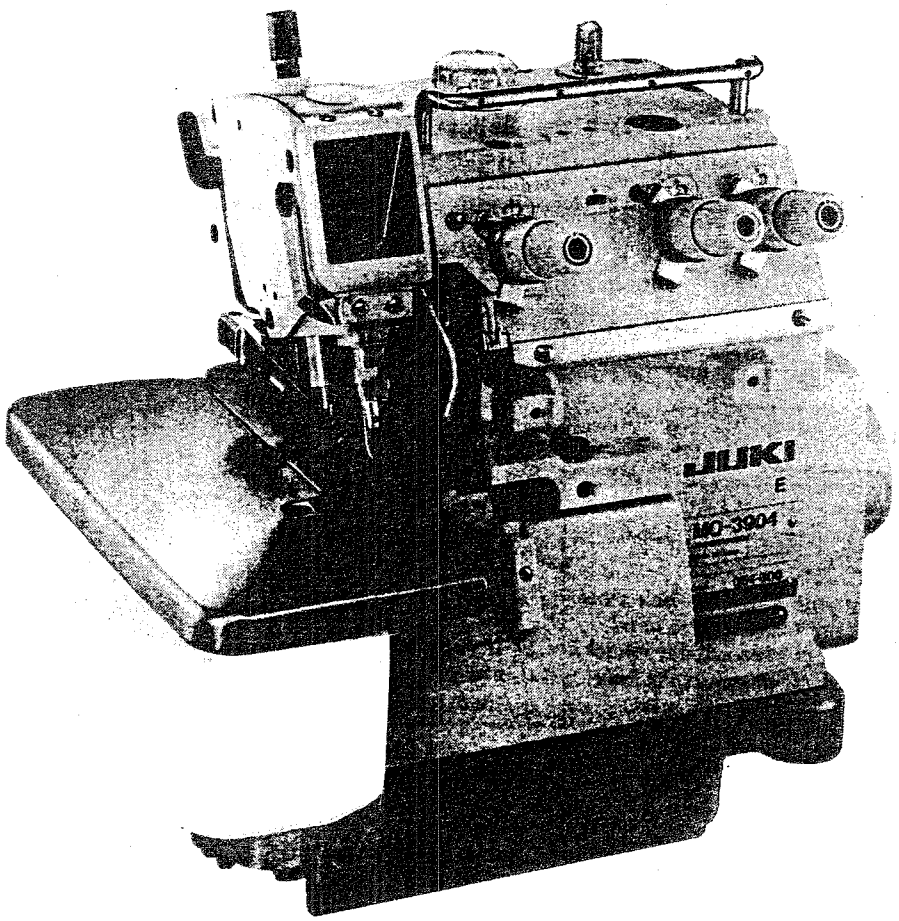
JUKI

MO-3900 Series

ENGINEER'S MANUAL

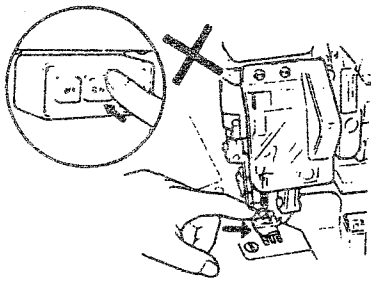


No. III-38
1993. 9

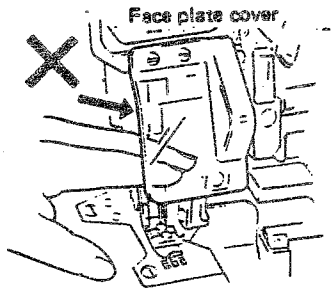
PREFACE

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machine. The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered by the Instruction Manual.
It is advisable to use the relevant Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines.

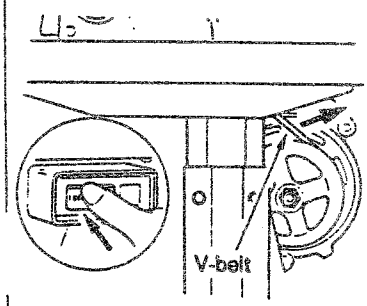
CAUTION



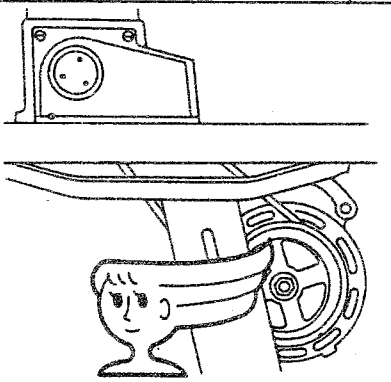
1. Do not put your hand under the needle when you turn on the power switch.



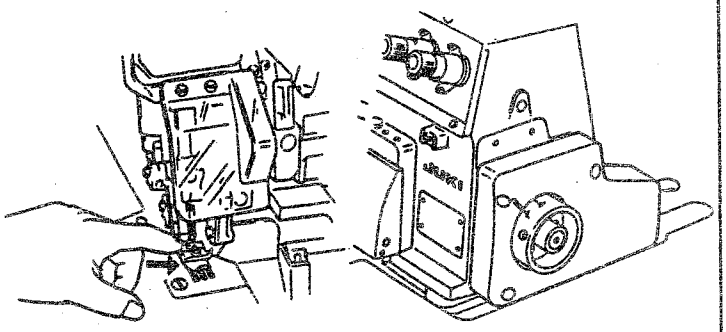
2. Do not put your hand into the face plate section while the machine is running.



3. Be sure to turn off the power switch before you remove the V-belt.



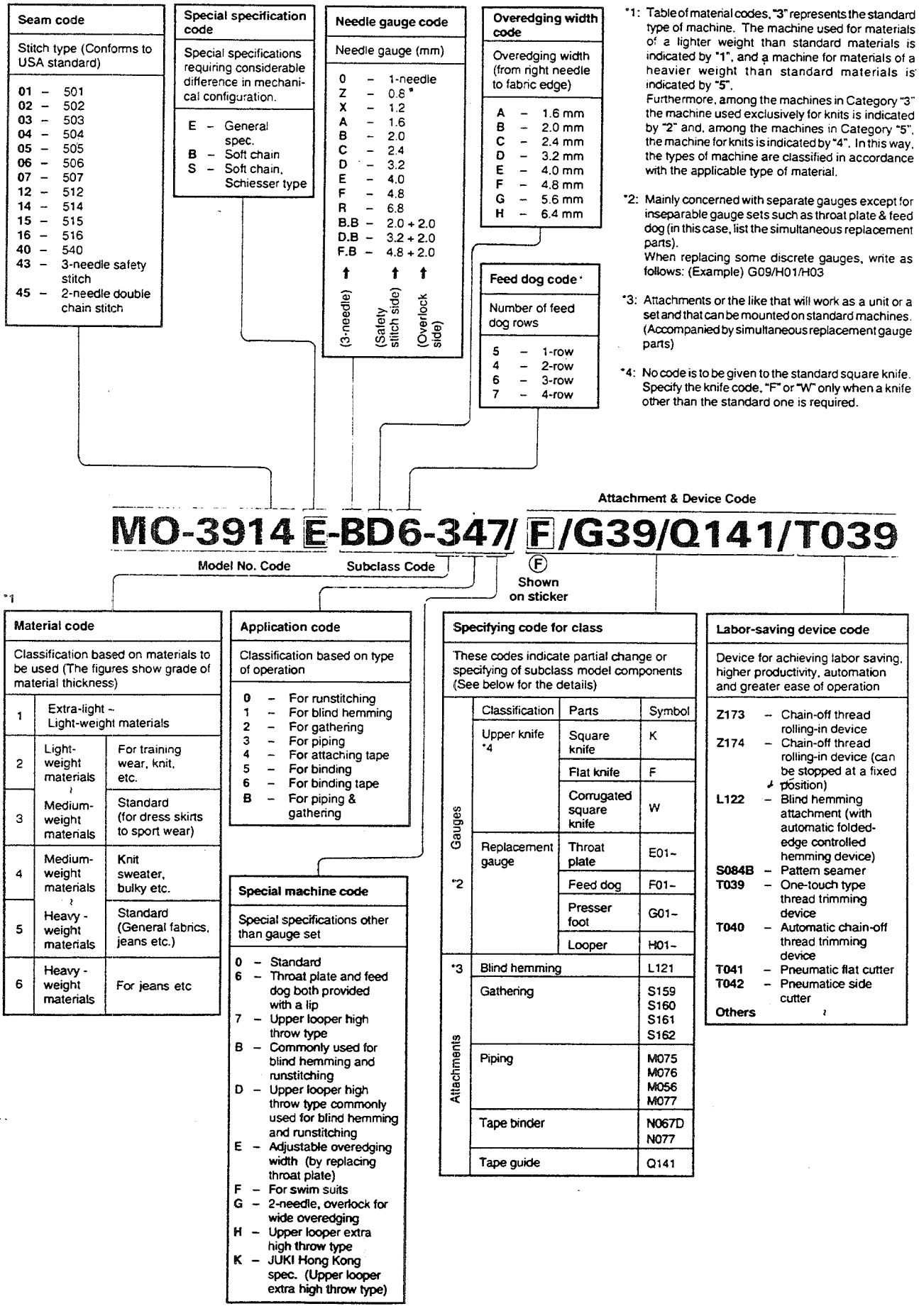
4. Never bring your fingers or hair close to, or place anything on the hand-wheel, V-belt, bobbin winder wheel or motor during operation. It may lead to serious personal injuries.



5. If your machine is provided with a belt cover, finger guard and eye guard, never operate your machine with any of them removed.

6. Do not wiper the surface of the machine head with lacquer thinner.

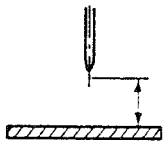
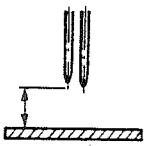
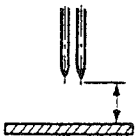
2. MODEL NUMBERING SYSTEM



Standard Adjustment

(1) Adjusting the needle height

When the needle(s) is in the highest position the distance between the needle point(s) and the throat plate surface should be as shown below.

MO	3904
Refer to right Fig.	
MO	3914
Refer to right Fig.	
MO	3916
Refer to right Fig.	

⇨

Model	Left needle	Right needle
MO-3903-ΔΔΔ MO-3904-ΔΔΔ-ΔΔ0 / ΔΔ6 MO-3905-ΔΔΔ	10.5	—
MO-3904-ΔΔΔ-ΔΔH / ΔΔK	11.3	—
MO-3912-ΔΔΔ-ΔΔ7	11.0	9.4
MO-3914-XB5-100	10.5	10.5
MO-3914-AD4-307	10.5	10.2
MO-3914-BΔΔ-ΔΔ7	10.5	9.1
MO-3914-BΔΔ-ΔΔK / ΔΔH	11.3	9.9
MO-3914-CΔΔ-ΔΔH	11.3	10.0
MO-3914-DF6-50G	11.3	9.7
MO-3915-ΔΔΔ	—	—
MO-3916-ΔΔΔ-ΔΔ0	10.5	—
MO-3916-ΔΔΔ-ΔΔH	11.3	—
MO-3916-ΔΔΔ-60H	13	—
MO-3943-ΔΔΔΔ-ΔΔ7	10.5	9.1
MO-3945-ΔΔΔ-360	9.8	—

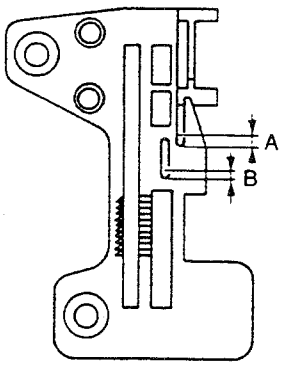
The adjustment of needle height for the 2-needle overlock machine should be made in reference to the left needle.

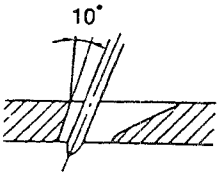
(2) Positioning the throat plate

The needle entry point should be such that the distances listed below are provided between the needle slot edge of the throat plate and the center of the needle.

Overlock side A	1.3
Double-chainstitch B	1.0

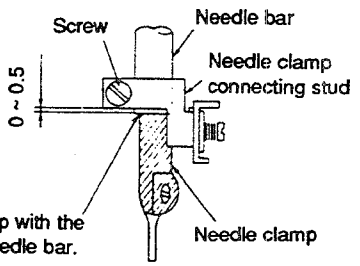
(Unit: mm)

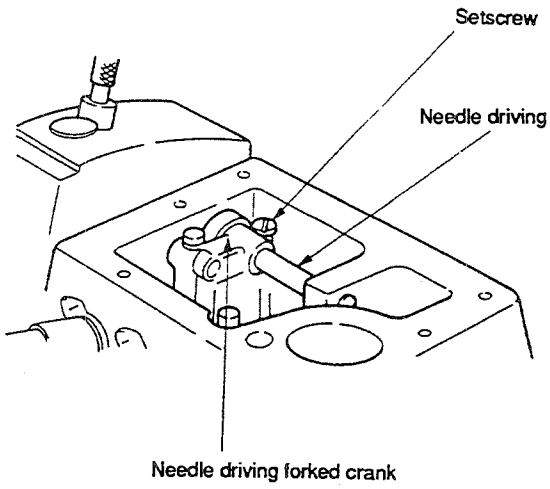
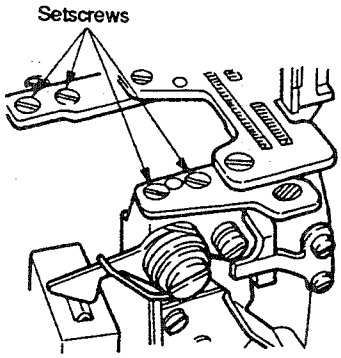




(3) Installing position of the needle clamp

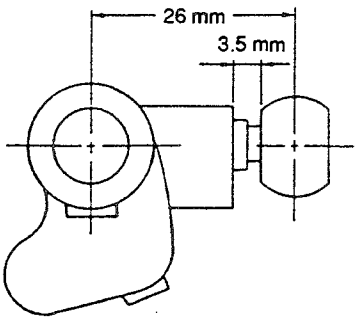
The needle clamp connecting stud should fit with the bottom end of the needle bar or spaced 0.5 mm or less from it.



Adjustment Procedures	Results of Improper Adjustment
o Take off the upper cover, and loosen the setscrew of the needle driving forked crank to perform the adjustment of the needle height.  	o Any other needle height than specified here will badly affect the action of the lower looper, the timing for catching the upper looper thread, etc.
(Caution) Do not fully loosen the setscrew of the needle driving forked crank. If the needle driving forked crank has got out of position laterally when its setscrew was loosened, fully loosen the setscrew and turn pulley to allow the forked crank to turn until it settles by itself. Then tighten the setscrew to fix the forked crank at that position.	o Improper lateral position of the needle driving forked crank will cause seizure, play, or other troubles.
o Loosen the setscrews of the throat plate base to make the adjustment.  	o Improperly positioned throat plate will cause needle breakage, contact of the needles with the throat plate, or other troubles.
o Loosen the screw and adjust, by slightly turning the needle clamp, the clearance provided between the right-hand side needle and the lower looper (for 2-needle overlock machine) and the clearance provided between the needle hole in the throat plate and the needle (for safety stitch machine).	o If the clearance provided between the needle and the looper is excessive, the needle thread will be likely to skip at the time of tucking. o If the clearance provided between the needle and the looper is insufficient, the needle will break or the looper blade point will be damaged causing thread breakage.

(4) Adjusting the length of the lower looper holder (Applicable only to MO-3916 series)

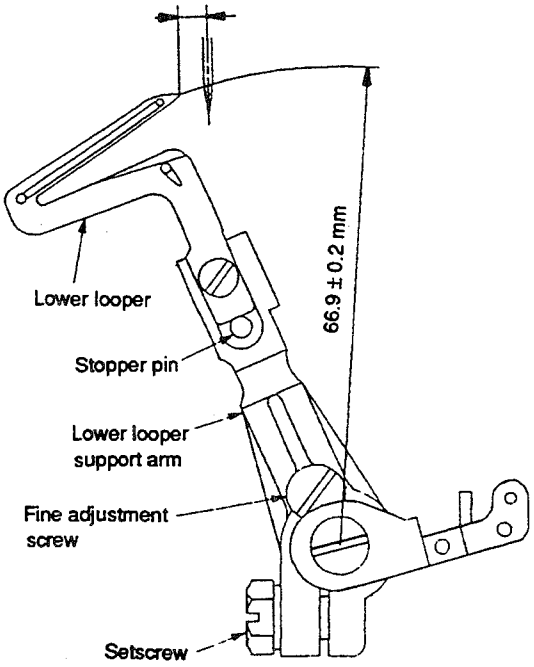
The center-to-center distance should be 26 mm.
At this time, the clearance between the end surface of the arm and the neck of the ball should be 3.5 mm.



(5) Adjusting the lower looper

1) Returning amount of the lower looper

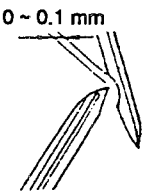
The distance between the blade point of the lower looper and the center of the needle should be as follows when the lower looper is at the extreme left of its stroke.

