2 positions). Replace the stop plug ⑤ and mount it on the one-touch joint ⑥.
4. Disconnect the connector (CN20) ⑦ from the cords of the 5-gang switch.
5. Insert the cords ⑧ and ⑨ of the solenoid valve (Assy) ② in the connector (CN20) ⑦.

This work should be carried out after confirming the inserting position.

(The cords of the solenoid valve (Assy) ② shall be passed through the tubes ⑩ and then inserted in the connector (CN20) ⑦.)

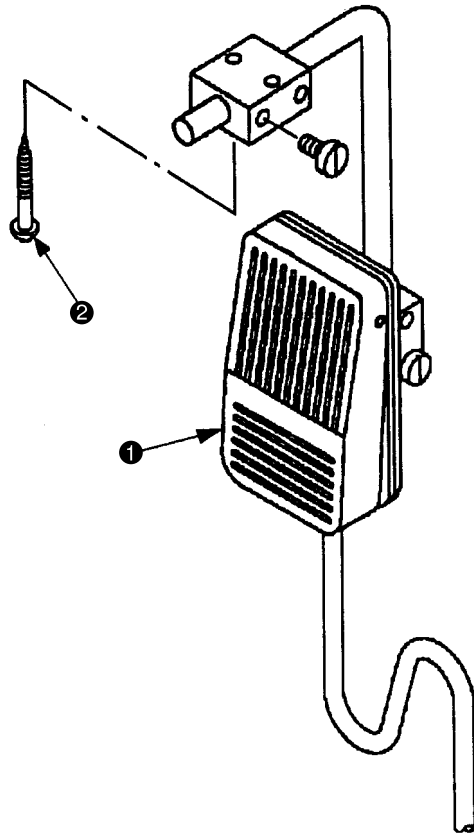
Solenoid valve (Assy) ② newly attached	Cord ⑧: (Red) → CN20-6
	Cord ⑨: (Black) → CN20-1
Solenoid valve (BT) already mounted	Cord ⑪: (Red) → CN20-8
	Cord ⑫: (Black) → CN20-3
Solenoid valve (AK) already mounted	Cord ⑬: (Red) → CN20-7
	Cord ⑭: (Black) → CN20-2

6. Connect the connector (CN20) ⑦ with the cords of the 5-gang switch.
7. Connect the one-touch joint ⑥, which has been mounted as per 3. above, to the DL device elbow through an air hose.
8. Check the function of the DL device.
 - 1) Connect the pipe of the air supply source and turn the motor power supply ON.
 - 2) Press the second-from-left switch ⑮ of the 5-gang switch and confirm that the DL device is actuated.

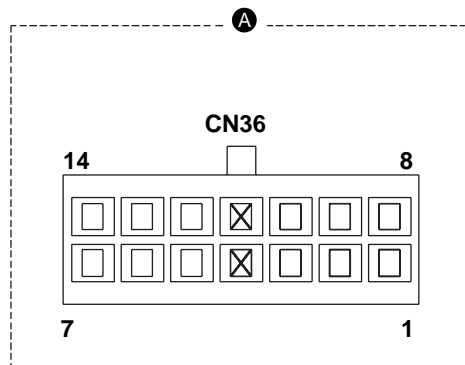
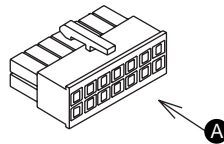
DL device: Additional parts list (List J)

No.	Part No.	Names of part	Q'ty
②	40040420	Solenoid valve (Assy)	1
	40040672	Air hose (Assy) (for DL)	1

3) Knee switch mounting



CN36



1. Mount the knee switch (Assy) ❶ on the bottom face of the table by means of the wood screws ❷ (2 pcs.).
2. Insert the cords of the knee switch (Assy) ❶ in the relay cord connector (CN36: 14 pins connector, white).
(Cord (white) → Insert to Pin No. [4], Cord (black) → Insert to Pin No. [11])
3. Set up the motor (SC-510).

For more details, refer to the SC-510 Instruction Manual, [Method of Functional Setup].

- (1) Pressing the [+] button that is located on the motor panel, turn the power supply ON.
- (2) Press [↓] and adjust the Setup No. to 24.
- (3) Press the [+] or [-] button and make setting at [2] or [3].
 - In the case of Setting [2], the DL is turned ON with the switch turned ON and the DL is turned OFF with the switch turned OFF.
 - In the case of Setting [3], the DL is turned ON with the switch turned ON and the DL is turned OFF with the switch turned OFF and again turned ON.
- (4) Press the [↓] button once in order to preserve the setting data.
- (5) Turn the power supply OFF.
- (6) Turn the power supply ON and press the knee switch Assy ❶ to check the operation.

DL device: Additional parts list (List K)

No.	Part No.	Names of part	Q'ty
❶	40025036	Knee switch (Assy)	1
❷	SK3514000SC	Wood screw	2

(4) List of optional parts

AK kit (AK-136)

Kit Item No.: 40040414 (Contents: List A + B)

No.	Part No.	Names of part	Q'ty
1	PA400150100	Auto-presser lifting cylinder	1
2	SM6082002SP	Setscrew	4
3	21356506	Cylinder connecting screw	1
4	NM6080001SE	Nut	1
5	SD0720331SP	Hinge screw	1
6	21388509	Auto-presser lifting lever A	1
7	21356803	Auto-presser lifting lever B	1
8	SM6051002TP	Hexagon socket head cap screw	2
9	21356704	Auto-presser lifting lever shaft	1
10	PJ304065102	Elbow	2
11	21356308	Cylinder stay (front)	1
12	21356407	Cylinder stay (rear)	1
13	SS6151040SP	Setscrew	4
14	CM300200001	Finger injury caution seal	1
15	HX00295000A	Wire mark (2)	1
16	HX00295000B	Wire mark (3)	1
17	40038906	Air device (P) (Assy)	1
18	SK3415001SE	Wood screw	4
19	40038722	Filter regulator (Assy)	1
20	SK3482501SE	Wood screw	2

BT kit (for PLC-1710, 1760)

Kit Item No.: 40040415 (Contents: List C + D + E + F)

No.	Part No.	Names of part	Q'ty
1	22656003	Lever spring hanger	1
2	SS4120615SP	Setscrew	1
3	22952501	Reverse feed lever stopper	1
4	SS7111810SP	Setscrew	1
5	10120004	Lever return spring hanger	1
6	22656102	Reverse feed shaft link	1
7	SS7120760SP	Pushing screw	1
8	13515606	Lever return spring	1
9	40040660	Window plate (Assy)	1
	40043357	Window plate H	(1)
	PA320150200	Reverse feed cylinder	(1)
	SM6061602TP	Setscrew	(2)
	WP0641601SD	Washer	(2)
	21348602	Cylinder connecting screw	(1)
	NM6060003SC	Nut	(1)
	21348503	Reverse feed link installing base	(1)
	SS7151210SP	Setscrew	(2)
	21348701	Reverse feed link	(1)
	SD0800352SP	Hinge screw	(2)
	PJ301065104	Straight joint	(1)
	PX015101000	Muffler	(1)
	21349105	Cylinder gasket	(1)
	HX002950000	Wire mark (1)	(1)
10	40024849	5-gang switch (Assy)	1
11	SS7110840SP	Setscrew	2
12	HX00123000A	Cable clip	3
13	SS4110815SP	Setscrew	3
14	D2112555B00	Cord stopper fittings	2
15	SS6111140SP	Setscrews for cord stopper fittings	2
16	40040419	Solenoid valve (P) (Assy)	1
17	HK034610100	Connector	1
18	40024864	Relay cord	1
19	40040671	Air hose (Assy) (for BT)	1

BT kit (for PLC-1760L)

Kit Item No.: 40040469 (Contents: List D + E + F)

No.	Part No.	Names of part	Q'ty
1	40040660	Window plate (Assy)	1
	40043357	Window plate H	(1)
	PA320150200	Reverse feed cylinder	(1)
	SM6061602TP	Setscrew	(2)
	WP0641601SD	Washer	(2)
	21348602	Cylinder connecting screw	(1)
	NM6060003SC	Nut	(1)
	21348503	Reverse feed link installing base	(1)
	SS7151210SP	Setscrew	(2)
	21348701	Reverse feed link	(1)
	SD0800352SP	Hinge screw	(2)
	PJ301065104	Straight joint	(1)
	PX015101000	Muffler	(1)
	21349105	Cylinder gasket	(1)
	HX002950000	Wire mark (1)	(1)
2	40024849	5-gang switch (Assy)	1
3	SS7110840SP	Setscrew	2
4	HX00123000A	Cable clip	3
5	SS4110815SP	Setscrew	3
6	D2112555B00	Cord stopper fittings	2
7	SS6111140SP	Setscrews for cord stopper fittings	2
8	40040419	Solenoid valve (P) (Assy)	1
9	HK034610100	Connector	1
10	40024864	Relay cord	1
11	40040671	Air hose (Assy) (for BT)	1

DLT kit (DL-23)

