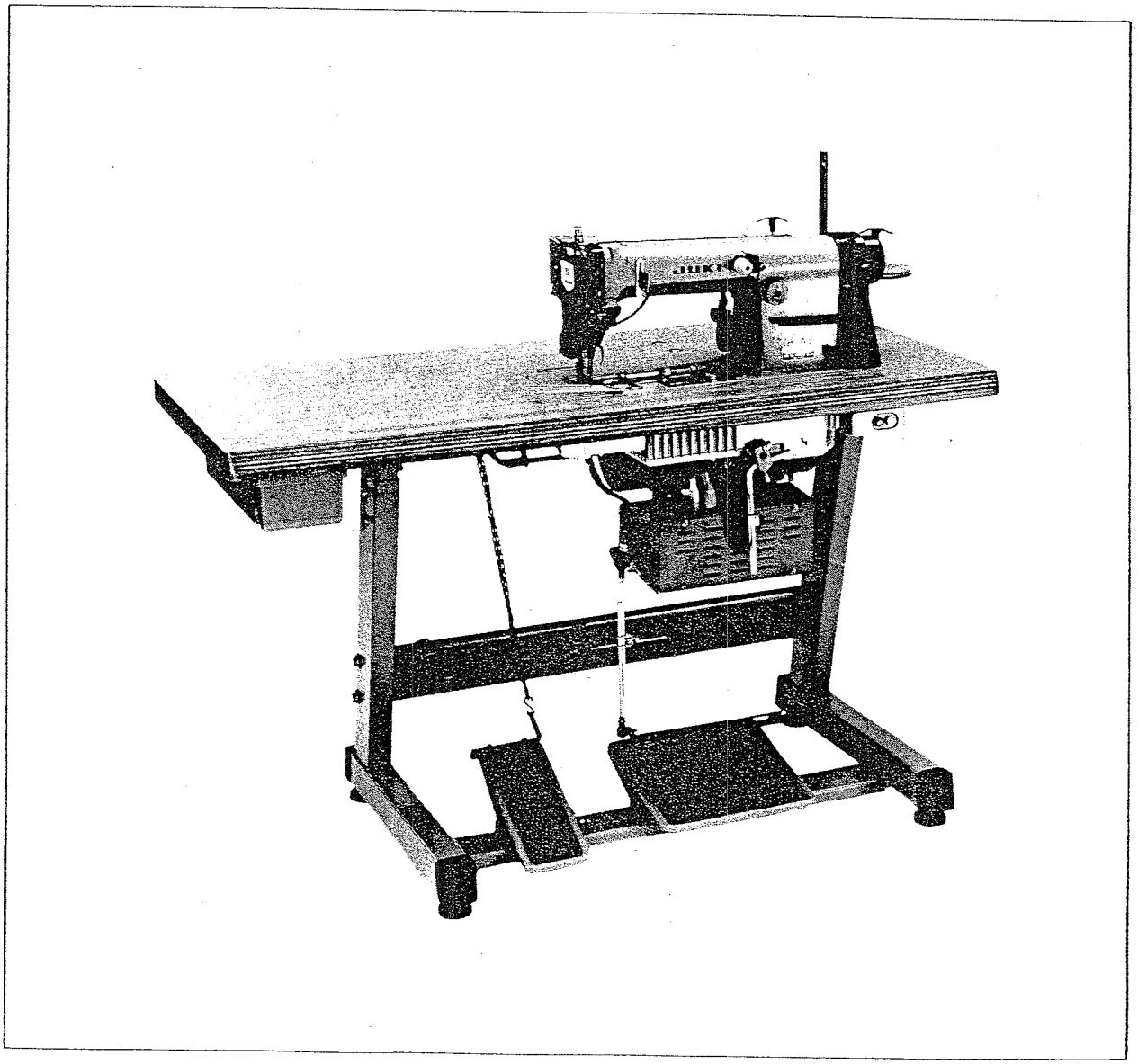
JUKI

1-Needle & 2-Needle, Flat Bed, Double Chainstitch
Industrial Sewing Machine

MH-SERIES

MH-380
MH-382
MH-481
MH-484
MH-481-4
MH-484-4
MH-481-5
MH-484-5

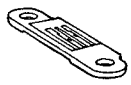
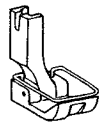
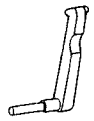
ENGINEER'S MANUAL



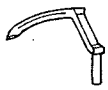
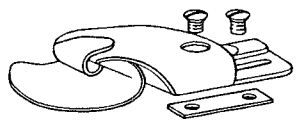
CONTENTS

TABLE OF EXCHANGING GAUGE SETS

MH-380

Description / Gauge components	Throat plate	Needle clamp asm.	Presser foot asm. (with finger guard)	Feed dog	Rear moving needle guard	Right fix needle guard	Left needle guard
							
3.2mm (1/8")	B1103-380-B00	B1406-019-BA0	B1509-038-BB0	B1613-380-B00	B2311-380-B00	B2315-380-000	B2312-380-000
4.0mm (5/32")	B1103-380-C00	B1406-019-CA0	B1509-038-CB0				
4.8mm (3/16")	B1103-380-D00	B1406-019-DA0	B1509-038-DB0	B1613-380-D00			
5.6mm (7/32")	B1103-380-E00	B1406-019-EA0	B1509-038-EB0	B1613-380-F00	B2311-380-E00		
6.4mm (1/4")	B1103-380-F00	B1406-019-FA0	B1509-038-FB0				
7.9mm (5/16")	B1103-380-H00	B1406-038-HA0	B1509-038-HB0	B1613-380-H00	B2311-380-H00		
9.5mm (3/8")	B1103-380-K00	B1406-038-KA0	B1509-038-KB0	B1613-380-K00			
12.7mm (1/2")	B1103-380-L00	B1406-038-LA0	B1509-038-LBB	B1613-380-L00	B2311-380-L00		
MH-382							
—	B1103-382-000	B1406-038-BA0	B1524-382-0B0	B1613-382-000	B2311-382-000	B2312-382-000	

MH-380

Description / Gauge components	Right looper	Left looper	Bed slide asm.	Bed slide asm.	Folder		
					M	MH	H
							
3.2mm (1/8")	B2030-380-000	B2031-380-000	B1104-380-AA0	B1108-380-BA0	B9126-038-BAA	B9126-038-BAB	B9126-038-BAC
4.0mm (5/32")					B9126-038-CAA	B9126-038-CAB	B9126-038-CAC
4.8mm (3/16")					B9126-038-DAA	B9126-038-DAB	B9126-038-DAC
5.6mm (7/32")					B9126-038-EAA	B9126-038-EAB	B9126-038-EAC
6.4mm (1/4")					B9126-038-FAA	B9126-038-FAB	B9126-038-FAC
7.9mm (5/16")				B1108-380-HA0	B9126-038-HAA	B9126-038-HAB	B9126-038-HAC
9.5mm (3/8")					—	—	—
12.7mm (1/2")			B1104-380-LA0	B1108-380-LA0	—	—	—
MH-382							
—	B2030-380-000	B2031-380-000	B1104-380-A00	B1108-380-B00	—	—	—

1) Size code

3.2mm (1/8") = B
4.0mm (5/32") = C
4.8mm (3/16") = D
5.6mm (7/32") = E
6.4mm (1/4") = F
7.9mm (5/16") = H
9.5mm (3/8") = K
12.7mm (1/2") = L

2) Folder code

M (for light weight materials) = A
MH (for medium heavy weight materials) = B
H (for heavy weight materials) = C

III. MH-484

IV. MH-481-4, MH-484-4 MH-481-5, MH-484-5 (with automatic thread trimmer)

1. INTRODUCTION

JUKI MH Series, high speed, flat bed, Double Chainstitch Sewing Machine, consists of MH-480 with reverse feed, MH-380 without reverse feed and their subclasses as listed below with sliding type presser foot (e.g. MH-481C), under-trimmer (e.g. MH-481-4-4 and MH-481-5-4) or chain-off thread trimmer (e.g. MH-380/AT-8).

1-needle	MH-481, MH-481C, MH-481-4, MH-481-5
Parallel 2-needle	MH-380, MH-380/AT-8
Tandem 2-needle	MH-382, MH-382/AT-8
Differential feed	MH-484, MH-484/S060, MH-484/S061, MH-484-4, MH-484-4/S060, MH-484-4/S061, MH-484-5, MH-484-5/S060, MH-484-5/S061

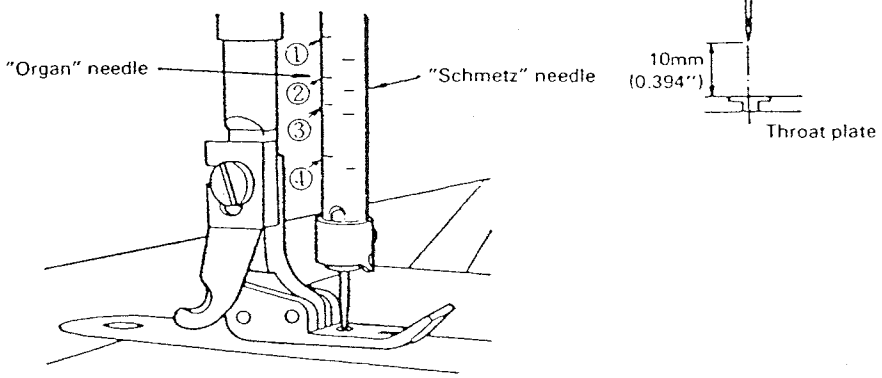
2. Specifications

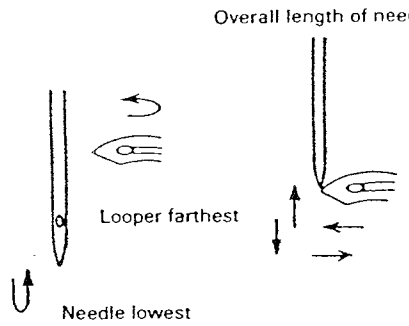
1	Model	MH-481	MH-484	MH-380	MH-382
2	Type	1-needle, double chainstitch with reverse feed	1-needle, differential feed, double chainstitch with reverse feed	Parallel 2-needle, double chainstitch	Tandem 2-needle, double chainstitch
3	Sewing speed	Max. 5,500 s.p.m.		Max. 6,000 s.p.m.	
4	Thread take-up	Needle bar thread take-up (stroke : 30mm (1.181"))			
5	Needle bar stroke	30mm (1.181")			
6	Needle	ORGAN TV x 7 #9 ~ #21 (SCHMETZ UY128 GAS #65 ~ #130)			
7	Needle gauge	–	–	1/8", 5/32", 3/16" 7/32", 1/4", 5/16" 3/8", 1/2"	0" wide x 3/16" long
8	Presser foot	Exclusive presser foot with chain-off thread presser	Sliding type presser foot	Presser foot for lamp seam feller	Exclusive presser foot with chain-off thread presser
9	Pressure of presser foot	4 ~ 7 kgs			
10	Presser foot lift	5mm (0.197") (by hand lifter), 8mm (0.315") (by knee lifter)			
11	Feed mechanism	Link-type box feed			
12	Stitch length	Max. 4mm (0.157")		1.4 to 4mm (0.055" to 0.157")	
13	Reverse stitch length (max.)	4mm (0.157") (including denser stitches)		Denser stitches only	
14	Ratio of differential feed (max.)	–	Stretching 1 : 0.4 Gathering 1 : 3	–	–
15	Looper driving mechanism	Inclined crank type			
16	Looper stroke	21.5mm (0.846")		22.6mm (0.890")	
17	Looper avoiding stroke	2.1 to 3.3mm (0.083" to 0.130")		2.4mm to 3.7mm (0.094" to 0.146")	
18	Needle guard stroke	3mm (0.118")			
19	Needle guard (rear)	Movable			
20	Needle guard (front)	–	–	Fixed	
21	Loop guide	Movable		–	–
22	Loop guide stroke	3mm (0.118")		–	–
23	Thread spreader driving mechanism	4-pivot link system		–	–
24	Thread spreader stroke	10 x 4.7 (elliptic motion)		–	–
25	Lubrication	Fully automatic by impeller pump			
26	Lubricating oil	New Defrix Oil No. 1			
27	Circulation system	Plunger pump			

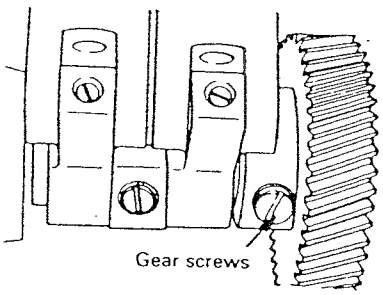
I. MH-481

1. Adjustment Standard

Adjustment Standard
(1) Height of the needle bar When the needle bar reaches its highest point, the clearance between the needle point and the stop surface of the throat plate is 10 mm (0.394").
(2) Timing of the looper with respect to the needle When the needle reaches its lowest point, the looper is back at the farthest point.

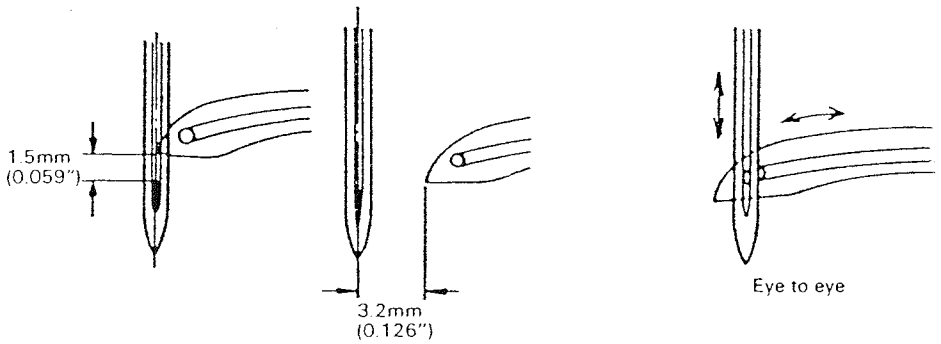




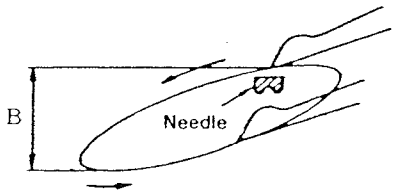
How to Adjust	Results of Improper Adjustment
* Align the 1st mark line (left line is for an "Organ" needle and right line is for a "Schmetz" needle as illustrated) to the bottom end of the needle bar lower bushing. ("Schmetz" needle is about 2mm (0.079") longer than "Organ" TV x 7 in its overall length).	* Frequent change of the height of the needle bar will vary the timing of feed eccentric cam, thread spreader, looper thread take-up component, height of the needle guard, looper stroke etc. So, it is advisable to avoid changing needle bar height as much as possible.
* Loosen the screw securing the looper gear (lower) to the looper crank driving shaft and adjust the looper position.  * It is advisable to prepare a needle of which overall length is 35.5 mm (1.398") and adjust the looper position so that the looper point meets the needle point on its both forward and backward strokes.	* If the timing of looper is earlier than that of the needle, uneven thread triangular loops may be formed and stitch shipping may occur. * If the timing of looper later than that of the needle, needle thread tension will be reduced.

