JUKI®

1-NEEDLE, UNISON-FEED LOCKSTITCH MACHINE WITH AUTOMATIC THREAD TRIMMER

LU-2210N-7 LU-2210W-7

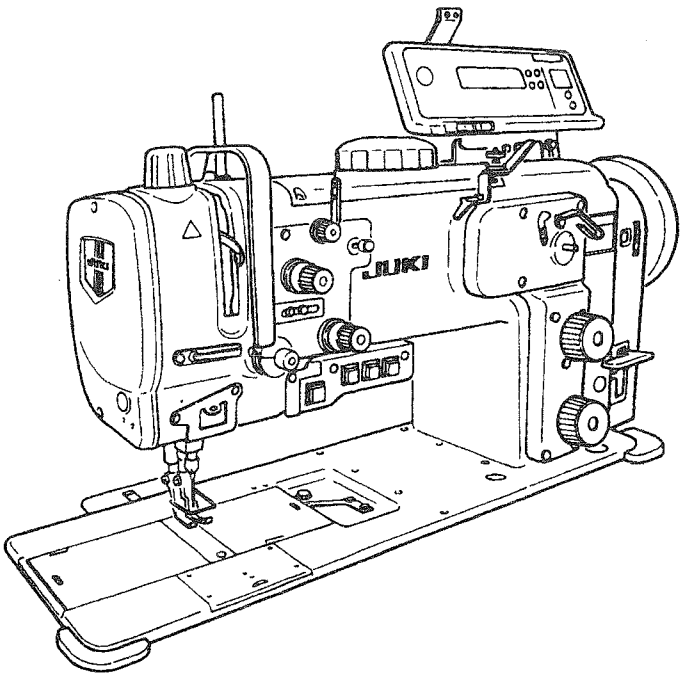
1- NEEDLE, UNISON-FEED LOCKSTITCH MACHINE WITH AUTOMATIC THREAD TRIMMER
(SPECIALLY SPECIFIED FOR 2P)

LU-2212N-7

2- NEEDLE, UNISON-FEED LOCKSTITCH MACHINE WITH AUTOMATIC THREAD TRIMMER

LU-2260N-7 LU-2260W-7

ENGINEER'S MANUAL



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Introduction

This Engineer's Manual is for technical service engineers. In the instruction manual for the maintenance engineers of sewing machines 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 instruction manual.
When maintenance is performed for our sewing machines, refer not only to this manual, but also to the instruction manual and parts list.

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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1. Specifications

No.	Item	Specification				
1	Model	LU-2210N-7	LU-2210W-7	LU-2212N-7	LU-2260N-7	LU-2260W-7
2	Model name	1-needle, unison feed lockstitch machine with automatic thread trimmer		1-needle, unison feed lockstitch machine with automatic thread trimmer (Specially specified for 2P)	2-needle, unison feed lockstitch machine with automatic thread trimmer	
		(With a touch-back device, auto-lifter and lifting device)				
3	Applications	For medium-weight materials, car seats and furniture)				
4	Sewing speed	Max. 3,500 rpm (Varies according to sewing conditions).				
5	Needle	Schmetz 134 x 35R, Nm 110 to Nm 160 (Standard Nm 140)				
6	Thread	#4 to #30			#5 to #20	
7	Stitch Length	Max. 9 mm for both normal feed stitching and reverse feed stitching			Max. 6 mm for both normal feed stitching and reverse feed stitching	
8	Presser foot lift	Using hand lifter: 9 mm, Using knee lifter: 15.5 mm (equipped with a reversing device)				
9	Stitch length regulating method	Using a dial				
10	Stitch length regulating method for 2P	———		Using a dial	———	
11	Reverse feed stitching	Externally mounted air pressure cylinder (with a touch-back switch and hand lever)				
12	Thread take-up lever	Link type				
13	Needle bar stroke	33.8mm				
14	Needle gauge	———			6mm•8mm•10mm(Standard)•12mm•20mm*	
15	Hook	1.6-fold horizontal axis hook (Automatic lubrication hook)	2-fold horizontal axis hook (Automatic lubrication hook)	1.6-fold horizontal axis hook (Automatic lubrication hook)	2-fold horizontall axis hook (Automatic lubrication hook)	
16	Opener	Opener shaft eccentric cam speed reduction system (The opener travels by one stroke while the hook rotates twice).				
17	Feed mechanism	Using an arc block slider				
18	Hook driving system	Screw gear				
19	Thread trimmer	Rocks around the hook (peripheral cam and solenoid)				
20	Tension release system	Using the push solenoid for actuating together with the thread trimmer				
21	Adjustment of the amount of alternating vertical movement of the walking foot and presser foot	Using a dial (peripheral cam)				
22	Main shaft and hook driving shaft driving system	Using a timing belt				
23	Bobbin winder	Built in the arm				
24	Lubrication system	Automatic lubrication system				
25	Oil return flow	Circulated with the plunger and felts				
26	Lubricating oil	JUKI New Defrix Oil No. 1 (Equivalent to ISO VG7)				
27	Space under the needle	263.5 mm (Distance from the center of the presser bar to the bottom of the arm)				
28	Bed size	517mm x 178mm				
29	Automatic lifter	Externally mounted pneumatic cylinder				
30	Lifting device (DL)	Pneumatic cylinder with a built-in type speed controller to control the speed corresponding to the amount of alternating vertical movement of the walking foot and presser foot				
31	2P device	———		Externally mounted pneumatic cylinder	———	
32	Weight of machine head	Approx. 55 kg			Approx. 58 kg	
33	Transmission belt	HM type V belt				
34	Air pressure/ Air consumption	0.5MPa•0.3dm3/min (ANR)				
35	Source voltage	Single phase 200V to 240V, Single phase 100V to 120V, Three phase 200V to 240V				
36	Noise	Workplace-related noise at sewing speed n = 2,230 min^{-1} : $L_{PA} \leqq 84$ dB (A) Noise measurement according to DIN 45635-48-A-1.				

* Needle Gauge:
The gauge from 4 mm up to 36 mm (for LU-2260N-7) or from 4 mm up to 30 mm (for LU-2260W-7) is available with special specifications.

2. Model Numbering System

(1) LU-2210N/W-7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
L	U	2	2	1	0	□	□	□	□	□	7	0	B	□	–	□	□

7	Hook Code
N	Large hook (1.6-fold)
W	Double size hook (2.0-fold)

8	Walking Foot
A	Standard
B	For urethane
C	Right-single-sided foot
D	Left-single-sided foot
E	For piping ø3
F	For piping ø4
G	For piping ø5
H	For piping ø6
J	Adjustable type for piping ø3
K	Adjustable type for piping ø4
L	Adjustable type for piping ø5
M	Adjustable type for piping ø6

9	Presser Foot
A	Standard
B	For overlapped section
C	For urethane
D	Right-single-sided foot
E	Left-single-sided foot
F	For piping ø3
G	For piping ø4
H	For piping ø5
J	For piping ø6
K	Presser area small

10	Feed Dog
S	Standard (with groove)
A	Without groove
B	For thin thread (2.5 x 1.6)

11	DL Device
Z	Without DL device
A	DL device without knee switch
B	DL device with knee switch

* The pneumatic automatic presser foot lifter is equipped as standard.

15	Option
Z	Without option
A	AE9 (Bobbin thread level detection device)

* Applicable only for the machine with Hook Code N (Large Hook)

17	Specification Code for Destination
A	Standard
B	For Europe
E	For Japan

18	Accessory Specification Code
A	Standard
B	For Europe
D	For United States
E	For Japan

(2) LU-2212N-7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
L	U	2	2	1	2	N	□	□	□	B	7	0	B	□	–	□	□

7	Hook Code
N	Large hook (1.6-fold)

8	Walking Foot
A	Standard
B	For urethane
C	Right-single-sided foot
D	Left-single-sided foot
E	For piping ø3
F	For piping ø4
G	For piping ø5
H	For piping ø6
J	Adjustable type for piping ø3
K	Adjustable type for piping ø4
L	Adjustable type for piping ø5
M	Adjustable type for piping ø6

9	Presser Foot
A	Standard
B	For overlapped section
C	For urethane
D	Right-single-sided foot
E	Left-single-sided foot
F	For piping ø3
G	For piping ø4
H	For piping ø5
J	For piping ø6
K	Presser area small

10	Feed Dog
S	Standard (with groove)
A	Without groove
B	For thin thread (2.5 x 1.6)

11	DL Device
B	DL device with knee switch

15	Option
Z	Without option
A	AE9 (Bobbin thread level detection device)

17	Specification Code for Destination
A	Standard
B	For Europe
E	For Japan

18	Accessory Specification Code
A	Standard
B	For Europe
D	For United States
E	For Japan

(3) LU-2260N/W-7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
L	U	2	2	6	0	□	S	□	S	□	7	0	B	□	–	□	□

7	Hook Code
N	Large hook (1.6-fold hook)
W	Double size hook (2.0-fold hook)

8	Stitch Length Code
S	6mm

9	Needle Gauge Code
B	6.0mm
C	8.0mm
D	10.0mm
E	12.0mm
J	20.0mm

10	Walking Foot, Presser Foot and Feed Dog
S	Standard

11	DL Device
Z	Without DL device
A	DL device without knee switch
B	DL device with knee switch

* The pneumatic automatic presser foot lifter is equipped as standard.

15	Option Code
Z	Without option
A	AE9 (Bobbin thread level detection device)

* Applicable only for the machine with Hook Code N (Large Hook)

17	Specification Code for Destination
A	Standard
B	For Europe
E	For Japan

18	Accessory Specification Code
A	Standard
B	For Europe
D	For United States
E	For Japan

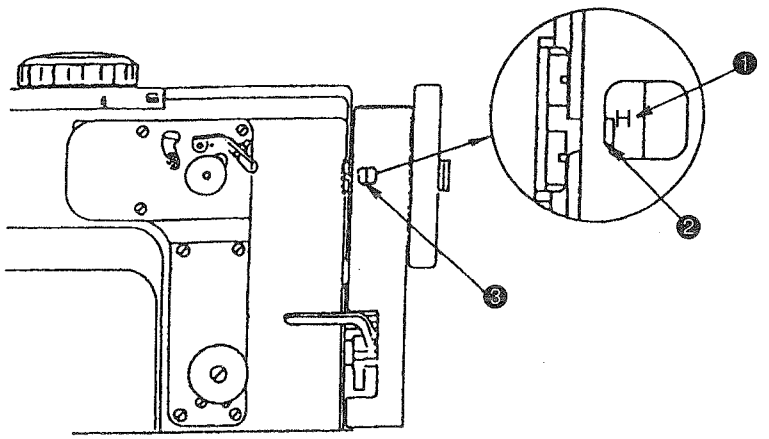
MEMO

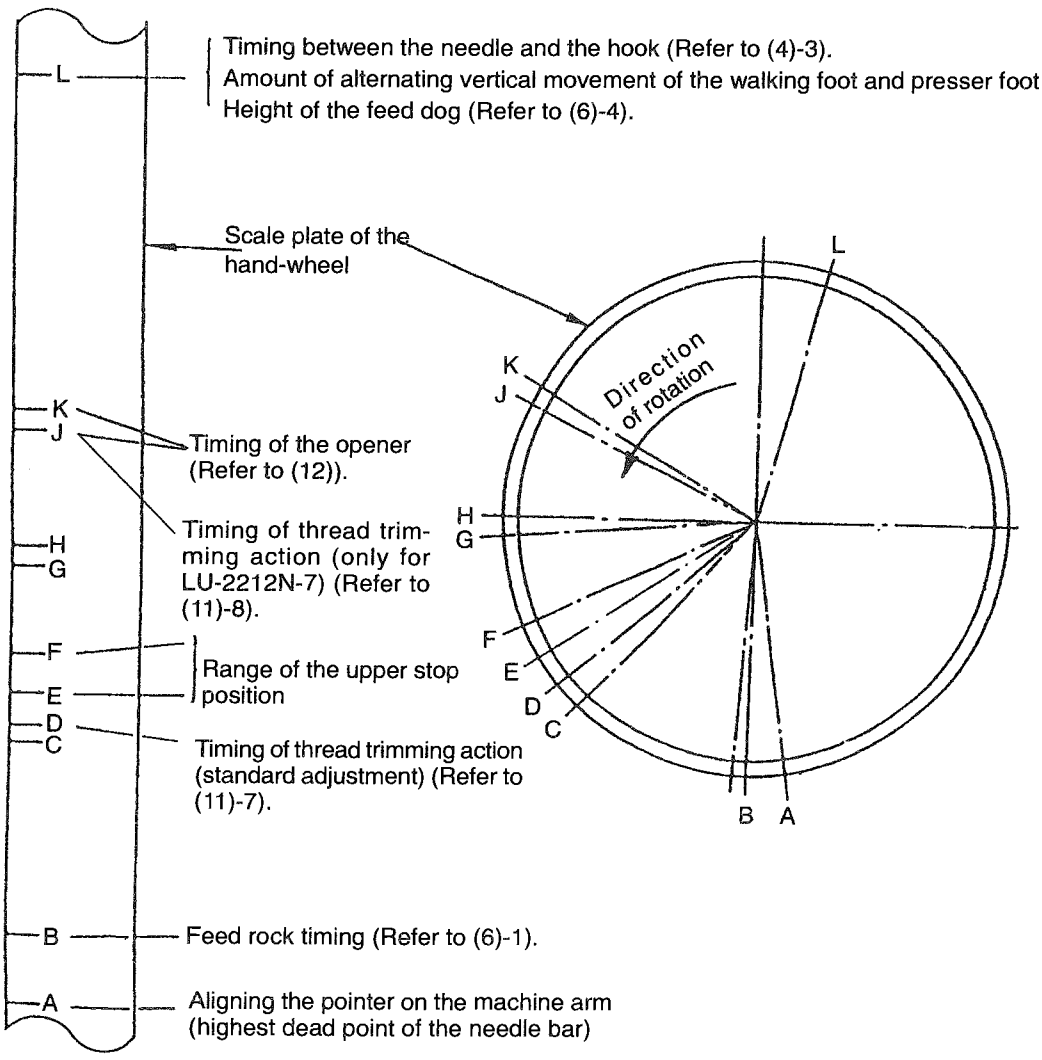
3. Standard Adjustment

(1) Types and Names of Gradations on the Hand-wheel

Standard Adjustment

Adjust the timing of each operation of the sewing machine while aligning the upper side of the hand-wheel pointer ❷ with the corresponding gradation on the hand-wheel ❶. The gradation on the hand-wheel ❶ and the pointer ❷ on it can be observed through the notch ❸ on the belt cover.



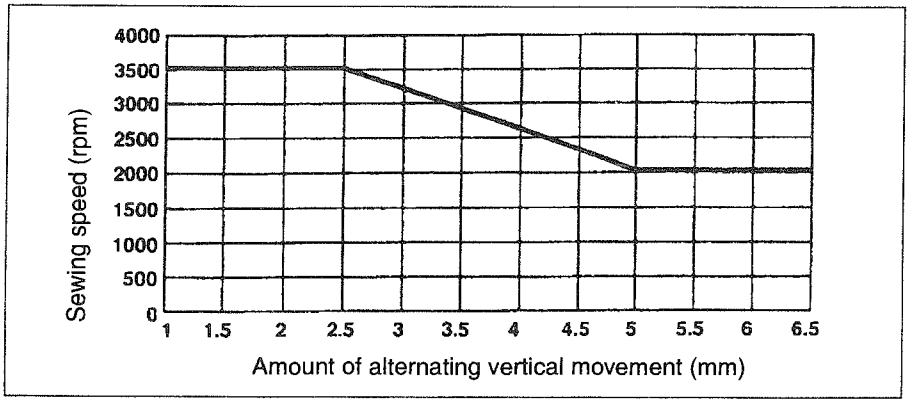


(2) Sewing Speed

Standard Adjustment

The maximum sewing speed is set according to the sewing conditions as shown in the lists below. Set the maximum sewing speed according to each sewing condition so that the sewing speed does not exceed the set value.

1. Maximum sewing speed according to the amount of alternating vertical movement of the walking foot and presser foot, and sewing pitch.
   (1) For sewing pitch of 6 mm or less



   (2) For sewing pitch of more than 6 mm, but less 9 mm or less (for LU-2210N/W-7, LU-2212N-7)

Amount of alternating vertical movement (mm)	Max. sewing speed (rpm)
1 to 6.5	2, 000

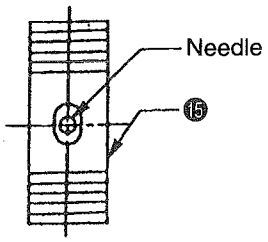
2. Maximum sewing speed according to the needle gauge (only for LU-2260N/W-7)

Needle Gauge (mm)	Max. Sewing Speed (rpm)
4 to 10	3, 500
12 to 20	3, 300
22 to 30	3, 000
32 to 36	2, 500

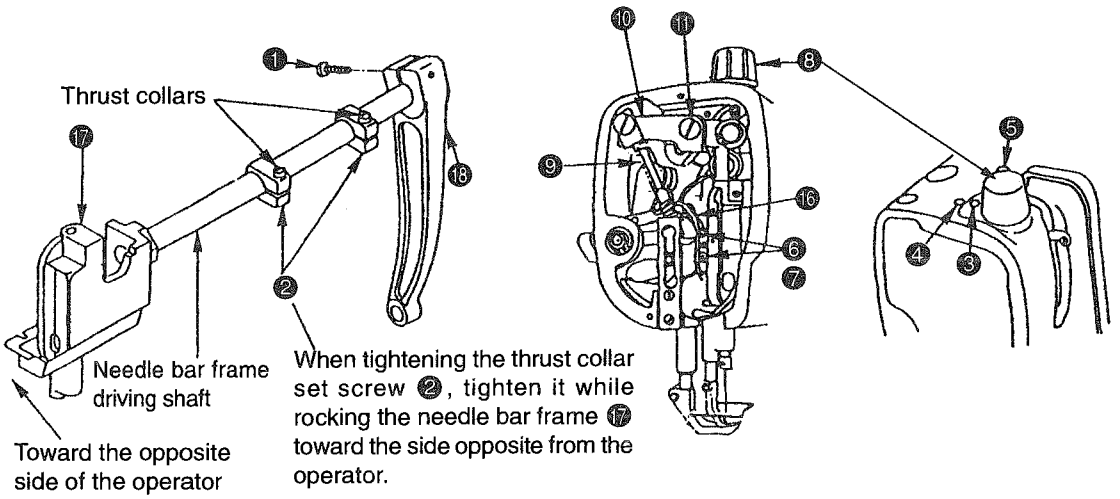
(3) Needle Entry

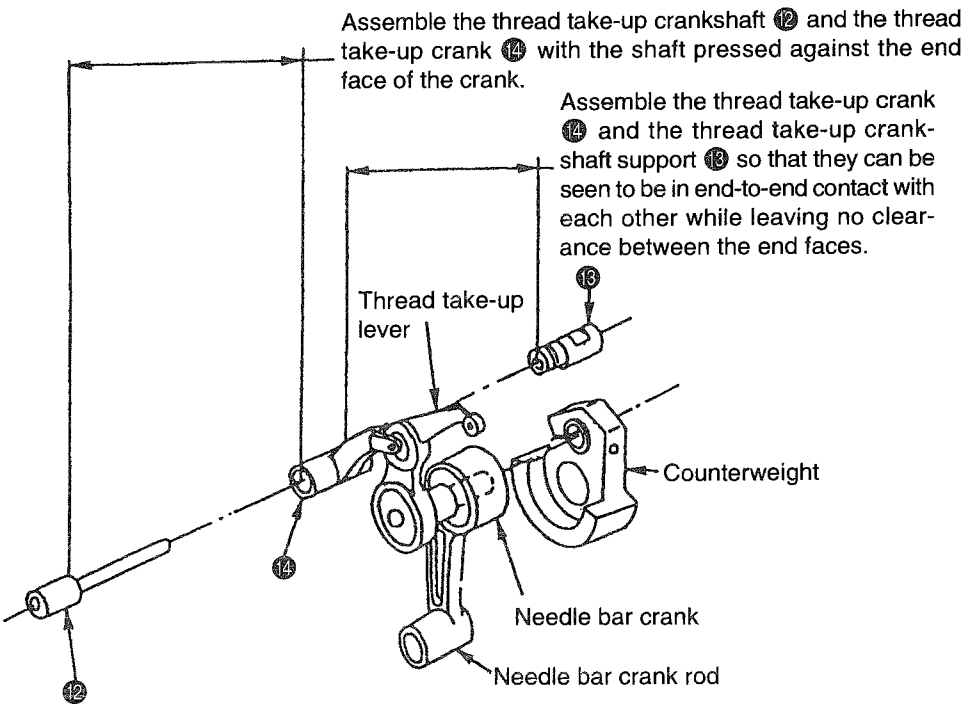
Standard Adjustment

1) Needle entry in the needle slot of the feed dog in the lateral direction



Needle entry point
The center of the needle slot in the feed dog ⑮ should be aligned with the center of the needle.
Requirements:
- Needle bar should be brought to the lowest dead point.
- The stitch dial should be set to [0] on the scale.

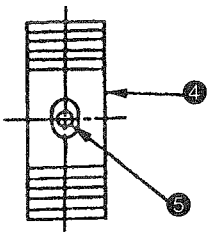


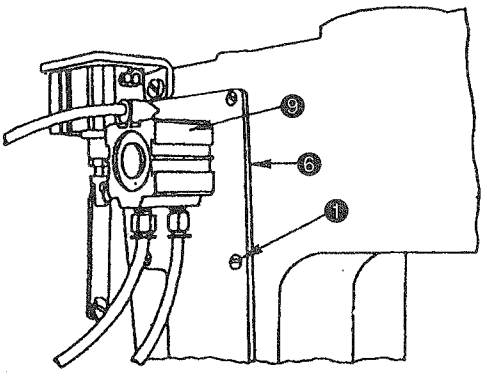


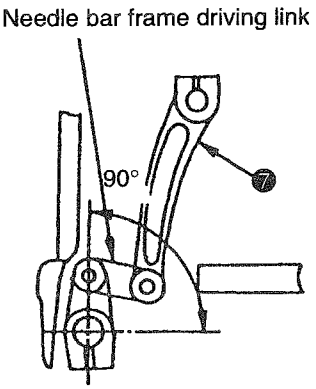
Adjustment Procedure	Results of Improper Adjustment
1. Set the dial to adjust the amount of alternating the vertical movement of the walking foot and presser foot to [1] on the scale. 2. Remove the top cover. 3. Set the stitch dial to maximum value on the scale. 4. Loosen the set screw of the reverse feed cylinder. (Except for LU-2212N-7) 5. Remove the reverse feed cylinder. (Except for LU-2212N-7) 6. Remove the aperture plate. 7. Loosen the set screw ❶ of the needle bar connecting rod. 8. Loosen the set screws ❷ of the thrust collars of the needle bar frame driving shaft. 9. Remove the presser spring regulating dial ❽. 10. Loosen the set screw ❸ of the presser spring regulating arm shaft. 11. Remove the presser adjusting spring ❾. 12. Remove the presser adjusting arm ❿. 13. Remove the presser spring regulating arm shaft ⓫. 14. Loosen the set screw ❹ of the thread take-up crankshaft. 15. Loosen the set screw ❺ of the thread take-up crankshaft support. 16. Draw out the thread take-up crankshaft ⓬. 17. Remove the triangular lever shafts ❻ and ❼. 18. Adjust the needle entry. 19. Fasten the set screws ❷ of the thrust collar. 20. Adjust the position of the thread take-up crankshaft support ⓭ in accordance with the position of the thread take-up crank ⓮. 21. Fasten the set screw ❺ of the thread take-up crankshaft support. 22. Insert the thread take-up crankshaft ⓬ into the thread take-up crank ⓮ until the shaft reaches the end face of the thread take-up crank. 23. Fasten the set screw ❹ of the thread take-up crankshaft. 24. Attach the triangular lever shafts ❻ and ❼ in place. 25. Attach the presser spring regulating arm ❿ in place. 26. Attach the presser spring regulating arm shaft ⓫ in place. 27. Fasten the set screw ❸ of the presser spring regulating arm shaft. 28. Attach the presser adjusting spring ❾. 29. Attach the presser spring regulating dial ❽ in place. 30. Set the stitch dial to [0] on the scale. 31. Adjust the needle entry in the needle slot of the feed dog ⓯ in the feeding direction. 32 . Fasten the clamping screw ❶ of the needle bar connecting rod. **(Caution) Fasten the screw with a tightening torque of 7.84 to 8.82N•m (80 to 90 kgf.cm).** 33. Attach the aperture plate in place. 34. Attach the reverse feed cylinder in place, and fasten the set screw in it. (Except for LU-2212N-7)	6' For how to remove or attach the aperture plate in LU-2212-N-7, refer to [3-(16) Aperture Plate Removal Procedure]. 17' Tilt the triangular lever ⓰, which has been set free, toward the presser bar lifting lever. At this time, eliminate a thrust play at the needle bar frame ⓱ and fasten the set screw while oscillating the needle bar frame ⓱ toward the operator. 20' At that time, move the thread take-up crank shaft support ⓲ and adjust so that the end face of the thread take-up crankshaft support ⓲ come in slight contact with the end face of the thread take-up crank, but providing no play between them. 21' Fasten the set screw while making the contact point of the thread take-up crankshaft support ⓲ with the screw straight up. 31' Refer to [2) Needle entry in the needle slot of the feed dog in the lateral direction in (3) Need Entry]. 32' At that time, fluctuate the needle bar connecting rod ⓲ to the right or left until the needle bar connecting rod ⓲ is approximately placed at the center of the play, and fasten the clamping screw.

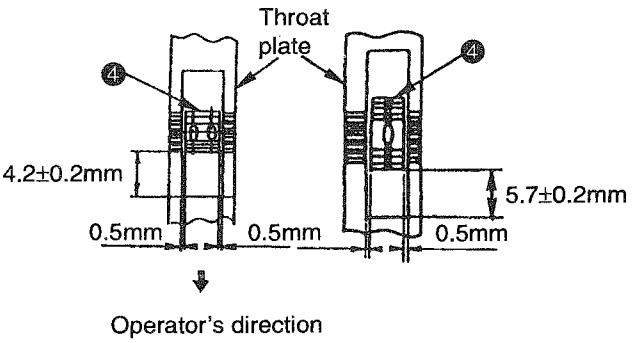
2) Needle entry in the needle slot of the feed dog in feeding direction

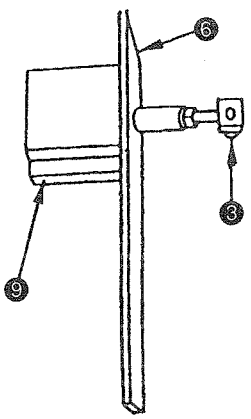
- Needle Entry Point
  The center of the needle slot in the feed dog ❹ must align the center of the needle ❺.
  (For the 2-needle type, both the two needles should be applied).
- Requirements:
  - The needle bar should be brought to the lowest dead point.
  - The stitch dial should be set to [0] on the scale.
  - The needle feeding arm should be made perpendicular.
  - The following clearance should be provided between operator's side end of the slot in the throat plate and the edge of the feed dog ❹.
    5.7 ± 0.2 mm → LU-2210N/W-7, LU-2212N-7
    4.2 ± 0.2 mm → LU-2260N/W-7 (For all gauge sizes)

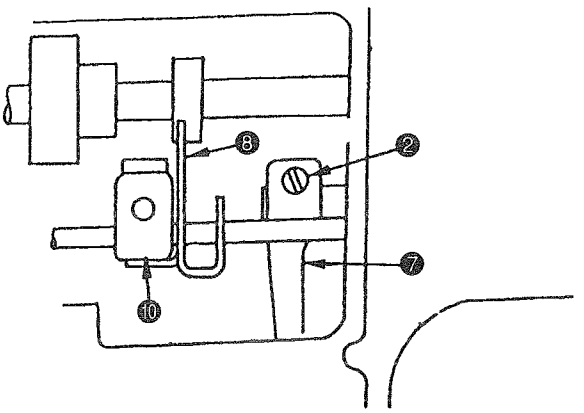










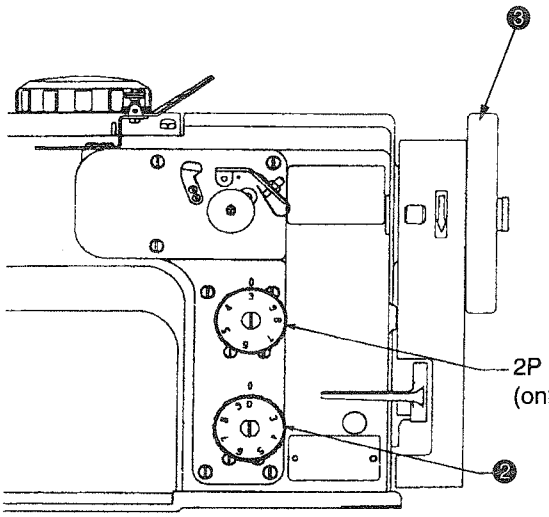


Adjustment Procedure	Results of Improper Adjustment
1. Set the stitch dial to [0] on the scale. 2. Loosen the aperture plate set screw ❶. 3. Remove the aperture plate ❻. 4. Loosen the clamping screw ❷ of the needle bar connecting rod. 5. Bring the needle bar to the lowest position of its stroke. 6. Align the center of the needle ❺ with the center of the feed dog ❹. 7. Fasten the set screw ❷ of the needle bar connecting rod. **(Cautions) Fasten the set screw with a tightening torque of 7.84 to 8.82N•m (80 to 90 kgf.cm).** 8. Raise the presser bar lifting lever. 9. Insert the hinge screw ❸ of the presser bar lifting cylinder ❾ into the forked section of the presser lifting lever ❽. 10. Make sure that the bottom face of the knee lifter arm A ❿ is engaged with the presser lifting lever ❽. 11. Attach the aperture plate ❻ in place. **(Caution) The feed amount of the needle is mechanically larger than the feed amount of the feed dog ❹ by 5%.**	o If the needle entry is adjusted too close to the operator: 1) The needle ❺ may interfere with the feed dog ❹, resulting in needle breakage. o If the needle entry is adjusted too far from the operator: 1) When the needle comes out of the slot in the throat plate, the needle ❺ may interfere with the feed dog ❹, resulting in thread breakage. 2) The needle ❺ may come in contact with the feed dog ❹ during the reverse feed stitching, resulting in needle breakage. 2' For how to remove the aperture plate in LU-2212N-7, refer to [3.-(16) Aperture Plate Removal Procedure (for LU-2212N-7)]. 7' At that time, move the needle bar connecting rod ❼ to the right or left until the needle bar connecting rod ❼ is positioned approximately at the center of the play. If the needle bar connecting rod is not correctly positioned, an excessive torque may result.