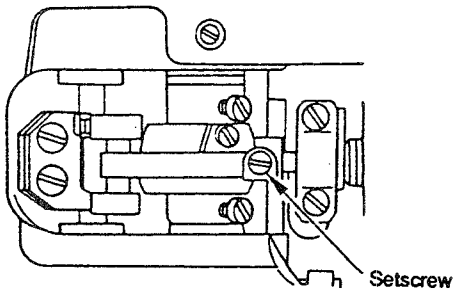


	Model	Returning amount of the lower looper
1-needle overlock machine	MO- 3903 0A5~0F5 15 3904 0A4~0E4 210 3905 0D6 3ΔΔ 500	4.0±0.3
	MO- 3904 - 0F4~0G4 3Δ0 0F6~0H6 500	3.7
	MO- 3904 - 0D4~0E4 4ΔH 0F6 40K 0H6 50H	3.8
	MO- 3904 - 0K6 - 50H	2.8
2-needle overlock machine	MO- 3914 - XB5 - 100	4.1
	MO- 3914 - AD4 - 307	3.8
	MO- 3914 - BD4~BE4 - 3Δ7 BD6~BE6	3.8
	MO- 3914 - BD6~BF6 - 4ΔH BE7 40K	4.0
	MO- 3914 - CD6~CE6 - 4ΔH CE7	4.0
	MO- 3914 - CF6 - 40H	2.8
	MO- 3914 - DF6 - 50G	2.8
	MO- 3912 - DD6~DF6 - 3Δ7 507	2.2
Safety stitch machine	MO- 3915 - ΔΔΔ - 3Δ0 3916 500	3.7
	MO- 3916 - DD4~DE4 4ΔH DF6 - 40K FF6 ΔΔH	3.8
	MO- 3916 - ΔΔΔ - 60H	3
	MO- 3916 - RH6 30H - 42H 50H	4.5
	MO- 3943 - DBD6 - 3Δ7 FBD6	3.8

2) Clearance between the lower looper and the needle

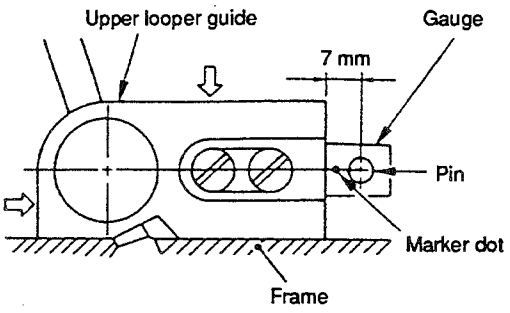
The clearance should be 0 to 0.1 mm.

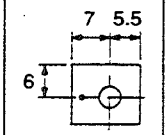
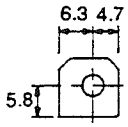


Adjustment Procedures	Results of Improper Adjustment
o Loosen the setscrew of the lower looper holder from the rear of the frame. Since it is difficult to accurately measure the center-to-center distance, perform adjustment to provide a 3.5 mm distance between the end surface of the arm and the neck of the ball as illustrated.  	o Increasing the center-to-center distance will give a smaller stroke of the double chain looper or lower looper, and decreasing the distance will give larger stroke.
o Loosen the setscrew of the lower looper support arm to make adjustment of the returning amount of the lower looper. **(Referential information)** **1. The radius of the lower looper will be 66.9 mm when the lower looper is inserted into the support arm until it contacts with the stopper pin and then fixed.** **2. The rocking angle of the lower looper will be 26°.**	o Excessive return of the lower looper tends to cause stitch skipping when filament thread is used. o Insufficient return of the lower looper tends to cause needle thread stitch skipping when mixed yarn is used.
o Loosen the screw in the lower looper supporting arm until it is temporarily tightened. Then, finely adjust the longitudinal position of the looper using the fine adjustment screw. [Turn the fine adjustment screw clockwise to move the lower looper away from the needle, or counterclockwise to move the lower looper closer to it.]	o Excessive clearance will often cause needle thread stitch skipping. o. Insufficient clearance will cause needle breakage due to the contact of the looper with the needle, or produce scratches on the blade point of the looper, leading to needle thread breakage or other troubles.

(6) Position of the upper looper guide

Vertical position: To be in close contact with the frame guide surface.
Lateral position: To be pressed against the upper looper guide support gauge.



Upper looper guide support gauge		
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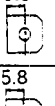
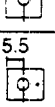
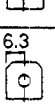
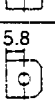
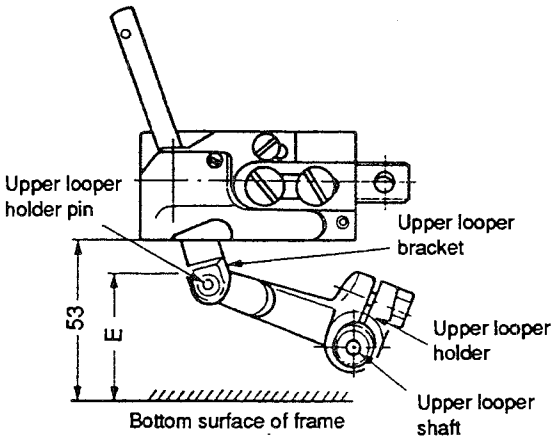
	Model		Position of guide support
1-needle overlock machine	MO- 3903 / 3904	0A5~0F5 / 0A4~0E4 / 0D6 - 15Δ / 210 / 3ΔΔ / 500	
	MO- 3904 -	0F4~0G4 / 0F6~0H6 - 3Δ0 / 500	
	MO- 3904 -	0D4~0E4 / 0F6 / 0H6 - 4ΔH / 40K / 50H	
	MO- 3904 - 0K6	- 50H	
2-needle overlock machine	MO- 3914 - XB5	- 100	
	MO- 3914 - AD4	- 307	
	MO- 3914 -	BD4~BE4 / BD6~BE6 - 3Δ7	
	MO- 3914 -	BD6~BF6 / BE7 - 4ΔH / 40K	
	MO- 3914 -	CD6~CE6 / CE7 - 4ΔH	
	MO- 3914 - CF6	- 40H	
	MO- 3914 - DF6	- 50G	
	MO- 3912 - DD6~DF6 -	3Δ7 / 507	
Safety stitch machine	MO- 3915 / 3916 - ΔΔΔ	- 3Δ0 / 500	
	MO- 3916 -	DD4~DE4 / DF6 / FF6 - 4ΔH / 40K / 50H	
	MO- 3916 - FF6	- 60H / 60K	
	MO- 3916 - RH6	30H / - 42H / 50H	
	MO- 3943 -	DBD6 / FBD6 - 3Δ7	

Adjustment Procedures	Results of Improper Adjustment
o Fit the upper looper guide supporting gauge over the gauge fixing pin which has been driven in the frame and secure the gauge with an O ring. Then position the gauge taking the marker dot engraved on it or the chamfering direction as reference. o When installing the upper looper guide, press it against the gauge while keeping the upper looper guide into close contact with the frame surface, then tighten the screws.	o If the upper looper guide has improperly positioned vertically, it will cause oil leakage or disturbed path of the upper looper with resultant stitch skipping. o If the upper looper guide has been inaccurately positioned laterally, it will cause stitch skipping, or contact with the looper.

(7) Positioning the upper looper holder

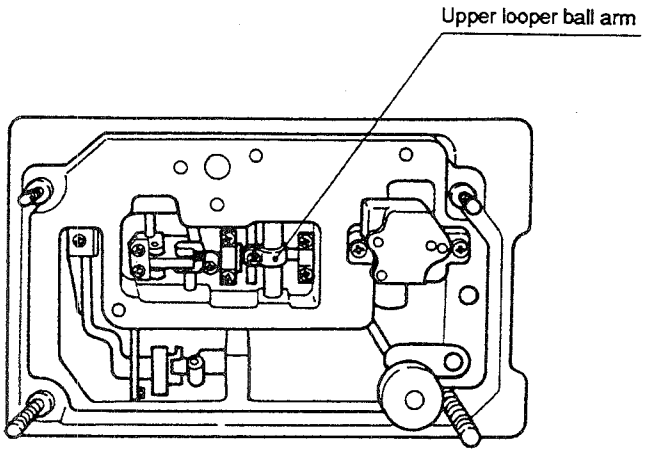
The distance between the bottom surface of the frame and the upper end of the upper looper holder pin should be as shown below when the upper looper holder is at the highest point of its stroke.

Model	Dimension (E)
M0-3904	45.0±0.05mm
M0-3914	47.3±0.05mm
M0-3916	46.2±0.05mm



For models other than standard models

Model	Dimension (E)
MO- 3903 - ΔΔΔ-ΔΔ0 MO- 3905 - ΔΔΔ-ΔΔ0	45.0±0.05 mm
MO- 3904 - 0F4~0G4 -3Δ0 0F6~0H6 500	46.2±0.05
MO- 3904 - 0D4~0E4 4ΔH 0F6 -40K 0H6 50H	48.2±0.05
MO- 3904 - 0K6 -50H	48.6±0.05
MO- 3914 - XB5 -100	45.0±0.05
MO- 3914 - BD6~BF6 -4ΔH BE7 40K	48.4±0.05
MO- 3914 - CD6~CE6 -4ΔH CE7	48.4±0.05
MO- 3914 - CF6 -40H	48.5±0.05
MO- 3914 - DF6 -50G	48.5±0.05
MO- 3912 - DD6~DF6 -3Δ7 507	46.9±0.05
MO- 3915 - ΔΔΔ-ΔΔ0	46.2±0.05
MO- 3916 - DD4~DE4 4ΔH DF6 -40K FF6 ΔΔH	48.2±0.05
MO- 3916 - ΔΔΔ -60H	48.4±0.05
MO- 3916 - RH6 30H -42H 50H	47.7±0.05
MO- 3943 - DBD6 FBD6 -3Δ7	47.3±0.05

Adjustment Procedures	Results of Improper Adjustment
<Adjustment order> 1) Loosen the setscrew of the upper looper ball arm. 2) Position the upper looper holder so that it smoothly moves when it is allowed to have a slightly larger stroke than that of the upper looper clamp, then tighten the setscrew of the upper looper holder. (Make sure that the upper looper holder smoothly moves together with the shaft.) 3) Then properly adjust the distance between the bottom surface of the frame and the top of the upper looper holder pin before tightening the setscrew of the upper looper ball arm.  	o Inaccurately positioned upper looper holder will cause excessive projection of the upper looper, resulting in stitch skipping, or other troubles. o If the upper looper ball arm has been improperly positioned longitudinally, seizure will result (mainly because the arm sticks when it goes up). **(Caution) To adjust the upper looper ball arm, take dimension E as standard. Remember that the projecting amount and the height of the upper looper should eventually be properly adjusted. So, confirm the dimensions related to the upper looper.**

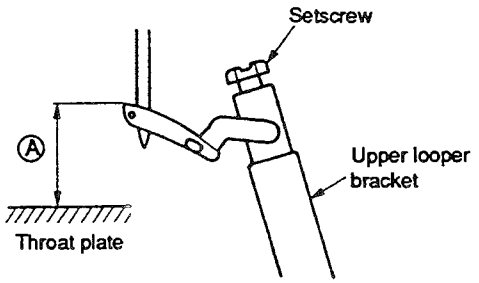
(8) Positioning the upper looper

1) Height of the upper looper

The distance between the throat plate surface and the blade point of the looper should be as follows when the upper looper is at the extreme left of its travel.

① MO-3900 Standard
MO-3904 11.0 ± 0.3 mm
MO-3916 11.0 ± 0.3

MO-3914 10.3 ± 0.3



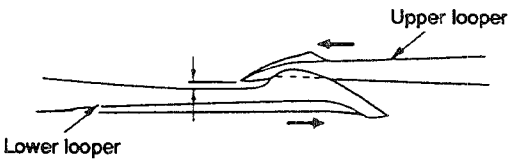
For models other than standard models

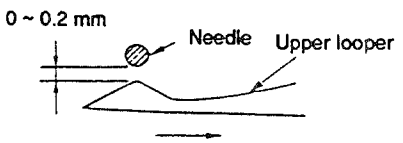
Model	Dimension Ⓐ
MO- 3903 - ΔΔΔ-ΔΔ0 MO- 3905 - ΔΔΔ-ΔΔ0	11.0±0.3 mm
MO- 3904 - 0D4~0E4 4ΔH 0F6 -40K 0H6 50H	11.3±0.3
MO- 3904 - 0K6 -50H	10.5±0.3
MO- 3914 - XB5 -100	11.3±0.3
MO- 3914 - BD6~BF6 BE7 CD6~CE6 CE7	10.5±0.3
MO- 3914 - CF6 -40H DF6 50G	10.8±0.3
MO- 3912 - DD6~DF6 - 3Δ7 507	10.5±0.3
MO- 3915 - ΔΔΔ-ΔΔ0	11±0.3
MO- 3916 - DD4~DE4 4ΔH DF6 -40K FF6 ΔΔH	11.3±0.3
MO- 3916 - ΔΔΔ -60H	12.8±0.3
MO- 3916 - RH6 30H -42H 50H	11.5±0.3
MO- 3943 - DBD6 FBD6 -3Δ7	10.3±0.3

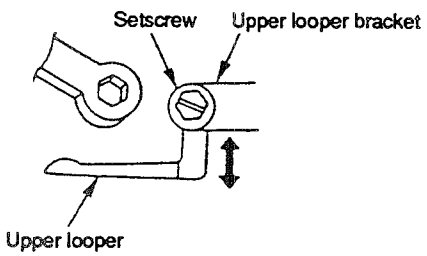
2) Longitudinal position of the upper looper

① The clearance between the upper and lower loopers should be 0.1 to 0.2 mm when they cross with each other.

② The clearance between the upper looper and the needle should be 0 to 0.2 mm.



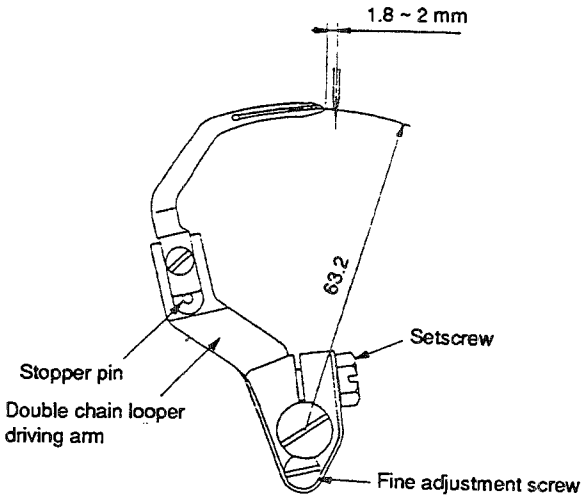


Adjustment Procedures	Results of Improper Adjustment
o Set a hexagon screwdriver onto the setscrew at the end of the upper looper bracket to adjust the height of the upper looper. When adjusting the height, pay attention also to the clearance produced between the upper looper and lower looper at the time of their crossing.	o If the upper looper has been positioned too high, an excessive clearance will be produced between the upper looper and the needle. As the result, the upper looper thread will fail to catch the needle thread, and stitch skipping occur. o On the contrary, if the upper looper has been positioned too low, the needle point will hit the looper, causing needle breakage. Also the looper will touch other component when the presser foot goes up.
o Loosen the setscrew at the top end of the upper looper bracket to move the looper back or forth for positioning.  	o Excessive clearance will cause stitch skipping. o Insufficient clearance will cause the upper looper to come in contact with the lower looper.

(9) Adjusting the double chain looper (applicable only to MO-3916 series)

1) Returning amount of the double chain looper

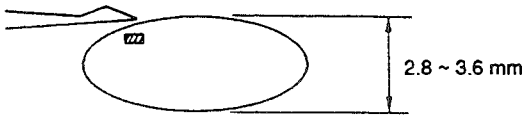
The distance between the needle center and the blade point of the double chain looper should be 1.8 to 2 mm when the looper is at the extreme left of its travel.



2) Longitudinal motion (Avoid motion)

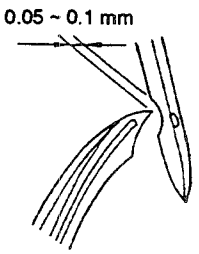
The standard minor axis of the elliptical motion should be 2.93 mm (MO-3900).

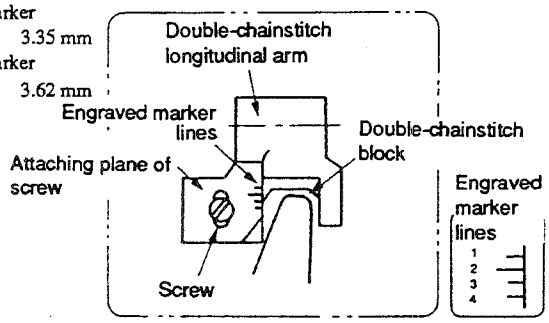
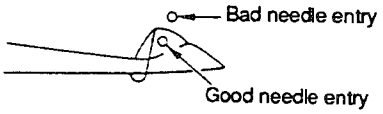
Note : The avoid motion should be adjusted in accordance with Needle No.



3) Clearance between the double chain looper and the needle

The clearance should be 0.05 to 0.1 mm.

