



USER'S MANUAL

KM-2070P SERIES

Electronically Controlled
1-Needle ZigZag Lock Stitch
Machine
(Mechanical Part)

- 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.



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.

1. Machine Safety Regulations	5
2. Machine Specifications	8
3. Machine Configuration	9
1) Part Name of Machine	9
2) Internal Structure of Control Box	10
4. Machine Installation	11
1) Environment for Machine Installation	11
2) Electric Installation Environment	11
3) Safe Table Mounting of Machine	11
4) Installation of Presser Foot Lifter Pad	13
5) Adjustment of Presser Foot Lifter (group) Pad	13
6) Belt Cover Installation	14
7) Thread Stand Installation.....	14
8) Power Voltage and Power Code Connection	15
9) Cable Connection to Control Box	16
10) Exchanging the fuse.....	17
11) Head Earth Connection	17
5. Preparations to Use the Machine	18
1) How to fill Lubricating Oil	18
2) How to Set a Needle.....	18
3) How to Remove Bobbin Case.....	18
4) Bobbin Case Attachment Method	19
5) How to Wind Lower Thread	19
6) Upper Thread Passing Method	20
7) Adjusting of Stitch Number	20
6. Sewing	21
1) Sewing Method	21
7. Machine Repairing Method	22
1) Thread Tension Adjustment	22
2) Presser Foot Pressure Adjustment	23
3) Presser Foot Height Adjustment	23
4) Feed Dog Height Adjustment	24
5) Feed Dog Slope Regulation	24
6) Feed Dog Front and Back Adjustment	25
7) Needle and Transfer Timing	25
8) Needle Bar Height Adjustment	26
9) Needle and Hook Timing	27
10) Location Adjustment of Hook Holder	27

11) Synchronizer Adjustment -----	28
12) Lubrication Adjustment for Hook -----	29
13) Adjustment of Upper Thread Remainder after Thread Cutting -----	29
14) Location Adjustment of Thread Cutting Cam -----	31
15) Tension Adjustment of Lower Thread Presser -----	32
16) Exchange of Fixed Mess and Moving Mess -----	32
17) Gauge Parts -----	33
18) Adjustment of the Device for Rasing Presser Foot Minutely -----	33
19) Method of Setting the Starting Point -----	34
8. Maintenance -----	35
9. In Case of Using Feed Dog Except Sunstar's One -----	36
10. Failure Causes and Countermeasures -----	37
11. Table Drawing -----	39
12. Guage Parts -----	40

MACHINE SAFETY REGULATIONS




Safety instruction on this manual are defined as Danger, Warning and Notice.

If you do not keep the instructions, physical injury on the human body and machine damage might be occurred.

Danger : This indication should be observed definitely. If not, danger could be happen during the installation, conveyance and maintenance of machines.

Warning : When you keep this indication, injury from the machine can be prevented.

Notice : When you keep this indication, error on the machine can be prevented.

<p>1-1) Machine Transportation</p>  <p>Danger</p>	<p>Those in charge of transporting the machine should know the safety regulations very well. The following indications should be followed when the machine is being transported.</p> <ul style="list-style-type: none"> Ⓐ More than 2 people must transport the machine. Ⓑ To prevent accidents from occurring during transportation, wipe off the oil on the machine well.
<p>1-2) Machine Installation</p>  <p>Notice</p>	<p>The machine may not work well or breakdown if installed in certain places, Install the machine where the following qualifications agree.</p> <ul style="list-style-type: none"> Ⓐ Remove the package and wrappings starting from the top. Take special notice on the nails on the wooden boxes. Ⓑ Dust and moisture stains and rusts the machine. Install an airconditioner and clean the machine regularly. Ⓒ Keep the machine out of the sun. Ⓓ Leave sufficient space of more than 50cm behind, and on the right and left side of the machine for repairing. Ⓔ EXPLOSION HAZARDS Do not operate in explosive atmospheres. To avoid explosion, do not operate this machine in an explosive atmosphere including a place where large quantities of aerosol spray product are being used or where oxygen is being administered unless it has been specifically certified for such operation. Ⓕ The machine were not provided with a local lighting due to the feature of machine. Therefore the illumination of the working area must be fulfilled by end user. <p>[Refer] Details for machine installation are described in 4. Machine Installation.</p>
<p>1-3) Machine Repair</p>  <p>Danger</p>	<p>When the machine needs to be repaired, only the assigned troubleshooting engineer educated at the company should take charge.</p> <ul style="list-style-type: none"> Ⓐ Before cleaning or repairing the machine, turn off the main power and wait 4 minutes till the machine is completely out of power. Ⓑ Not any of the machine specifications or parts should be changed without consulting the company. Such changes may make the operation dangerous. Ⓒ Spare parts produced by the company should only be used for replacements. Ⓓ Put all the safety covers back on after the machine has been repaired.

1-4) Machine Operation



KM-2070P Series is made to sew patterns on fabrics and other similar material for manufacturing.

Follow the following indications when operating the machine.