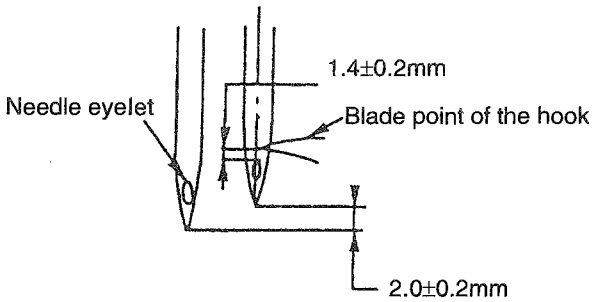
(4) Needle-to-Hook Relation

Standard Adjustment

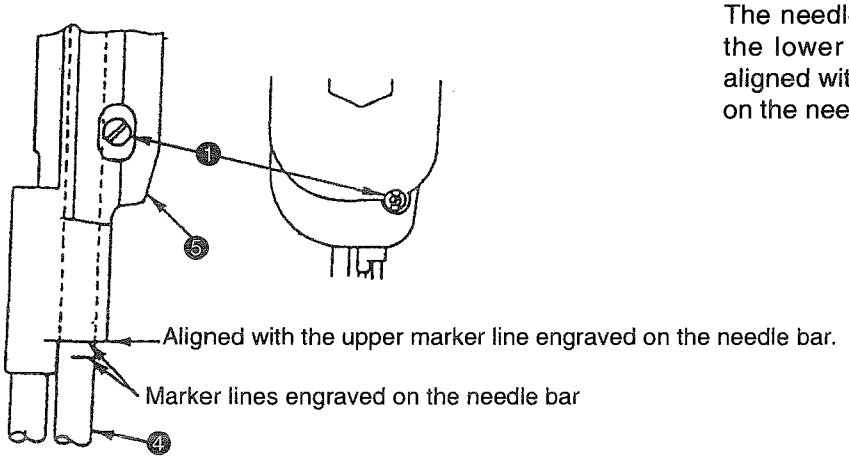
1) Height of the Needle Bar



Requirements:
The stitch dial should be set to [0].
The needle bar should be brought to the lowest dead point.



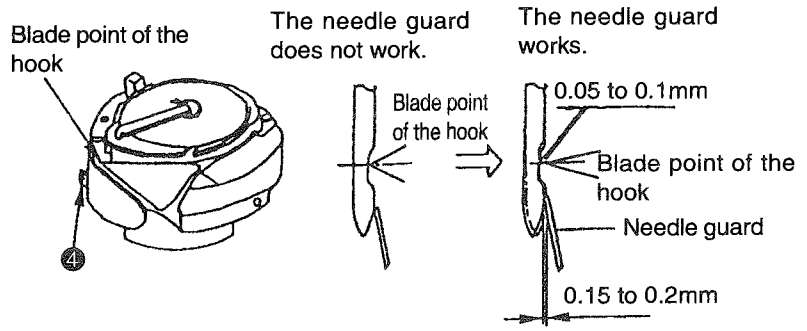
Adjust the height of the needle bar ❹ so that a distance of 1.4 ± 0.2 mm will be provided between the top end of the needle eye and the blade point of the hook when the needle bar is raised from its lowest dead point by 2.0 ± 0.2 mm.

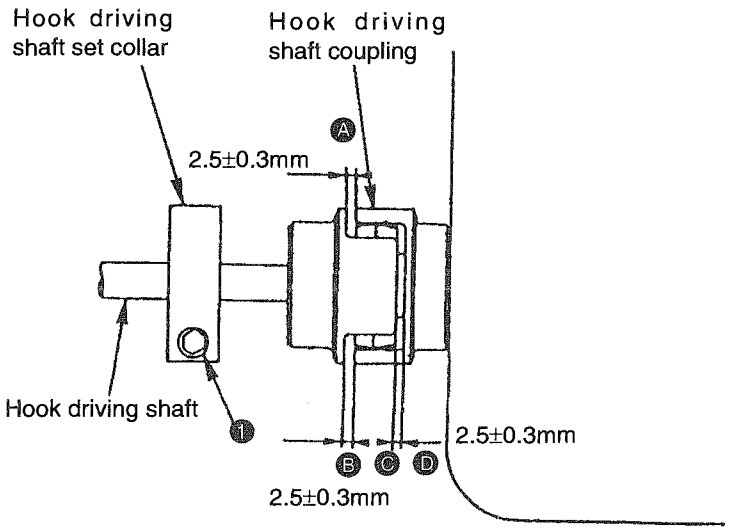


Reference:
The needle bar lowest dead point is where the lower face of needle bar frame ❺ is aligned with the upper marker line engraved on the needle bar.

Adjustment Procedure	Results of Improper Adjustment
1. Set the stitch dial ❷ to [0] on the scale. 2. Turn the hand-wheel ❸ to bring the needle bar ❹ to the lowest dead point. 3. Loosen the needle bar connecting stud clamping screw ❶. 4. Adjust the height of the needle bar ❹ to the specified dimension. 5. Fasten the needle bar connecting stud clamping screw ❶.	o Stitch skipping or thread breakage may result. 4' At that time, align the bottom face of the needle bar frame ❺ with the marker line engraved on the needle bar (the upper one of the two marker lines). This will enable you to adjust the height of the needle bar almost to the specified dimension.

2) Clearance between the Needle and the Blade Point of Hook



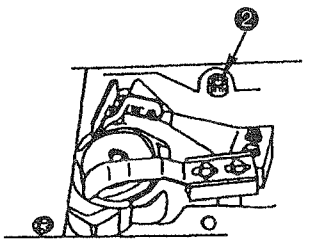


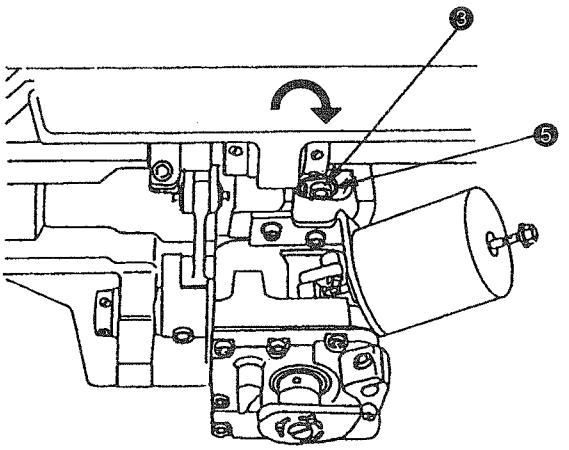
Clearance between the needle and the blade point of the hook

= 0.05 to 0.1 mm

Requirements:

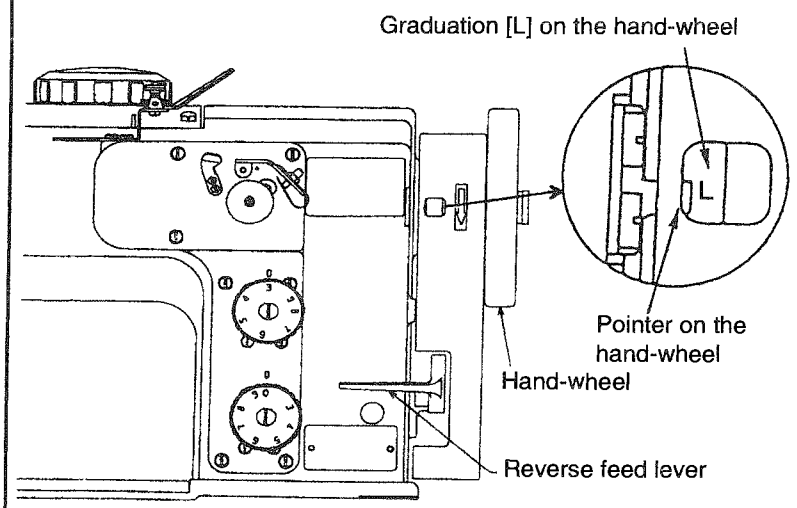
- The timing between the needle and the hook should be adjusted in advance.
- Effective amount of the needle guard: 0.15 to 0.2 mm
- The stitch dial should be set to [0] on the scale.





Adjustment Procedure	Results of Improper Adjustment
1. Remove the throat plate. 2. Set the stitch dial to [0] on the scale. 3. Loosen the clamping screw ❶ of the hook driving shaft set collar. 4. Slightly loosen the set screws ❷ and ❸ of the hook driving shaft saddle. 5. Move the hook driving shaft saddle to right and left to adjust the clearance provided between the needle and the blade point of hook to 0.05 to 0.1 mm. 6. Adjust the effective amount of the needle guard to 0.15 to 0.2 mm by turning the needle guard effective amount adjusting screw ❹. 7. Turn the eccentric pin ❺ of the hook driving shaft saddle with a screwdriver to move the hook driving shaft saddle in the opposite direction of the operator (↷) until it will go no further. 8. Fix the hook driving shaft saddle, holding it in the state describing in step 7, by fastening the set screws ❸ and ❷ in the hook driving shaft saddle in the written order. 9. At this time, confirm that the clearances Ⓐ, Ⓑ, Ⓒ and Ⓓ in the hook driving shaft coupling are respectively adjusted to 2.5 ± 0.3 mm. If not, adjust the clearances properly. 10. Confirm that the needle-to-hook timing is correct. If the timing is correct, fasten the clamping screw ❶ of the hook driving shaft set collar. if not, refer to [(4)-3 Timing between the Needle and the Hook].	o If the clearance between the needle and the blade point of the hook is too large: Stitch skipping or improper threading may result. o If the clearance between the needle and the blade point of the hook is too small: The needle may interfere with the blade point of the hook. As a result, the blade point of the hook may be damaged and thread breakage may be caused.

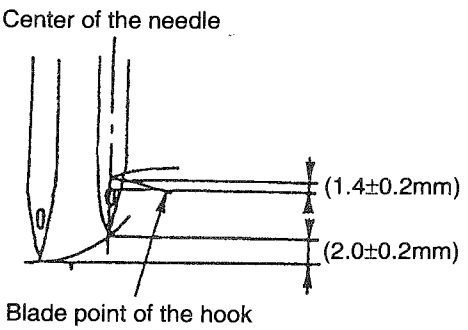
3) Timing between the Needle and the Hook

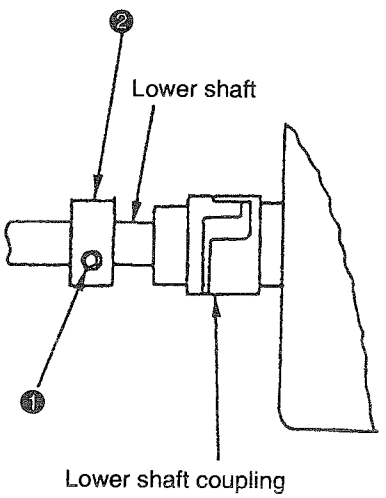


Align the center of the needle with the blade point of the hook.

Requirements:

- The hand-wheel pointer should point Graduation [L] on the hand-wheel.
- The stitch dial should be set to [0] on the scale.
- The adjustment should be performed after the needle bar has been adjusted to the correct height.

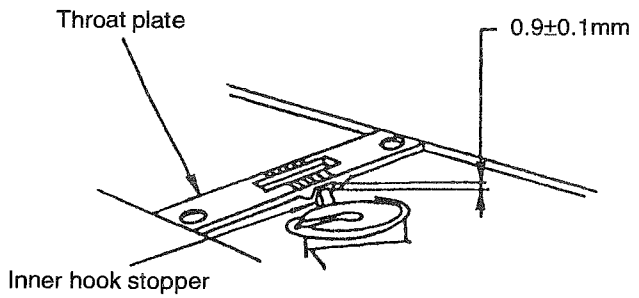


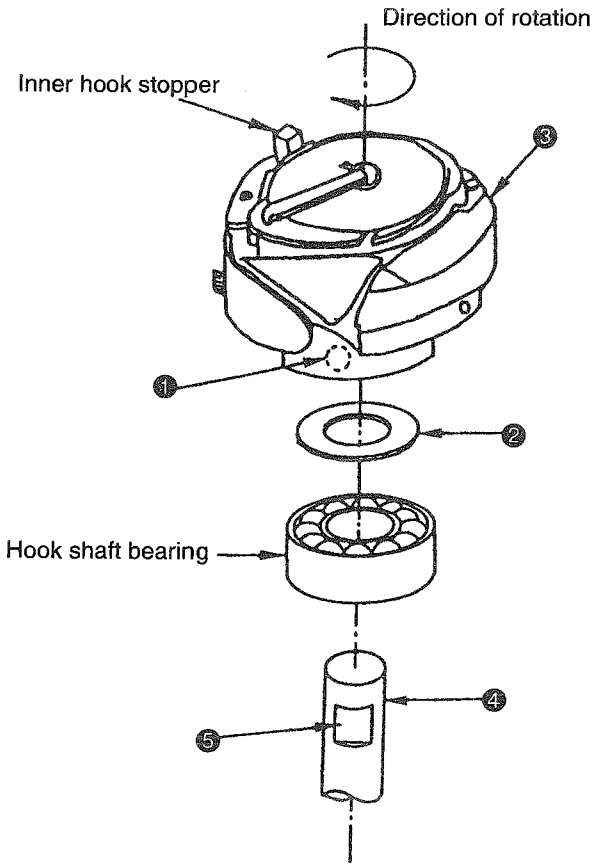


Adjustment Procedure	Results of Improper Adjustment
1. Set the stitch dial to [0] on the scale. 2. Loosen the set screw ❶ of the set collar ❷ of the hook driving shaft. 3. Align the hand-wheel pointer with Graduation [L]. 4. Turn the hook in the normal direction until the blade point of the hook is aligned with the center of the needle. 5. Fasten the set screw ❶. **(Caution) Adjust the needle entry in the needle slot of the feed dog with reference to the feeding direction prior to the adjustment of "Timing between the needle and the hook".**	o Loose stitches, stitch skipping or thread breakage may result. 3' Refer to [3-(1) Types and Names of Graduations on the Hand-wheel]. 5' Hold the hook by hand at the correct position to maintain accurate needle-to-hook timing and fasten the set screw ❶.

(5) Clearance between the Throat Plate and the Inner Hook Stopper

Standard Adjustment





o Hook Shaft Thrust Plate ❷

Thickness (mm)	Part No.
1.4	10111201
1.5	10109809
1.6 (Standard)	10112506
1.7	10112605
1.8	10112704

Adjustment Procedure	Results of Improper Adjustment
1. Select an appropriate thrust plate ❷ of the hook shaft and adjust the clearance at the thrust plate. 2. Set the hook ❸ over the hook shaft ❹ while pressing the hook down to prevent any axial play. When fastening the set screws ❶ of the hook, first fasten the set screw No. 1, by reference to the direction of rotation, of screws on the flat section ❺ of the hook shaft ❹. Then, fasten the set screw No. 2, in terms of the direction of rotation, of screws. 3. For how to adjust the thread trimmer after the completion of the adjustment of the clearance between the throat plate and the inner hook stopper, refer to [3-(10) and (11) Thread Trimmer].	o If the clearance between the throat plate and the inner hook stopper is too large: • The inner hook may come off the throat plate. o If the clearance between the throat plate and the inner hook stopper is too small: • Loose stitches (isolated idling loops) may result. • The moving knife may interfere with the hook at the time of thread trimming.

(6) Timing of the Cloth Feed Action

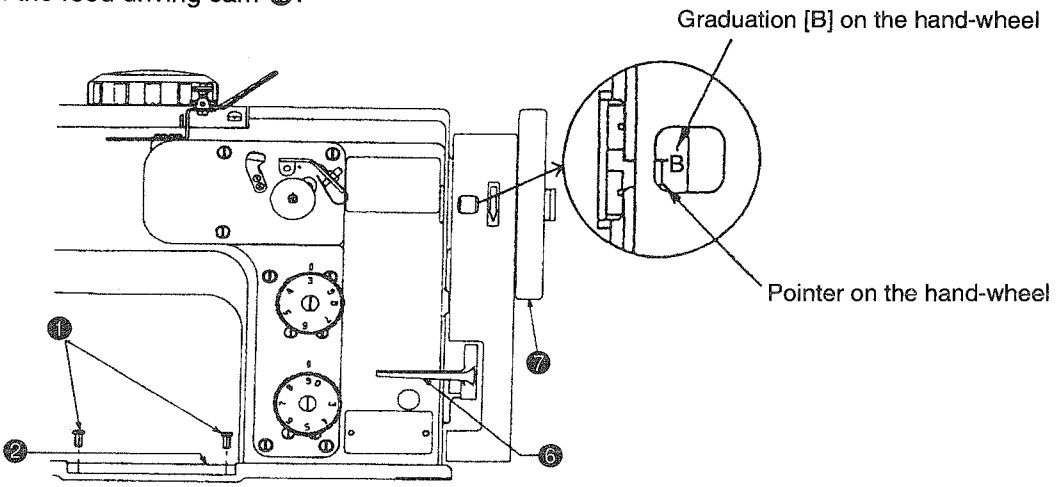
Standard Adjustment

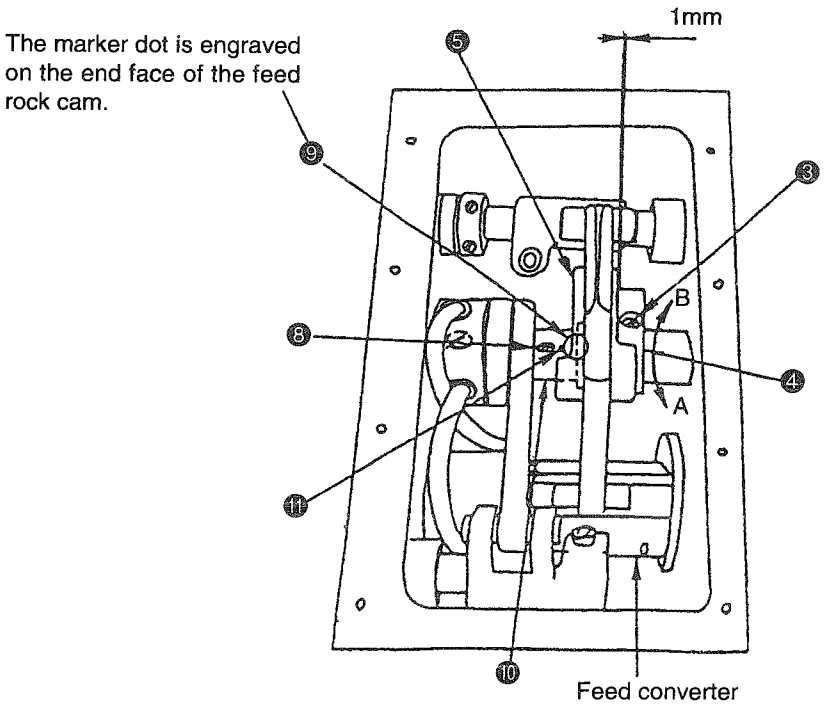
1) Horizontal Feed Timing

- Set the stitch dial to the maximum value on the scale.
- Align the hand-wheel pointer with the graduation [B] on the handle-wheel. In this state, move the reverse feed lever ❻ up and down until the feed dog does not move in the feeding direction. Then fasten the feed lock cam set screw ❸.
  Reference:
  When the hand-wheel pointer is aligned to the graduation [B] on the hand-wheel, the set screw No. 1 ❸ (in terms of the direction of rotation) on the feed rock cam ❹ is nearly brought to the top.

2) Vertical Feed Timing

Adjust so that the mark ❾ (marker dot engraved on the end face of the feed rock cam) on the feed rock cam ❹ is in line with the mark ⓫ (marker dot engraved on the feed driving cam). Then, fasten the set screw ❽ of the feed driving cam ⓫.

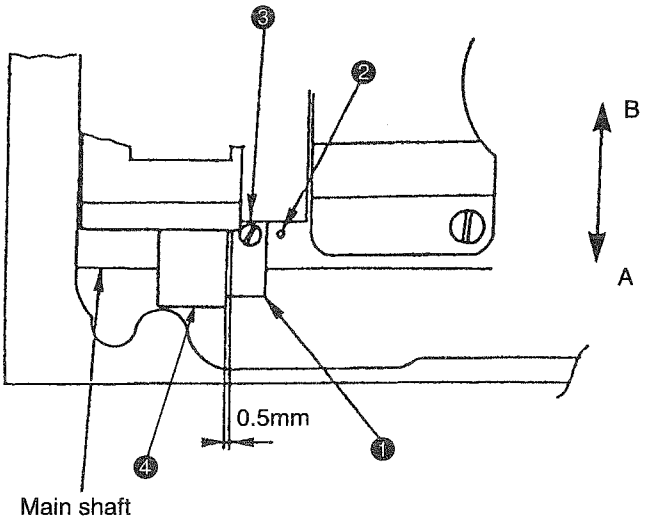




Adjustment Procedure	Results of Improper Adjustment
1) Horizontal Feed Cam Timing 1. Loosen the set screws ❶ of the bed top cover. 2. Remove the bed top cover ❷. 3. Loosen the Horizontal Feed Cam set screw ❸. 4. Observing the notch on the belt cover, turn the hand-wheel ❼ until the hand-wheel pointer is aligned with the graduation [B] on the hand-wheel. 5. Turn the Horizontal Feed Cam ❹ while moving the reverse feed lever ❻ up and down until the feed dog will not fluctuate. Now fix the feed rock cam. 6. A clearance of 1 mm should be provided between the end face of the feed rock rod ❺ and the end face of the Horizontal Feed Cam ❹. 7. Fasten the Horizontal Feed Cam set screw ❸. **(Cautions) 1. Take care not to allow any such foreign matter as a screw to enter the bed tank.** **2. Adjust the timing within the range of ±5° from the standard timing.** **3. After the feed rock timing has been adjusted, re-adjust the feed driving timing.**	o Improper stitch length may result when the machine is operated at high-low speed. o Thread tension may change from the correct one. o Tightness of normal and reverse stitches may be different from each other. 4' Refer to [3-(1) Types and Names of Graduations on the Hand-wheel]. 5' At that time, the screw No. 1 ❸ in the Horizontal Feed Cam ❹, in terms of the direction of rotation, is almost straight up. o When the Horizontal Feed Cam ❹ is fixed after turning it toward the operator (in the direction of arrow A) from the standard adjustment position, the Horizontal Feed Timing will be advanced. When the Horizontal Feed Cam is fixed after turning it away from the operator (in the direction of arrow B) from the standard adjustment position, the Horizontal Feed Timing is retarded.
2) Vertical Feed Timing 1. Perform the adjustment after adjusting the Horizontal Feed Timing. 2. Loosen the vertical feed cam set screw ❽. 3. Adjust so that the mark ❾ (marker dot engraved on the end face of the Horizontal Feed Cam ❹) on the Horizontal Feed Cam is in line with the mark ❶❶ (marker dot engraved on the Vertical Feed Cam ❶❶). **(Cautions) 1. Take care not to allow any such foreign matter as a screw to enter the bed tank.** **2. Adjust the timing within the range of ±5° from the standard timing.**	o Improper stitch length may result when the machine is operated at high/low speed. 3' At this time, if the feed driving timing is properly adjusted, the feed dog is positioned on the side of the operator and the top surface of the feed dog is almost flush with the top surface of the throat plate. o When the Vertical Feed Cam ❶❶ is fixed after turning it toward the operator (in the direction of arrow A) from the standard adjustment position, the feed driving timing will be advanced. When the Vertical Feed Cam is fixed after turning it away from the operator (in the direction of arrow B) from the standard adjustment position, the Vertical Feed Timing is retarded.

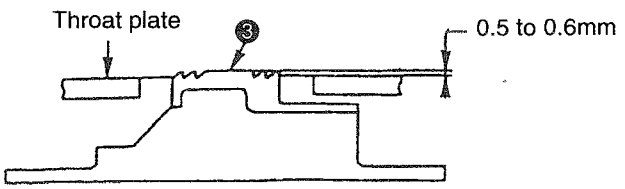
3) Upper Feed Timing

Set marker dot ❷ engraved on the periphery of the main shaft in line with the set screw No. 1 ❸ of the upper feed cam ❶ and fasten the set screws No. 1 ❸ and No. 2.

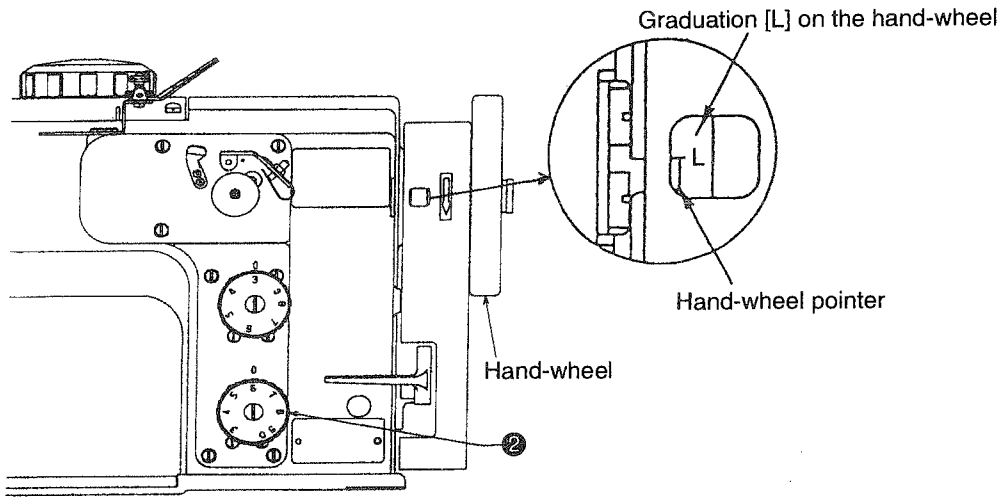


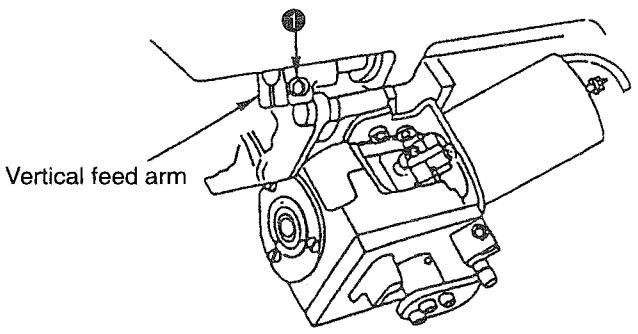
Adjustment Procedure	Results of Improper Adjustment
1. Loosen the set screw of the top cover. 2. Remove the top cover. 3. Turn the hand-wheel to bring the marker dot ❷ engraved on the periphery of the main shaft to the top. 4. Loosen the No.1 set screw ❸ and No. 2 screw of the upper feed cam ❶. 5. Align the marker dot ❷ engraved on the periphery of the main shaft with the set screw No. 1 ❸ of the upper feed cam ❶. 6. Fasten the set screws No.1 ❸ and No. 2 of the upper feed cam ❶. **(Cautions) 1. Take care not to allow any foreign matter such as a screw to enter the arm.** **2. Adjust the timing within the range of ±5° from the standard timing.**	o Improper stitch length may result when the machine is operated at high/low speed. o When the upper feed cam ❶ is turned toward the operator (in the direction of arrow A), the upper feed timing will be earlier than the standard timing. When the upper feed cam is turned away from the operator (in the direction of arrow B), the upper feed timing will be retarded more than the standard timing. 5' At that time, make sure that the clearance of 0.5 mm is provided between the end face of the upper eccentric rod ❹ and the end face of the periphery of the upper feed cam ❶.

4) Height of the Feed Dog



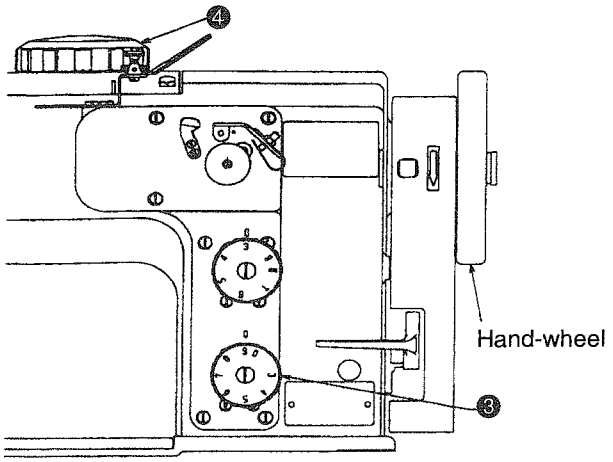
Height of the feed dog: 0.5 to 0.6 mm
Requirements:
- Set the stitch dial to [6] on the scale.
- Align the hand-wheel pointer with the graduation [L] on the hand-wheel.





Adjustment Procedure	Results of Improper Adjustment
1. Set the stitch dial ❷ to [6] on the scale. 2. Slightly loosen the clamping screw ❶ of the vertical feed arm. 3. Align the hand-wheel pointer with the graduation [L] on the hand-wheel. 4. Adjust the height of the feed dog ❸ to 0.5 to 0.6 mm. 5. Fasten the clamping screw ❶ of the vertical feed arm. **(Caution) Fasten the clamping screw with a tightening torque of 5.88 to 6.86N•m (60 to 70 kgf•cm).**	If the height of the feed dog is excessive: o The material may be fed backward in the normal feed mode. If the height of the feed dog is insufficient: o The stitch length may become shorter than the specified value. 3' Refer to [3.-(1) Types and Names of Graduations on the Hand-wheel].