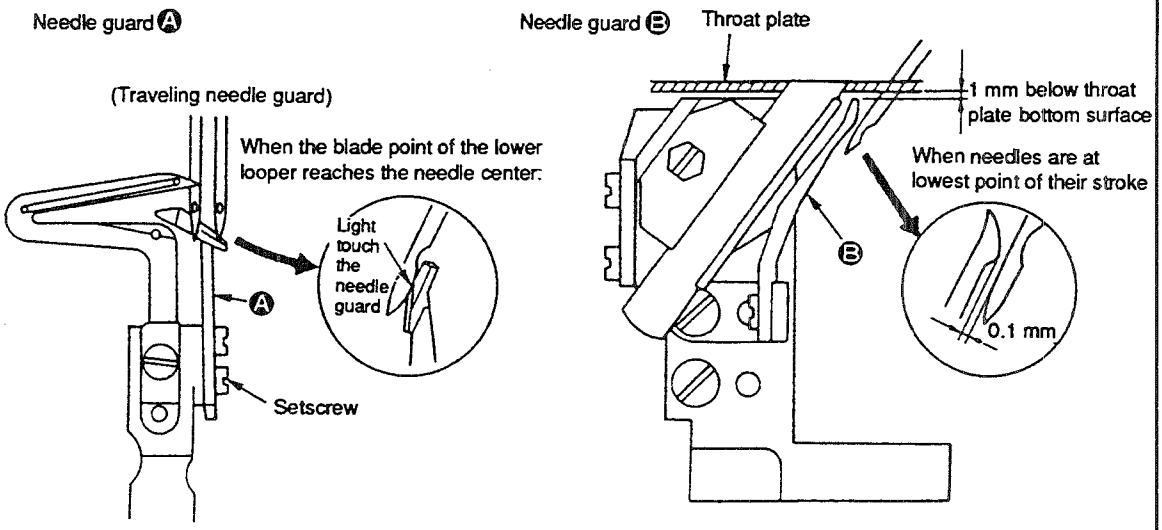


Adjustment Procedures	Results of Improper Adjustment
o Loosen the setscrew of the double chain looper driving arm to make this adjustment. (Referential information) The radius of the double chain looper driving arm will be 63.2 mm when it is lowered until it comes in contact with the stopper.	o Excessive return of the double chain looper will cause frequent stitch skipping. o Insufficient return of the double chain looper will cause frequent thread stitch skipping when a mixed yarn is used.
o Remove the cover on the rear of the frame. Loosen the screw, and adjust the avoid motion by moving the double-chainstitch block up or down. Move the block down to increase the moving amount of the avoid motion. When the block is set at the position where the attaching plane of the screw is perpendicular and where the top face of the double-chainstitch block is aligned with the following engraved marker lines, the respective longitudinal moving amounts of the double chain looper will be as stated below. Engraved marker line 1 2.75 mm Engraved marker line 2 3.10 mm Engraved marker line 3 3.35 mm Engraved marker line 4 3.62 mm 	o If the avoid motion is too large, triangle stitch skipping will often occur.  o Insufficient avoid motion will cause the needle point to hit the looper, producing scratches on the needle point or looper.
o Temporarily tighten the screw in the double-chainstitch looper arm, and finely adjust the longitudinal position of the double-chainstitch looper arm using the fine adjustment screw. [Turn the fine adjustment screw clockwise to move the double-chainstitch looper away from the needle, or counterclockwise to move the looper closer to it.]	o Excessive clearance will cause frequent needle thread stitch skipping. o Insufficient clearance will cause the looper to hit the needle, leading to needle breakage or scratches on the looper blade point with consequent thread breakage.

(10) Positioning the needle guard

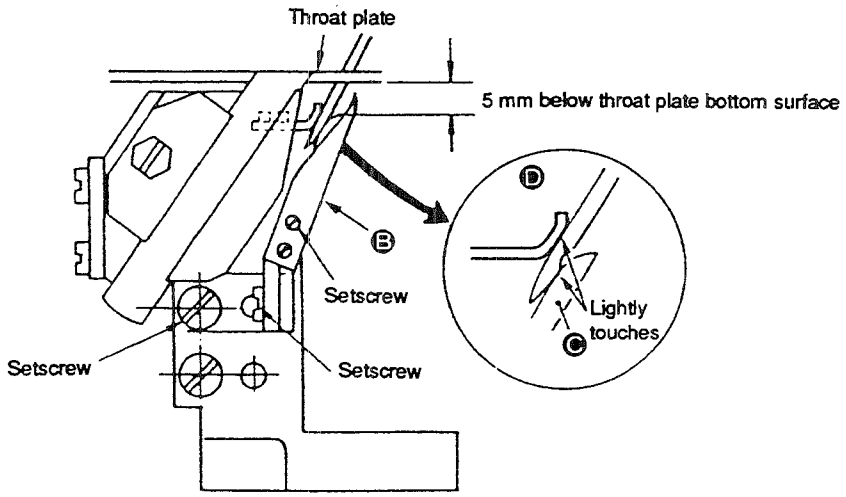
1) For 1-needle or 2-needle overlock machine

The overlock machine has two needle guards, Ⓐ and Ⓑ
The needle guard Ⓑ should be located 1 mm below the throat plate bottom surface.



2) For safety stitch machine

The safety stitch machine has four needle guards, Ⓐ, Ⓑ, Ⓒ and Ⓓ. The needle guards Ⓐ and Ⓑ are positioned in the same manner as those for the overlock machine.
The needle guard Ⓒ should be positioned 5 mm below the throat plate bottom surface.

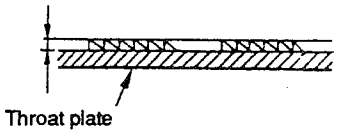


Adjustment Procedures	Results of Improper Adjustment
o Adjust the clearance between the needle guard Ⓐ and the needles by the setscrews of the needle guard. o Loosen the screw in the needle guard support, and adjust the clearance provided between needle guard Ⓑ and the needle by turning the needle guard. Adjust the vertical position of the needle guard by its setscrews.	o Excessively close contact between the needle guard Ⓐ and the needles will lead to needle bend or stitch skipping. o A clearance left between the needle guard Ⓐ and the needles will cause the looper blade point to come in contact with the needles, leading to needle or blade point breakage, or other troubles. o If the needle guard Ⓑ is too high, thread loops will be damaged with resultant stitch skipping. Also, double chain loops will be affected, causing double chain stitch skipping. o If the needle guard Ⓑ is too low, the needle cooling felt will be lowered, resulting in deteriorated effect of the cooling and needle guard. o Excessive clearance between the needle guard Ⓑ and the needle will cause stitch skipping due to needle shake. On the contrary, insufficient clearance will cause the needle guards to catch the needles between them, leading to wear on the needle guards and scratches on the needles.
o Loosen the screw in the needle guard, and adjust the clearance provided between needle guard Ⓒ and the needle. Adjust the vertical position of the needle guard by its setscrew. At this time, the needle guard Ⓑ gets out of position, therefore it must be re-positioned. o The needle guard Ⓓ can not be adjusted in height. Adjust the clearance between the needle guard Ⓓ and the needles by the needle guard setscrew.	o If the needle guard Ⓒ is too high, the needle thread loops will be damaged, and stitch skipping occur. If it is too low, the needle points will be crushed. o If the clearance between the needle guard Ⓒ and the needles is too large, the double chain looper blade point will come in contact with the needles, causing the breakage of the needles or looper blade point. No clearance left between them will cause them to come in excessively close contact with each other, and wear on the needle guard and scratches on the needles will occur. o Excessive clearance left between the needle guard Ⓓ and the needles will cause stitch skipping due to needle shake, and insufficient clearance will cause the needle guards to catch the needles between them, leading to wear on the needle guards and scratches on the needles.

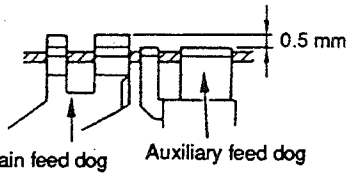
(11) Adjusting the height of the feed dog

The height of the feed dog should be as follows when it is at its highest position.

Model	Height of the feed dog
MO-3900	1 mm

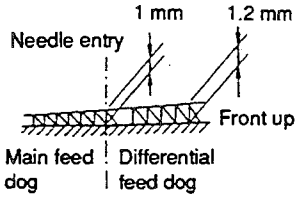


The auxiliary feed dog is 0.5 mm lower than the main feed dog.

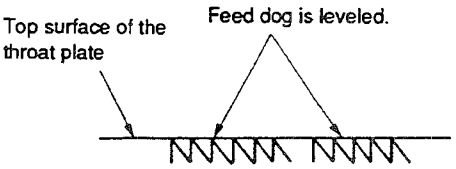


(12) Adjusting the tilt of the feed dog

When the feed dogs have come up most, they should be flat.

MO-3904 MO-3914 (Overedging) MO-3916 (Safety stitch)	

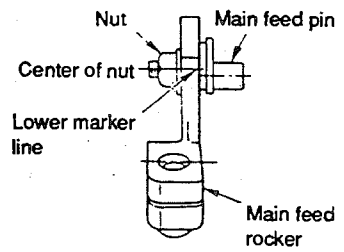
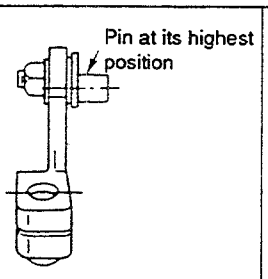
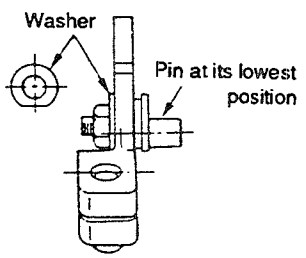
When the feed dog juts out the top surface of the throat plate

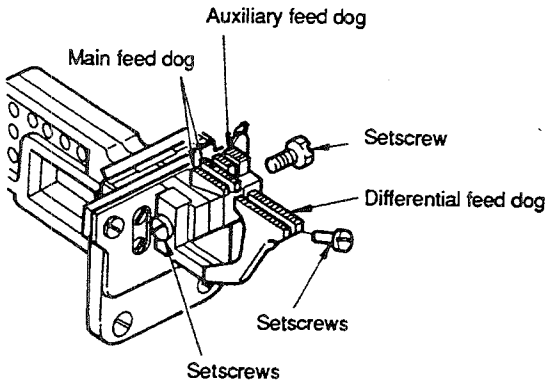
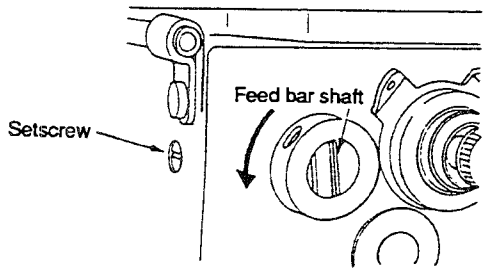
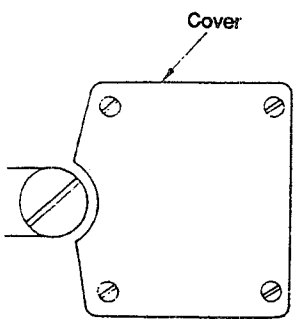


Adjust the inclination of the feed dog when it is in its highest position so that the feed dog is flush with the throat plate when the feed dog juts out the throat plate.

(13) Changing the differential feed ratio

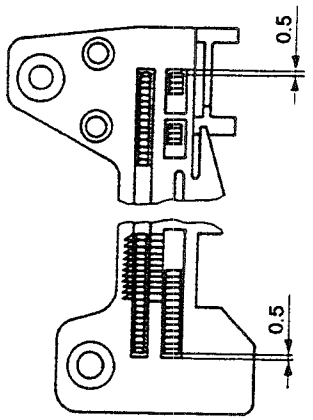
Generally, the adjustment of differential feed is made by the differential feed adjusting lever. However, if a desired adjustment cannot be made by this lever, the differential feed ratio should be changed.

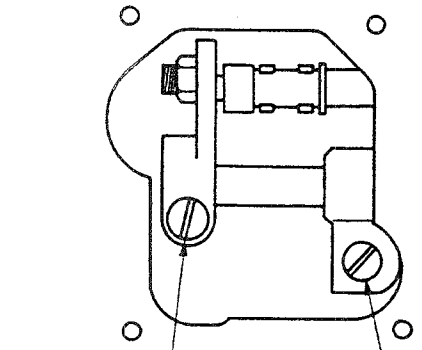
		
(Standard) Gathering: 1 : 2 Stretching: 1 : 0.7	(Max. stretching) Gathering: 1 : 1.6 Stretching: 1 : 0.6	(Max. gathering) Gathering: 1 : 4 Stretching: 1 : 1.3

Adjustment Procedures	Results of Improper Adjustment
○ Perform adjustment by the setscrews.  	○ If the feed dogs are too high, the needles will be deflected and broken when sewing heavy-weight materials. The feed dogs will tend to suffer scratches when sewing light-weight materials. Puckering will frequently occur. ○ If the feed dogs are too low, insufficient feed power will result. ○ If the auxiliary feed dog is too high, chain-off thread will be often jammed. ○ If the main feed dog and differential feed dog are set at different heights, proper differential feeding action will be hindered.
○ The feed bar shaft consists of an eccentric shaft. Loosen the setscrew to perform adjustment. When the marker dot is set at middle .....The feed dog will be flat. When the marker dot is set at bottom .....The feed dog will be tilted with its front up (in the arrowed direction.) When the marker dot is set at top .....The feed dog will be tilted with its front down.  **Note: The marker dot should be used just as a reference. Confirm the accurate tilt of the feed dog by observing the feed dog itself.**	○ When tilted with the front up Good material catching will be obtained. ○ When tilted with the front down Uneven feed and puckering will be effectively prevented.
○ Removing the cover on the rear of the frame, loosen the nut of the main feed pin to adjust the position of the pin. The standard adjustment is obtained by aligning the lower marker line with the center of the nut. When the pin is set at its highest position. .....Max. stetching is obtained. When the pin is set at its lowest position. .....Max. gathering is obtained.  	

(14) Longitudinal position of the feed bar

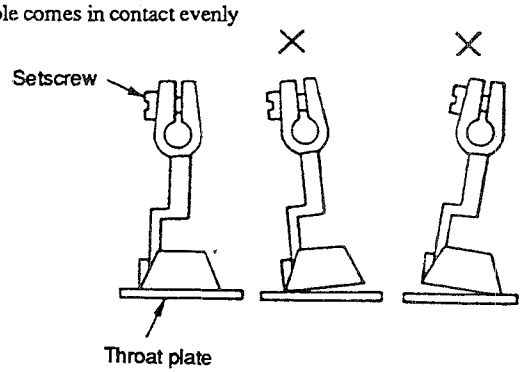
When the feed pitch is maximized and the differential feed ratio is also maximized, the front and rear ends of the feed dog should be spaced approximately 0.5 mm away from the corresponding edges of the slot in the throat plate.



Adjustment Procedures	Results of Improper Adjustment
o Remove the cover from the adjusting hole in the rear face of the frame, loosen the main feed bracket clamping screw and differential feed bracket clamping screw, and adjust the clearance provided between the throat plate and the feed dog.  	o If the clearance provided between the throat plate and the feed dog is too small, they will come in contact with each other when the sewing machine runs at high speed.

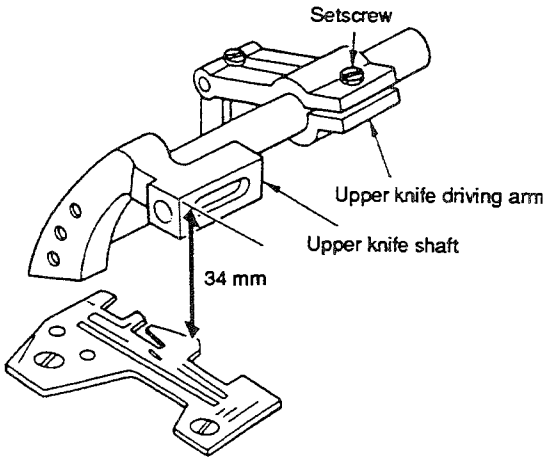
(15) Positioning the presser foot

The presser foot should be positioned so that the feed dogs go down under the specified presser foot pressure, and the presser foot sole comes in contact evenly with the throat plate surface.



(16) Positioning the upper knife arm shaft

The upper knife shaft should be positioned 34 mm above the top surface of the throat plate when it is at its highest position.



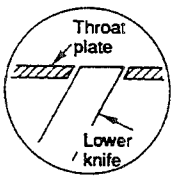
(17) Positioning the upper and lower knives, and available overedge widths

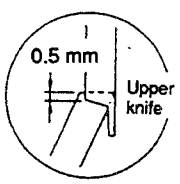
1) Lower knife

The vertical position of the lower knife should be adjusted to make its blade top end flush with the throat plate top surface. The lateral positioning should be done in accordance with a desired overedging width.

2) Upper knife

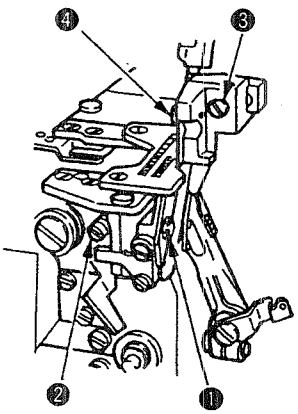
The upper knife should be positioned vertically so that it engages with the lower knife 0.5 to 1 mm when the upper knife is at the lowest point of its travel. The lateral positioning should be done in accordance with a desired overedging width.





3) Overedging width

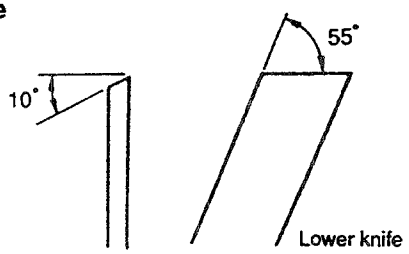
Overedging widths from 1.6 to 6.4 mm are obtainable by replacing the components or by using subclass machines.