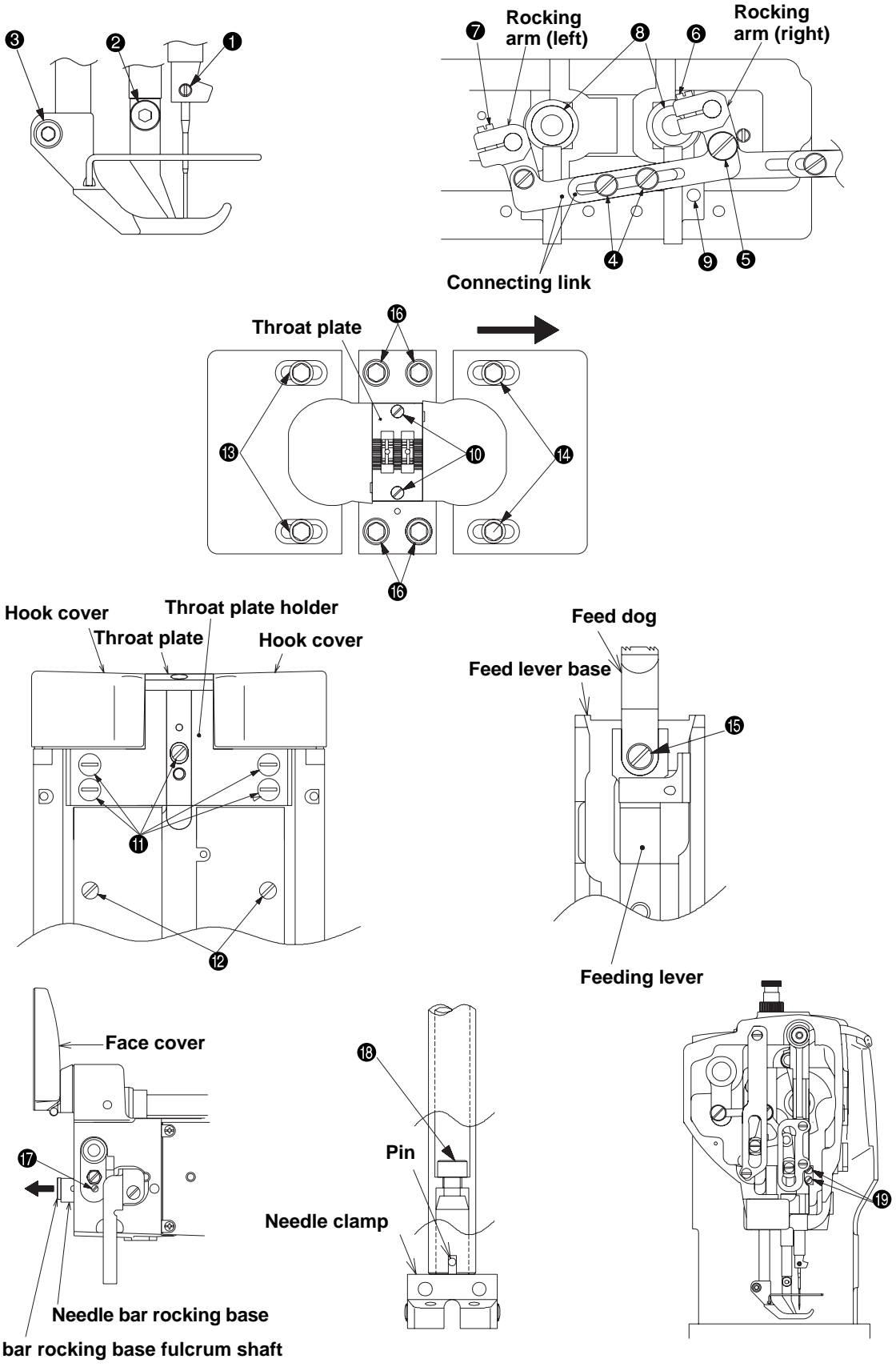
Kit Item No.: 40040416 (Contents: List G + H + J + K)

No.	Part No.	Names of part	Q'ty
1	21438106	Upper feed stopper plate	1
2	21438205	Stopper plate B	1
3	SD0600454TP	Alternate vertical link hinge screw	1
4	21438502	Alternate vertical link	1
5	21438601	Alternate vertical link spacer	1
6	SS6111610SP	Setscrew	2
7	21438700	Alternate vertical link support	1
8	SS4110815SP	Setscrew	2
9	40040663	Window plate F (Assy)	1
	PA320200100	Jig cylinder	(1)
	PJ304065102	Elbow	(1)
	PX015101000	Muffler	(1)
	21438403	Cylinder connecting screw	(1)
	SD0600403TP	Hinge screw attaching to cylinder connecting screw	(1)
	NM6080721SE	Cylinder connecting screw nut	(1)
	21437207	Window plate F	(1)
	SM6044002TP	Jig cylinder setscrew	(2)
	HX00295000C	Wire mark (4)	(1)
10	40040420	Solenoid valve (Assy)	1
11	40040672	Air hose (Assy) (for DL)	1
12	40025036	Knee switch (Assy)	1
13	SK3514000SC	Wood screw	2

* The DL kit applicable to the PLC-1760L only

5. Gauge replacement for the 2-needle sewing machine

Standard Adjustment



Adjustment Procedures

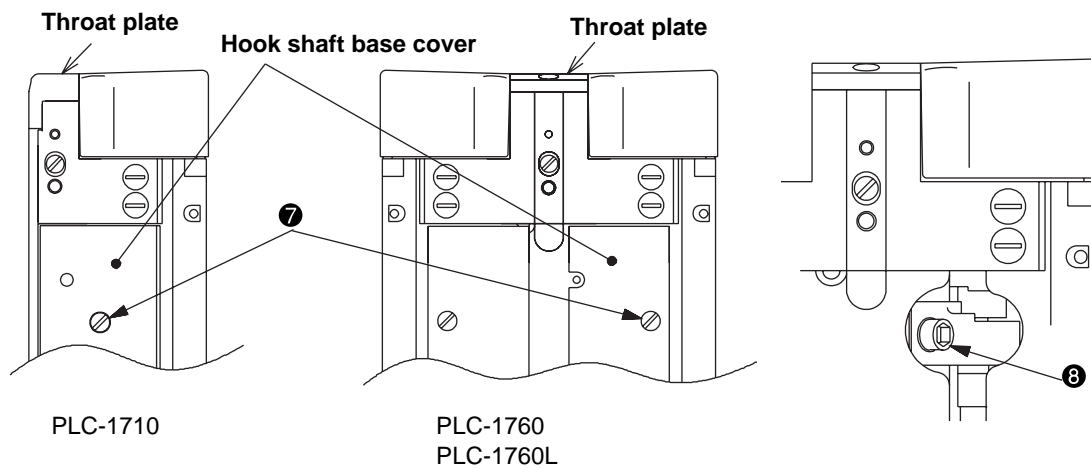
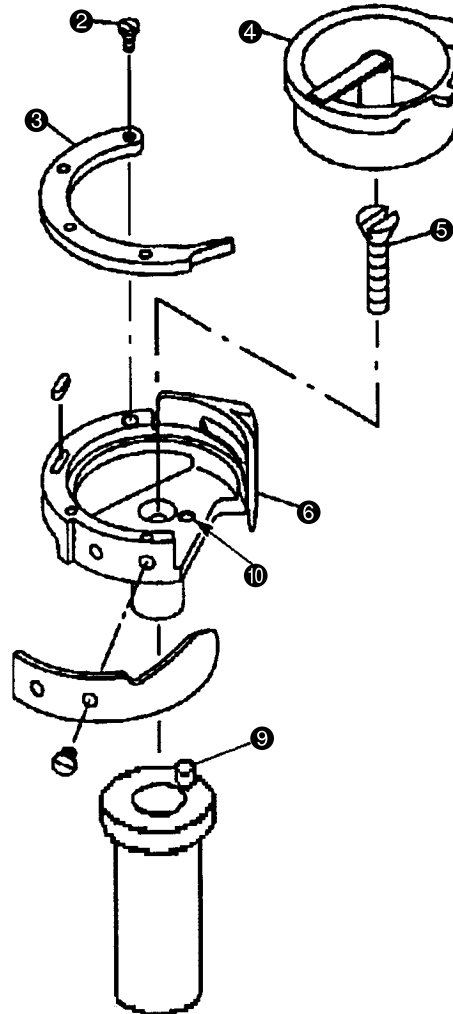
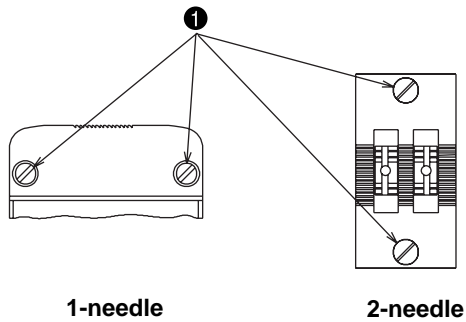
1. Loosen the needle setscrews ❶ (2 positions) and remove the needle.
 2. Loosen the feed foot setscrew ❷ (1 position) and take out the feed foot.
 3. Loosen the presser foot setscrew ❸ (1 position) and take out the presser foot.
 4. Let the sewing machine fall down.
 5. Loosen the connecting link setscrews ❹ (2 positions). (PLC-1760-7 only)
 6. Remove the rocking arm (right) hinge screw ❺ (1 position). (PLC-1760-7 only)
 7. Loosen the rocking arm (right) tightening screw ❻ (1 position) and the rocking arm (left) tightening screw ❼ (1 position) and remove the rocking arm (left) and the connecting link (2 pcs.). (PLC-1760-7 only)
 8. Loosen the hook shaft gear setscrews ❽ (6 positions).
 9. Loosen the lower shaft gear setscrews ❾ (4 positions) so that the lower shaft gear can move to the right and left.
In this case, make sure that the first screw of the lower shaft gear setscrews can never be disengaged from the flat face of the lower shaft.
 10. Raise the sewing machine.
- (Caution) For the PLC-1760-7, pay attention to the connecting link that is attached to the thread trimmer driving arm.**
11. Loosen the throat plate setscrews ❿ (2 positions) and remove the throat plate.
 12. Loosen the screws ⓫ (10 positions) of the throat plate base and remove the throat plate holder.
 13. Loosen the screws ⓬ (8 positions) of the hook shaft base cover and remove the hook shaft base cover (4 pcs.).
 14. Loosen the left hook shaft base setscrews ⓭ (2 positions) and remove the left hook shaft base.
 15. Loosen the right hook shaft base setscrews ⓮ (2 positions) and shift the right hook shaft base to the right in advance.
 16. Loosen the feed dog setscrew ⓯ (1 position) to replace the feed tooth and tighten the feed dog setscrew ⓯ again.
(The feed dog setscrew ⓯ shall be tightened at the tightening torque of 5.39 to 6.37N•m.)
 17. Remove the needle bar rocking fulcrum shaft setscrew ⓰ (1 position).
 18. Open the face cover and draw out the needle bar rocking fulcrum shaft in the direction of the arrow until the top face of the needle bar can be seen from the top screw hole.
 19. Insert the accessory hexagon head wrench (2.5mm) in the needle bar through the hole of the needle bar rocking fulcrum shaft setscrew ⓰ and loosen the needle clamp setscrew ⓱ (1 position) that is located in the needle bar.
 20. Mount the replacing needle clamp on the needle bar and tighten the needle clamp setscrew ⓱ (1 position).
(In this case, the pin attached to the needle clamp shall be adjusted to the groove that is located at the bottom end of the needle bar.)
 21. Return the needle bar rocking fulcrum shaft that has been drawn out as per 18. above. Tighten the needle bar rocking fulcrum shaft setscrew ⓰ (1 position).
At that time, this setscrew shall be tightened until it comes in contact with the flat face of the shaft. After screw tightening, confirm that there is no thrust backlash in the needle bar rocking base.
 22. After the needle has been mounted, loosen the needle bar connecting bracket tightening screws ⓲ (2 positions) to a degree so that the needle bar can move lightly.
 23. Turn the needle clamp by hand so that the right and left needles are positioned in parallel to the lower shaft and temporarily tighten the needle bar connecting screws ⓲ (2 positions).
 24. Loosen the feed lever base setscrews ⓳ (4 positions) and the feed base arm tightening screws to adjust the position of the feed needle hole in relation to the needle center.
For more details, refer to 3. -(2), Adjustment of the feed dog position.
 25. Mount the left hook shaft base setscrews ⓴ (2 positions) that have been removed, and adjust the timing for the needle and the hook.
For more details, refer to 3. -(5), Timing between the needle and the hook (Except for PLC-1760L).
 26. Mount the replacing throat plate base by means of the throat plate holder setscrews ⓫ (10 positions).
 27. Mount the replacing throat plate by means of the throat plate setscrews ❿ (2 positions).
At that time, adjust the vertical clearance between the throat plate and the inner hook clamp section.
For more details, refer to 3. -(3), Clearance between the throat plate and the inner hook clamp section.
 28. Adjust the clearance between the inner hook guide and the inner hook.
For more details, refer to 3. -(7), Adjustment the inner hook guide.
 29. Adjust the feed dog height.
For more details, refer to 3. -(4), Height of the feed dog.
 30. Adjust the vertical feed timing.
For more details, refer to 3. -(11) -3), Vertical feed cam phase.
 31. Adjust the vertical cam timing.
For more details, refer to 3. -(11) -2), Top feed cam phase.
 32. Mount the replacing feed foot and fix it by means of the feed foot setscrew ❷ (1 position).
At that time, mount the feed foot so that its needle hole center coincides with the needle center.
 33. Mount the replacing presser foot and fix it with the presser foot setscrew ❸ (1 position).
At that time, turn the hand wheel by hand and fix this screw so that the feed foot does not come in contact with the presser foot.
 34. Fix the hook shaft base covers (4 pcs.) by means of the hook shaft base cover setscrews ⓬ (8 positions).