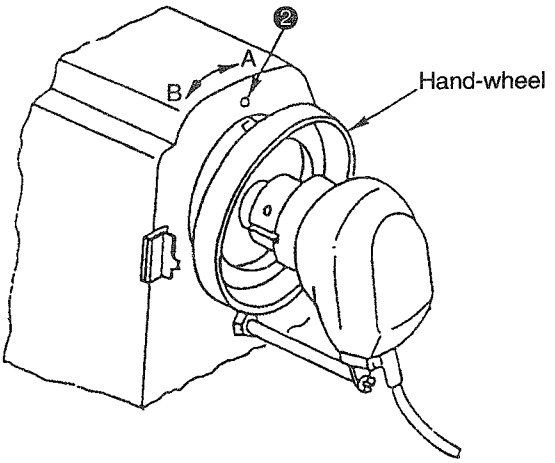
5) Amount of alternating vertical movement of the walking foot and presser foot (Balance between the lifting amounts of the presser foot and walking foot)

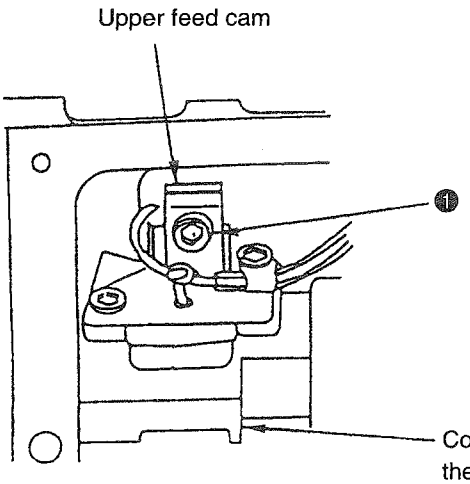


Align the marker dot ❷ engraved on the top feed arm with the graduation [L] on the hand-wheel. Then, fasten the upper feed cam clamping screw ❶.

Requirements:

- The dial for setting the amount of alternating vertical movement of the walking foot and presser foot should be set to [1].
- The stitch dial should be set to the maximum value on the scale.
- The sole of the presser foot should rest on the throat plate.
- Make the walking foot come in contact with the feed dog.
- The upper feed timing has already been properly adjusted before the adjustment of the amount of alternating vertical movement of the walking foot and presser foot.



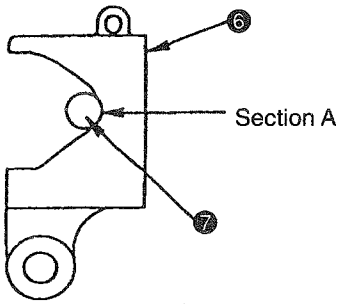


Adjustment Procedure	Results of Improper Adjustment
1. Set the stitch dial ❸ to the maximum value on the scale. 2. Set the dial ❹ for setting the amount of alternating vertical movement of the walking foot and presser foot to [1] on the scale. 3. Remove the rubber plug from the top cover. 4. Loosen the upper feed cam clamping screw ❶ from the hole where the rubber plug has been removed. 5. Align the marker dot ❷ engraved on the top feed arm with the graduation [L] on the hand-wheel. 6. In the state described in step 5, make the walking foot rest on the feed dog and make the presser foot come in contact with the throat plate. 7. Fasten the upper feed cam clamping screw ❶.	o Improper stitch length may result when the machine is operated at high/low speed. o The lifting amount of the presser foot or the walking foot would be decreased. As a result, the material may not be fed smoothly. 5' If the graduations on the hand-wheel shift in the direction A from the marker dot ❷, the lifting amount of the walking foot will decrease and the lifting amount of the presser foot will increase. If the graduations on the hand-wheel shift in the direction B, the former will increase and the latter will decrease.

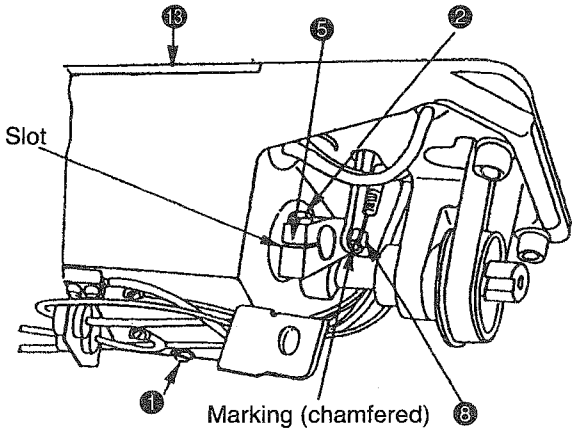
(7) Adjustment of the Feed Mechanism

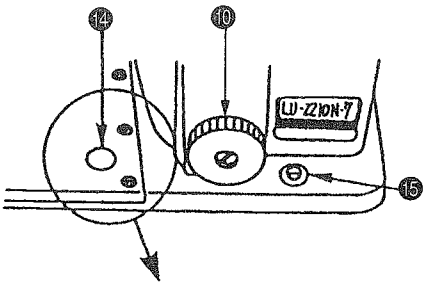
Standard Adjustment

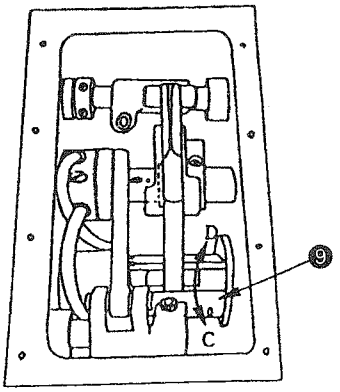
1) Zeroing of the feed adjusting mechanism

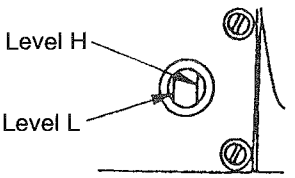


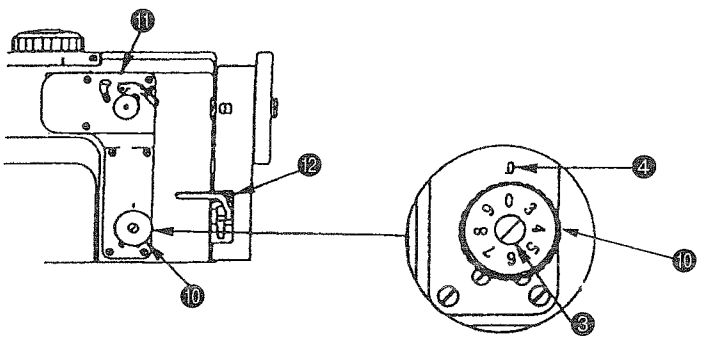
- Align the feed adjusting pin ❼ with the section A of the feed adjusting belt ❻.
- Make sure that the marking on the feed adjusting eccentric pin ❽ faces in the same direction as the slot in the feed adjustment change arm ❺.
- Tilt the feed change belt ❾ in the direction of C or D until the feed amount of the feed dog becomes zero (0). At that position, fasten the set screw ❷.
- Align the marking ❹ of the face aperture plate ⓫ on the front face of the machine with [0] on the scale of the stitch dial ⓾.









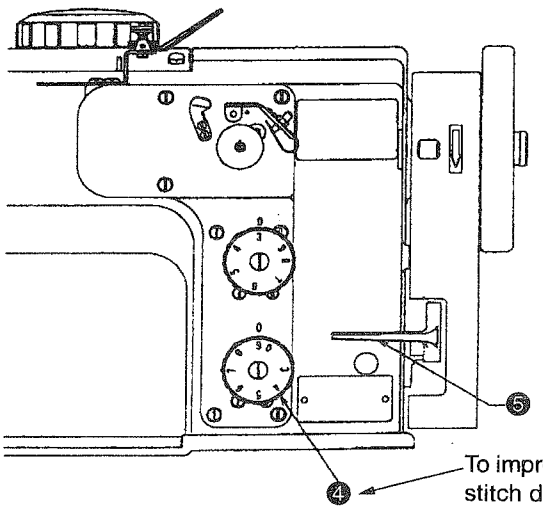


Adjustment Procedure	Results of Improper Adjustment
1. Turn the stitch dial ⑩ clockwise while moving the reverse feed lever ⑫ up and down until the feed adjusting pin ⑦ meets the section A of the feed adjusting belt ⑥. At that time, the feed adjusting pin ⑦ and the feed adjusting belt ⑥ cannot be observed. The above-mentioned adjustment allows the operator to feel by hand that the reverse feed lever ⑫will no longer come down. 2. Make sure that the marking (chamfered) on the feed adjusting eccentric pin ⑧ faces in the same direction as the slot in the feed adjustment change arm ⑤. 3. Loosen the drain cock ① and expel the oil from the drain opening. 4. Remove the top cover ⑬ of the bed. 5. Loosen the set screw ② of the feed adjustment change arm ⑤. 6. Turn the hand-wheel in the normal direction of rotation to adjust the feed change belt ⑨ so that the feed amount of the feed dog is set to zero (0). 7. Fasten the clamping screw ② in the feed adjustment change arm ⑤. **(Caution) Fasten the screw ② with a tightening torque of 3.43 to 4.41N•m (35 to 45 kgf•cm).** 8. Supply oil to the machine. (Check it through the oil sight window ⑭.) 9. Loosen the set screw ③ of the stitch dial ⑩. 10. Align zero (0) on the scale of the stitch dial ⑩ with the marking ④ on feed aperture plate ⑪ of the front face of the machine. 11. Fasten the set screw ③ of the stitch dial ⑩.	o The actual stitch length will greatly differ from the value set on the stitch dial ⑩. 6' When the feed change belt ⑨ is tilted in the direction of arrow C, the feeding amount in the normal direction will increase. When the feed crank stud is tilted in the direction of arrow D, the feeding amount in the reverse direction will increase. 8' Supply oil from the oil port ⑮ while checking the oil level through the oil sight window ⑭. The amount of oil is sufficient when level H is reached. 11' At that time, take care not to allow the marking ④ to shift from the zero (0) point on the scale of the stitch dial ⑩.

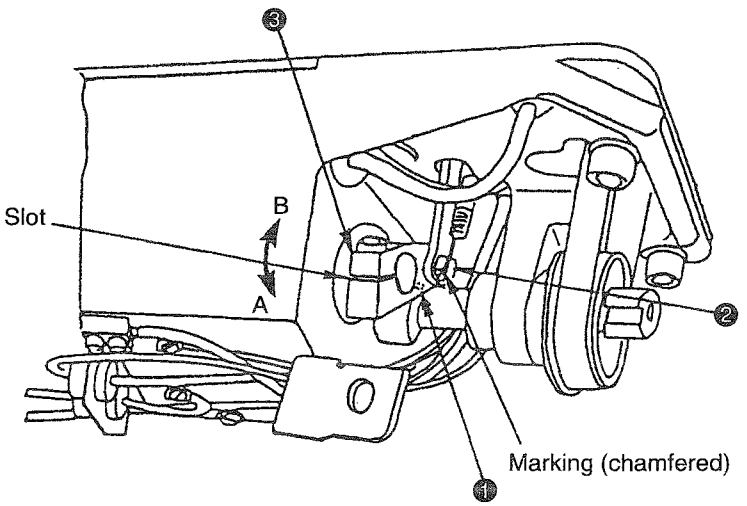
2) Stitch length in the normal feed and reverse feed

Stitch length will change in accordance with the positions of the marking (chamfered section) of the feed adjusting eccentric pin ❷ with respect to the slot in the feed adjusting change arm ❸ as described below:

- If the marking is tilted in the direction of arrow A ..... The stitch length of the normal feed stitching will decrease.
  The stitch length of the reverse feed stitching will increase.
- If the marking is tilted in the direction of arrow B ..... The stitch length for the normal feed stitching will increase.
  The stitch length of the reverse feed stitching will decrease.



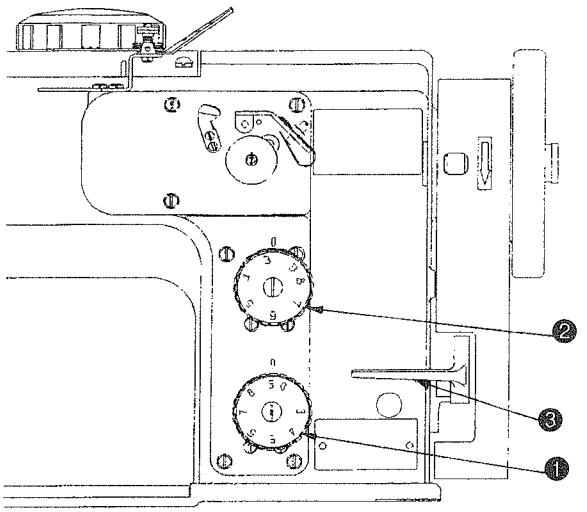
To improve ease of operation, set the stitch dial ❹ to the maximum value on the scale before loosening the set screw ❶.

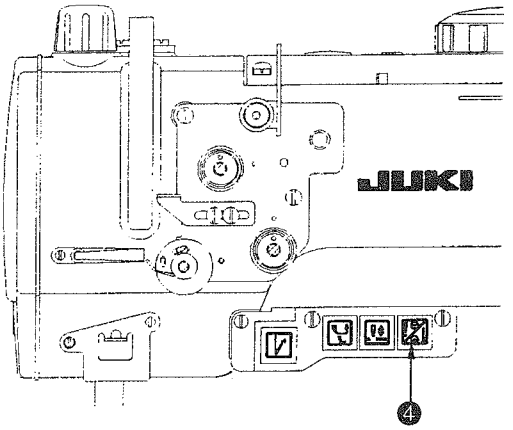


Adjustment Procedure	Results of Improper Adjustment
1. Set the stitch dial ❹ to the maximum value on the scale. 2. Lower the reverse feed lever ❺. 3. Slightly loosen the set screw ❶ of the feed adjusting eccentric pin ❷. 4. Set the stitch dial ❹ to [0] on the scale. 5. Make the marking (chamfered section) of the feed adjusting eccentric pin ❷ in the direction of the slot in the feed adjustment change arm ❸. 6. In the state of step 5, fasten the set screw ❶.	o The stitch length specified may not be equally obtained in the normal feed stitching and the reverse feed stitching, resulting in excessive stitch length error between the normal feed stitching and the reverse feed stitching. 5' Turning the feed adjusting eccentric pin ❷ downward (in the direction of arrow A) decreases the stitch length for the normal feed stitching and increases the stitch length for the reverse feed stitching. Turning the feed adjusting eccentric pin upward (in the direction of arrow B) increases the stitch length for the normal feed stitching and decreases the stitch length for the reverse feed stitching. o The machine has been factory-adjusted so that stitch length error in the normal/reverse feed stitching does not exceed ± 10% of the specified value when the stitch dial ❹ is set to [6] on the scale.

3) 2P Adjustment (for LU-2212N-7)

How to zero for the 2P adjustment





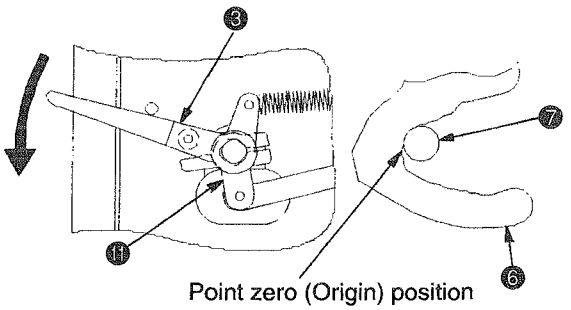


Fig. A

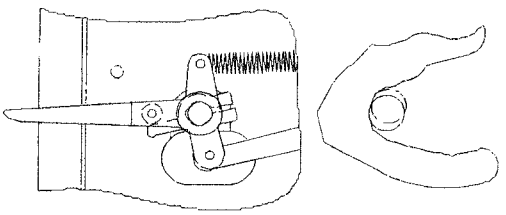


Fig. B

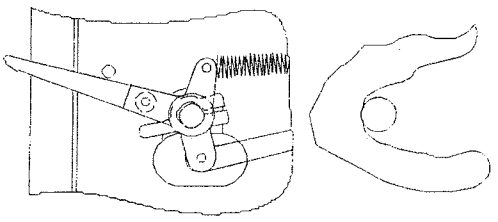
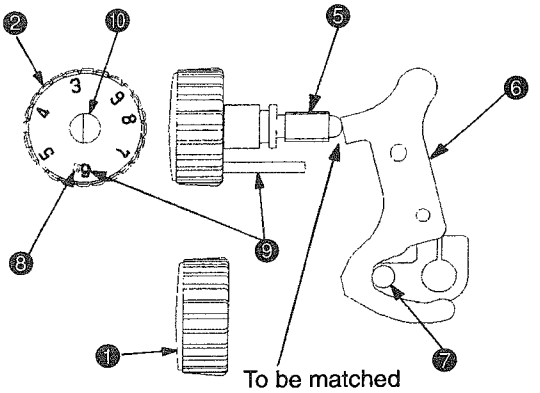


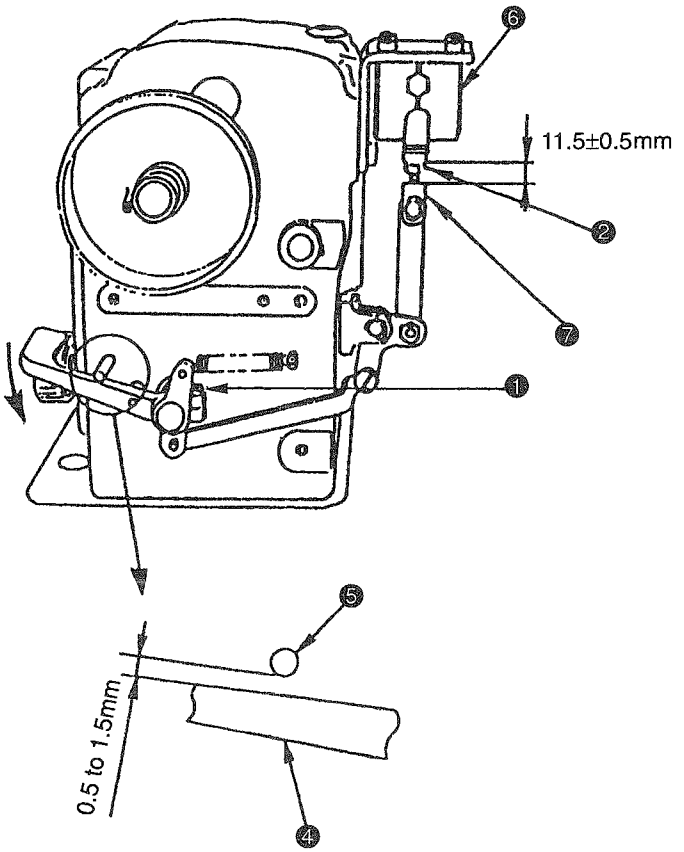
Fig. C



Adjustment Procedure	Results of Improper Adjustment
1. Remove the belt from the hand-wheel on the machine head. 2. Remove the pulley cover from the motor, and then, remove the belt. 3. Turn ON the power switch. 4. Set the stitch dial ❶ to the maximum value (P=9) on the scale. 5. Turn the 2P stitch dial ❷ counterclockwise and remove the 2P stitch dial screw ❺. 6. Turn ON the 2P switch ❹. (The air cylinder will work so that the relationship between the 2P feed regulator ❻ and feed adjusting pin roller ❼ is set as shown in Fig. A). 7. Lower the reverse feed lever ❸ so that the cam section (point zero position) of the 2P feed regulator ❻ is aligned with the feed adjusting pin roller ❼) (Fig. B). At that time, the reverse feed connecting arm ⓫ is fixed as shown in Fig. C. 8. Turn the 2P stitch dial ❷ clockwise slowly until a slight load is felt (easily sensed by hand), to align the 2P stitch dial screw ❺ with the 2P feed regulator ❻. At that time, if the dial stopper ❽ on the 2P stitch dial ❷ is matched with the stitch dial pin ❾ and the dial can not be turned any more, loosen the 2P stitch dial set screw ❿ and adjust the dial position. In the case of adjusting the dial position, adjust it so that around the front or back where the 2P stitch dial adjusting screw ❺ is aligned with the 2P feed regulator ❻, the dial stopper ❽ does not match with the stitch dial pin ❾. **(Caution) If the 2P stitch dial ❷ is forcibly turned, after the 2P stitch dial screw ❺ is aligned with the 2P feed regulator ❻, the point zero position for the 2P adjustment would be shifted.** 9. Loosen the 2P stitch dial set screw ❿. 10. Turn the 2P stitch dial ❷ counterclockwise to align with the dial stopper ❽ position. 11. Fasten the 2P stitch dial set screw ❿. **[Confirmation]** 1. Perform the above adjusting procedure steps No. 1. through 4. 2. Turn the 2P stitch dial ❷ counterclockwise and set it at where it stops (at where it is stopped with the dial stopper ❽). 3. Turn on the 2P switch ❹. 4. Perform the above adjusting procedure step No. 7. and align the cam section (point zero position) of the 2P feed regulator ❻ with the feed adjusting pin roller ❼. Then, when the hand-wheel is turned and the stitch length set to zero, the 2P stitch dial point zero setting will have been completed. If it is not (if the stitch length is not set to zero), perform the adjustment again.	3' In some motor versions an alarm might sound because they are not equipped with belt and alarm output. However, the alarm will be stop after some seconds so that, then, continue the procedure. 10' For the 2P stitch dial ❷, the position where it is stopped with the dial stopper ❽, is the point zero position in the adjustment.

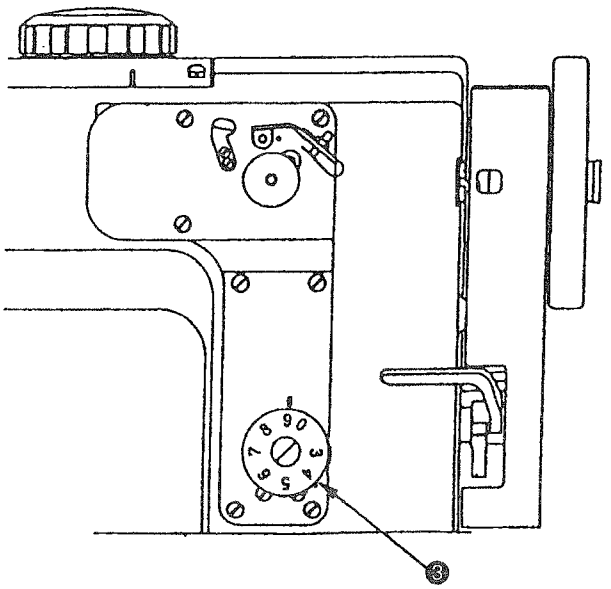
(8) Position of the Reverse Feed Connecting Arm

Standard Adjustment



Requirement:

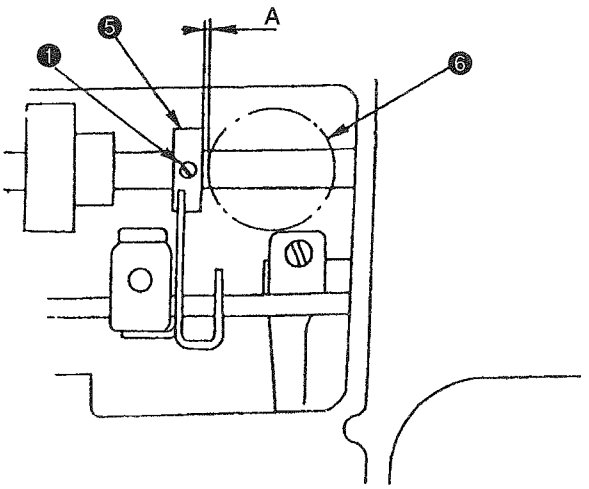
- The stitch dial should be set to the maximum value on the scale.



Adjustment Procedure	Results of Improper Adjustment
Reverse Feed Lever Position Adjustment 1. Set the stitch dial ❸ to the maximum value on the scale. 2. Fasten the clamping screw ❶ of the reverse feed connection arm. 3. Adjust so that the clearance of 0.5 to 1.5 mm is provided between the reverse feed lever ❹ and the stopper ❺ when the reverse lever ❹ is slightly pressed down. Then, fasten the clamping screw ❶. **(Caution) For a sewing machine equipped with the touch-back mechanism, a clearance of 11.5 ± 0.5 mm should be provided between the top end of the rod of the reverse feed cylinder ❻ and the reverse feed cylinder knuckle joint ❼.** **Fasten the locknut ❷ securely in the reverse feed cylinder knuckle joint ❼.**	If the clearance between the stopper and the reverse feed lever is too large: o The top end of the reverse feed lever ❹ will interfere with the bed. As a result, the stitch length for the reverse feed stitching may be shortened. If the clearance between the stopper and the reverse feed lever is too small: o The reverse feed lever ❹ will interfere with the stopper ❺. As a result, stitch length for the normal feed stitching may be shortened.

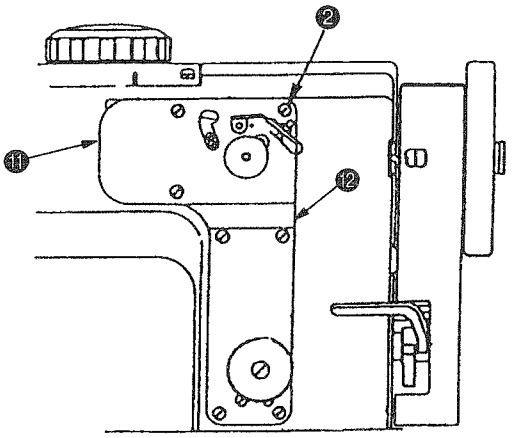
(9) Bobbin Winder

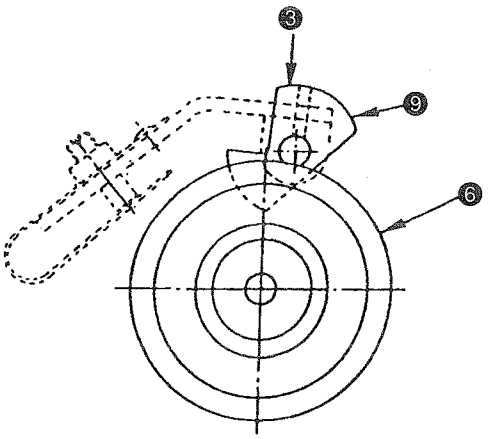
Standard Adjustment

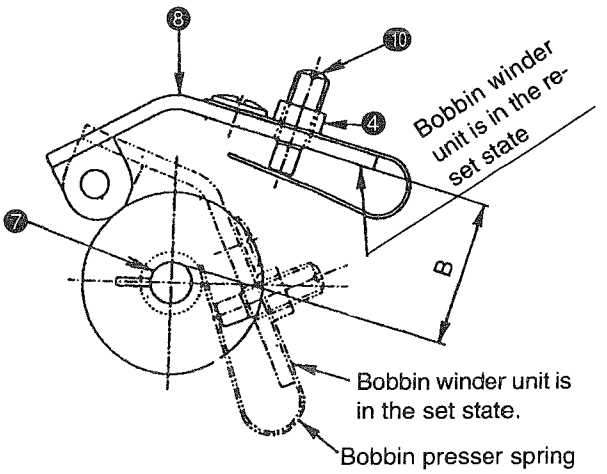


A : 0.3 to 0.6 (mm)
B : 25.5±0.5 (mm)

Note that A and B are in the reset state.







(Caution) The above figure is illustrated as seen from the rear side of the machine head with the face aperture plate ⑫ on the front of the machine head removed.

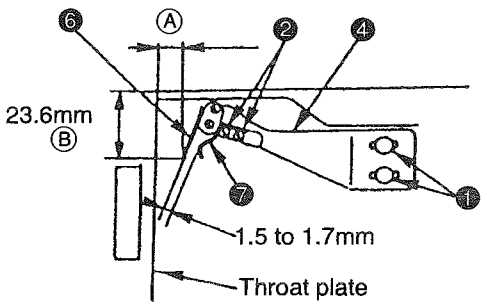
Adjustment Procedure	Results of Improper Adjustment
1) Bobbin Winder Friction Wheel Adjustment 1. Loosen the reverse feed cylinder set screw. (Except for LU-2212N-7) 2. Remove the reverse feed cylinder. (Except for LU-2212N-7) 3. Remove the side plate. 4. Set the bobbin winder in the reset state. 5. Loosen the screw No. 1 ❶ in the bobbin winder friction wheel ❺. 6. Adjust the clearance A between the bobbin winder friction wheel ❺ and the friction ring ❻ to 0.3 to 0.6 mm. 7. Fasten the set screw ❶ of the bobbin winder friction wheel ❺. 8. Set the bobbin winder in the operating position and make sure that the bobbin winder shaft rotates normally. 9. Attach the aperture plate in place.	3' For how to remove the aperture plate of LU-2212N-7, refer to [(16) Aperture Plate Removal Procedure (for LU-2212N-7)]. 8' If the bobbin winder fails to rotate normally, finely adjust the clearance between the bobbin winder friction wheel ❺ and the friction ring ❻. 9' Attach the aperture plate referring to step 8~11. in [3.-(3)-2) Needle entry in the needle slot of the feed dog in feeding direction].
2) Bobbin Winding Amount Adjustment 1. Loosen the face aperture plate set screw ❷ on the front of the machine head. 2. Remove the face aperture plate ⓬ on the front of the machine head. 3. Loosen the set screw ❸ of the bobbin winder cam ❾. 4. Adjust the distance B from the bobbin winder shaft ❼ to the bobbin presser ❽ to 25.5 ± 0.5 mm. 5. Fasten the set screw ❸ of the bobbin winder cam ❾. 6. Attach the face aperture plate ⓬ to the front of the machine head. 7. Operate the sewing machine to perform bobbin winding. 8. Securely fasten the hexagon nut ❹.	2' For LU-2212N-7, remove the face aperture plate (A) ⓫ on the front of the machine head. 6' For LU-2212N-7, attach the face aperture plate A ⓫ on the front of the machine head. 7' Adjust so that the bobbin is wound with thread up to approximately 80% of its capacity (diameter of the bobbin wound with thread: 23.3 mm) by turning the bobbin winding amount adjusting screw ⓾.