Adjustment Procedures	Results of Improper Adjustment
o Loosen the setscrew, and perform adjustment so that the presser foot sole comes in contact evenly with the throat plate top surface. Accurate adjustment can be made by using two pieces of thin paper to check for even drawing-out tension. o Even contact of the presser foot with the throat plate top surface is achieved rather easily by tightening the screw while pushing the right side of the presser foot.	o Uneven contact will result in bad straight material feed, weak feed power, or puckering.
o Removing the upper cover, loosen the setscrews of the upper knife driving arm, and turn the upper knife shaft to perform vertical positioning. **Caution: Be sure to fully tighten the setscrews since the knife shaft is subjected to high load.**	o Improperly positioned upper knife arm shaft will come in contact with the frame. If it is moved with the position of the upper knife unchanged, proper engagement of the knives will be disturbed, prohibiting sharp cutting of the knives.
o Adjust the vertical position of the lower knife by screw ❶. o Adjust the lateral position of the lower knife by screw ❷. On completion of the adjustment, be sure to securely tighten the screws. Loosen screws will badly affect the durability of the knife. Tighten the screw after bringing the upper knife to its lowest position of its stroke. o Adjust the vertical position of the upper knife by screw ❹. o Adjust the lateral position of the upper knife by screw ❸. o Adjust the overedging width in the following way: Laterally position the upper knife before loosening screw ❷. Tighten screw ❷ when the upper knife has settled by itself under the pressure applied by the spring. Repeat this adjustment procedure to obtain desired overedging width.	o The lower knife, if positioned too high, will catch materials or cause no contact of the presser foot with the throat plate top surface. o If the lower knife is positioned too low, the cutting width will be changed or materials will be caught by the lower knife. o The upper knife, if positioned too high, will fail to cut materials. o Unsharp cutting or abnormal wear on the knives will result unless the lower knife is laterally positioned and fixed at a position where it has settled by itself under the upper knife spring.

(18) Resharpening of the knife

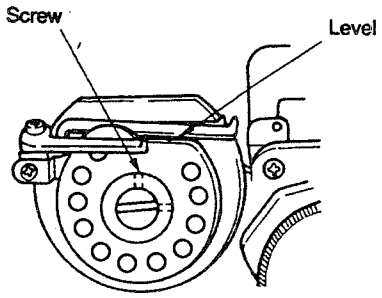
Lower knife gauge
Part No. 119-96907



(19) Position of the thread cam (Applicable only to MO-3916 series)

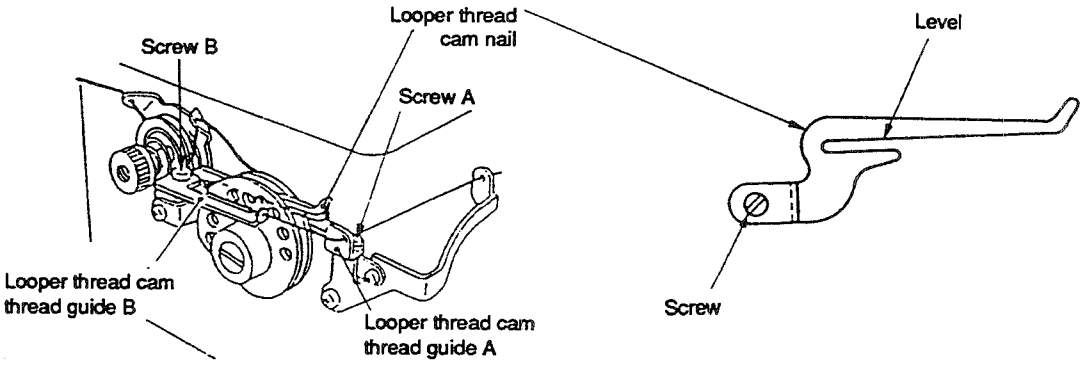
1) Adjustment of the thread cam

Install the looper thread cam so that its straight section is leveled when the needle is in its highest position of its stroke.



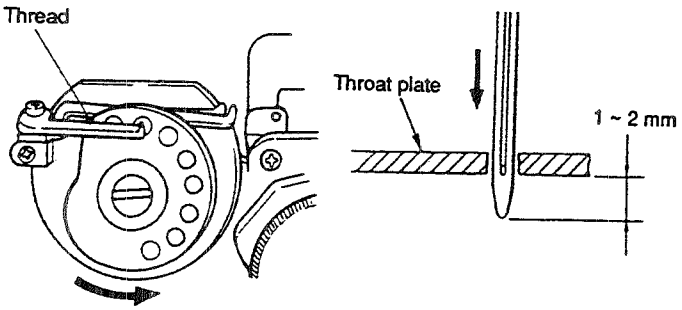
MO-3916 series

2) Adjusting looper cam thread guides A and B and the looper thread cam nail

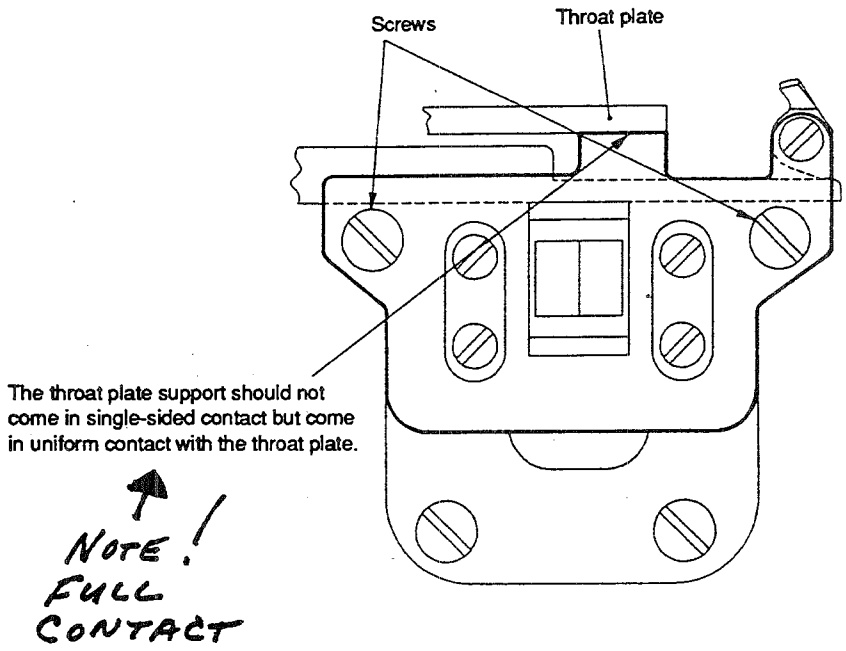


Position looper thread cam thread guides A and B at the center of the slots.

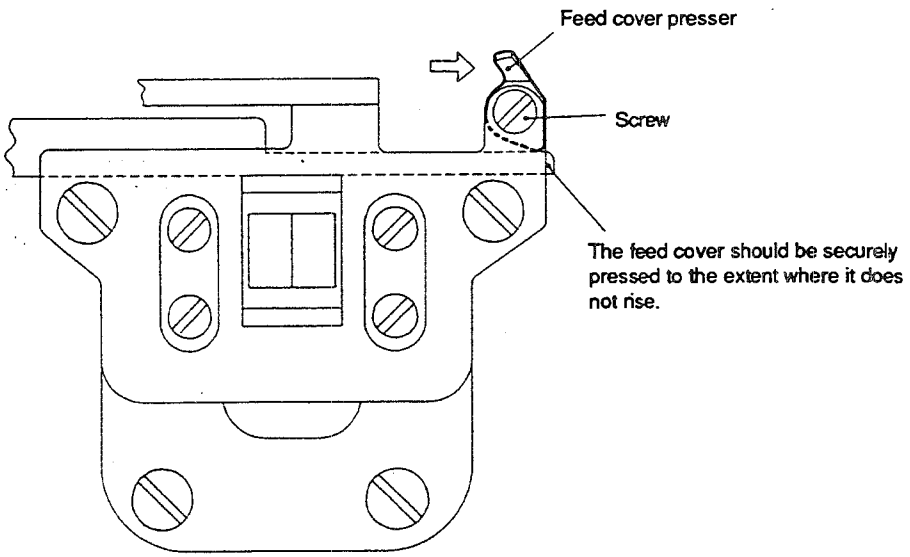
Position the looper thread cam claw so that the straight section of the forked portion is leveled.

Adjustment Procedures	Results of Improper Adjustment
o When the lower knife has become dull, fully resharpen it. o In principle, no resharpening of the upper knife is done. When the upper knife has become dull, replace it. (This is because the upper knife is a serrated carbide knife.)	o If the 10° angle of the lower knife is exceeded, the durability of the knife will be deteriorated, often resulting in blade chipping. o If the angle is smaller than 10°, the knife will be dull. o If the 55° angle is not observed, the knife may catch materials.
o Adjust the position of the thread cam by its setscrew with the needles at their upper dead point. o Laterally position the thread cam so that the hook is located at the center of the thread cam groove. **[How to check for proper positioning]** Check that the thread cam releases the looper thread when the needle point begins to come out of the bottom surface of the throat plate.  	o If the timing of the thread cam is too early, the needle point will fail to enter a thread triangle, resulting in looper thread stitch skipping. o If the timing of the thread cam is too late, puckering and loose looper thread stitches will results.
o Install looper thread cam thread guides A and B at the center of the respective slots.	o If the chain looper thread guide is moved away from you, the take-up amount of the lower looper thread will decrease. In this case, puckering may result thereby impairing the feeling of the finished product.

(20) Adjusting the throat plate support



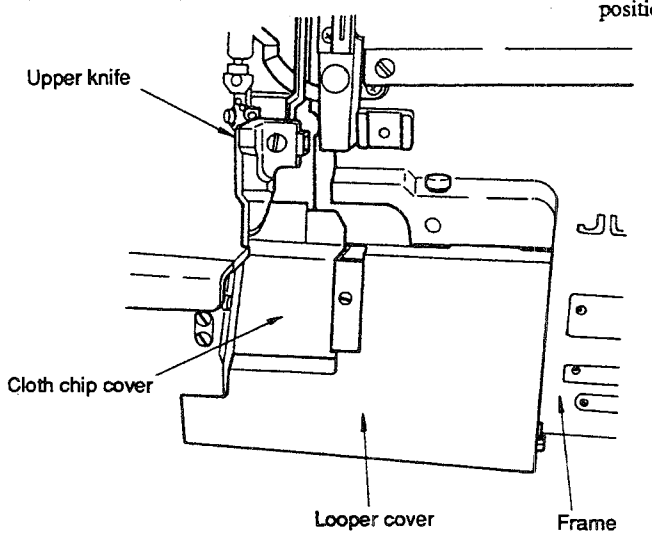
(21) Adjusting the feed cover presser



Adjustment Procedures	Results of Improper Adjustment
o Adjust the screw so that the throat plate support comes in contact with the throat plate with no single-sided contact.	o If the throat plate support comes in single-sided contact with the throat plate or does not come in contact with it, the throat plate will vibrate severely.
o Press the feed cover presser in the direction of the arrow until it securely press down the feed cover and prevents the cover from rising. Now, tighten the screw.	o If the feed cover is not sufficiently pressed down in position, oil leakage will result.

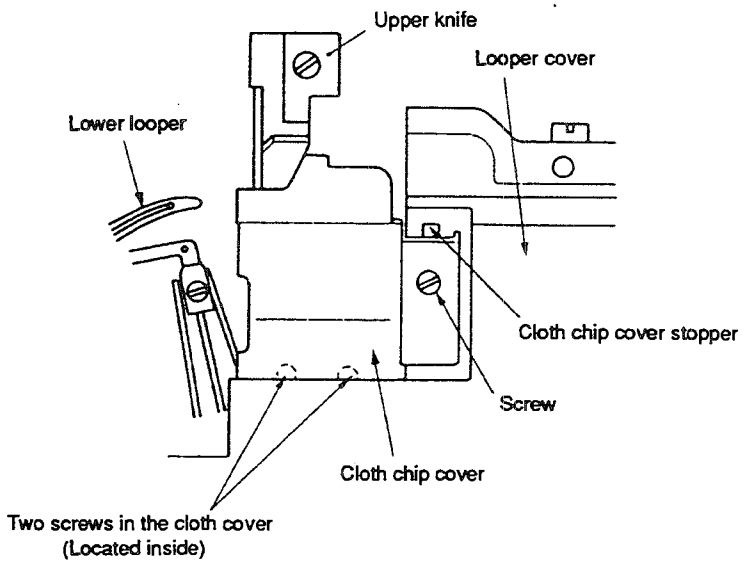
(22) Adjusting the looper cover

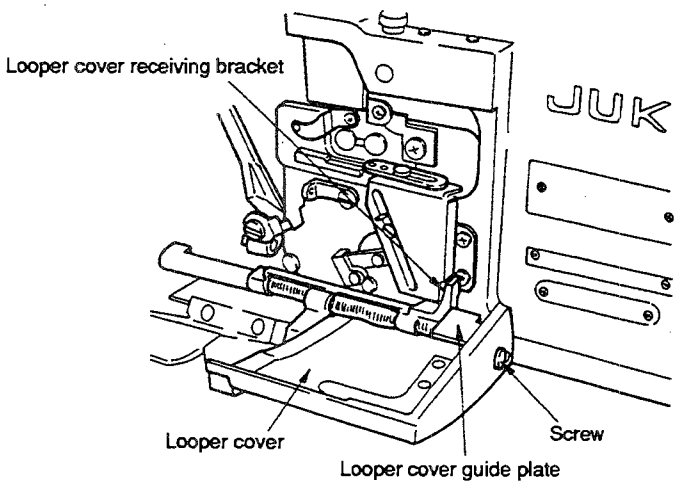
- The looper cover should smoothly close when slowly closing the looper cover with the upper knife in its lowest position of its stroke.



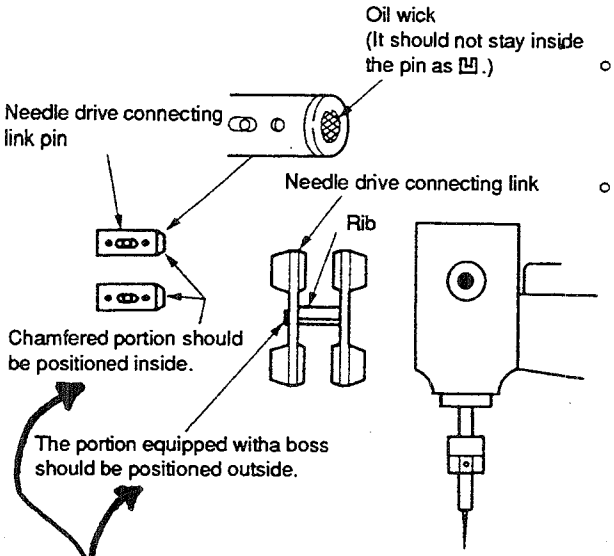
(23) Adjusting the cloth chip cover

- When the cloth chip cover is pressed away from you, it should not rattle.
  In addition, the cloth chip cover should not come in contact with the upper knife and the lower looper.



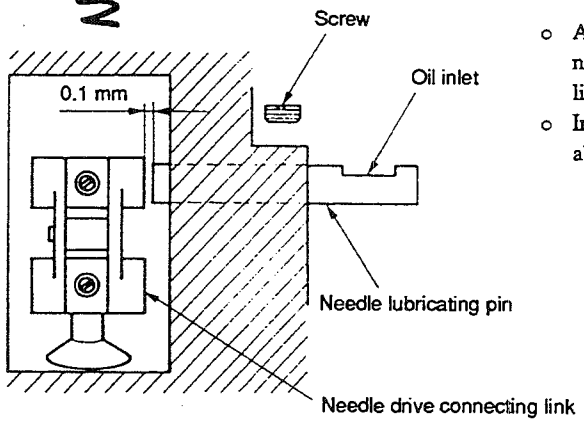
Adjustment Procedures	Results of Improper Adjustment
o Close the looper cover, loosen the screw, and move the looper cover guide plate back and forth until the looper cover is brought to a position where the cover smoothly closes. [Move the looper cover guide plate until it slightly comes in contact with the looper cover receiving bracket. Now, fix the guide plate by tightening the screw.]  	
o Temporarily tighten the screw with the cloth chip cover stopper raised. o Loosen the screw in the cloth chip cover, and adjust the longitudinal position of the cloth chip cover. o Loosen the screw in the cloth chip cover stopper again, and press the cloth chip cover stopper downward until the stopper slightly comes in contact with the looper cover. Now, tighten the screw. o Finally, confirm that the cloth chip cover comes in contact with neither the upper knife nor the looper.	

(24) Adjusting the needle mechanism

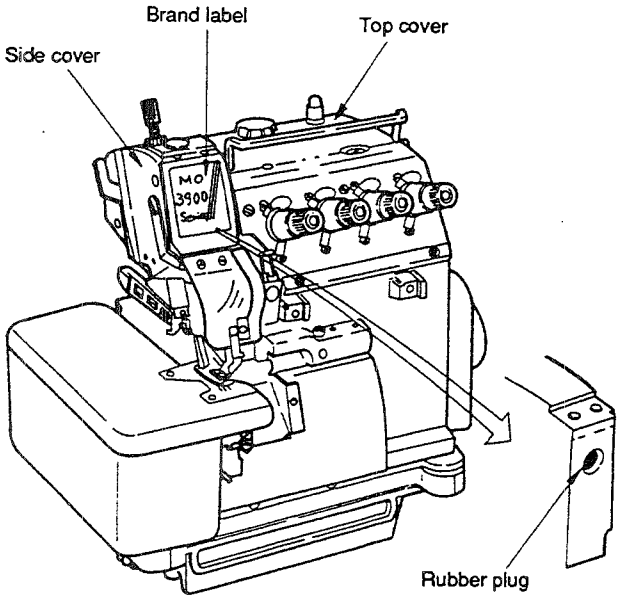
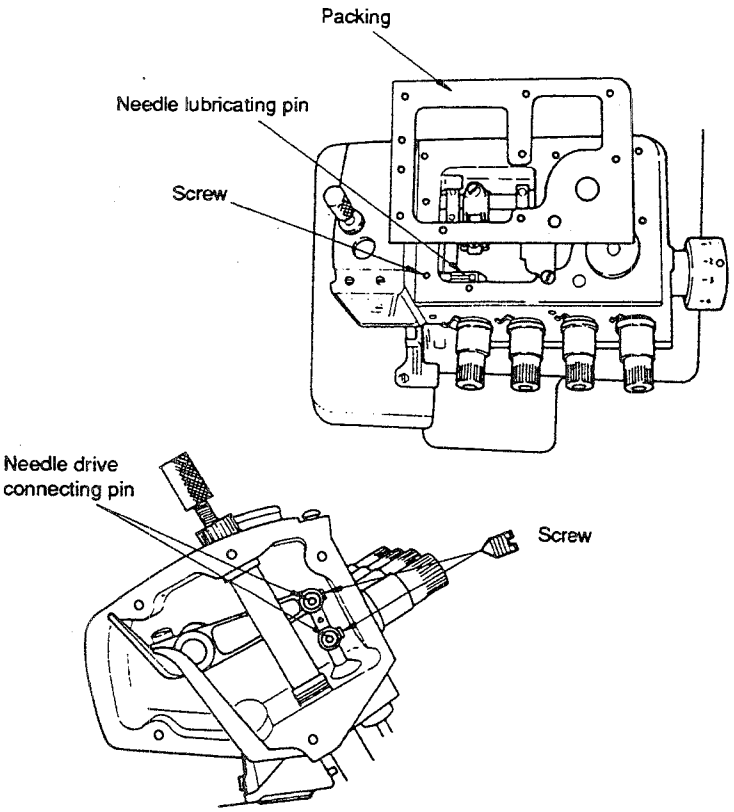


NOTE !!