- Ⓐ Read through this manual carefully and completely before operating the machine.
- Ⓑ Wear the proper clothes for work.
- Ⓒ Keep hands or other parts of the body away from the machine operation parts(needle, shuttle, thread take-up lever, and pulley etc.) when the machine is being operated.
- Ⓓ Keep the covers and safety plates on the machine during operation.
- Ⓔ Be sure to connect the earthing conductor.
- Ⓕ Turn off the electric main power and check if the switch is turned “off” before opening electric boxes such as the control box.
- Ⓖ Stop the machine before threading the needle or checking after work.
- Ⓗ Do not step on the pedal when turning the power on.
- Ⓘ Do not operate the machine with any cooling fan blocked.
The air-filter on control box must be cleaned once a week.
- Ⓙ If possible, install the machine away from source of strong electrical noise such as high frequency welding machines

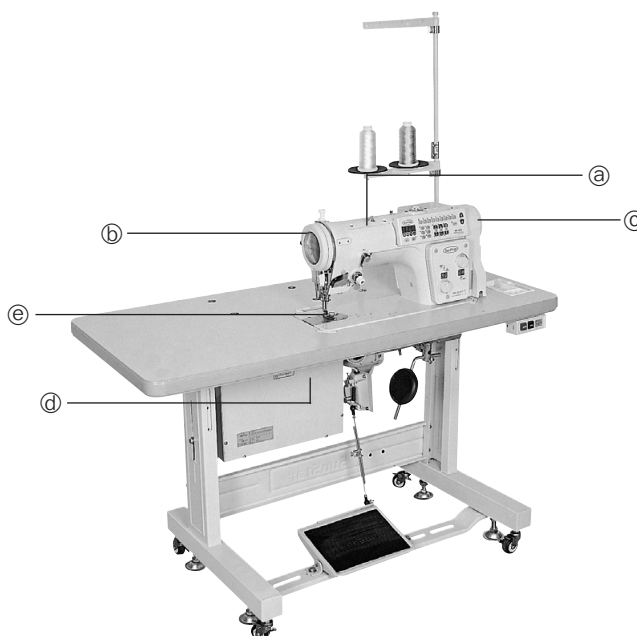
[Warning]

Belt will crush or amputate finger or hand, keep cover in place before operating, turn off power before inspecting or adjusting.

1-5) Devices for Safety



- Ⓐ Safety label : It describes cautions during operating the machine.
- Ⓑ Face plate guard : It prevents from any contact between body and take-up lever.
- Ⓒ Belt cover : It prevents from insertion of hands. feet or clothes by belt.
- Ⓓ Label for specification of power : It describes caution for safety to protect against electric shock during rotating the motors.
- Ⓔ Finger guard : It prevent from contacts between a finger and needle.



1-6) Caution Mark Position



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, 바늘교환이나 청소전에는 반드시 주전원의 스위치를 꺼 주십시오.



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.

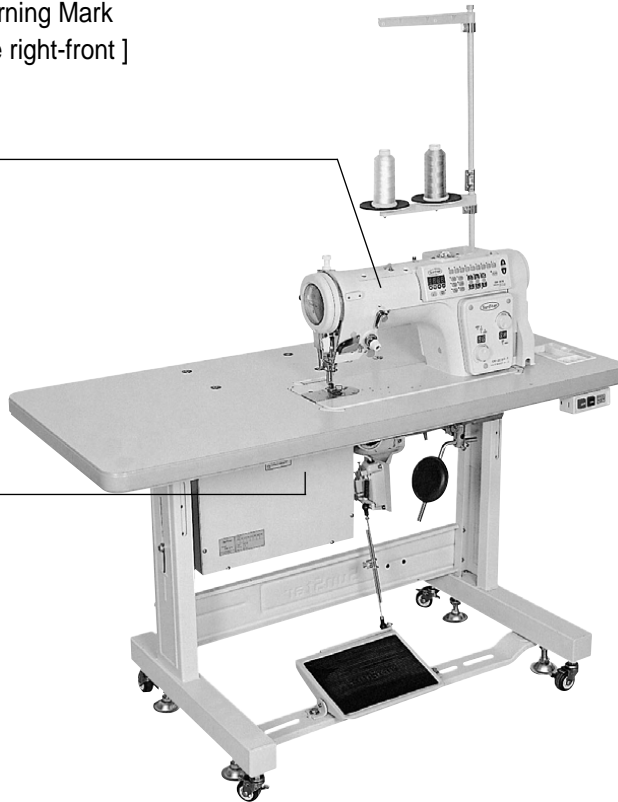
고압 전류에 의해 감전될 수 있으므로 커버를 열 때는 전원을 내리고 전원 플러그를 뽑고 나서 360초간 기다린 후 여십시오.

Caution mark is attached on the machine for safety.

When you operate the machine, observe the directions on the mark.

Position of Warning Mark

[View from the right-front]



1-7) Contents of Marks



Warning

Caution

1)



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, 바늘교환이나 청소전에는 반드시 주전원의 스위치를 꺼 주십시오.

2)

