SunStar

# USER'S MANUAL

## KM-750

**High speed, two needle, drop feed, needle feed, sewing machine with automatic thread trimmer.**

## KM-790

**High speed, two needle, drop feed, needle feed, split needle bar lock stitch M/C with automatic thread trimmer**

1) FOR AT MOST USE WITH EASINESS, PLEASE CERTAINLY READ THIS MANUAL BEFORE STARTING USE.
2) KEEP THIS MANUAL IN SAFE PLACE FOR REFERENCE WHEN THE MACHINE BREAKS DOWN.

SunStar CO., LTD.

MME-090929


1. Thank you for purchasing our product. Based on the rich expertise and experience accumulated in industrial sewing machine production, SUNSTAR will manufacture industrial sewing machines, which deliver more diverse functions, high performance, powerful operation, enhanced durability, and more sophisticated design to meet a number of user's needs.
2. Please read this user's manual thoroughly before using the machine. Make sure to properly use the machine to enjoy its full performance.
3. The specifications of the machine are subject to change, aimed to enhance product performance, without prior notice.
4. This product is designed, manufactured, and sold as an industrial sewing machine. It should not be used for other than industrial purpose.

SunStar CO., LTD.

# Table of Contents

# Safety Rules for Machines

Safety labels in the manual are categorized into danger, warning and caution.
Failure to follow the safety rules may result in physical injuries or mechanical damages.
The safety labels and symbols are defined as follows.

**[ The meaning of the safety labels ]**

| ⚠ Danger |
| --- |
| Instructions here shall be observed strictly.<br>Otherwise, the user will be killed or suffer severe physical injuries. |

| ⚠ Warning |
| --- |
| Instructions here must be observe4d, or the user could suffer fatal or severe physical injuries. |

| ⚠ Caution |
| --- |
| Instructions here should be observed, or the user could face physical injuries or mechanical damages. |

**[ The meaning of symbols ]**

| | |
| --- | --- |
|  | This symbol means a must-not |
|  | This symbol means a must for safety |
|  | This symbol means that an electric shock may be caused if the instruction is not followed properly. |

| | |
|---|---|
| **1-1) Machine mobilization**<br>  <br>Danger | Only personnel with a full understanding of the safety rules should move the machines. The following directions must be observed when delivering the machines.<br><br>ⓐ At least 2 persons should work together.<br>ⓑ In case the machine should be transported, please wipe the oil covered on the machine to prevent the accident |
| **1-2) Machine Installation**<br>  <br>Caution | Because the physical damage such as the functional obstacles and breakdowns are likely to occur in compliance with the condition of installing the machine,<br>The following preconditions should be fulfilled.<br><br>ⓐ Please keep the order from top to bottom when unpacking the package. Especially, mind that the nail on the boxes.<br>ⓑ Because machines are apt to be contaminated and corroded by dust and moisture, you should install the climate controller and should clean the machines regularly.<br>ⓒ Keep the machines out of the direct rays of the sun.<br>ⓓ Keep both sides and the backside of the machines off at least 50cm from the wall to secure enough space to repair.<br>ⓔ Danger of Explosion<br>Don' t run the machine near the places with the dangers of explosion.<br>Don' t run the machine near the places with the dangers of explosion, including the places where the spraying product like aerosol are used in large quantities or oxygen are dealt with, unless the exact actions concerning the operation are guaranteed to avoid the explosion.<br>ⓕ Because of the peculiarity of the machine, any illuminators are not equipped. So, users should install the lighting apparatus around the working area.<br><br>[Note] The details about the installment of the machine are described in No. 2 Installations. |
| **1-3) Troubleshooting**<br>  <br>Danger | In need of troubleshooting, it should be done by the trained A/S engineer of our company.<br><br>ⓐ Ahead of cleaning and repair, be sure to shut off the power supply. And wait for about 4 minutes till the machine discharges completely.<br>ⓑ Even a part or all of the machine should not be modified without any consultation with our company<br>ⓒ In case of repair, you should change the damaged part into the standard article of our company<br>ⓓ After repair, please put again the safety cover disjointed while repairing |

## 1-4) Machine Operation

Caution

KM-750/790 series are manufactured for industry use to sew textiles and other similar material. In case of running the machine, users should observe the following things.

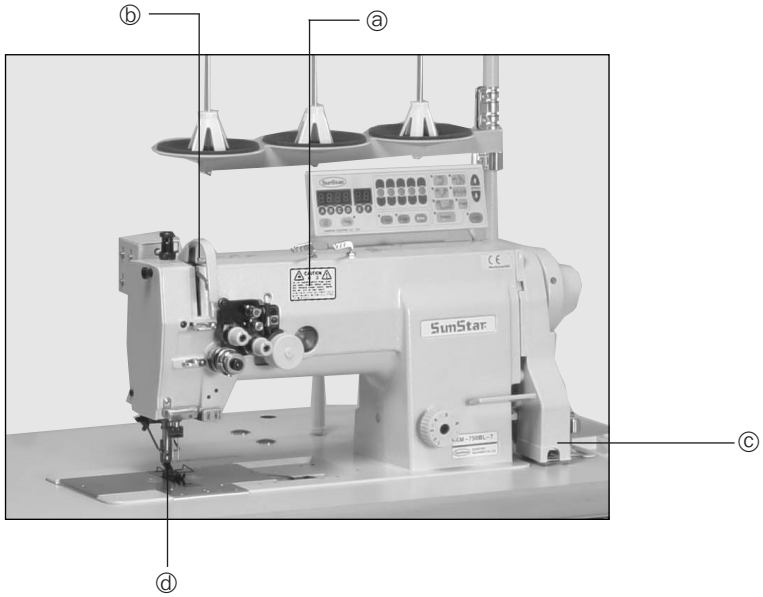
ⓐ Ahead of operating the machine, please read the manual and understand fully the details on its operation.
ⓑ Don't forget to put on the garment suited for the safe work.
ⓒ Keep your hands or a part of the body away from the running part of the machine like a needle, hook, thread take-up spring and pulley etc.
ⓓ Don't remove any kind of cover for safety while running the machine.
ⓔ Be sure to connect the earthed line.
ⓕ Before opening the electric box such as a control box, be sure to shut off the power supply and make sure that the power switch should be put on "off."
ⓖ When threading the needle or before checking after sewing, be sure to stop the machine.
ⓗ Don't switch on the power supply with the foot on the pedal.
ⓘ Don't run the machine when the cooling fan are not running. Be sure to clean the air filter in the control box once a week.
ⓙ If possible, keep off from the strong electronic wave like a high frequency welding machine

| Caution | Always start the machine with safety covers in place since fingers or hands could be injured or cut off by the belt. Turn off the power switch during check-ups or adjustments. |
|---|---|

## 1-5) Safety Device

Caution

ⓐ Safety Label: Suggestions while running the machine are stated.
ⓑ Thread take-up spring cover: the device to prevent the human body from touching the thread take-up spring.
ⓒ Belt cover: the device to prevent hands, feet and clothing from getting jammed by the belt
ⓓ Finger guard: the device to prevent fingers from contacting the needle.



## 1-6) Position of Caution Mark

CAUTION
경 고

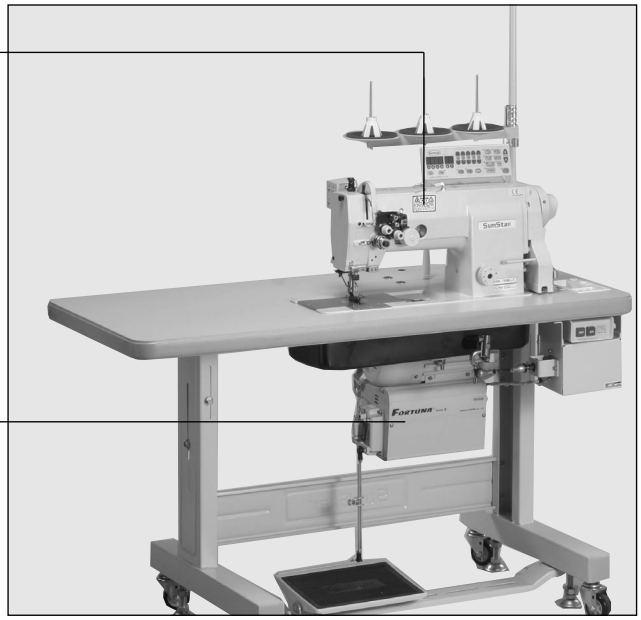
Do not operate without finger guard and safety devices. Before threading, changing bobbin and needle, cleaning etc. switch off main switch.
손가락 보호대와 안전장치 없이 작동하지 마십시오.
실, 보빈, 바늘교환시나 청소전에는 반드시 주전원의 스위치를 꺼 주십시오.

CAUTION
경 고

Hazardous voltage will cause injury.
Be sure to wait at least 360 seconds before opening this cover after turn off main switch and unplug a power cord.
고압 전류에 의해 감전될 수 있으므로 커버를 열 때는 전원을 내리고 전원 플러그를 뽑고 나서 360초간 기다린 후 여십시오.

"Cautions" is adhered to the machine for safety.
In case of starting to run the machine, read the directions of "Cautions" carefully

[Position of Caution Mark]



## 1-7) Content of "Caution"

Caution

CAUTION
경 고

Do not operate without finger guard and safety devices. Before threading, changing bobbin and needle, cleaning etc. switch off main switch.
손가락 보호대와 안전장치 없이 작동하지 마십시오.
실, 보빈, 바늘교환시나 청소전에는 반드시 주전원의 스위치를 꺼 주십시오.

CAUTION
경 고

Hazardous voltage will cause injury.
Be sure to wait at least 360 seconds before opening this cover after turn off main switch and unplug a power cord.
고압 전류에 의해 감전될 수 있으므로 커버를 열 때는 전원을 내리고 전원 플러그를 뽑고 나서 360초간 기다린 후 여십시오.

# 1 Specifications

## 1) Specifications of the sewing machine

| NO | Model No. | Model Name |
|---|---|---|
| 1 | KM-750 | Two needle, drop feed, needle feed sewing machine (standard hook) |
| 2 | KM-750-7 | Two needle, drop feed, needle feed, sewing machine with automatic thread trimmer (standard hook) |
| 3 | KM-750BL | Two needle, drop feed, needle feed sewing machine (double hook) |
| 4 | KM-750BL-7 | Two needle, drop feed, needle feed, sewing machine with automatic thread trimmer (double hook) |
| 5 | KM-790 | Split two needle, drop feed, needle feed sewing machine (standard hook) |
| 6 | KM-790-7 | Split two needle, drop feed, needle feed, sewing machine with automatic thread trimmer (standard hook) |
| 7 | KM-790BL | Split two needle, drop feed, needle feed sewing machine (double hook) |
| 8 | KM-790BL-7 | Split two needle, drop feed, needle feed, sewing machine with automatic thread trimmer (double hook) |

| Item \ Model type | | KM-750 | KM-750-7 | KM-750BL | KM-750BL-7 |
|---|---|---|---|---|---|
| Purpose | | General - Heavy Material | | | |
| Max. sewing speed | | 3,000 SPM | | | |
| Max. no. of stitches | | 5mm | | 7mm | |
| Needle bar stroke | | 33.4mm | | | |
| Feed dog height | | 1mm | | | |
| Presser foot height | manual | 7mm | | | |
| | Knee | 18mm | | | |
| | automatic | | 10mm | | 10mm |
| Needle used | | DP×5 #14(#11～#22) | | DP×5 #22(#11～#22) | |
| Feeding method | | Low pressure circular automatic feeding | | | |
| Needle width gauge | | 1.6mm～52.4mm | 1.6mm～50.8mm | 1.6mm～38mm | |

| Item \ Model type | | KM-790 | KM-790-7 | KM-790BL | KM-790BL-7 |
|---|---|---|---|---|---|
| Purpose | | General - Heavy Material | | | |
| Max. sewing speed | | 3,000 SPM | | | |
| Max. no. of stitches | | 5mm | | 7mm | |
| Needle bar stroke | | 33.4mm | | | |
| Feed dog height | | 1mm | | | |
| Presser foot height | manual | 7mm | | | |
| | Knee | 18mm | | | |
| | automatic | | 13mm | | 13mm |
| Needle used | | DP×5 #14(#11～#22) | | DP×17 #22(#16～#24) | |
| Feeding method | | Low pressure circular automatic feeding | | | |
| Needle width gauge | | 2.4mm～15.9mm | | | |

## 2) Specifications of the servo motor controller

**A. KM-750-7, 750BL-7**

| MODEL | VOLT | WATT | HERTZ |
|---|---|---|---|
| SC55-1B | 1 phase 110V | 550W | 50/60 Hz |
| SC55-2B | 1 phase 220V | 550W | 50/60 Hz |
| SC55-3B | 3 phase 220V | 550W | 50/60 Hz |

**B. KM-790-7, 790BL-7**

| MODEL | VOLT | WATT | HERTZ |
|---|---|---|---|
| SC55-1C | 1 phase 110V | 550W | 50/60 Hz |
| SC55-2C | 1 phase 220V | 550W | 50/60 Hz |
| SC55-3C | 3 phase 220V | 550W | 50/60 Hz |

## 3) Specifications of the clutch motor (for non-trimming type)

| MODEL | VOLT | WATT | HERTZ |
|---|---|---|---|
| HEC-1701 | 1 phase 220V | 250W | 50/60 Hz |
| HEC-1703 | 3 phase 220V/380V | 250W | 50/60 Hz |
| HEC-1705 | 3 phase 220V | 400W | 50/60 Hz |
| HEC-1706 | 1 phase 220V | 400W | 50/60 Hz |

## 4) Peripheral automation devices (optional: for trimming type)

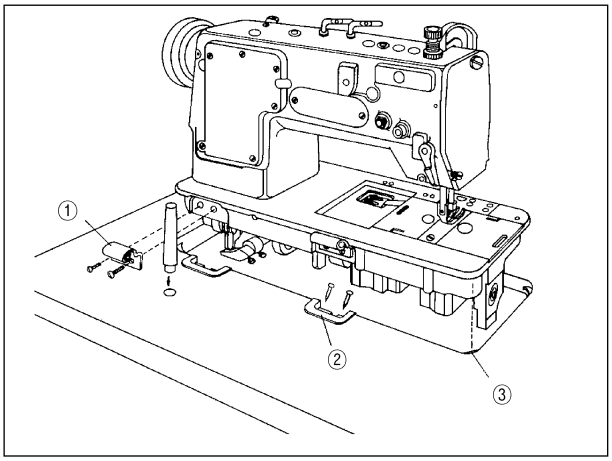
| Optional Device | Model | Purpose |
|---|---|---|
| Auto Knee Lifting System | SPF-3A | A solenoid operating structure where the presser foot gets lifted automatically with pedal reverse gear stage 1 operation. |
| Production Counter | SCOUN-1 | A counting device which indicates the completed quantity on the program unit panel, including added, subtracted, corrected or remaining quantity along with other performance rates. |
| Material Edge Sensor | SEDG-1B<br>SEDG-2B | A device that senses the edge or thickness of the sewing material to stop the machine without manual pedaling. Available in two types: SEDG-1B for edge sensing type and SEDG-2B for thickness sensing type. |
| Standing Pedal | SPDL-1<br>SPDL-2 | A device needed when only one operator runs several sewing machines. Pedals for acceleration, thread trimming, presser foot and ascending are built separately. There are two types: SPDL-1 for fixed speed type and SPDL-2, EDPL-2 for adjustable speed type. |

# 2 Installation

| Warning | |
|---|---|
| | ▶ Installation of the machine should be performed by a trained engineer. |
| | ▶ Any electrical wiring must be performed by a qualified technician or agent. |
| | ▶ The machine weighs over 45kg. At least 2 persons should carry out the installing work. |
| | ▶ Plug in after the installation is complete. If the operator mistakenly steps down on the pedal with the pug in, the machine will start automatically and can cause physical injuries. |
| | ▶ Connect the ground (earth) wire. An unstable connection may result in an electric shock or a malfunction. |
| | ▶ Place the belt cover on top of the machine. |
| | ▶ Use both hands when bending the machine backwards or returning it to the normal position. Using only one hand can lead to severe hand injuries due to the weight of the machine. |