- The oil wick in the needle drive connecting pin should be flush with the chamfered plane of the pin.
  (If the oil wick sinks inside the chamfered plane, oil will not be fed smoothly.)
- Assemble the needle drive connecting link components so that the portion equipped with a boss comes outside.
  In addition, the rib located at the center of the link should face upward.

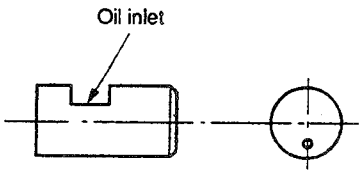


- A clearance of 0.1 mm should be provided between the needle lubricating pin and the needle drive connecting link. (Assemble them using a 0.1 mm spacer.)
- Install the oil lubricating pin in place with its oil inlet faced above.

Adjustment Procedures	Results of Improper Adjustment
o Remove the top cover, side cover and brand label. o Remove the rubber plug located under the brand label. o If packing of the top cover has been adhered on the frame, also remove the packing. o Loosen the screw in the needle lubricating pin, and remove the pin.  	o If the oil wick is installed in the needle drive connecting link pin inside the pin as [U], oil will not lubricated properly resulting in seizure.
o Loosen the screw in the needle drive connecting link . o Fitting the needle drive connecting link pin in the hole in the frame, thrust the pin until it can be drawn out.  	o If the clearance provided between the needle lubricating pin and the needle drive connecting link is too small, the related components will come in contact with each other. o If the clearance provided between the needle lubricating pin and the needle drive connecting link is too large, oil will not be fed properly resulting in seizure. o If the oil inlet does not face upward, oil will not be fed resulting in seizure.

(25) Position of the upper looper lubricating pin

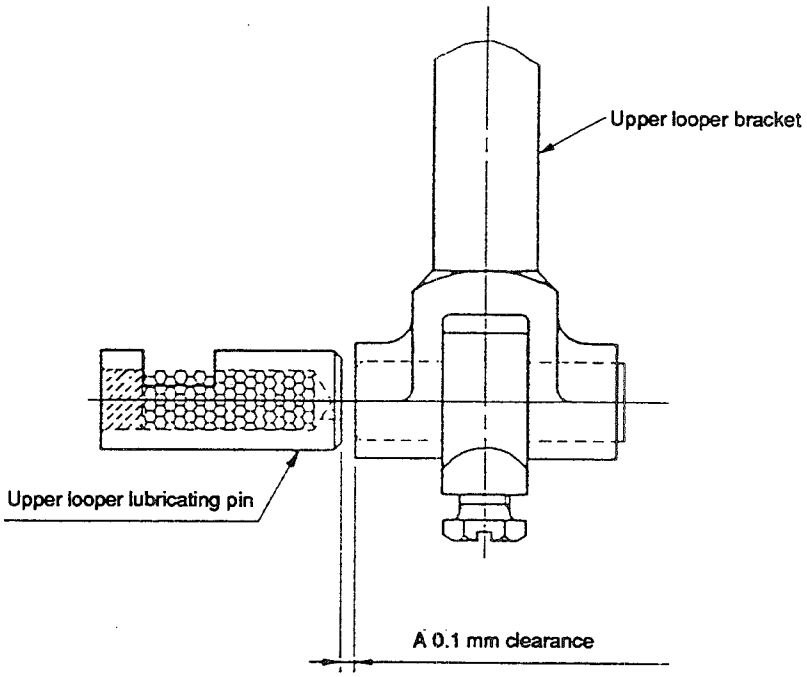
1) Orientation of the lubricating pin

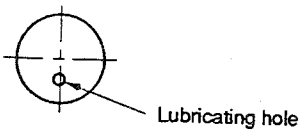
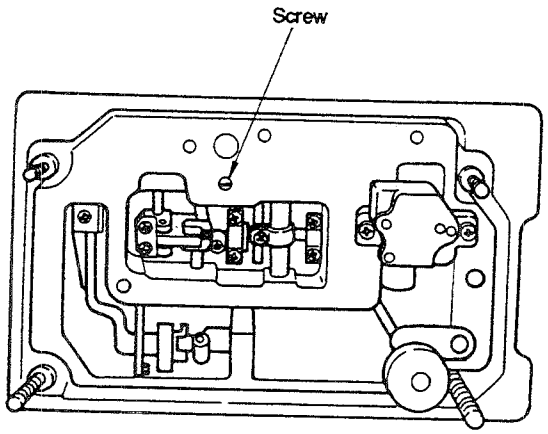


The oil inlet of the upper looper lubricating pin should face upward.

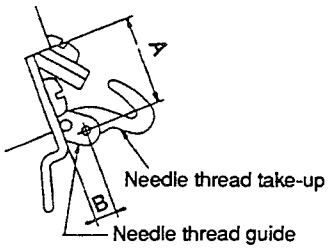
2) Setting the lubricating pin

Set the lubricating pin in position so that a clearance of 0.1 mm is provided between the upper looper lubricating pin and the upper looper bracket.

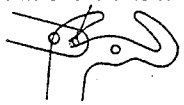


Adjustment Procedures	Results of Improper Adjustment
o When the upper looper lubricating pin is set in place with the oil inlet faced upward, the lubricating hole is in the lower section as observed from this side.  	o If the oil inlet does not face upward, oil will not be fed resulting in seizure.
o Remove the oil reservoir, loosen the screw and adjust the position of the upper looper lubricating pin. Adjust the clearance provided between the upper looper lubricating pin and the upper looper bracket using a 0.1 mm spacer.  	o If the clearance provided between the upper looper lubricating pin and the upper looper bracket is too small, the related components will come in contact with each other. o If the clearance provided between the upper looper lubricating pin and the upper looper bracket is too large, oil will not be fed resulting in seizure.

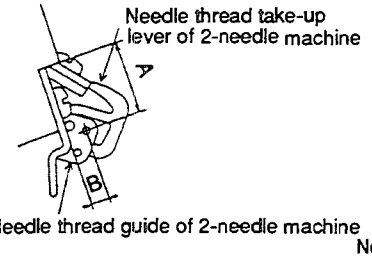
(26) Position of the thread guides and the looper thread take-ups



Shift the hook of the thread take-up lever from the thread hole in the needle thread guide by the distance equivalent to 1/3 of the diameter of the hole.

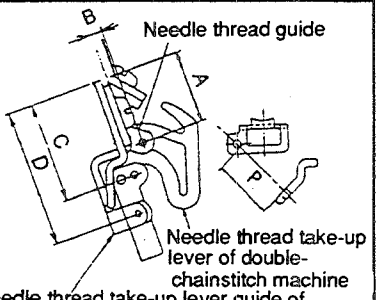


When the needle thread take-up lever is in its lowest dead point, shift the hook of the thread take-up lever from the thread hole in the needle thread guide by the distance equivalent to 1/3 of the diameter of the hole.



Shift the hook of the thread take-up lever from the thread hole in the needle thread guide by the distance equivalent to 1/3 of the diameter of the hole.

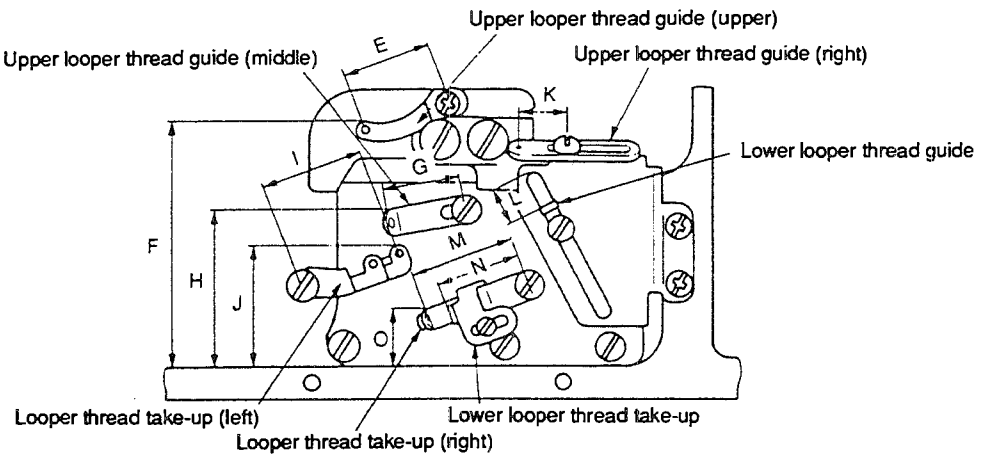
When the needle thread take-up lever is in its lowest dead point, shift the hook of the thread take-up lever from the thread hole in the needle thread guide by the distance equivalent to 1/3 of the diameter of the hole.



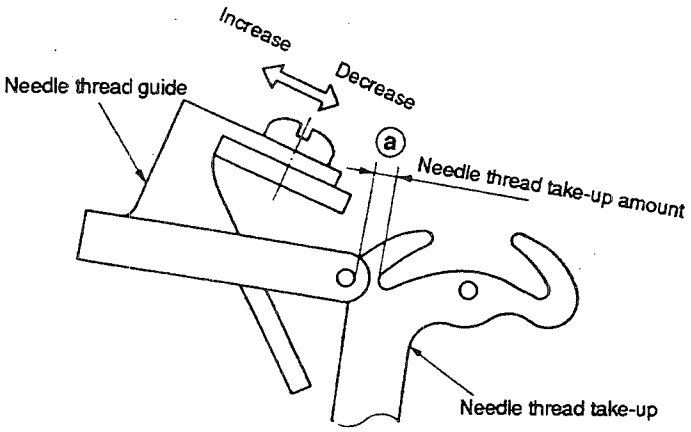
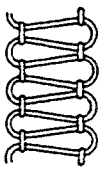
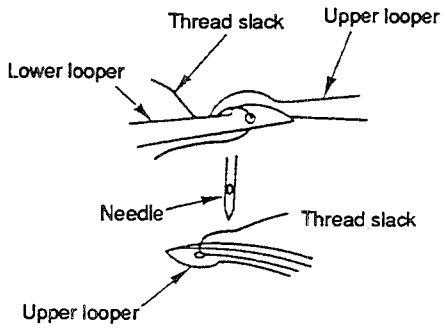
Shift the hook of the thread take-up lever from the thread hole in the needle thread guide by the distance equivalent to 1/3 of the diameter of the hole.

When the needle thread take-up lever is in its lowest dead point, shift the hook of the thread take-up lever from the thread hole in the needle thread guide by the distance equivalent to 1/3 of the diameter of the hole.

MO-3904 **MO-3914** **MO-3916**



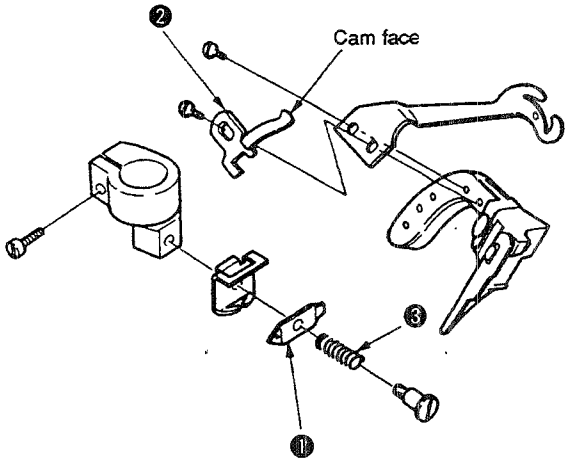
Symbol	MO-3904 (Standard)		MO-3914 (Standard)		MO-3916 (Standard)		MO-3905 (Blind hemming)		MO-3904 (Soft chain)	MO-3916 (Soft chain)
	General thread	Wooly thread	General thread	Wooly thread	General thread	Wooly thread	General thread	Wooly thread	General thread	General thread
A	15.8	←	←	←	←	←	←	←	13.5	13.5
B	4	←	←	←	2.4	←	4	←	2.1	0.5
C	——	——	——	——	23	←	——	——	——	23.8
D	——	——	——	——	31	←	——	——	——	31
E	22	←	←	←	←	←	←	←	←	←
F	65	←	←	←	←	←	←	←	←	←
G	17.5	←	←	←	←	←	←	←	←	←
H	43.5	←	←	←	←	←	40.5	←	43.5	←
I	26.5	←	←	←	←	←	24	←	26.5	24
J	38	41	38	←	34	36	38	42	43.5	36.5
K	15	←	12	15	12	15	12	←	14	←
L	6.5	←	10	←	6.5	←	24.5	33.5	←	27
M	29	←	←	←	27.5	←	29	←	26.5	←
N	27	21	23	←	19	←	24	←	19	←
O	11	←	←	←	←	←	12	←	9.5	←
P	——	——	——	——	12.5	←	——	——	——	12.5

Adjustment Procedures	Results of Improper Adjustment
o Perform the adjustment by the setscrews. Position of the needle thread guide and needle thread take up lever is a very important decisive factor when making soft chains or setting the number of stitches to 503 since the needle thread take-up amount is increased in either case. So, carefully position these parts.  	o Distance ⓐ When set smaller, better tightness of needle thread stitches will be obtained. When set larger, loose needle thread stitches will result.
o Set distance I a little smaller when using synthetic thread or the like which tends to form stitches swelling out of the cloth edge. A smaller I is effective for preventing stitch skipping. o Distance J is related to the vertical knotting point of the upper and lower looper threads. Set this distance larger for wooly thread, and set is smaller for thin thread which is likely to cause stitch skipping. o It is desirable to set distance K larger for stretchy threads such as wooly thread. o Set distance L a little larger when making blind hemming soft chain stitches. o Set distance N a little smaller for blind hemming or making soft chain stitches. o Set distance O larger if stitch skipping occurs due to looper thread slack. Set it smaller for better appearance and touch of produced stitches when wooly thread is used.  Swell out  	o Distance E, F and H exert least influence on stitch formation, however, improper setting of these distances will cause contact between the moving parts. o Distance J When set larger, the amount of the upper looper thread will be increased. When set smaller, the amount of the upper looper thread will be decreased. o Distance K When set larger, the amount of the upper looper thread will be increased. When set smaller, the amount of the upper looper thread will be decreased. o Distance L When set larger, the amount of the lower looper thread will be decreased. When set smaller, the amount of the lower looper thread will be increased. o Distance N When set larger, the amount of the lower looper thread will be increased. When set smaller, the amount of the lower looper thread will be decreased. o Distance I When set larger, the amount of the upper and lower looper threads will be increased. When set smaller, the amount of the upper and lower looper threads will be decreased. o Distance O When set larger, the amount of the upper and lower looper threads will be decreased. When set smaller, the amount of the upper and lower looper threads will be increased.

(27) Adjusting soft chain making mechanism

1) Replacing the parts with those exclusively designed for making soft chains

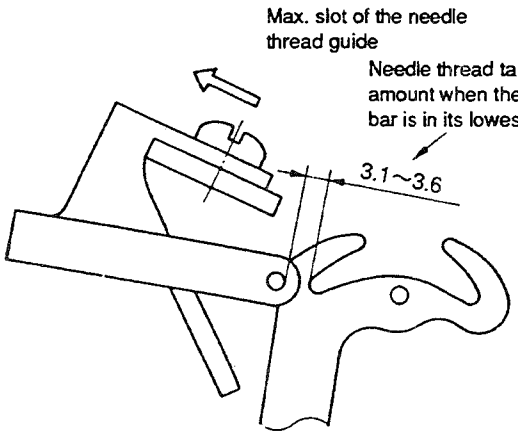
①	Needle thread presser plate C	12112504
②	Driving cam	12112603
③	Needle thread presser spring B	12112702
④	Throat plate	(only for 1-needle overlock machine)
	0D4-300	R4200J0DD0A
	0E4-300	E
	0F4-300	F



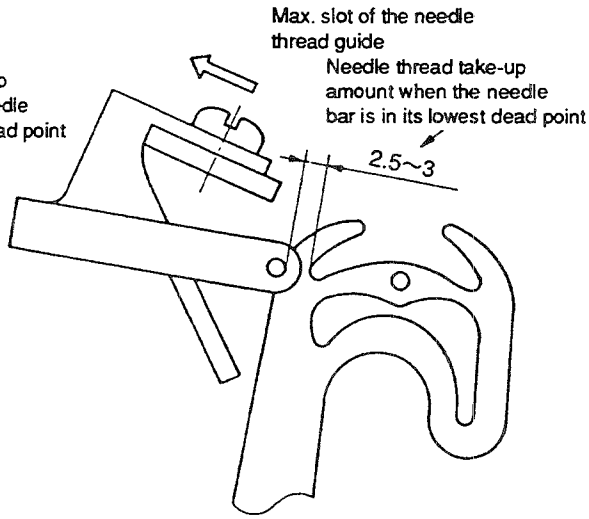
2) Adjustment value

① Needle thread guide and needle thread take-up lever

Adjust the needle thread guide to increase the needle thread feeding amount when the needle bar is in the lowest dead point of its stroke.