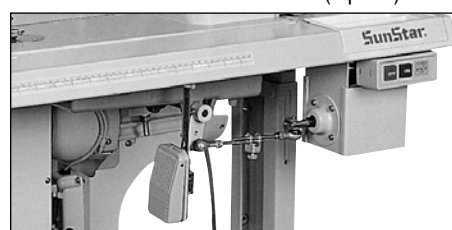
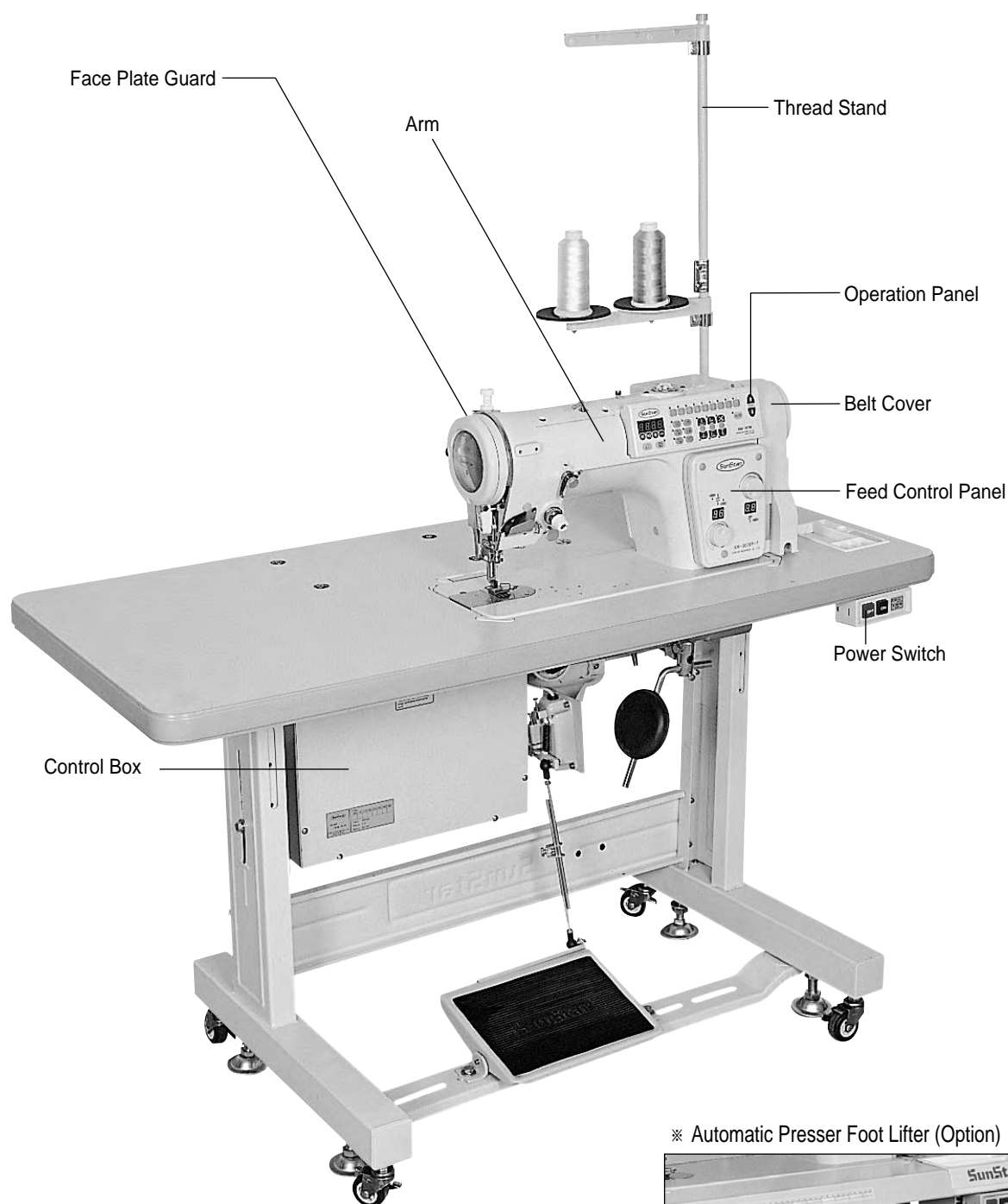


Hazardous voltage will cause injury. Be sure to wait at least 360 seconds before opening this cover after turn off main switch and unplug a power cord.

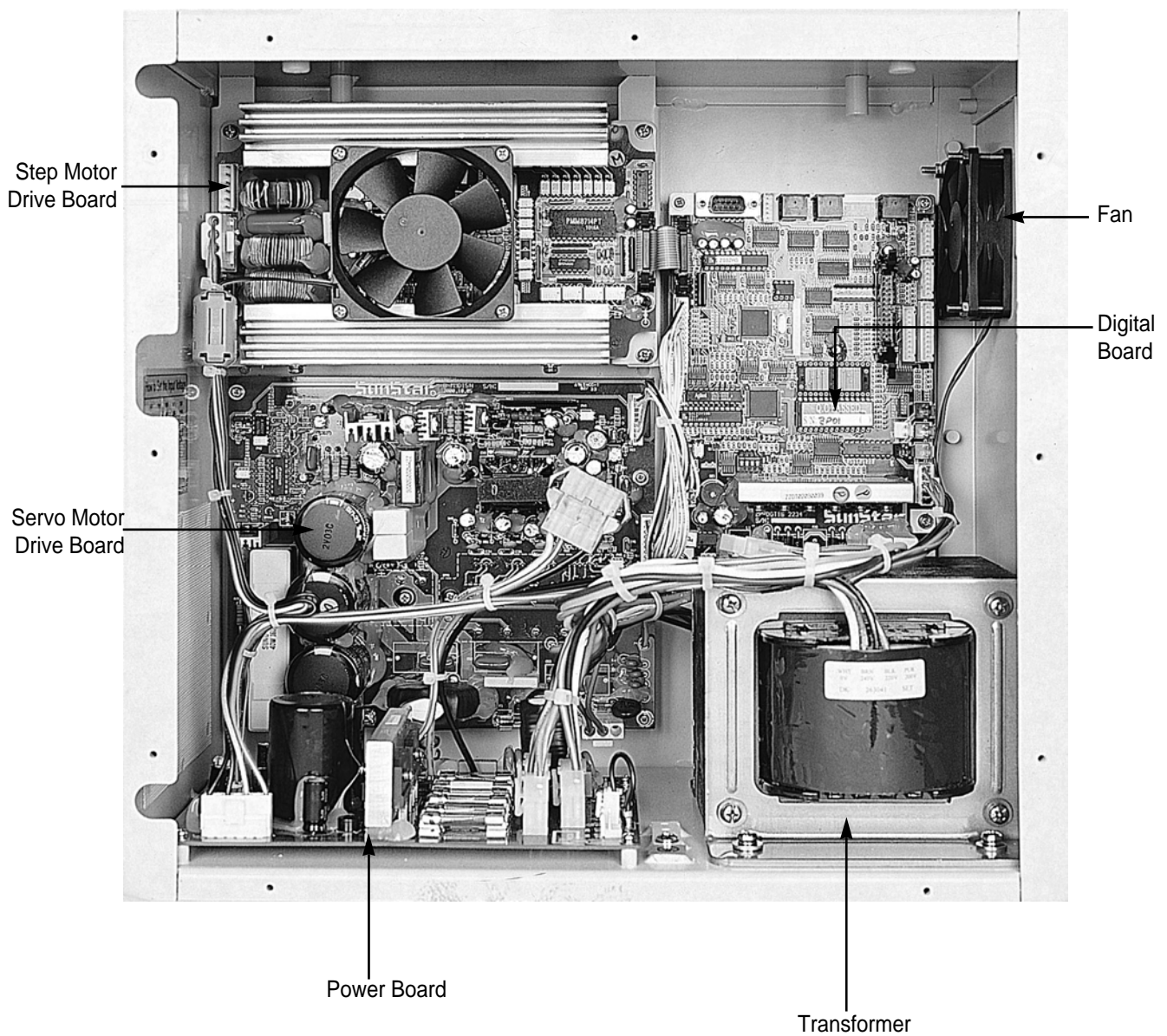
고압 전류에 의해 감전될 수 있으므로 커버를 열 때는 전원을 내리고 전원 플러그를 뽑고 나서 360초간 기다린 후 여십시오.