6. Replacement of the consumable parts

Standard Adjustment

(1) Hook replacement

o PLC-1710, 1760, 1760L



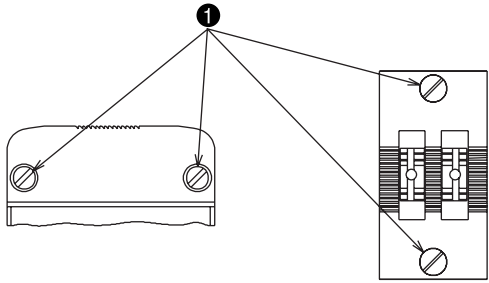
Adjustment Procedures

o PLC-1710, 1760, 1760L

1. Loosen the throat plate setscrews ❶ (2 positions) and remove the throat plate.
 2. Loosen the feed track clamp setscrews ❷ (3 positions) and remove the feed track clamp ❸.
 3. Remove the inner hook ❹.
 4. Loosen the screws ❺ (2 positions) of the hook shaft base cover and remove the hook shaft base cover.
 5. Loosen the inner hook guide arm tightening setscrew ❻ (1 position).
 6. Loosen the hook setscrew ❼ (1 position) and lift the outer hook ❽ and the inner hook guide at the same time to take out the outer hook ❽.
 7. Mount the outer hook ❽ of the new hook in the reverse procedures as for the removal of the outer hook ❽.
 8. Fix the outer hook ❽ by means of the hook setscrew ❼ (1 position).
At that time, fix the outer hook ❽ in the state that the positioning pin ❾ of the hook shaft top face is entered in the hole ❿ of the outer hook.
 9. Mount the inner hook ❹ in the outer hook ❽.
 10. Fix the feed track clamp ❸ by means of the feed track clamp setscrews ❷ (3 positions).
 11. Check the timing for the needle and the hook.
For more details, refer to 3. -(5) and -(6) Timing between the needle and the hook.
 12. Fix the throat plate with the throat plate setscrews ❶ (2 positions).
 13. Check the vertical clearance between the top face of the inner hook clamp section and the throat plate.
For more details, refer to 3. -(3) Clearance between the throat plate and the inner hook clamp section.
 14. Tighten the inner hook guide arm tightening setscrew ❻ (1 position).
At that time, make sure that there is no vertical backlash around the inner hook guide.
For more details, refer to 3.-(7) Adjusting the inner hook guide.
 15. Mount the hook shaft base cover by means of the hook shaft base cover setscrews ❺ (2 positions).
- (Caution) There is difference in the shape of the inner hook ❹ between the PLC-1710, 1760 and the PLC-1760L. However, replacement can be carried out in the same procedures.**

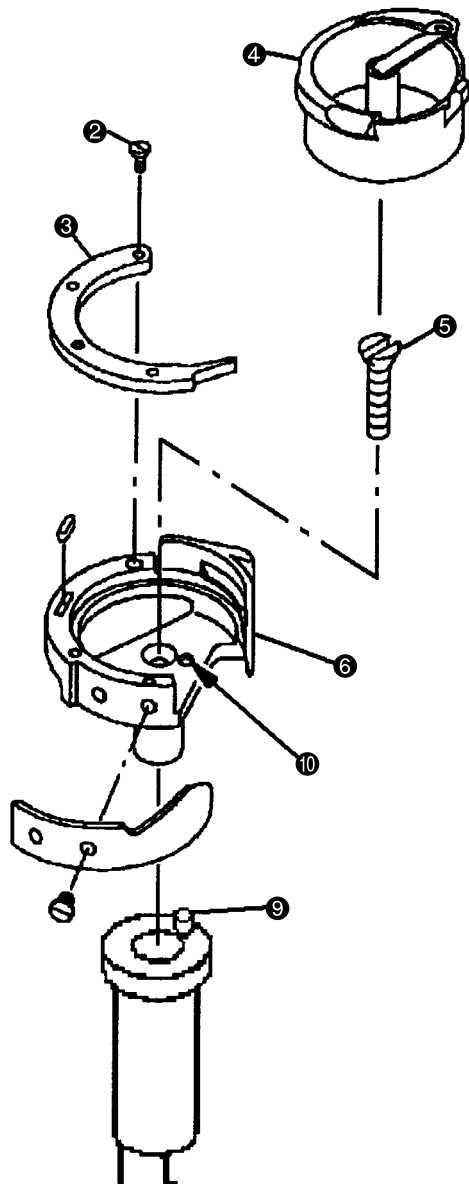
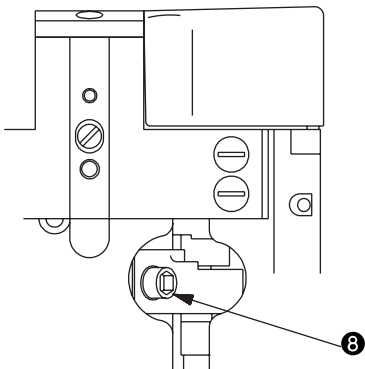
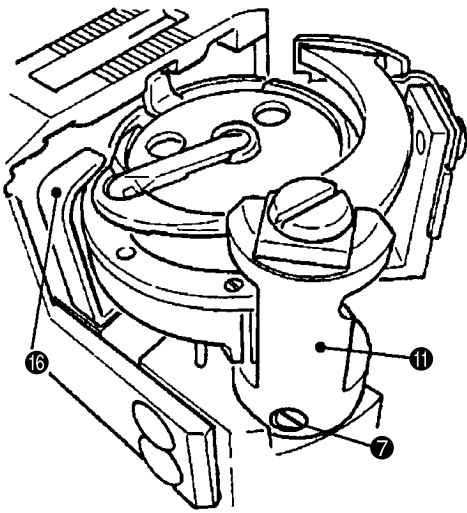
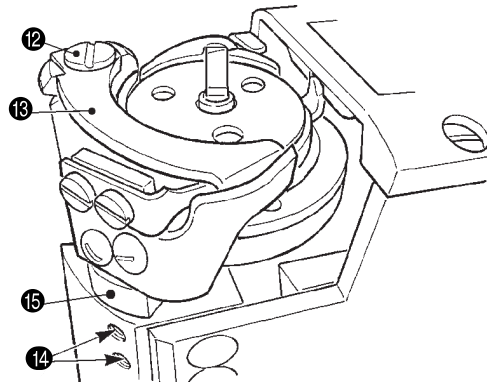
Standard Adjustment

o PLC-1710-7, 1760-7



1-needle

2-needle



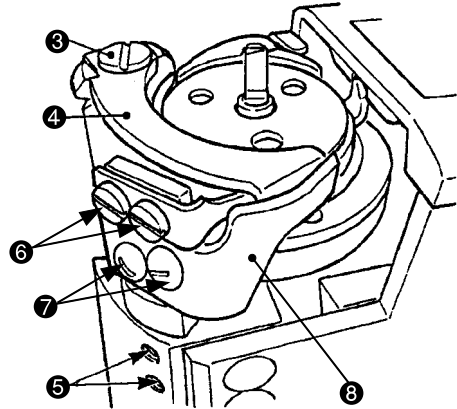
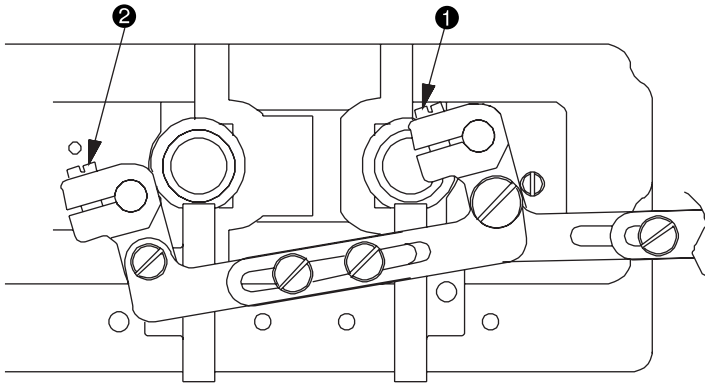
Adjustment Procedures