(04 1-needle overlock machine)

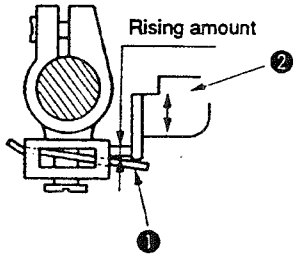


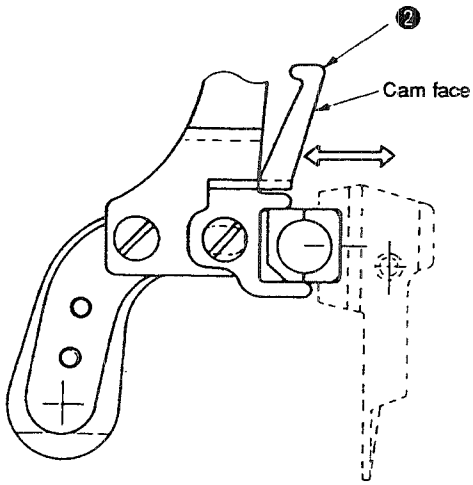
(16 Safety stitch machine)

② Adjusting the rising amount of needle thread presser plate C

Adjust the rising amount of needle thread presser plate C❶ to 0.6 to 1 mm (max.) by moving driving cam ❷ to the right and left within the slot.

o Rising amount: 0.6 to 1 mm (max.)





3) Important points in adjustment

① Increase the thread take-up amount of the needle thread take-up lever.
Refer to the adjustment values related to the needle thread guide and needle thread take-up lever.

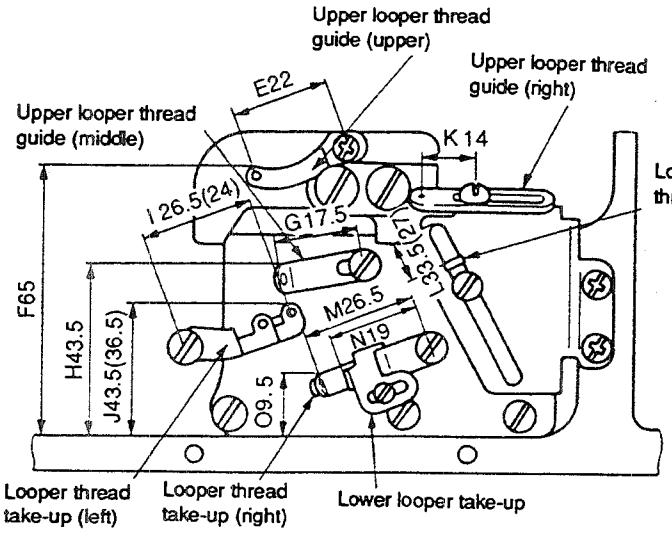
② Reduce the feed of the looper threads. (mainly lower looper thread)
Set J, K, L and M for the soft chain distances.
Fine adjustment of J and M is required to produce even stitches.

③ Adjust the thread tension while checking the appearance and touch of the stitches produced.
1) Minimize the needle thread tension as far as satisfactory tightness of needle thread stitches is obtained.
2) Increase the upper looper thread tension as much as possible.

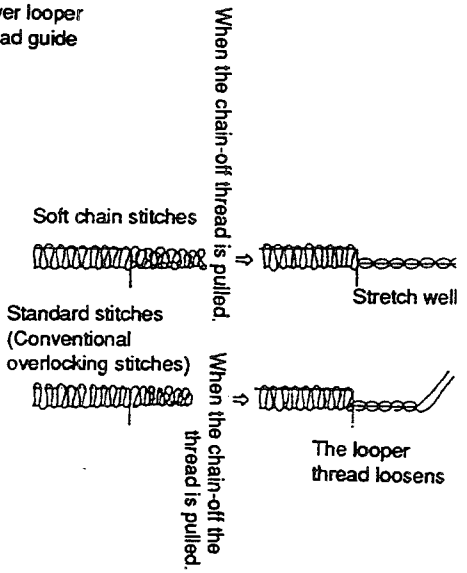
④ If the chain-off thread does not stretch satisfactorily (if not satisfied with (1)), proceed with the following.
1) Increase the upper looper thread tension.
2) Further increase distances J and K.
3) Further increase the upper looper thread tension.
4) Increase the lower looper thread tension to a maximum as far as good tightness of needle thread stitches is maintained.
5) Increase the thread take-up amount. If the needle thread is poorly tensed, increase the needle thread tension.

⑤ Fine adjustment for producing stitches with better appearance and touch
1) If the knotting point varies at high or low sewing speed, slightly reduce L, and increase the lower looper thread tension.
2) If a knot is made at a high point, increase J and I.
3) If the needle thread is likely to break, decrease the thread take-up amount and lower the needle thread tension.

⑥ Pay attention to the following
1) Minimize the needle thread tension as far as satisfactory tightness of needle thread stitches is obtained.
2) The knot of upper and lower looper threads should be made near the upper edge of a material.
3) Minimize the lower looper thread tension as far as even stitches are maintained.
4) For a safety stitch machine, adjust the soft chain making mechanism so that uniform chain-off thread is produced during double-chainstitching and overlocking.



The value given in parentheses is the adjustment value for a safety stitch machine.



NOTE !!

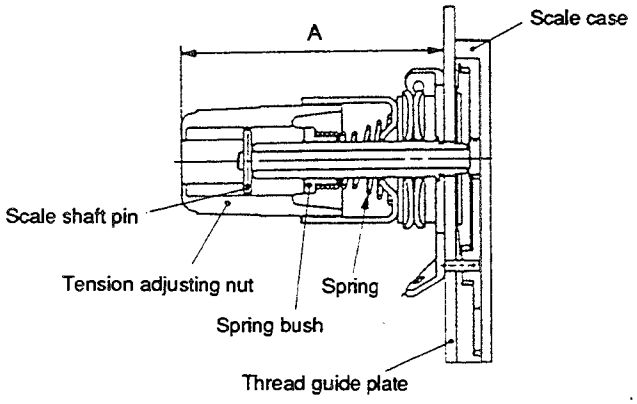
4. ADDITIONAL INFORMATION AND PRECAUTIONS

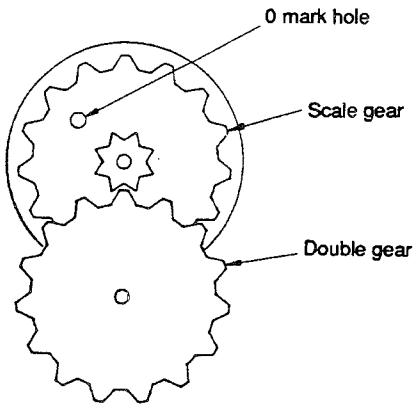
(1) Thread tension

1) Strength of tension spring and height of tension adjusting nut

Part No.	Color	Natural length	Operating length	Weight required to compress spring to working length	Height A of nut when "0" is set on the scale
115-50100	Purple	19.5 mm	11.5 mm	910±50g	54.4±0.5 mm
115-50209	Green	19.5	11.5	640±50	54.4±0.5
B3101-804-000	Red	19.5	11.5	430±50	54.4±0.5
B3102-804-000	Yellow	17.8	9.8	320±35	52.7±0.5
B3103-804-000	Blue	17.3	9.3	150±20	52.2±0.5
B3121-804-000	Gray	13.8	5.8	150±20	48.7±0.5

2) How to replace the tension spring and set "0" on the scale





① Remove the tension adjusting nut, scale shaft pin and spring bush, then replace the pin with the exclusive one. When the knob is removed, the scale pin will come off. So, be careful.

② Attach the spring bush and the scale shaft pin in place and screw in the tension adjusting nut. At this time, screw in the knob after aligning the axial direction of the scale shaft pin and the longitudinal direction of the groove inside the knob.

③ Adjust the height of the end face of the knob (dimension A) as measured from the thread guide plate to the value given in the table above.

④ Remove the screw from the thread guide plate. At this time, the scale case and the gear inside the case will come off if the scale case is faced downward. So, be sure to remove the screw from the thread guide plate keeping the scale case held faced upward.

⑤ Remove the scale case.
Remove the double gear.
The scale gear freely rotates. So, position the 0 mark hole straight up. Now, fit the double gear over the scale gear.

⑥ Fit the scale case over the double gear and fix the case with a locknut.

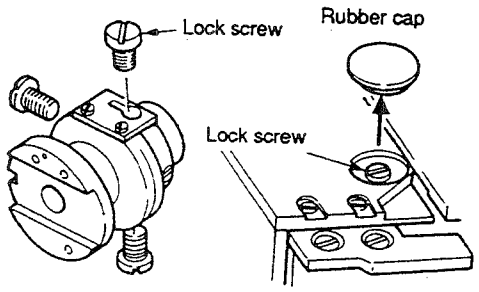
3) Springs used for each model

Model \ Where to use	Needle thread	Double-chainstitch needle thread	Upper looper thread	Lower looper thread
MO-3903 series	Blue	——	——	Yellow
MO-3904-ΔΔΔ-ΔΔΔ (3ΔΔ or lower)	Red	——	Yellow	Blue
MO-3904-ΔΔΔ-ΔΔΔ (4ΔΔ or higher)	Red	——	Blue	Yellow
MO-3905 series	Yellow	——	Blue	Yellow
MO-3912 series	Red Yellow	——	Yellow	Blue
MO-3914-XB5-100	Blue Blue	——	Yellow	Blue
MO-3914 series	Red Yellow	——	Yellow	Blue
MO-3915 series	Blue	Red	——	Yellow
MO-3916-ΔΔΔ-ΔΔΔ (3ΔΔ or lower)	Red	Yellow	Yellow	Blue
MO-3916-ΔΔΔ-ΔΔΔ (4ΔΔ or higher)	Red	Red	Blue	Yellow
MO-3943 series	Red Red	Yellow	Yellow	Blue
MO-3945 series	——	Red Red	——	——

(2) Locking of the feed cam

In the regular operation, no problem will be caused even if the feed cam is not locked. (Operating the machine with the cam locked, the cam will not be worn out.)

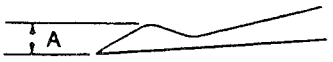
For MO-3900, align the alphabet "L" on the sewing machine pulley with the marker line engraved on the belt cover, and the lock screw will be straight up. Remove the rubber cap from the feed cover and lock the lock screw.



(3) Upper looper of the MO-3900

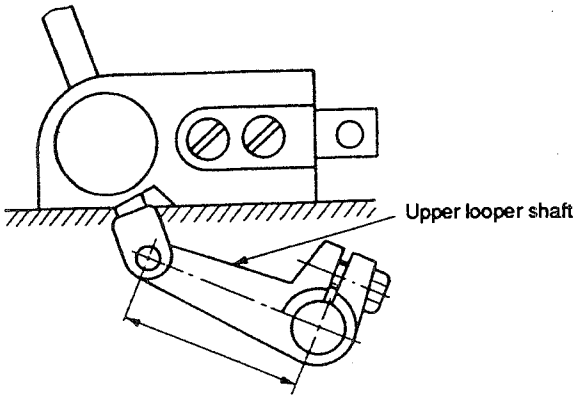
Use a proper upper looper in accordance with the needle No. When ordering, specify the boxed numbers shown in the table at right. The loopers with asterisks will be attached to standard machine heads.

Model	Nos. engraved on upper looper	Needle No.	Upper looper thickness A
3904	*1188 [81]	#9 #11 #14	2.1
3916	1199 [92]	#14 #16 #18	2.2
3914	*1217 [60]		2.1



(4) Center-to-center distance of the upper looper holder

The standard center-to-center distances are as shown below.



MO-3904 ┐
MO-3916 ┘ 38 mm

MO-3914 39 mm

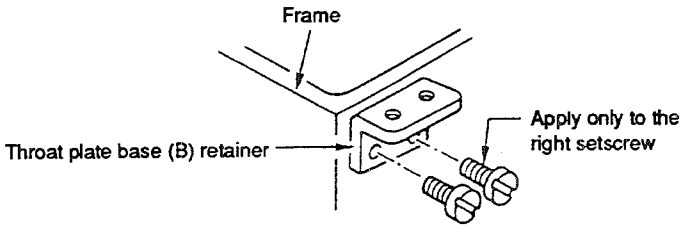
For models other than standard

Model	Center-to-center
MO- 3903 - ΔΔΔ-ΔΔ0 MO- 3905 - ΔΔΔ-ΔΔ0	38
MO- 3904 - 0D4~0E4 4ΔH 0F6 -40K 0H6 50H	39
MO- 3912 - ΔΔΔ-ΔΔΔ	39
MO- 3914 - XB5 -100	38
MO- 3915 - ΔΔΔ-ΔΔ0	38
MO- 3916 - DD4~DE4 4ΔH DF6 -40K FF6 ΔΔH	39
MO- 3943 - DBD6 -3Δ7 FBD6	39

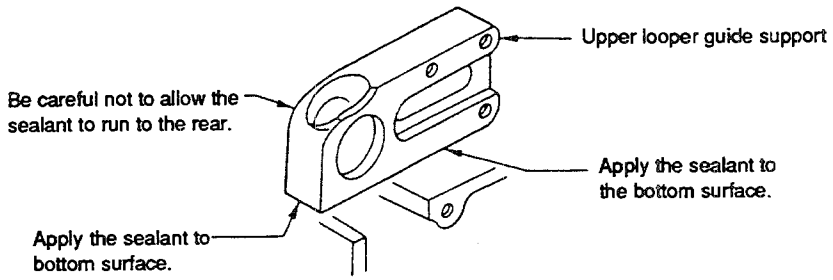
(5) Caution in assembly

1) Application of sealant

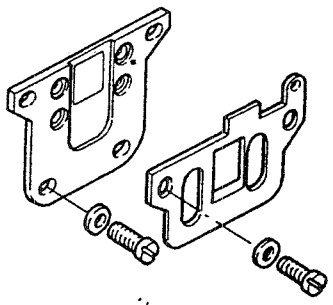
① Setscrew of the throat plate base (B) retainer (JUKI seal)
Apply the sealant only to the right setscrew.



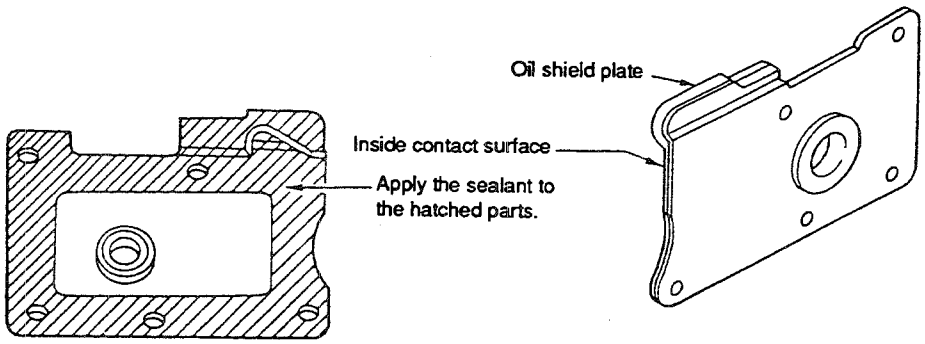
② Bottom surface of the upper looper guide support (Three-bond TB1102)
Apply the sealant to the bottom surface of the upper looper guide support, which contacts with the frame surface.



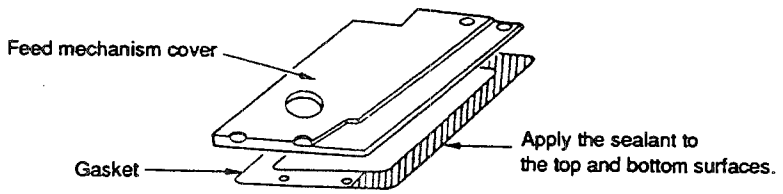
③ Setscrews of the rubber case (JUKI seal)
Apply the sealant to the four setscrews.



④ Oil shield plate assembly (JUKI seal)
Apply the sealant to the inside of the oil shield plate.



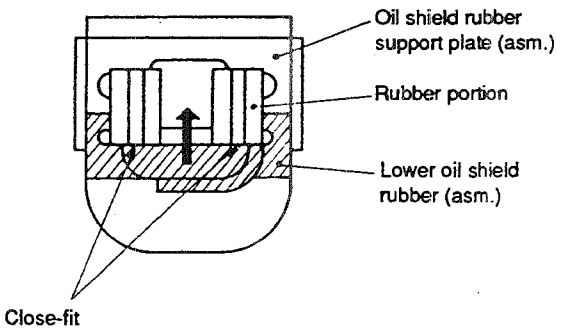
⑤ Feed mechanism cover gasket (Three-bond 11041)
Apply the sealant to the hatched parts on the top and bottom surfaces of the gasket.