MODEL		KM-2070P	KM-2070P-7
Stitch Type		Lock Stitch	
ZigZag Width		Max. 8mm/10mm (2 Step, 3 Step)	
Stitch Length		Max. 2.5mm	
Sewing Speed		Max. 5,000 spm(4,000 spm at the time of shipment)	
Needle		SY 1965 Nm 70/10 or DP × 5 #10	
Hook		DP Hook (Titanium Coated Inner Hook) : Hook Center is Offset	
Thread Take-up		Rotary Thread Take-up	
Height of Presser Foot	By Hand	6mm	
	By Knee	10mm	
	Automatic	7mm(Optional)	
Presser Foot Pressure		2~6kgf	
Needle Bar Stroke		33.3 mm	
Provided Patterns		Basic : 8 Kinds, 16 Patterns User Input Pattern : Max. 99 Patterns, 256 Stitches per pattern	
Pattern Input Function			
Automatic Thread Trimmer		×	★
Upper Thread Feeding Device		×	★
Backtack/Condense Device		★	★
Wiper		×	★
Height of Feed Dog		1.0mm	
Motor Specification		550W A/C Servo Motor	
Power Supply		1 Phase: 100~240V, 3 Phases: 200~415, 50/60Hz	
Power Consumption		600VA	
Temperature		5° C~40° C	
Humidity		20%~80%	
Airborne noise level		LAP ≤ 79.9dB(A) (at 3500spm)(Noise measurement according to ISO 10821-CA-M1)	

1) Part Name of Machine



2) Internal Structure of Control Box



1) Environment for Machine Installation

A. In order to use safely, use in the environment as follows:

- ☐ Ambient Temperature for machine operation: 5° ~40° C(32° ~104° F)
- ☐ Ambient Temperature for machine reservation: -10° ~60° C(14° ~140° F)

B. Humidity: within 45~80% (Relative Humidity)

C. Altitude: Up to 1000m above mean sea level.

2) Electric Installation Environment

A. Power Voltage

- Use the power voltage within 10% of the rated voltage.
- It is desirable to use frequency of power within 1% of the rated frequency (50/60Hz)

B. Electromagnetic wave Noise

- It is desirable to use the power separated from the strong magnetic field and high frequency product and keep away from them.

C. In case of attaching additional device and accessories to control box, must safe low voltage.

D. Pay attention that water; coffee and other should not enter into control box and motor.

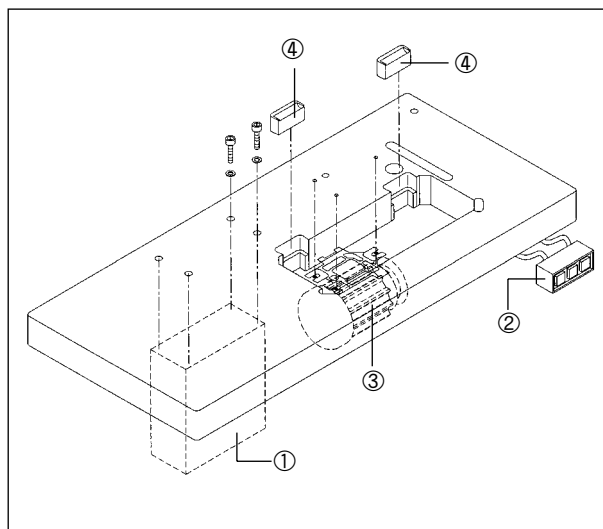
E. Do not drop control box and motor.

[Note]

- Install the machine by trained technician.
- Ask electric wiring to the electric engineer of the purchased selling agent.
- Weight of the sewing machine is over 40kg. Please install it by more than two personnel.
- Do not connect power plug until installation is completed.
Accidentally stepping on the pedal, the sewing machine gets operating and causes injury.
- Execute earth connection. In case that earth connection is no stable, it becomes the cause of electric shock or wrong operation.
- Put the belt cover on the head and motor of the sewing machine.