o PLC-1710-7, 1760-7

1. Loosen the throat plate setscrews ❶ (2 positions) and remove the throat plate.
2. Loosen the moving knife setscrew ❷ (1 position) and remove the moving knife ❸.
3. Loosen the feed track clamp setscrews ❹ (3 positions) and remove the feed track clamp ❺.
4. Remove the inner hook ❻.
5. Loosen the hook shaft base cover setscrews to take out the hook shaft base cover and loosen the inner hook guide arm tightening screw ❸ (1 position).
6. Loosen the counter knife installing base setscrews ❹ (2 positions).
7. Loosen the moving knife installing base setscrews ❺ (2 positions).
8. Loosen the hook setscrew ❻ (1 position) and lift the outer hook ❼, the counter knife installing base ❽, the moving knife installing base ❾, and the inner hook guide ❿ at the same time in order to take out the outer hook ❼.
9. In the same procedures as when the outer hook ❼ is removed as per 8. above for the replacement by a new outer hook ❼, mount the counter knife installing base ❽, the moving knife installing base ❾, and the inner hook guide ❿ all together.
10. Fix the new outer hook ❼ by means of the hook setscrew ❻ (1 position).
At that time, fix the outer hook in the state that the positioning pin ❶ of the hook shaft top face is entered in the hole ❷ of the new outer hook ❼.
11. Mount the inner hook ❸ in the outer hook ❼.
12. Fix the feed track clamp ❺ by means of the feed track clamp setscrews ❹ (3 positions).
13. Check the timing for the needle and the hook.
For more details, refer to 3.-(5) Timing between the needle and the hook.
14. Fix the throat plate with the throat plate setscrews ❶ (2 positions).
15. Check the vertical clearance between the top face of the inner hook clamp section and the throat plate.
For more details, refer to 3.-(3) Clearance between the throat plate and the inner hook clamp section.
16. Tighten the inner hook guide arm tightening setscrew ❸ (1 position).
At that time, make sure that there is no vertical backlash around the inner hook guide ❿.
For more details, refer to 3.-(7) Adjusting the inner hook guide ❿.
17. Fix the moving knife ❸ to the moving knife installing base ❾ by means of the moving knife mounting screw ❷ (1 position).
18. Adjust the height of the moving knife
For more details, refer to 3.-(18)-1) Adjusting the height of the moving knife.
19. Adjust the counter knife and the clamp spring.
For more details, refer to 3.-(18)-2) Adjusting the position of the counter knife and knife pressure, and 3.-(18)-3) Adjusting the clamp spring.
20. Adjust the position of the moving knife ❸ on the right hook shaft base.
For more details, refer to 3.-(18)-8) Adjusting the position of the moving knife (Right) (PLC-1710-7, 1760-7).
21. Adjust the position of the moving knife ❸ on the left hook shaft base.
For more details, refer to 3.-(18)-9) Adjusting the position of the moving knife (Left) (PLC-1760-7 only).
22. Mount the hook shaft base cover by means of the hook shaft base cover setscrews.

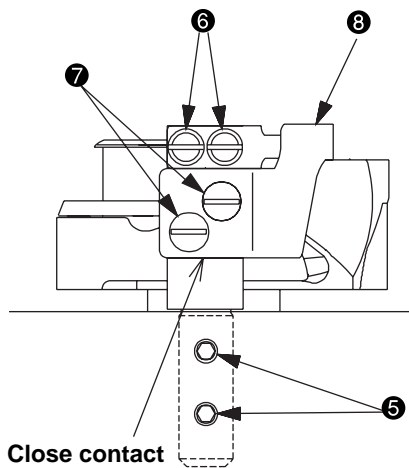
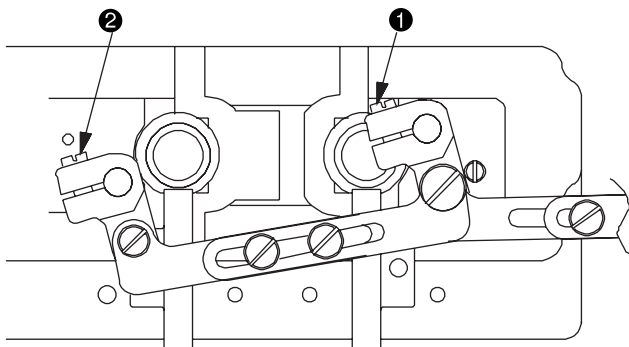
Standard Adjustment

(2) Replacing the moving knife (PLC-1710-7, 1760-7)



(3) Replacing the counter knife (PLC-1710-7, 1760-7)

(4) Replacing the clamp spring (PLC-1710-7, 1760-7)



Adjustment Procedures

(2) Replacing the moving knife (PLC-1710-7, 1760-7)

1. Let the sewing machine fall down.
2. Loosen the rocking arm (right) tightening screw ❶ or the rocking arm (left) tightening screw ❷ (1 position each) and move the moving knife ❹ by hand to the position apart from the counter knife ❸. In this state, temporarily tighten the rocking arm (right) tightening screw ❶ or the rocking arm (left) tightening screw ❷.
3. Raise the sewing machine.
4. Loosen the moving knife setscrew ❸ (1 position) and remove the moving knife ❹.
5. Fix the new moving knife ❹ with the moving knife setscrew ❸ (1 position).
6. Loosen the counter knife base setscrews ❺ (2 positions) to make adjustments of the knife pressure.
For more details, refer to 3.-(18)-2) Adjusting the position of the counter knife and knife pressure

(Caution) The knife pressure should be kept as low as possible.

7. Lay down the sewing machine body and fix the rocking arm (right) tightening screw ❶ or the rocking arm (left) tightening screw ❷.
In this case, refer to 3.-(18) -8), -9) Adjusting the position of the moving knife (Right), (Left).
8. Raise the sewing machine.

(3) Replacing the counter knife (PLC-1710-7, 1760-7)

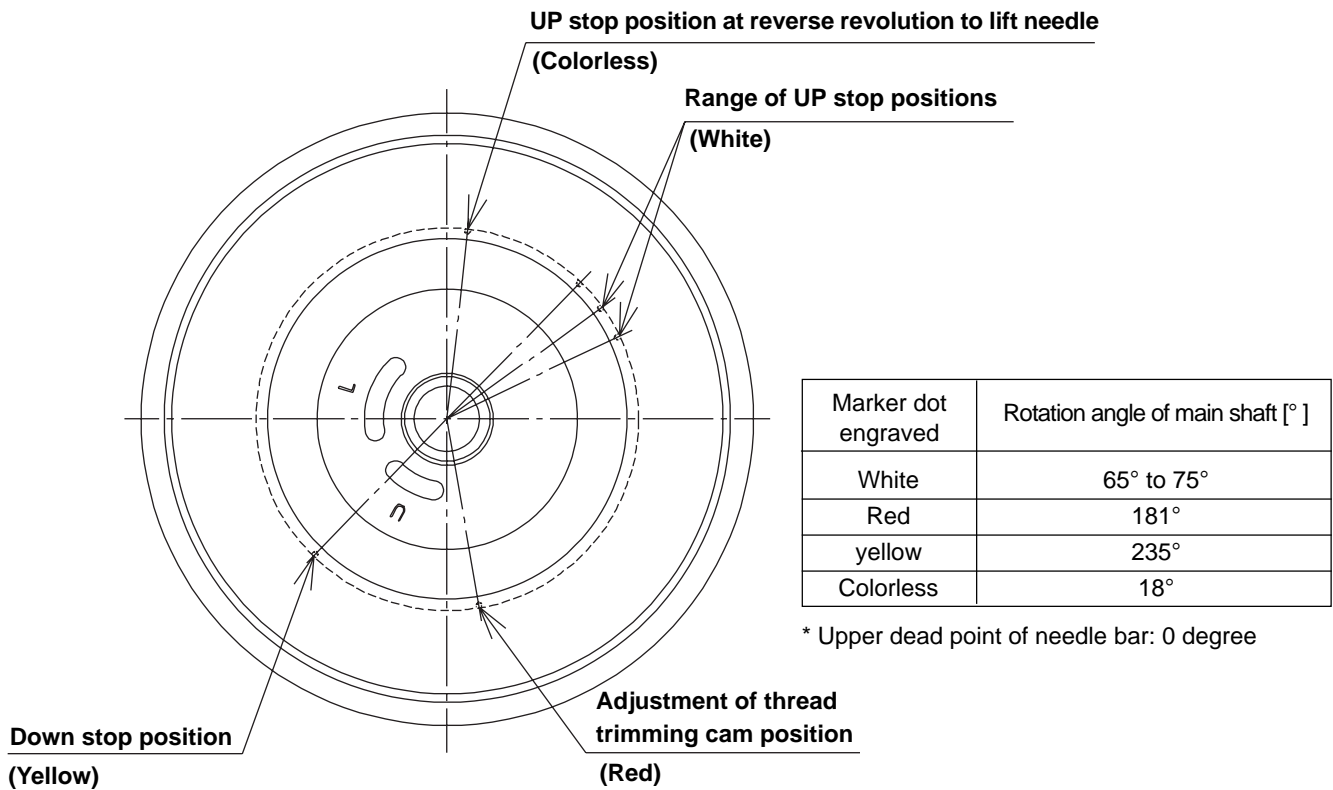
1. Let the sewing machine fall down.
2. Loosen the rocking arm (right) tightening screw ❶ (1 position).
3. Loosen the rocking arm (left) tightening screw ❷ (PLC-1760-7 only)
4. Raise the sewing machine.
5. Loosen the clamp spring setscrews ❻ (2 positions).
6. Loosen the counter knife setscrews ❼ (2 position) and remove the counter knife ❸.
7. Fix the new counter knife ❸ with the counter knife setscrew ❼ (2 position).
At that time, let the bottom face of the counter knife ❸ come in close contact with the counter knife mounting holder.
8. Loosen the counter knife base setscrews ❺ (2 positions) to make adjustments of the knife pressure.
For more details, refer to 3.-(18)-2) Adjusting the position of the counter knife and knife pressure
9. Fix the clamp spring with the clamp spring setscrews ❻ (2 positions).
For more details, refer to 3.-(18)-3) Adjusting the clamp spring.
10. Lay down the sewing machine body and fix the rocking arm (right) tightening screw ❶ or the rocking arm (left) tightening screw ❷ (1 position).
In this case, refer to 3.-(18) -8), -9) Adjusting the position of the moving knife (Right), (Left).
11. Raise the sewing machine.