## 1) Installation of the machine head

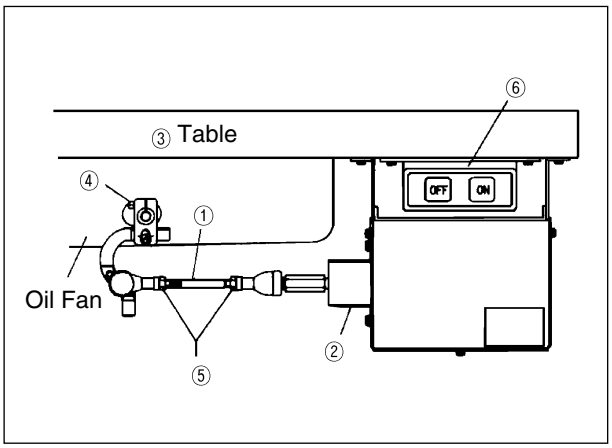
Fix the two head hinges ① to the bed. Insert the hinge rubber ② and cushion rubber ③ onto the table. Settle the machine on the table. (see figure 1)




[Figure 1]

## 2) Installation of knee lifting solenoid and power switch box

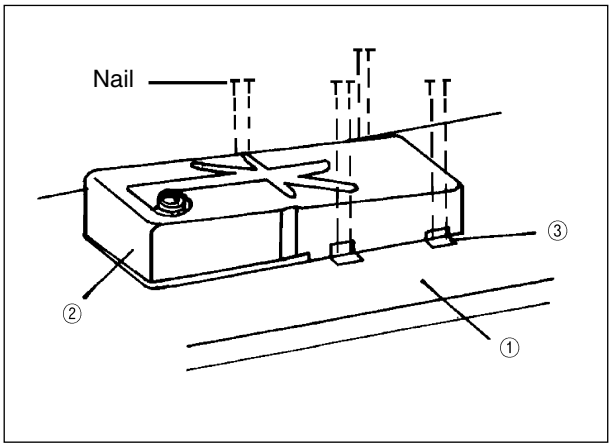
A. When attaching the power switch box ⑥, refer to figure 2 to make sure that it is placed at the very center of the solenoid bracket.
B. After attaching the solenoid onto the table, unfasten the screw ④ to adjust the center of middle linking bar ① and the center of solenoid shaft ② in parallel position with the lower side of the table ③. After the adjustment is over, fasten the screw tightly.
(see figure 2): assembling position diagram can be found inside the solenoid box.
C. The presser foot height of the sewing machine can be adjusted after unfastening the fixing nut ⑤ and then turning the middle linking bar ① clockwise to raise and counterclockwise to lower. After finishing the adjustment, tightly fasten the fixing nut ⑤.
D. According to the installation position of knee-lifting solenoid, the operation noise, operation load and presser foot elevation range may differ. Please assemble so that the machine will operate smoothly.




[Figure 2]

## 3) Installation of the oil fan

Insert the projecting part of the oil fan ② into the respective machine holes on the lower side of the table ①, and then push securely to the right. Fix the oil fan to the four fixing spots ③ using 4 nails. (see figure 3)




[Figure 3]

### ⚠ Caution

- ▶ Be sure to plug in after finishing oil supply, If the user presses on the step by mistake, the machine will start automatically, and this might lead to physical injuries.
- ▶ When handling lubricant, use safety goggle or gloves to prevent the lubricant from coming into contact with the eyes or skin. It can cause inflammation. And don't drink the lubricant. It can cause vomiting or diarrhea. Please keep it out of the reach from children.

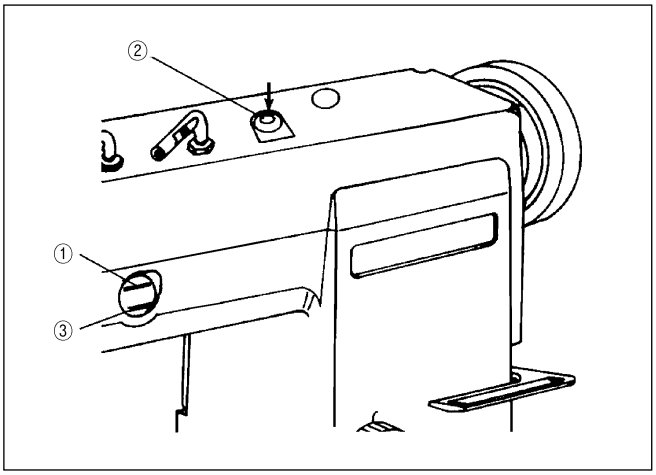
- ▶ Make sure to supply oil when using it for the first time or after not using it for a long time.

## 4) Oil supply

A. Checking the oil supply

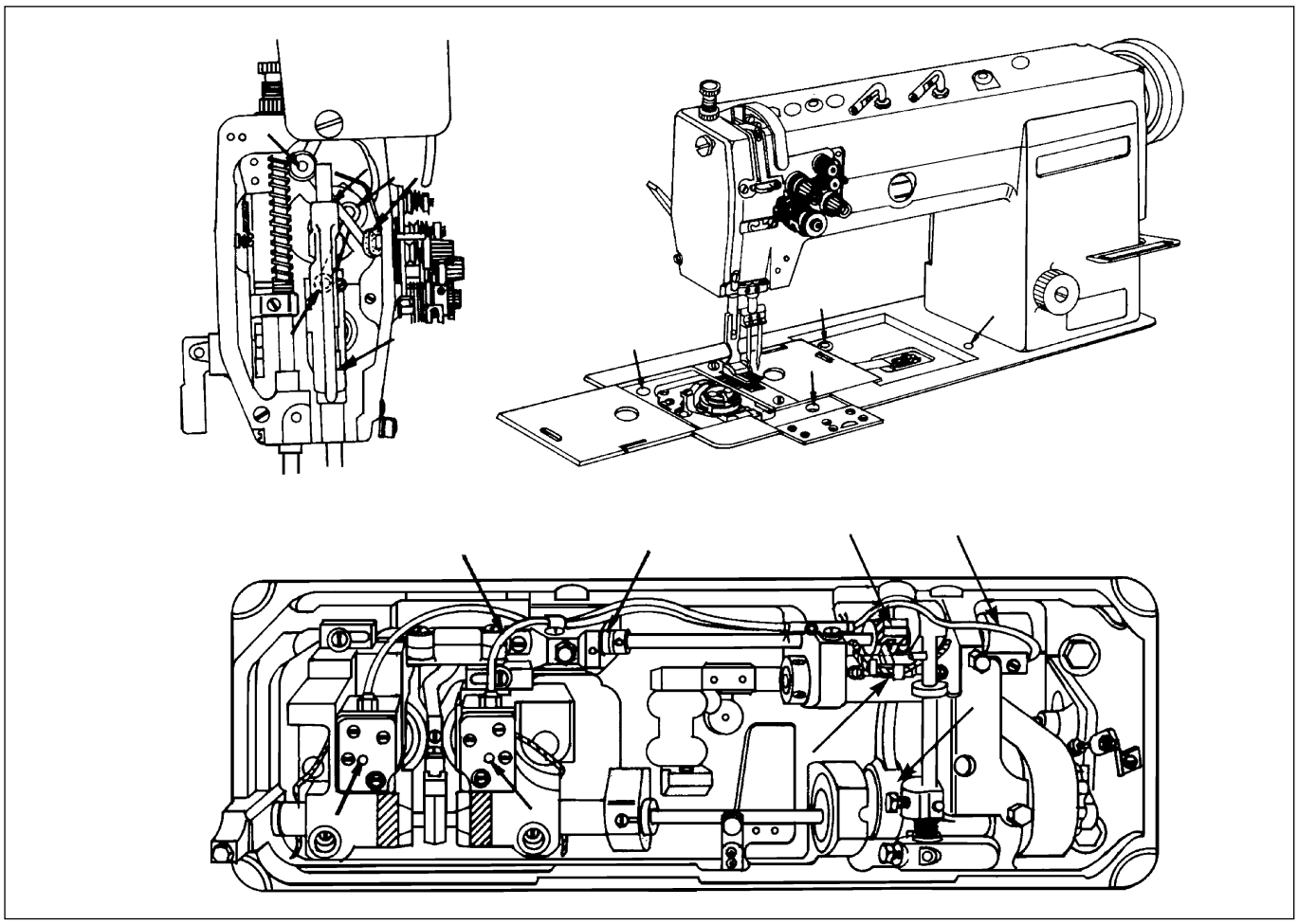
a) Oil tank check

As can be seen on figure 4, pour the oil into the oil hole ② until the oil tank's oil level reaches the red maximum line ①. While using the machine, replenish the oil immediately when the oil level goes down to the minimum level ③, back to the red maximum level ①. Make sure to check the oil level once a day.




[Figure 4]

b) As can be seen on figure 5, make sure to supply oil into the oil holes marked in red and into each friction part, before moving the sewing machine.

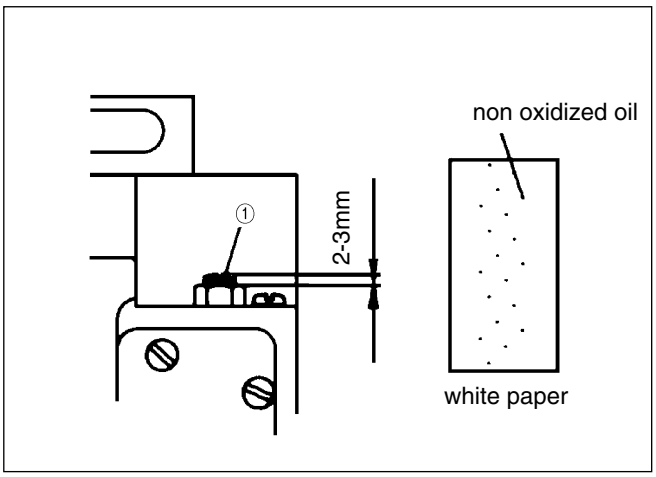


[Figure 5]

c) Hook oil level check

Check whether the amount of oil sprinkled from the hook for 10 seconds is as is on figure 6.

To adjust the amount of oil supply, turn the oil supply screw on the hook base to the right ① to decrease the oil supply, and to the left to increase the oil supply. (see figure 6)




[Figure 6]

B. As test operation, run the machine for 10 minutes at about 1,500 SPM.

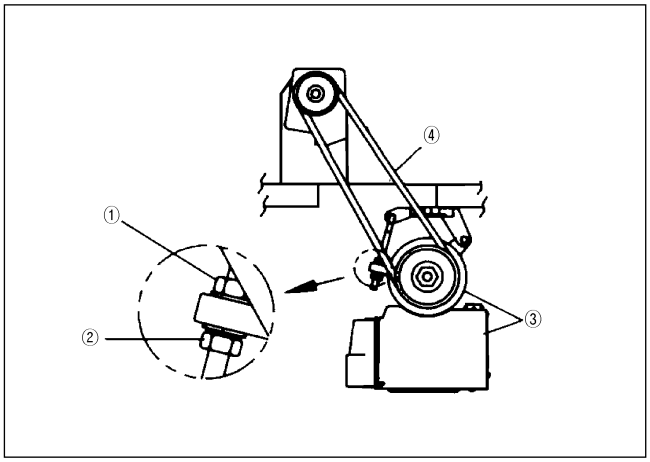
For the first 4~5 days of using the machine, operate the machine at less than 2,400 SPM per minute. Then, start using at normal pace. This will help good performance of the machine along the way.

## 5) Adjustment of belt tension

After installing the motor, when the fixing nuts ①,② are unfastened to both sides with enough room, tension is created to the belt ④ due to motor ③ due to the motor's own weight balance.

At this moment, fasten the fixing nut ① first, then fasten the fixing nut ② tightly.

(See to figure 7)

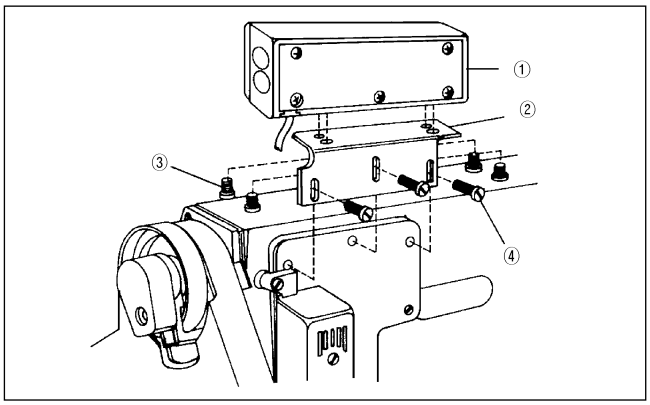



[Figure 7]

## 6) Installation of the program unit (automatic trimming type)

A. Fix the bracket ② onto the program unit ①, using 4 fixing nuts ③.

B. Then, use 3 fixing bolts ④ to tightly fix the bracket ②, where the program unit ① has been attached, along with the back cover.
(see figure 8)

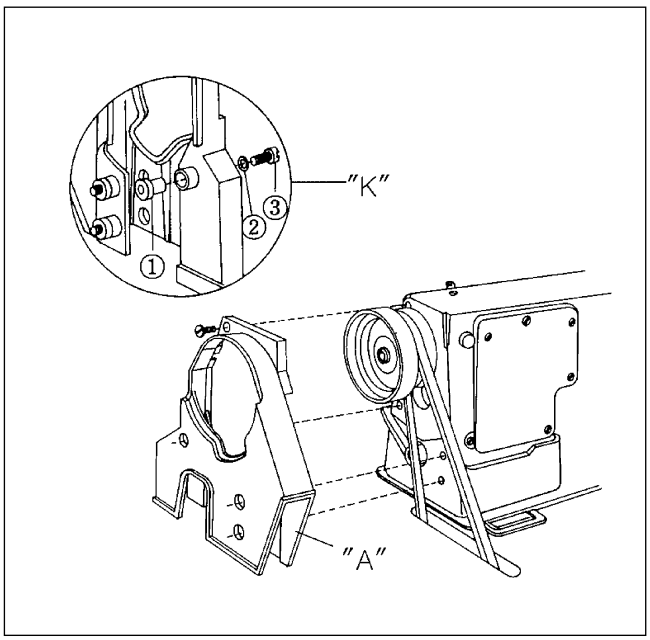



[Figure 8]

## 7) Installation of the belt cover

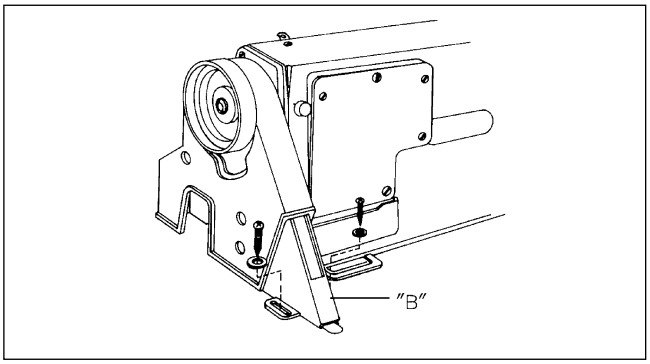
A. Before attaching the belt cover "A" to the machine body, assemble in advance the rubber collar ① and washer ② and fixing nail ③ on the to-be-attached side of the cover as can be seen in picture "K" of figure 9.

B. Attach belt cover "A" onto the machine body as can be seen on figure 9. Now, if a bobbin winder is attached on the table, lay down the machine body on its back and attach the belt cover "A".




[Figure 9]

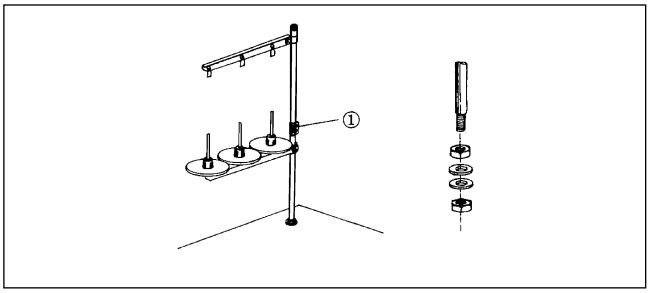
C. Lastly, fasten the belt cover "B" to the table, as can be seen in figure 10.




[Figure 10]

## 8) Installation of the thread stand

As can be seen in figure 11, fix the thread stand ① to the table using the washer and nut on the right.