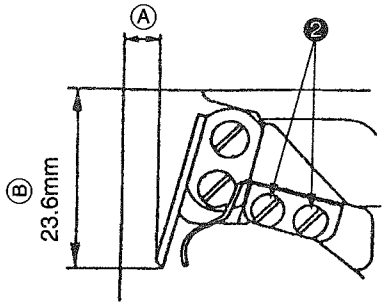
(10) Thread Trimmer (for LU-2210N/W-7 and LU-2260N/W-7)

Standard Adjustment

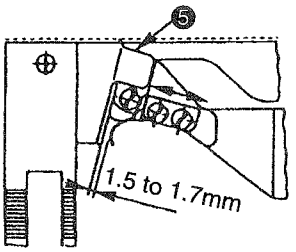
1) Counter Knife

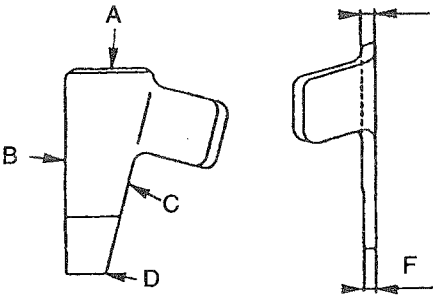
2) Clamp Spring





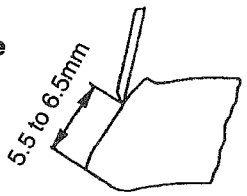
Model	Dimension Ⓐ (mm)
LU-2210N-7	4.8
LU-2260N-7	
LU-2210W-7	5.2
LU-2260W-7	

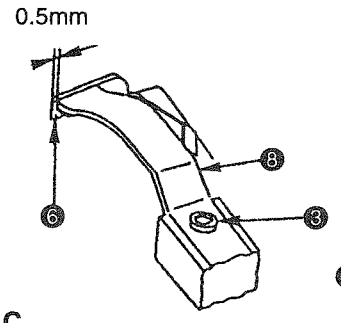




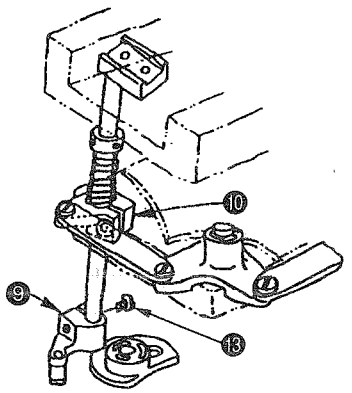
Counter knife gauge ❺

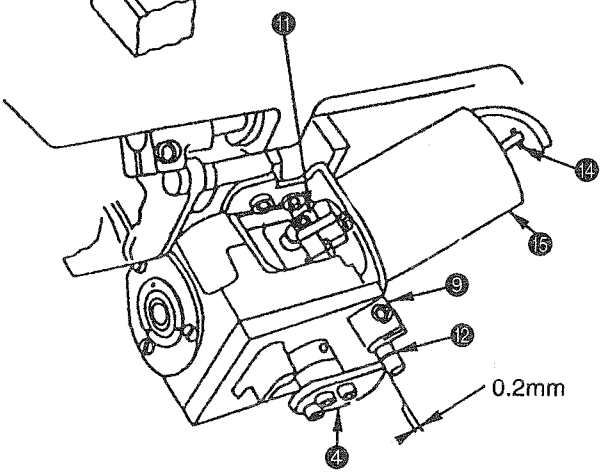
3) Knife Pressure





4) Moving Knife Driving Arms A, B and C





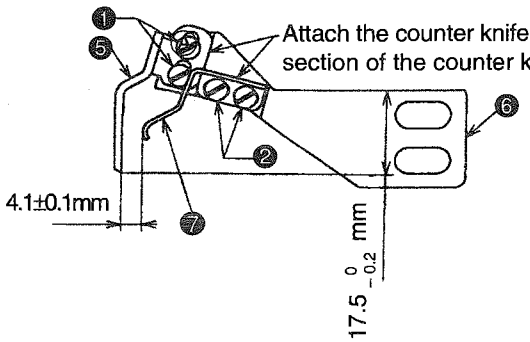
Adjustment Procedure	Results of Improper Adjustment
1) Counter Knife 1. Loosen the set screws ❶ of the counter knife base ❹. 2. Bring the counter knife ❻ to the position shown in the left figure, using the counter knife gauge ❺ supplied with the machine. At that time, adjust the counter knife gauge ❺ so that the section A of the counter knife gauge ❺ should come in contact with the attaching groove on the bed slide plate, and the section B should come in contact with the end face of the throat plate. 3. Move the counter knife gauge base ❹ to adjust so that the counter knife ❻ comes in contact with the sections C and D of the counter knife gauge ❺. Then, fasten the set screws ❶.	o If the dimension Ⓐ is larger: • Knife pressure will be higher. As a result, the motor may be unnecessarily stopped. o If the dimension Ⓐ is smaller: • Knife pressure will be lower, resulting in thread breakage. o If the dimension Ⓑ (23.6 mm) is larger: • The length of the bobbin thread to be clamped will be shortened, resulting in stitch skipping. o If the dimension Ⓑ (23.6 mm) is smaller: • Thread trimming failure may occur.
2) Clamp Spring 1. Loosen the set screws ❷ of the clamp spring ❼. 2. Adjust the clearance between the clamp spring ❼ and the counter knife ❻ by sliding the clamp spring ❼ along the surface of the counter knife base ❹ on which the clamp spring ❼ is to be attached. At this time, adjust the clearance using the sections E and F of the counter knife gauge ❺. 3. Thickness of the section E is 1.7 mm and that of section F is 1.5 mm. Adjust the position of the clamp spring ❼ so that the section E of the gauge does not smoothly pass through the clearance provided between the clamp spring ❼ and the counter knife ❻, but the section F of the gauge does smoothly pass through it. 4. Fasten the set screws ❷ of the clamp spring ❼.	o If the clearance between the clamp spring and the counter knife is too large: • Bobbin thread clamping failure may result. o If the clearance between the clamp spring and the counter knife is too small: • The clamp spring may clamp the needle thread. This means that the material may not be taken out from the sewing position with ease. As a result, the clamped bobbin thread may be removed together with the material.
3) Knife Pressure 1. When the moving knife ❽ and the counter knife ❻ come in contact each other, adjust the attaching position of the moving knife ❽ so that the moving knife ❽ starts coming in contact with the counter knife ❻ at the position that is 5.5 to 6.5 mm away from the top end of the moving knife ❽, by means of loosing the set screw ❸ of the moving knife ❽.	o If the knife pressure is too high: • The blades of the counter knife ❻ and the moving knife ❽ may break. o If the knife pressure is too low: • Thread trimming failure may result.
4) Moving Knife Driving Arms A, B and C 1. In the case of the right-hand side hook, loosen the set screws of the moving knife driving arm A ❾ and B ⓫ and adjust so that the top end of the moving knife is 0.5 mm from the top end of the counter knife. In the case of the left-hand side hook, loosen the set screws of the moving knife driving arms A ❾ and C ⓾, and adjust in the same way as in the right-hand side hook. 2. Put the plunger stopper ⓮ of the thread trimmer solenoid ⓯ onto the main body of the solenoid ⓯ and fasten the clamping screws of the moving knife driving arms B ⓫ and C ⓾. 3. Adjust so that a clearance of 0.2 mm is provided between the thread trimmer cam ❹ and the thread trimmer cam roller ⓬ when the thread trimmer cam ❹ is brought to the highest position of its stroke (for both the right-hand and left-hand side hooks). 4. Fasten the clamping screw ⓭ of the moving knife driving arm A ❾. **[Item to be confirmed]** Turn the hand-wheel by hand to make the sewing machine perform thread trimming and align the top end of the moving knife ❽ with the top end of the counter knife ❻, which is the initial position of the thread trimming mechanism. At this time, make sure that a clearance of 0.05 to 1.5 mm is provided between the plunger stopper ⓮ of the thread trimmer solenoid ⓯ and the main body of the thread trimmer solenoid ⓯.	o If the distance from the top end of the counter knife to the top end of the moving knife is larger than the specified value: • The moving knife❽ may overrun after trimming the thread, resulting in clamping failure. o If the distance from the top end of the counter knife to the top end of the moving knife is smaller than the specified value: • The main body of the solenoid ⓯ may interfere with the plunger stopper ⓮ at the time of thread trimming.

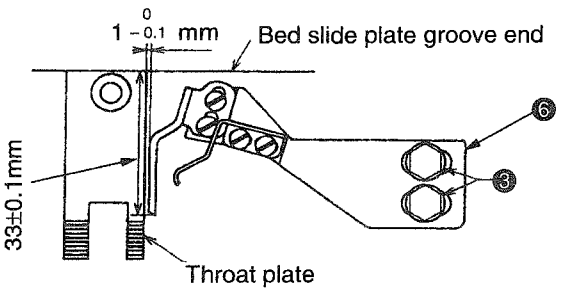
(11) Thread Trimmer (for LU-2212N-7)

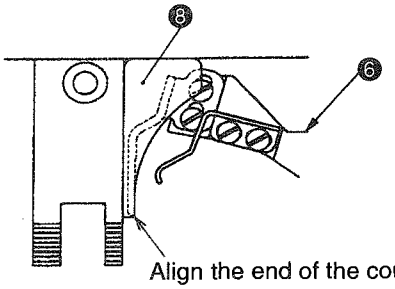
Standard Adjustment

1) Positions of Counter Knife and Clamp Spring

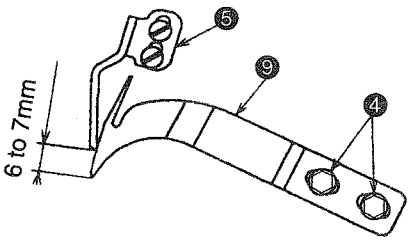
2) Counter Knife Base Position

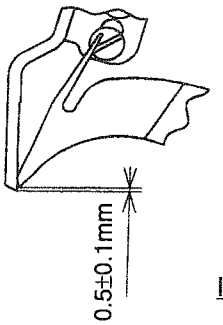




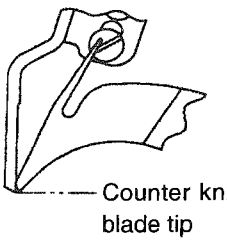


3) Knife Pressure



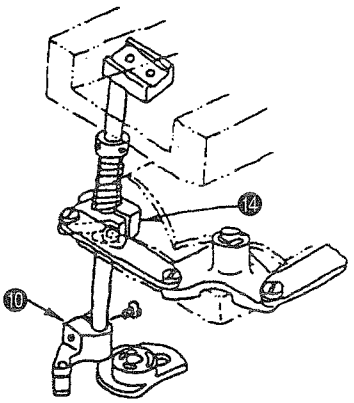


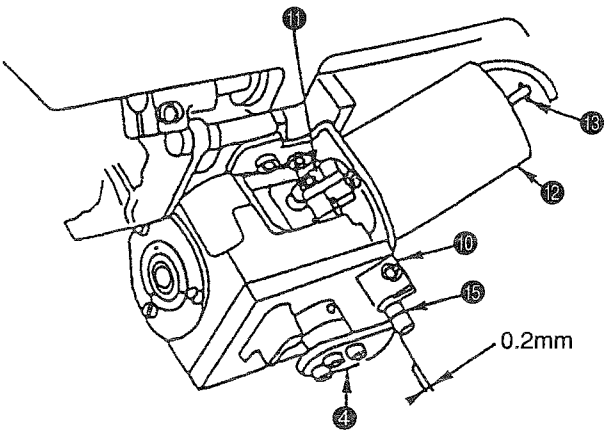
Standard initial position



Initial position for thick thread

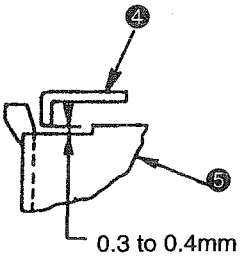
4) Moving Knife Driving Arms A, B and C



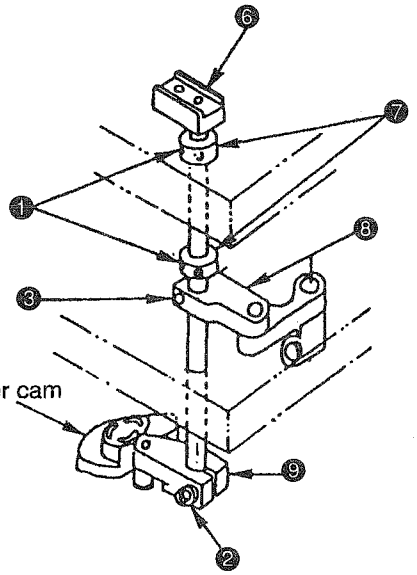


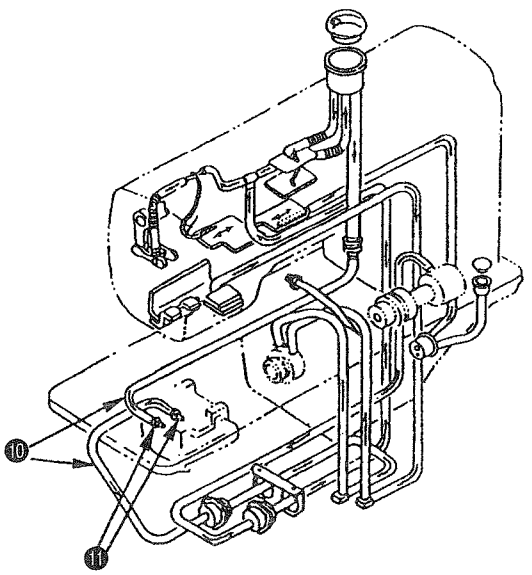
Adjustment Procedure	Results of Improper Adjustment
1) Positions of Counter Knife and Clamp Spring 1. Loosen the set screws ❶ of the counter knife ❺. 2. Bring the top end of the counter knife ❺ so that it comes in contact with the staged section of the counter knife base ❻. 3. Adjust so that the distance between the end of the counter knife base ❻ and the top end of the counter knife ❺ reaches $17.5\ ^{0}_{-0.2}$ mm. 4. Fasten the set screws ❶ of the counter knife ❺. Clamp Spring Position 1. Loosen the set screws ❷ of the clamp spring ❼. 2. Bring the end of the clamp spring ❼ so that it comes in contact with the staged section of the counter knife base ❻. 3. While the end of the clamp spring comes in contact with the staged section of the counter knife base, slide the end of the clamp spring and adjust so that the distance between the clamp spring and the counter knife reaches 4.1 ± 0.1 mm. 4. Fasten the set screws ❷ of the clamp spring ❼. **(Caution) When the positions of the counter knife ❺ and the clamp spring ❼ are moved, re-adjust the counter knife base ❻ position and knife pressure.**	o If the distance (17.5 mm) from the top end of the counter knife base to the top end of the counter knife is larger than the specified value: • The length of bobbin thread to be clamped will be shortened, resulting in stitch skipping. • The bobbin can not be inserted or removed. o If the distance (17.5 mm) from the top end of the counter knife base to the top end of the counter knife is smaller than the specified value: • Thread trimming failure may be caused. o If the distance (4 mm) from the counter knife to the clamp spring is larger than the specified value: • Bobbin thread clamping failure may be caused. • Stitch skipping may be caused at the sewing start. o If the distance (4 mm) from the counter knife to the clamp spring is smaller than the specified value: • The clamp spring may clamp the needle thread. This means that the material may not be taken out from the sewing position with ease. As a result, the bobbin thread clamped may be removed together with the material. • The clamp spring ❼ may interfere with the rear end of the moving knife ❾, resulting in deformation of the clamp spring.
2) Counter Knife Base Position 1. Loosen the set screws ❸ of the counter knife base ❻. 2. Move the counter knife base ❻ to the position specified in the figure using the counter knife gauge ❽ supplied with the machine. 3. Fasten the set screws ❸ of the counter knife base ❻. **(Caution) When the counter knife base ❻ is moved, re-adjust the knife pressure.**	o If the distance (1 mm) from the throat plate to the counter knife is larger than the specified value: • The knife pressure may increase, resulting in motor stop. o If the distance (1 mm) from the throat plate and the counter knife is smaller than the specified value: • The knife pressure may decrease, resulting in thread trimming failure. o If the distance (33 mm) from the bed slide plate end surface to the top end of the counter knife is larger than the specified value: • The length of bobbin thread to be clamped will be shortened, resulting in stitch skipping. o If the distance (33 mm) from the bed slide plate end surface to the top end of the counter knife is smaller than the specified value: • Thread trimming failure may result.
3) Knife Pressure 1. Adjust, when the moving knife ❾ and the counter knife ❺ come in contact with each other, the attaching position of the moving knife so that the moving knife ❾ starts coming in contact with the counter knife ❺ at the position that is 6 to 7 mm away from the top of the moving knife ❾. At this time, perform aforementioned adjustment after loosening the set screws ❹ of the moving knife ❾.	o If the knife pressure is too high: • The counter knife ❺ blade and the moving knife ❾ blade may break. o If the knife pressure is too low: • Thread trimming failure may result.
4) Moving Knife Driving Arms A, B and C 1. Loosen the moving knife driving arms A ❿ and B ⓫ and adjust so that the distance between the top end of the counter knife ❺ and the top end of the moving knife ❾ becomes 0.5 mm. In the case that a bobbin thread clamp failure occurs when using a thick thread, agree the top end of the counter knife ❺ with the top end of the moving knife ❾. 2. Put the plunger stopper ⓲ of the thread trimmer solenoid ⓬ onto the main body of the solenoid ⓬ and fasten the clamping screws of the moving knife driving arms B ⓫ and C ⓮. 3. Adjust so that a clearance of 0.2 mm is provided between the thread trimmer cam ❹ and the thread trimmer cam roller ⓯ when the thread trimmer cam ❹ is brought to the highest position of its stroke (for both the right-hand and left-hand sides). 4. Fasten the clamping screw of the moving knife driving arm A ❿. **[Item to be confirmed]** Turn the hand-wheel by hand to make the sewing machine perform thread trimming and align the top end of the moving knife ❾ with the top end of the counter knife ❺. This is the initial position of the thread trimming mechanism. At this time, confirm that a clearance of 0.05 to 0.15 mm is provided between the plunger stopper ⓲ of the thread trimmer solenoid ⓬ and the main body of the thread trimmer solenoid ⓬.	o If the distance from the top end of the counter knife to the top end of the moving knife is larger than the specified value: • The moving knife ❾ may overrun after trimming the thread, resulting in clamping failure. o If the distance from the top end of the counter knife to the top end of the moving knife is smaller than the specified value: • The main body of the thread trimmer solenoid ⓬ may come in contact with the plunger stopper ⓲ at the time of thread trimming.

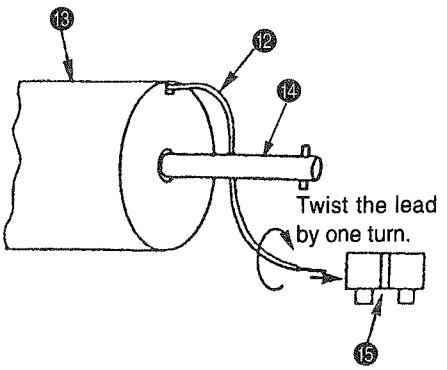
5) Height of the Moving Knife
(for the right-hand side hook)



0.3 to 0.4mm (LU-2212N-7)
0.4 to 0.5mm (LU-2210N/W-7/LU-2260N/W-7)



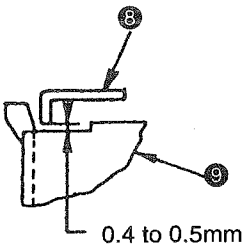


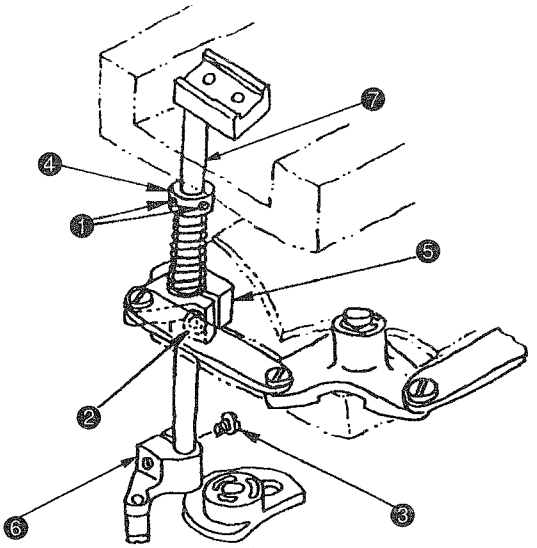


Adjustment Procedure	Results of Improper Adjustment
Height of the Moving Knife (for the right-hand side hook) 1. Disconnect the lead wire ⑫ of the thread trimmer solenoid ⑬ from the terminal board ⑮. 2. Loosen the clamping screw in the hook driving shaft set collar. 3. Disconnect the urethane tubes ⑩ from the tube connecting screws ⑪ of the hook driving shaft saddle. 4. Loosen the hook driving shaft saddle set screw and remove the hook driving shaft saddle. 5. Loosen the thrust collar set screws ① for the moving knife ④. 6. Loosen the set screw ② of the moving knife driving arm A ⑨. 7. Loosen the set screw ③ of the moving knife driving arm B ⑧. 8. Adjust so that a clearance of 0.4 to 0.5 mm is provided between the moving knife ④ and the inner hook ⑤ by moving the moving knife shaft ⑥ up and down. (For LU-2210N/W and LU-2260N/W) 9. Fasten the moving knife thrust collar set screw ①. 10. Adjust the moving knife driving arm A ⑨ and fasten the set screw ②. (Refer to [3.-(10)-4 Moving Knife Driving Arms A, B and C]). 11. Adjust the moving knife driving arm B ⑧ and fasten the set screw ③. (Refer to [3.-(10)-4 Moving Knife Driving Arms A, B and C]). 12. Temporarily fix the hook driving shaft saddle. 13. Connect the lead wire ⑫ of the thread trimmer solenoid ⑬ to the terminal board ⑮. 14. Connect the urethane tubes ⑩ to the tube connecting screws ⑪ of the hook shaft saddle. At the same time, use the tube connecting screws ⑪ to which the urethane tubes ⑩ had been connected before removing it. 15. Adjust the clearance between the needle and the blade point of the hook. (Refer to [3.-(4)-2) Clearance between the Needle and the Blade Point of the Hook]). 16. Adjust the needle-to-hook timing. (Refer to [3.-(4)-3) Timing between the Needle and the Hook]).	o If the clearance between the moving knife and the bobbin case is too large: • The needle thread and bobbin thread may fail to be caught by the moving knife. o If the clearance between the moving knife and the bobbin case is too small: • The moving knife ④ may interfere with the bobbin. (In the standard adjustment, it designed that the moving knife ④ slightly comes in contact with the bobbin). • Widen the space in the hook driving shaft coupling, then remove the hook driving shaft saddle. o In the case of LU-2212N-7: 8' Adjust so that the clearance of 0.3 to 0.4 mm is provided between the moving knife ④ and the inner hook ⑤ by moving the moving knife shaft ⑥ up and down. 13' Give the lead wire ⑫ a clockwise turn and connect it to the terminal board ⑮ while routing it along the back of the solenoid ⑬. At that time, take care not to allow the lead to come in contact with the plunger shaft ⑭.

6) Height of the Moving Knife
(for the left-hand side hook)

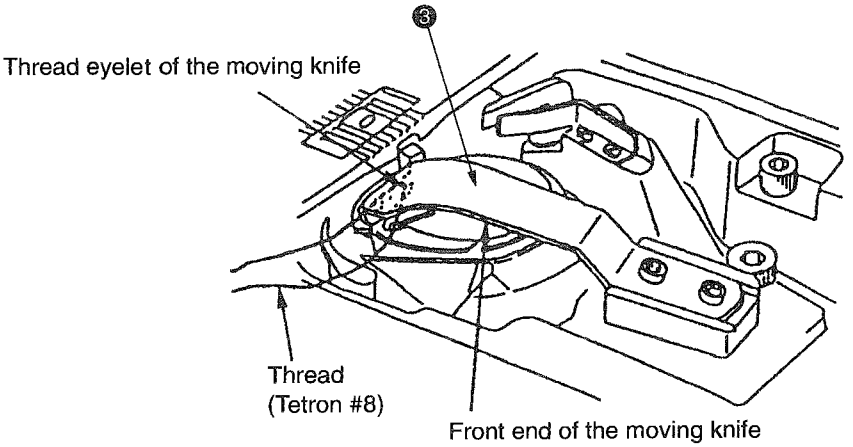
(LU-2260N/W-7)

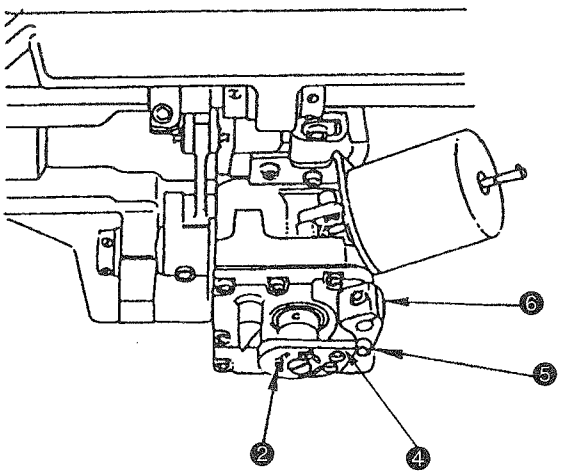


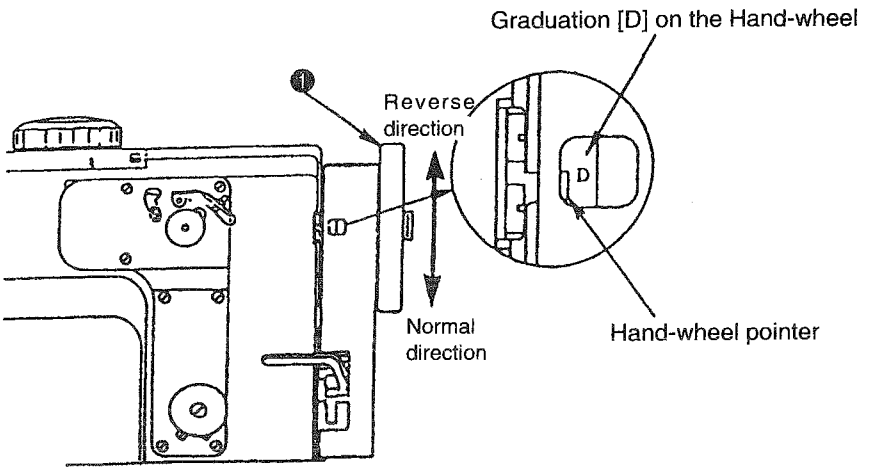


Adjustment Procedure	Results of Improper Adjustment
Height of the Moving Knife (for the left-hand side hook) 1. Tilt the machine head. 2. Loosen the set screws (two pcs.) ❶ of the moving knife shaft thrust collar ❹ and the clamping screw ❷ of the moving knife driving arm C ❺. 3. Loosen the clamping screw ❸ of the moving knife driving arm A ❻. 4. Adjust so that a clearance of 0.4 to 0.5 mm is provided between the moving knife ❽ and the inner hook ❾, by moving the moving knife shaft ❼ up and down. 5. Fasten the set screws (2 pcs.) ❶ of the moving knife shaft thrust collar ❹. 6. Fasten the clamping screw ❷ of the moving knife driving arm C ❺ and the clamping screw ❸ of the moving knife driving arm A ❻. (Refer to [3.-(10)-4) Moving Knife Driving Arms A, B and C]).	o If the clearance between the moving knife and the bobbin case is too large: • The needle thread and the bobbin thread may fail to be caught by the knife. o If the clearance between the moving knife and the bobbin case is too small: • The moving knife ❽ may interfere with the bobbin. (In the standard adjustment, it is designed so that the moving knife ❽ comes slightly in contact with the bobbin).