(4) Replacing the clamp spring (PLC-1710-7, 1760-7)

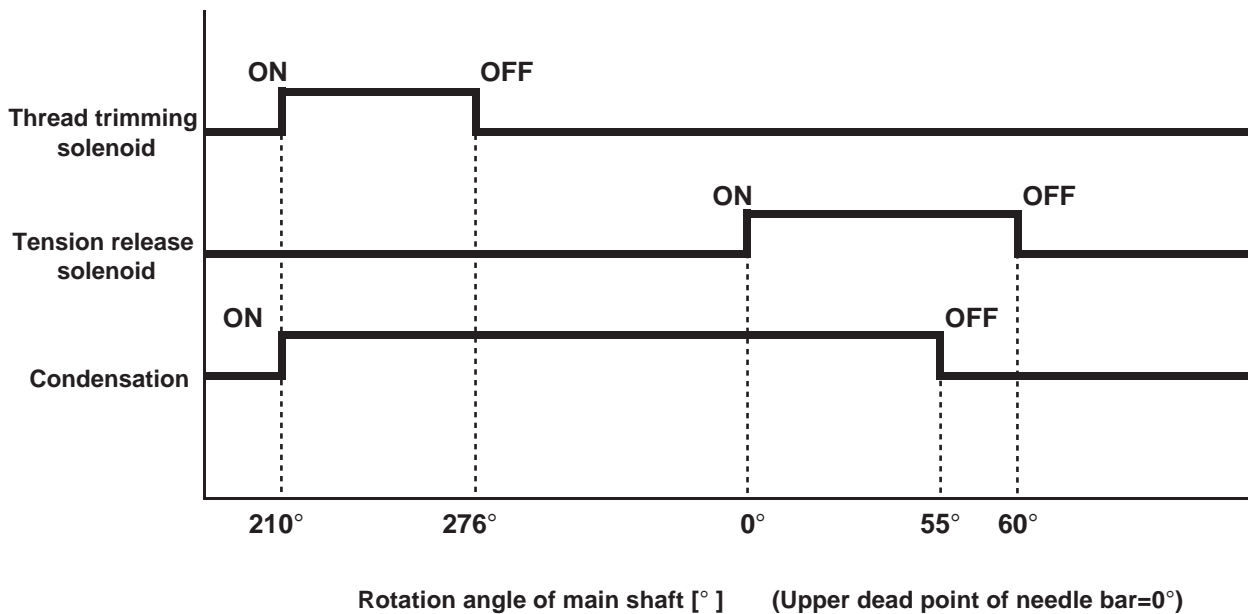
1. In the state of 5. above, [(3) Replacement the counter knife], remove the clamp spring that has been used.
2. Replace the new clamp spring and fix the clamp spring setscrews ❻ (2 positions).
For more details, refer to 3.-(18)-3) Adjusting the clamp spring.
3. Lay down the sewing machine body and fix the rocking arm (right) tightening screw ❶ or the rocking arm (left) tightening screw ❷.
In this case, refer to 3.-(18) -8), -9) Adjusting the position of the moving knife (Right), (Left).
4. Raise the sewing machine.

7. Marking points on flywheel (PLC-1710-7, 1760-7)

(1) Marking points on flywheel

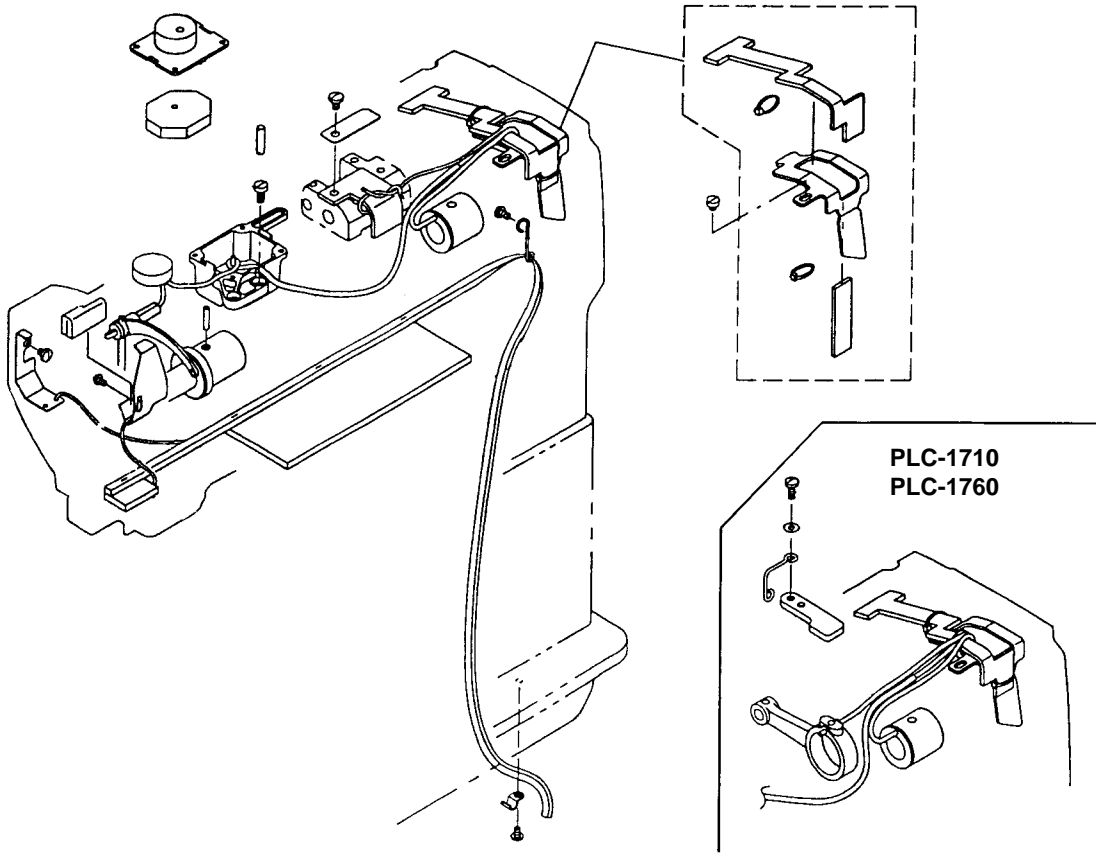


(2) Thread trimming timing chart



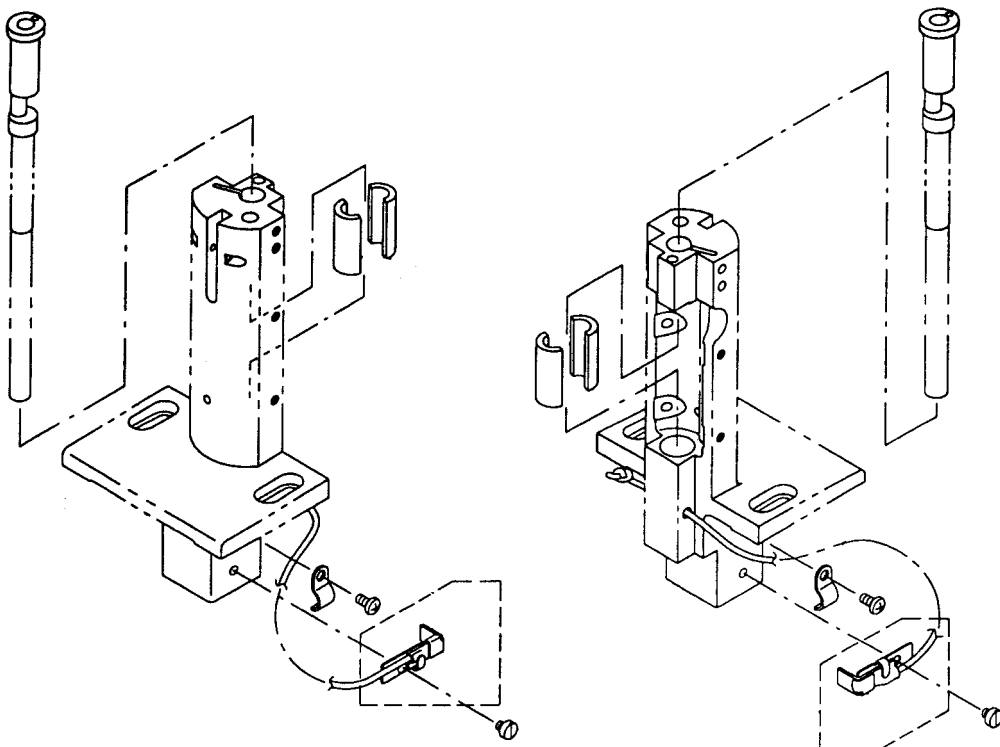
8. Lubrication diagram

Arm section



Base of left hook shaft

Base of right hook shaft



9. LOCKTITE applied portion

LOCKTITE was applied the following portions in the assembly line at the factory, and minimize the possibility of disassembly.

In case of disassembly by necessity, apply LOCKTITE at reassembly.

Be sure to clean the surface well with thinner or the like and dry the surface before LOCKTITE application.

If the LOCKTITE applied portion cannot be released, use a blowtorch or the like to increase the possibility of release.

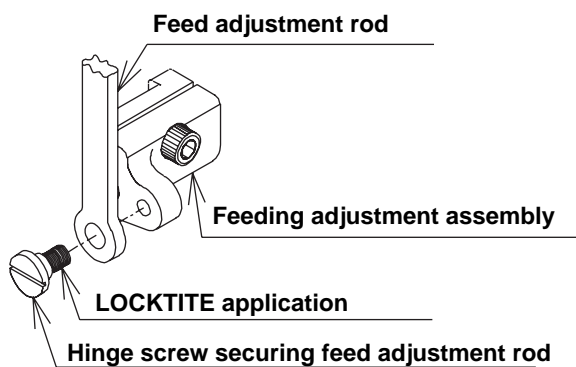
No.	Applied portion	Part No.	LOCKTITE No.
1	Hinge screw securing feed adjustment rod	SD0800402TP	LOCKTITE 638
2	Alternate vertical adjusting arm pin (*1)	10715308	LOCKTITE 638
3	Bushing for alternate dial shaft (*1)	10715100	LOCKTITE 638
4	Screw securing the shaft that supports the alternate vertical amount change assembly (*1)	SS8150710SP	LOCKTITE 243
5	Hinge screw securing feeding lever square block	23009509	LOCKTITE 243
6	Presser auto-lifting lever shaft (*2)	21356704	LOCKTITE 243
7	Hinge screw attaching to cylinder connecting screw (AK) (*2)	SD0720331SP	LOCKTITE 243
8	Hinge screw attaching to cylinder connecting screw (BT) (*2)	SD0800352SP	LOCKTITE 243
9	Hinge screw attaching to cylinder connecting screw (DL) (*2)	SD0600403TP	LOCKTITE 243
10	Tension release bar (*3)	21441209	LOCKTITE 243
11	Hinge screw securing thread trimming roller arm (*3)	SD0640325SP	LOCKTITE 243