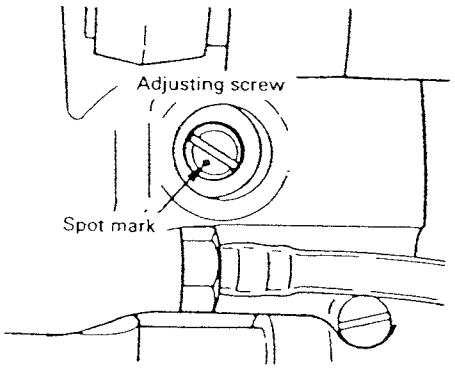
Adjustment Standard

(2) Position of the looper point to take up the needle thread
When taking up the needle thread:
1.5mm (0.059") from the top end of the needle eye
When returned:
3.2mm (0.126") from the center of the needle



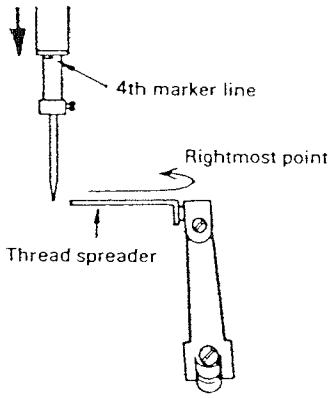
(3) Looper avoiding motion
B=2.1 to 3.3mm (0.083" to 0.130")



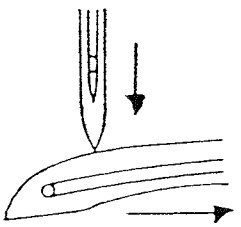
How to Adjust	Results of Improper Adjustment
* Bring up the needle bar until the 2nd mark line of the needle bar reaches the bottom end of the needle bar lower bushing and adjust the looper point to the needle center. * Align the looper eye with the needle eye as illustrated.	* When the looper point is lower; Stitch skipping may occur in the use of synthetic filament thread excepting the mixed threads. * When the looper point is higher; Stitch skipping may occur in the use of mixed thread.
* Loosen the 2 black screws of the looper crank (Do not loosen the 1st screw too much) and adjust the crank by turning the chromium plated looper crank adjusting screw. * The distance represented by "B" in the illustration will be increased by moving the spot mark to the right.  	* If the distance "B" is too small, the needle point may hit the top face or the rear face of the looper, causing scratches on the needle point or the looper.

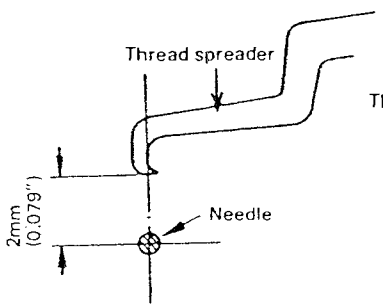
Adjustment Standard

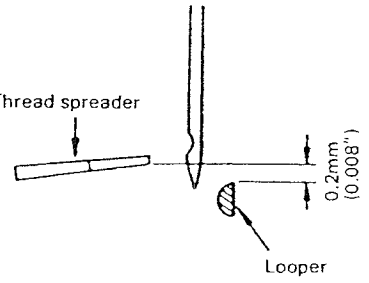
(4) Timing of the thread spreader with respect to the needle
The rightmost point of the swing of the thread spreader must be at an angle of 60° with the needle point (needle in its highest position) taken as 0°.

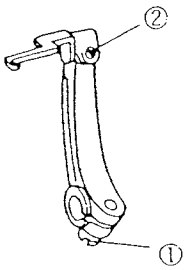


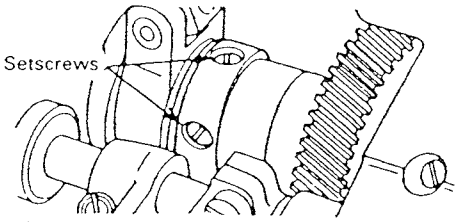
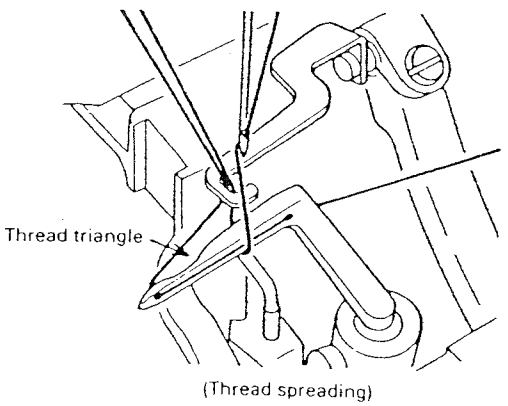
(5) Position of the thread spreader
Clearance between thread spreader and needle: 2mm (0.079")
Clearance between thread spreader and looper: 0.2mm (0.008")









How to Adjust	Results of Improper Adjustment
* Loosen the setscrews of the thread spreader eccentric cam and adjust so the thread spreader reaches its rightmost position at the moment the needle bar comes down to show its 4th marker line at the bottom end of the lower bushing of the needle bar.  	* If the angle is smaller than 60°, the thread spreader will often release the needle thread earlier than required, resulting in stitch skipping. * If the angle is greater than 60°, the thread spreader holds the thread too long, resulting in formation of loose needle thread stitches.
* Adjust the thread spreader driving arm so that the inside face of the thread spreader is aligned with the center of the needle when the pointed end of the needle comes down to the same level as that of the upper face of the looper. * Also adjust it so that the top end of the spreader is 2mm (0.079″) away from the needle center by means of screw ①. * In addition, adjust screw ② so that the thread spreader passes over the top face of the looper with a clearance of 0.2mm (0.008″) or less.  (Thread spreading)	* If the clearances are larger than 2mm (0.079″) and 0.2mm (0.008″), the thread spreader may fail to take up either the looper or needle thread, often resulting in stitch skipping. * If the clearance is smaller than 2 mm (0.079″), the thread spreader may take up 3 threads, resulting in loose stitches or needle thread stitch skipping especially during reverse stitching. * If the thread spreader is deflected from the center of the needle to the left, uneven triangular loops of the thread may result with consequent stitch skipping. * If the thread spreader is deflected excessively to the right by 1 mm (0.039″) or more, a fine needle thread may be broken or loose stitches may be formed due to late release of the thread.

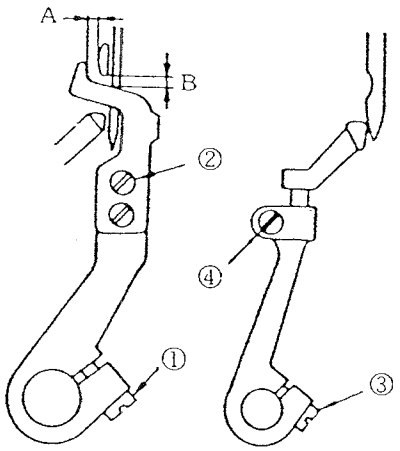
Adjustment Standard

(6) Positioning the needle guard and the loop guide

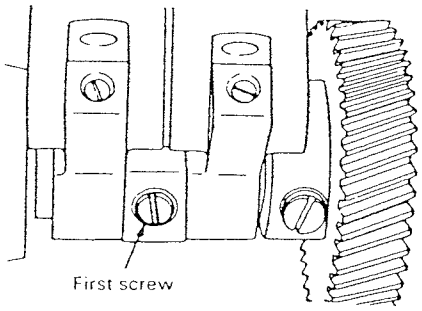
* Position of the loop guide

A = 0.2 ~ 0.5 mm (0.008" ~ 0.020")

B = 0.5 ~ 1.0 mm (0.020" ~ 0.039")

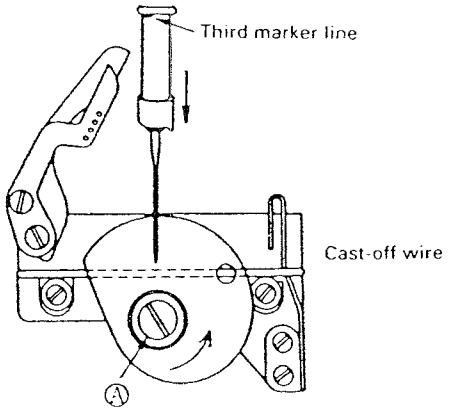


* Position of the needle guard: As high as possible as long as it does not deform the needle thread loop.

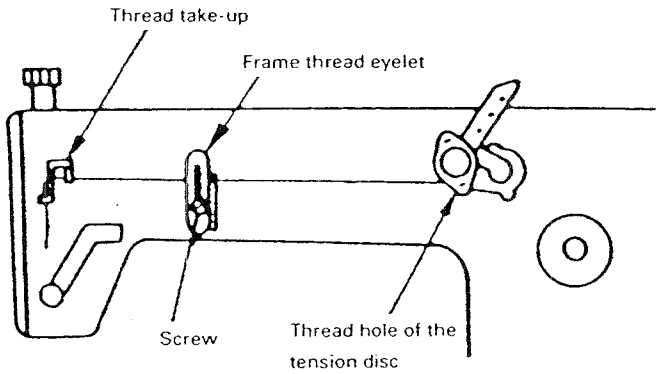
How to Adjust	Results of Improper Adjustment
* Adjust the timing of the needle guard cam with respect to the needle by setting the first screw to the flat of the shaft.  	* If interspaces A and B are too large, the loop guide will not work effectively and may cause stitch skipping especially in reverse stitching. * If interspace A is too small, it may be harmless as long as the loop guide does not come in contact with the looper. If the loop guide is allowed to strike the looper, it will cause scratches on the looper.
* Turn screw ① and screws ② to adjust interspaces A and B, respectively.	* If interspace B is too small, it may be harmless when thin threads are used. But the loop guide may be hook the thread when thick thread are used.
* The height of the needle guard is restricted by the bottom of the loop guide. Turn screw ④ to adjust so the needle guard is set as high as possible but to such an extent that it neither touches the loop guide nor deforms the needle thread loop. Then, make additional adjustment of the needle guard by turning screw ③ so it properly guides the needle when the looper takes up a thread loop from the needle.	* If the needle guard is set to excessively press the needle, it may cause the needle point to wear out or cause the needle point to strike the needle guard, leading to needle breakage when the handwheel is turned in the reverse direction for adjustment.

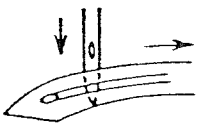
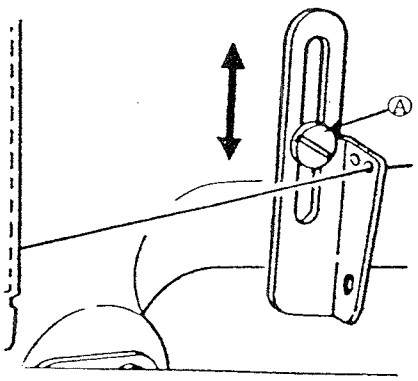
Adjustment Standard

(7) Timing of the looper thread take-up
When the looper thread take-up has turned 110° from the start point at which the needle bar is in the highest position, the cast-off wire must be seen through the adjustment hole in the looper thread take-up.



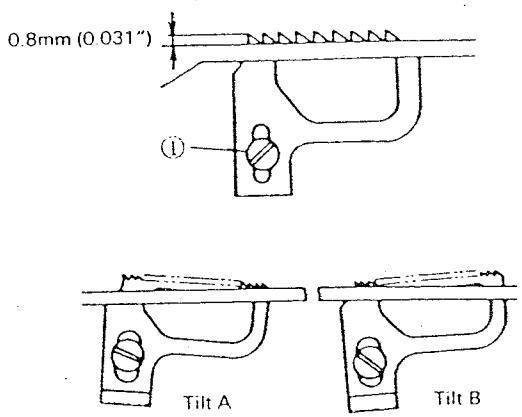
(8) Positioning the frame thread eyelet
When the needle bar is in its highest position of its stroke, the thread hole of the tension disc, frame thread eyelet, and the hole of the thread take-up lever must be horizontally aligned with each other.



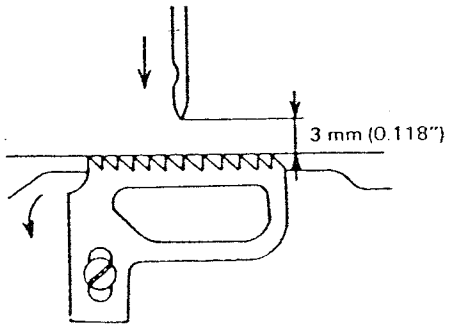
How to Adjust	Results of Improper Adjustment
* Turn setscrew Ⓐ of the looper thread take-up to adjust so the cast-off wire appears in the middle of the adjustment hole when the third marker line on the needle bar is coming out of the bottom end of the needle bar lower bushing (equivalent to 110° turn). * After making the above adjustment, confirm that the looper thread take-up keeps on holding the looper thread until the needle point comes down to the bottom surface of the looper and passes entirely through a triangular thread loop. 	* If the timing is set earlier than specified, the looper thread may be released before the needle point completely enters the triangular thread loop and stitch skipping may result. * If the timing is very late, uneven stitch tightness or looper thread stitch skipping may result. * It is recommendable to set the timing of the looper thread take-up comparatively earlier than the standard adjustment in order to obtain moderate looper thread tension which leads to formation of good stitches.
* Move up or down screw Ⓐ to adjust so 2/3 of the necessary length of the needle thread is drawn out through the tension disc while the needle bar is going up and the remaining 1/3 is drawn out while the needle bar is coming down. 	* If screw Ⓐ is set too high, the needle thread tension is increased when the needle bar reaches its lowest position. * If screw Ⓐ is set too low, the needle thread tension is increased when the needle bar reaches its highest position.

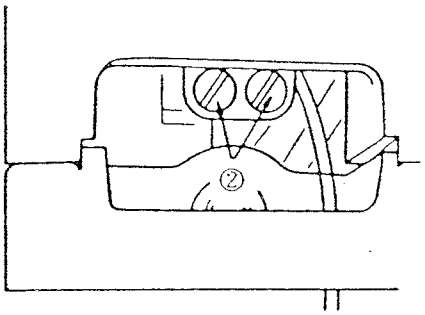
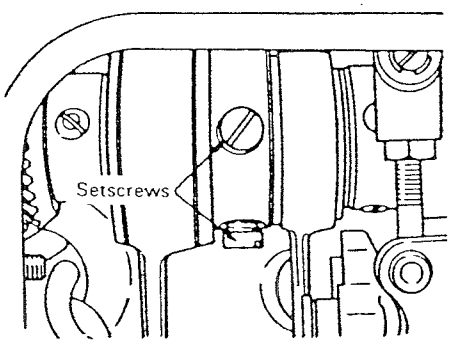
Adjustment Standard

(9) Height and tilt of the feed dog
The feed dog must be 0.8mm (0.031") above and in parallel to the throat surface.



(10) Feed timing
When the needle point is 3 mm (0.118") above the throat plate surface, the top of the feed dog must be flush with the throat plate surface.

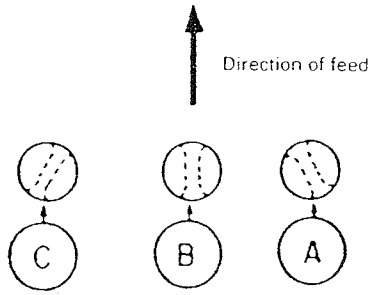


How to Adjust	Results of Improper Adjustment
* Turn screw ① to adjust the height of the feed dog. * Turn screw ② to adjust the tilt (A or B) of the feed dog.  	* If the feed dog is too high, the needle stays in the throat plate long and may be broken or bent. * If the feed dog is too low, the feed mechanism may fail to feed the material in a regular pitch. * The tilt "A" will effectively prevent puckering by pulling the material. * The tilt "B" will prevent uneven material feed of some kinds of cloths.
* Loosen the two setscrews of the feed eccentric cam to adjust the feed timing. After adjustment, tighten the two setscrews.  (Precaution) To detach the side plate, first remove the looper thread tension release latch, and be sure to parallel the side plate to the face as much as possible when removing it. * By so doing, the tension release bearing can be protected from deformation which leads to oil leakage.	* A late lowering timing of the feed dog may allow the needle to come down farther and to stay in the throat plate longer. As a result, the needle may bend or break when sewing heavy-weight material or sewing reverse stitches.

2. Other important remarks

(1) How to set the needle

Do not set the needle in direction "C" as illustrated, or uneven stitches may be formed in the reverse feed. However, it is advisable to set the needle with such a slight inclination as "A" when using filament threads and "C" for cotton threads to prevent the stitches from skipping.



(2) How to select a suitable throat plate

Normally it is necessary for the throat plate of double chainstitch to have a slit, which is about 1.5 times longer than the feed pitch, behind the needle entry point.

The following two different throat plates are supplied with MH-481 as standard equipment with which you can obtain a proper stitch tension up to the feed pitch (stitch length) of 4 mm (0.157").

The throat plate for light weight materials may not be suitable to provide a proper stitch tension at a maximum feed pitch but is useful to prevent puckering when it is used in combination with a thin needle.