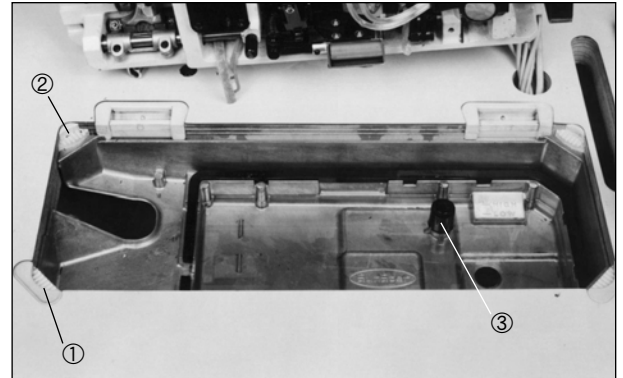
3) Safe Table Mounting of Machine

A. Please fix control box ①, power switch ②, motor ③, and hinge rubber ④ to the table.



[Fig. 1]

- B. Insert head support rubber A①, and head support rubber B② to the corner of oil fan and then mount on the table.
At this time, insert rising stitch support cap ③ on the hole of oil fan.



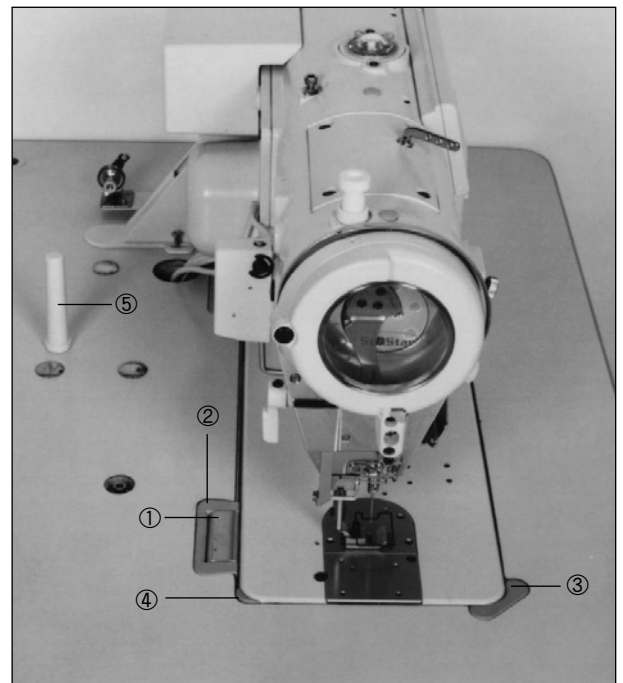
[Fig. 2]

- C. After attaching hinge① inserted to sewing bed to hinge rubber②, put down the head of sewing machine on head support rubber A③ and head support rubber B④ on top of the oil fan.

- D. Drive Head Support Pole⑤ into table.

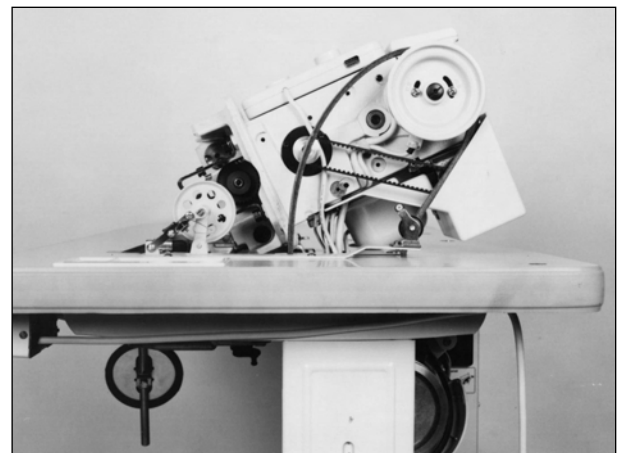
[Note]

- Drive head support pole ⑤ through into end of table firmly.
- Unless drive it into the end, when lay the head of sewing machine, stability is not good and dangerous.



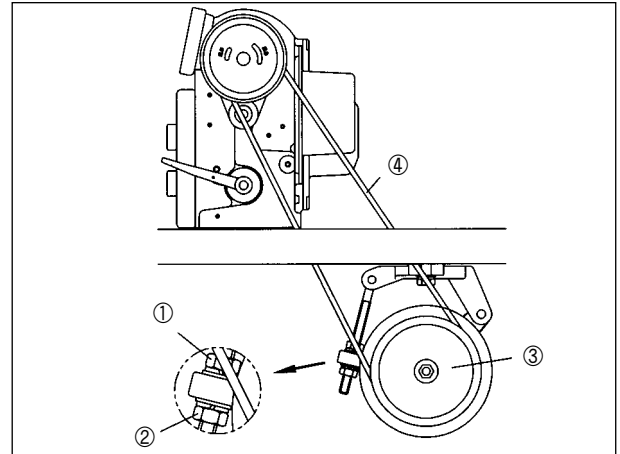
[Fig. 3]

- E. On condition that stood the machine as shown in the figure, insert V belt between pulley and motor of the machine.