2) Precautions to be taken with respect to the lubricating components

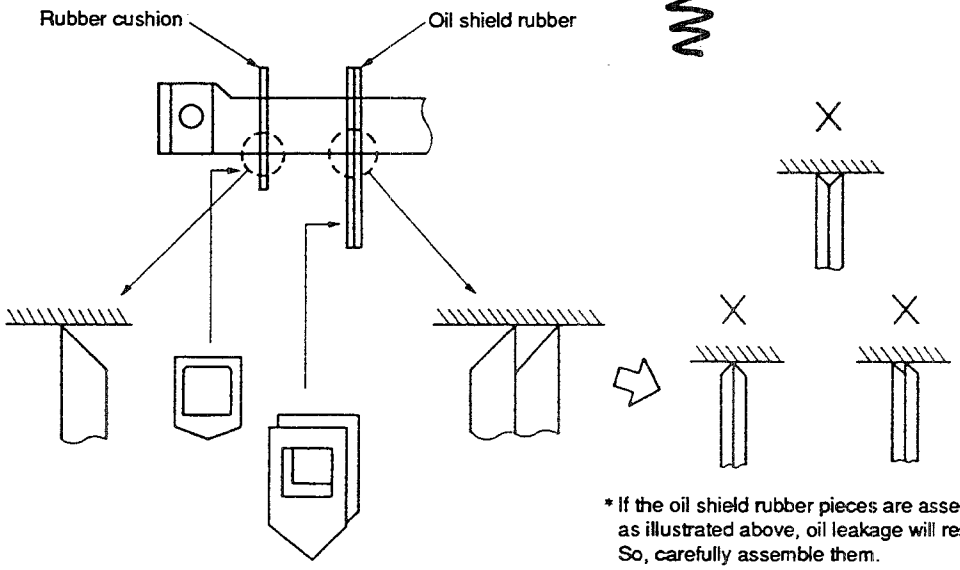
① Feed bar components

- Press the lower oil shield rubber asm. against the rubber portion of the oil shield rubber support plate. Now, tighten the screw.



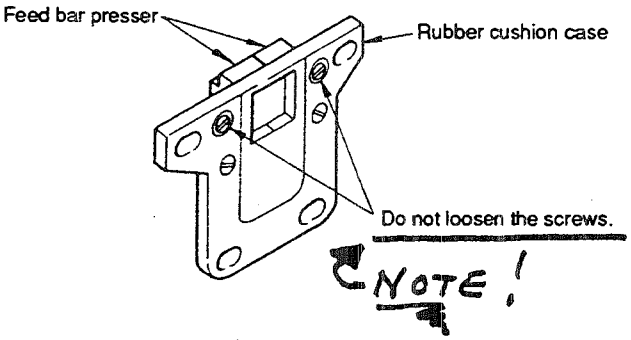
- Carefully check the orientation of the oil shield rubber and rubber cushion.

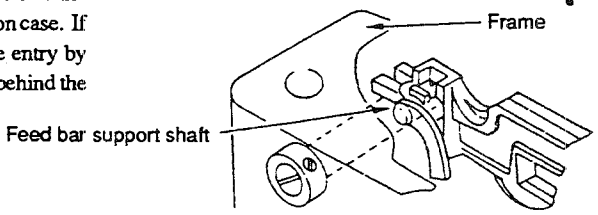
NOTE !!



* If the oil shield rubber pieces are assembled as illustrated above, oil leakage will result. So, carefully assemble them.

- Assemble the feed bar presser and rubber cushion case so that their top faces are flush with the frame plane on which the feed cover is installed.
- Do not loosen the screws in the feed bar presser unless it is really necessary. The clearance provided between the feed bar and the feed bar presser and the contact between them should be properly adjusted. If the screws have been loosened, carefully check that there is no clearance as well as no single-sided contact exist between the aforementioned components.
  When you have replaced the gauges, adjust the needle entry by moving the feed bar presser to the right or left together with the rubber cushion case. If a torque is produced, re-adjust the needle entry by moving the feed bar support shaft located behind the frame to the right or left.

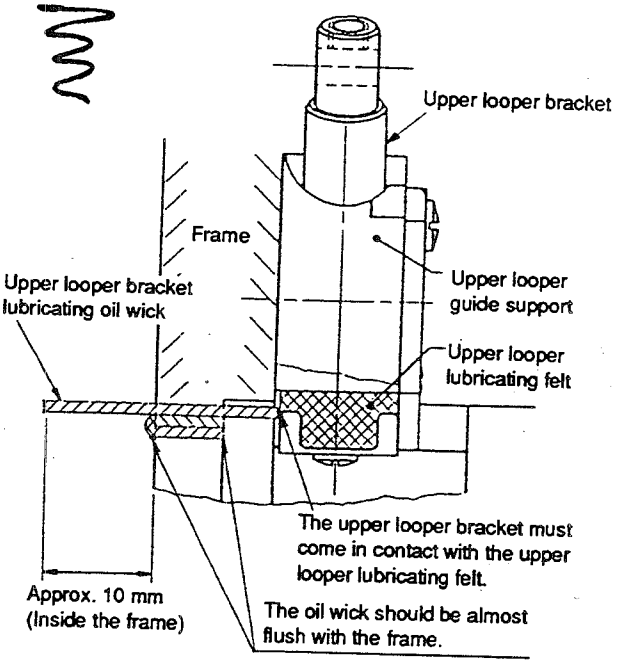




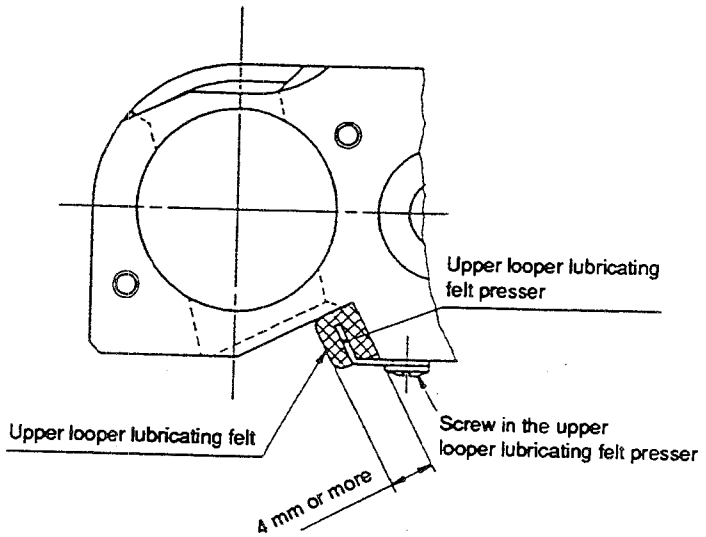
② Upper looper guide components

- Cut both ends of the oil wick inside the upper looper connecting pin so that they are flush with the pin ends taking care not to allow the oil wick ends to protrude the pin ends.
- Oil is fed to the upper looper lubricating felt through the oil wicks installed inside the frame. The oil wicks should not be longer than the required length. So, carefully check the oil wick length. One oil wick should be 10 mm from the inside of the frame. The turned-up section of the oil wick should be flush with the frame end. Another oil wick should come in contact with the lubricating felt.
- Set the upper looper lubricating felt so that it projects 4 mm from the upper looper guide support as illustrated in the figure and confirm that the upper looper bracket comes in contact with the top of the felt.

Note !!



Note !!



(6) Kinds of motor pulleys, belts and frame support plate bolts

1) Motor pulleys and belts (for MO series machines)

Sewing speed of sewing machine (s.p.m.)	50 Hz			60 Hz		
	Outside diameter of motor pulley (mm)	Semi-sunken type (inch)	Fully-sunken type (inch)	Outside diameter of motor pulley (mm)	Semi-sunken type (inch)	Fully-sunken type (inch)
8500	160.5	40	36	135.5	38	34
8000	150.5	40	34	125.5	38	32
7500	140.5	38	34	120.5	38	32
7000	130.5	38	34	110.5	36	32
6500	120.5	38	32	100.5	36	32
6000	110.5	36	32	95.5	35	30
5500	100.5	36	32	85.5	35	30
5000	90.5	35	30	80.5	34	30
4500	85.5	35	30	70.5	34	30
4000	75.5	34	30	60.5	34	29

* Use a motor of 3/4 HP (550 W) when the sewing machine runs at 7,500 s.p.m or higher speed.
Use a motor of 1/2 HP (400 W) when the sewing machine runs at a speed lower than 7,500 s.p.m.

○ Be sure to use the motor of which speed does not exceed the sewing speed of the sewing machine.

* Part No. of motor pulley

MTKP0×××000 (Enter the effective diameter to "×××.")

If the outside diameter of the motor pulley is 150.5 mm, the effective pulley will be 145 mm.
So, the part No. will be MTKP0145000.

If the outside diameter of the motor pulley is 90.5 mm, the effective pulley will be 085 mm.
So, the part No. will be MTKP0085000.

* Part No. of belt

MTJVM00××00 (Enter a number that shows the belt length to "××.")

If the belt length is 40 inches, enter "40" to "××." So, the part No. will be MTJVM004000.

If the belt length is 35 inches, enter "35" to "××." So, the part No. will be MTJVM003500.

2) Pat No. of frame support plate bolt

① Semi-sunken type frame support plate (A) asm. requires four bolts.

Support plate bolt (A) asm. 119-66751

- Support plate bolt (A) 119-66702 ×1
- Ⓐ
  - Locknut NS6240630SN ×1
  - Washer WP1102016SC ×1
  - Spring washer WS1002560KR ×1

② Fully-sunken type frame support plate (C) and (D) asms. respectively require two bolts.

* Support plate bolt (C) asm. 115-71858

- Support plate bolt (C) 115-71809 ×1
- Ⓐ
  - Aforementioned locknut ×1
  - Aforementioned washer ×3
  - Aforementioned spring washer ×3

* Support plate bolt (D) asm. 115-7197

- Support plate bolt (D) 115-71908 ×1
- Ⓐ
  - Aforementioned locknut ×3
  - Aforementioned washer ×3
  - Aforementioned spring washer ×1

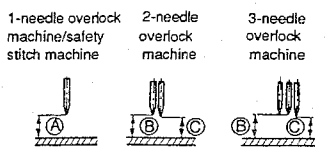
Separately from the aforementioned bolts, support plate (B) (115-71700) is available.

Difference of support plate bolts (A), (B), (C) and (D)
Entire length under the neck and length of threaded part

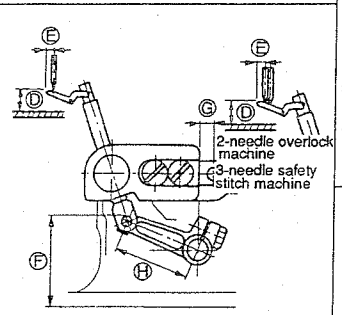
	Entire length (mm)	Length of threaded part (mm)
Bolt (A)	69	39
Bolt (B)	125	95
Bolt (C)	137	107
Bolt (D)	149	119

5. ADJUSTMENT OF THE NEEDLE HEIGHT AND LOOPER TIMING (MO-3900 SERIES)

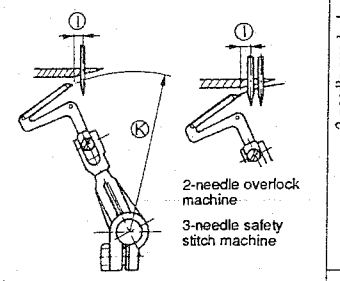
Needle height



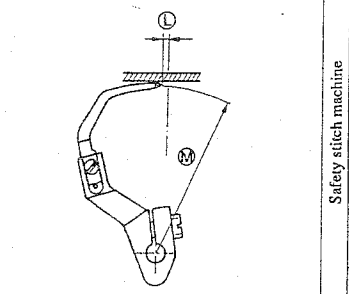
Upper looper components



Lower looper components



Double-chainstitch looper components



Classification	Description / Subclass	Needle height: 1-needle 2-needle (left) Ⓐ Ⓑ	Needle height: 2-needle (right) Ⓒ	Upper looper components: Upper looper height Ⓓ	Projection of upper looper Ⓔ	Height of pin Ⓕ	Position of guide support Ⓖ	Center-to-center of looper holder Ⓗ	Center-to-center of looper holder Ⓗ	Lower looper components: Returning amount of lower looper Ⓘ	Radius of lower looper Ⓚ	Double-chain looper: Returning amount of double-chainstitch looper Ⓛ	Radius of double-chain looper Ⓜ
1-needle overlock machine	MO- 3903 3904 - 0A5~0F5 0A4~0E4 0D6 - 15Δ 210 3ΔΔ 500	10.5	—	11.0	4.0	45.0	7	38	—	4.0	66.9	—	—
1-needle overlock machine	MO- 3904 - 0F4~0G4 0F6~0H6 - 3Δ0 500	10.5	—	11.0	4.0	46.2	6.3	38	—	3.7	66.9	—	—
1-needle overlock machine	MO- 3904 - 0D4~0E4 0F6 0H6 - 4ΔH -40K 50H	11.3	—	11.3	4.4	48.2	5.8	—	39	3.8	66.9	—	—
1-needle overlock machine	MO- 3904 - 0K6 - 50H	11.3	—	10.5	4.0	48.6	4.7	38	—	2.8	66.9	—	—
2-needle overlock machine	MO- 3914 - XB5 - 100	10.5	10.5	11.3	4.0	45.0	7	38	—	4.1	66.9	—	—
2-needle overlock machine	MO- 3914 - AD4 - 307	10.5	10.2	10.3	4.4	47.3	6	—	39	3.8	66.9	—	—
2-needle overlock machine	MO- 3914 - BD4~BE4 BD6~BE6 - 3Δ7	10.5	9.1	10.3	4.4	47.3	6	—	39	3.8	66.9	—	—
2-needle overlock machine	MO- 3914 - BD6~BF6 BE7 - 4ΔH 40K	11.3	9.9	10.5	4.8	48.4	5.8	—	39	4.0	66.9	—	—
2-needle overlock machine	MO- 3914 - CD6~CE6 CE7 - 4ΔH	11.3	10.0	10.5	4.8	48.4	5.8	—	39	4.0	66.9	—	—
2-needle overlock machine	MO- 3914 - CF6 - 40H	11.3	10.0	10.8	4.8	48.5	6.3	—	39	2.8	66.9	—	—
2-needle overlock machine	MO- 3914 - DF6 - 50G	11.3	9.7	10.8	4.8	48.5	6.3	—	39	2.8	66.9	—	—
2-needle overlock machine	MO- 3912 - DD6~DF6 - 3Δ7 507	11.0	9.4	10.5	3.8	46.9	5.5	—	39	2.2	66.9	—	—
Safety stitch machine	MO- 3915 3916 - ΔΔΔ - 3Δ0 500	10.5	—	11.0	4.0	46.2	6.3	38	—	3.7	66.9	1.8~2.0	63.2
Safety stitch machine	MO- 3916 - DD4~DE4 DF6 FF6 - 4ΔH -40K 50H	11.3	—	11.3	4.4	48.2	5.8	—	39	3.8	66.9	1.8~2.0	63.2
Safety stitch machine	MO- 3916 - FF6 - 60H 60K	13.0	—	12.8	4.7	48.4	5.8	—	39	3.0	66.9	1.8~2.0	63.4
Safety stitch machine	MO- 3916 - RH6 - 30H -42H 50H	11.3	—	11.5	4.5	47.7	4.7	38	—	4.5	66.9	1.8~2.0	63.2
Safety stitch machine	MO- 3943 - DBD6 FBD6 - 3Δ7	10.5	—	10.3	4.4	47.3	6	—	39	3.8	66.9	1.8~2.0	63.2
Safety stitch machine	MO- 3945 - DD4 ED4 - 360	9.8	—	—	—	—		—	—	—	—	2~2.5	63.6

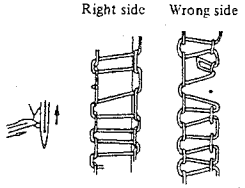
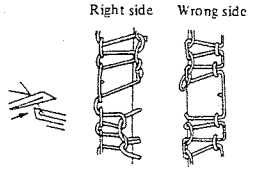
Gauge	11831807	11991809
	7 5.5 / 6	6.3 4.7 / 5.8

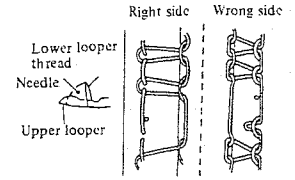
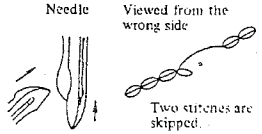
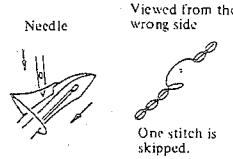
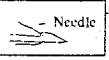
Looper holder	12122701	12122800
	38	39

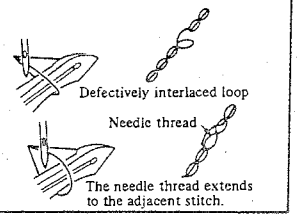
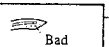
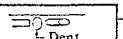
6. TROUBLES AND CORRECTIVE MEASURES

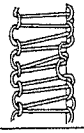
(1) Main unit components

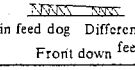
Trouble	Case (1)	Case (2)	Check and Corrective measures
1. Needle thread breakage	Threading	The thread is entangled with the thread guide, or the machine head has been incorrectly threaded.	Refer to the threading diagram.
	Thread path	Scratches, burrs or rust on the pawls or needle holes of the throat plate, stitch tongue, lower looper, double chain looper, needle thread take-up, needle thread presser spring, thread guide, or tension discs causes friction.	Remove such scratches, burrs, etc. and perform thread path finishing. Replace major components such as looper, which have been deformed, causing thread breakage.
	Needle guard	The needle hits the needle guard intensely, and sharp edges are produced on them, causing thread breakage.	Replace the needle and needle guard if they have worn.
	Needle	The needle is too thin for the thread.	Replace the needle by a proper one.
	Needle heat	The needle gets very hot, depending on the type of materials, number of plies and sewing speed, and causes the thread to burn and break.	Use a thinner needle. Reduce the sewing speed. Use the needle cooler. Use an S-point needle or needle for synthetic thread.
	Thread	The thread is weak because of its poor quality.	Replace the thread by one with good quality.
	Thread tension	The thread tension is too high.	Reduce the thread tension. Check whether the needle thread take-up guide and needle thread guide are positioned too high, causing such excessive thread tension.
	Contact	The double chain looper or lower looper has been improperly positioned and strikes the feed dog or throat plate.	Properly position the double chain looper or lower looper
	Double thread hooking (only for double chain stitch)	Poor drawing up of the needle thread causes the looper to catch it again	Increase the needle thread tension. Properly position the thread cam
	Deffective double chain-off thread (only for double chain stitch)	Refer to the clause referring to defective double chain-off thread.	
	Threading	The thread is entangled with the thread guide, or the looper has been incorrectly threaded.	Refer to the threading diagram.
2. Looper thread breakage	Thread path	Scratches, burrs, rust, etc. on the pawl of the throat plate, stitch tongue, looper, looper thread take-up, thread guide, or tension discs causes friction.	Remove such scratches, burrs, etc. and carry out thread path finishing. Replace loopers or other components which have been deformed, causing thread breakage.
	Adjustment of the looper thread take-up	The looper thread take-up or thread guide has been improperly positioned, causing excessive thread tension.	Refer to the pertinent Standard Adjustment.
	Thread tension	The looper thread tension is too high.	Reduce the tension while checking the tension balance other looper thread.
	Thread	The thread is weak because of its poor quality.	Replace the thread by one with good quality.
	Position of the thread guides	The upper looper thread guide is too high, and the thread taking balance is disturbed, resulting in the thread breakage.	Refer to the pertinent Standard Adjustment.
	Double chain looper avoid (only for double chain stitch)	The double chain looper strikes the needle at the back, causing the thread breakage.	Correct the longitudinal motion of the double chain looper so as not to cause the looper to strike the needle.
	Needle heat	The needle gets hot, and the looper thread breaks when it comes in contact with the hot needle at the time of needle stop.	Refer to the clause relating to the needle heat causing needle thread breakage.