	Needle hole width x slit length
B1103-481-F00 (supplied as standard item) (For medium and heavy weight materials)	1.6 x 7 mm (0.063" x 0.276")
B1103-481-B00 (For light weight materials)	1.0 x 5 mm (0.039" x 0.197")

(3) Types of feed dogs and suitable throat plates

Select a suitable feed dog for each type of material to be sewn.

	Tooth pitch x Angle
B1613-481-F00 (supplied as standard item) (For medium and heavy weight materials)	1.6 (0.063") x 45°
B1613-481-A00 (For light weight materials)	1.15 (0.045") x 45°
B1613-481-D00 (Coarse teeth)	1.6 (0.063") x 45°
B1613-481-G00 (Special type)	1.6 (0.063") x 30°

The following table shows combinations of the throat plates and the feed dogs.

Throat plate	Feed dog
B1103-481-F00	B1613-481-F00 B1613-481-G00
B1103-481-B00	B1613-481-A00 B1613-481-D00 *(B1613-481-F00) *(B1613-481-G00)

(Note)*( ): Length of these 2 feed dogs does not properly correspond to the length of the throat plate slits, but there is no problem in using them together.

(4) Presser foot

Any presser foot which is prepared for lockstitch machine can be attached to MH-481.

But, if it is necessary to produce a well-formed chain-off thread at a high speed operation, we recommend you to use an exclusive presser foot with chain-off thread presser for MH-481.

Sliding type presser foot is also available, which is useful to prevent uneven material feed. Refer to the paragraphs mentioned later for installation details.

(5) Frictional heat of the needle and silicon oil lubricant unit

When sewing synthetic materials at high speed, the needle often gets very hot due to friction, and may soften and finally bend.

Such frictional heat generated on the needle may cause the following troubles:

Stitch skipping : Needle thread loops are deformed by heat or stick on the heated needle.

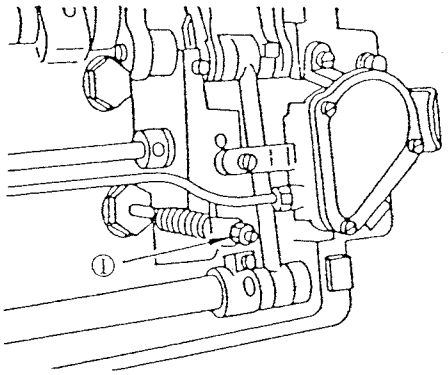
Thread breakage : Thread is melted by the heated needle.

Texture breakage: Synthetic material is melted by the heated needle.

In order to prevent such troubles, use the silicon oil lubricant unit. (Refer to the pertinent Instruction Book.) Another preventive way is to replace the needle with a super needle for synthetic materials, a needle with a relief stem or a thinner needle. If they do not solve the problem, lower the sewing speed down to an optimum rate depending on the ply and kind of cloth, thickness and type of thread, size of needle, etc.

(6) Counter pressure of the reverse feed control lever

The counter pressure of the reverse feed control lever is adjusted to be strong enough to put the lever back to its original position without fail under any sewing conditions at a high speed operation. If you want to reduce the counter pressure for sewing with a smaller feed pitch or at a lower speed, loosen slightly adjusting nut ① as illustrated.



(7) Relation between the thread take-up tension plate and the take-up thread tension disc

① Function of the thread take-up tension plate

The thread take-up tension plate, which moves with the needle bar, prevents the needle thread from forming unnecessary loop in the opposite side of the looper when the needle bar goes up to its highest position to form the needle thread loop to be hooked by the looper. By so doing, there is not possibility that the thread loop grows up excessively by drawing in such unnecessary loop through the needle eye (A large loop is undesirable to form uniform stitch). Therefore, the tension plate must apply the lowest tension to the thread only for surpassing the resistance produced between the thread and the cloth.

② Function of the take-up thread tension disc

The take-up thread tension disc functions especially for preventing the stitches from skipping during reverse stitching and production of chain-off threads.

It is very important to pull in the slack of the needle thread especially when the feed direction is reversed. If a slackened needle thread remains on the cloth, it may be cut by the returning needle or it may form an idle loop which results in stitch skipping. Another function of the take-up thread tension disc is to take in the slack of the needle thread while the needle goes down in order to prevent the chain-off threads from skipping.

The needle thread is entirely free from the resistance of the cloth when the chain-off threads are formed. Therefore, when the needle point comes down to pass through a triangular loop formed on the back of the looper, the triangular loop will be deformed or broken to skip a stitch if the interlooping needle thread is slackened.

③ The relation between the thread take-up tension plate ① and the take-up thread tension disc ②

To let these two thread tension components properly function, it is necessary to maintain the tension of ① higher than that of ②. The standard ratio is 3 g : 1 g (drawing force required for the cotton thread. No. 60).

(8) Sliding type presser foot

The sliding type presser foot is quite useful to prevent the material from slipping (or uneven material feed)

i) Motion of the sliding type presser foot

The illustrations show the operation sequence of the sliding type presser foot.

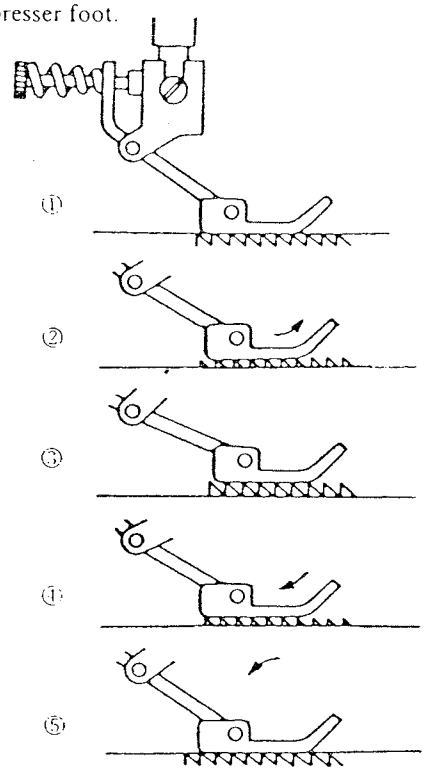
① The feed dog goes up to the top surface of the throat plate.

② The feed dog moves in the feed direction as it continues to go up. It pushes up the presser foot. But the presser foot moves in the reverse feed direction as it goes up, because it is supported by a pivot.

③ The feed dog and the presser foot reach the highest position.

④ The feed dog moves further in the feed direction as it comes down. Also the presser foot comes down as it moves in the feed direction contrary to ②.

⑤ The feed dog comes down below the throat plate surface, and the presser foot returns to its original position shown in ①.

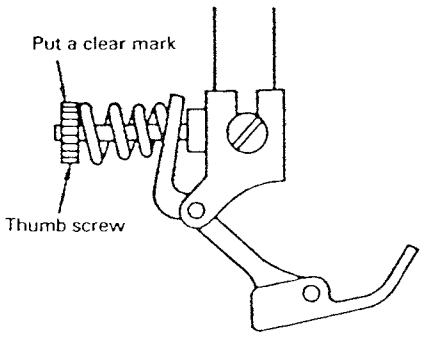


ii) Adjustment of the sliding type presser foot

Secure the presser bar firmly by tightening the presser spring regulator not to allow it to move up and down during operation. If the presser bar vertically moves, the sliding type presser foot will not perform its "sliding" motion as shown in the above illustrations but will function similar to an ordinary presser foot. The pressing force given to the material by the presser foot is adjustable with the thumb screw located on the sliding type presser foot. It should be noted that the pressure of the presser bar must be adjusted in proportion to that of the presser foot as specified in the following table.

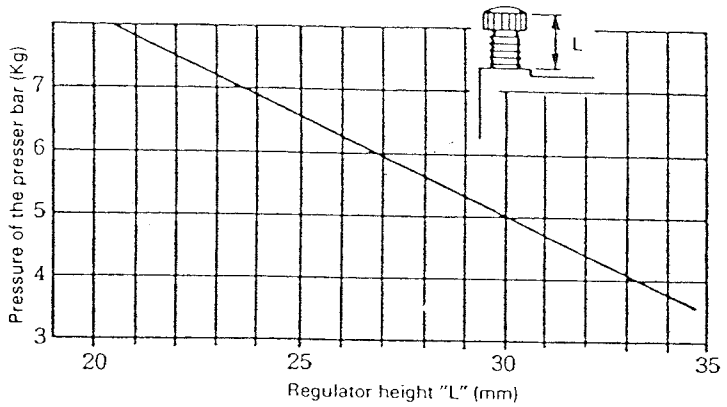
Raise the presser foot by the hand lifter and release the tension from the presser foot as illustrated.

Turn the adjust thumb screw until the tension spring starts to apply pressure to the foot and put a clear mark on the adjusting screw to show its starting point ("0" point). The number of turns of the adjust thumb screw indicated in the table below should be counted up from the starting point ("0" point) obtained as above.



The pressing force applied by the presser bar can be obtained from the graph provided that the height "L" of the presser spring regulator is measured from the top face of the machine arm as illustrated.

Number of turns (adjust screw)	Required pressure of the presser bar	Height of regulator (L)
2 turns	4 Kgs	33.2 mm (1.307")
3 turns	5 Kgs	30.0 mm (1.181")
4 turns	6 Kgs	26.8 mm (1.055")
5 turns	7 Kgs	23.5 mm (0.925")



Determine the number of turns of the thumb screw according to the type of material sewn.

In general, a higher number of turns is effective for prevention of packering, whereas it is rather ineffective for prevention of uneven material feed.
A lower number of turns is effective for prevention of uneven material feed, whereas it is rather ineffective for puckering.
If the pressing force of the presser bar is not enough, it will be indicated by noise originated from the mating faces of the presser bar guide bracket and the presser bar lower bushing. Correct it by tightening the presser bar regulator until such noise is gone and lock the regulator by the nut.

iii) How to replace a regular presser foot with a sliding type presser foot

① Detach each component from the presser bar and remove the presser bar lower bushing. Set the height of the needle bar so that its bottom end is positioned 52.5mm (2.067") above the upper surface of the throat plate. (Standard height: 50mm (1.969"))

② Install the presser bar and presser bar guide bracket so that a gap of about 0.5mm (0.020") is left between the guide bracket and the lifting lever when the bracket is pressed against the top end of the presser bar lower bushing. If the gap is not enough, push up the lower bushing as needed.

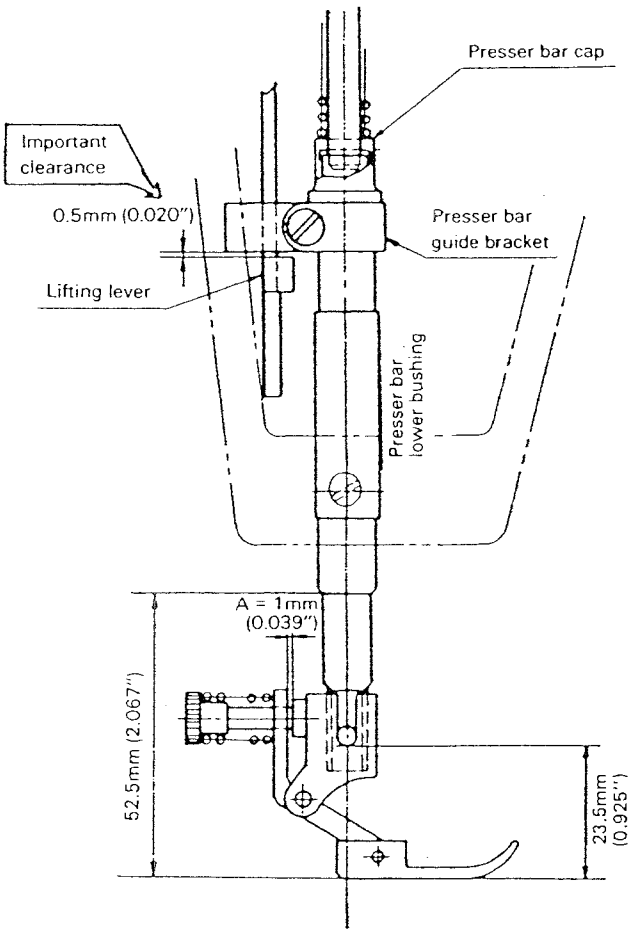
③ Put the presser bar cap over the top end of the presser bar and set the presser spring and presser spring regulator in their position.

④ Adjust the height of the presser bar so that a clearance of about 1mm (0.039") is made at the place "A" when the feed dog has been lowered and fix the presser bar guide bracket by its clamp screw.

By the above procedure, the regular presser foot is replaced by the sliding type presser foot. When re-installing the regular presser foot, you do not need to adjust the lower bushing.

Sliding type presser foot (asm.)

Part No. B1524-481-CB0



(9) Formation of "Balloon" stitch

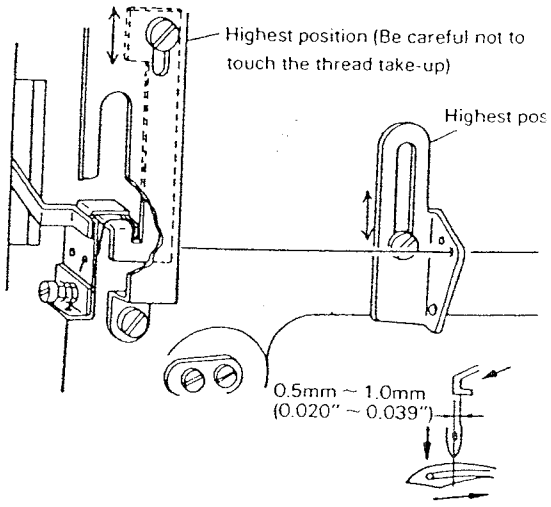
"Balloon" stitch, which is formed by a tightened needle thread and loosened looper thread, is sometimes advantageous when sewing flexible or expandable materials because of its soft and flexible characteristics which can minimize occurrence of puckering.

You can expect the effect of "Balloon" stitch by slightly adjusting MH-481 in the following way; Adjust the machine so as to draw in the most part of the slack of the needle thread when the needle reaches its lowest point.

As illustrated, raise the thread take-up lever and also the frame thread eyelet to their highest positions so that the needle thread is extremely drawn when the needle bar reaches its lowest position. Also, increase the needle thread tension to a certain degree.

Therefore, this method can not be applied to those threads which are of very thin diameter or very poor physical strength.

For reducing the looper thread tension, change the timing of the looper thread take-up to a little ealier than the standard setting.



Establish an optimum thread tension between the needle and looper threads in combination of these 2 adjustments. Your special attention should be paid here again to paragraph (7) for the relative tension between the thread take-up tension plate and the take-up thread tension disc. Readjust the tension ratio of 3g: 1g for MH-481 to 6g: 3g for MH-481-4 after the above-mentioned adjustment has been completed. In addition, the position of the thread spreader must be adjusted so that, in the case of MH-481-4, the inner face of the thread spreader is about 0.5mm to 1.0mm (0.020" to 0.039") away from the center of the needle when the needle point comes down just about the top face of the looper as illustrated. This is very important to form even triangular loops to prevent triangular stitch skipping and similar troubles.

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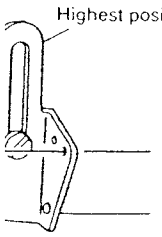
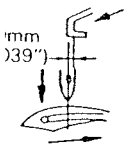
ıke-up)





: 2 adjustments.
· thread take-up
31 to 6g: 3g for
ı of the thread
ıbout 0.5mm to
ıt about the top
riangular stitch

(10) Reverse stitch skipping

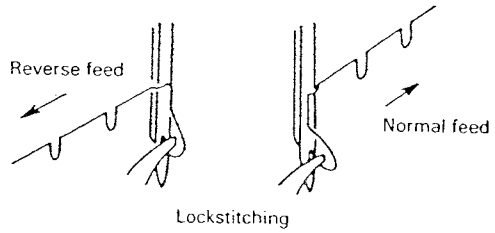
This is one of the most difficult adjustments for the double chainstitch machines.

In the case of lockstitch machine, due to its principle of stitch formation, the blade of the sewing hook is designed to swing in the longitudinal way in parallel with the feed direction and the thread is passed through the needle from left to right.