[Fig. 4]

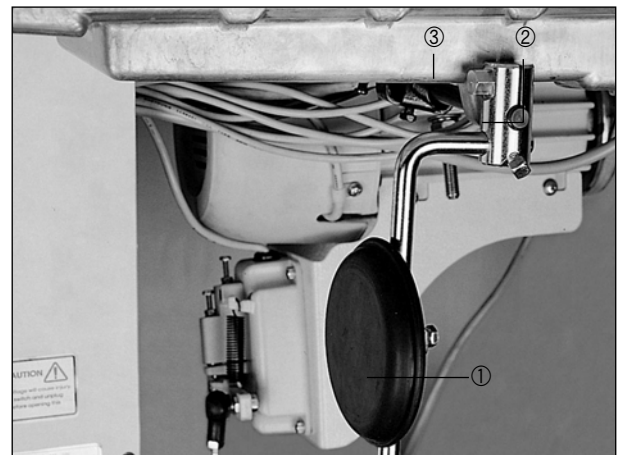
- F. After connecting V belt, fully unfasten the fixing nut ①, ② to up and down, tension occurs to belt by self weight of motor ③. On this condition, fasten the fixing nut ① first and the fixing nut ② tightly.



[Fig. 5]

4) Installation of Presser Foot Lifter Pad

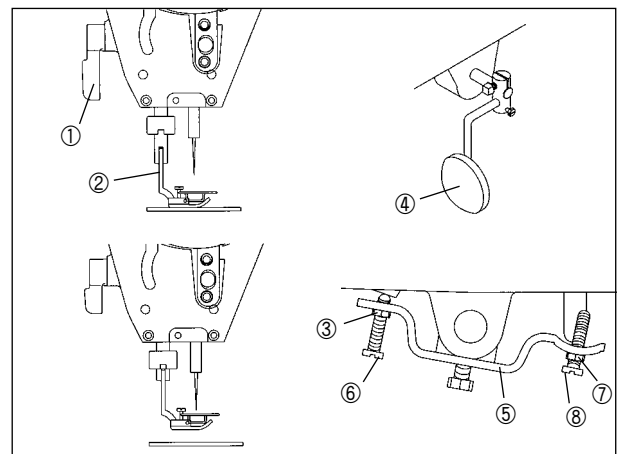
- A. Insert the presser foot lifter pad (group) ① packed in the accessory box into control body shaft ② of oil fan.
- B. After unfastening the volt ③ and deciding the location convenient of operation for presser foot lifter, tightly fasten again.



[Fig. 6]

5) Adjustment of Presser Foot Lifter (group) Pad

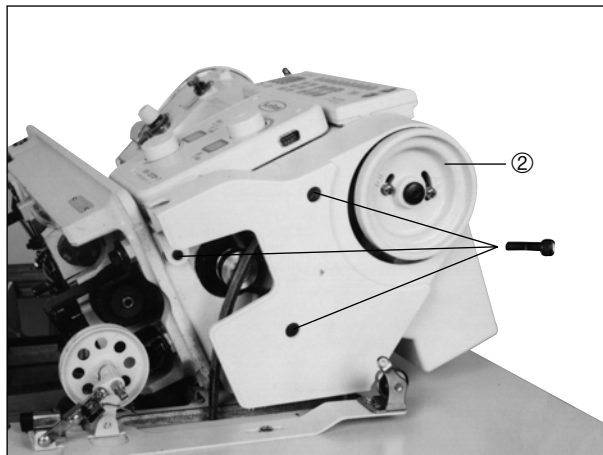
- A. Put down the feed dog lower than top of the needle plate by turning the pulley.
- B. Put down the presser foot ② to presser bar lifter ①.
- C. Unfasten nut ③.
- D. Adjust by turning the joint screw ⑥ that operation olume (space) of control body ⑤ should become about 2mm when lightly press the presser foot lifter pad (group) ④ by hands.
- E. After adjustment, joint the nut ③ tightly.
- F. Unfasten the nut ⑦.
- G. Adjust by rotating joint screw ⑧ that joint screw ⑧ becomes about 7mm higher than control body ⑤.
- H. Adjust by turning joint screw ⑧ that presser foot ② becomes within 10mm than needle plate when hardly pressed the presser foot lifter pad (group) ④.
- I. After adjustment, joint the nut ⑦ tightly.



[Fig. 7]

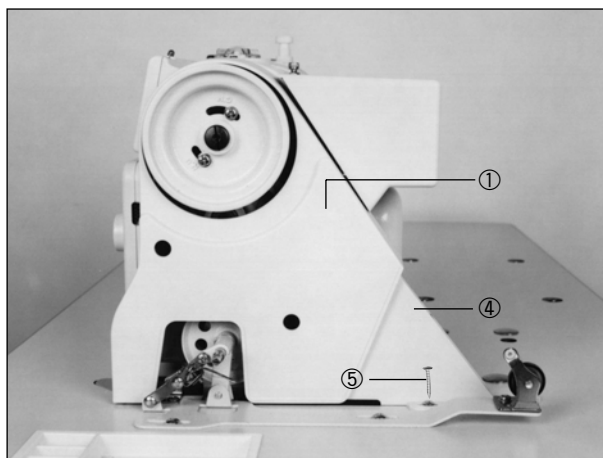
6) Belt Cover Installation

- A. After inserting belt cover A① into sewing machine pulley and attach with joint screw③ (three screws).



[Fig. 8]

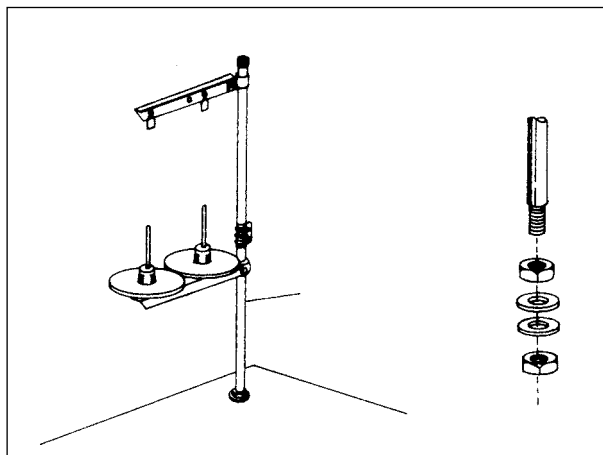
- B. Fasten the tapping screw⑤ (two) keeping belt cover C④ not to contact to belt cover A①.