7) Thread Trimmer Cam (for LU-2210N/W-7 and LU-2260N/W-7)

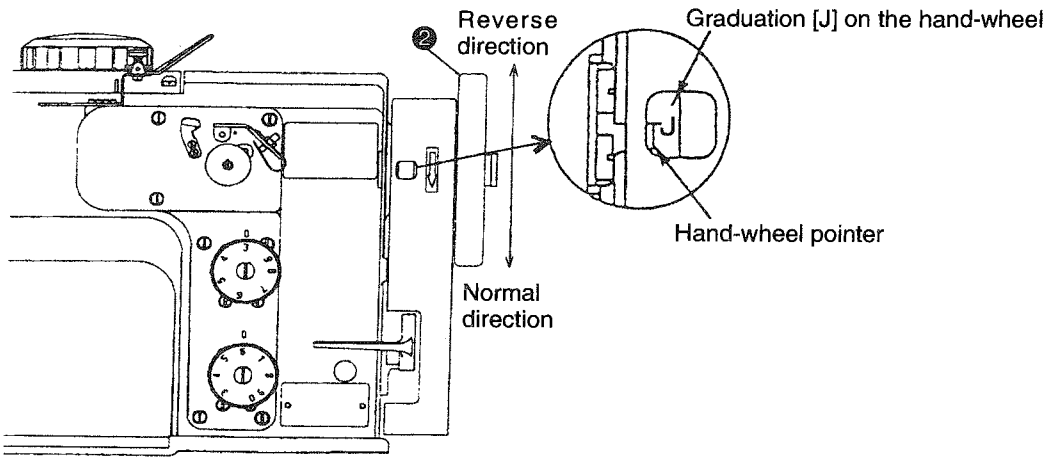


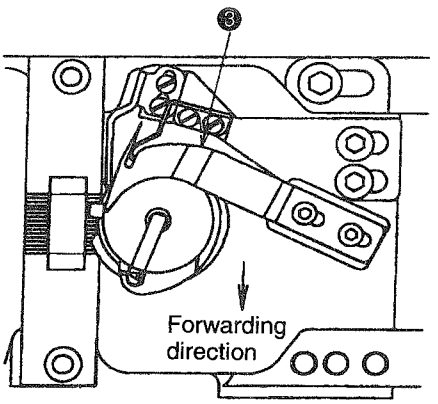


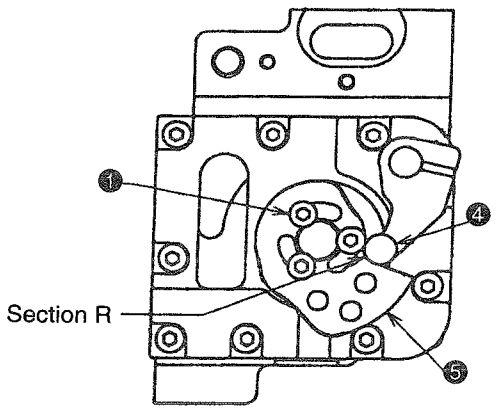


Adjustment Procedure	Results of Improper Adjustment
1. Tilt the machine head and support the head at that position, using the head support bar. 2. Move the moving knife ❸ forward by hand until it will go no further. (While turning the hand-wheel ❶ by hand, draw the moving knife ❸ forward from its initial position, and the moving knife ❸ will move). 3. Put a thread (Tetron #8) into the thread eyelet of the moving knife ❸. (The thread should be held slack until the thread has been trimmed). 4. Turn the hand-wheel ❶ slowly by hand in the normal direction of rotation. 5. The moving knife ❸ engages with the counter knife and the thread is trimmed. Then, stop turning the hand-wheel ❶. 6. Turn the hand-wheel ❶ slightly from the position described in step 5 in the reverse direction of rotation. Turn it to the extent where the thread trimmer cam ❹ does not come in contact with the thread trimmer cam roller ❺. 7. Loosen the set screws (3 pcs.) ❷ of the thread trimmer cam ❹. 8. While securing the thread trimmer cam ❹ by hand so that it does not come in contact with the moving knife driving arm A ❻, turn the hand-wheel ❶ until the hand-wheel pointer meets the graduation [D] on the hand-wheel. 9. In the state described in step 7, turn the thread trimmer cam ❹ until it slightly comes in contact with the thread trimmer cam roller ❺ of the moving knife driving arm A ❻. 10. Fasten the set screw ❷ of the thread trimmer cam ❹. 11. Make sure that the timing of thread trimming action has been properly adjusted. Repeat steps 3 and 4 and perform thread trimming. Now, check that the hand-wheel pointer meets the graduation [D] on the hand-wheel: they will meet if the timing of thread trimming action has been properly adjusted.	o If the timing of thread trimming is too early: • The length of thread remaining at the needle after thread trimming will be insufficient. As a result, the thread may slip out of the needle eyelet at the sewing start or after thread trimming. • Stitch skipping may occur at the start of sewing. o If the timing of thread trimming is to late: • Thread trimming failure may be caused. 8' For the marker dot engraved on the hand-wheel, refer to [3.-(1) Types and Names of Graduations on the Hand-wheel].

8) Thread Trimmer Cam (for LU-2212N-7)





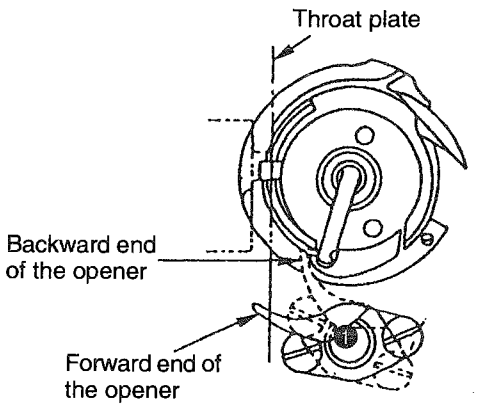


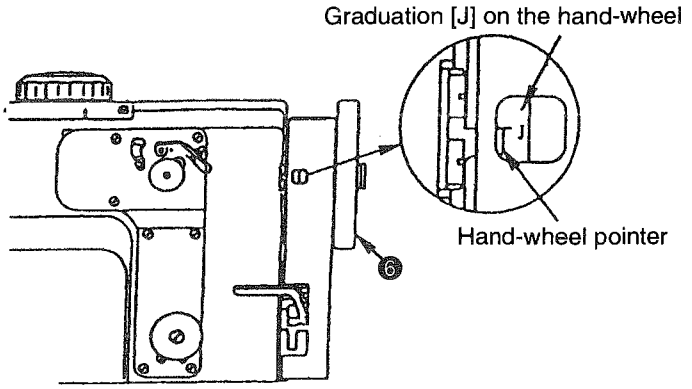
Adjustment Procedure	Results of Improper Adjustment
1. Tilt the machine head and support the head using the head support bar. 2. Align the hand-wheel pointer with the graduation [J] on the hand-wheel by turning the hand-wheel ❷. 3. Move the moving knife ❸ forward so that the thread trimmer cam roller ❹ comes in contact with the thread trimmer cam ❺. 4. Loosen the thread trimmer cam set screw ❶. 5. Make the section R of the thread trimmer cam come in close contact with the thread trimmer cam roller ❹. 6. Fasten the thread trimmer cam set screw ❶. 7. Make sure that the hand-wheel pointer meets the graduation [J] on the hand-wheel when the section R of the thread trimmer cam comes in close contact with the thread trimmer cam roller.	2' For the marker dot engraved on the hand-wheel, refer to [3.-(1) Types and Names of Graduations on the Hand-wheel].

(12) Opener

Standard Adjustment

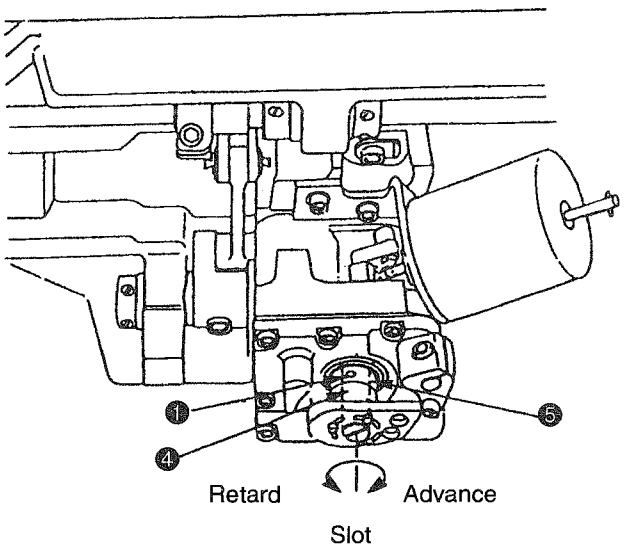
1) Timing of the Opener



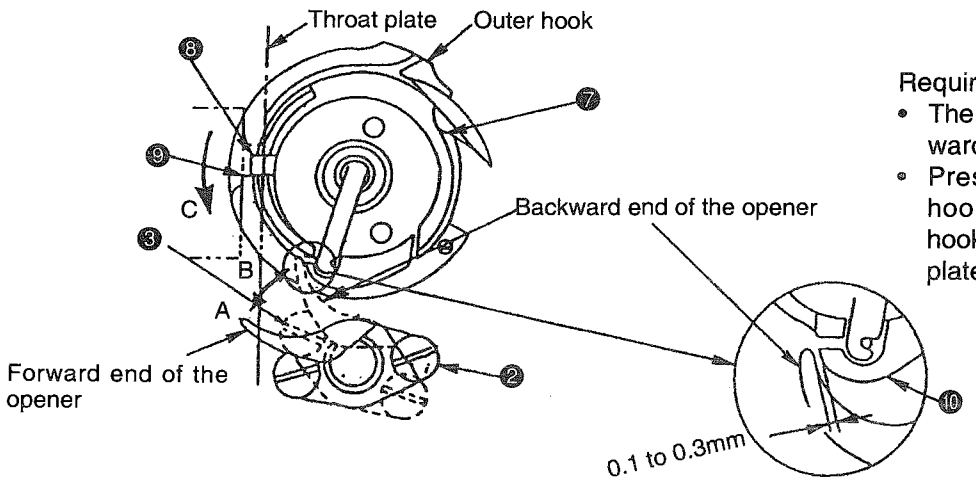


Requirements:

- For LU-2210N/W-7 and LU-2212N-7
  The opener should be brought to its forward end when the hand-wheel pointer meets the graduation [J] on the hand-wheel.
- For LU-2260N/W-7
  The opener should be brought to its forward end when the hand-wheel pointer meets the graduation [K] on the hand-wheel.



2) Clearance between the opener and the protruding section of the inner hook



Requirements:

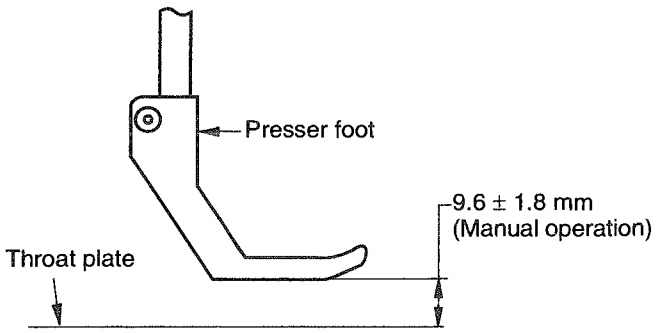
- The opener should be in its backward position.
- Press the stopper in the inner hook gib ❽ against the inner hook resting groove on the throat plate.

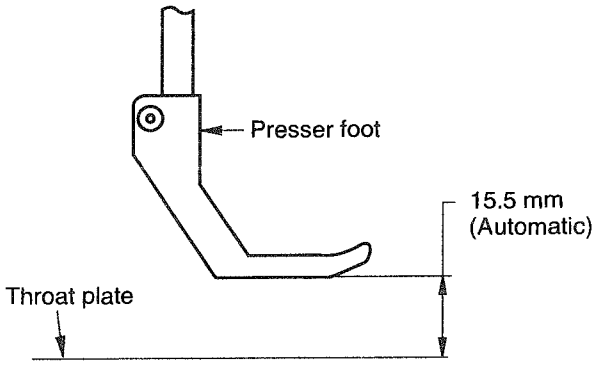
Adjustment Procedure	Results of Improper Adjustment
1) Timing Adjustment of the Opener 1. Loosen the set screws (2 pcs.) ❶ of the opener shaft screw gear ❺. 2. For LU-2210N/W-7 and LU-2212N-7: Align the hand-wheel pointer with the graduation [J] on the hand-wheel. For LU-2260N/W-7: Align the hand-wheel pointer with the graduation [K] on the hand-wheel. 3. Turn the opener shaft ❹ using the slot provided on the bottom end of the opener shaft ❹. 4. For the standard adjustment turn the opener shaft ❹ so that the opener is brought to the forward end position in the state described in item 2 . Then, fasten the set screws (2 pcs.) ❶ of the opener shaft screw gear. **(Caution) Re-adjust the thread trimmer cam after the completion of the adjustment of the opener timing. (Refer to [3.-(11)-7) and 8) Tread Trimmer]).**	o Loose stitches may be caused. 2' Refer to [3.-(1) Types and Names of Graduations on the Hand-wheel]. 4' Fasten the opener shaft screw gear set screw ❶ while pressing the opener from the upper side and pressing upward the opener shaft screw gear ❺ so as to eliminate a play. • If the opener shaft is turned clockwise as viewed from underside, the timing of the opener is advanced. If the opener shaft is turned counterclockwise, it is retarded.
2) Clearance between the Opener and the Protruding Section of the Inner Hook 1. Turn the hand-wheel ❻ to move the opener in the direction of arrow A. Then, loosen the opener set screw ❷. 2. Turn the hand-wheel ❻ to move the opener in the direction of arrow B. Then, loosen the opener set screw ❸. At that time, be sure to loosen the screw with the opener positioned at its backward end. 3. Turn the inner hook ❼ in the direction of arrow C, and press the inner hook stopper ❽ against the inner hook resting section ❾ of the throat plate. 4. Move the opener and adjust so that a clearance of 0.1 to 0.3 mm is provided between the opener and the triangular projection ❿ of the inner hook. 5. Fasten the opener set screw ❸. 6. Turn the hand-wheel ❻ to move the opener in the direction of arrow A. Then, fasten the opener set screw ❷.	o If the clearance between the opener and the inner hook triangular projecting section of the inner hook is too large: • Loose stitches may be caused. o If the clearance between the opener and the inner hook triangular projecting section of the inner hook is too small: • The inner hook ❼ may break.

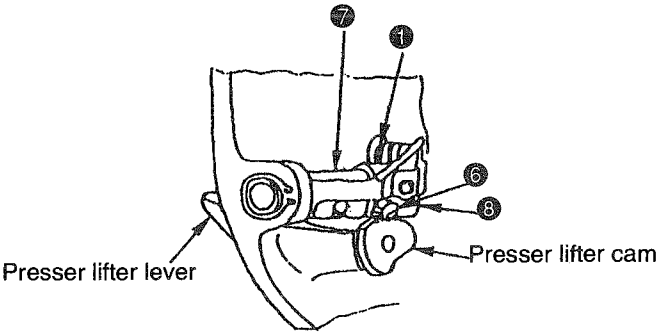
(13) Presser Lifting Unit

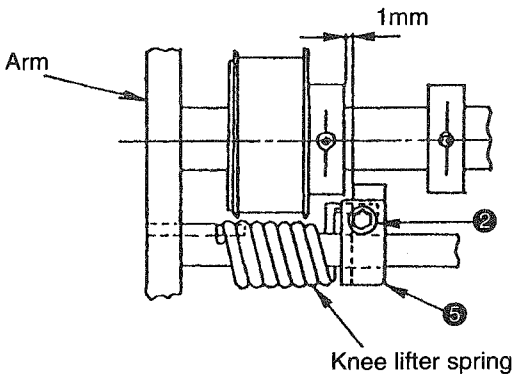
Standard Adjustment

1) Presser Lifting Amount

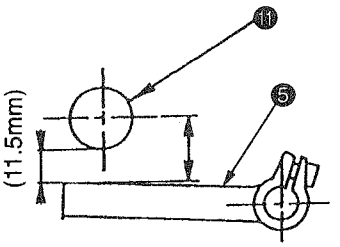








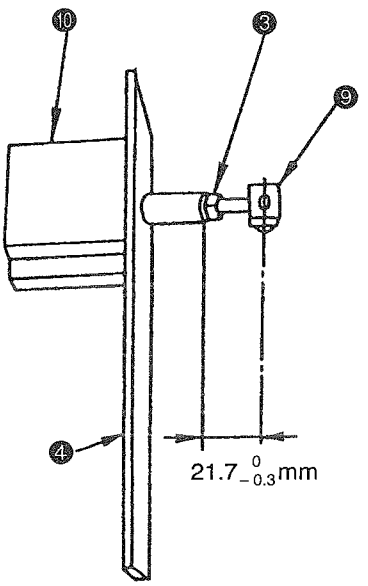
[As viewed from the Side 2]



*At the time when the presser foot is lifted by 15.5 mm

[As viewed from the Hand-wheel Side]

2) Presser Lifting Cylinder

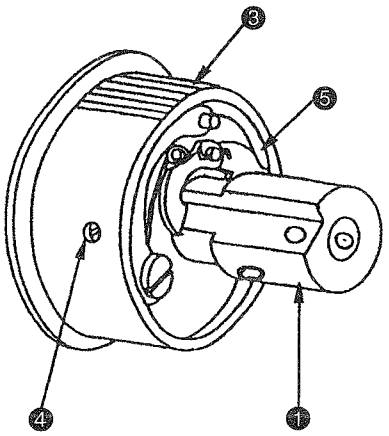


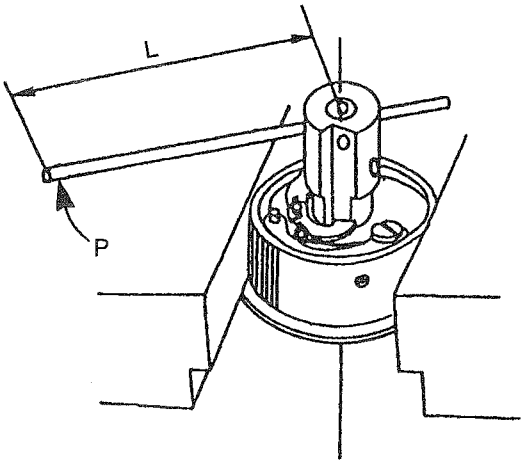
Adjustment Procedure	Results of Improper Adjustment
1) Presser Lifting Amount 1. Remove the face plate and the aperture plate ❹. 2. Loosen the presser lifting bracket clamping screw ❶ and knee lifter arm A clamping screw ❷. 3. Set the height of the presser foot to 15.5 mm. 4. Position of the Knee Lifter Arm A Lateral Direction: ..... The distance from the end face of the knee lifter arm A ❺ to the end face of the upper sprocket is 1 mm. Vertical Direction: ..... The distance from the upper face of the knee lifter arm A ❺ to the center of the main shaft ⓫ is 20 mm. 5. In the state in step 4. press the presser lifting bracket pin ❻ against the presser lifting guide bracket ❼, while the end face of the presser lifting bracket ❽ is put to the end face of the presser lifting guide bracket ❼. In this state, fasten the presser lifting bracket clamping screw ❶. **2) Presser Lifting Cylinder** 1. Loosen the locknut ❸ of the cylinder connecting screw ❾. 2. Adjust so that the distance from the top end of the rod of the presser lifting cylinder ❿ to the center of the cylinder connecting screw ❾ is $21.7_{-0.3}^{0}$ mm. 3. Fasten the locknut ❸ of the cylinder connecting screw ❾.	

(14) Safety Mechanism

Standard Adjustment

1) Releasing Torque Adjustment

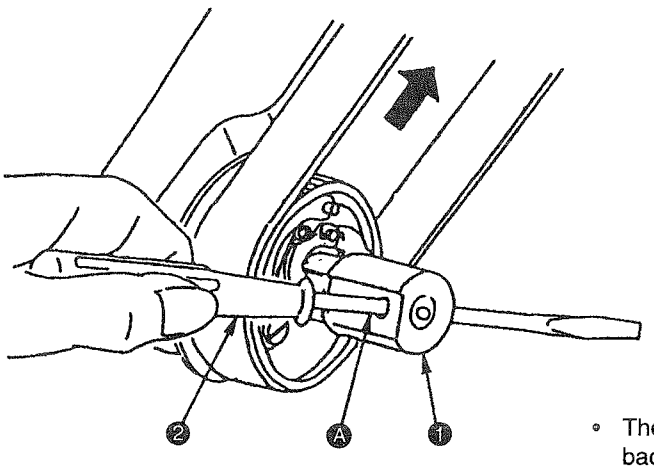




Torque = P (N) x L (m)

Standard specification of the releasing torque = 11.76 to 14.7N•m (120 to 150kgf•cm)

2) How to reset the Safety Mechanism



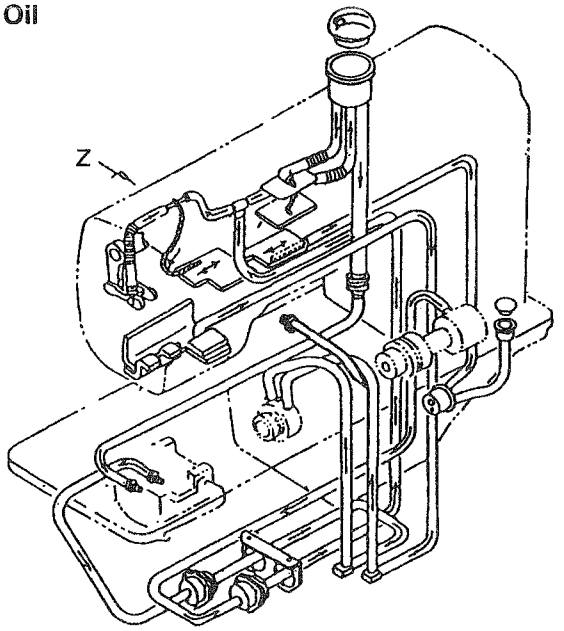
- The opener should be in its backward position.
- Press the stopper in the inner hook gib against the inner hook resting groove on the throat plate.

Adjustment Procedure	Results of Improper Adjustment
1) Releasing Torque Adjustment Change the pressure of the safety clutch (if the safety clutch is hard to be released or it is released too easily) following the procedure described below. 1. Remove the timing belt from the lower sprocket ❸. 2. When the adjusting screw ❹ is fastened, the pressure of the safety clutch will be increased. When the adjusting screw is loosened, the pressure of the safety clutch is decreased. 3. Fix the lower sprocket ❸ and turn the safety clutch bushing ❶ until the safety clutch pawl ❺ comes off the groove on the safety clutch bushing ❶. A torque developed at the time when the safety clutch pawl comes off the groove is taken as the releasing torque. 4. Adjust the standard releasing torque to 13.23 ± 1.47N•m (135 ±15kgf.cm). 5. After adjustment, put the timing belt on the lower sprocket. (Refer to [5.-(3) How to replace the Timing Belt] for how to put the timing belt on the lower sprocket).	o If the releasing torque is set to an excessively high value: • The hook, hook driving shaft gear or related components will break. o If the releasing torque is set to an excessively low value: • The safety clutch will be released too easily. His will impair smooth operation of the sewing machine.
2) How to reset the Safety Mechanism If an excessive load is applied to the hook driving shaft, the safety clutch will be released. In this case, the hook will not rotate even if the hand-wheel were turned. 1. Reset the safety mechanism with the machine head tilted. 2. Insert the screwdriver (medium) ❷ supplied with the machine into the hole Ⓐ in the safety clutch bushing ❶. 3. Hold the screwdriver (medium) ❷ supplied with the machine by hand to prevent the safety clutch bushing ❶ from turning, and rotate the hand-wheel in the reverse direction. 4. When the safety clutch clicks, the safety clutch pawl ❺ fits in the groove on the safety clutch bushing ❶. This completes the resetting procedure of the safety clutch.	

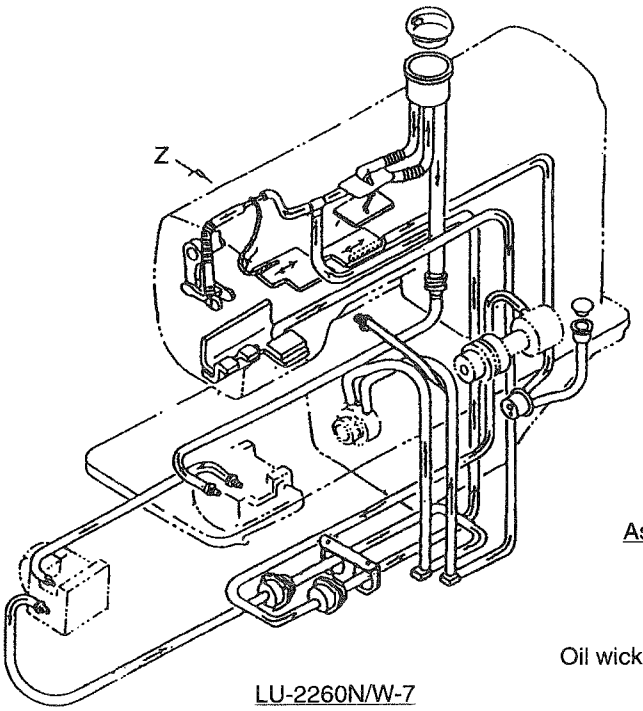
(15) Lubricating Unit

Standard Adjustment

1) **Oil Distribution Diagram**
2) **Supplying and Replacing Oil**

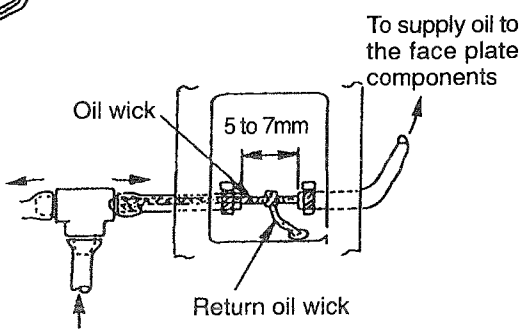


LU-2210N/W-7, LU-2212N-7



LU-2260N/W-7

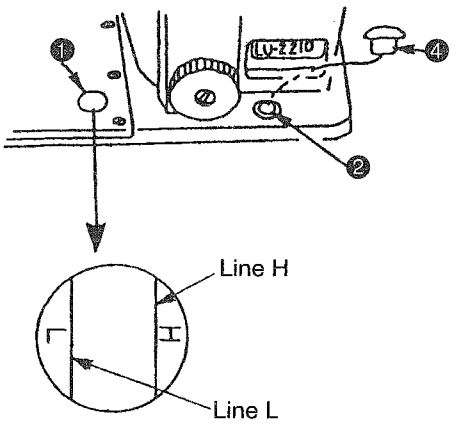
As viewed from side Z

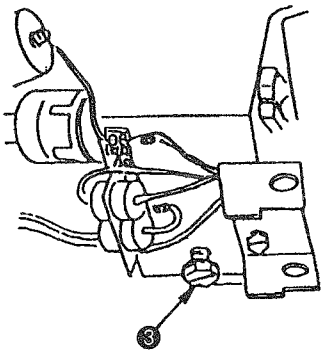


1) Oil Distribution Diagram

The oil distribution diagram is shown on the left.

2) Supplying and Replacing Oil





Take care of the following points when supplying or replacing oil.

(1) Check whether or not the oil level reaches the specified level on the oil level gauge ❶.
Supply oil to the tank until the ìHî line on the oil level check window is reached. Perform the warming-up operation of the machine until oil flow from the hook driving shaft saddle is confirmed. Then, stop the machine. At that time, the oil surface in the tank should reach a level within the range of [H] and [L] to satisfy the specified level of oil. If the oil surface fails to reach the specified level, supply oil from the oil port ❷.

(Caution) Be sure to close the oil port cap ❹.

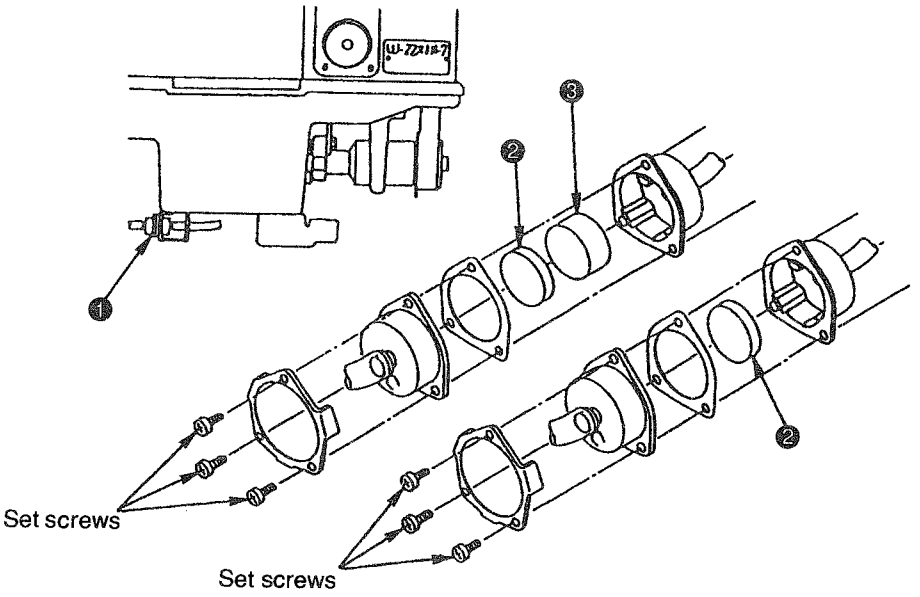
(2) Inspect the oil sight window to make sure that oil is supplied to the hook (Oil spouts from the oil reservoir and flows toward the hook driving shaft saddle).
(Oil should always accumulate by the depth of approximately 1 mm of the bottom of the oil sight window. This is the proper amount of oil to spout from the oil reservoir).

(3) Observe the oil flow in the urethane tube from the lower section of the bed to check whether or not oil is fed to the hook driving shaft saddle and then circulated.

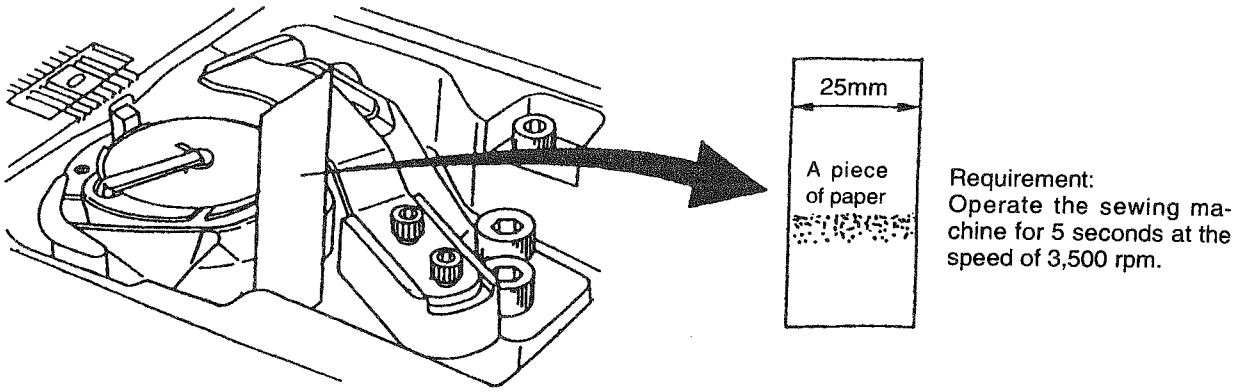
(4) Carefully observe the filter to check whether or not oil changes in color, due to oxidation and deterioration. If oil changed in color obviously, replace the deteriorated oil with new oil without delay. To change oil, loosen the drain cock ❸ (hexagon head bolt) located under the bed tank and expel the deteriorated oil from the drain outlet. Remove the top cover of the bed, clean inside the bed with cleansing oil and dry it with an air-blow. At this time, take care not to allow any foreign material, including a screw, to enter the bed tank. After the bed tank is drained and cleaned, securely fasten the drain cock ❸. (As reference, replace it every 500 hours of operation of the sewing machine).
When replacing the oil, also replace the filter with a new one. (Refer to next page for how to replace it).