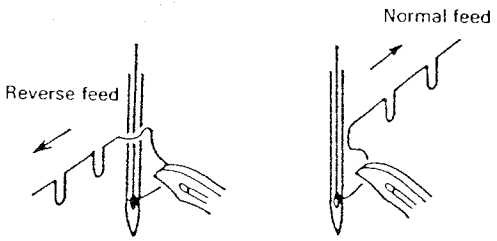
Accordingly, almost the same shape of thread loop is formed by the forward and reverse feeds.

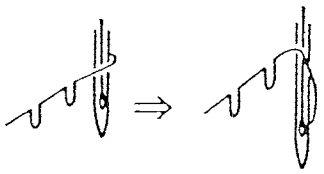
On the other hand, in double chainstitch machines, the looper moves across the direction of feed and the thread is passed through the needle from front to rear. Therefore, the thread loops may be twisted when the feed direction is reversed, while they are well shaped during the normal feed. The thread initially positioned in the opposite side of the needle turns round the needle to form a stitch and, therefore, the loop is formed in a laterally spiral shape. The direction of turn is an important factor as well as the direction of twist of the thread. Through our experiments, it can be said that the condition is improved by turning the thread counterclockwise with a delayed timing along a shorter trajectory.

Accordingly, it is necessary to set the needle by slightly turning in the counterclockwise direction as illustrated, to lower the frame thread eyelet so that the needle thread is released gently from the looper and not to allow the thread spreader to hold the needle thread so long as to give an excessive tension to the needle thread.

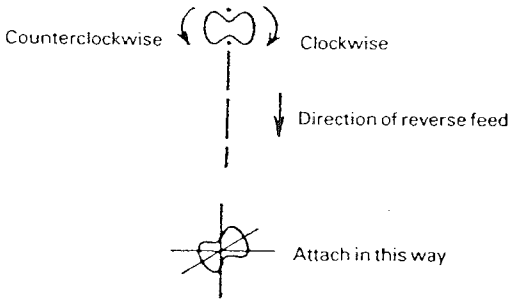


Lockstitching



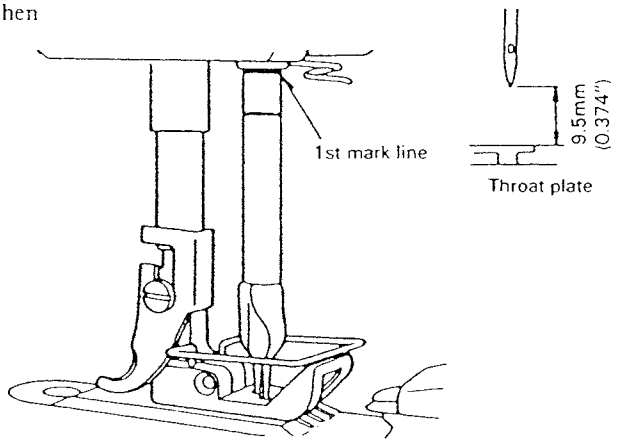
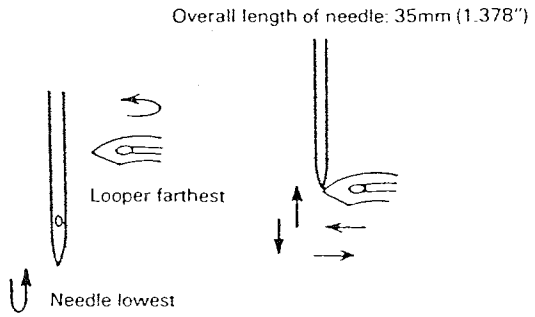
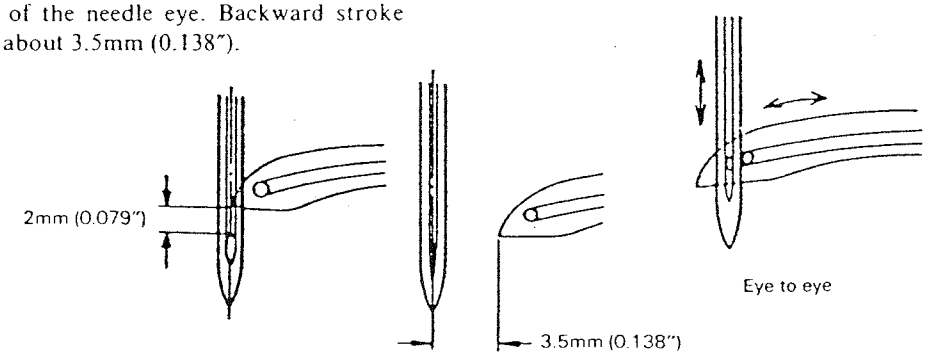


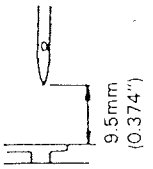
Thread turns round the needle as the needle comes down

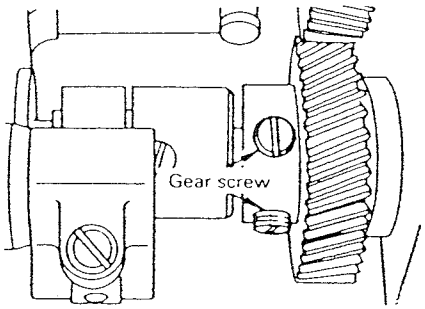


II. MH-380

1. Adjustment Standard

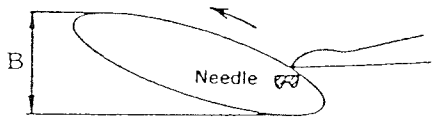
Adjustment Standard
(1) Height of the needle bar The distance between the needle point and the throat plate surface must be 9.5mm (0.374") when the needle bar reaches its highest position. 
(2) Timing of the looper with respect to the needle When the needle reaches its lowest point, the looper is back at the farthest point. 
(3) Motion of the loopers for taking up the threads from the needles Looper point must be 2mm (0.079") above the top end of the needle eye. Backward stroke must be about 3.5mm (0.138"). 



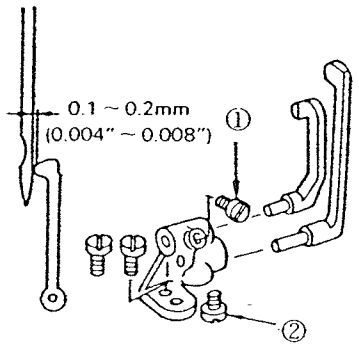
How to Adjust	Results of Improper Adjustment
* Adjust the height of the needle bar so that the 1st mark line is aligned with the bottom end of the needle bar lower bushing when the needle is at its lowest point. * The standard needle bar is designed for "ORGAN" needles (TV x 7 #14). Special needle bar (B1401-380-A00) for SCHMETZ needles (UY128GAS #90) is also available.	
* Loosen the setscrew securing the looper gear to the looper crank driving shaft and adjust the looper position.  * It is advisable to prepare a needle of which overall length is 35mm (1.378") and adjust the looper position so that the looper point meets the needle point on its both forward and backward strokes.	* If the timing of the looper is earlier than that of the needle, uneven thread triangular loop may be produced and stitches may be skipped on the rear of the material. * If the timing of the looper is later than that of the needle, loose stitches may result.
* Align the looper point with the center of the needle when the 2nd mark of the needle bar has gone up to align with the bottom end of the needle bar lower bushing. * Make sure that the looper eye intersects the needle eye when the looper swings forward and backward.	* If the looper point is lower than 2mm (0.079"), needle thread may be skipped when synthetic filament or even cotton thread is used. * If it is higher than 2mm (0.079"), the same trouble may occur when mixed or synthetic spun thread is used.

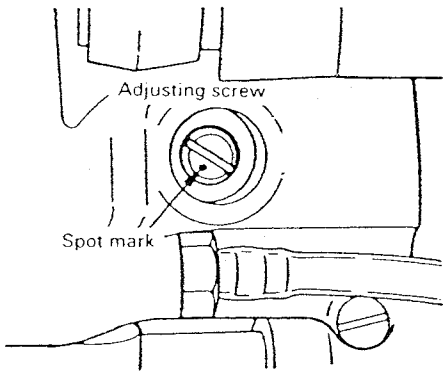
Adjustment Standard

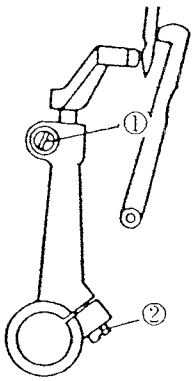
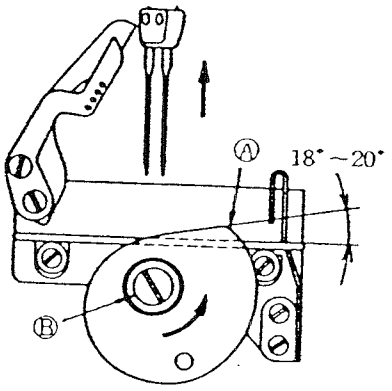
(4) Looper avoiding motion
B = 2.4 to 3.7mm (0.094″ to 0.146″)

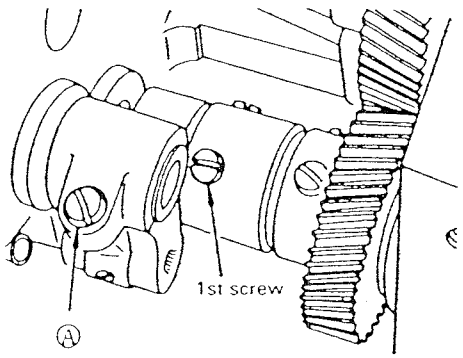


(5) Clearance between the needle and the stationary needle guard
0.1 to 0.2mm (0.004″ to 0.008″)



How to Adjust	Results of Improper Adjustment
* Refer to the same heading of model MH-481. Turn the spot mark on the looper crank adjusting screw fully to the right and move the crank forwards to maximize distance B.  	* If distance B is too small, the looper and the needle will contact with each other to scratch on their points and surfaces. It may also become a cause of triangular loop skipping. It is advisable to increase distance B to prevent stitches from skipping, because the needle thread loop is held by the looper with a higher tension.
* Adjust the stationary needle guard for the suitable position to each needle by means of screws ① and ② , respectively.	* If the clearance is too small, the mating surface of the needle or needle guard will be worn out or the needle may become heated due to friction. * If the clearance is too much, the needle guard will not work and the needle may be bent, which will also become a cause of stitch skipping.

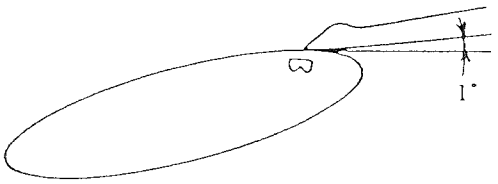
Adjustment Standard
(6) Position and timing of the rocking needle guard Set it as high as possible to the extent that it does not deform the needle thread loop. 
(7) Timing of the looper thread take-up Angle of the flat face of the looper thread take-up to the cast-off wire, when the needle bar is at its highest position: 18° to 20°. 

	How to Adjust	Results of Improper Adjustment
	* Timing of the rocking needle guard is obtained by setting the 1st screw of the needle guard cam to the flat part of its shaft. * Adjust its height and the angle correctly to both needles by loosening the screw ①.  * Adjust its position in relation to the needles by loosening screw ② and screw Ⓐ so as to lightly guide the needle point when the looper hooks the needle thread. * Ensure that the rear needle of model MH-382 is correctly guided.	* If the rocking needle guard is too high, it may damage the needle thread loop and may skip stitches especially when synthetic thread is used. * If it guides the needle with too much pressure, the needle may be held in between the rocking and stationary needle guards and their mating surfaces may be worn out.
r is at its highest	* The flat face of the looper thread take-up must form angle of 18° to 20° with the cast-off wire, when the rising needle reaches its highest position. Loosen screw ① and adjust the angle. * Be sure that, when the looper thread leaves point Ⓐ, the needle points are in triangular looper thread loops.	* If the timing is early: A little earlier timing will produce soft stitches with slightly loosened looper thread similar to so-called "balloon stitches." But, if it is too early, it releases the looper thread before the needle point has completely fallen down through the triangular loop and may cause skipped stitches. * If it is late, looper thread tension will be increased. Thus, uniform and stable tension will be given to the looper thread during both high and low speed operations.

2. Other important points

(1) Elliptic motion of the looper

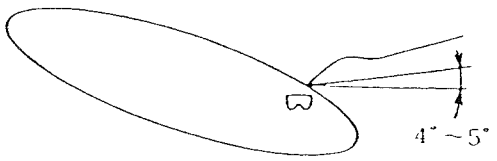
An elliptic motion shown by the looper is classified into either "right-side-up" or "left-side-up" motion and both of them have their own advantages in stitch formation. Inclined looper crank is incorporated into each model of the MH series and the eccentricity of its crank shaft determines the type of elliptic motion of the looper. Therefore, the direction of such motion cannot be changed.



MH-481 (right-side-up motion)

Fig. 1

*In the model MH-481, "right-side-up" motion is employed as shown in Fig. 1. Through this motion, the looper keeps a constant clearance from the surface of the needle until it has taken up the needle thread from the needle. Also a length of thread taken up by the thread spreader is adequately compensated.
In the models MH-380 and MH-382, on the other hand, "left-side-up" motion is employed as shown in Fig. 2 due to their designs without thread spreader and loop guide.

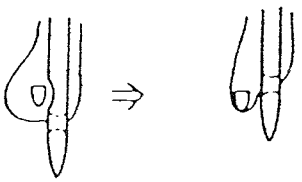


MH-380 & 382 (left-side-up motion)

Fig. 2

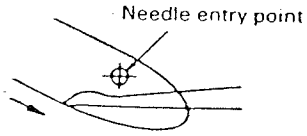
☆ The characteristics of "left-side-up" motion are as follows:

① As the looper parts from the needle and moves backwards after taking the thread from the needle, there is no possibility that the needle thread will be nipped or twisted in the bottom end of the needle eye by the bottom face of the looper. In addition, the needle thread taken by the looper is tightened at an earlier timing so as to prevent it from slipping off.



② A triangular loop formed behind the looper is kept stable till the needle comes down through it, because the needle thread is moved by the looper with a higher tension than that of the looper of "right-side-up" motion.

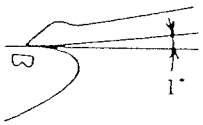
③ While the threading hole of the looper is passing by the front face of the needle after the needle has come down through a triangular loop, the looper is moving away from the needle. Therefore, there is no possibility that the looper thread is nipped or cut accidentally by the thread hole of the looper and the needle. In order to make use of the above-mentioned characteristics, the standard distance "B" of the looper avoiding motion (refer to the paragraph under (4) of How to Adjust) is determined to 3.7mm (0.146"), which is common to the use of a thicker needle than the standard side No. 14.



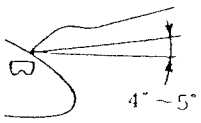
(2) Factors to untwist a thread and the shape of needle thread loop

Most of the sewing machine threads are made of 3 or more single filaments twisted together. Many factors in sewing machines conspire to untwist the threads while the machines are running, such as tensions applied by the thread tension discs, threading holes of the thread guides and their directions of feed, sharp angles and edges of thread paths, needle eye etc. However, in general, cotton, mixed, synthetic spun threads etc. which are made of short fibers are not easily untwisted, because those fibers entangle themselves with their own friction. Also monofilament or coated threads which are solid or bonded have no problem of untwisting.
On the other hand, filament threads like Tetron or Nylon threads are apt to get untwisted.
Needle thread loop is normally formed in a vertically spiral shape. Therefore, if the thread is untwisted, such a loop may be deformed to entangle with the needle and may cause stitch skipping or thread breakage.
The most important thing to prevent such a problem is to check and correct the direction of the thread which is drawn through the thread guide components with a certain tension by means of, for instance, reduction of thread tension, elimination of sharp kinks from the thread, minimizing edges thread paths etc.