[Figure 11]

## 9) Location detector assembling and its control method (automatic trimming type)

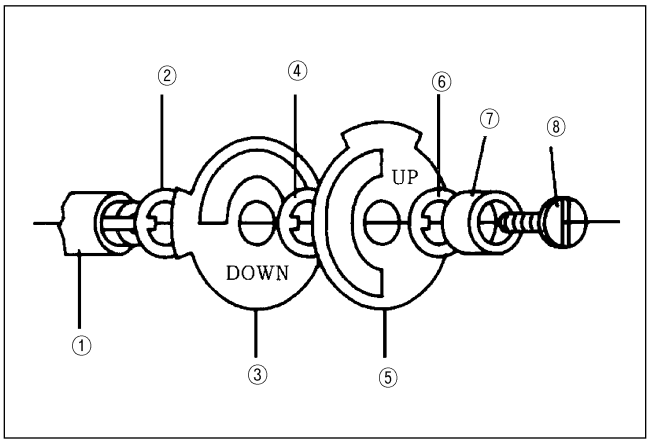
### (1) Installation of location detector

Assemble in the order of marked number as can be seen in figure 12. Then, following the figure 13, make adjustments to place the photo film at the center of the sensor housing①, by moving the shaft ② right and left. Then, tighten the 2 fixing screws ③ using the hexagonal wrench④.

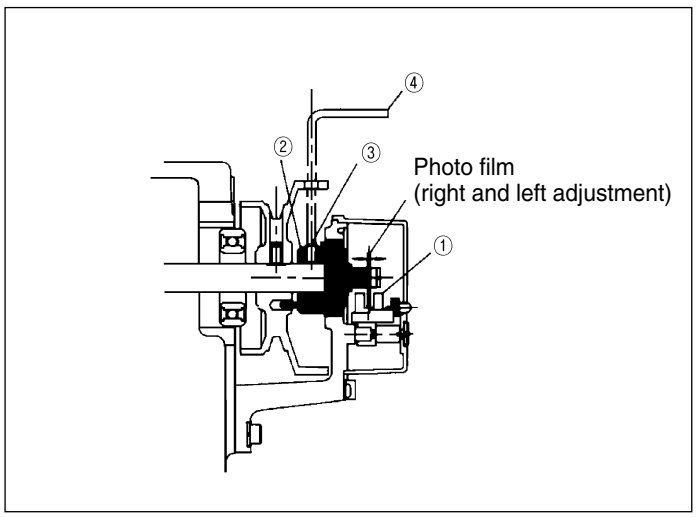
**[Note]**

a) As can be seen on figure 12, make sure that the marks "DOWN" and "UP" face the front when looking from the pulley side.

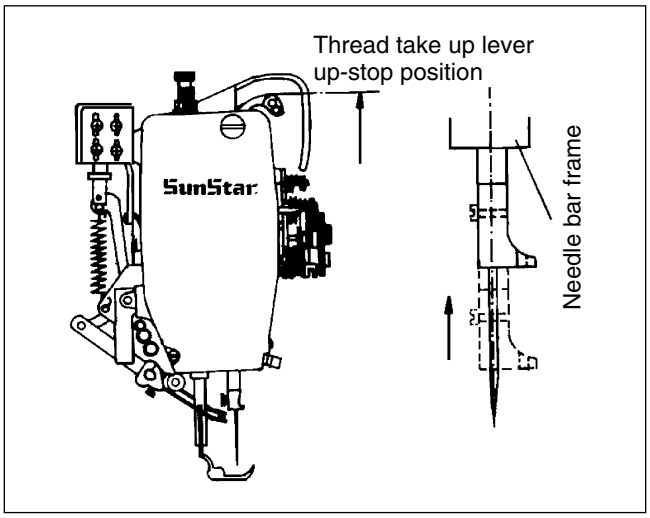
b) Film adjustment is completed upon shipment.




[Figure 12]




[Figure 13]




[Figure 14]

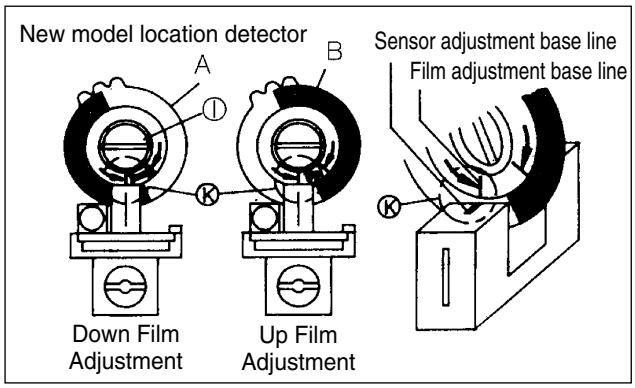
**(2) Film adjustment of location detector**

A. For new model type (see figures 14, 15)

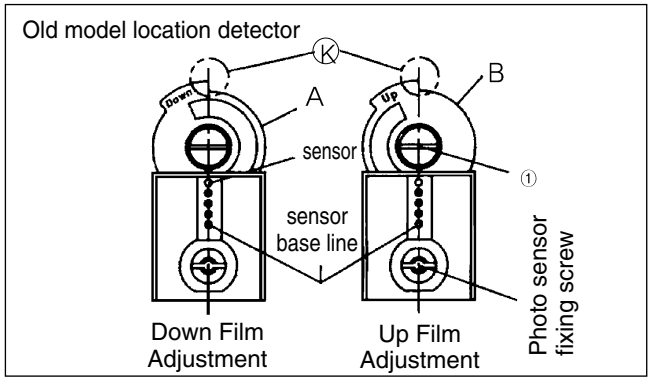
Turn the pulley with hand so that the needle bar is placed where it starts rising from the lowest point. Unfasten the film fixing screw ① in figure 15, and for "DOWN" film A, align the film adjustment base line with the sensor adjustment base line, as can be seen in ⓚ. Then, using the fixing screw ①, tighten only to the degree that the film will not turn. In the same method, place the thread take up lever in the highest point, once again unfasten the fixed screw ①, and align the "UP" film B like ⓚ. Now, be careful not to move the previously set "DOWN" film A.

B. For old model type (see figure 16)

Adjust in the same method as new model to make the right side ⓚ of the film's projecting part aligned to the center of the sensor base line.




[Figure 15]



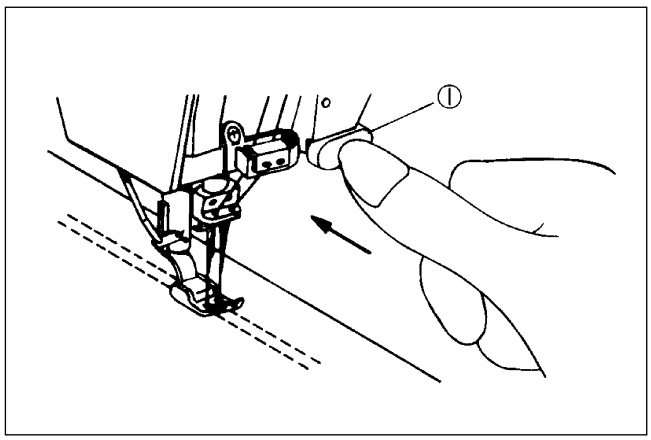

[Figure 16]

## 10) Reverse button function

If reverse button ① is pressed while sewing forward, reverse sewing takes place immediately. If the machine is stopped first and the button ① is pressed before stepping the pedal to start the machine, reverse sewing will take place from the very beginning. Also by pressing button ① while the machine is at stop position, the high-low position of the needle bar can be changed.

If the button ① is pressed once when the needle bar is in down-stop position, the needle bar changes to up-stop position. Once again, if the button ① is pressed twice consecutively within 1 second, the needle bar changes to down-stop position.

That is, it has both the reverse sewing and needle up-down position change functions. (See figure 17)

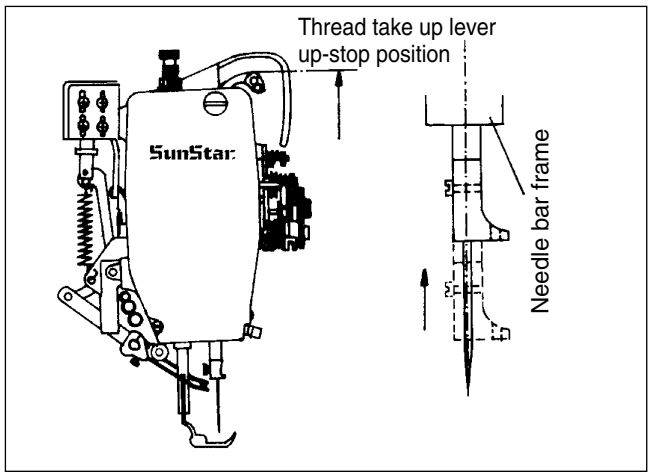



[Figure 17]

## 11) Checking stop position of the sewing machine

After changing the up-down position of the needle by pressing the reverse button, check the stop position of the machine. Check whether the thread take-up lever is in the highest position when the needle is in up-stop position. When the stop position is incorrect, there might be problems to the trimming function, hence the photo film location of the location detector must be corrected. That is, the needle up-stop position is the same as the needle bar's stop position once the trimming action takes place. So there is no problem with the timing of the trimming action. (See figure 18)

(See 'location detector adjustment' on page 14)




[Figure 18]

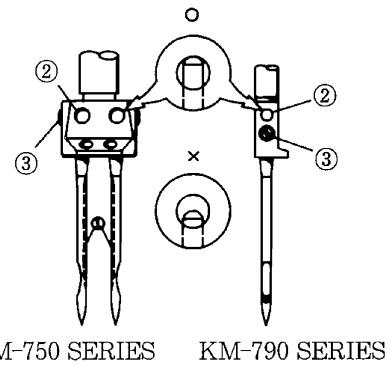
# 3 Adjustment of the machine

## ⚠ Caution

- ▶ In case of setting the needle, be sure to switch off the power supply. If the user presses on the step by mistake, the machine will start automatically, and this might lead to physical injuries.
- ▶ When using the clutch motor, remember that the motor revolves for a while even after switching off the power supply due to inertia. Make sure to start working only after the motor has come to a complete stop.

### 1) Inserting the needle

As in figure 19, place the upper end of the needle closely adhered to the upper side of the stopper hole ②, with the needle groove ① facing inward. Fix the needle with a fixing screw③.



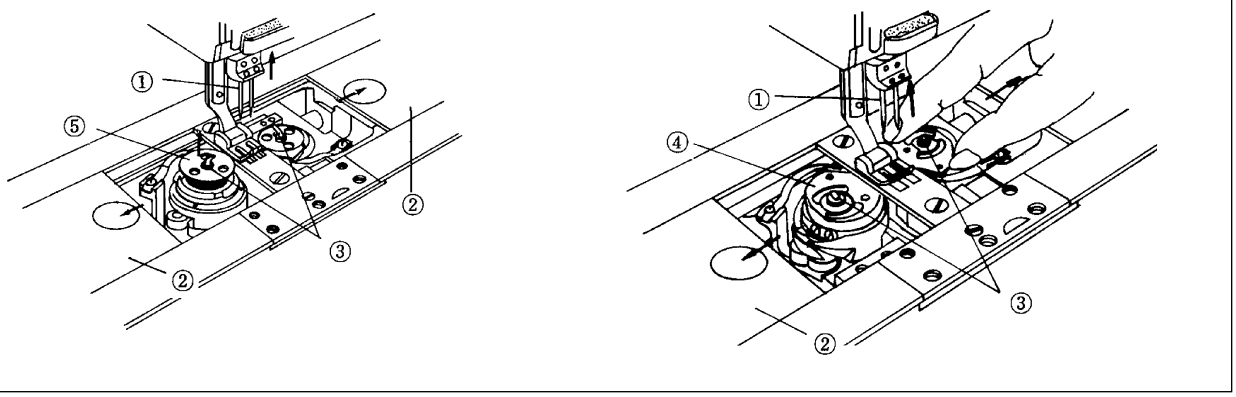

[Figure 19]

## ⚠ Caution

- ▶ In case of adjusting the tension of the lower thread, be sure to switch off the power supply. If the user presses on the step by mistake, the machine will start automatically, and this might lead to physical injuries.
- ▶ When using the clutch motor, remember that the motor revolves for a while even after switching off the power supply due to inertia. Make sure to start working only after the motor has come to a complete stop.

### 2) Removing bobbin and bobbin case

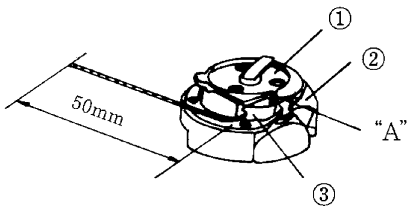
Place the needle ① in the highest position, and then just like in figure 20, open the slide plates ② on the left and right, lift the bobbin holder ③ to remove the bobbin case ④ and the bobbin ⑤.




[Figure 20]

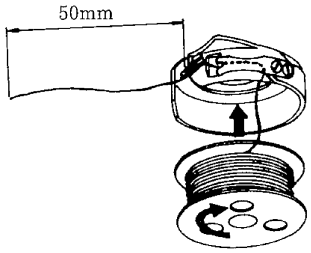
## 3) Routing the lower thread

[Applicable Models]
a) KM-750
b) KM-750BL
c) KM-750-7

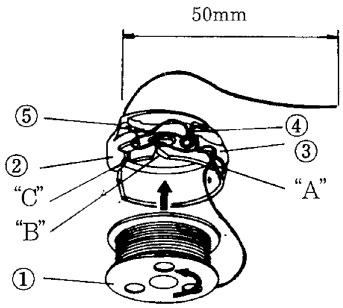



A. Insert the bobbin ① into the hook ②.
B. Insert the thread through "A" part of the hook ②, and pull it out from the end of the lower thread tension adjustment plate ③.
C. The adequate length of the pulled-out lower thread is 50mm.

(Application Standard)
KM- 750BL-7

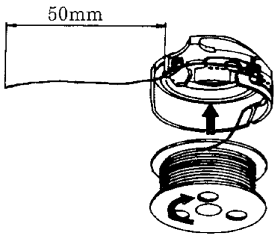



[Applicable Models]
a) KM -790
b) KM-790BL
c) KM-790-7




A. Insert the bobbin① into the bobbin case②. For KM -790-7, it is crucial to insert the bobbin in the turning direction as in the picture.
B. Insert the thread through "A" part of the hook ②, and pull it out from the end of the lower thread tension adjustment plate ③.
C. Pass the pulled-out thread through "B" and "C" of the bobbin case, as can be seen on the picture, and hang it onto the lower thread holding spring ④. Then pull it out through the thread hole ⑤.
D. The adequate length of the pulled-out lower thread is 50mm.

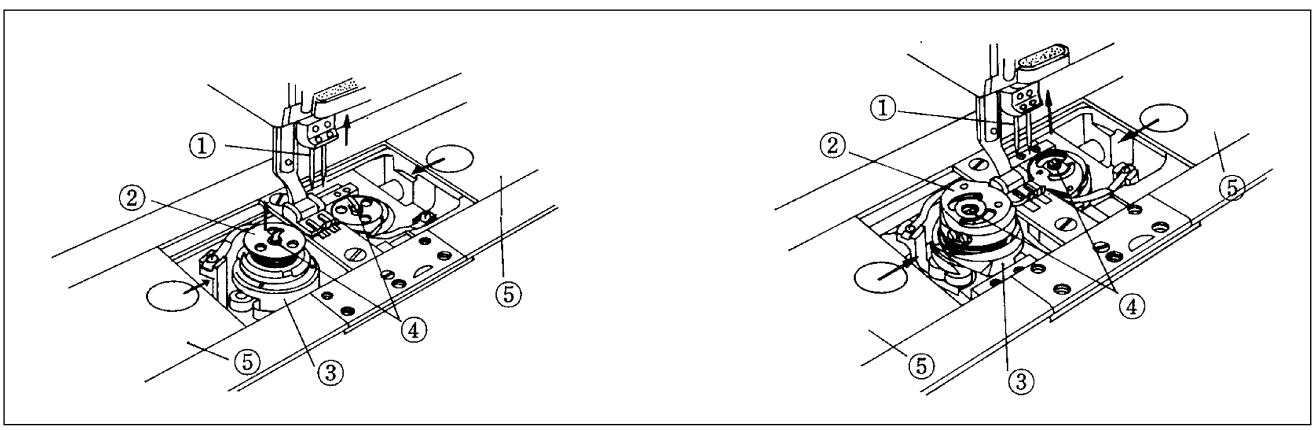
(Application Standard)
KM-790BL-7




[Figure 21]

## 4) Inserting the bobbin

Stop the needle ① at the highest position. Following the figure 22, insert the bobbin (where the thread is rolled onto) or the bobbin case ② into the hook ③. After laying down the bobbin holder ④, close the slide plates ⑤ on the right and left.