(*1): PLC-1710 and PLC-1760 excluded

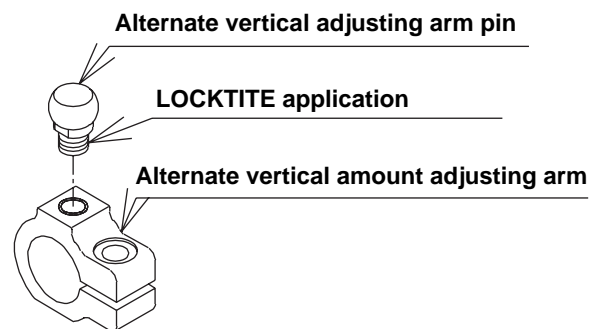
(*2): Optional parts included

(*3): Only sewing machines with thread trimmer

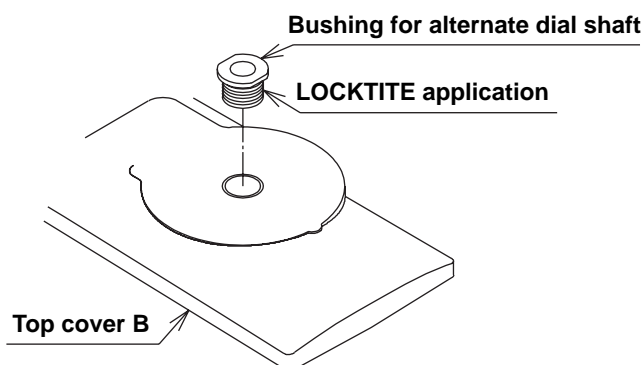
No. 1



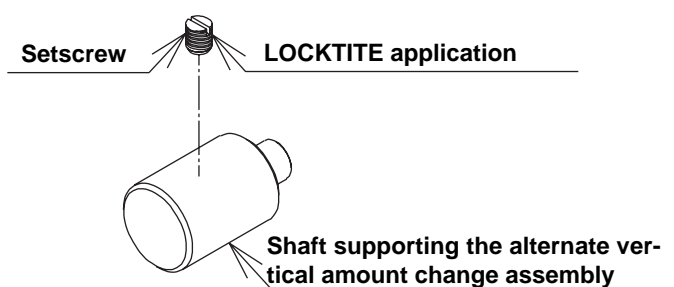
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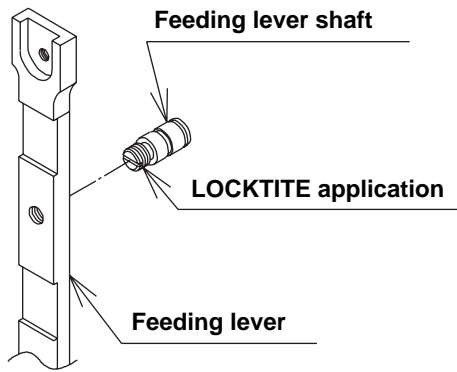
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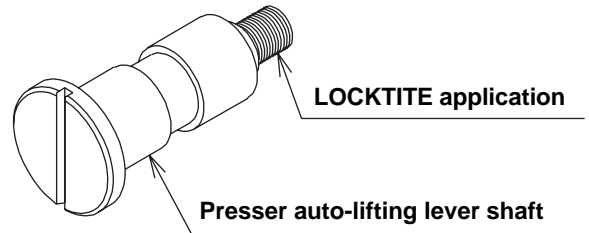
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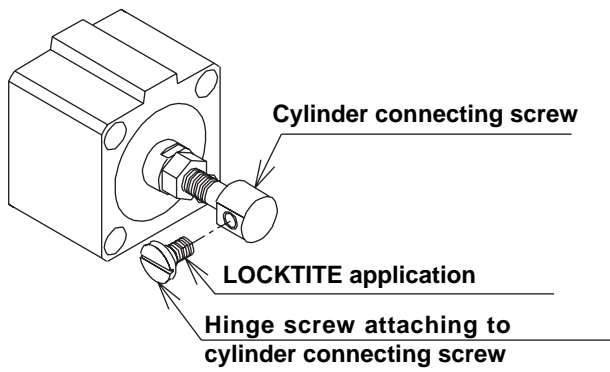
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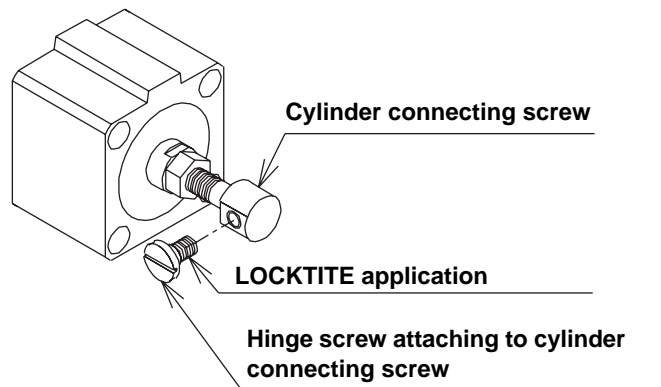
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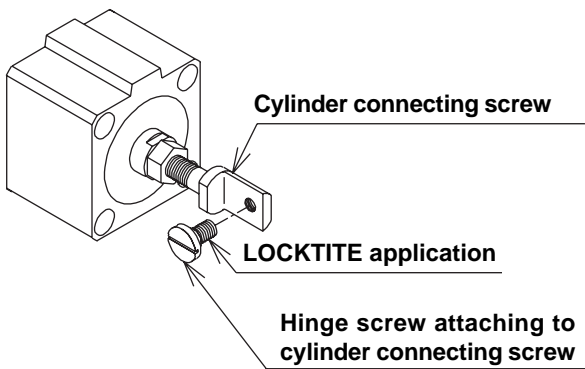
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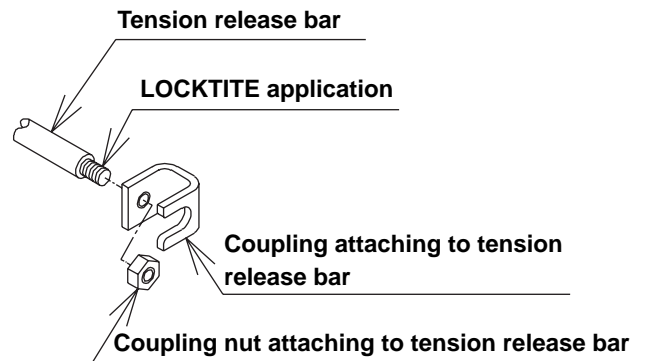
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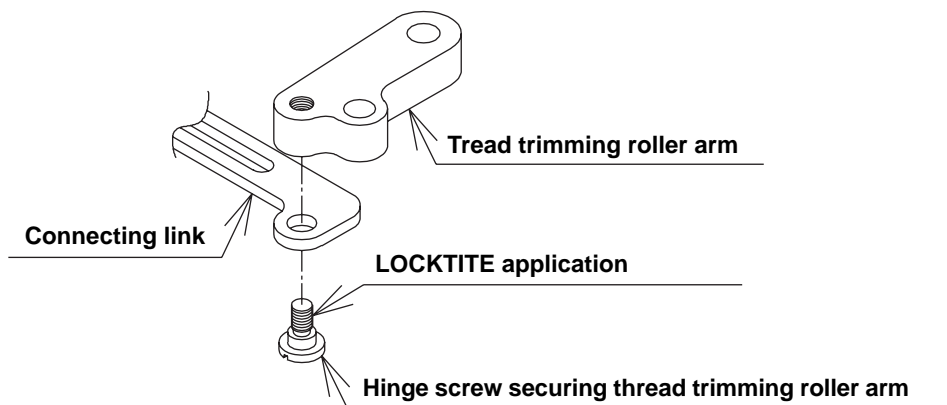
No. 9



No. 10



No. 11



10. Consumable part list/replaceable gauge part list

(1) Consumable part lists

o PLC-1710, 1760

Consumable part	Part No.	Remarks
Needle	MC321001400	Schmetz 134-35 Nm140
Hook (assembly)	40039010	
Bobbin	10759603	Aluminum bobbin (with a knurling tool)

o PLC-1710-7, 1760-7




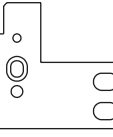
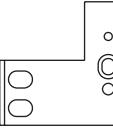
Consumable part	Part No.	Remarks
Needle	MC321001400	Schmetz 134-35 Nm140
Hook (assembly)	40038731	
Bobbin	10759603	Aluminum bobbin (with a knurling tool)
Moving knife	40038746	
Counter knife	40038747	
Clamp spring	40039404	


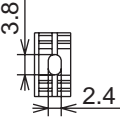
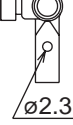


o PLC-1760L

Consumable part	Part No.	Remarks
Needle	MC321002000	Schmetz 134-35 Nm200
Hook (assembly)	40038870	
Bobbin	10759603	Aluminum bobbin (with a knurling tool)

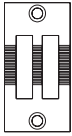
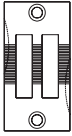

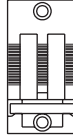
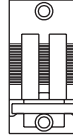
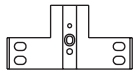
(2) Replaceable gauge part lists

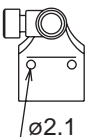
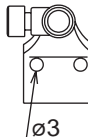
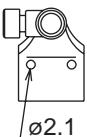


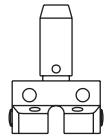
o PLC-1710, 1710-7

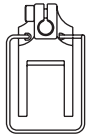
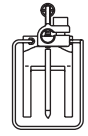
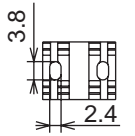
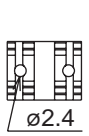
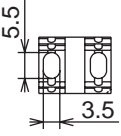
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PLC-1710-7		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Location	Throat plate		Presser foot	Throat plate holder A	Throat plate holder B
Appearance					
Part No.	40038970	40038969	40017286	40038972	40038976

PLC-1710	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PLC-1710-7	<input type="radio"/>		<input type="radio"/>		<input type="radio"/>
Location	Feed dog		Feeding foot		
	Standard	For thick thread	Standard	For thick thread	With slit
Appearance					
Part No.	40038971	40040294	21444559	40040295	23032055

o PLC-1760, 1760-7, 1760L

PLC-1760			○			○		○
PLC-1760-7				○			○	○
PLC-1760L					○			○
Location			Throat plate			Throat plate for lower tape		Throat plate holder
			Standard	For thread trimming	For L	Standard	For thread trimming	
Appearance								
Part No.	Needle gauge	6mm	40038996	40038759	—	40039004	40038769	40038790
		8mm	40038995	40038758	—	40039001	40038767	40038788
		10mm	40038994	40038757	40038893	40038999	40038765	40038786
		12mm	40038993	40038756	—	40038997	40038762	40038784

PLC-1760			○		○	○		○
PLC-1760-7			○		○	○		○
PLC-1760L				○			○	○
Location			Feeding foot			Feeding foot for guiding		Needle clamp
			Standard	For L	With slit	Standard	For L	
Appearance								
Part No.	Needle gauge	6mm	40038846	—	10783157	40038854	—	40038778
		8mm	40038844	—	10783256	40038852	—	40038776
		10mm	40038842	40038898	10783355	40038850	40039271	40038774
		12mm	40038840	—	10783454	40038848	—	40038772

PLC-1760			○	○	○		
PLC-1760-7			○	○		○	
PLC-1760L			○	○			○
Location			Presser foot	Presser foot with guide	Feed dog		
					Slot	Circular hole	For L
Appearance							
Part No.	Needle gauge	6mm	40038800	40038810	40039009	40038783	—
		8mm	40038797	40038808	40039008	40038782	—
		10mm	40038795	40038806	40039007	40038781	40038897
		12mm	40038792	40038802	40039006	40038780	—

* Only [10mm] of needle gauge is available for PLC-1760L.