(Caution) When replacing oil, also replace the packing (Part No. R0068190100) for the drain cock ❸ and the packing (Part No. 10701209) for the bed top cover with new ones.
Be sure not to use any oil other than JUKI New Defrix Oil No. 1.

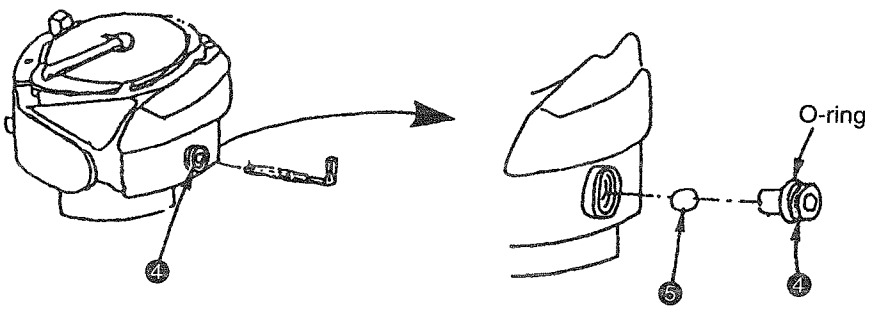
3) Filter Replacement Procedure



4) Adjusting the amount of oil in the hook and cleaning the hook filter



Requirement:
Operate the sewing machine for 5 seconds at the speed of 3,500 rpm.

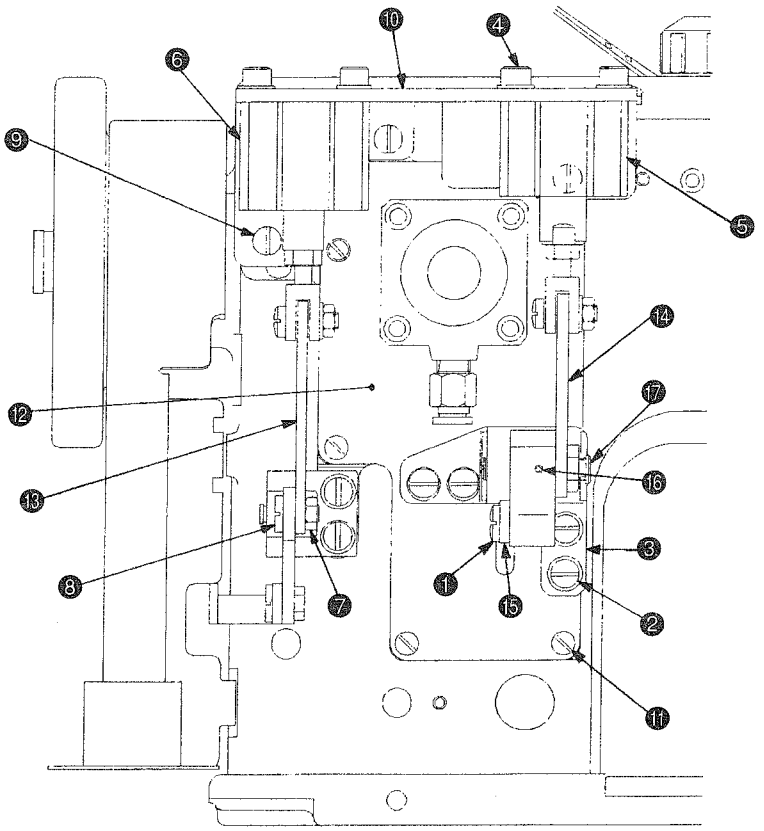


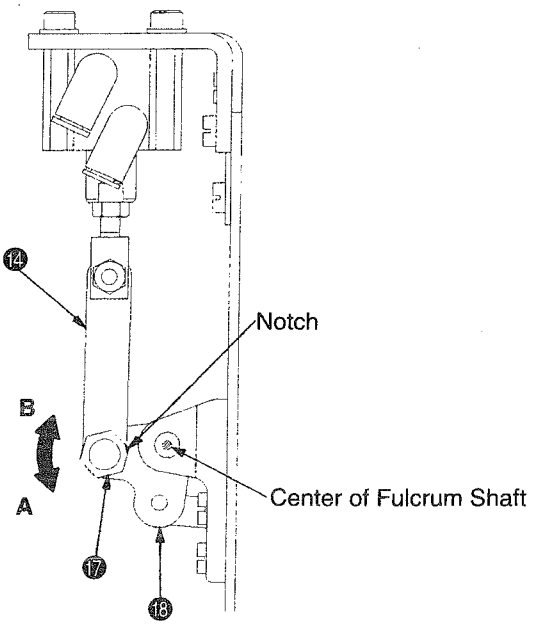
Adjustment Procedure	Results of Improper Adjustment
3) Filter Replacement Procedure Remove the magnet ❷ and filter element ❸ in the filter ❶ and wash them once a month after the first operation of the machine.	o If the filter element ❸ is clogged with dust or the like, a return oil flow may fail. In this case, oil may overflow the top of the hook driving shaft saddle, resulting in oil leakage.
4) Adjusting the amount of oil in the hook and cleaning the hook filter Oil amount in the hook (1) Oil splashes from the race surface as illustrated in the sketch. (2) When the oil adjusting screw ❹ is fastened (turn the screw clockwise), the oil amount in the hook is decreased. (3) When the oil adjusting screw ❹ is loosened (turn the screw counterclockwise), the oil amount in the hook is increased. **(Caution) The adjusting screw ❹ can be turned by a quarter revolution, within which the amount of oil in the hook can be adjusted from the minimum to the maximum value. If the adjusting screw ❹ is excessively turned, the rubber ball ❺ placed inside the tapped hole will be crushed and the amount of oil in the hook will no longer be adjusted. So take the greatest care.** How to clean the Filter in the Hook If the filter ❶ is clogged, the machine cannot be oiled. So it is necessary to clean the filter periodically. Clean the filter following the procedure described below. (1) Remove the hook from the main unit of the sewing machine. Loosen the oil amount adjusting screw ❹ and take out the rubber ball ❺ placed inside the tapped hole. (2) Blow air to the tapped hole of the oil amount adjusting screw ❹.	o If the oil amount in the hook is insufficient, the hook may generate heat. As a result, the hook will soon wear out, so causing seizure. o If the oil amount in the hook is excessive, the thread or material may be stained with oil. Also, the oil consumption will be larger.

(16) Aperture Plate Removal Procedure (for LU-2212N-7)

Standard Adjustment

1) Removal Procedure of Aperture Plate
2) Attachment Procedure of Aperture Plate
3) Adjustment of 2P Cylinder Connecting Link





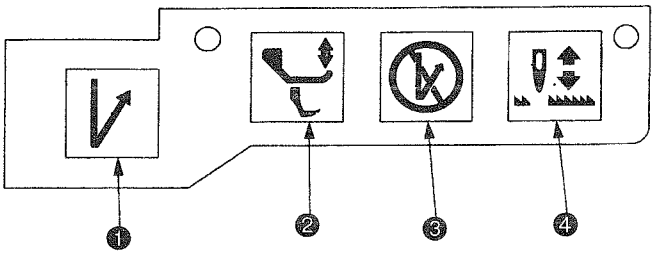
Adjustment Procedure	Results of Improper Adjustment
1) Removal Procedure of Aperture Plate 1. Remove the conversion link hinge screw ❶. 2. Loosen the set screw ❷ (four locations) on the conversion link base and remove the conversion link base ❸. 3. Loosen the 2P cylinder set screw ❹ and remove the 2P cylinder ❺. 4. Loosen the cylinder connecting bar hinge screw nut ❼ of the reverse feed cylinder ❻ and remove the cylinder connecting bar hinge screw ❽. 5. Loosen the set screw ❾ (three locations) of the cylinder set plate and remove the cylinder set plate ❿. 6. Remove the aperture plate set screw ⓫ (four locations) and remove the aperture plate ⓬.	
2) Attachment Procedure of Aperture Plate 1. Attach the aperture plate ⓬ with the aperture plate set screw ⓫ (four locations). 2. Attach the cylinder set plate ❿ temporarily with the cylinder set plate set screw ❾ (three locations). 3. Attach the cylinder connecting bar hinge screw ❽ of the reverse feed cylinder ❻ and fasten the cylinder connecting bar hinge screw nut ❼. 4. Adjust the cylinder set plate ❿ and attach it so that it is parallel with the head of the machine (in the direction of arm shaft), and that the cylinder connecting bar ⓭ is parallel with the shaft center of the reverse feed cylinder ❻. Then fasten the cylinder set plate set screw ❾. 5. Attach the 2P cylinder ❺ temporarily with the 2P cylinder set screw ❹. 6. Adjust the conversion link base ❸ and attach it so that the 2P cylinder connecting link ⓮ is parallel with the shaft center of the 2P cylinder ❺. Then, fasten the conversion link base set screw ❷ and fasten the 2P cylinder set screw ❹. 7. Fasten the conversion link hinge screw ❶.	1' Refer to the items 1) through 4) in "Result of Improper Adjustment" in [3.-(3)-2 Needle Entry in the Feed Direction to the Feed Dog] and attach the aperture plate ⓬. 6' Confirm that the feed regulator link ⓯ projects from the center of the long hole section of the aperture plate ⓬. If the projection point is deviated from the center, adjust the 2P cylinder ❺ position to the right or left and adjust the conversion link base ❸ again.
3) Adjustment of 2P Cylinder Connecting Link 1. Connect air hoses to all the air cylinder couplings. 2. Arrange the air route. 3. Loosen the eccentric pin set screw ⓰ (two locations). 4. Align the notch of the eccentric pin ⓱ in the direction of the fulcrum shaft of the conversion link ⓲. 5. Turn the eccentric pin ⓱ in the direction A or B and move the 2P cylinder connecting link ⓮ to the right and left by hand. Then stop it when backlash is felt and fasten the eccentric pin set screw ⓰.	1' Connect the air hoses so that the seal No. of the air hose is corresponding to the coupling No. 5' Direction A: Backlash increased Direction B: Backlash decreased * Adjust it so that backlash is minimized.

4. Various Switches

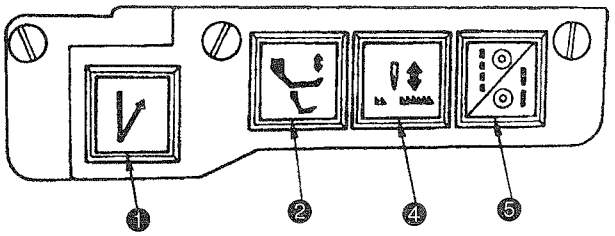
Standard Adjustment

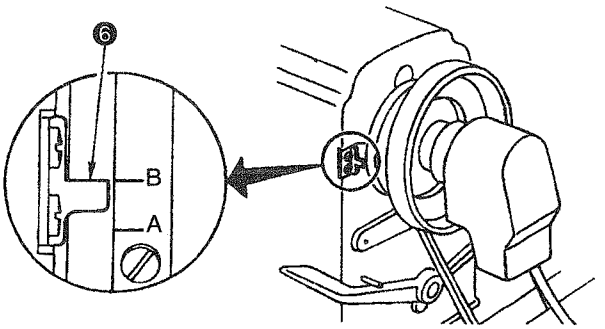
(1) Operation Switches

(LU-2210N/W-7, LU-2260N/W-7)

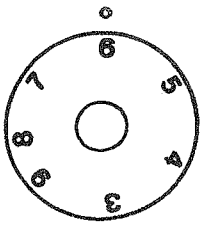


(LU-2212N-7)

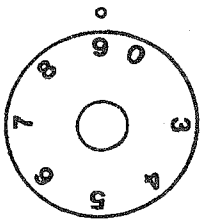




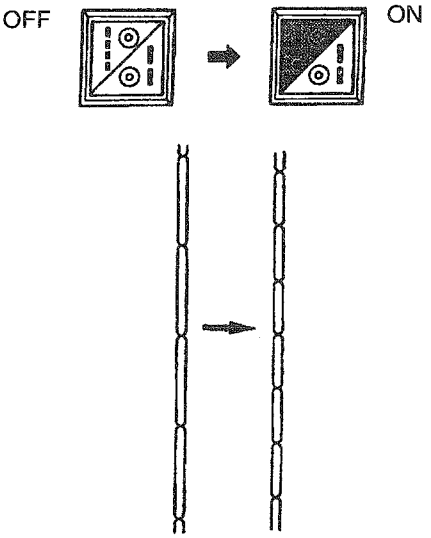
• Set the 2P stitch dial to "6" on the scale.



• Set the stitch dial to "9" on the scale.

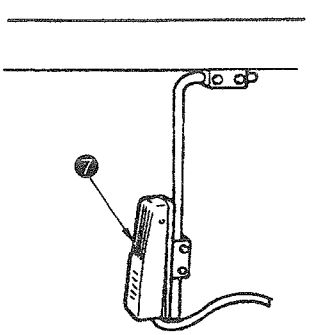


• Pressing the knee switch changes the stitch length from "9" to "6".



• Pressing the switch returns the stitch length of "6" to "9".

(2) Knee Switch

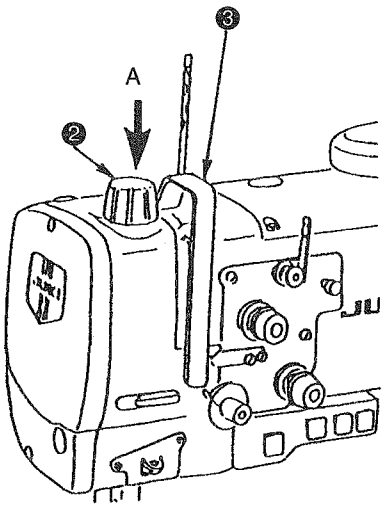


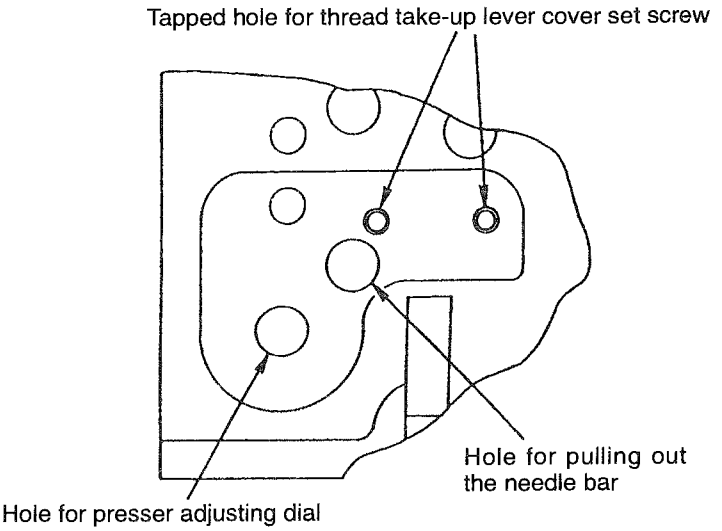
Adjustment Procedure	Results of Improper Adjustment
(1) Operation Switches 1) One-touch type reverse feed switch ❶ In the sewing machine operation, reverse feed stitching is performed during the pressing of this switch. When the switch is released, normal feed stitching is returned. 2) Altemating vertical movement amount change-over switch ❷ for the amount of alternating vertical movement of the walking foot and the presser foot Pressing this switch raises the alternating vertical movement of the walking foot and the presser foot to the maximum value (The lamp embedded in the button is turned on). Use it on the material overlapped section where the feed of the material is hard. 3) Automatic Reverse Feed Stitching Cancellation/Extra Switch ❸ • When this switch is pressed while the automatic reverse feed stitching has been set then the automatic reverse feed stitching is not performed (only once immediately after this switch is pressed). • When this switch is pressed while the automatic reverse feed stitching has not been set then the automatic reverse stitching is performed (only once immediately after this switch is pressed). 4) Needle Lifting Switch ❹ Pressing this switch moves the needle position from the lower stop position to reverse feed stitching position. (The hand-wheel pointer ❻ shows the graduation [B] on the hand-wheel). 5) 2P Switch ❺ (Only for LU-2212N-7) Pressing this switch changes the stitch length to the one specified on the scale of the 2P stitch dial. (The lamp embedded in the button is turned on). **(Caution) The value specified on the scale of the 2P stitch dial should be smaller than that in the stitch dial.** **(2) Knee Switch** 1) Pressing this knee switch ❼ brings the alternating vertical movement of the walking foot and the presser foot to the maximum value. (The same result, of pressing the converting switch for the amount of alternating vertical movement of the walking foot and the presser foot on the machine head, will be secured). 2) Also, using the function setting in the sewing machine controller, it can be used as the presser lifting switch. (In this case, it does not function as the converting switch for the amount of alternating vertical movement of the walking foot and the presser foot).	

5. Part Replacement

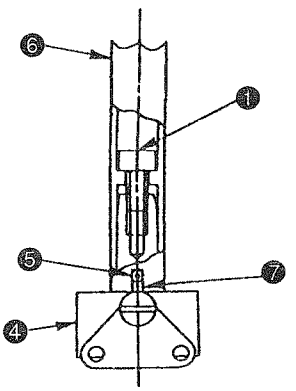
(1) How to replace the Needle Clamp

Assembling and Disassembling Procedure





(As viewed from side A)

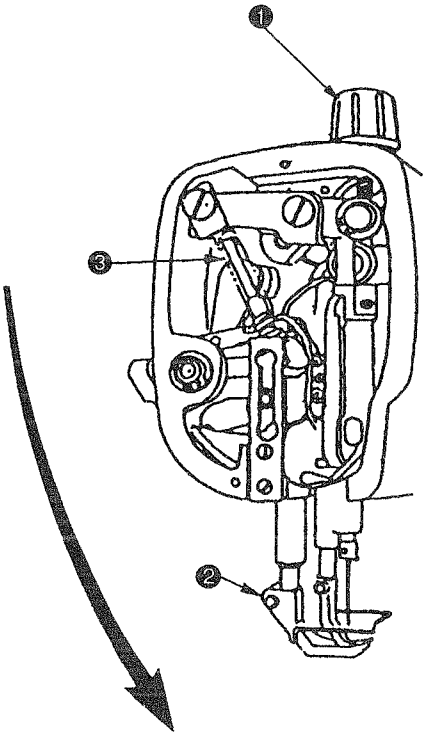


Cross Section of Connecting Portion

Assembling and Disassembling Procedure	Results of Improper Adjustment
1. Remove the presser adjusting dial ❷ and the thread take-up lever cover ❸. 2. Loosen the clamping screw ❶ of the needle clamp (assembly) ❹ through the hole for pulling out the needle bar with the hexagon wrench supplied with the machine and remove the needle clamp (assembly) ❹. 3. Insert the rotation stopper pin ❺ in the needle clamp (assembly) ❹ so that it is placed in the groove ❼ of the needle bar ❻, and fasten the set screw ❶. 4. Attach the presser adjusting dial ❷ and the thread take-up lever cover ❸. (Set the pressure to the standard adjustment value when the presser adjusting dial ❷ is installed. Refer to [5-(2) Replacement of the Presser Adjusting Spring]. **(Caution) The maximum sewing speed varies in accordance with the needle gauge. Set the speed to the proper one.**	

(2) Replacement of the Presser Adjusting Spring

Assembling and Disassembling Procedure



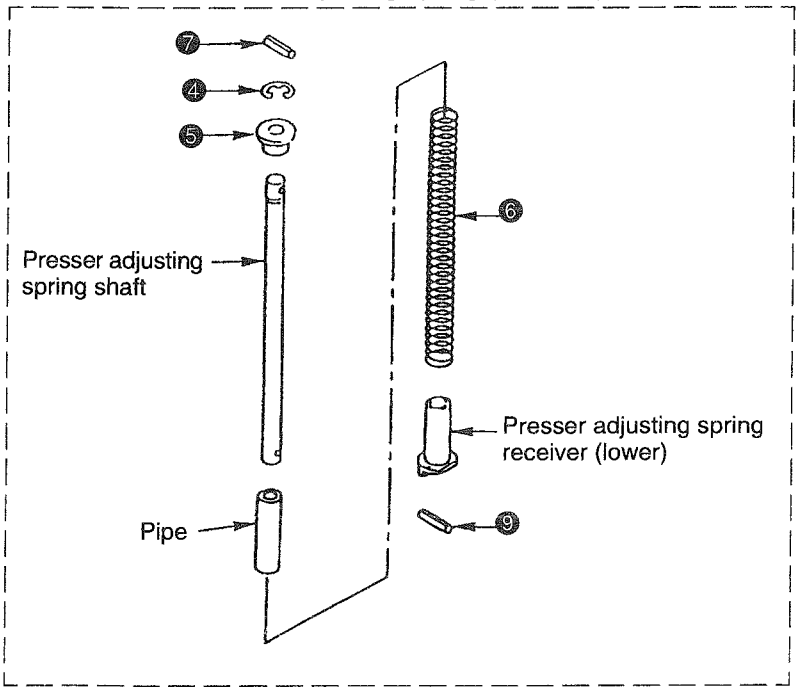
Presser adjusting spring ⑥	Diameter
10718302	ø1.4
10715902	ø1.8
10717007	ø2.0

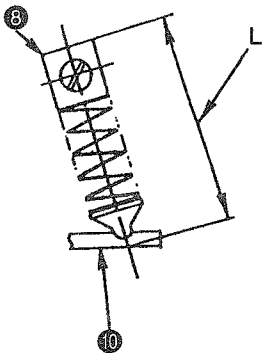
- o For LU-2210N/W-7 and LU-2212N-7, ø1.8 is the standard. Other are optional.
- o For LU-2260N/W-7, ø2.0 is the standard. Others are optional.

Pressure of the Presser Adjusting Spring

Model Name	Presser Adjusting Spring ⑥ (Diameter)	Pressure N(kgf)	L (mm)
LU-2210N/W-7 LU-2212N-7	10715902 (ø1.8)	88.2 (9)	82.5±0.5
LU-2260N/W-7	10717007 (ø2.0)	98 (10)	82.5±0.5

Presser Adjusting spring (assembly)

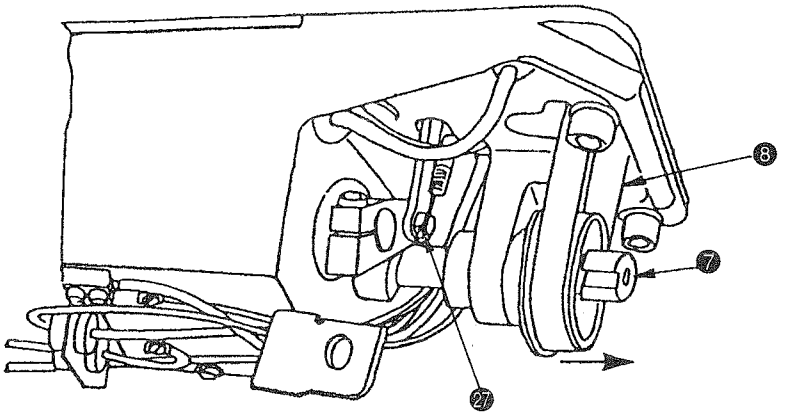


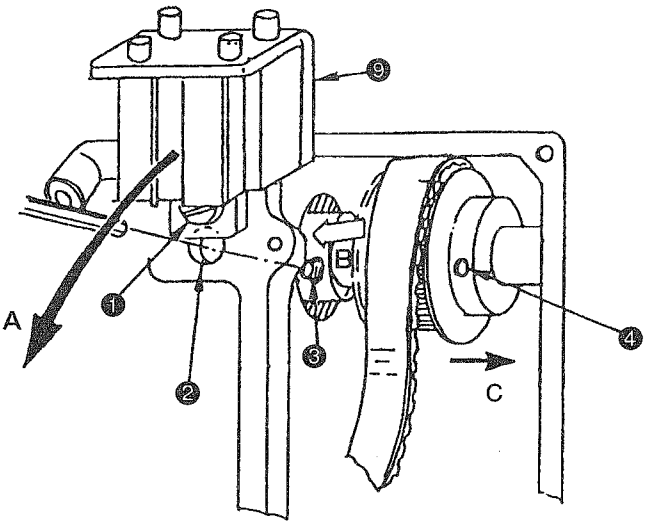


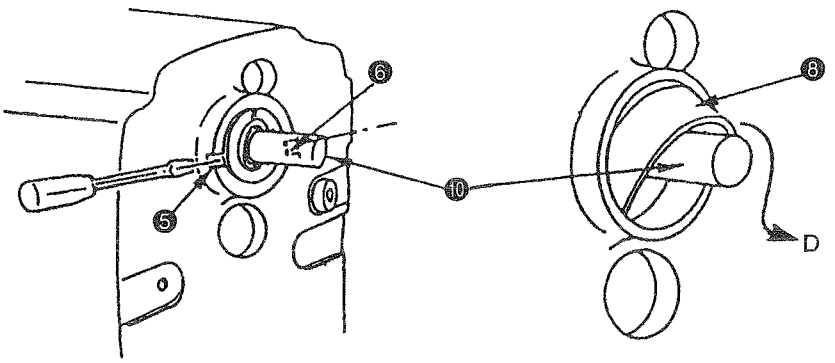
Assembling and Disassembling Procedure	Results of Improper Adjustment
1. Remove the presser adjusting dial ❶, and lower the presser foot ❷. 2. Remove the presser adjusting spring (assembly) ❸. 3. Remove the spring pin (upper) ❼ and the snap ring (E-ring) ❹. Then, remove the presser adjusting spring receiver (upper) ❺. 4. Replace the presser adjusting spring ❻ with that for 2-needle (ø2). 5. Set the presser adjusting spring receiver (upper) ❺, snap ring (E-ring) ❹ and spring pin (upper) ❼. (Presser adjusting spring (assembly) ❸). 6. Attach the presser adjusting spring (assembly) ❸. At that time, securely place the spring pin (upper) ❼ into the groove of the presser adjusting spring receiver ❽ and the spring pin (lower) ❾ into the groove of the presser bar guide arm ❿. 7. Attach the presser adjusting dial ❶ and set the pressure to the standard pressure value.	o When the presser adjusting spring ❻ is replaced, the above steps 3 to 5 are not required if it is replaced as an assembly ❸. The part No of the assembly ❸ is as follows: Presser Adjusting Spring (assembly) / Diameter 10718351 / ø1.4 10715951 / ø1.8 10717056 / ø2.0 o For LU-2210N/W-7 and LU-2212N-7, ø1.8 is the standard. (Others are optional). o For LU-2260N/W-7, ø2.0 is the standard. (Others are optional).

(3) How to replace the Timing Belt

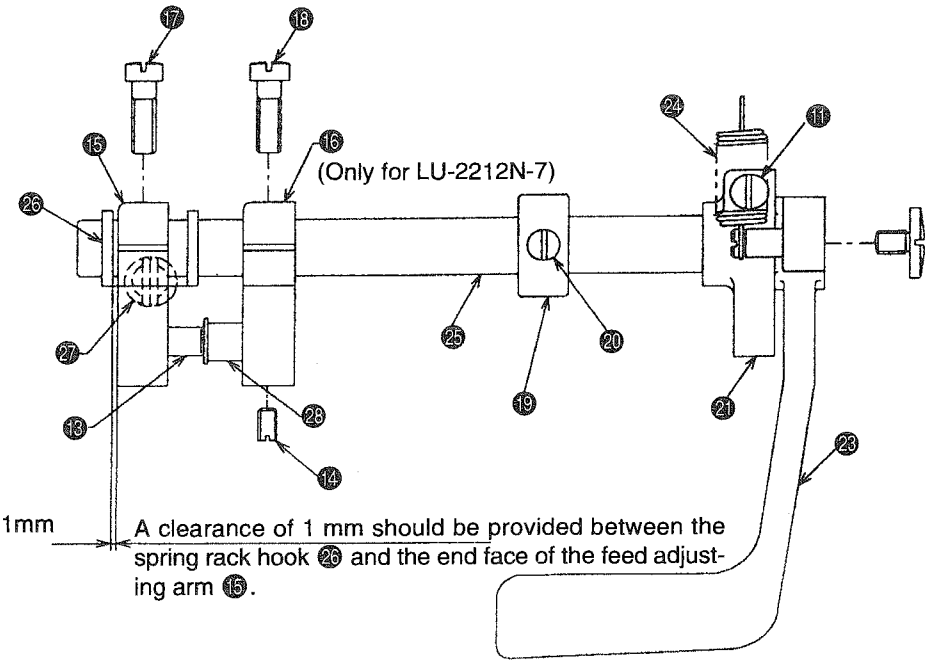
Assembling and Disassembling Procedure







Assembling and Disassembling Procedure	Results of Improper Adjustment
1. Remove the timing belt ❽ from the lower sprocket ❼. 2. Remove the hand-wheel. 3. Remove the aperture plate. 4. Remove the set screw ❶ of the reverse feed cylinder installation base ❾ and lower the installation base ❾ in the direction of arrow A until the arm hole ❷ in the arm can be observed. (Except for LU-2212N-7) 5. Insert the hexagon wrench (3 mm) through the arm hole ❷ and loosen the set screw ❸ of the main shaft bearing bush. 6. Loosen the sprocket set screw ❹. 7. Fit the top end of the screwdriver in notches ❺ and ❻ on the arm and draw out the main shaft bearing bush (assembly). 8. Shift the sprocket in the direction of arrow C as illustrated in the figure and shift the timing belt in the direction of arrow B. 9. Push the timing belt ❽ out from the hole in the machine arm and draw it in the direction of arrow D to detach it from the main shaft ❿. 10. Remove the feed adjusting tension spring ㉗ from the feed adjusting eccentric pin.	3' Refer to [3-(16) Aperture Plate Removal Procedure (for LU-2212N-7)] for how to remove the aperture plate for LU-2212N-7.