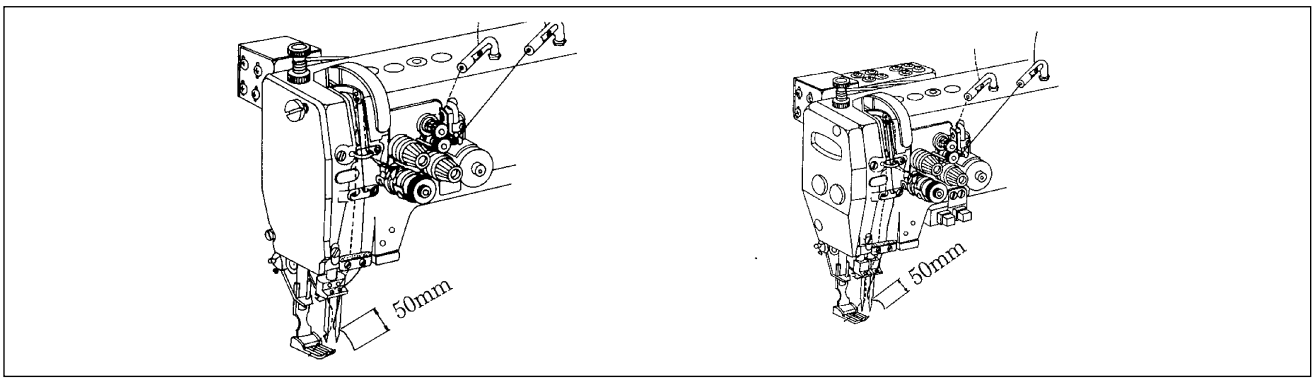

[Figure 22]

## ⚠ Caution

- ▶ In case of taking up the upper thread, be sure to switch off the power supply. If the user presses on the step by mistake, the machine will start automatically, and this might lead to physical injuries.
- ▶ When using the clutch motor, remember that the motor revolves for a while even after switching off the power supply due to inertia. Make sure to start working only after the motor has come to a complete stop.

### 5) Routing the upper thread

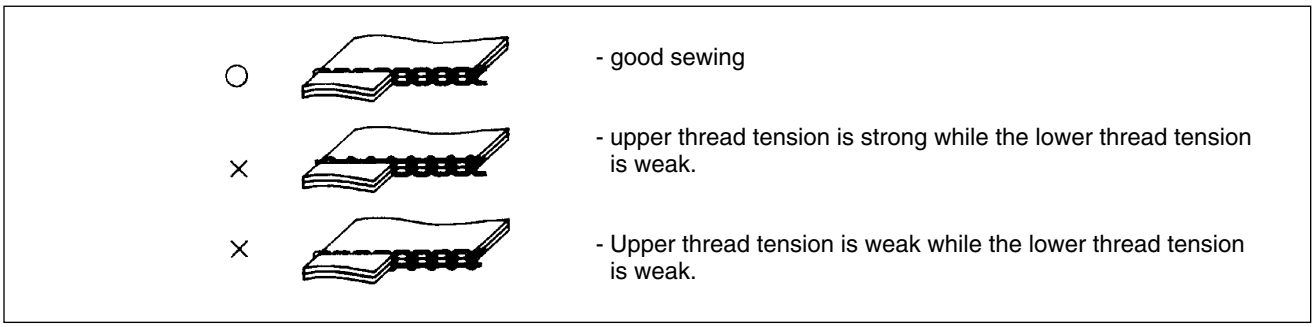
Place the thread take-up lever to the highest position and hang the upper thread like in figure 23. The adequate length of upper thread extending from the needle hole is 50mm for initial sewing.




[Figure 23]

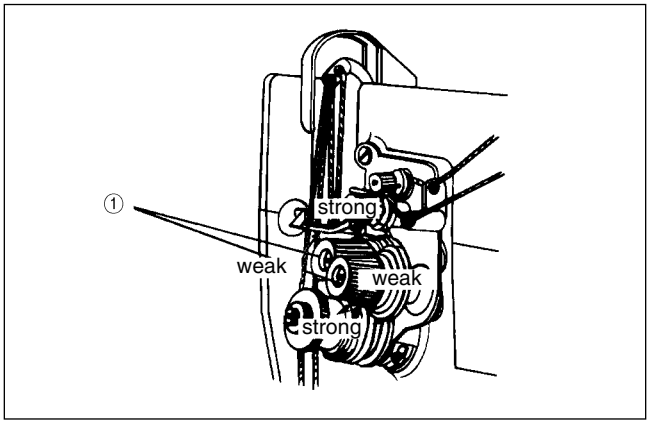
### 6) Adjusting the thread tension

The result of the needlework depends on the sewing conditions such as the sewing material, used thread and stitch length. So please adjust as desired.




#### (1) Adjusting the upper thread tension

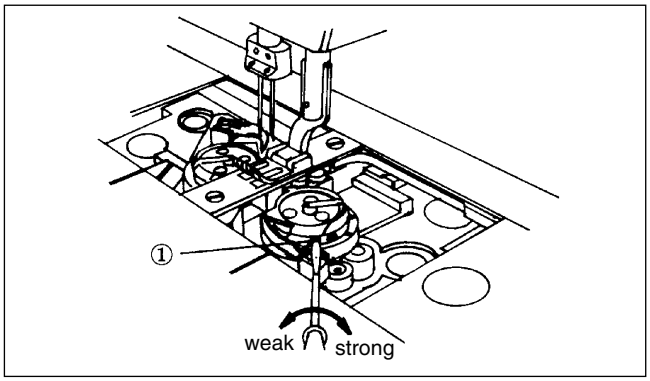
Like in figure 24, turning the tension adjustment nut ① of the thread tension control assembly clockwise makes the upper thread tension stronger and counterclockwise makes it weaker.




[Figure 24]

### (2) Adjusting the lower thread tension

Like in figure 25, turning the tension adjustment nut ① of the hook clockwise makes the lower thread tension stronger and counterclockwise makes it weaker.




[Figure 25]

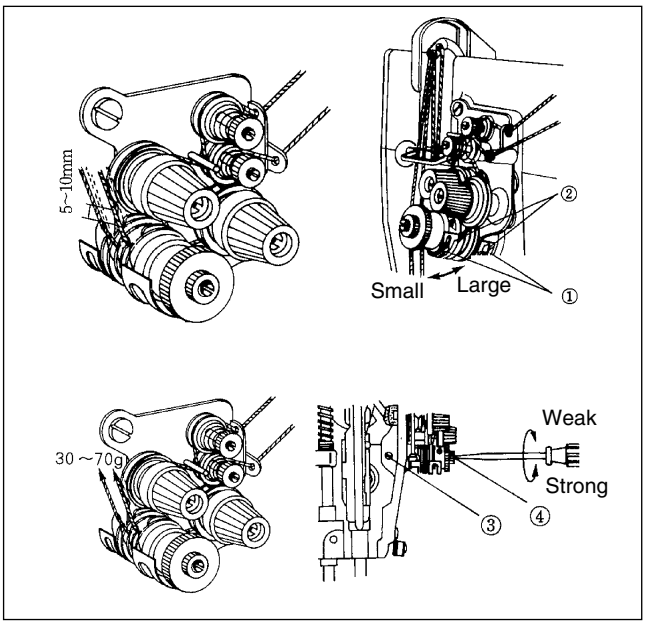
### (3) Adjusting the tension of thread take up lever spring

A. Adjusting the thread take up stroke

As in figure 26, loosen the stopper fastening screw ①, and turn the thread take up lever's spring stopper ② clockwise to make the stroke smaller and counter clockwise to make it bigger. The thread take up stroke is normally 5~10mm.

B. Adjusting the thread take up tension

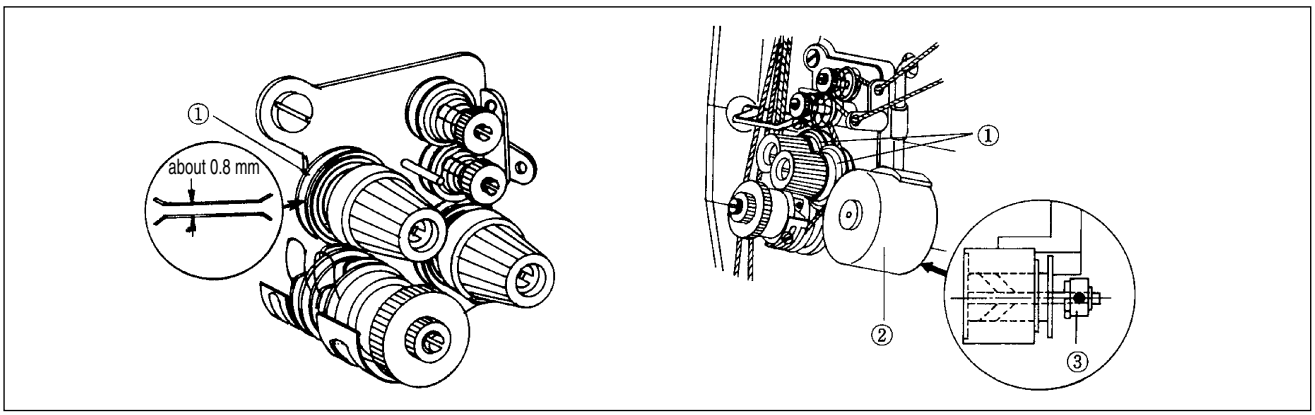
As in figure 26, loosen the screw ③ of the thread tension control assembly, and insert the driver into the groove ④ of the thread tension control assembly. Turn clockwise to make the spring tension stronger and counter clockwise to make it weaker. The thread take up spring tension is normally 30~70g.




[Figure 26]

### (4) Adjusting the thread release stroke. (for automatic trimming type)

If the upper thread falls out from the needle hole after trimming, check whether the plate ① opens while the trimming is in action. For the adjustment of plate opening level, put the solenoid ② in action, and adjust by moving solenoid collar ③ back and forth to make the opening of the thread tension adjusting plate① 0.8 mm. Also, when the thread release solenoid is not in action, check whether the plates are closely adhered to each other. (See figure 27)



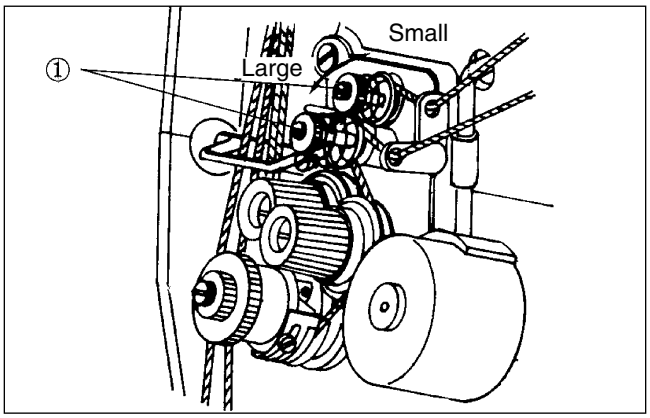

[Figure 27]

**[Caution]**

If the plates do not open enough during trimming action even when the assembling is correctly done, check whether or not the upper thread length adjustment volume, which is at the front of the control box, is low.

### (5) Adjusting the auxiliary thread tension control assembly (automatic trimming type)

As in figure 28, when the auxiliary thread tension adjustment nut ① is turned clockwise, the length of the thread after trimming is short. The other way makes the thread long. The appropriate length of the upper thread on the needle after trimming is 35~45mm. (This can also be done by using the remaining upper thread length adjustment volume of the control box.)




[Figure 28]

## ⚠ Caution

- ▶ Be sure to place back safety devices and check whether they function properly, after disassembling and adjustments.
- ▶ Use both hands when bending the machine backwards or returning it to the normal position. Using only one hand can lead to severe hand injuries due to the weight of the machine.

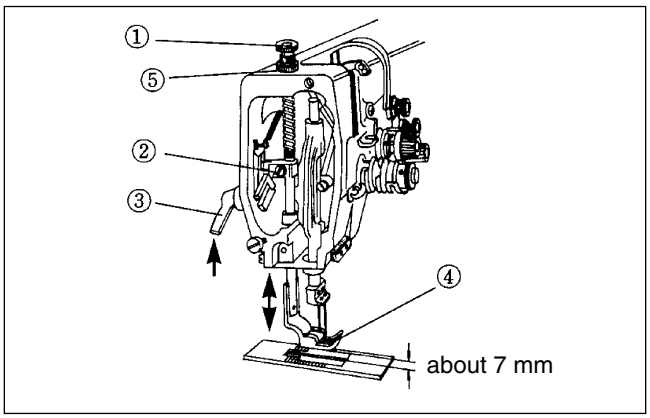
- ▶ Be sure to pay caution to safety when making adjustments with the power switch on.
- ▶ The machine must be repaired and inspected only by trained technicians.
- ▶ Qualified technicians or agent must perform electrical repairs or inspections.

## 7) Adjusting the height and pressure of the presser foot

### (1) Adjusting the height of the presser foot

Loosen the pressure adjustment screw ① and the presser bar bracket fastening screw ②, and lift the presser bar lifter③. Make the distance between the upper side of the needle plate and the lower side of the presser foot ④ 7mm. Then, tightly fasten the bracket fastening screw ②. (See figure 29)

Be careful not to turn the presser bar.




[Figure 29]

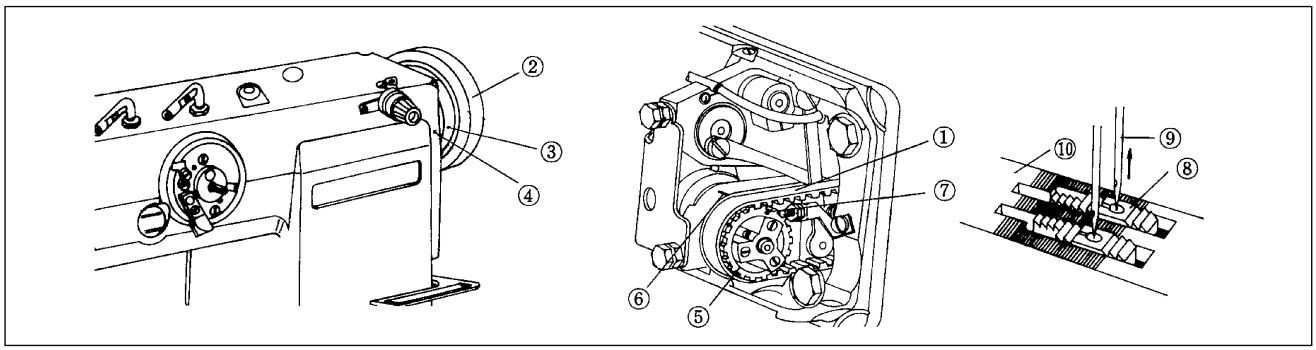
### (2) Adjusting the tension of the presser foot

Turning the pressure adjustment screw① to the right increases the presser foot tension, and turning it to the left makes it weaker. After adjusting, make sure to tighten the fixing nut⑤. (See figure 29)

## 8) Adjusting the needle and feed dog timing

After removing the needle, lay down the machine on its back and remove the timing belt①. Turn the pulley② to align the highest position③ of the pulley's thread take up lever with the position ④. Then rotate the timing pulley ⑤ to align the bed base point ⑥ with the timing pulley's base point ⑦. Hang the timing belt ① in this position.