[Fig. 9]

7) Thread Stand Installation

Install the thread stand on the table.



[Fig. 10]

8) Power Voltage and Power Code Connection

A. Voltage Specification

- Match the indication of voltage to specification of power code and connect the cable.
 - Must not use on condition that voltage specification is different.
 - In case of change the using voltage, refer to article [Power Voltage Changing Method].
 - Single-phase connection (100V, 110V, 120V, 200V, 220V, 240V)
 - Three-phase connection (200V, 220V, 240V, 380V, 440V)

B. Power Voltage Changing Method

- In voltage of 110V series, 220V series and 380~440V specification, you can change into the voltages as follows by just changing the location of power voltage switching connector.

■ Voltage change of 100~220V specification
Trans former Model: KM-2070P-110

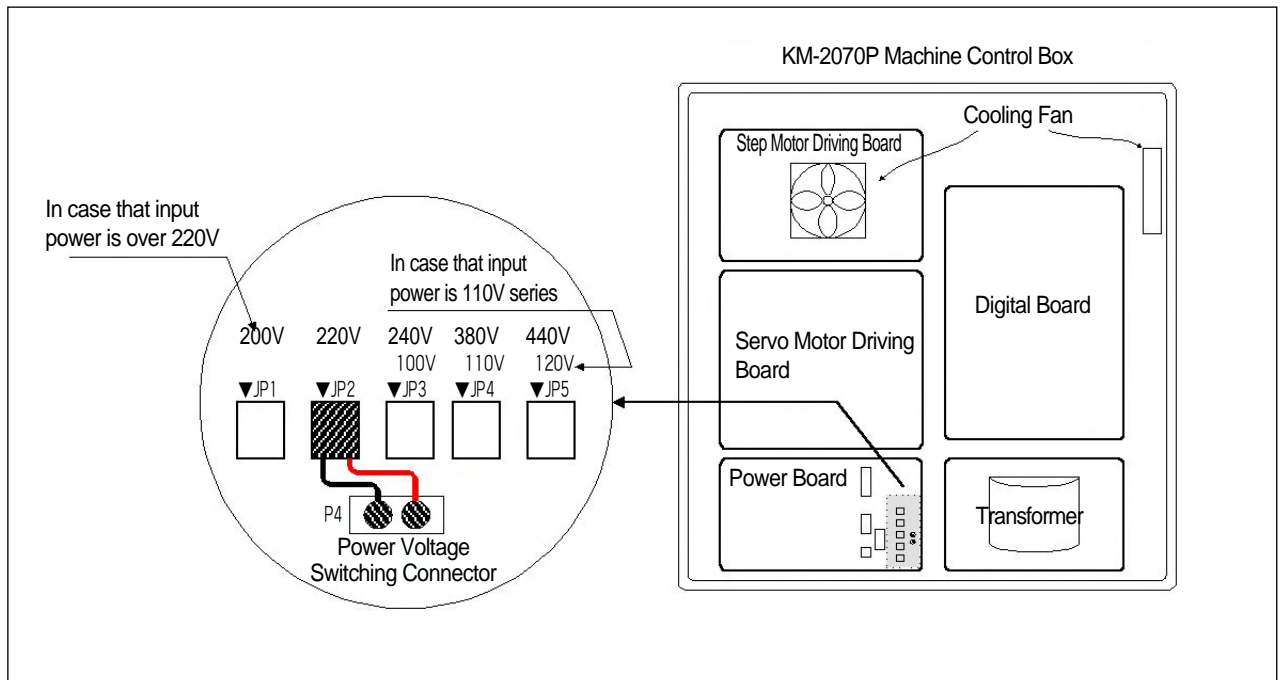
■ Voltage change of 220V specification
Trans former Model: KM-2070P-220

■ Voltage change of 380~440V specification
Trans former Model: KM-2070P-440

Input Voltage	Location of Power Voltage Switching Connector	Input Voltage	Location of Power Voltage Switching Connector	Input Voltage	Location of Power Voltage Switching Connector
95V~105V	JP3	190V~210V	JP1	345V~415V	JP4
106V~115V	JP4	211V~230V	JP2	416V~480V	JP5
116V~125V	JP5	231V~250V	JP3		



If power voltage switching connector is wrongfully set, control box can be damaged.
In case that changes voltages between the phases 110V series and 220V series and 380V~440V series transformer should replace.