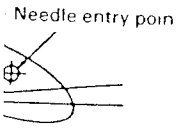
☆ Thus, the relative position between the frame thread eyelet and the take-up thread tension lever is also related to the occurrence of thread untwisting, because they determine the timing of change of the thread tension. Generally the more the frame thread eyelet and the take-up thread tension lever is raised, the easier it is to prevent thread from untwisting. This tendency should be carefully considered when using a filament thread.



it-side-up motion)



(left-side-up motion)



(3) Denser stitches

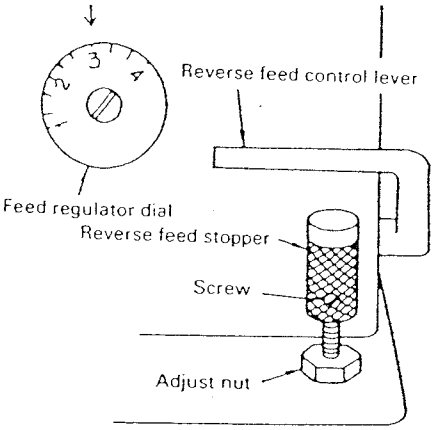
In MH-481, reverse stitches are formed by operating the reverse feed control lever. But, for some sorts of products, it is necessary to minimize gathering of much thread on the wrong side of the material.

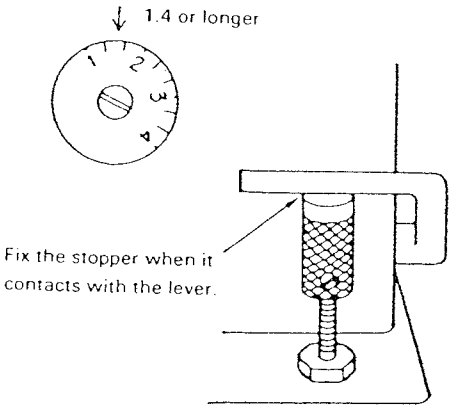
In these cases, you can easily and quickly produce the partial denser stitches for reinforcement or prevention of unstitching by making use of the reverse feed control lever and its stopper.

① Set the feed regulator dial to a desired stitch length for denser stitches. (In order to prevent the needle from being broken, do not set the stitch length to "1.4" or finer.)

② Raise the stopper until it comes in contact with the bottom face of the reverse control lever and secure it by tightening the screw.

③ Turn the feed regulator dial back to the normal stitch length. The machine is now ready for producing the denser stitches. Depress the reverse feed control lever when the denser stitches are required, for example, at the start or end of a seamline, part of seamline to be reinforced etc. The denser stitches are continuously formed as long as the lever is depressed.





:r. Many factors in
ensions applied by
, sharp angles and
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their own friction.
visting.

s untwisted, such a
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; etc.

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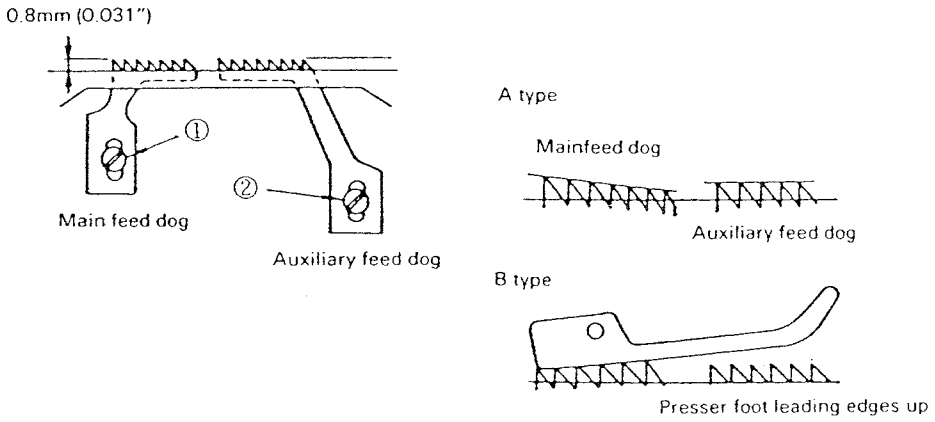
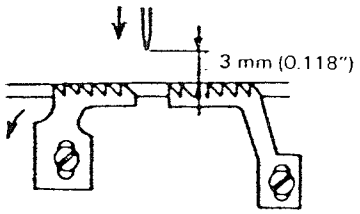
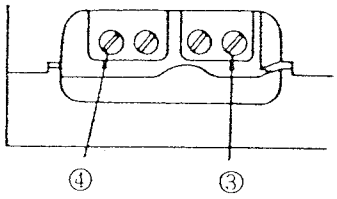
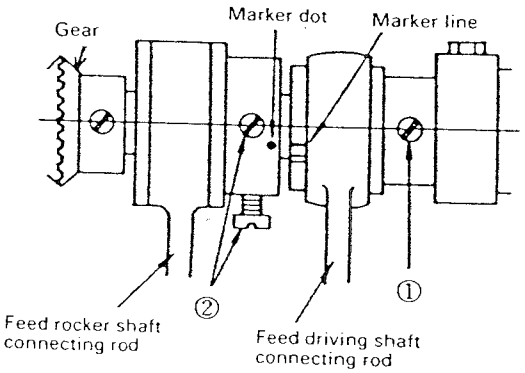
he thread tension.
l, the easier it is to
a filament thread.

III. MH-484

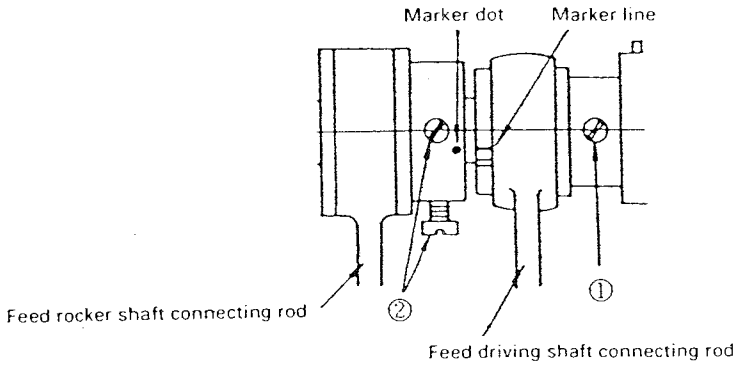
1. Adjustment Standard

Adjustment Standard
(1) Height and tilt of the feed dog 0.8mm (0.031") above and parallel with the top surface of the throat plate at its highest position. 
(2) Timing of the feed dog (vertical motion) Feed dog must completely come down below the level of throat plate when the descending needle reaches 3mm (0.118") above the throat plate surface. 

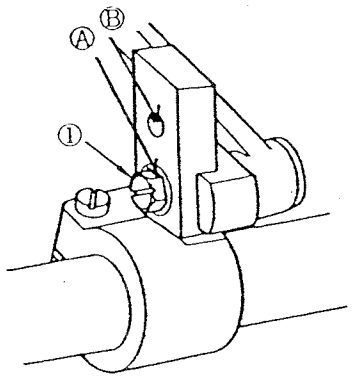
How to Adjust	Results of Improper Adjustment
* Adjust the main feed dog by loosening screws ① and ③. Screws ② and ④ are for the auxiliary feed dog.  	* Special attention should be paid to the tilt of the main feed dog when applying differential feed with a single presser foot. Adjust the main feed dog so that it stays in horizontal position or its top end slightly raises as shown by A type when it reaches the highest point. You can not expect the effect of differential feed with an arrangement like B type in which the auxiliary feed dog is idle. In stretching feed for preventing puckering, the material must be properly stretched and firmly pressed down by the foot, when the needle thread is tightened by the needle at the highest point.
* Tighten the 1st setscrew ① of the feed eccentric cam so that it rests on the flat face of the main shaft, and the timing of feed dog against that of the needle point is automatically determined correctly. * Make sure that the screw ① lines up with the 1st screw of the gear.  	* Do not change this setting. If the feed dog delays, it may bend or break the falling needle, or needle may be swept away by the material.

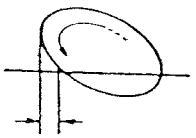
Adjustment Standard

(3) Timing of the feed dog (horizontal motion)
Phase difference between the feed rocker shaft connecting rod and the feed driving shaft connecting rod in the feed eccentric cam:
Stretching feed : 125°
Gathering feed:95°

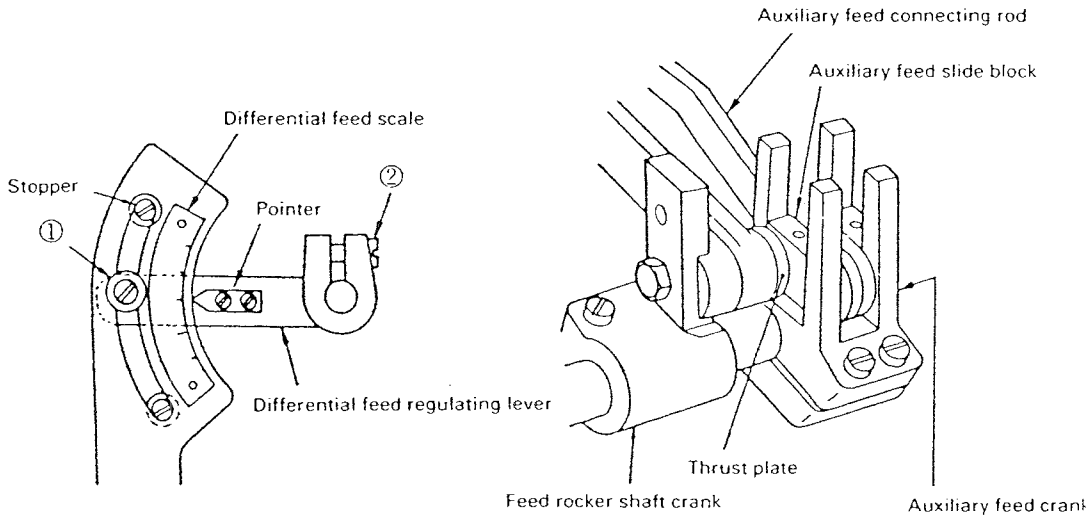


(4) Position of the feed rocker shaft crank
A = Stretching feed (max.) 1 : 0.4
B = Gathering feed (max.) 1 : 3



	How to Adjust	Results of Improper Adjustment
shaft connecting	* There are single and double marker lines on the cover of the feed driving eccentric cam. * Set them to the dot mark on the feed rocker cam, and their correct phase difference is obtained. Single line is for stretching feed. Double line is for gathering feed.	* If the double line deflects to the single line side, gathering effect will be reduced. * If the timing of the feed rocker cam is not standard, the trajectory of the feed dog is changed accordingly. For preventing the material from slipping, it is advisable to provide a slight degree of "return" as illustrated.  Return
	* Take out the hexagon head screw ① and adjust the position. * Move the crank toward Ⓐ for stretching. Move the crank toward Ⓑ for gathering.	* If the gathering amount is set to the maximum (B side), the actual feed pitch will be 2mm (0.079") at the most even when the dial is set to 4mm (0.157"). Then the differential feed is 1 : 3.

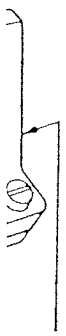
(5) Position of the differential feed regulating lever
When the lever points at "1" on the differential feed scale, the actual feed performed by the main and auxiliary feed dogs must be at a ratio of 1 : 1.



ied by the main and

d connecting rod

y feed slide block



Auxiliary feed crank

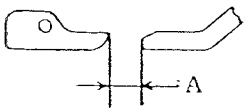
How to Adjust	Results of Improper Adjustment
* Adjust the position of the differential feed regulating lever, if it does not achieve the identical feed with its calibrated scale. * Loosen the screw ② , turn the lever up and tighten the thumb screw ① . Then, push down the slide block of the auxiliary feed dog to the extent that it does not touch the bottom face of the feed crank and tighten the screw ② . * Loosen the screw ① , move the slide block up and down until the upper circumference of the thrust plate coincides with the top surface of the slide palte and tighten the screw ①. Set the pointer of the lever to "1", and the differential ratio will be about "1".	* If the natural position (ratio 1 : 1) is not correct, the maximum ratio of either side may be deviated. If the difference is too great, it may hit other parts.

Adjustment Standard

(6) Feed dog and presser foot for gathering feed

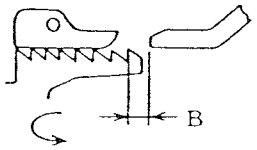
a) Clearance between the rear and front feet:

A = 0.5 to 1.5mm (0.020″ to 0.059″)

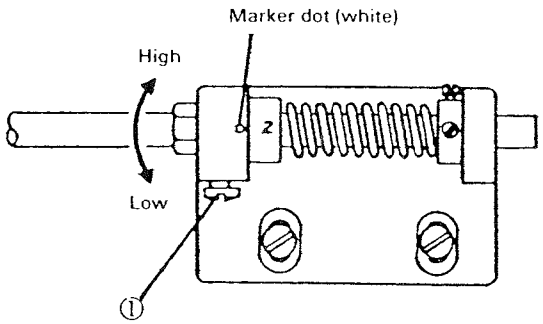


b) Position of the main and auxiliary feed dogs:
Set them as close as possible, but do not contact them with each other.

B = 0.5mm (0.020″) or greater



c) Pressure of the front presser foot



d) Horizontal position of the front presser foot.

How to Adjust	Results of Improper Adjustment
* Adjust it by means of the adjusting hole on the front presser foot holder.	* With a small clearance : Fine gathering. With a large clearance : Coarse gathering. If the clearance is too great, no gathering will be made.
* Leave a clearance "B" by moving the main feed dog after loosening the screw of the feed crank and adjust the position of the auxiliary feed dog.	* The smaller clearance is left between these 2 feed dogs, the better gathering is made. But, if the clearance "A" is too small, no gathering may be made.
* Loosen setscrew ① , and turn the hexagonal nut to adjust the pressure of the front presser foot:	* Scale 1: About 1.5 kg at the edge of front presser foot. Scale 2: About 3 kg at the edge of front presser foot.
* Apply a suitable shim between the front presser foot and its holder to keep it horizontally.	* It may fail to feed the material straight.

2. Other important points

(1) Stretching

Model MH-484 is basically designed for stretching and is equipped with a sliding presser foot which ensures straight feed of the materials and prevention of puckering or slipping. Especially, when sewing such materials as to cause puckering or slipping during stitching, it is quite effective to eliminate the said trouble by setting a ratio of differential feed at 1 : 0.85 to 1 : 0.7 (1/2 scale to 1 scale). Set the differential feed regulating lever to an adequate position on the scale and tighten the screw to clamp the lever.

Special throat plate (B1103-484-B00) for light weight materials is also available.

(2) Gathering

Subclass model MH-484/S060 is specially designed for gathering. The differential feed ratio for gathering is normally 1 : 1.6(*) but it can be changed up to a maximum of 1 : 3(*) by changing the position of the feed rocker shaft crank to the B side (refer to 1-(4)). But, in this case, the actual feed pitch is reduced down to about 2mm (0.079") even though the feed regulator dial is set for the maximum of 4mm (0.157").

In order to apply intermittent gathering by means of the pedal system, we recommend you to use the subclass model MH-484/S061. You can apply partial gathering any part at your will very easily. For making gathered stitches on a single material, use a special presser foot (B1524-484-0B0).

(Note) (*): The figures marked on the differential feed scale are just a rough indication. The actual differential feed varies according to the feed pitch. The figures represents the differential feed ratios achieved by a main feed pitch of 1.8mm (0.071").

(3) Convertibility of gathering into/from stretching

It is possible for the models MH-484 and MH-484/S060 to convert the function of gathering feed or stretching feed in to the other by changing corresponding attachments and making some adjustments.

1) Converting the stretching feed into the gathering feed: Replace the corresponding attachments of MH-484 with the gathering attachment S060.

Remove the side plate from the machine head and set the dot mark on the feed rocker cam to the double-line mark on the outer face of the feed driving cam.

Attachments to be removed from MH-484	
B1524-481-CC0	Sliding type presser foot asm.
B1613-484-000	Main feed dog
B1653-484-000	Auxiliary feed dog
B1111-481-000	Attachment-installation-base

2) Converting gathering into stretching

Remove the gathering attachment S060 from the machine and reverse the procedure mentioned in the above 1). Do not forget to change the timing of feed cams.