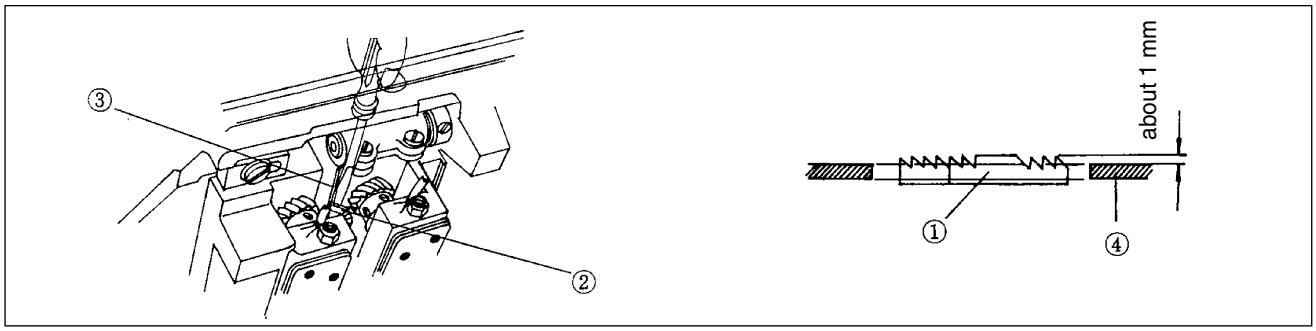
After adjustment, when the feed dog ⑧ comes down and the needle ⑨ goes up, check whether the needle tip⑨ matches the needle plate upper side ⑩ at the moment that the feed dog upper side and the needle plate upper side⑩ match each other. (See figure 30)




[Figure 30]

## 9) Adjusting the height of the feed dog

Turn the pulley to place the feed dog ① in the highest point. Loosen the feed dog base fastening screw② and move the feed dog base ③ up and down to make the feed dog① stick out in parallel from the needle plate upper side④ for about 1 mm. (See figure 31)

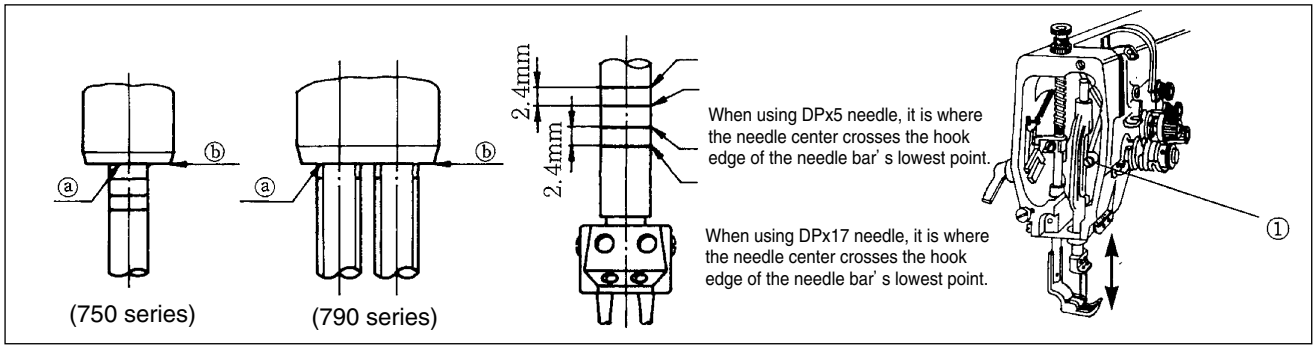



[Figure 31]

## 10) Adjusting the needle and hook timing

### (1) Fixing the height of the needle bar

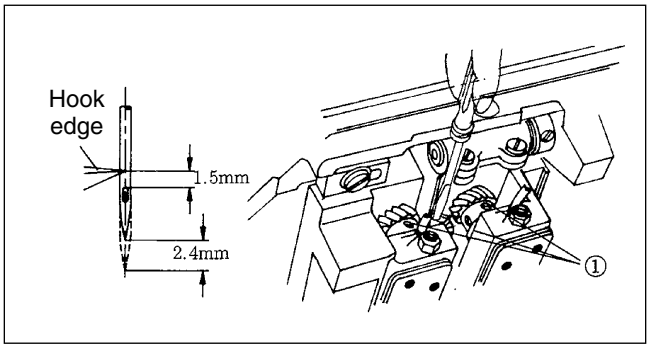
Turn the pulley to make the needle bar in the lowest position. Loosen the needle bar holding screw①, adjust so that the needle bar carved sign ⓐ meets the end of the frame ⓑ like in figure 32, then tighten the screw.




[Figure 32]

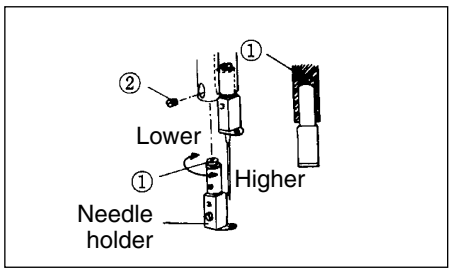
### (2) Adjusting the timing of hook edge and needle center crossing

A. First, set the stitch length of (DIAL) KM-750, 750-7, 790, 790-7 types at 2.5mm and KM-750BL, 750Bl-7, 790BL, 790BL-7 types at 3.5mm. Adjust the hook gear fastening screw① so that like in figure 40, the hook edge fall exactly at the center of the needle center when the needle bar is raised 2.4mm from its lowest position. When this is done, the hook edge will be placed at about 1~1.5 mm above from the upper shaft of the needle thread hole.



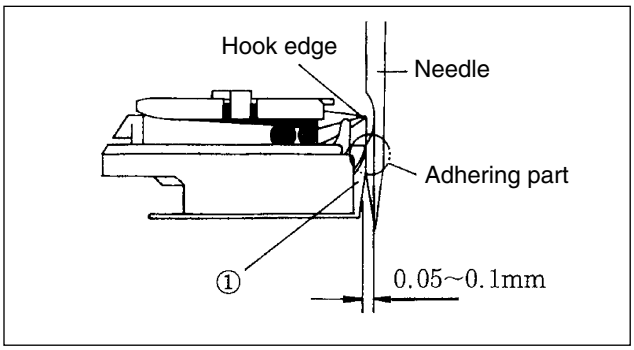

[Figure 33]

B. In case of the 790 series, if the height of the left and right needles is not the same, or if the figure 33 situation-where the needle bar is raised 2.4 mm but the hook edge is not placed about 1~1.5 mm from the upper shaft of the needle thread hole-is not true, loosen the fixing screw② of figure 34, pull out the needle holder, and adjust the needle holder position fixing screw① up and down to set the height of the needle.

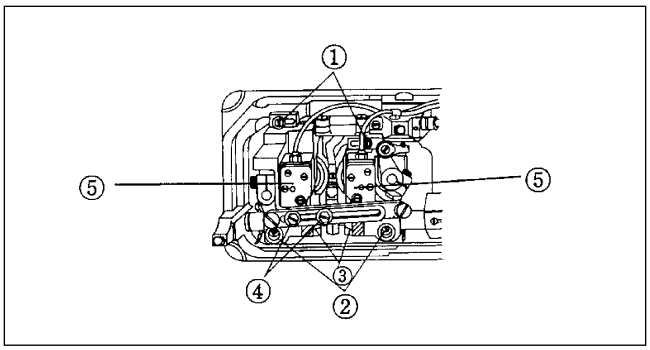



[Figure 34]

C. Adjusting the distance between the needle and the hook edge
Raise the needle from its lowest point so that the hook center meets the needle center. Like in figure 35, when the lower shaft of the needle meets the balance point of the hook' s needle guide plate① (adjust the needle guide form), adjust the distance between the hook edge and the inner side of the needle groove to 0.05~0.1mm. Loosen ①②③④ of figure 36 and move the left and right⑤ of the hook base for adjustment.



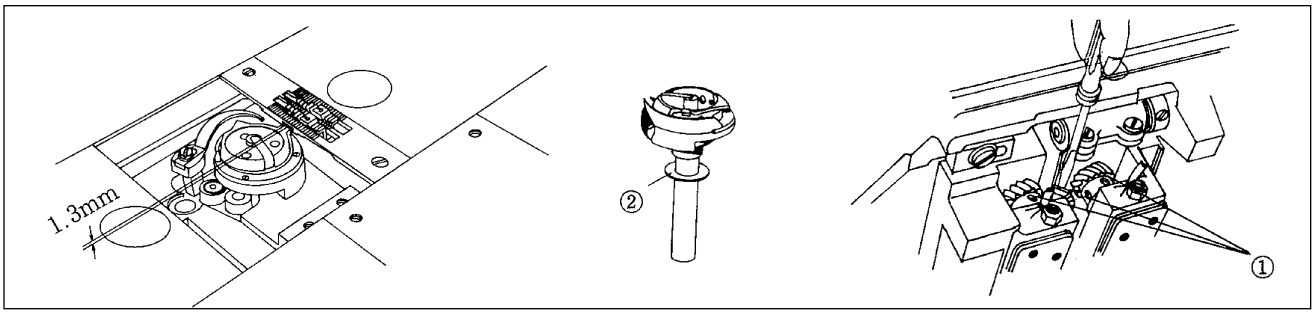

[Figure 35]




[Figure 36]

## 11) Clearance adjustment between the upper side of hook stopper and the upper side of needle board groove

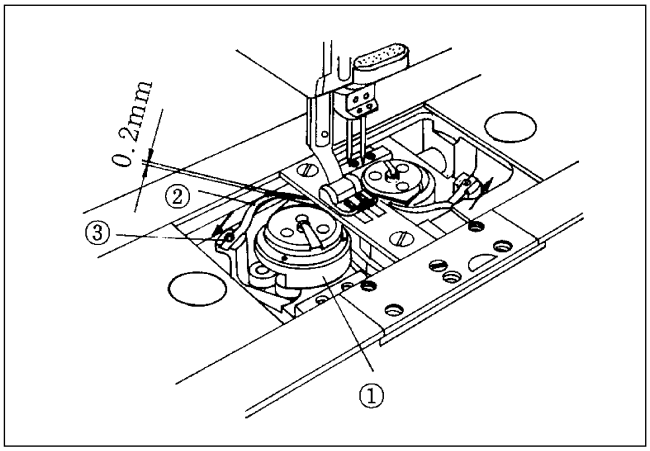
Like in figure 37, the normal distance between the hook stopper and the upper side of the needle plate groove is 1.3mm. This distance is adjusted by the thickness of the space washer ② that lies under the hook. When the hook gear fixing screw ① is removed for repair or replacement, make sure to put back the space washer that was used originally. (as the thickness of the washer may differ by machine)




[Figure 37]

## 12) Clearance adjustment between hook and opener

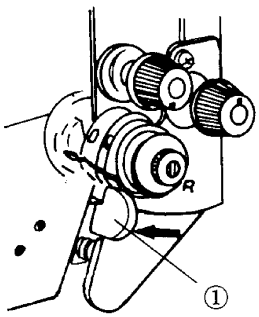
Loosen the opener fastening screw③ and adjust the opener ② to the right and left so that the distance between the hook ① and the opener ② is 0.2mm when the opener ② is pulled to its max towards the arrowed direction. (See figure 38)



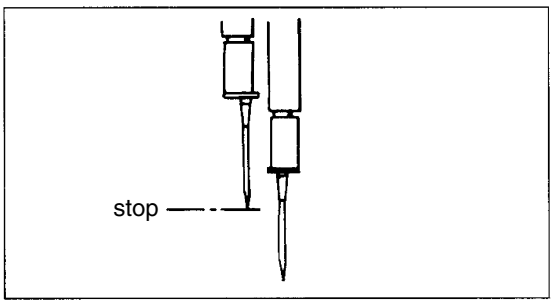

[Figure 38]

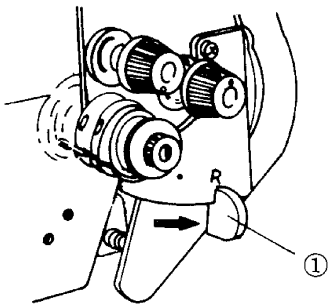
## 13) Operation of needle bar (left, right) stop (KM-790 series)

### (1) Non-trimming type (KM-790, 790BL)

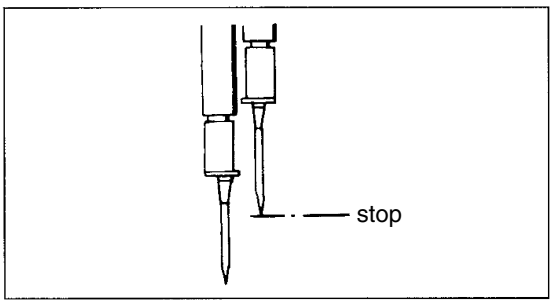


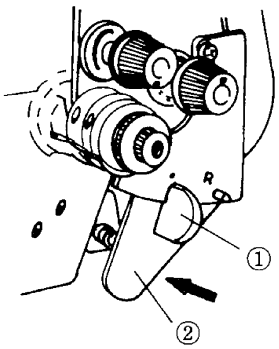

A. When stopping the left needle bar
Place the needle bar trimming direction lever ① to the L (left) position.




B. When stopping the right needle bar
Place the needle bar trimming direction lever ① to the R (right) position.



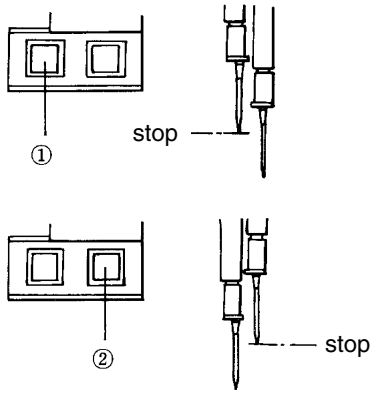




C. When switching to two needle sewing
Vertically press the needle bar return pressing plate②. The needle bar trimming reverse lever ① will return automatically.

※ The needle bar trimming reverse lever ① can be used even during operation. However, don' t use this function when the needle bar is in the highest position. It works safely from the point when the needle bar is about 3 mm below the highest point.

### (2) Trimming type (KM-790-7, 790BL-7)

A. Button usage




a) When stopping the left needle bar (when sewing left turn corner)
Turn on the lamp by pressing the trimming direction button switch (left) ①.

b) When stopping the right needle bar
Turn on the lamp by pressing the trimming direction button switch (right) ②.

c) When switching to two needle sewing
Turn off the light of the trimming direction button switches ①② by pressing once again.

B. Using Program (semi-automatic cornering work)

※ Only 'E' type controller provides this function

**Operation of semi-automatic corner sewing**

For semi-automatic corner sewing, the data program necessary for corner sewing need to be entered to the relevant code number of the box in advance. Given this, when corner sewing is necessary during ordinary sewing, press the left needle or right needle button, as desired, and step onto the pedal. The needle of the pressed button will stop in up-stop position while the other needle will stop after sewing the preset number of stitches. Then, turn the angle of the sewing material and step onto the pedal for the second time. The machine will stop after sewing the preset number of stitches. If the pedal is stepped once again, the up-stopped needle automatically revokes getting back to the normal double-line sewing.

※ Programming order

**Reference Explanation**

After reading thoroughly the program entering method in the manual for electronic part, program using the initial configuration of "A" group code numbers 30 to 36.

ⓐ Call out the code number 30 and enter 1 as the initial configuration value. Entering 1 gives the semi-automatic cornering function while entering 0 doesn't.

ⓑ Call out the code number 31 and designate the desired sewing speed. Adjustments can be made freely within the range of 24 spm to 2040 spm.

ⓒ According to the direction of corner sewing,

※ For left corner sewing,
Enter the number of stitches of the right needle for the first round , with the left needle in the up-stop position, into code number 32, and second round into code number 33.

※ For right corner sewing,
Enter the number of stitches of the left needle for the first round , with the right needle in the up-stop position, into code number 34, and second round into code number 35.

ⓓ The data entered to code number 36 is 450 (45 seconds), which is the time that the machine waits before turning off the power automatically in order to protect solenoid when the machine is not operated after selecting the left/right solenoid. If adjustment needs to be made to this time interval, it may be done with in the range of 5 (0.5 seconds) to 1275 (127.5 seconds)

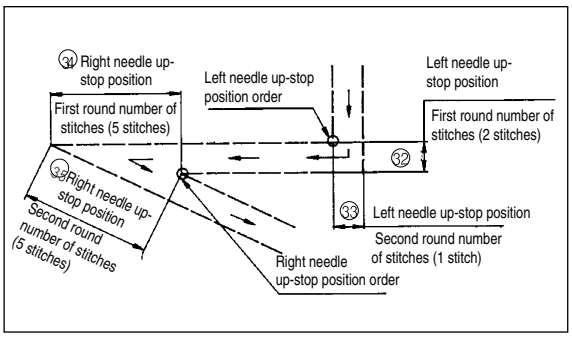
**Reference explanation**

※ The number of stitches of the left and right needles can range from 0 to 64.
※ Once the programming is done in the above method, operating the machine in the before-mentioned semi-automatic corner sewing method whenever necessary will repeatedly render semi-automatic corner sewing.