⑰
⑱
⑯
(Only for LU-2212N-7)
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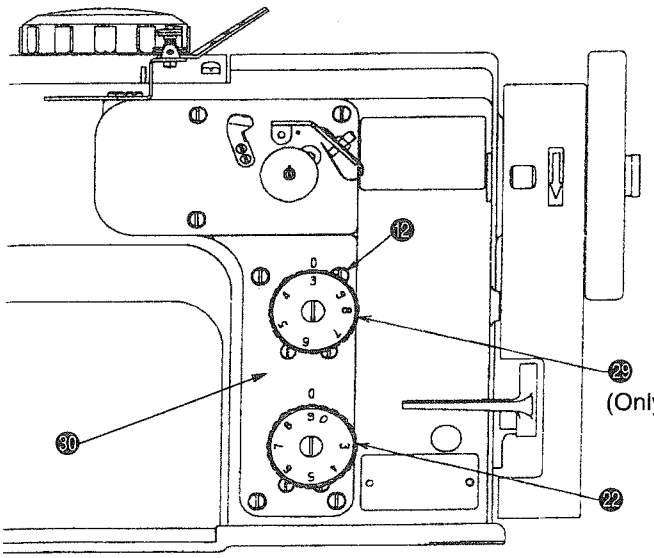
1mm
A clearance of 1 mm should be provided between the spring rack hook ㉖ and the end face of the feed adjusting arm ⑮.


⑫
㉙
(Only for LU-2212N-7)
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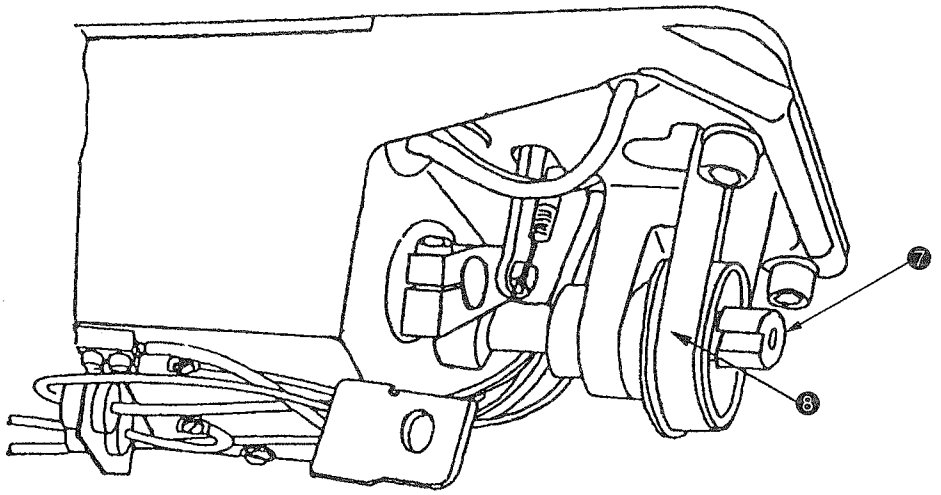
㉒

Assembling and Disassembling Procedure	Results of Improper Adjustment
11. Loosen the clamping screws ⑰ and ⑱ of the feed adjusting arm ⑮ and the feed adjusting pin support arm ⑯ (only for LU-2212N-7). 12. Loosen the clamping screw ⑳ of the thrust collar ⑲. 13. Loosen the clamping screw ⑪ of the reverse feed connecting arm ㉑. 14. Set the stitch dial ㉒ to the maximum value on the scale. Then, remove the face aperture plate on the front face of the sewing machine. 15. Loosen the clamping screw ⑭ (two locations) of the feed adjusting pin ⑬. 16. Remove the tension spring ㉔ of the reverse feed lever ㉓. Draw out the reverse feed lever shaft ㉕ to a position where the timing belt can be removed. Then, remove the spring rack hook ㉖, the feed adjusting tension spring ㉗, the feed adjusting arm ⑮ and the feed adjusting pin support arm ⑯ (only for LU-2212N-7). 17. Replace the timing belt with a new one and put it on the upper sprocket. 18. Insert the reverse feed lever shaft ㉕ inside the periphery of the timing belt. Attach the feed adjusting pin support arm ⑯ (only for LU-2212N-7), spring rack hook ㉖ and feed adjusting arm ⑮ onto the reverse feed lever shaft ㉕. 19. Insert the reverse feed lever shaft ㉕ in the shaft hole in the machine arm. Fasten the set screw ⑳ of the thrust collar ⑲. 20. Fasten the set screw ⑭ of the feed adjusting pin ⑬. At that time, fasten the screw so that the pin roller ㉘ is in a position where it rotates smoothly. 21. Fasten the set screw ⑰ of the feed adjusting arm ⑮. At that time, fluctuate the feed adjusting arm ⑮ to the right and left until the feed adjusting arm ⑮ is placed almost at the center of the play, then fasten the clamping screw. **(Caution) Fasten the clamping screw with a tightening torque of 3.92 to 4.9 N•m (40 to 50 kgf•cm).** 22. Fasten the clamping screw ⑨ of the feed adjusting pin support arm ⑯ (only for LU-2212N-7). 23. Put the feed adjusting tension spring ㉗ onto the spring rack hook ㉖ and the feed adjusting eccentric pin. 24. Fasten the clamping screw ⑪ of the reverse feed connecting arm ㉑ and attach the face aperture plate on the front face of the sewing machine. 25. Attach the tension spring ㉔ of the reverse feed lever ㉓ in place.	11' Insert the screwdriver from the aperture plate side. 12' Insert the screwdriver from the aperture plate side and from the under surface of the bed. 14' For LU-2212N-7: • Set the stitch dial to the maximum value on the scale. After that, remove the 2P stitch dial ㉙. Loosen the set screw ⑫ of the aperture plate on the front face of the sewing machine and remove the face aperture plate B ㉚ on the front face of the machine. 19' Fasten the set screw ⑳ of the thrust collar ⑲ while eliminating a thrust play at the reverse feed lever shaft ㉕. 21' If the feed adjusting arm ⑮ is not correctly positioned, the feed connecting rod may fail to operate normally, the feed adjusting arm ⑮ may interfere with the inner wall of the arm, and the feed adjusting arm ⑮ may be pushed against the side face of the feed crank stud. In this case, the reverse feed lever ㉓ may not be lifted/lowered smoothly. 23' Set the stitch dial ㉒ to the maximum value on the scale. Adjust so that a clearance of 0.5 to 1.5 mm is provided between the reverse feed lever ㉓ and the stopper when the reverse feed lever ㉓ is slightly pushed down, and then fasten the clamping screw ⑪. (Refer to [3.-(8) Position of the Reverse Feed Connecting Arm] for further details. 24' For LU-2212N-7: • Fasten the clamping screw ⑪ of the reverse feed connecting arm ㉑ and attach the face aperture plate B ㉚ on the front face of the machine. After that, attach the 2P stitch dial ㉙.

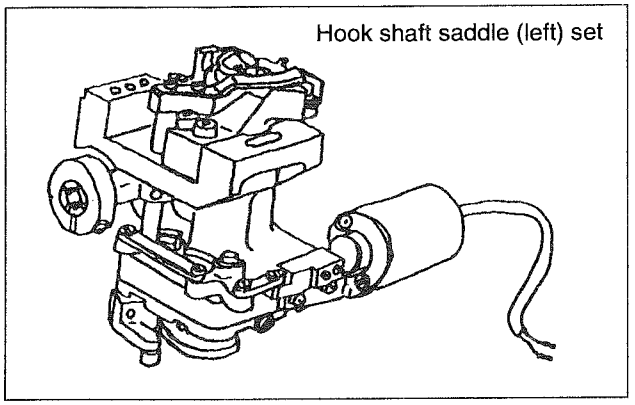


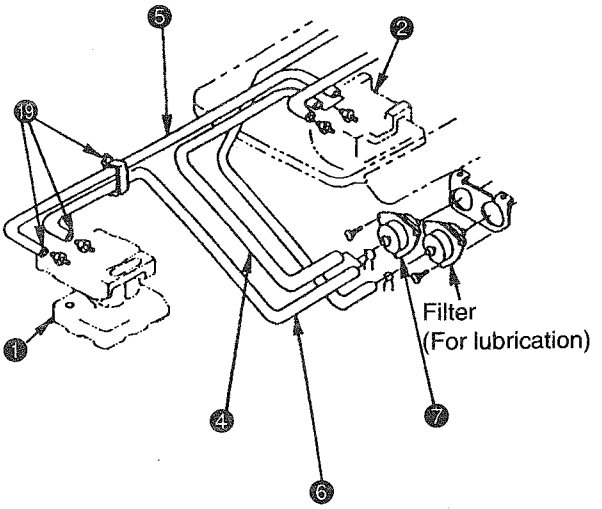
When the timing belt ⑧ is put on the lower sprocket ⑦, take care to set the correct timing between the needle and the hook.
After the timing belt has been properly set on the machine, check the [Timing between the needle and the hook], [Feed rock timing], [Feed driving timing] and [Height of the feed dog].

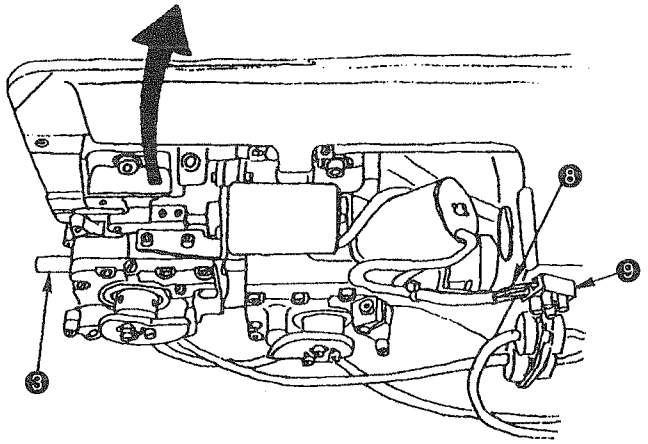
Assembling and Disassembling Procedure	Results of Improper Adjustment
26. Put the timing belt ⑧ on the lower sprocket ⑦. At that time, take care not to change the needle-to-hook timing away from the correct timing. 27. Check the timing between the needle and the hook. 28. Check the feed rock timing. 29. Check the feed driving timing. 30. Check the height of the feed dog. 31. Fasten the clamping screw while pressing the hand-wheel against the main shaft bearing.	27' Refer to [3-(4)-3) Timing between the Needle and the Hook]. 28' Refer to [3-(6)-1) Feed Rock Timing]. 29' Refer to [3-(6)-2) Feed Driving Timing]. 30' Refer to [3-(6)-4) Height of the Feed Dog].

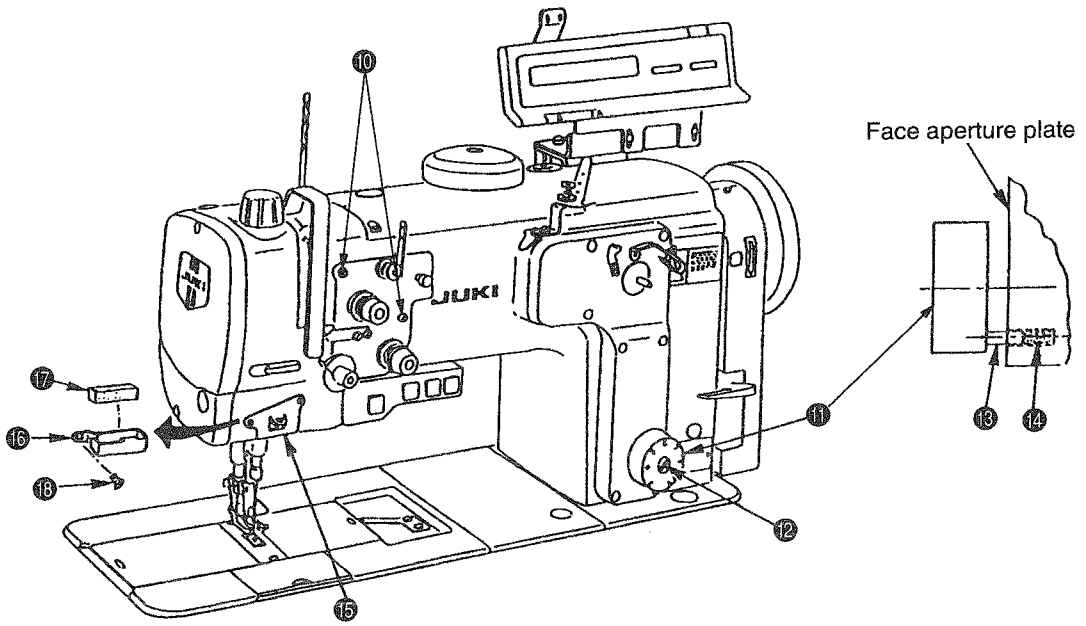
(4) How to change from 1-needle to 2-needle specifications (LU-2210N-7 → LU-2260N-7)

Assembling and Disassembling Procedure









Assembling and Disassembling Procedure

1. Remove the sliding plate (right) and (left) and the needle. Then, tilt the machine head.
2. Loosen the clamping screw of the hook driving shaft set collar.
3. Loosen the set screws (2 pcs.) of the hook driving shaft coupling (left) and pull out the hook driving shaft B.
4. Remove the throat plate, feed dog, presser foot (assembly) and walking foot (assembly).
5. Fix temporarily the hook shaft saddle (left) ❶ on the bed. To attach the hook shaft saddle (left) ❶, screws (2 pcs.) and washers (2 pcs.) are necessary, but an eccentric pin is not necessary.
6. Loosen the set screws (2 pcs.) to the extent that the hook shaft saddle (right) ❷ moves to the right and left.
7. Attach both the feed dog and the throat plate for 2-needle.
8. Remove the face plate, presser adjusting screw and thread take-up lever cover, and loosen the clamping screw of the needle bar connecting stud to pull out the needle bar.
9. Temporarily attach the needle bar for 2-needle.
10. Attach the needle clamp (assembly).
11. Attach the hook driving shaft coupling (left) through the hook driving shaft C ❸.
12. Attach the needle and adjust the [Height of the needle bar], [Clearance between the needle and the blade point of hook], [Timing between the needle and the hook], and [Clearance between the throat plate and the inner hook stopper]. The adjustment for the left and right needles is the same.
13. Remove the return oil pipe A (for 1-needle) ❹. Then connect the lubricating pipe C (for 2-needle) ❺ from the pipe joint on the upper side of the hook shaft saddle (right) ❷ to the pipe joint on the lower side of the hook shaft saddle (left) ❶. Then, connect the return oil pipe A (for 2-needle) ❻ from the pipe joint on the lower side of the hook shaft saddle (left) ❶ to the filter (for return oil) ❼. Attach the cable band ⓳ to the respective pipe joints to fix the pipes.
14. Attach the lead ❽ for the right and left thread trimmer solenoids. At that time, be sure to insert two solenoid leads ❽ in one hole of the terminal base ❾.
15. Adjust the right and left of the [Thread trimmer] and [Opener].
16. Replace the presser adjusting spring with a new one for 2-needle.
17. Loosen the thread tension (assembly) set screws (2 pcs.) ❿ and replace the thread tension controller (assembly) with a new one for 2-needle.
18. Set the stitch dial ⓫ to [0] on the scale. In this state, loosen the stitch dial set screw ⓬ and replace the stitch dial with a stitch dial for 2-needle. At that time, make sure that the stitch dial pin ⓭ and the spring ⓮ are placed in position.
19. Remove the thread guide B ⓯ in the arm and attach the felt thread guide ⓰ and felt ⓱. At that time, the set screw ⓲ of the thread guide should be replaced as well.
20. Attach the face plate, presser adjusting screw, thread take-up lever cover and slide plates (left) and (right).

(Caution) Refer to the List of the Parts to be changed (next page)

● List of the Parts to be changed

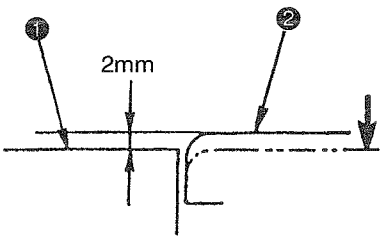
When the mode is changed from 1-needle to 2-needle, perform the changing work according to the unit as the part No. of the unit for mode change have been set.

List of Unit for mode change

No.	Part No.	Description	Q'ty	Details of set	Remarks
1	10771772	Unit for mode change	1		
2	10771764	Hook shaft base (left) set		1	❶
3	10771756	Hook shaft base (right) set (assembly)		(1)	
4	10726552	Counter knife base (assembly)		(1)	
5	SM6052502TP	Counter knife base (assembly) set screw		(2)	
6	WP0520656SA	Counter knife base (assembly) set screw washer		(2)	
7	10726800	Moving knife shaft		(1)	
8	10726305	Moving knife		(1)	
9	SM6030802TP	Moving knife set screw		(2)	
10	WP0320501SC	Moving knife set screw washer		(2)	
11	B2311019000	Moving knife shaft spring		(1)	
12	10772804	Thread trimmer solenoid		(1)	
13	10772200	Thread trimmer solenoid mounting plate (left)		(1)	
14	SM6040602TP	Thread trimmer solenoid set screw		(2)	
15	SM6040602TP	Thread trimmer solenoid mounting plate set screw		(2)	
16	10772101	Thread trimmer solenoid arm (left)		(1)	
17	SM8050602TP	Thread trimmer solenoid arm (left) set screw		(2)	
18	10771806	Moving knife driving arm C		(1)	
19	10772507	Moving knife driving arm E		(1)	
20	10771905	Moving knife driving link (A)		(1)	
21	10772002	Moving knife driving link (B)		(1)	
22	SM6041202TP	Moving knife driving arm C clamping screw		(1)	
23	SD0500301SP	Moving knife driving link (A) hinge screw		(2)	
24	SD0500301SP	Moving knife driving link (B) hinge screw		(2)	
25	CS0790731SH	Moving knife shaft thrust plate		(1)	
26	SS8110422TP	Moving knife shaft thrust plate set screw		(2)	
27	10728160	Moving knife driving arm A joint		(1)	
28	10727709	Thread trimmer cam		(1)	
29	SM6041202TP	Thread trimmer cam set screw		(3)	
30	10722551	Hook (assembly)		(1)	
31	10724607	Hook driving shaft set collar		(1)	
32	SM6051402TP	Hook driving shaft set collar set screw		(1)	
33	SM6062002TP	Hook shaft base set screw		2	
34	WP0641601SD	Hook shaft base set screw washer		2	
35	10772705	Hook driving shaft C		1	❸
36	10773364	Thread tension (assembly)		1	
37	22603609	Felt thread guide		1	⓰
38	22603708	Felt		1	⓱
39	SS2090710SP	Felt thread guide set screw		1	⓲
40	10771459	Stitch dial (assembly)		1	
41	10717007	Presser adjusting spring		1	
42	10771103	Needle bar		1	
43	SM6030502TP	Needle clamp screw		1	
44	BT0600402EA	Hook shaft base oil pipe C		0.18m	❺
45	BT0500300EO	Hook shaft base return oil pipe A		0.26m	❻
46	EA9500B0100	Cable clip		3	⓳
47	10777407	Hexagon wrench 2.5 mm		1	

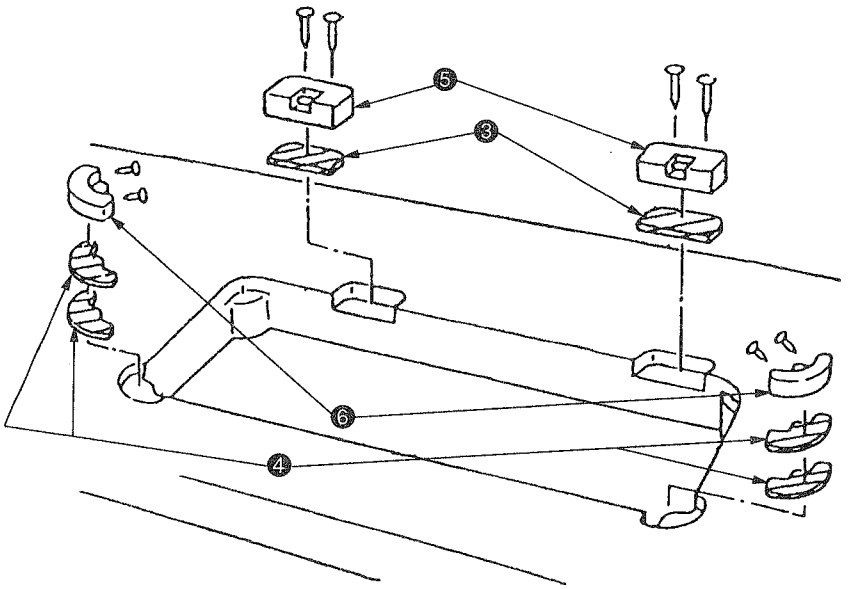
6. Bed Height Adjustment

Standard Adjustment



When the sewing machine head is installed on the sewing machine table ❶ in the standard state, the top surface of the sewing machine bed ❷ is 2 mm higher than the top surface of the table ❶ as illustrated in the figure on the left.

If the sewing machine is to be used with the bed ❷ lowered as shown by the arrow, remove the rubber spacers (2 pcs.) ❸, rubber cushions (4 pcs.) ❹ shown with oblique lines and attach the hinge seat ❺ and the machine head support rubber pieces ❻ in place.

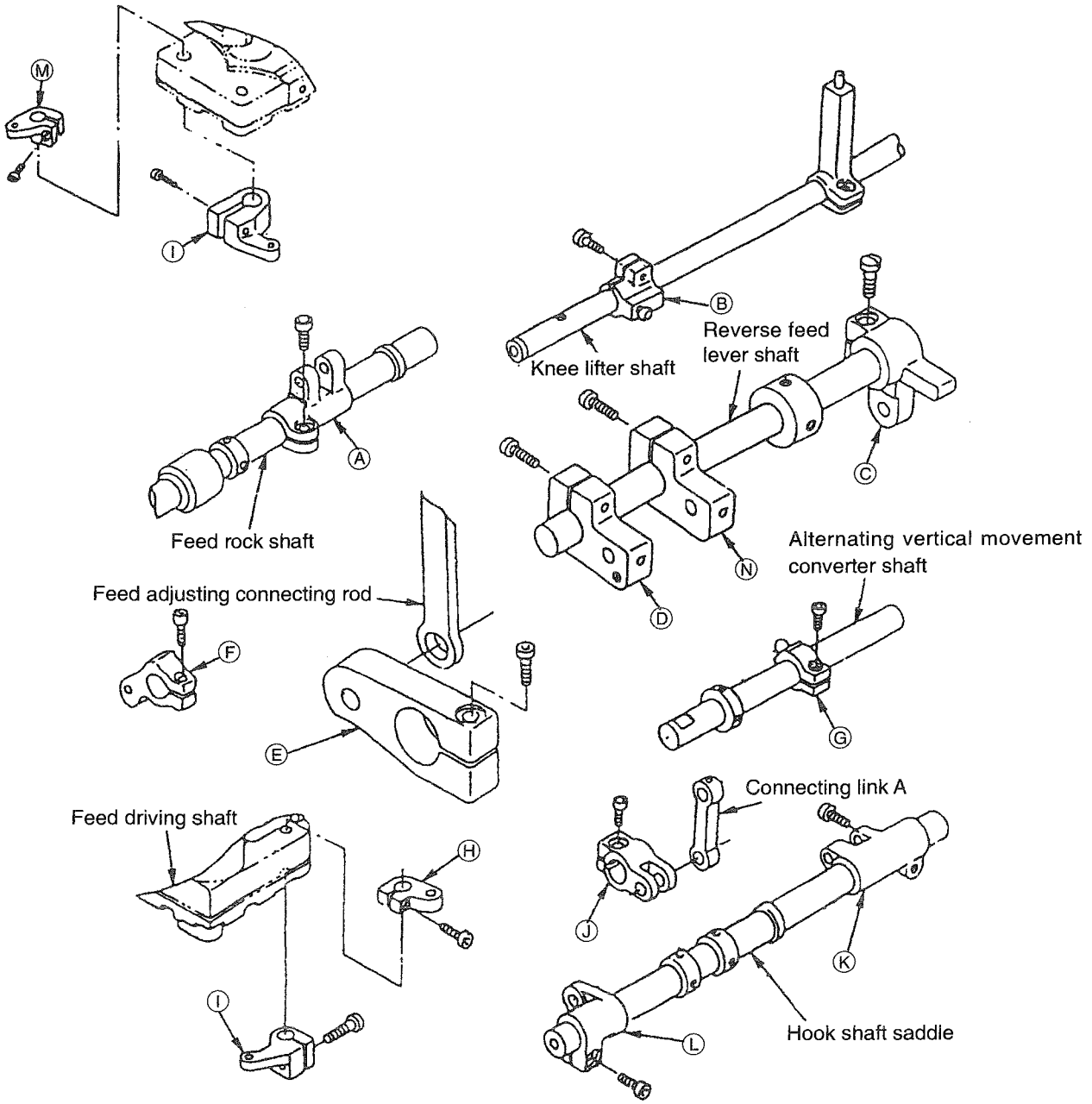


No.	Part Name	Part No.
❸	Rubber spacer	10742005
❹	Rubber cushion	10740900

7. Parts to be carefully tightened

The following parts will break if they are excessively tightened. So, fasten the screws carefully in the respective parts.

	Part No.	Part Name		Part No.	Part Name
Ⓐ	10718104	Feed rock shaft clank	Ⓗ	10727808	Moving knife driving arm B
Ⓑ	10729705	Presser lifter arm	Ⓘ	10728103	Moving knife driving arm A
Ⓒ	10721207	Reverse feed connecting arm	Ⓙ	10713907	Top feed arm
Ⓓ	10720506	Feed adjusting arm	Ⓚ	10718104	Feed driving shaft crank
Ⓔ	10720308	Feed adjusting converting arm	Ⓛ	10718609	Feed driving arm
Ⓕ	10735900	Cylinder arm for the alternating vertical movement of the walking foot and presser foot	Ⓜ	10771806	Moving knife driving arm C
Ⓖ	10715209	Adjusting arm for the alternating vertical movement of the walking foot and presser foot	Ⓝ	40025558	Stitch dial pin support arm (Only LU-2212N-7)



8. Parts to be fixed with LOCK-TITE Paint

The following parts are fixed with "LOCK-TITE" paint. When these parts are disassembled, remove residual paint thoroughly using pint thinner and assemble them applying "LOCK-TITE" after removing any moisture from the surface.

If the screw which has been fixed with "LOCK-TITE" paint, is too hard to loosen, it is advisable to warm it up using a torch lamp. This will make the screw easily come off.

No.	Description	Part No.	LOCK-TITE type No.
1	Moving knife driving link hinge screw	SD0500481TP	LOCK-TITE #638
2	Cam roller shaft hinge screw	SD0500721SP	LOCK-TITE #638
3	feed adjusting base set screw	SS7110710SP	LOCK-TITE #638
4	Safety mechanism spring hinge screw and safety mechanism claw hinge screw	SD0640322TP	LOCK-TITE #242
5	Engaging section of the feed adjusting arm and stitch dial pin	10720506, 10721504	LOCK-TITE #638
6	Stitch dial pin set screw	SS7110810SP	LOCK-TITE #638
7	Feed connecting link B support pin screw	SM8050602TP	LOCK-TITE #242
8	Top feed connecting converting unit support pin set screw	SM8050602TP	LOCK-TITE #242
9	Top feed converting unit shaft set screw	SM8050602TP	LOCK-TITE #242
10	Reverse feed connecting arm hinge screw	SD0800352SP	LOCK-TITE #638
11	Hook driving shaft bearing holder set screw	SS8080610SP	LOCK-TITE #242
12	Thread take-up crank pin	10524106	LOCK-TITE #638
13	Amount of alternating vertical movement of the walking foot and presser foot adjusting arm and converting unit arm pin	10715209, 10715308	LOCK-TITE #638
14	Variable speed resistor link hinge screw	SD0550212TP	LOCK-TITE #638
15	Top cover and dial bush of alternating vertical movement of the walking foot and presser foot	10742609, 10715100	LOCK-TITE #638
16	Needle bar frame and needle bar fame driving shaft	10708402, 10708709	LOCK-TITE #638
17	Needle bar frame and roller guide base screw	10708469, SM6041012TP	LOCK-TITE #638
18	Feed adjusting arm and feed adjusting connecting rod pin	10720506, 10725307	LOCK-TITE #638
19	Tension release presser pin and tension release push screw	10702702, 10702801	LOCK-TITE #242
20	Presser lifter arm and converter arm pin	10729705, 10715308	LOCK-TITE #638
21	Tension release arm and tension release arm pin	10729903, 10730000	LOCK-TITE #638
22	Alternating vertical movement stopper plate and stopper plate hinge screw	10714400, B3416552000	LOCK-TITE #638
23	Alternating vertical movement shaft spring suspension bracket and spring hinge screw	10714905, 11007101	LOCK-TITE #638
24	Side pate on the front face and side plate positioning pin	10737005, 10704302	LOCK-TITE #638
25	Cylinder connecting screw and cylinder connecting screw hinge screw	10737013, SD0720331SP	LOCK-TITE #638
26	Hook shaft saddle lower plate and opener shaft oil seal	10724300, 10726107	LOCK-TITE #638
27	Hook driving shaft and hook driving shaft gear screw	10722304, SS2090710SP	LOCK-TITE #638
28	Moving knife driving link A hinge screw and moving knife driving link B hinge screw	SD0500301SP	LOCK-TITE #638
29	Opener arm shaft B	10770501	LOCK-TITE #242

	No.	Description	Part No.	LOCK-TITE type No.
*	30	Face aperture plate B and face aperture place pilot pin	40027141, 10704302	LOCK-TITE #638
*	31	Engaging section of feed adjusting bracket and feed adjusting pin (A)	10720506, 40025557	LOCK-TITE #638
*	32	Feed adjusting pin (A) set screw	SS7110810SP	LOCK-TITE #638
*	33	Feed adjusting base A set screw	SS7110710SP	LOCK-TITE #638
*	34	Feed adjusting base B set screw	SS7110710SP	LOCK-TITE #638
*	35	2P cylinder connecting screw and cylinder connecting screw hinge screw	10737013, SD0720331SP	LOCK-TITE #243

The item with * mark applies only to LU-2212N-7.