IV. MH-481-4, MH-484-4
MH-481-5, MH-484-5 (with automatic thread trimmer)

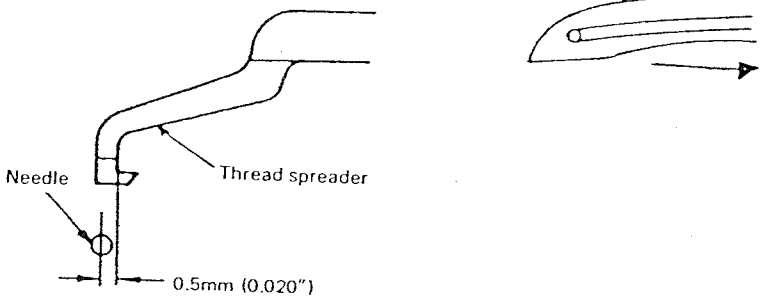
1. Adjustment Standard

Adjustment Standard

(1) Position of the thread spreader

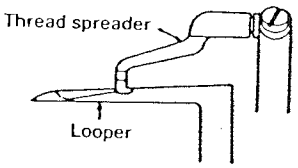
a) Lateral positioning

0.5mm (0.020") from the center of the needle

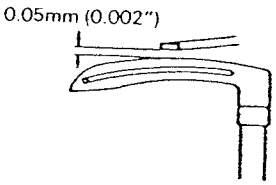


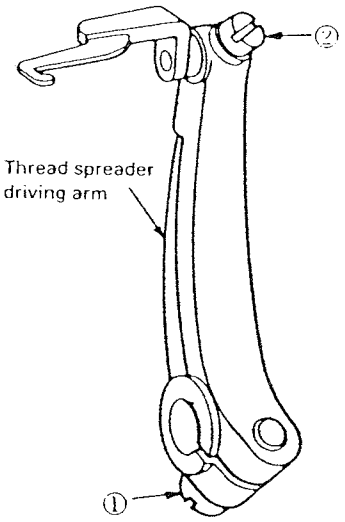
b) Longitudinal positioning

When the needle bar is at the highest point, the inside face of spreader hook must align with the back line of the looper.



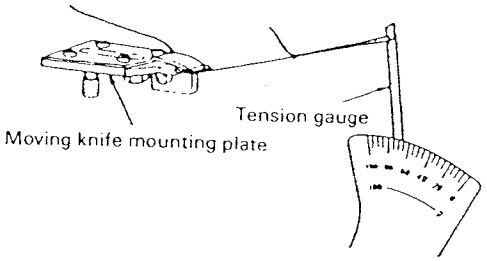
c) Vertical positioning



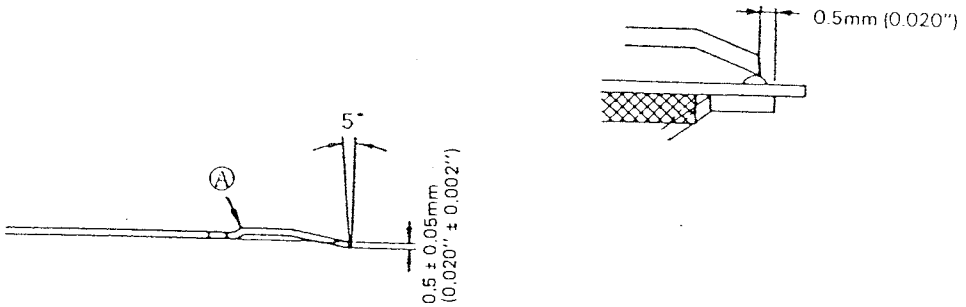
How to Adjust	Results of Improper Adjustment
a) Adjust the thread spreader by loosening the screw ① so that the inside face of its hooked end has a distance of 0.5mm (0.020″) from the center of the needle when the pointed end of the descending needle reaches the same level of the upper face of the looper.  	* If the distance is less than 0.5mm (0.020″), triangular needle thread may be skipped. * If it is more than 0.5mm (0.020″); • Thread breakage may occur when using a thin thread. • Needle thread stitches may be skipped during reverse stitching.
b) Align a white dot on the hand wheel to a white dot on the machine arm and adjust the thread spreader by means of the screw ①.	* If the spreader hook deflects outwards from the back line of the looper, stitches may be skipped at the start of sewing after thread trimming.  * If it deflects inwards, the spreader may take up 3 threads at a time. Accordingly, loose stitches may be left after trimming and faulty stitches may be formed at a start of sewing.
c) Make a clearance of about 0.05mm (0.002″) between the upper surface of the looper and the bottom face of the thread spreader by means of the screw ②. Make it as small as possible but do not contact them with each other.	* If the clearance is greater than 0.05mm (0.002″); • Thread spreader may fail to take the looper thread at the start resulting in skipped stitches. • The looper thread may not be trimmed off when cutting a chain-off thread.

Adjustment Standard

(2) Thread clamp pressure applied by the moving knife mounting plate
70 to 100 grs (with a cotton thread No. 60)

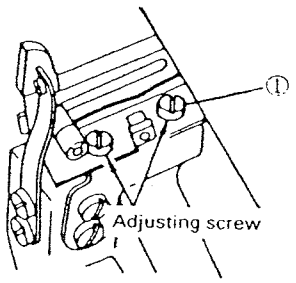


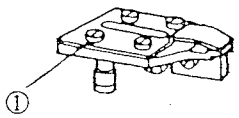
(3) Dimensions and position of the counter knife



(4) Position of the moving knife

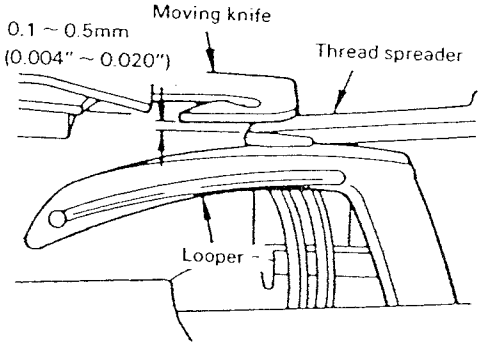
* Lateral positioning
Set it at the left end of the slit.



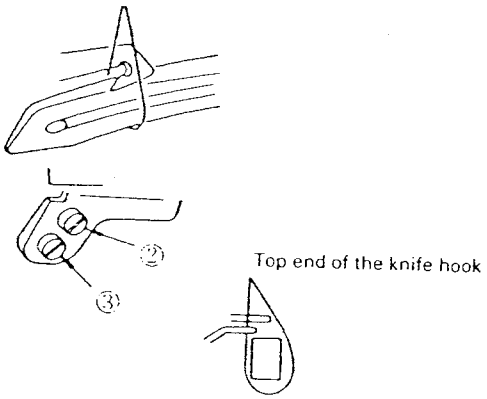
How to Adjust	Results of Improper Adjustment
* Correct the pressure by means of the thread clamping spring adjusting screw. Proceed it with care so as to apply the pressure evenly all over the mating surface. If the unit is faulty, renew it.	* If it is less than 70g, looper thread may escape from the clamp. * If it is greater than 100g, looper thread is not released smoothly by the clamp and a light weight material may be curled up at a start of stitching, or thread may break at a knot, leaving fibrous waste in the clamp.
* When re-sharpening the counter knife, correct its shape as illustrated by bending it at point Ⓐ. * Installing position must be recessed by 0.5mm (0.020″) from the top end of the clamp spring. Fix it by screws Ⓘ.  	* If the recess is less than 0.5mm (0.020″), thread may not be trimmed sharply. * If the recess is larger than 0.5mm (0.020″), the thread trimmer may fail to work smoothly. • If the recess is less than 0.5mm (0.020″) or the counter knife protrudes from the clamp spring, looper thread may not be clamped.
* A length of threads left on the material after trimming is determined by this position. By setting it at the leftmost position, a minimum length of thread with which the end of seam line does not ravelling is left on the material.	* It is possible to increase the length of thread to be remained by 1.5mm (0.059″) by moving the position of the moving knife up to a maximum of 1.5mm (0.059″) to the right for preventing a longer stitch from ravelling. But, if the position is changed, adjust the position of the stopper plate (1mm (0.039″)) as mentioned in the following paragraph (5).

Adjustment Standard

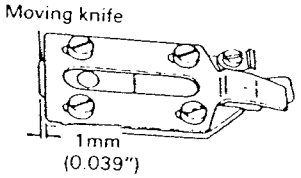
* Vertical positioning
Clearance between the bottom face of the top end of the moving knife and the upper surface of the thread spreader must be 0.1 to 0.5mm (0.004″ to 0.020″).

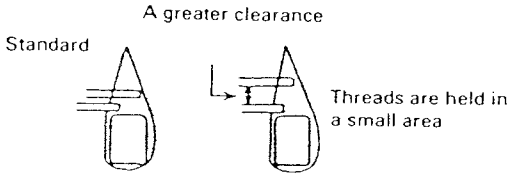
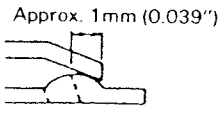


* Longitudinal position
With the maximum feed pitch, the top end of the knife must pass by the near side of the needle thread on the looper as close as possible but not to touch or hook the thread.

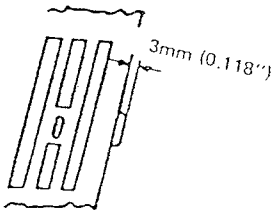


(5) Stroke of the moving knife

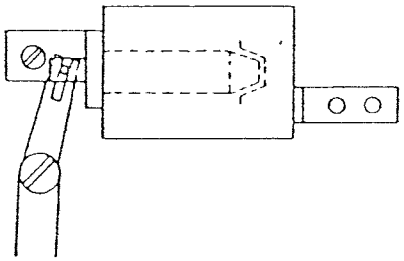


How to Adjust	Results of Improper Adjustment
* Move the knife forwards and adjust its position by means of screw ① so that the clearance between the bottom face of the top end of the knife and the upper face of the thread spreader is 0.1 to 0.5mm (0.004″ to 0.020″). * Adjust the position of the knife by moving it around the round hole of screw ② .	* If the clearance is too small, they may hit others and make scratches on their thread paths. * If it is too great, they hold the thread within a small area and may fail to trim, as illustrated.  * If it passes too close, it may hook 3 threads to cut and may leave insufficient length of thread on the needle resulting in thread escape at a start of stitching. * If it is too far, it may fail to hook a deformed loop and it may fail to trim the needle or looper thread.
* Loosen the screw of the moving knife driving fork and adjust the moving knife so that its rear end is 1mm (0.039″) ahead of the rear end of the moving knife base when it has returned to the rear position. At this position, it must contact with the rear stopper.	* If it is less than 1mm (0.039″), the overlapping width of knife blades will be smaller than 1mm (0.039″) and thick thread may not be trimmed. 

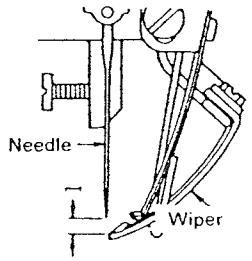
Adjustment Standard



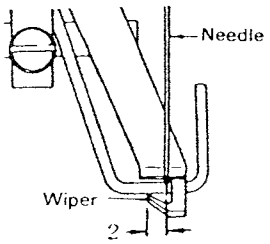
Throat plate

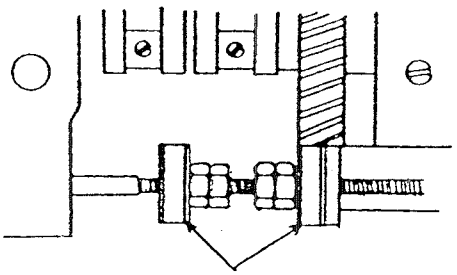
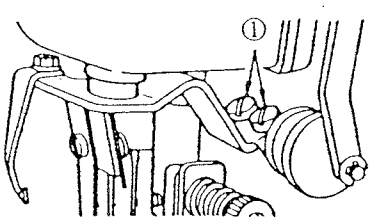


(6) Position of the wiper in relation to the needle
Vertical distance: 1mm (0.039")



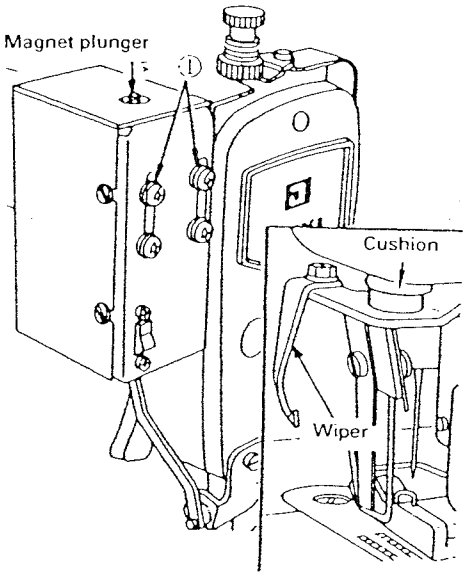
Longitudinal distance: 2mm (0.079")

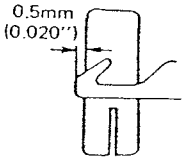


How to Adjust	Results of Improper Adjustment
* For the most advanced position of the moving knife, adjust it by turning the stopper nuts so that the top end of the knife blade protrudes by 3mm (0.118″) from the right end of the throat plate.  Stopper nuts * If the plunger of the magnet hits its bottom end before the knife is limited by the stopper, loosen the 3 setscrews of the magnet and adjust its position.	* If it is more than 1mm (0.039″), a greater motion is shown by the knife after trimming and stretchable or thin thread may be pulled out of the looper thread clamp. * If the knife blade protrusion is less than 3mm (0.118″), the knife hook may fail to hook and trim the thread.
* Position the wiper point 1mm (0.039″) below the needle point and its hooked end 2mm (0.079″) away from the center of the needle as illustrated by means of 2 setscrews ① of the wiper arm.  	* If it is greater than 1mm (0.039″), the wiper point will hit the material if it is thick, and may break. * If it is less than 2mm (0.079″), the wiper may fail to work.

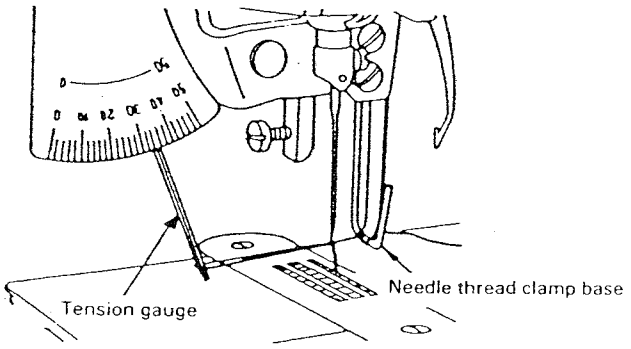
Adjustment Standard

(7) The most advanced position of the wiper 0.5mm (0.020") from the left end of the presser foot.





(8) Clamp pressure applied by the needle thread clamp 30 to 40 grs (with a cotton thread No. 60)



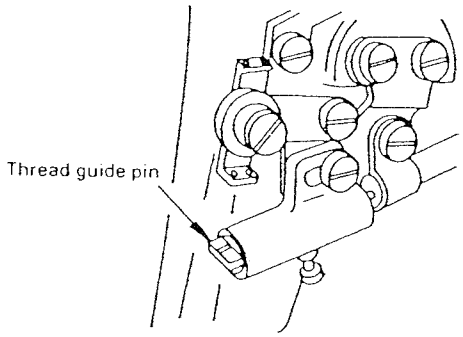
How to Adjust	Results of Improper Adjustment
* Set the position of the wiper by screws ① so that the top end of it protrudes from the left end of the presser foot by about 0.5mm (0.020″) when the magnet plunger is pushed up to the highest. After setting the position as above, make sure that the cushion attached to the wiper arm contacts with the bottom face of the arm when the wiper comes back to its rear position. If not, adjust it by changing the stroke of the solenoid plunger. * Magnet stroke: Set to 8.5mm (0.335″)	* If it is less than 0.5mm (0.020″), the wiper may fail to work. If it is far greater than 0.5mm (0.020″), the wiper may hit the needle thread clamp spring and become inoperative.
* Adjust the wire part for a proper tension by checking the actual tension using a gauge as illustrated. Make sure that the pressure is applied evenly by the clamp.	* You do not need to adjust every time after the thread is replaced. However, if the pressure is too high, a longer thread will be left on the material after trimming, if it is too low, thread will not be clamped.