ⓔ Example

When corner sewing is carried out after entering the following data, the resulting needlework will be as figure 39.

| Code No. | Initial configuration | What it means |
|---|---|---|
| 30 | 1 | Whether or not semi-automatic corner work will be carried out |
| 31 | 1500 | Speed of semi-automatic corner work |
| 32 | 2 | First round no. of stitches for the right needle when the left needle is in up-stop position |
| 33 | 1 | Second round no. of stitches for the right needle when the left needle is in up-stop position |
| 34 | 5 | First round no. of stitches for the left needle when the right needle is in up-stop position |
| 35 | 5 | Second round no. of stitches for the left needle when the right needle is in up-stop position |
| 36 | 450 | Left and right needle solenoid waiting time |




[Figure 39]

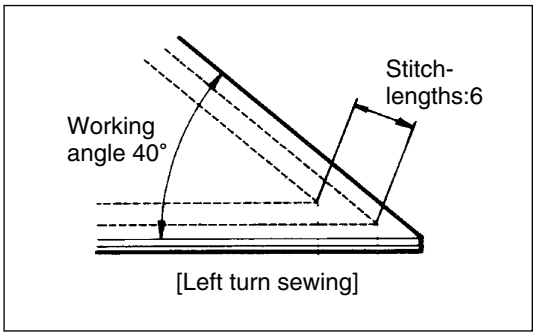
Here, the corner sewing speed is 1500 spm, and the left and right solenoid holding time is 45 seconds.

ⓕ With the semi-automatic corner sewing data entered, if the left/right button is pressed before start operating the machine and then step on the pedal, semi-automatic sewing gets started immediately according to the entered data.

C. Reference table for adjusting the number of stitches when sewing corners (when the needle width is 1/4")

In order to do accurate corner sewing, decide on the stitch length taking the following reference table into account. Tat is, once the sewing angle and stitch length is known, it becomes clear how many stitch lengths the outside needle needs to be set apart from the inside.

Ex) If you look at figure 40, the sewing angle is 40° and the stitch length is 2.9 mm. Then the outside needle need to be set apart by 6 stitch-length.



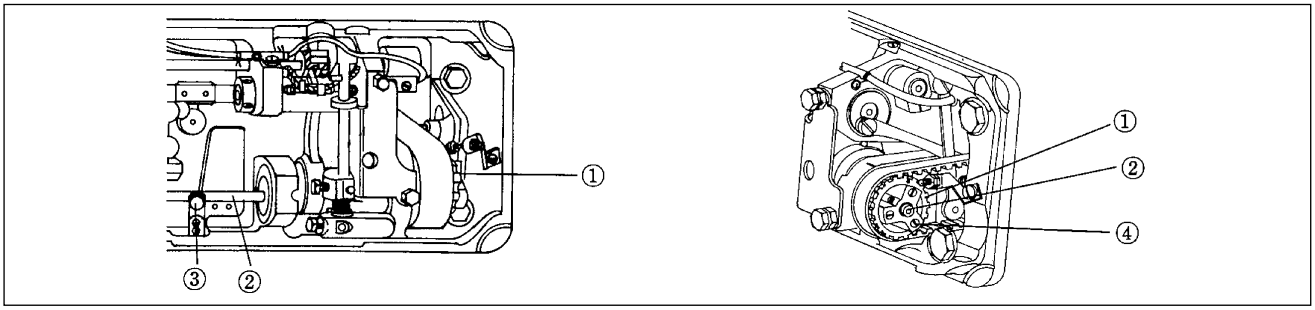

[Figure 40]

| no of stitch-lengths \ sewing angle | 30° | 40° | 50° | 60° | 70° | 80° | 90° | 100° | 110° | 120° | 130° | 140° |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | | | | | 4.6 | 3.8 | 3.2 | 2.7 | 2.2 | 1.8 | 1.5 | 1.1 |
| 3 | | | 4.6 | 3.5 | 3.0 | 2.5 | 2.1 | 1.8 | 1.5 | 1.2 | | |
| 4 | | 4.4 | 3.4 | 2.8 | 2.3 | 1.9 | 1.6 | 1.3 | | | | |
| 5 | 4.8 | 3.5 | 2.7 | 2.2 | 1.8 | 1.5 | 1.3 | | | | | |
| 6 | 4.0 | 2.9 | 2.3 | 1.9 | 1.5 | 1.3 | | | | | | |
| 7 | 3.7 | 2.5 | 2.0 | 1.6 | | | | | | | | |
| 8 | 3.0 | 2.2 | 1.7 | | | | | | | | | |

## 14) Adjustment of safety device

When there is over load in the machine during operation, the safety device pulley ① and the lower shaft ② get separated, thereby not handing over the driving power of the upper shaft to the lower shaft②. Hence major parts get to be safe from damage. In this case, the power switch needs to be turned off, the cause of overload need to be removed, and lay down the machine on its back. Pressing the latch button③, turn the pulley. Safety device pulley ① and the lower shaft ② will come back to its original position.

※ The load in which the safety device gets activated can be adjusted by turning the adjusting screw④ to the right for large load, and left for small load. (See figure 41)




[Figure 41]

## 15) Adjusting trimming device

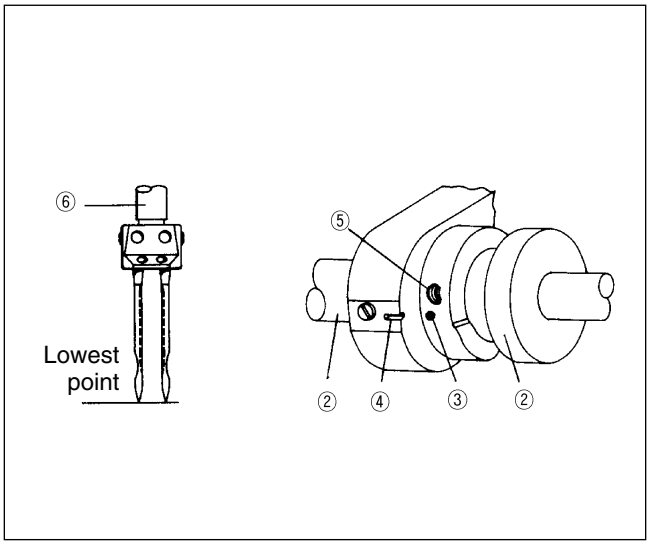
### (1) Adjusting the trimmer driving part

A. Fixing the position of trimming cam (See figure 42)

a) Turn the pulley with hand to place the needle bar ⑥at its lowest position.

b) With the left side of the trimming cam① softly attached to the right side of the lower shaft medium bushing②, turn the cam to align the base point③ with the carve④ in the lower shaft medium bushing crank.

c) Fasten tightly the trimming cam fixing crews(3) ⑤. Now, turn the pulley with hand to see whether or not the machine turns smoothly.




[Figure 42]

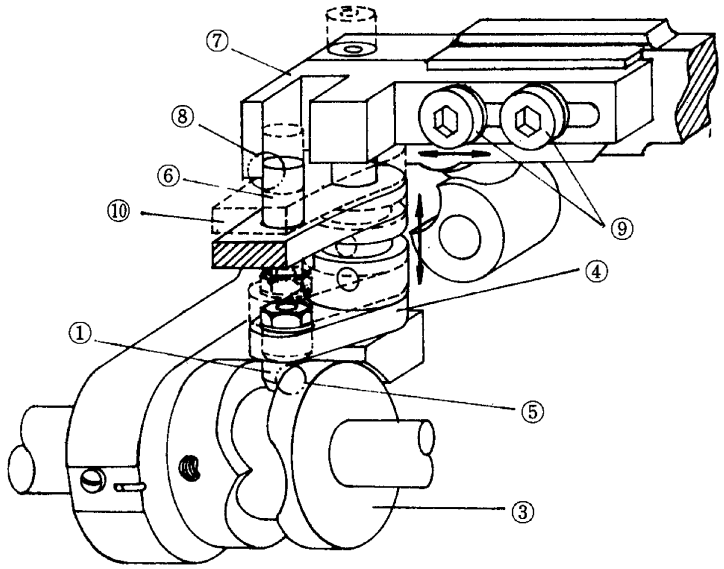
B. Adjusting the stopper pin holder (See figure 43)

a) Once the necessary trimming for trimming cam lead is finished, make sure to turn the machine pulley to place the trimming cam ③ in the right position, so that the roller① can enter the complementary straight line range ②

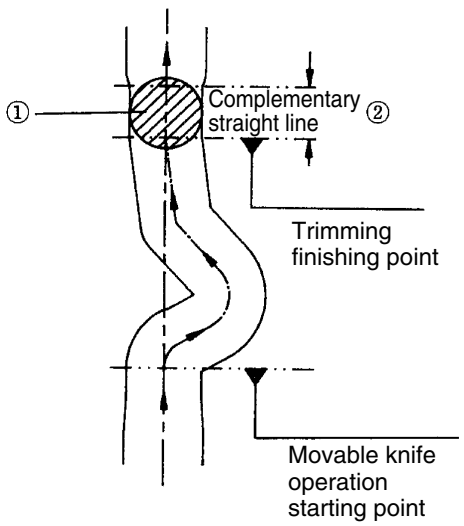
b) Press down the trimmer shake linkage ④ to make the roller ① come inside the trimming cam ③,

※ Adjust the holder ⑦ to make the right equal point of the roller① adhere ⑤ smoothly to the right inside of the cam' s complementary straight line②, and the left equal point of the stopper pin⑥ adhere⑧ smoothly to the left inside of the stopper pin holder⑦. Once this is done, tightly fasten the fixing screw ⑨.

※ Once such adjustments are made, the trimmer shake linkage④ will not move even when shaken to its sides (the roller is inside the cam). Make sure to check if the shake linkage④ returns to its original position⑩ quickly and smoothly when released. If not, proceed with horizontal adjustment of stopper pin holder ⑦.




※ The present cam stop position: still inside the complementary straight line of cam leading, right before the roller drops out upon finishing trimming.



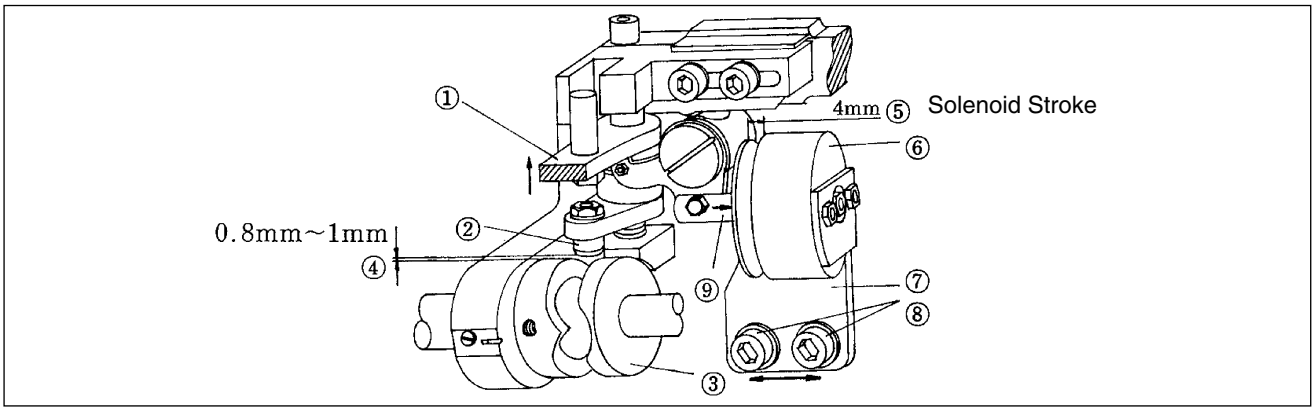

[Trimming cam lead]

[Figure 43]

C. Fixing the position of the trimmer solenoid (ass' y) (See figure 44)

a) When the whole trimmer shake linkage① is in up position, that is, when it has come back to its original position after finishing trimming, the distance④ between the lower part of the roller② and the equal point of the trimming cam ③ is about 0.8~1mm. Assuming that this distance④ never changes, adjust the position of solenoid bracket⑦ horizontally, where the solenoid housing⑥ is attached, to make the solenoid stroke⑤ 4 mm. Then, tightly fasten with fixing screw⑧.

b) After adjusting the solenoid stroke⑤, manually operate the solenoid shaft ⑨ towards the arrow direction. See whether it returns to its original position fast and smooth when released. If not, proceed with horizontal adjustment of the bracket⑦.




[Figure 44]

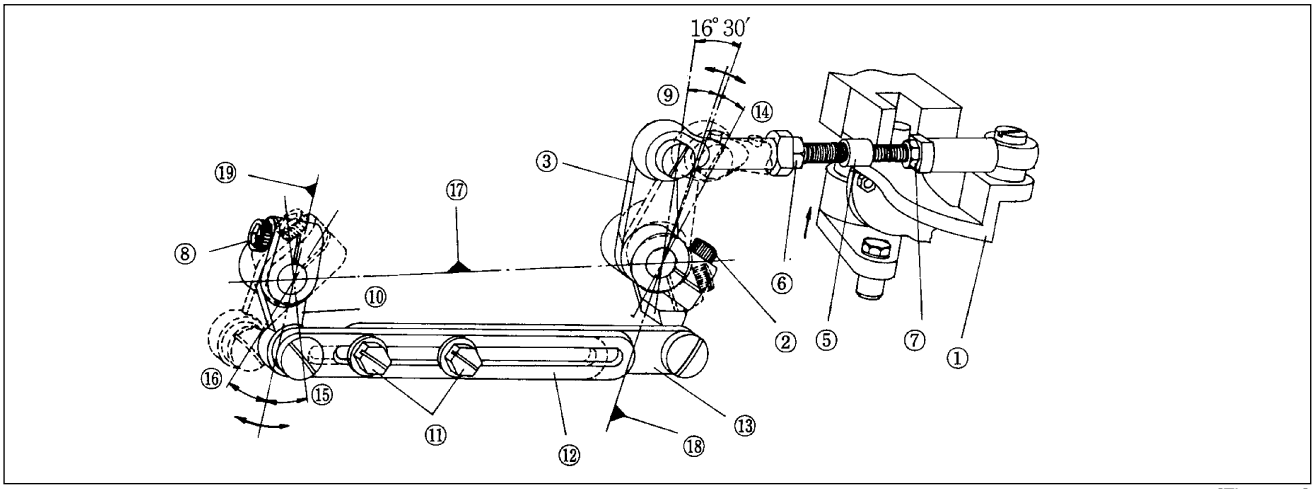
**(2) Adjustment of linking device for movable knife shaft and the trimmer driving part**

A. When the previously explained adjustment of trimmer driving part is complete, it is in its normal position where the trimmer shake linkage① has returned to its up position after trimming action.

B. First, loosen the fixing screw② of the movable knife shaft (right), hold the initial assembling angle of the crank (right) ③ to be about 15°, 30' to the left from the perpendicular line ⑱ drawn to its center ⑰. To make sure that this position is maintained, adjust the length of the ball joint linking bar⑤ which comes assembled to trimmer shake linkage①. Also, adjust the fixing screw ② tightly.
(For the adjustment of the ball joint linking bar⑤, turn the linking bar⑤ after loosening the nuts (left)⑥ and (right) ⑦. ⑥ is left nut and ⑦ is the right nut.)

C. Then, loosen fixing screw⑧ of the movable knife shaft crank (left) ⑩, and in the same angle as the crank(right)' s ③ lower assembling angle⑨, place the crank(left)⑩. Tightly fasten the fixing bolt⑪ to make sure this position holds.

D. When the linking device is connected as such, the movement angles ⑯, ⑮, ⑭, ⑨ of crank (left)⑩ and (right)③ during trimming movement results in an equal angle movements for left and right, against the perpendicular lines ⑱ and ⑲ that are drawn from the center line⑰ of the two movable knife shafts. Hence, it can be said that the trimming movement is very light.