Trouble	Case (1)	Case (2)	Check and Corrective measures
3. Needle breakage	Needle entry	The needle entry has not been correctly adjusted, and the needle strikes the throat plate or presser foot.	Correct the needle entry.
	Upper looper position	The upper looper juts out too much or it is too low.	Refer to the related Standard Adjustment.
	Contact with the looper	The needle strikes the looper, resulting in needle breakage.	Re-position the looper so that it does not come in contact with the needle. Adjust the longitudinal motion of the double chain looper for the contact of its back with the needle.
	Needle guards	A needle guard has been improperly positioned, causing the needle point to strike it.	Refer to the pertinent Standard Adjustment.
	Needle No.	The needle is too thin for the materials.	Replace the needle with a thicker one.
	Thread tension	The thread tension is too high.	Reduce the thread tension.
	Height of the feed dog or needle	The feed dog is too high, or the needle is too low, causing the needle to deflect with resultant needle breakage.	Refer to the related Standard Adjustment.
4. The needle point is crushed. (Double chain stitch needle)	Needle guard	The needle guard C is too low, or its longitudinal position is not correct.	Increase the height of the needle guard C. Check the clearance between the needle and needle guard.
	Contact with the looper	The tilt of the looper is not correct. The longitudinal motion of the looper is not correct.	Check the tilt of the looper. Correct the longitudinal motion of the looper, and increase the clearance between the looper and needle when the looper reaches its most retracted position.
5. Overlocking needle thread stitches are skipped.	Lower looper	The blade point has defective shape and does not catch needle thread loops.	Replace the lower looper
The lower looper fails to catch needle thread loops. 	Adjustment of the loopers.	The clearance or the amount of return is not correct.	Refer to the relevant Standard Adjustment.
	Needle thread presser	The duration in which the presser holds the needle thread is not correct, and unstable loop result.	Refer to the pertinent Standard Adjustment.
	Needle	The needle is bent or improperly oriented. A needle or DC x 1 is used.	Replace the bent needle. Correctly orient and attach the needle. Use a DC x J27 needle for a stretchy thread.
	Needle guards	Incorrect height or clearance prohibits correct guide for the needle. If a needle guard is too high, loops are crushed with consequent stitch skipping.	Refer to the pertinent Standard Adjustment.
	Height of needle	The needle has incorrect height and does not properly pick up loops even if the looper has a correct return.	Refer to the related Standard Adjustment
	Needle heat	Stitch skipping occurs before the thread breaks due to needle heat.	Refer to the clause relating to the needle thread breakage due to needle heat.
	Positioning of the needle thread take-up guide and needle thread guide	They are positioned too high, and the needle thread take-up takes too much thread, producing too small loops.	Refer to the pertinent Standard Adjustment.
	Threading	The thread has been entangled with a thread guide. Threading has not been correctly done. 	See the threading diagram.
6. Lower looper stitches are skipped.	Upper looper	The blade point has a bad shape, and fails to catch the loops. 	Replace the upper looper with badly deformed blade point.
The upper looper does not catch the lower looper thread. 	Lower looper	The clearance between the needle and the back of lower looper are not correct.	Replace the lower looper having a deformed tip.
	Adjustment of the loopers	The feed amount of the lower looper, height of the upper looper, or clearance produced at time of crossing of the upper and lower loopers is not correct.	Refer to the relevant Standard Adjustment.
	Thread amount	Too much lower looper thread is fed, giving slack of thread. Slack of thread 	Slightly lower the looper thread take-up (left) (reduction in distance J), or slightly reduce distance I to decrease the amount of thread. Slightly raise the looper thread take-up (right) (increase in dimension O) to decrease the amount of thread. Lower the lower looper thread guide (increase in distance L), and decrease distance N to reduce the amount of thread.
	Threading	The thread has been entangled with a thread guide. Threading has not been done correctly.	Refer to the threading diagram.

Trouble	Case (1)	Case (2)	Check and Corrective measures
7. Upper looper thread stitches are skipped.	Threading	The thread has been entangled with a thread guide. Threading has not been done correctly.	See the threading diagram.
	Needle height	The needle, if positioned too high or low, may fail to catch the upper looper thread.	Refer to the related Standard Adjustment.
The needle does not take the upper looper thread. 	Needle	The needle is bent or crushed in its point.	Replace the needle. At this time, be sure to eliminate the cause for such needle bend or needle point crush.
	Adjustment of the upper looper.	The height of the blade point is not correct, making the upper looper unable to properly pass the thread to the needle. The clearance between the needle and the back of the upper looper is not correct.	Refer to the relevant Standard Adjustment.
	Amount of thread	Excessive upper looper thread is fed, producing slack of thread. 	Slightly lower the looper thread take-up (left) (reduction in distance J), or slightly reduce distance I to decrease the amount of thread. Make the upper looper thread guide (right) (shorter decrease in distance K), to reduce the amount of thread. Slightly raise the looper thread take-up (right) (increase in dimension O) to decrease the amount of thread. If the thread tension is not enough, increase it.
8. Double chain stitches are skipped.	Needle height	If the needle height is not correct, stitch skipping occurs even when the return of the chain looper is correct.	Refer to the pertinent Standard Adjustment.
The double chain looper fails to catch needle thread loops. 	Needle	The needle is bent or attached with wrong orientation. A DC x 1 needle is used.	Replace the bent needle. (Remove the cause for the needle bend.) Correct the orientation of the needle. Use a DC x 27 needle (with a better recess configuration).
	Double chain looper	The lower part of the blade point has been deformed, and the blade point fells loops.	Replace the double chain looper.
	Adjustment of looper	Clearances or returning amount is not correct.	Refer to the related Standard Adjustment.
	Thread tension	The thread tension is too high, preventing formation of good loops.	Reduce the tension. However, be careful not to reduce the tension too much, otherwise unstable loops will result.
	Needle guards	A needle guard is too high, and loops are crushed. The clearance is too big, causing the needle to shake.	Refer to the relevant Standard Adjustment.
	Needle heat	The thread breaks due to heat generated on the needle, depending on the type of materials, number of plies, and sewing speed.	Use a thinner needle. Reduce the sewing speed. Check the coolant if necessary.
9. Triangle double chain looper thread stitches are skipped.	The needle point is crushed.	The needle point has been crushed and got thicker and shorter.	Refer to the clause relating to the needle point crush.
The needle fails to catch the double chain looper thread. 	Double chain looper	The thread hole in the tip has worn, and the looper thread does not reach the needle as shown at right. 	Replace the double chain looper.
	Adjustment of looper	Excessive return or longitudinal motion will often cause this stitch skipping.	Refer to the pertinent Standard Adjustment.
	Thread cam timing	The thread cam timing is too early, causing the looper thread to slack before the needle enters a thread triangle.	Refer to the pertinent Standard Adjustment.
	Thread tension	The lower thread tension is very low, and the thread is not stretched.	Increase the thread tension a little.
	Threading	The area around the thread cam has been threaded erroneously.	Correct the threading.

Trouble	Case (1)	Case (2)	Check and Corrective measures
10. Triangle double chain needle thread stitches are skipped. The needle fails to catch the needle thread loop on the double chain looper, resulting in the stitch skipping shown below.  	Double chain looper	The chain looper is too high and too close to the throat plate, or has bad shape as shown at right.  	Correct the height of the chain looper by pushing it down until it comes into contact with the stopper. Replace the chain looper having a bad shape.
	Adjustment of looper	The return is not enough, causing the needle to miss the loop as shown at right.  	Refer to the related Standard Adjustment.
	Thread tension	The needle thread tension is too low.	Slightly increase the needle thread tension.
	Stitch length	The stitch length is as small as 1.5 mm or less.	Increase the stitch length.
	Needle guard	A needle guard is too high, and catches needle thread loops.	Refer to the related Standard Adjustment.
	Double-chainstitch needle thread guide	The needle thread guide is installed too high, and it fails to tense the thread.	Refer to the related Standard Adjustment.
11. Overlocking chain-off thread is bad. (Provided that no chain-off trouble occurred when sewing operation was done with materials set on the machine.)	Position of the throat plate	The throat plate has been improperly positioned longitudinally, and chain-off thread gets in between the main feed dog and throat plate, causing defective chain-off thread.	Correct the position of the throat plate.
	Feed dog	The auxiliary feed dog has scratch.	Repair or replace the auxiliary feed dog.
		The auxiliary feed dog is too high, and interferes with chain-off thread. The auxiliary feed dog is too low. (Lower than the main feed dog by more than 0.5 mm)	Refer to the pertinent Standard Adjustment.
	Adjustment of looper	Adjustment of loopers for producing chain-off thread without materials requires higher accuracy.	Refer to the relevant Standard Adjustment.
	Thread tension	The thread tension is too low.	Slightly increase the tension.
		The needle thread tension is too high, causing damaged balance with other thread tension.	Check whether the needle thread take-up guide or needle thread guide is positioned too high with consequent excessive needle thread tension. And if so, correct it.
12. Problems with double chain stitch chain-off thread	Adjustment of loopers	Adjustment of the loopers for producing chain-off thread without materials requires higher accuracy.	Refer to the related Standard Adjustment
	Needle Guard	The needle guard C is too high, damaging loops.	Refer to the related Standard Adjustment.
	Position of the throat plate	The needle comes into contact with the front edge of the needle hole in the throat plate.	Correctly position the throat plate.
		The lateral position of the throat plate with respect to the feed dogs is wrong, causing chain-off thread to drop in. 	
	Throat plate	A dent exists on the flat part between the rear edge of the needle hole and feed dog groove.  	Repair or replace the throat plate, since such dent causes chain-off thread to slip out.
	Presser foot	The rear pressure foot is indented and not flush with the presser foot sole, so that it cannot hold chain-off thread.	Replace it, or correct it to make it flush with the presser foot sole.
	Main feed dog	The leading edge of the main feed dog is too sharp and cuts chain-off thread.	Buff the leading edge of the main feed dog.
	Double hooking	The needle thread is not drawn up fully because of the insufficient return insufficient return of the double chain looper or wrong threading.	Refer to the related Standard Adjustment for the return of the double chain looper. See the threading digram for correct threading.
		If the feed pitch is too small, the cam timing will be advanced.	Retard the cam timing.
	Thread tension	The needle is bend or chain-off thread runs back due to excessive needle thread tension.	Reduce the needle thread tension.
		Both the needle thread and looper thread tension are too low.	Slightly increase the both tensions.

Trouble	Case (1)	Case (2)	Check and Corrective measures
13. Overlocking needle thread is loose.	Position of the needle thread take-up guide and needle thread guide	They are positioned too high, and the thread take-up draws out excessive needle thread.	Refer to the pertinent Standard Adjustment.
	Thread tension	The thread tension balance has been disturbed.	Refer to the Standard Adjustment for the looper thread take-up components, and increase the tension if necessary.
	Needle	The needle is too thin for the thread used.	Replace it with a proper one.
14. Double chain stitch needle thread is loose.	Thread tension	The looper thread tension is too high, and the needle thread tension is too low.	Reduce the looper thread tension to a minimum, and increase the needle thread tension.
	Thread cam	The thread cam draws out an insufficient amount of thread.	Refer to the relevant Standard Adjustment.
		The thread cam timing is bad.	Refer to the relevant Standard Adjustment.
	Needle	The needle is too thin for the thread used.	Replace the needle with a proper one.
	Double-chainstitch needle thread take-up guide	Drawing amount of the needle thread is insufficient.	Refer to the relevant Standard Adjustment.
15. Uneven overlocking stitches The knotting position of the upper and lower threads varies as shown below. 	Looper thread tension	The upper and lower looper thread tensions are not enough.	Slightly increase the upper and lower looper thread tensions.
	Looper thread take-up	The looper thread take-up (left) is too high.	Slightly lower the looper thread take-up (left)
	Knife width	The knife width is unsuited for the overedging width.	Make the overedging width slightly smaller than that given for the knife width.
	Thread path	Scratches on the thread path catch thread.	Check the thread path for scratches.
	Presser foot	The presser foot comes into contact unevenly with the throat plate and feed dogs and tends to meander.	Make the presser foot come into contact with them evenly.
	Double-chainstitch needle thread take-up guide	Drawing amount of the needle thread is insufficient.	Refer to the relevant Standard Adjustment.
16. Uneven double chain stitches	Thread tension	The looper thread tension is not enough.	Slightly increase the tension.
	Presser foot	The presser foot comes into contact with the throat plate unevenly.	Make the presser foot come into contact with the throat plate evenly.
		The presser foot pressure is not enough.	Increase the presser foot pressure.
17. The looper thread bulges out	Knife width	The knife width is too small for the overedging width.	Use a knife having width suited to the overedging width.
	Looper thread take-up adjustment	The looper thread take-up draws out excessive looper thread.	Decrease the radius of the looper thread take-up (left) (reduction in dimensions F). Raise the looper thread take-up (right) (increase in distance O).
18. Looper thread bite	Knife width	The knife width is too large for the overedging width.	Use a knife having width suited to the overedging width.
	Adjustment of the looper thread take-up	The looper thread take-up draws out insufficient amount of looper thread.	Increase the radius of the looper thread take-up (left) (increase dimension I). Lower the looper thread take-up (right) (reduction in distance O).
19. Knotting position is not correct.  Right side Knots are deflected to the upper looper side.	Threading	Re-threading after thread breakage, etc. has been done erroneously.	See the threading diagram.
	Adjustment of the looper thread take-up	The height of the looper thread take-up (left) is not correct.	Raise the looper thread take-up (left) to increase the amount of upper looper thread, and the knotting position moves toward the lower looper side.
		The upper looper thread guide (right) is too short.	Increase distance K.

Trouble	Case (1)	Case (2)	Check and Corrective measures
20. Uneven material feed	Presser foot pressure	The presser foot pressure is too high.	Reduce the presser foot pressure except for the uneven material feed due to puckering.
	Presser foot	The hinge is too stiff.	Remove the stiffness provided no hinge play is produced.
		Scratches on or defective finish on the presser foot sole produce friction between the presser foot and materials.	Buff the presser foot sole for good surface finish.
	Tilt of feed dogs	The front is too high.	Make the front down. However, be sure to align the differential feed dog with the main feed dog. 
	Height of feed dogs	A different in level exists between the main feed dog and differential feed dog.	Eliminate the difference in level.
	Adjustment of differential feed	The differential feed has been improperly adjusted.	Provide differential feed suited to the material.
21. Puckering (main concerned with double chain stitch)	Needle	The needle is too thick.	Use a thin needle as much as possible.
	Thread	The thread used is too thick.	Use a thin thread as much as possible.
	Thread tension	Both the needle thread and looper thread tensions are too high.	Reduce the both thread tensions to a minimum.
	Throat plate	The throat plate has a large needle hole.	Replace the throat plate with one with a small needle hole.
	Thread cam timing	The thread cam timing is too late.	Advance the cam timing. Refer to the related Standard Adjustment.
	Feed dogs	The leading edge of the feed dog teeth has been rounded off.	Replace the feed dog.
		A difference in level exists between the main feed dog and differential feed dog.	Eliminate such difference in level.
	Presser foot pressure	The presser foot pressure is not high enough, providing poor ironing effect.	Increase the presser foot pressure.
	Differential feed ratio	The differential feed ratio has been set for gathering.	Set it for stretching. When stretching light-weight materials, be careful not to cause the presser foot to contact unevenly with the materials.
	Thread amount	The looper thread amount is not enough, causing excessively tensed stitches.	Bring the thread cam thread guide fully to the front to increase the amount of looper thread.

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