Adjustment Standard

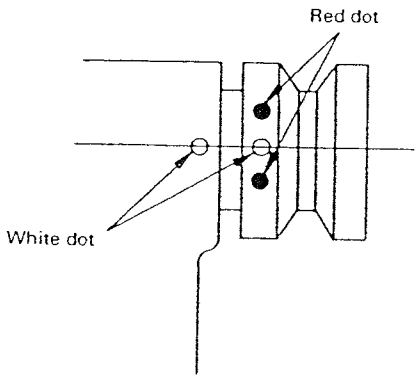
(9) Adjusting the needle thread draw-out solenoid component

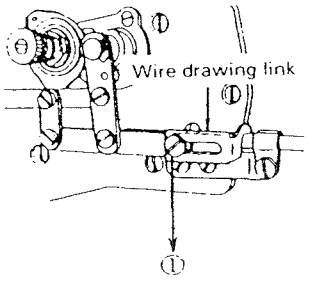
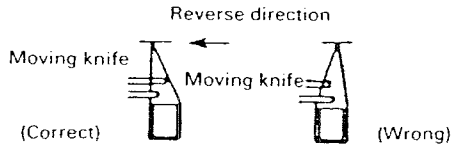
① When the needle thread clamp is in operation:
Draw-out length = 0mm

② When the needle thread clamp is not operated:
Draw-out length = 0 to 10mm (0 to 0.394")



(10) Stop angle at the time of thread trimming 360° ± 8°

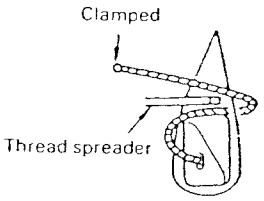


How to Adjust	Results of Improper Adjustment
* Loosen screw ① of the wire drawing link and adjust the stroke of the thread guide pin.  	* Adjustment is not necessary when the needle thread clamp is in operation. * When the needle thread clamp is not operated; The draw-out length of thread must be adjusted depending on the type of threads, because such stretchable threads as Tetron and Nylon threads usually shrink after being trimmed off and such shortened threads may become a cause of stitch skipping thread escape from the needle at the start of stitching. Normally, 42 to 43mm (about 1.692") of thread must be left on the needle after trimming.
* 360° is shown by the coincidence of the white dot on the pulley with the white dot on the machine arm. 8° is represented by the red dots on both sides of the white dot of the pulley.	* If it is less than -8°(352°), the trimmer knife may fail to hook and trim the thread. * If it is more than +8°, the looper is kept far away from the thread spreader and a faulty stitch may be formed at the start of the following stitching. Also the looper thread may escape from the looper. 

2. Other important points

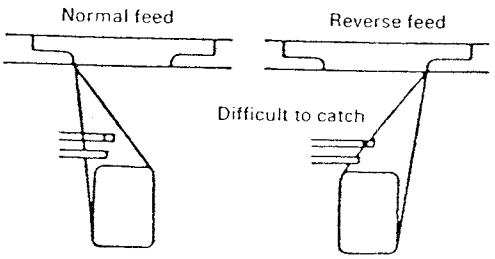
(1) Function of the looper thread guide

The sewing machine equipped with an automatic thread trimmer is apparently characterized by the stationary thread guide which is located under the looper thread tension disc. The thread guide does not allow the looper thread to be pulled out excessively by the moving knife when trimming. If the looper thread is drawn out too much by a thread trimming action, it closely sticks on the upper face of the looper as illustrated and may not be hooked up by the thread spreader. In such a case, proper stitches will not be formed at the start of sewing. Therefore, the looper thread guide provides the thread with a light friction (3g. when cotton thread #60 is drawn) to prevent said trouble. It is also necessary to keep sharpness of the pointed end of the thread spreader and an exact clearance of 0.05mm (0.002″) from the upper face of the looper.



(2) Thread trimming after reverse sewing

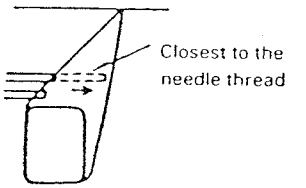
In principle, the thread trimming is not possible after a reverse sewing (with the reverse feed control lever depressed), because the reverse stitch is formed in the opposite side to that of the normal feed, and the thread is beyond the reach of the moving knife hook. Therefore, trim the thread after sewing even a stitch with the normal feed. However, the thread can be trimmed in the following cases;



① If the thread trimmer is always operated with a reverse sewing;

In the standard adjustment of the longitudinal positioning of the moving knife, it must be positioned to pass by the near side of the needle thread on the looper as close as possible but not to touch or hook the thread with a maximum feed pitch of "4" (normal feed). But, in this case, change the knife position to the closest to the location of the needle thread to be actually trimmed with a reverse feed.

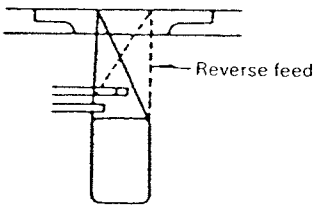
By this adjustment, you can cut the thread after a reverse sewing but take care that after this adjustment 3 threads will be trimmed in the normal feed.



② If all sewing works are made with a stitch length less than 2mm (0.079″) both in the normal and reverse feeds;

Change the position of the moving knife in the longitudinal direction to the closest to the near side needle thread. At the same time, minimize the vertical clearance within the range of 0.1 to 0.5mm (0.004″ to 0.020″) also make its angle of stop position closer to +8°.

* The position of the moving knife can be changed within a necessary range for a specific purpose but can not cover a whole range with a maximum feed pitch.



(3) Thread trimming after denser stitches

The feed pitch must be set at 1.6 or more when the chain-off thread is trimmed off.

Needless to say, it is possible to operate the thread trimmer after denser stitches were worked by using the reverse feed control lever and its stopper.

But, in this case, your special care should be paid to the following points. If the chain-off thread made by denser stitches with a feed pitch of 1.6 or smaller is to be cut off, it may be brought down below the throat plate and is cut off all together resulting in looper thread escape.

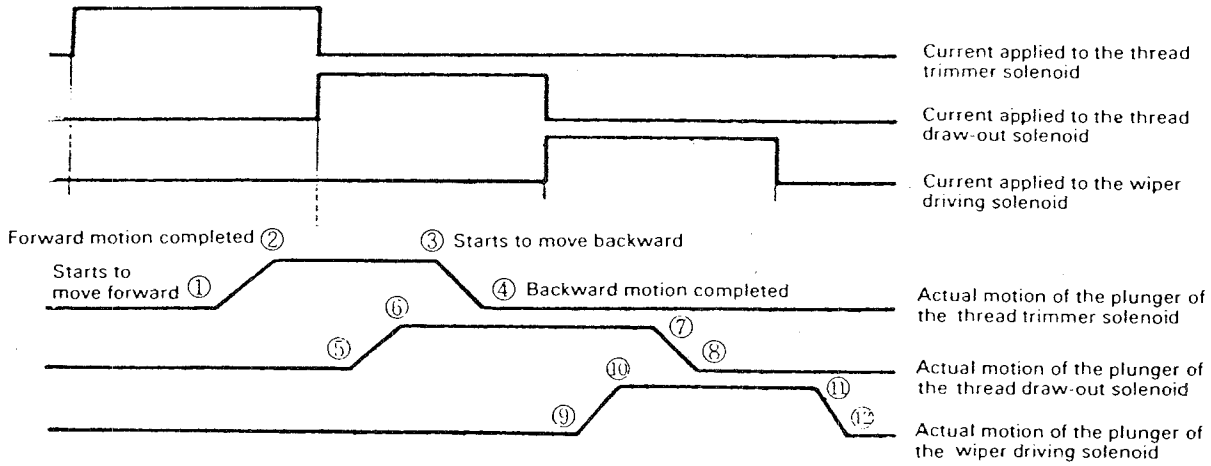
Therefore, set the feed pitch for denser stitches at 1.6 or more when cutting the chain-off thread outside of the material.

(4) Needle thread clamp

Do not form more than 2 idle stitches before starting to seam. When a seamline has to be started from the very end of a material, apply some reverse stitches if it is allowed. However, if it is not preferable to form reverse stitches, you will have to set the material to the first needling spot exactly by your hand, but you may fail to set it sometimes and may produce some idle stitches.

Should it happen, the needle thread clamp will work to hold the needle thread so as not to allow it to slip out of the needle eye. However, we recommend you not to form 3 or more such idle stitches, because such idle loops will be gathered on the bottom face of the throat plate, entangle with the looper blade and pull out the looper thread from its clamp.

(5) Timing of each solenoid



The above timing chart shows the relation between the current signal applied to each solenoid and the actual motion of each plunger. These solenoids drive the linked components in the following sequence;

i) When the moving knife has reached its front end, the thread tension disc must be closed.
(② is earlier than ⑤)
(Reason) If the hooked end of the moving knife clears the thread away on its forward motion, the thread will come back to the original position as long as it is tightened by the tension disc. Thus, failure in thread trimming will be prevented.

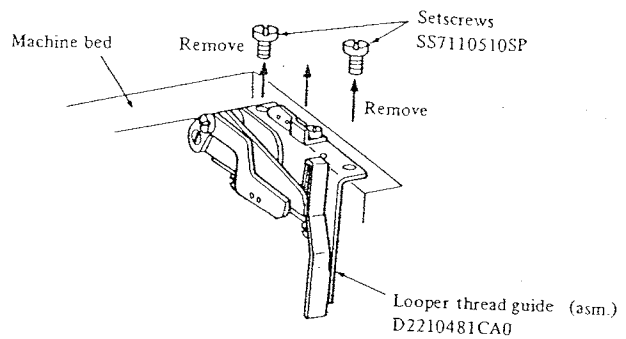
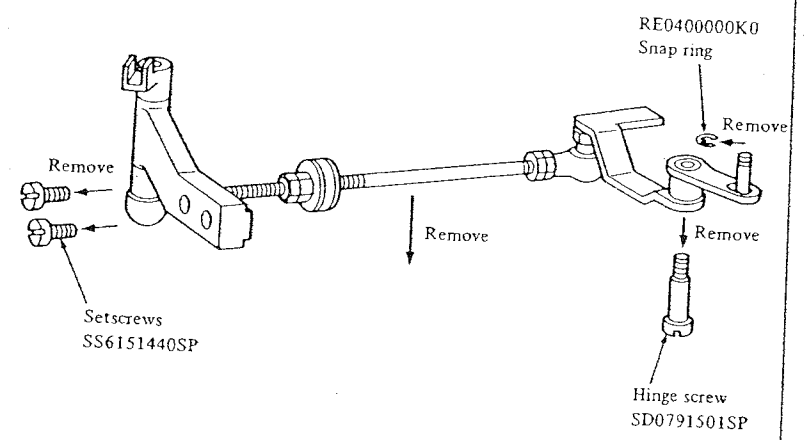
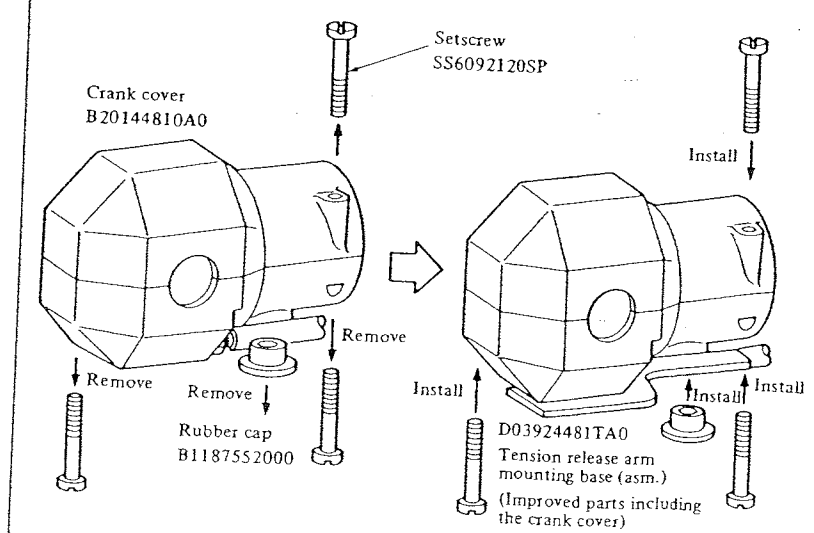
ii) When the moving knife starts to move backwards, the thread tension disc must be loosened.
(⑥ is earlier than ③)
(Reason) The moving knife catches a needle and a looper threads and takes them back on its backward motion to cut with the counter knife. In this process, the threads are not tightened by the disc.

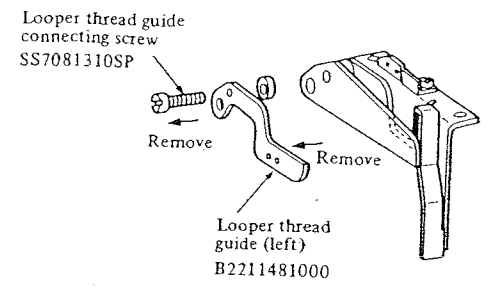
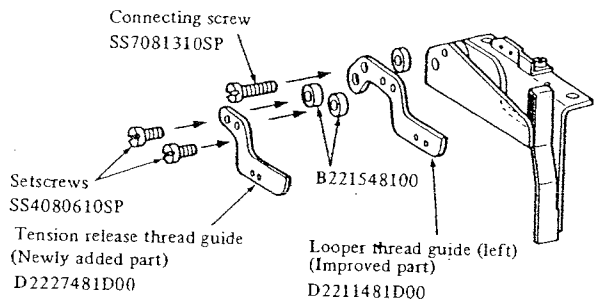
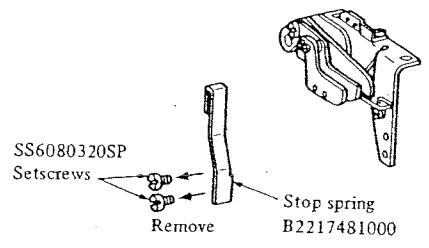
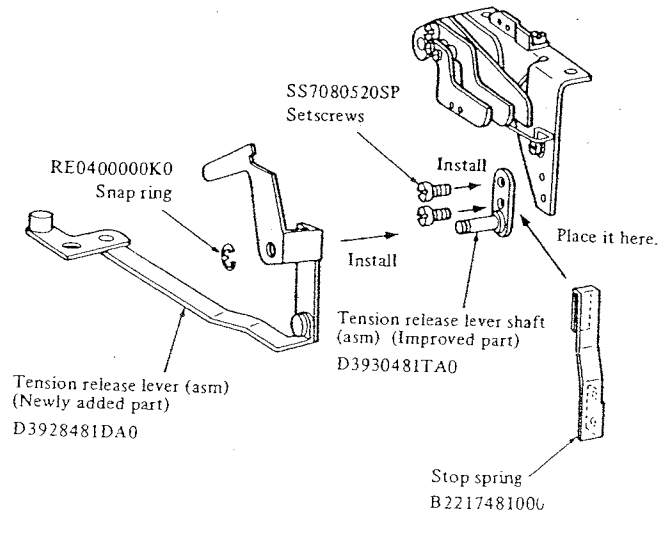
iii) When the thread guide pin is in the position to draw out a thread, the wiper must move to the front position.
(⑪ is earlier than ⑦)
(Reason) If the thread guide pin has moved back to slacken a thread, such a thread will not come back to its original position when the wiper may sweep it away in the forward motion. Thus, the wiper will not fail to take up the thread.