11. Wiring in machine head (only for machines with thread trimmer)

(1) Connector from machine head

• 12-pin connector

Pin No.	Function
1	Thread trimming (-)
2	Tension release (-)
3	—
4	DL Limit1
5	DL Limit 2 & Speed Limit
6	GND
7	Thread trimming (+)
8	Tension release (+)
9	—
10	—
11	—
12	Ground

• Integrated synchronizer

Pin No.	Function
1	+5V
2	UDET
3	DDET
4	GND

(2) Connector from pneumatic air

• 14-pin connector (Blue)

Pin No.	Function
1	—
2	—
3	Condensation (-)
4	—
5	—
6	—
7	—
8	—
9	—
10	Condensation (+)
11	—
12	—
13	—
14	—

• 16-pin connector

Pin No.	Function
1	BT SW
2	NU SW
3	DL SW
4	DL (-)
5	DL (-)
6	2P (-)
7	BT (-)
8	FL (-)
9	GND
10	ABT SW
11	2P SW
12	+24V
13	+24V
14	—
15	+24V
16	+24V

• 10-pin connector

Pin No.	Function
1	DL (-)
2	AK (-)
3	BT (-)
4	—
5	—
6	DL (+)
7	AK (+)
8	BT (+)
9	—
10	—

(3) Connector from relay cable

- Connector CN50-1 to 4

Pin No.	Function			
	CN50-1	CN50-2	CN50-3	CN50-4
1	+24V	+24V	+24V	+24V
2	FL (-)	DL (-)	Condensation (-)	Signal indicating sewing machine is in operation
3	BT (-)	2P (-)	Short tail (-)	—
4	GND	GND	GND	GND

- Connector CN51-1 to 4

Pin No.	Function			
	CN51-1	CN51-2	CN51-3	CN51-4
1	+12V	+12V	+12V	+12V
2	NU SW	DL SW	Sewing machine stop signal	DL Limit 1
3	ABT SW	2P SW	Thread rack switch	DL Limit 2 & Speed Limit
4	GND	GND	GND	GND

- 4-pin connector (Blue)

Pin No.	Function
1	Thread trimming (-)
2	—
3	—
4	—
5	BT SW
6	—
7	Tension release (-)
8	Thread trimming (+)
9	—
10	Ground
11	—
12	GND
13	—
14	Tension release (+)

12. Troubles in sewing and corrective measures

(1) Related to sewing

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
1. Loose stitches (Isolated idling loops)	1-1) Needle thread tension is too low		Increase the needle thread tension.
	1-2) Thread take-up spring tension has been improperly adjusted	2-A) Stroke of the thread take-up spring is too small.	Increase the stroke of the thread take-up spring sufficiently.
		2-B) Thread take-up spring tension is insufficiently tensioned.	Increase the needle thread tension.
	1-3) Defective hook components (outer hook)	3-A) Inadequate adjustment of hook height.	Re-adjust the clearance between the throat plate and the inner hook fastening block.
		3-B) Defective hook (scratch or the like).	Modify or replace the hook.
	1-4) Defective hook components (inner hook)	4-A) Defective bobbin thread tension adjusting spring.	Replace the inner hook.
		4-B) Thread tangle due to engagement failure of inner hook.	Replace the bobbin or the inner hook.
		4-C) The bobbin runs idle in the bobbin case.	Add an idling prevention spring.
		4-D) Lubrication deficiency.	Supply oil to the hook.
	1-5) Thread path is incorrect	5-A) Not smooth on thread path.	Make the thread path smooth.
		5-B) Thread path has scratches on the surface.	Smooth then the thread path.
		5-C) Thread is caught in some part of the thread path.	Thread path modification.
	1-6) Defective lower bobbin winding	6-A) The tension of the bobbin thread is too strong or too weak when winding the thread around the bobbin.	Adjust the tension.
	1-7) Needle slot in the feed dog is too small		Enlarge the needle hole.
	1-8) Needle used is too thin the thread used		Increase the needle size.
1-9) Defective needles	9-A) Installing direction of the needle is incorrect.	Re-install the needle.	
	9-B) Tip of the needle has burrs.	Replace the needle with a new one.	

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Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
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Continued from the previous page

	1-10) Defective feed timing	10-A) Feed timing is earlier than the standard one.	Re-adjust the feed timing. .
		10-B) Height of the feed dog differs from the standard value.	Re-adjust the height of the feed dog.
	1-11) Defective hook timing	11-A) Hook timing is too early.	Re-adjust the hook timing.
	1-12) Defective needle entry		Align the needle hole center of the needle dog with the needle center.
	1-13) Inner hook opening lever is defective	13-A) The clearance between the inner hook and the inner hook guide is too much or eliminated.	Re-adjust the inner hook guide.
	1-14) Needle thread tangle with feed dog	13-A) Stroke of the thread take-up spring is too short.	Increase the stroke.
2. Loose stitches (needle thread floating)	2-1) The needle thread is pulled up completely.		Use the feeding foot with the slit.
			(Refer to "10.-(2) Replaceable gauge part lists".)
3. Stitch Skipping	3-1) Defective needle	1-A) The needle is installed facing in the wrong direction.	Reset the needle.
		1-B) Bent needle	Replace the needle with a new one.
		1-C) Tip of the needle is blunt.	Replace the needle with a new one.
		1-D) The needle is too thick or too thin for the thread used.	Replace the needle with a new one.
	3-2) Defective hook components	2-A) Blade point of the hook is blunt or worn out.	Correct the blade point of the hook or replace the hook with a new one.
		2-B) Incorrect hook timing	Re-adjust the hook timing.
		2-C) Height of the needle bar is not correct.	Re-adjust the vertical position of the needle bar in the light of the blade point of the hook.
		2-D) Clearance between the blade point of the hook and the needle is not correct.	Minimize the clearance.
		2-E) Effective amount of the needle guard is wrong.	Adjust the effective amount of the needle guard.
		2-F) Thread loops are not made with consistency.	Wind the thread around the needle.
	3-3) The needle thread tension is too high		Decrease the needle tension.

To the next page

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
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	3-4) Sewing speed is too high		Decrease the sewing speed.
	3-5) Height of the needle bar is not correct	5-A) Height of the needle bar is not adjusted to the specified dimension.	Re-adjust the height of the needle bar.
	3-6) Defective upper feeding foot	6-A) The needle hole of the upper feeding foot and needle are in contact.	Reset the upper feeding foot.
	3-7) Improper feed timing		Re-adjust the feed timing.
	3-8) Thread take-up spring has been improperly adjusted	8-A) Stroke of the thread take-up spring is too high.	Decrease the tension of the spring.
		8-B) The thread take-up spring is too tense.	Decrease the tension of the spring.
	3-9) Incorrect needle entry	9-A) The needle comes in contact with the needle hole in the throat plate.	Adjust the needle entry.
	3-10) Improper pressure of the presser foot	10-A) Pressure of the presser foot is too low.	Increase the pressure of the presser foot.
		10-B) The work clamp foot is floating.	Re-adjust the lifting amount of the work clamp foot.

4. Needle Thread Breakage (Cutting) (Hangnail)

	4-1) Thread path is incorrect	1-A) Thread path is not smooth on the surface.	Make the thread path smooth.
		1-B) Thread path has scratches on the surface.	Smoothen the thread path.
		1-C) Thread is caught in some part of the thread path.	Thread path modification.
	4-2) Improper needle thread tension		Adjust the needle thread tension.
		2-A) The tension controlled by the tension controller No. 1 is too low.	Adjust the tension controller No. 1 thread tension to prevent the thread from flapping.
	4-3) Defective needle	3-A) The needle is installed facing the wrong direction.	Re-install the needle in the correct manner.
		3-B) Needle abnormality (Deformation, breakage, wear)	Replace the needle with a new one.
		3-C) The needle is too thick or too thin for the thread used.	Replace the needle with a new one.

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Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
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4-4) Defective hook components	4-A) Blade point of the hook is blunt or worn out.	Correct the blade point of the hook or replace the hook with a new one.
	4-B) Hook timing is too early.	Adjust the hook timing.
	4-C) Re-adjust the clearance between the the hook and throat plate is too small.	Re-adjust the clearance between the throat plate and the inner hook clamp section.
	4-D) The needle interferes with the blade point of the hook.	Adjust the needle-to-hook relation.
	4-E) Inadequate adjustment of hook needle guide.	Adjust the effective amount of the needle guard.
	4-F) Thread path of the hook has scratches.	Smoothen the thread path.
4-5) Defective inner hook guid	5-A) The clearance between the inner hook and inner hook guide is too much.	Decrease the clearance.
4-6) Thread take-up spring has been improperly adjusted	6-A) Adjustment amount of the stroke.	Re-adjust the stroke of the thread take-up spring.
	6-B) Adjustment amount of the tension.	Re-adjust the spring tension.
4-7) Sewing speed is too high	7-A) The needle generates heat, resulting in thread breakage.	Decrease the sewing speed.
		Wind the thread around the needle.
4-8) The installing point of the needle is too low	8-A) Height of the needle bar is insufficient.	Re-adjust the height of the needle bar.
	8-B) Needle is not attached in the needle bar in the correct manner.	Attach the needle in the needle bar.
4-9) Pressure of the presser foot is too low.	9-A) Stitches gather on the overlapped section of a material, resulting in thread breakage.	Increase the pressure of the presser foot.
4-10) Incorrect needle entry	10-A) Needle interferes with the needle hole edge of the throat plate.	Re-adjust the needle entry point.

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures	
5. Irregular Stitches	5-1) Defective hook components	1-A) Oil in the hook is insufficient.	Lubricate the hook race.	
		1-B) Defective hook (scratch, dust).	Clean, modify, or replace the hook.	
		1-C) The clearance between the needle and throat plate is too small.	Increase the clearance.	
		1-D) The inner hook opening lever provides excessive clearance.	Decrease the clearance at the inner hook opening lever.	
		1-E) Hook timing is too early.	Retard hook timing.	
		5-2) Defective bobbin and/or inner hook	2-A) Defective bobbin thread tension adjusting spring.	Replace the inner hook with a new one.
			2-B) The bobbin is not engaged with the inner hook. As a result, the bobbin thread cannot be led smoothly.	Replace the bobbin or inner hook with a new one.
			2-C) Bobbin runs idle in the inner hook.	Increase the idling prevention spring pressure.
			2-D) Bobbin thread is not wound. As a result, the bobbin thread fails to be fed smoothly.	Adjust the tension of the bobbin winder or the position of the bobbin winder tension controller.
			2-D) Thread has been wound excessively on the bobbin.	Re-wind the bobbin thread to the extent where the thread wound round the bobbin does not protrude from the periphery of the bobbin.
		5-3) The needle thread tension and the bobbin thread tension are too low.		Increase the thread tension.
		5-4) Thread take-up spring has not been correctly adjusted	4-A) Adjustment amount of the stroke.	Re-adjust the stroke of the thread take-up spring.
			4-B) Adjustment amount of the tension.	Re-adjust the tension of the thread take-up spring.
		5-5) Improper thread path	5-A) Thread path is not smooth on the surface.	Make the thread path smooth.
			5-B) Thread path has scratches on the surface.	Smoothen the thread path.
			5-C) Thread is caught in some part of the thread path.	Thread path modification.
		5-6) Defective feed timing		Re-adjust the feed timing.