[Figure 45]

### (3) Adjusting movable and fixed knives

A. Adjusting the position of movable knife-edge and hook stopper

a) When a movable knife ① passes the front side of the hook stopper ②, adjust the distance④ to be within 0.05~0.2 mm range like part ③. The upper surface of the movable knife-edge ⑥ should be set up 0.2mm below the upper side of hook stopper ⑤. (Given that the fixed knife is pressing down the movable knife)

b) Clearance ④ adjustment of the movable knife edge and hook stopper front side

※ Loosen the needle plate

※ Place the hook stopper in the hanging position to the needle plate

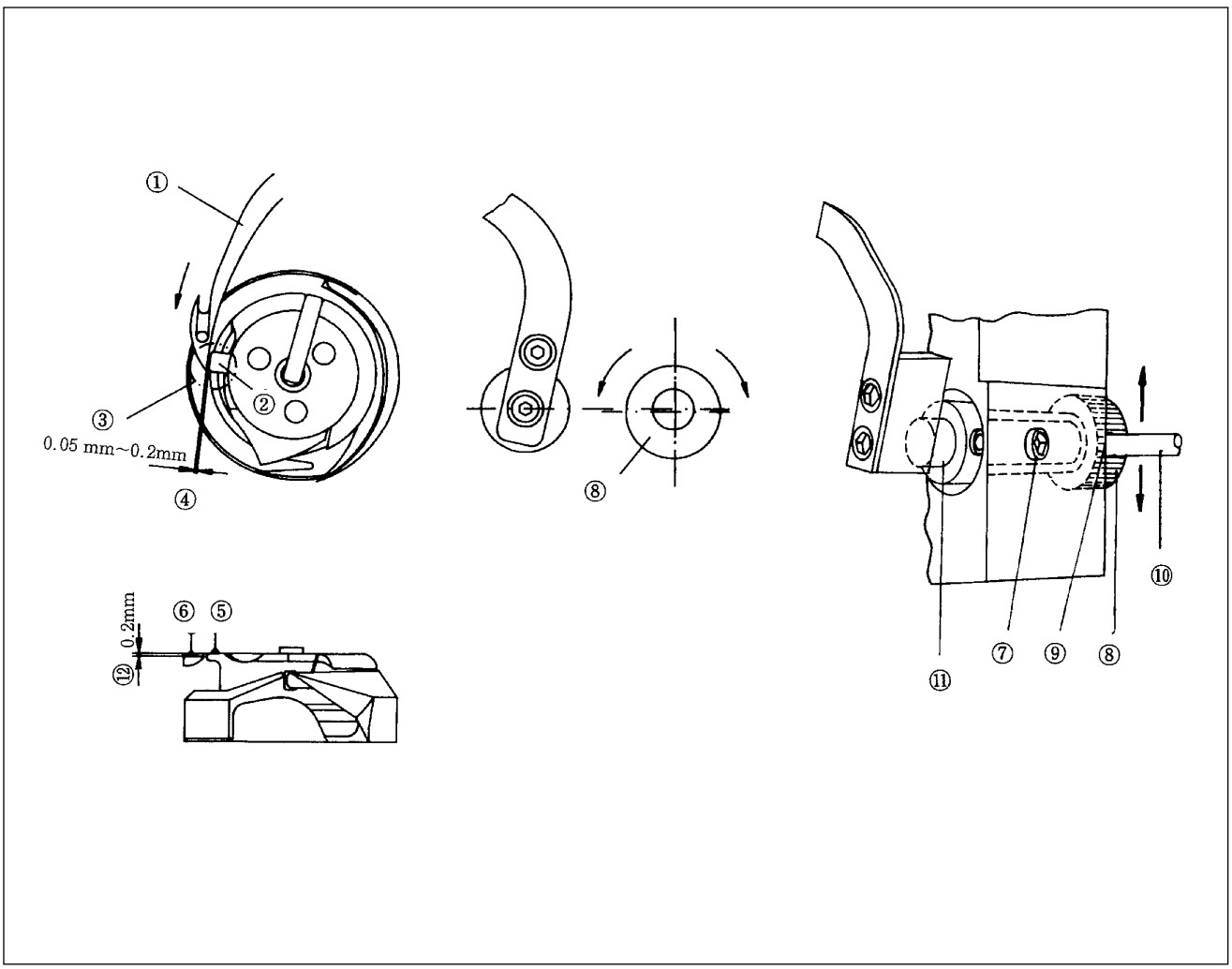
※ Holding the hook with the hand, manually operate trimming movement so that the movable knife-edge is matches the stopper front side ③.

※ Loosen the fixing screw ⑦ of the movable knife shaft eccentric bushing.

※ In the lower side hole⑨ of the eccentric bushing⑧, stick in a thin driver or adequate pin ⑩ and turn right and left. This will make the position of the movable knife shaft ⑪ change, hence changing the distance.

※ When the clearance adjustment is finished, tightly fasten the fixing screw⑦ of the bushing.

c) The adjustment ⑫ of crossing height between the hook stopper upper side ⑤ and movable knife edge upper side ⑥ is possible to certain degree by adjusting the movable knife base washer ⑦ or by changing the position of movable knife shaft collar⑧, as can be seen in figure 54.




[Figure 46]

B. Adjusting movable and fixed knife (See figure 47)

a) Like in figure 47, adjust the position of the fixed knife ③ so that the fixed knife right side edge② matches the movable knife inner side edge①.

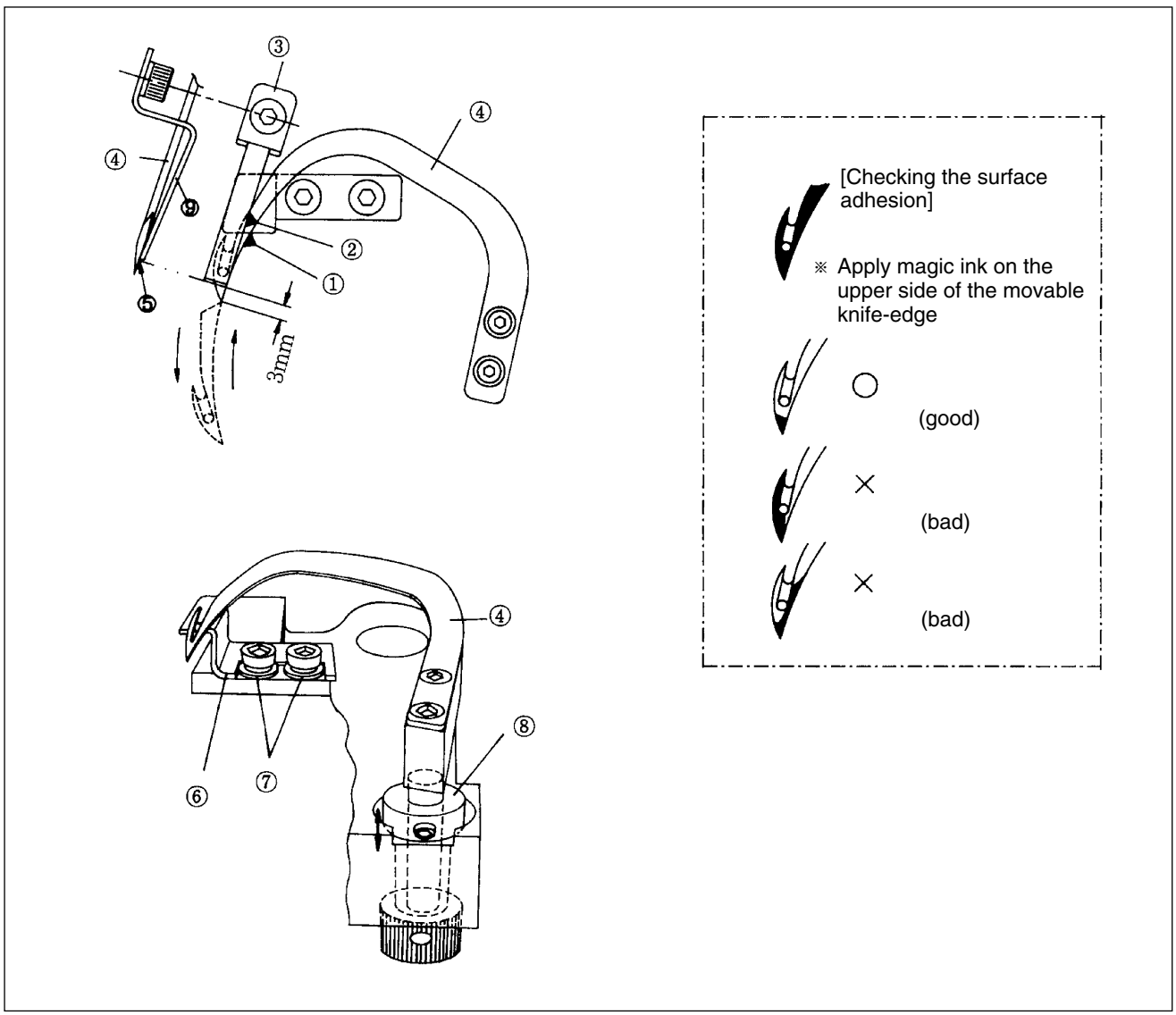
b) The initial assembling position of the movable knife ④ is where the movable knife-edge protrudes about 3 mm from the edge of the fixed blade. Please check the "final fixing of the movable knife initial position" on page 30.

c) The surface adhesion conditions ⑤ of fixed blade edge and movable knife upper side have huge impact on its trimming capacity. Please note the various cases of movable/fixed knife surface adhesion conditions on the picture.

[Correcting the adhesive conditions of movable and fixed knives]

※ Like in figure 47, operate manual trimming movement with magic ink on the movable knife-edge. By checking the ink trace remaining on the movable knife, the surface adhesion condition of the movable/fixed knives can be tested.

※ If the surface adhesion is not very good (same method is used to adjust the tension of movable/fixed knives), please use the following methods: adjusting the amount and position of the washer ⑦ in the lower side of the movable knife base ⑥, horizontally adjusting the assembling position of movable knife shaft collar ⑧, and correcting the shape of fixed blade ⑨ setting position.




[Figure 47]

C. Final fixing of the movable knife's initial position (See figure 48)

※ The standard initial assembling position of the movable knife ① is where the movable knife-edge protrudes about 3mm ③ from the fixed blade edge ② when the trimming action is finished, that is, when the movable knife is in its initial stop position. When fixing the position of the movable knife, the following directions must be followed so that the power generated in the cam ④ is delivered without any loss to the trimming action.

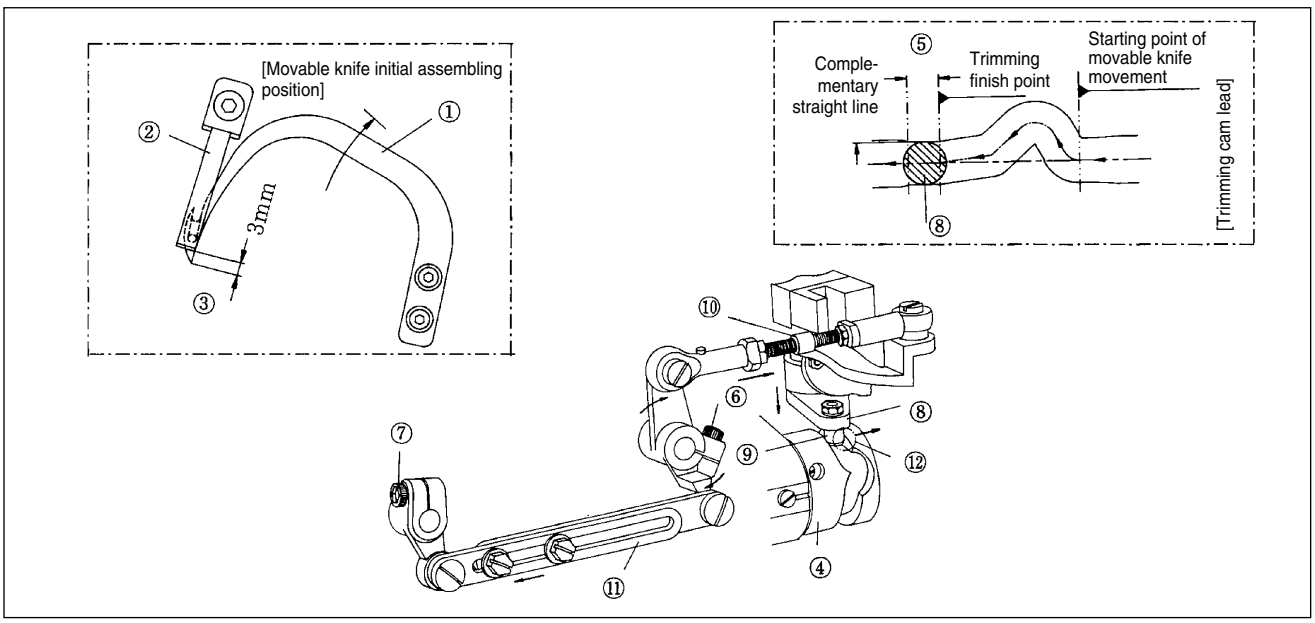
[Adjustment Order]

ⓐ Manually turn the pulley to finish trimming of the trimming cam ④. Place the cam so that the roller can enter the complementary straight line ⑤.

ⓑ Slightly loosen the fixing screws ⑥ ⑦ of movable knife shaft crank of both the left and the right.

ⓒ Press the trimmer shake linkage ⑧ to enter the roller ⑨ inside the cam. Push the linking bar⑩ to the right or the left crank linking rod⑪ to the left so that there is no excess room in each linking device. When this is done, the roller ⑨ gets to adhere to the right side of the cam's complementary straight line ⑤, as can be seen in the picture ⑫. While maintaining this position, adjust to make the movable knives on the right and the left protrude about 3mm from the fixed blade-edge ②. Now, tightly fasten the crank fixing screws ⑥⑦ on both sides.

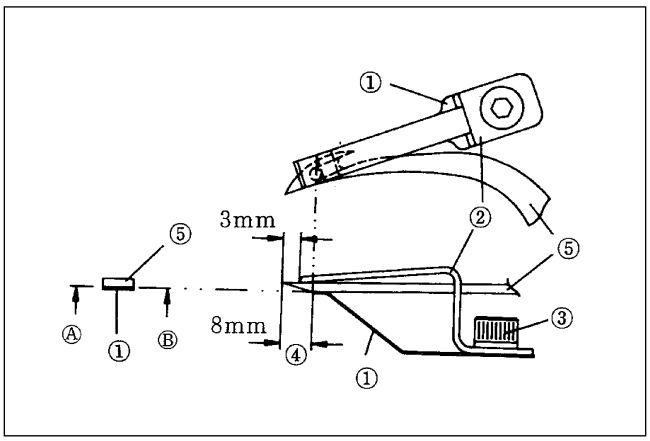
ⓓ If the initial position of the movable knives of both sides are to be adjusted slightly, use the ball joint linking bar ⑩. If only the movable knives are to be adjusted, use the linking rod ⑪.




[Figure 48]

D. Adjusting lower thread holder (See figure 49)

The position of lower thread holder ① is set by fixed blade② and bolt ③. Like in the picture, loosen the bolt ③ and place the lower thread holder① edge at the lower side of the movable knife ④, about 8mm apart from the movable knife edge ⑤. Make sure to check that the right and left upper sidesⒶⒷ of the lower thread holder is tightly adhered to the lower side of the movable knife.

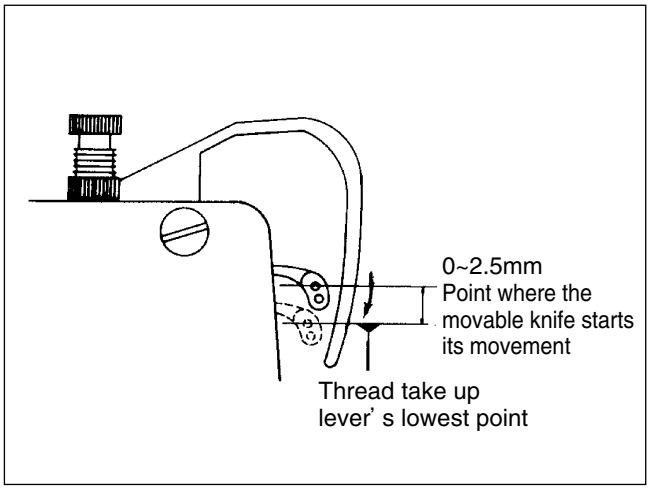



[Figure 49]

E. Checkpoints on the assembling status of other trimming devices

a) Check the starting point of the movable knife when the trimming action takes place

※ Operate trimming movement manually to check whether the thread take up lever is in the lowest or at least 2.5 mm raised level when the movable knife starts working, like in figure 50.