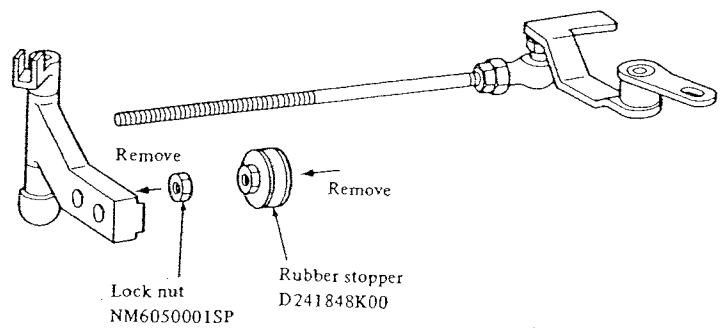
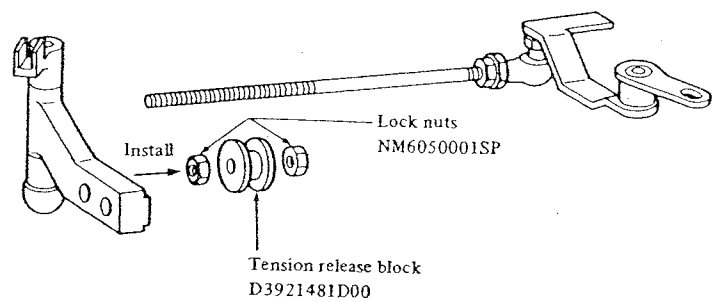
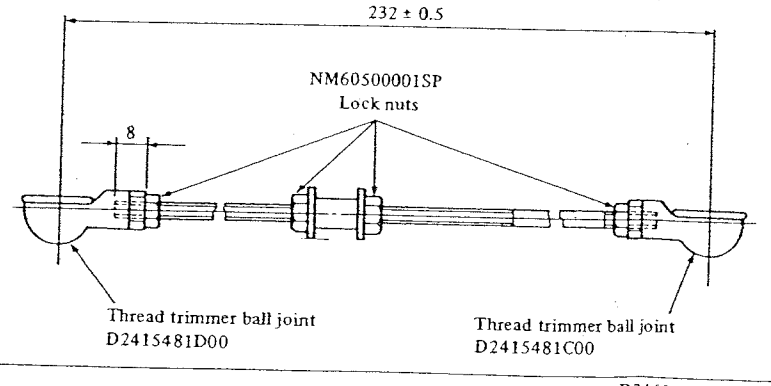
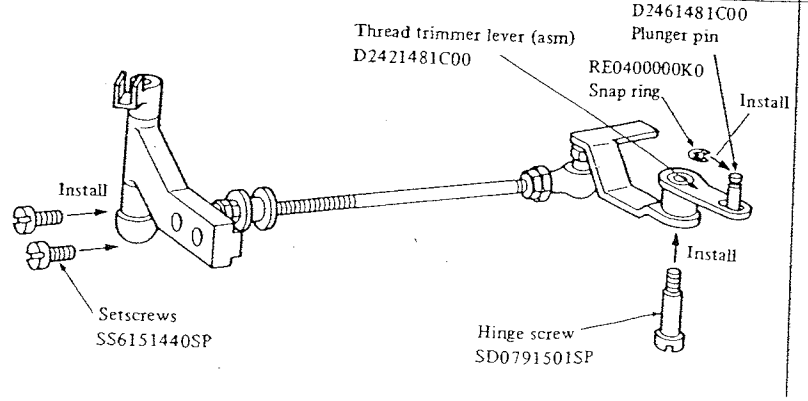
iv) The wiper sweeps the needle thread away after the thread tension disc has been closed.
(⑧ is earlier than ⑪)
(Reason) If the wiper sweeps a thread while the thread tension disc is loosened, the thread is drawn out of the spool and the wiper will fail to draw in the thread on the material.

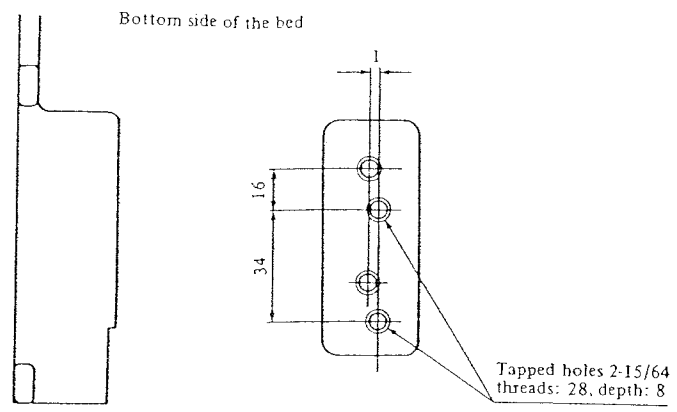
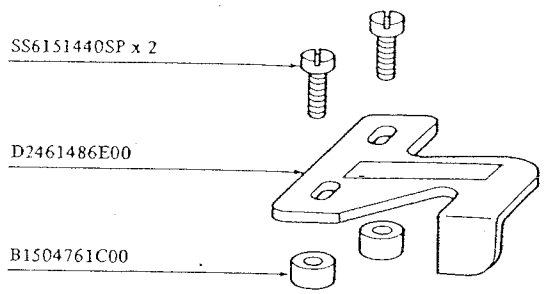
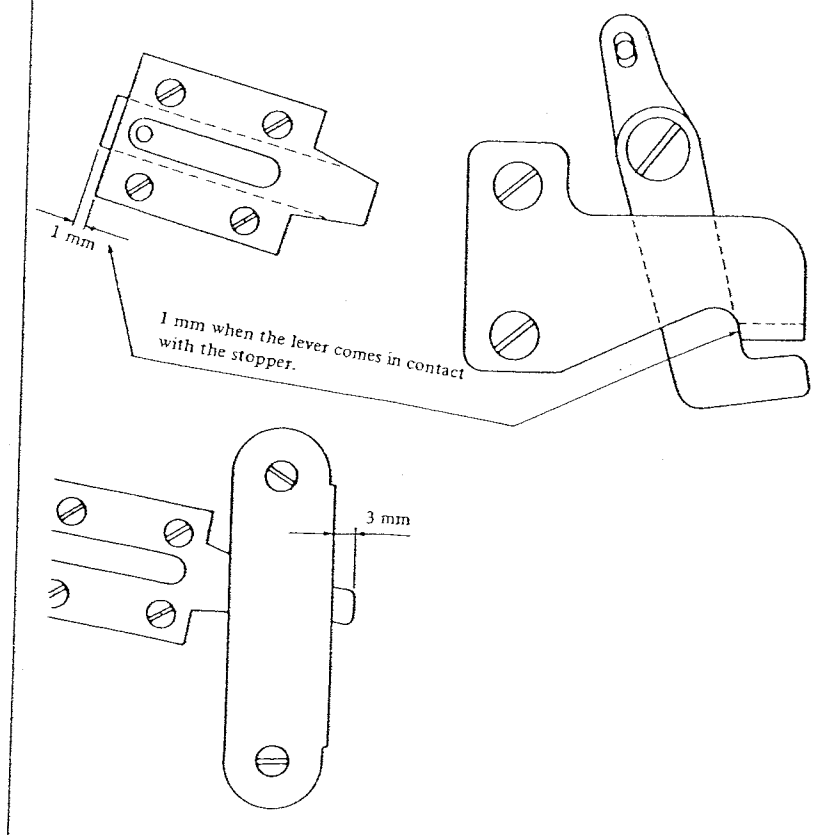
The above sequential operation is performed by the solenoids even with a slight voltage fluctuation and you do not need to change the tension of respective springs and stroke of plungers.

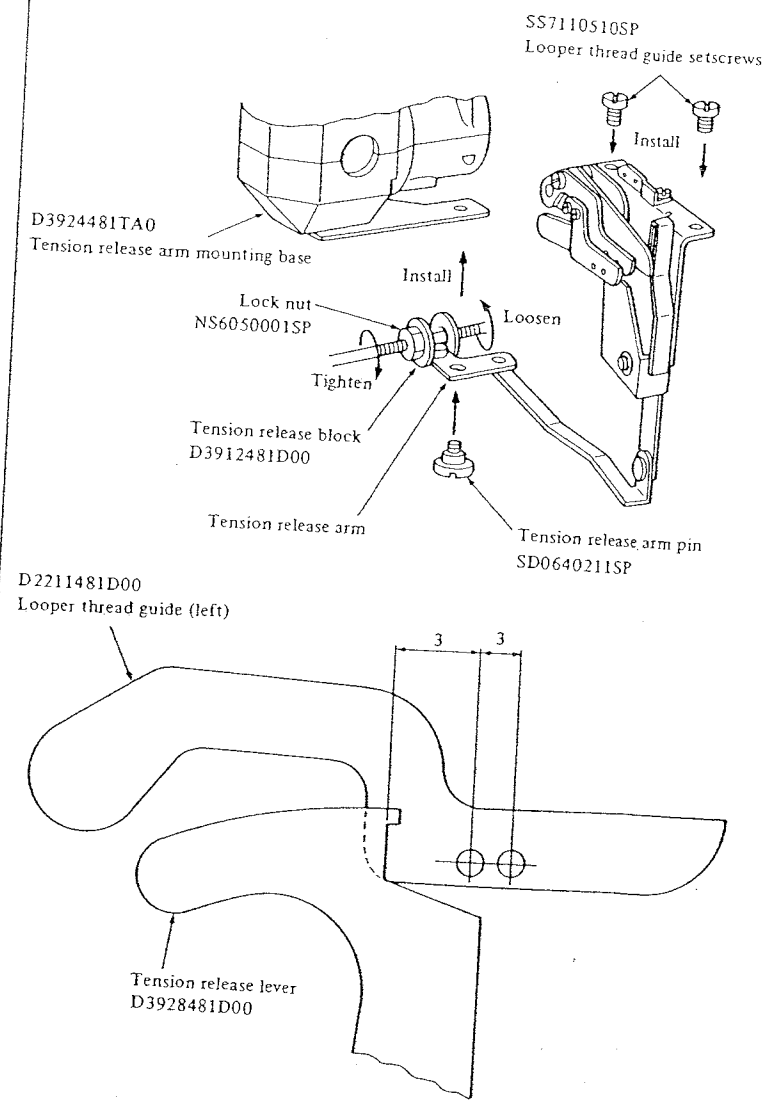
INSTALLING PROCEDURE OF IMPROVED PARTS FOR PREVENTING THREAD FROM SLIPPING OFF THE LOOPER
(MH-481-4-3, MH-481-5-3, MH-484-4-3, MH-484-5-3, MH-487)

No.	Description	Sketch	Adjusting procedure and precautions	Part No.	R/N	Part Name	Q'ty
1	Removing the looper thread guide.		Remove the cam cover and the screws. Take off the whole looper thread guide by moving it in the direction of the arrow.	B1106481OA0 D2210481OA0 SS7110510SP	A	Cam cover Looper thread guide (asm.) Setscrew	1 1 2
2	Removing the thread trimmer ball joint		Remove the moving knife bushing pin setscrews, knife driving link shaft hinge screw, and the snap ring in the order in which they are listed. Remove the whole thread trimmer ball joint by moving it downward as illustrated.	SS6151440SP SD0791501SP RE0400000K0		Setscrew Hinge screw Snap ring	2 1 1/2
3	Removing the crank cover	*	Remove the two setscrews from the crank cover as illustrated, then detach the crank cover from the machine head. At this time, the rubber cap should also be removed from the crank cover.	SS6092120SP D2014481T00 D3924481TA0		Setscrew Crank cover (asm.) Looper thread tension release arm mounting base (asm) (including the crank cover) [improved part]	3 1 1
4	Installing the improved crank cover		Install the improved crank cover, which incorporates the looper thread tension release arm mounting base, onto the machine head, using the setscrews of the previous crank cover. Attach the rubber cap to the improved crank cover.				

No.	Description	Sketch	Adjusting procedure and precautions	Part No.	R/N	Part Name	Q'ty
5	Connecting the looper thread guide to the looper thread tension release lever i) Removing the looper thread guide (left)	* 	Remove the left looper thread guide from the looper thread guide assembly, which was detached from the machine head in step 1 above, by removing the looper thread guide connecting screw as illustrated.	SS7081310SP		Connecting screw	1
	ii) Connecting the looper thread guide (left) to the tension release thread guide		Connect the improved looper thread guide (left) to the looper thread tension release thread guide as illustrated.	D2211481D00 D2227481D00 B2215481000 SS4080610SP		Looper thread guide (left) (Improved part) Tension release thread guide (Newly added part) Collor Setscrews	1 1 2 2
	iii) Removing the stop spring setscrews		Remove the stop spring setscrews	B2217481000		Stop spring	1
	iv) Attaching the tension release lever (asm) to the tension release lever shaft (asm)		Place and fix the looper thread tension release lever shaft (asm) on the stop spring, using setscrews (SS6080410SP) which have longer shanks than the setscrews mentioned in step 5-iii above. Then, attach the looper thread tension release lever (asm) to the lever shaft and fix it using the snap ring as illustrated.	D3930481TA0 SS6080410SP D3928481DA0 RE0400000K0		Tension release lever shaft (asm) [Improved part] Setscrew Tension release lever (asm) (Newly added part) Snap ring	1 2 1 1

No.	Description	Sketch	Adjusting procedure and precautions	Part No.	R/N	Part Name	Q'ty
6	Assembling the thread trimmer ball joints, washers and tension release block i) Removing the rubber stopper		Remove the ball joint (located on the moving knife bushing pin side with respect to the thread trimmer joint which was detached from the machine head in step 2 above) from the thread trimmer connecting rod, then remove the rubber stopper.				
	ii) Attaching the washers iii) Attaching the tension release block iv) Attaching the thread trimmer ball joints	 	Assemble the stopper washers, tension release block and the ball joints as follows: ○ Connect the thread trimmer ball joint (D2415481D00) on the moving knife bearing side to the thread trimmer connecting rod, and secure the joint using the lock nuts. (The screw length of the fitting between the joint and the connecting rod should be 8 mm as illustrated.) ○ Adjust the position of the ball joint (D2415481C00) on the solenoid side so that the center-to-center distance of the ball joints becomes 232 ± 0.5mm. Note: In this step, the thread trimmer slide block is not positioned yet. (The lock nut of the thread trimmer slide block is not tightened.)	NM6050001SP D3921481D00 NM6050001SP		Nut Tension release block (Newly added part) Nut	2 1 2
	v) Installing the thread trimmer ball joint assembly to the machine head		Attach the thread trimmer ball joint assembly, which has been set up, to the machine head using the moving knife bushing pin setscrews and the moving knife driving link shaft hinge screw. Then, attach the thread trimmer lever to the thread trimmer solenoid plunger using the plunger pin, and secure the pin with the snap ring. (No special readjustment is required for the thread trimmer.)	SS6151440SP SD0791501SP D2461481C00 RE0400000K0		Setscrew Hinge screw Plunger pin Snap ring	2 1 1 2

No.	Description	Sketch	Adjusting procedure and precautions	Part No.	R/N	Part Name	Q'ty
7	Making the stopper mounting holes in the machine bed		① Tap two holes (15/64 28 threads) in the positions adjacent to the bushing setscrew holes as illustrated. When tapping these holes, be sure to remove the machine head from the table in order to keep the oil reservoir from chips. (Necessary tools) Drill of 5 mm dia. -1 Tap No. 2 (for 15/64 28 threads) -1 Electric drill Punch				
8	Mounting the trimmer stopper		① Install the thread trimmer stopper by tightening the setscrews.	B1504761C00 D2461486E00 SS6151440SP		Nuts Thread trimmer stopper Setscrew	2 1 2
9	Positioning the moving knife		① With the thread trimmer lever in contact with the stopper, obtain the dimension, 1 mm, as illustrated. This should be the initial position of the moving knife. Perform this adjustment using the moving knife forked arm screw. ② Bring the moving knife in its most advanced position, and adjust the position of the thread trimmer solenoid so that the moving knife stops at 3 mm from the throat plate edge as illustrated.				

No.	Description	Sketch	Adjusting procedure and precautions	Part No.	R/N	Part Name	Q'ty
10	Installing the looper thread guide and the tension release lever		Insert the looper thread guide assembly, which has been set up in step 5 above, in the cam cover mounting part from above the machine bed. Fix the looper thread guide to the bed, using the looper thread guide setscrews. At this time, tighten the setscrews at the centers of the slots. Using the tension release arm shaft hinge screw, fix the looper thread tension release arm to the tension release arm mounting base located on the crank cover, which was installed in step 4. At this time, be sure that the roller of the tension release arm fits in the tension release block. Adjust the position of the tension release block so that the dimensions illustrated are obtained. Tighten the lock nut to secure the adjustment.	SS7110510SP SD0640211SP		Setscrew Tension release arm pin	2 1

Send the parts marked with asterisks in the figures back to JUKI.