(2) Thread trimming and concerns

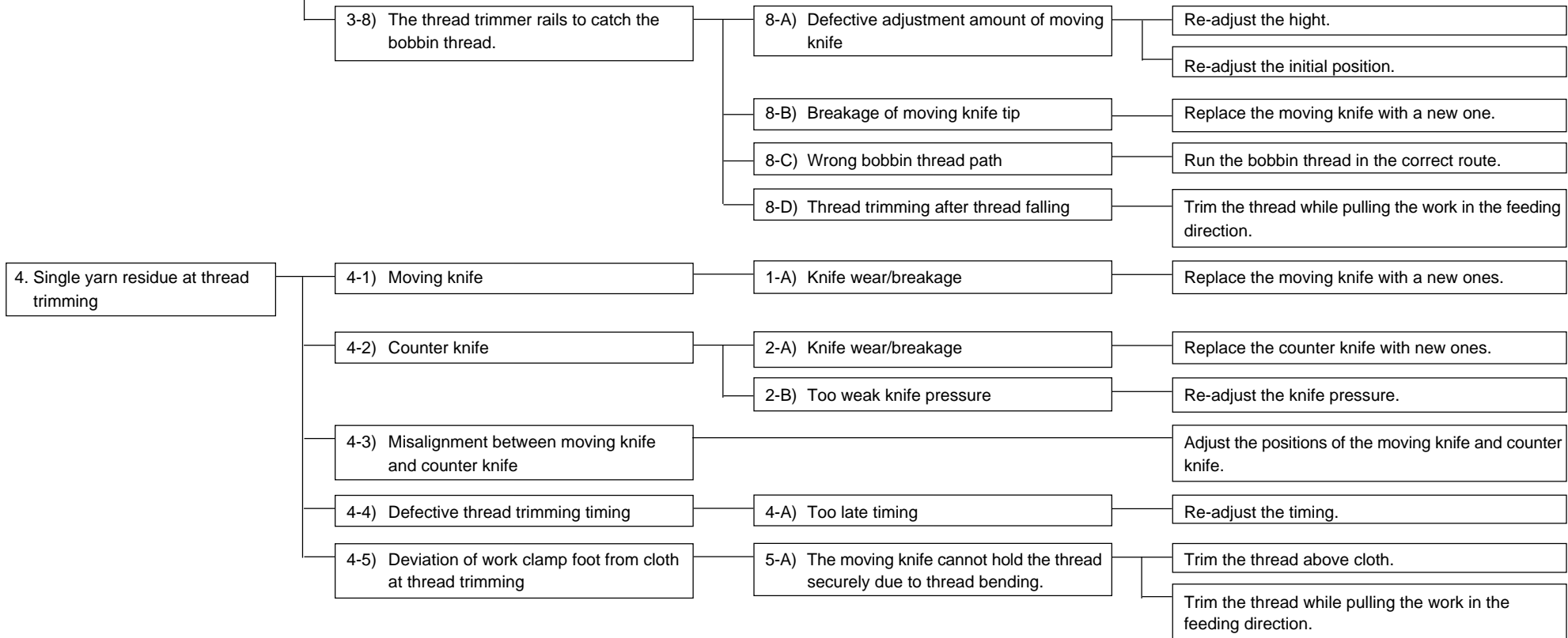
Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures	
1. Stitch skipping at the start of sewing	1-1) Length of thread left at the needle tip after thread trimming is too short.	1-A) Abnormality in needle thread route.	Run the thread in the correct route to avoid abnormal tension on the needle thread.	
		1-B) Tension of the tension disk No. 1 is too high.	Decrease the needle tension.	
		1-C) The tension disk fails to release the thread sufficiently at the time of thread trimming.	Float the disk with the thread release solenoid.	
		1-D) Timing of thread trimming is too early.	Adjust the thread trimming cam.	
		1-E) Moving knife and/or the hook has scratches.	Perform modification or replacement.	
		1-F) Deviation of work clamp foot from cloth at thread trimming.	Trim the thread above cloth.	
	1-2) The bobbin thread is not held after thread trimming.	2-A) The installing position of the clamp spring is not correct.	Re-adjust the position.	
		2-B) Clamp spring pressure is too low.	Re-adjust the spring tension.	
		2-C) Deformed clamp spring.	Replace the clamp spring with a new one.	
	1-3) Needle is too thick.		Replace the needle with a thinner needle.	
	1-4) Pressure of the presser foot is too low.		Increase the pressure of the presser.	
	1-5) The needle thread is too thin.		Do not run the needle thread under the presser of the thread guide in front of the needle bar guide.	
	2. Thread cast-off from the needle immediately after thread trimming.	2-1) Nonsmooth thread is used.		Change the route of the needle thread to decrease the thread bent points.
		2-2) Adjustment amount of thread take-up spring.	2-A) The tension is too weak because the stroke is too long.	Shorten the stroke to make the tension stronger.

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
3. The thread trimmer fails to cut the threads.	3-1) Moving knife	1-A) Defective shape	Replace the moving knife and the counter knife with new ones.
		1-B) Defective adjustment amount of position.	Adjust the position of the moving knife.
	3-2) The moving knife fails to operate	2-A) Defective synchronizer timing.	Re-adjust the synchronizer timing.
		2-B) Defective thread trimming timing.	Re-adjust the thread trimming cam.
		2-C) Thread trimming solenoid failure	Replace the thread trimming solenoid.
	3-3) The moving knife stops during thread trimming	3-A) Thread used is too thick.	Use a specified thread.
		3-B) Defective thread trimming timing.	Re-adjust the timing for the thread trimming cam.
		3-C) Needle thread tension is too high.	Adjust the tension of the needle thread. Decrease the thread tension controlled by the tension controller No. 1.
		3-D) The bobbin thread tension is too high.	Adjust the tension of the bobbin thread.
		3-E) The counter knife pressure is too strong.	Re-adjust the knife pressure.
	3-4) Counter knife	4-A) Defective shape.	Replace the counter knife with new ones.
		4-B) Defective adjustment amount.	Adjust the counter knife position and the knife pressure.
	3-5) Condensation system	5-A) Pneumatic system	Perform wiring properly.
			The air pressure is too low. Adjust the air pressure between 0.45 and 0.5 MPa.
		5-B) Cylinder failure	Replace the cylinder.
	3-6) Deviation of work clamp foot from cloth at thread trimming	6-A) The moving knife cannot hold the thread securely due to thread bending.	Trim the thread above cloth.
			Trim the thread while pulling the work in the feeding direction.
	3-7) The thread trimmer fails to catch the needle thread.	7-A) Breakage of moving knife tip	Replace the moving knife with anew one.
		7-B) Stitch skipping at the final stitch	Re-adjust the timing for the needle and hook.
		7-C) Defective thread trimming timing	Re-adjust the thread trimming cam.

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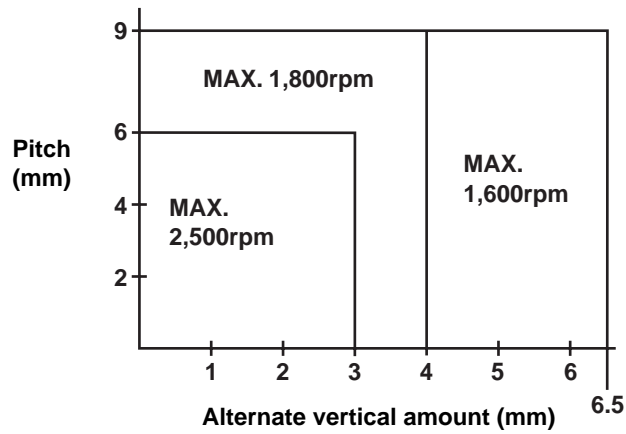
Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
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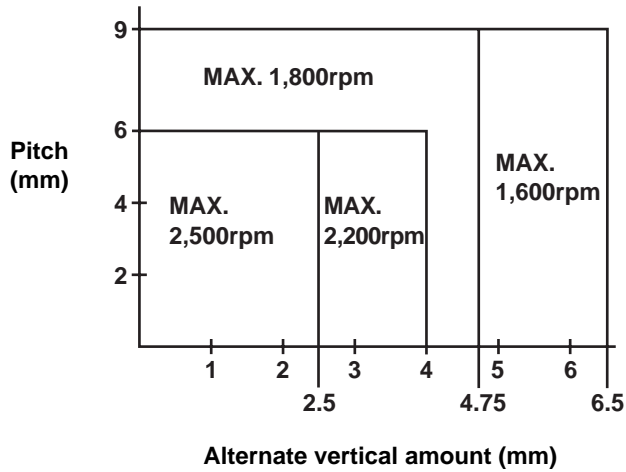


13. List of the sewing speeds

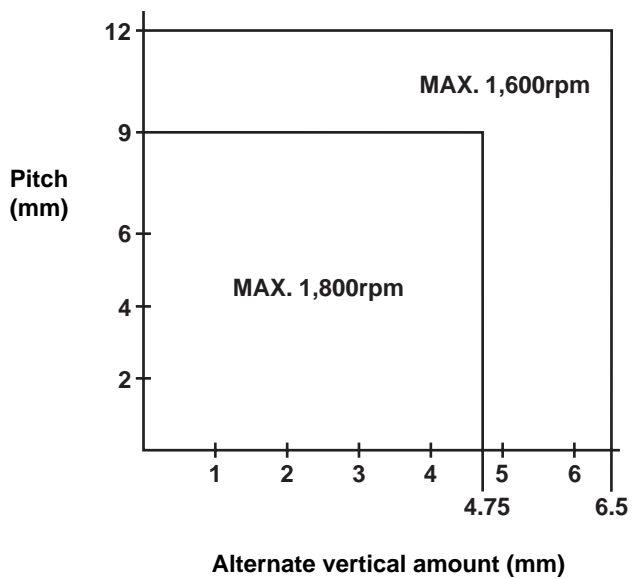
o PLC-1710, 1760



o PLC-1710-7, 1760-7



o PLC-1760L



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