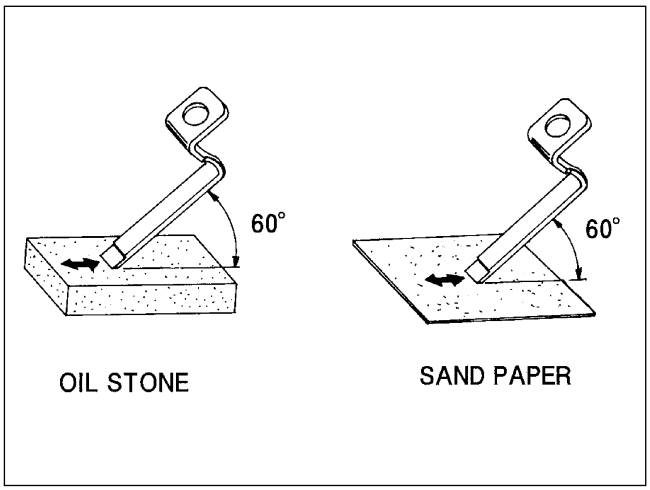



[Figure 50]

b) Maintenance of fixed blade

When the thread does not get trimmed or if the trimmed section of the thread is sloppy, please check the edge condition of the fixed blade.

If the edge of the knife is too dull, sharpen the edge using oil stone or sand paper. (See figure 51)




[Figure 51]

## 16) Replacing movable knife and fixed blade (See figure 52)

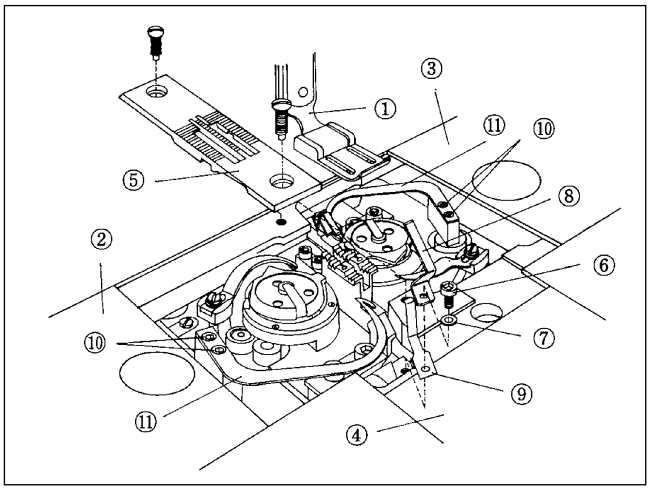
ⓐ Lift the presser foot ① and open the slide plate lefts ②, right ③ and front ④.

ⓑ Disassemble the needle plate ⑤

ⓒ Loosen the fixing screw ⑥, to disassemble the washer ⑦, fixed blade ⑧ and lower thread holder ⑨.

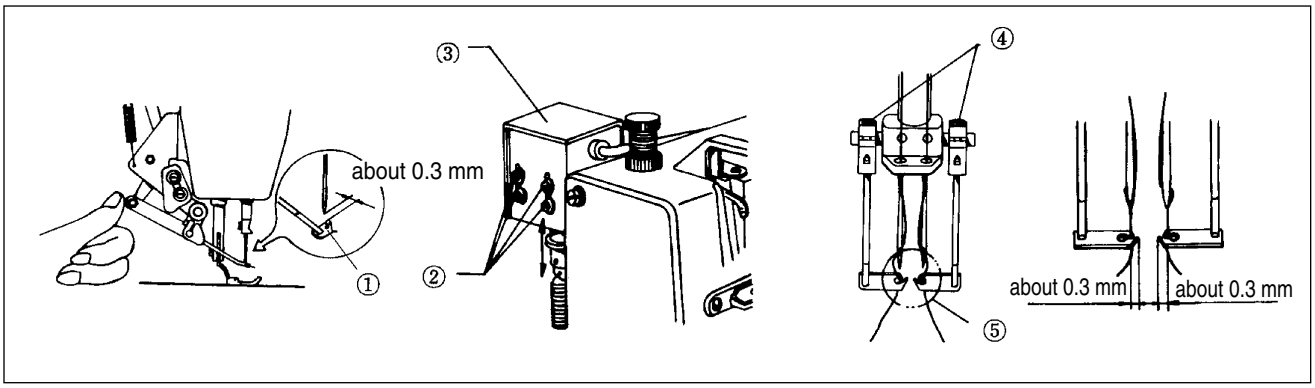
ⓓ Loosen the fixing screw ⑩ and dissemble the movable knife ⑪.

※ To assemble, follow the reverse order of disassembling.




[Figure 52]

## 17) Adjustment of wiper




[Figure 53]

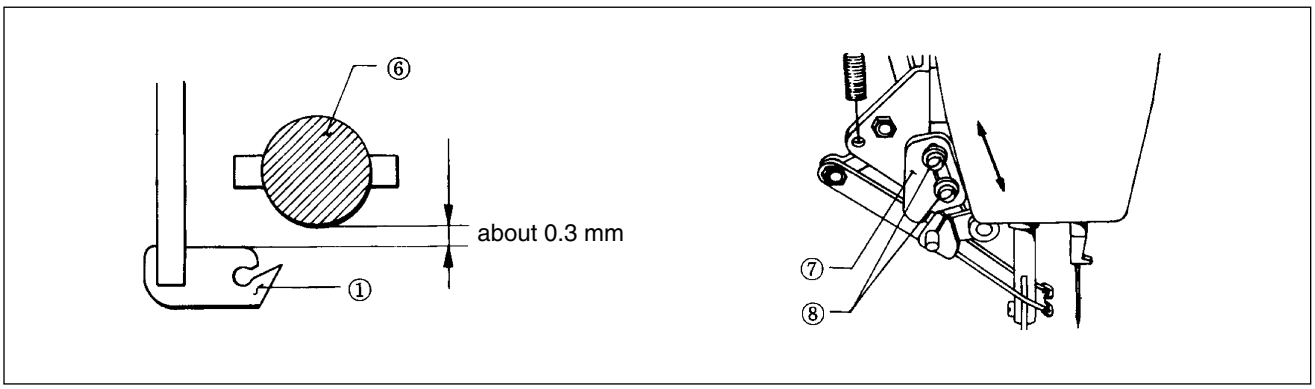
ⓐ Set the needle (at the needle position on the control after trimming)

ⓑ Set the stitch length at dial "2".

ⓒ When pressing with hand as in the picture, the wiper edge ① should protrude about 0.3 mm from the needle edge. Loosen the four clamp screws ② to vertically adjust the solenoid③.

ⓓ Hang the thread onto the two needles.

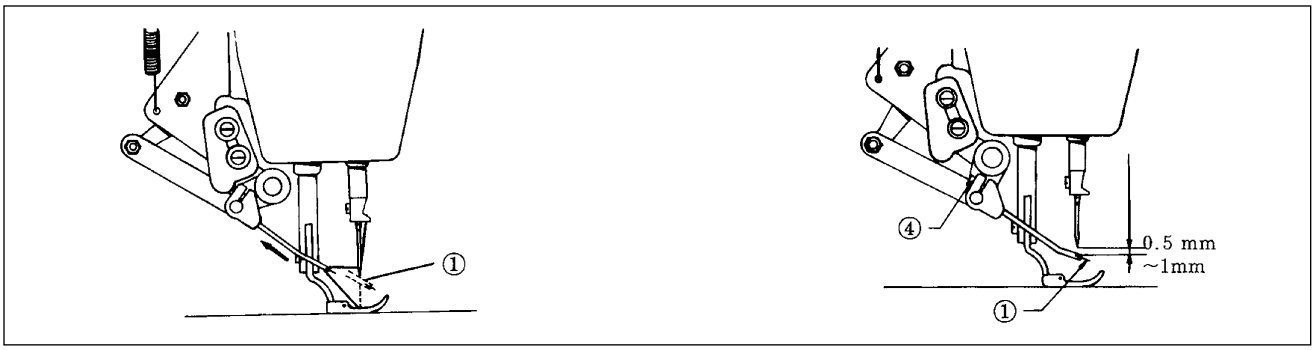
ⓔ The position of the wiper edge ① should look like the picture ⑤, where the two hooks of the wiper① can securely hang the thread. To do so, loosen the clamp screws④ of the wiper and horizontally adjust the wiper ①.




[Figure 54]

ⓕ When the wiper ① is in waiting position, the distance between the wiper edge ① and the presser bar⑥ equal point should be about 3 mm. To do so, loosen the clamp screw ⑧ and vertically adjust the stopper ⑦.

※ Depending on the thread type, there are cases where the thread cannot be hung to the wiper edge. Hence, it is necessary to bring the wiper into the range of the needle where the thread from the sewing material can be hung. Make sure that the needle fixing screw does not get in the way of the wiper.




[Figure 55]

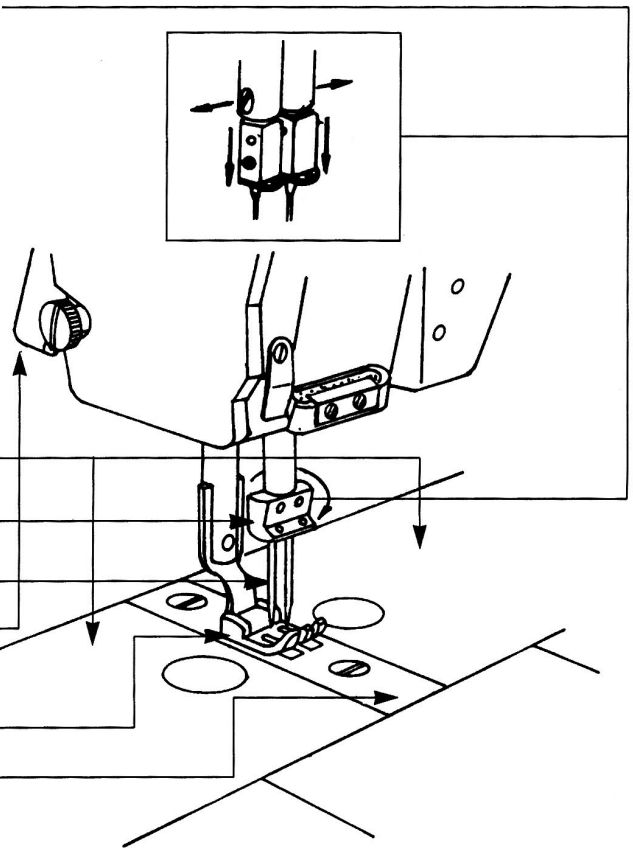
ⓖ The trace of wiper edge① is as the above picture. Adjust the wiper edge ① by loosening the clamp screw ④ and vertically adjusting the distance between the needle edge and wiper to 0.5~1mm.

## 18) Replacing gauge set for needle width

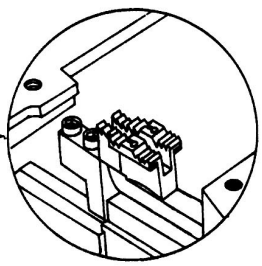
### (1) Disassembling order

**[Caution]** Turn off the power switch.

1. Remove the right and left slide plates.
2. Remove the two needles
3. Disassemble the needle holder
   (※ turn it towards the arrowed direction for removal: KM-750 series)
3. Disassemble the left and right needle holders (KM-790 series)



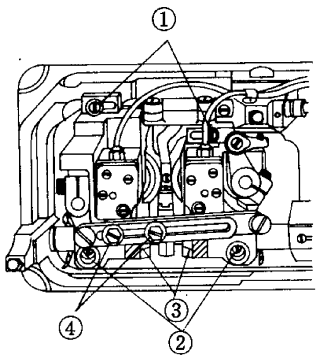
4. Lift the presser bar lifter to raise the presser foot
5. Remove the presser foot
6. Remove the needle plate
7. Disassemble the feed dog



8. Lay down the sewing machine.

**[Adjusting the left/right hook base]**

When replacing with a wider or narrower gauge than the needle width in use, the hook edge and needle distance may not fit correctly. In this case, loosen the screws ①, ②, ③, ④ as can be seen in the picture, and replace the feed dog or adjust the distance between the hook edge and the needle. Fasten after making the adjustments.




### (2) Assembling order

After assembling in the reverse order of disassembling, adjust the left and right hook base.

# 4 Cause of troubles and troubleshooting

## 1) Sewing machine troubleshooting

| No | Symptom | Checkpoints | Root cause | Corrective action |
|---|---|---|---|---|
| 1 | Needle breaks | Direction and height of needle | Needle is inserted into wrong position | Reinsert the needle correctly and push in to its highest level. |
| | | Needle | Needle is bent | Change the needle |
| | | Feed dog timing | Bad timing of feed dog | Adjust the timing of feed dog |
| | | Gap between needle and hook | Bad timing of needle and hook | The heads of the needle and the hook interfere each other. |
| | | | Adjust the timing of needle and hook | Adjust the location of the hook |
| 2 | Thread breaks | Threading method | Wrong threading (inserted from the opposite side) | Thread the needle correctly |
| | | Needle | Bent needle | Change the needle |
| | | Direction and height of needle | Needle inserted in the wrong direction and height | Insert the needle correctly |
| | | Upper thread tension | Too tight upper thread tension | Reduce the tension of upper thread |
| | | Lower thread tension | Too loose lower thread tension | Reduce the tension of lower thread |
| | | Thread take up stroke | Too large stroke | Adjust the stroke level |
| | | Hook | There is a scratch on the hook edge | Remove the scratch on the hook edge |
| | | Feed dog | There is a scratch on the needle hole of the feed dog | Remove the scratch on the feed dog |
| | | Needle plate | There is a scratch on the thread case and around the needle plate | Remove the scratch on the needle plate. |
| 3 | Poor thread adjustment | Thread tension | Upper and lower thread tensions are bad | Adjust the upper and lower thread tensions |
| | | Thread take up spring tension | Thread take up spring tension is inadequate | Adjust the thread take up spring tension |
| | | Gap between opener and hook | The gap between the opener and hook is inadequate | Adjust the gap between the opener and hook |
| 4 | Upper thread falls out when starting to sew or sewing is skipped. | Direction and height of needle | Needle is inserted into wrong position | Reinsert the needle correctly and push in to its highest level. |
| | | Needle | Needle is bent | Change the needle |
| | | Threading | Wrong direction | Insert the thread in the right way. |
| | | Hook timing | The timing between the needle and hook is bad | Adjust the timing between the needle and hook |
| | | Gap between the needle and the hook | Needle and hook are too far apart | Adjust the position of the hook |
| | | Remaining upper thread length after trimming | The length of the remaining upper thread is too short | Increase the adjustment volume of the upper thread on the control box |
| | | Lower thread holder | After trimming, lower thread holder does not hold the lower thread | Adjust the location and tension of the lower thread holder. |
| | | Check the up-stop position of the needle | Due to problems in the up-stop position of the needle, the thread take up lever pulls the upper thread out of the needle when the sewing starts | Readjust the needle' s up-stop film position |
| | | Check the oil felt tension of upper thread | The upper thread oil felt is pressing the thread too strongly. | Adjust the felt tension |

| No | Symptom | Checkpoints | Root cause | Corrective action |
|---|---|---|---|---|
| 5 | Trimming errors | The gap between the movable knife and the hook | The height and distance between the movable knife and the hook do not match | Readjust the movable knife setting position |
| | | Check the tension of fixed knife | Tension and contact of movable and fixed knives are bad | Correct the tension adjustment and surface contact of movable and fixed knives. |
| | | Direction of the needle | Needle is not inserted correctly | Insert the needle correctly |
| | | Blade side of movable and fixed knives | Scratch and abrasion of movable and fixed knives | Replace movable knife or fixed knife. |
| | | Trimming cam timing | The timing of trimming cam is wrong | Adjust the timing of trimming cam |
| | | Thread release stroke | Thread release stroke is too small | Readjust the thread release stroke |
| 6 | Too short thread length after trimming | Trimming timing | Wrong trimming timing | Adjust the trimming timing |
| | | Opening of the thread tension adjusting plate | The opening on the thread tension control plate is too small | Adjust the thread release stroke |
| | | Tension of auxiliary thread tension adjustment assembly | Too strong tension on the auxiliary thread tension control assembly | Adjust the tension of the auxiliary thread tension control assembly |
| | | Thread take up stroke | Thread take up stroke is too large | Adjust the thread take up stroke |
| | | Thread release adjustment volume on the control box | Volume is adjusted to too low | Increase the volume adjustment. |