9. Maintenance Parts List

Basic Maintenance Parts

• Refer to [3.-(11)-3 Knife Pressure].

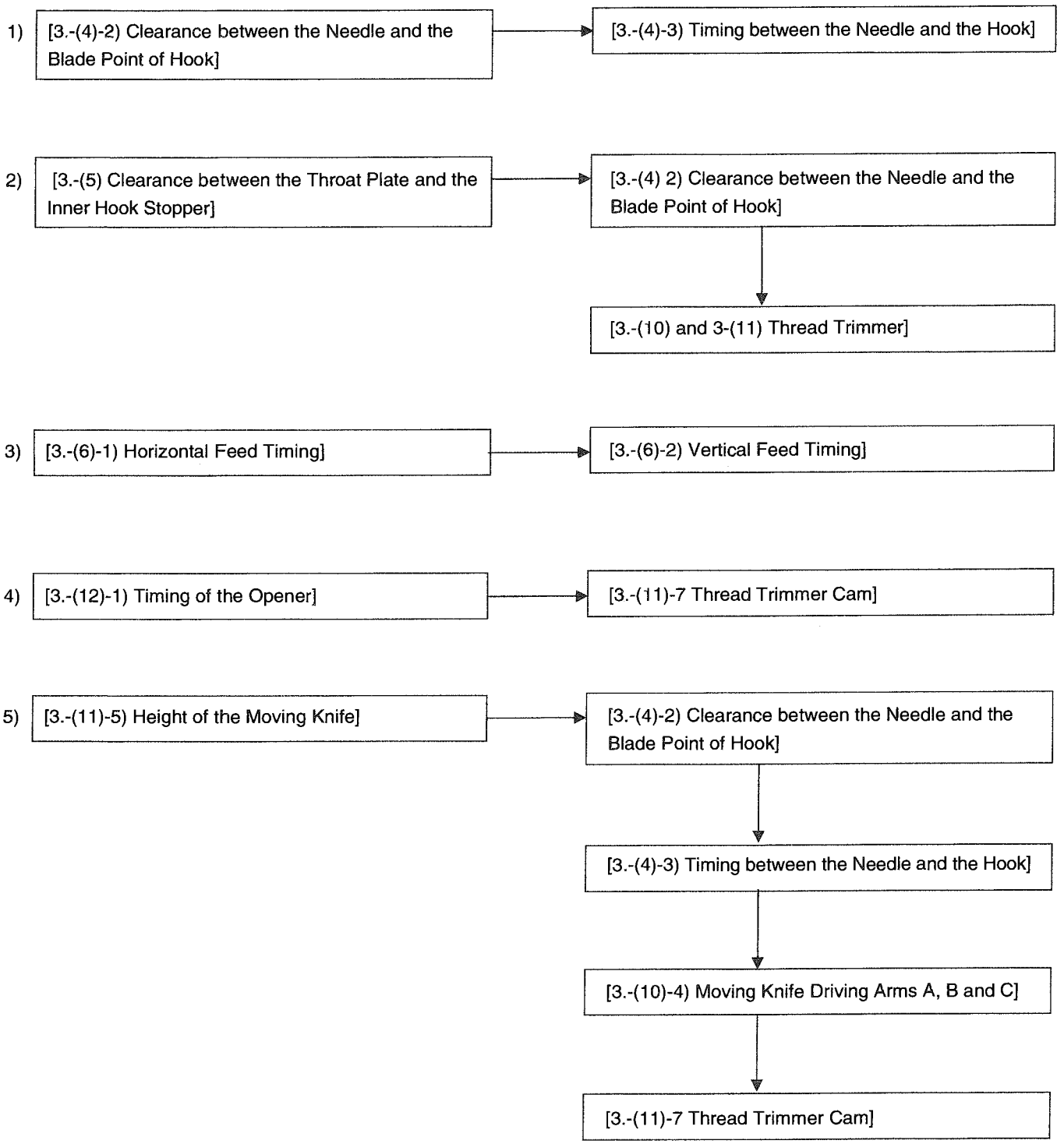
No.	Part No.	Part Name	Specifications	Instruction in attachment
1	MC321001400	Needle 134 x 35R (Standard: Nm 140)	2210N-7/2212N-7/2210W-7	Selection: • Orientation of the Needle
	MC321001402	Needle 134 x 35R (Standard: Nm 140)	2260N-7/2260W-7 (2-needle)	• Refer to [3.-(4)-2) Clearance between the Needle and the Blade Point of Hook] and [3.-(4)-3) Timing between Needle and the Hook].
2	10756757	Hook (assembly) 2-fold hook	2210W-7/2260W-7	Selection:
	10761252	Hook (assembly)	2210N-7/2260N-7/2212N-7	• Refer to [3.-(4)-2) Clearance between the Needle and the Blade Point of Hook] and [3.-(4)-3) Timing between Needle and the Hook].
3	10759603	Aluminum bobbin (with a knurling tool)	2210N-7/2260N-7	Selection
	21334800	Aluminum bobbin (with a knurling tool)	2210W-7/2260W-7	
	40018350	Aluminum bobbin A	2210N-7/2260N-7/2212N-7	
4	10726305	Moving knife	2210N-7/2210W-7 2260N-7/2260W-7	• Refer to [3.-(10)-3)
	21389200		Only 2212N-7	• Refer to [3.-(11)-3 Knife Pressure].
5	10726404	Counter knife	2210N-7/2210W-7 2260N-7/2260W-7	• Refer to [3.-(10)-1 Counter Knife].
	21389309	Counter knife	Only for 2212N-7	• Refer to [3.-(11)-1) Counter Knife].
6	10726909	Clamp spring	2210N-7/2210W-7 2260N-7/2260W-7	• Refer to [3.-(10)-2) Clamp Spring].
	21389408	Clamp spring	Only for 2212N-7	• Refer to [3.-(11)-1) Counter Knife and Clamp Spring Positions].
7	10727303	Filter	Common type	• Refer to [3.-(15) Lubricating Unit].

Maintenance Parts to be rarely replaced

No.	Part No.	Part Name	Specifications	Instruction in attachment
1	10702405	Thread take-up spring	2210N-7/2212N-7/2210W-7	
	B3128526000	Thread take-up spring	2260N-7/2260W-7	
2	10725000	Opener	Common type	• Refer to [3.-(12) Opener].
3	10706703	Timing belt	Common type	• Refer to [5.-(3) How to replace the Timing Belt].
4	B3212210000	Bobbin winder friction wheel	Common type	• Refer to [3.-(9)-1) Bobbin Winder Friction Wheel Adjustment].
5	10744308	Stitch dial	Common type	• Refer to [3.-(7)-1) Zeroing of the Feed Adjusting Mechanism].
	40027231	Stitch dial	Only for 2212N-7	• Refer to [3.-(7)-3) 2P Adjustment].

10. Mechanism Adjusting Procedure Chart at a Glance

When adjusting the items 1) through 8), also adjust the related components according to the arrows.



6) [5.-(3) How to replace the Timing Belt]

- [3.-(4)-3) Timing between the Needle and the Hook]
- [3.-(6)-1) Horizontal Feed Timing]
- [3.-(6)-2) Vertical Feed Timing]
- [3.-(6)-4) Height of the Feed Dog]

7) [5.-(1) How to replace the Needle Clamp]

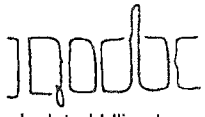
- [3.-(3) Needle Entry]
- [3.-(4)-2) Clearance between the Needle and the Blade Point of Hook]
- [3.-(4)-3) Timing between the Needle and the Hook]
- [3.-(5) Clearance between the Throat Plate and the Inner Hook Stopper]
- [3.-(2) Sewing Speed]

8) [5.-(4) How to change from 1-needle to 2-needle specifications]

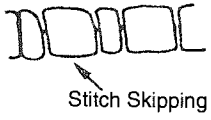
- [3.-(3) Needle Entry]
- [3.-(4)-2) Clearance between the Needle and the Blade Point of Hook]
- [3.-(4)-3) Timing between the Needle and the Hook]
- [3.-(5) Clearance between the Throat Plate and the Inner Hook Stopper]
- [3.-(10) Thread Trimmer]
- [3.-(12) Opener]
- [5.-(2) Replacement of the Presser Adjusting Spring]
- [3.-(15) Lubricating Unit]
- [3.-(2) Sewing Speed]

11. Troubles in Sewing and Corrective Measures

(1) Related to Sewing

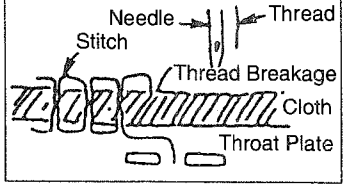
Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
1. Isolated idling loop (loose stitches and looped stitches) Knots of sewing threads are suddenly made on the upper of lower side of the material as isolated idling loops Needle Thread Bobbin Thread  Isolated Idling Loop	1-1) Needle 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 tension of the spring.
	1-3) The amount of thread to be fed by the thread take-up lever is excessive.		Move the take-up thread guide to the right to decrease the amount of thread to be fed by the ead take-up lever.
	1-4) Defective hook components	4-A) Clearance between the hook and the inner hook stopper is too small.	Re-adjust the height of the hook (Refer to [3-(5)]).
		4-B) Defective hook	Replace the hook.
	1-5) Thread path is incorrect.	5-A) Thread path is not smooth on the surface.	Smoothen the thread path.
		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.	Smoothen the thread path.
	1-6) Defective bobbin or bobbin case	6-A) The bobbin is engaged with the inner hook in a defective way. The thread is caught in a defective engaging section.	Replace the bobbin or the inner hook.
		6-B) Tension adjusting spring of the bobbin case is defective.	Replace the bobbin case.
		6-C) The bobbin runs idle in the bobbin case.	Increase the effective amount of the idling prevention spring.
	1-7) Bobbin does not wind the bobbin thread.	7-A) The bobbin winder spring pressure is too high or too low.	Adjust the spring pressure to an adequate value.
	1-8) Needle slot in the feed dog is too small.		Use a feed dog with a larger needle slot.
	1-9) Needle used is too thin for the thread used.		Replace the needle or the thread.
	1-10) Defective needles	10-A) Tip of the needle has burrs.	Replace the needle with a new one.
		10-B) Installing direction of the needle is incorrect.	Re-install the needle.

To the next page

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
Continued from the previous page			
	1-11) Defective feed timing	11-A) Feed timing is earlier than the standard one.	Re-adjust the feed timing. (Refer to [3-(6)]).
		11-B)Height of the feed dog differs from the standard value.	Re-adjust the height of the feed dog. (Refer to [3-(6)-4)])
	1-12) Defective hook timing	12-A) Hook timing is too early.	Retard the hook timing.
	1-13)Defective needle entry		Adjust so that the needle enters just at the center of the needle slot in the feed dog.
	1-14)Inner hook opening lever is defective.	14-A) Clearance between the hook and the inner hook opening is too large.	Decrease the clearance.
2. Stitch Skipping Stitches are not finishing completion since sewing threads are not made into stitches in part. Needle Thread Bobbin Thread  Stitch Skipping	2-1) Defective needle	1-A) Bent needle	Replace the needle with a new one.
		1-B) The needle is installed facing in the wrong direction.	Re-install the needle in the correct manner.
		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.
	2-2) 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.
	2-3) The needle thread tension is too high.		Decrease the needle tension.
	2-4) Sewing speed is too high.		Decrease the sewing speed.
To the next page			

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

Continued from the previous page

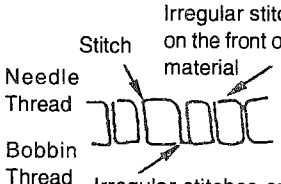
Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
	2-5) Height of the needle bar is not correct.	5-A) Height of the needle bar is not adjusted to the specified dimension.	Re-adjust the height of the needle bar.
	2-6) Defective presser foot	6-A) The presser foot fails to rest on the throat plate.	Height of the presser foot is incorrect.
	2-7) Improper feed timing (bent needle).		Re-adjust the feed timing.
	2-8) 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.
	2-9) Incorrect needle entry	9-A) The needle comes in contact with the needle hole in the throat plate.	Adjust the needle entry.
	2-10) Improper pressure of the presser foot	10-A) Pressure of the presser foot is too low.	Increase the pressure of the presser foot.
3. Needle Thread Breakage The needle thread splits finely or breaks during sewing.  	3-1) Thread path is incorrect.	1-A) Thread path is not smooth on the surface.	Smoothen the thread path.
		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.	Smoothen the thread path.
	3-2) Improper needle thread tension	2-A) Needle thread tension is too high or too low.	Adjust the needle thread tension.
		2-B) 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.
	3-3 Defective needle	3-A) Bent needle	Replace the needle with a new one.
		3-B) The needle has scratches.	Replace the needle with a new one.
		3-C) Tip of the needle is blunt.	Replace the needle with a new one.
		3-D) The needle is installed facing the wrong direction.	Re-install the needle in the correct manner.
		3-E) The needle is too thick or too thin for the thread used.	Replace the needle with a new one.

To the next page

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

Continued from the previous page

3-4) Defective hook components	4-A) Thread path of the hook has scratches.	Smoothen the thread path.
	4-B) 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-C) Clearance between the blade point of the hook and the inner hook stopper is too small.	Widen the clearance to allow the thread to come off the hook smoothly.
	4-D) Hook timing is too early.	Adjust the hook timing.
	4-E) The inner hook opening lever provides an excessive clearance.	Adjust the clearance.
	4-F) The needle interferes with the blade point of the hook.	Adjust the needle-to-hook relation.
3-5) Thread take-up spring has been improperly adjusted	5-A) Stroke of the thread take-up spring is too large or too small.	Re-adjust the stroke of the thread take-up spring.
	5-B) Tension of the thread take-up spring is too high or too low.	Re-adjust the spring tension.
3-6) Sewing speed is too high.	6-A) The needle generates heat, resulting in thread breakage.	Decrease the sewing speed.
		Wind the thread around the needle.
3-7) The installing point of the needle is too low	7-A) Height of the needle bar is insufficient.	Raise the needle bar.
	7-B) Needle is not attached in the needle bar in the correct manner.	Attach the needle in the needle bar.
3-8) Pressure of the presser foot is too low.	8-A) Stitches gather on the overlapped section of a material, resulting in thread breakage.	Increase the pressure of the presser foot.
3-9) Incorrect needle entry	9-A) Needle interferes with the needle hole edge of the throat plate.	Re-adjust the needle entry point. (Refer to [3.-(3)])

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
4. Irregular Stitches Knots of the needle thread and the bobbin thread irregularly appear on the front or back of the material.  	4-1) Defective hook components	1-A) Oil in the hook is insufficient.	Adjust so that a sufficient amount of oil is supplied to the hook (Refer to [3.-(15)-4)])
		1-B) Dust gathers on the reverse side of the inner hook	Clean the inner hook.
		1-C) Hook timing is too early.	Retard the hook timing.
		1-D) Defective hook (The hook has scratches or the thread path is improper, etc.)	Replace the hook with a new one and/or correct the thread path.
		1-E) The inner hook opening lever provides excessive clearance.	Decrease the clearance at the inner hook opening lever.
		1-F) Clearance between the throat plate and the inner hook stopper is too small.	Re-adjust the height of the hook (Refer to [3.-(5)]).
	4-2) Defective bobbin and/or inner hook	2-A) 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-B) 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-C) Bobbin runs idle in the inner hook.	Increase the idling prevention spring pressure.
		2-D) Defective adjusting spring tension of the inner hook	Replace the inner hook with a new one.
		2-E) 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.
	4-3) The needle thread tension and the bobbin thread tension are too low.		ncrease the thread tension.
	4-4) Thread take-up spring has not been correctly adjusted.	4-A) Stroke of the thread take-up spring is too large or too low.	Re-adjust the stroke of the thread take-up spring.
		4-B) Tension of the thread take-up spring is too high or too low.	Re-adjust the tension of the thread take-up spring.
	4-5) Improper thread path	5-A) Thread path is not smooth on the surface.	Smoothen the thread path.
		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.	Smoothen the thread path.
	4-6) Length of thread fed by the thread take-up lever is excessive or insufficient.		Move the take-up thread guide to the left and right and adjust the length of the thread to be fed by the thread take-up lever.
	4-7) Improper feed timing		Re-adjust the feed timing. (Refer to [3.-(6)]).

(2) Related to Thread Trimmer

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
1. One or two stitches skip at the start of the sewing.	1-1) Length of thread left at the needle tip after thread trimming is too short.	1-A) The needle thread path is incorrect in part, resulting in excessive needle thread tension at the time of thread trimming.	Check the needle thread path and remove the thread tangled round the thread guide or correct the position of the thread guide of the spool rest rod.
		1-B) Tension of the tension disk No. 1 is too high.	Turn the thread tension nut No. 1 counterclockwise to reduce the thread tension.
		1-C) The tension disk No. 2 fails to release the thread sufficiently at the time of thread trimming.	Re-adjust the timing of releasing thread tension. Also, make sure that the tension releasing solenoid activates while the sewing machine is being energized.
		1-D) Timing of thread trimming is too early.	Check the timing of thread trimming and adjust it referring to [3.-(11)-7) and 8) Thread Trimmer Cam].
		1-E) Moving knife and/or the hook has scratches.	Check the hook and the moving knife for scratches and buff them up if needed. If the knife and/or th hook is seriously damaged, replace it with a new one.
	1-2) Bobbin thread fails to be clamped.	2-A) The installing position of the clamp spring is not correct.	Adjust it referring to [3.-(10)-2) Clamp Spring] and [3.-(11)-1) Counter Knife and Clamp Spring Positions].
		2-B) Clamp spring pressure is too low.	Adjust the clamp spring pressure or replace the clamp spring with a new one referring to [3-(10)-2) Clamp Spring] and [3.-(11)-1) Counter Knife and Clamp Spring Positions].
		2-C) Clamp spring has scratches or is damaged.	Replace the clamp spring with a new one.
		2-D) The needle thread on the material side removes the bobbin thread.	Increase the thread tension of the thread tension controller No. 1.
	1-3) The needle, treadle and feed dog used are not suitable, or the pressure of the walking foot is too low.	3-A) Needle is too thick.	It is advisable to use the thinnest needle as long as loose stitches do not occur.
		3-B) The needle slot in the feed dog is too large.	Replace the feed dog with one which has a smaller needle slot.
		3-C) Pressure of the presser foot is too low.	Increase the pressure of the presser foot, by turning the presser spring regulator clockwise, to the extent where the feed dog does not scratch the material.
		3-D) Walking foot does not clamp the needle thread.	Replace the walking foot with one which does not have a slit. (Refer to [12. Replaceable Gauge Table]).

Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures
2. Needle thread is likely to slip off the needle eyelet.	2-1) Needle thread slips off the needle eyelet immediately after thread trimming.	1-A) Length of thread trailing from the needle eyelet after thread trimming is too short.	Refer to Cause (1)-1)-A through E and [3.-(11)-7) and 8) Thread Trimmer].
	2-2) Needle thread slips off the needle eyelet at the start of sewing.	2-A) Length of thread trailing from the needle eyelet at the sewing start is too short.	Refer to Cause (1)-1)-A through E and [3.-(11)-7) and 8) Thread Trimmer].
3. Thread Trimming Failure	3-1) The thread trimmer fails to cut the threads.	1-A) The moving knife blade fails to match the counter knife blade in height and direction.	Check the height of the moving knife and counter knife.
		1-B) The moving knife blade and counter knife blade have worn out or been damaged.	Replace the moving knife and the counter knife with new ones.
		1-C) The counter knife fails to provide sufficient pressure.	Re-adjust the knife pressure. (Refer to [3.-(10)-3) and (11)-3) Knife Pressure]).
	3-2) Single yarn of the thread remains untrimmed.	2-A) The moving knife blade and the counter knife blade have worn out or been damaged.	Replace the moving knife and the counter knife with new ones.
		2-B) The moving knife blade fails to match the counter knife blade in height and direction.	Check the height of the moving knife and counter knife.
		2-C) Timing of thread trimming is too late.	Check the cam for correct timing.
		2-D) The counter knife fails to provide a sufficient pressure.	Re-adjust the knife pressure. (Refer to [3.-(10)-3) and (11)-3) Knife Pressure].
	3-3) The moving knife stops during thread trimming.	3-A) Thread used is too thick.	Use the specified thread.
		3-B) Clearance between the moving knife blade (outside) and the throat plate is too small.	Check the lateral position of the moving knife and adjust it correctly.
		3-C) Needle thread tension is too high.	Decrease the thread tension controlled by the tension controller No. 1.
		3-D) Needle thread tension is too low.	Increase the thread tension controlled by the tension controller No. 1.
		3-E) The bobbin thread tension is too high.	Reduce the bobbin thread tension.
		3-F) The pressure of the counter knife is too high.	Adjust the counter knife position.
		3-G) The initial position of the moving knife is too advanced.	Check the initial position of the moving knife and adjust it.
		3-H) The thread trimming knives are not sharp enough.	Refer to Cause 3-1) and 2) for the knife pressure and thread trimmer cam.

To the next page

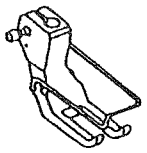
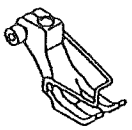
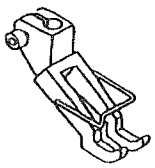
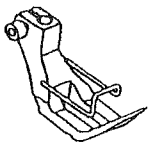
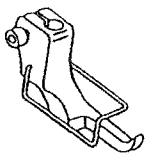
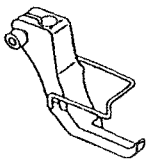
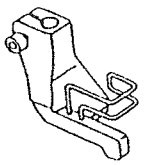
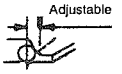
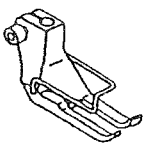
Trouble	Cause (1)	Cause (2)	Check Procedure and Corrective Measures

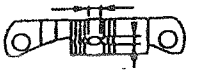
Continued from the previous page

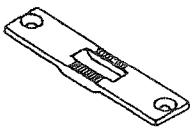
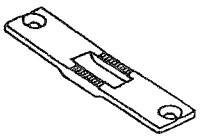
Cause (1)	Cause (2)	Check Procedure and Corrective Measures
3-4) The thread trimmer fails to catch the needle thread.	4-A) The last stitch at the end of sewing skips.	Check the installing position of the needle and the hook timing, and adjust them.
	4-B) Timing of the thread trimmer cam is too early or too late.	Check the timing of the thread trimmer cam and adjust it.
	4-C) Top end of the moving knife has been damaged or has scratches.	Replace the moving knife with a new one.
3-5) The thread trimmer rails to catch the bobbin thread.	5-A) Stroke of the moving knife is too small.	Check the moving knife for the correct height referring to [3.-(11)-5) or 6) Height of the Moving Knife].
	5-B) Bobbin thread path is inappropriate. (Bobbin thread slips off the bobbin thread guide of the inner hook).	Check the bobbin thread path.
	5-C) The tip of the moving knife has been damaged or has scratches.	Replace the moving knife with a new one.
	5-D) The position of the moving knife is too high or too low.	Check the height of the moving knife referring to [3.-(11)-5) or 6) Height of the Moving Knife].
3-6) The thread trimmer fails to trim the needle thread and bobbin thread.	6-A) The moving knife blade fails to match the counter knife blade in height and direction.	Check the height of the moving knife and counter knife.
	6-B) The moving knife blade fails to match the counter knife blade in height and direction.	Replace the moving knife and counter knife with new ones.
	6-C) The counter knife fails to provide a sufficient pressure.	Adjust the knife pressure. (Refer to [3.-(10)-3) and 3.-(11)-3) Knife Pressure]).
	6-D) The moving knife fails to operate.	Check the installing position of the moving knife driving arm A and adjust it.
		Check the performance of the thread trimmer solenoid.
		Check the timing of the synchronizer, and adjust it.

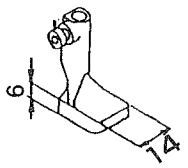
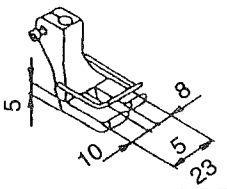
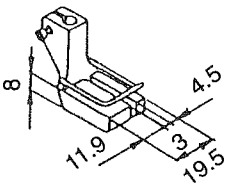
12. Replaceable Gauge Table

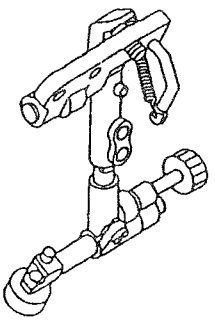
(1) For LU-2210N/W-7 and LU-2212N-7

Presser Foot \ Walking Foot								
	10711653	10711752	10711851	10711950	ø3 10745354 ø4 10745453 ø5 10745552 ø6 10745651	ø3 10746352 ø4 10746451 ø5 10746550 ø6 10746659	10712354 Non-groove type * To be used when stitch skips frequently.	10712057
 10712552	Standard 	—	—	—	—	—	○	—
 10758456	For overlapped sections of material * To be used both for flat and overlapped sections. The medium type between 10712552 and 10712651.	—	—	—	—	—	○	—
 10712651	For overlapped sections of material * To be used when the material is not fed smoothly into the overlapped sections. 	—	—	—	—	—	○	—
 10712750	For light-weight sponge * To be used when the material is not fed smoothly into the overlapped sections. 	Right-single-sided foot * To be used when sewing the edges of a material. 	—	—	—	—	—	—
 10712859	—	—	Right-single-sided foot * To be used when sewing the edges of a material. 	—	—	—	—	—
 10712958	—	—	—	Right-single-sided foot * To be used when sewing the edges of a material. 	—	—	—	—
 ø 3 10747350 ø 4 10747459 ø 5 10747558 ø 6 10747657	—	—	—	—	For piping * To be used in general piping process. 	For piping * The needle position with respect to the pipe can be adjusted.  Adjustable	—	—
 10713055	—	—	—	—	—	—	—	Wide type * To be used when the material is not fed smoothly.d.

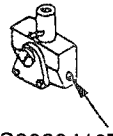
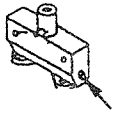
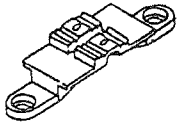
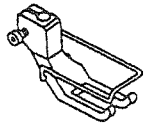
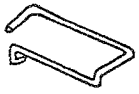
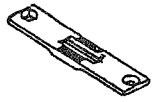
Feed Dog			
3.3mm  2.2mm	3.3mm  2.2mm	2.5mm  1.6mm	3.3mm  2.2mm
10717106	10717205	10717304	10739001
Standard	Without groove To be used when the needle thread and the bobbin thread do not smoothly interlace with each other at the start of sewing.	For thin threads.	Wide type

Throat Plate	
	
10701704	10702009
Standard	Wide type

For machining		
		
10712255	10748358	10713253
Walking foot for machining	Presser foot B for machining	Presser foot A for machining

MAH-152010A0 Handing Ruler


(2) For LU-2260N/W-7

Needle Width	Set No.	Needle Stopper	Thread Guide	Feed Dog	Presser Foot (Assembly)	Finger Guard	Walking Foot (Assembly)	Throat Plate	Slide Plate (Left)	Slide Plate (Right)
		 SS8080410TP  SS8080410TP	 SS6060440TP  SS5060310SP					 Max. Stich length = 6mm		
(4)	10784551	10777555	10779007	10780005	10781557	10786903	10783058	10784502	10786309	10701803
6	10784650	10777654	10779007	10780104	10781656	10786903	10783157	10784601	10786309	10781803
8	10784759	10777753	10779007	10780203	10781755	10786903	10783256	10784700	10786309	10701803
10	10784858	10777852	10779007	10780302	10781854	10787000	10783355	10784809	10786408	10786002
12	10784957	10777951	10779106	10780401	10781953	10787000	10783454	10784908	10786408	10786002
(14)	10785053	10778058	10779106	10780500	10782050	10787109	10783553	10785004	10786408	10786002
(16)	10785152	10778157	10779106	10780609	10782159	10787109	10783652	10785103	10786408	10786002
(18)	10785251	10778256	10779106	10780708	10782258	10787109	10783751	10785202	10786408	10786002
20	10783350	10778355	B1403526000	10780807	10782357	10787208	10783850	10785301	10786507	10786101
(22)	10785459	10778454	B1403526000	10780906	10782456	10787208	10783959	10785400	10786507	10786101
(24)	10785558	10778553	B1403526000	10781003	10782555	10787208	10784056	10785509	10786507	10786161
(30)	10785657	10778652	B1403526000	10781102	10782654	10787307	10784155	10785608	10786507	10786101
(36)	10785756	10778751	B1403526000	10781201	10782753	10787406	10784254	10785707	10786606	10786200

(Cautions) **1. The set, including the needle width with parentheses ( ), are made to special order.**
2. The slide plates (left and right) are not included in the set.