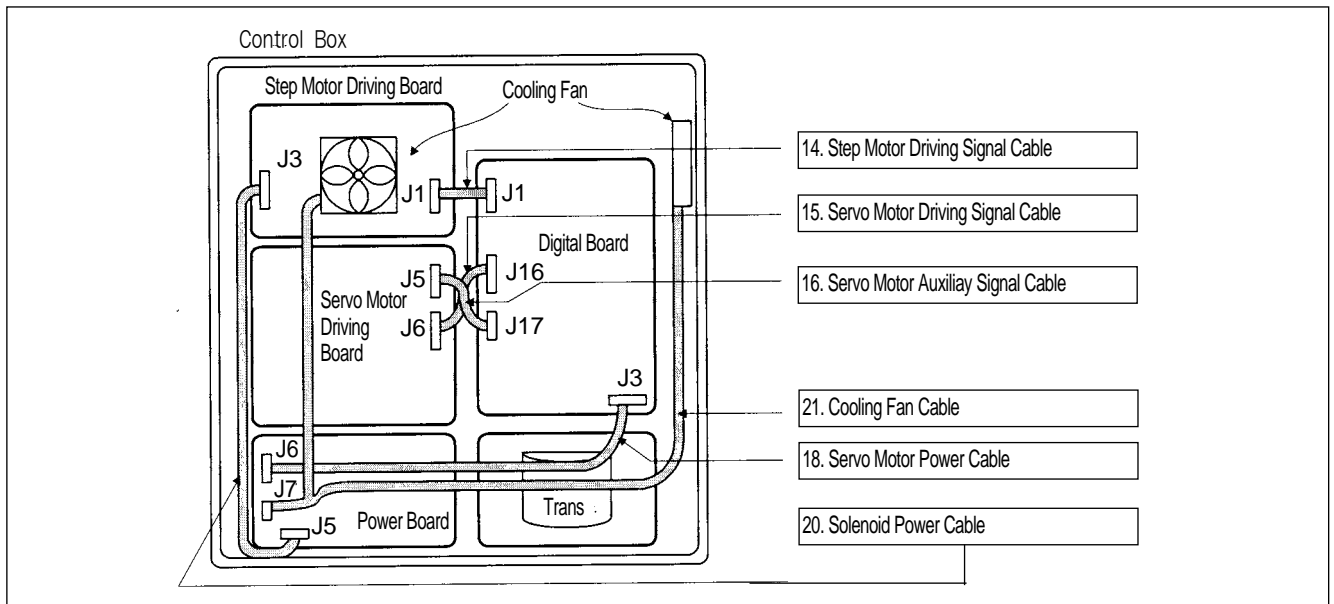


[Power Voltage Switching Connector Setting]

[Fig. 11]

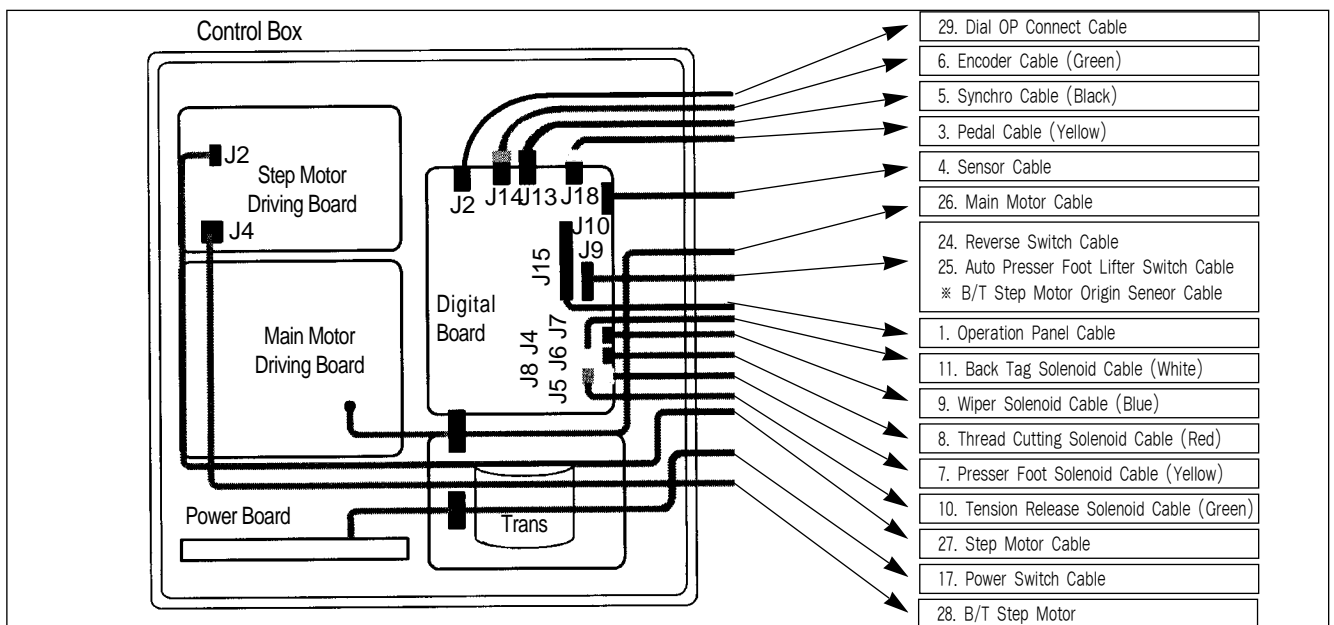
9) Cable Connection to Control Box

A. Internal Wiring of Control Box (Common in all types)



[Fig. 12]

B. External Wiring of Control Box



[Fig. 13]




Note

See "Block Wiring Diagram".

- [Fig. 20] is wiring diagram based on KM-2070-7L and KM-2070-7M model and the wiring in case that selected knee lifter switch (including presser foot solenoid) for option.
- As KM-2070-L and KM-2-70M model are none-thread cutting type, it does not need to connect cable for thread cutting, wiper, tension release solenoid.
- Switch cable consists of two; white and blue connector(knee-lifter switch is option)
White connector: Connect reverse button (A button)
Blue connector: Connect presser foot lifter switch (connect presser foot solenoid cable as well.)
In case of power cable connection, pay attention to fix to table that interference does not occur with belt.

10) Exchanging the Fuse

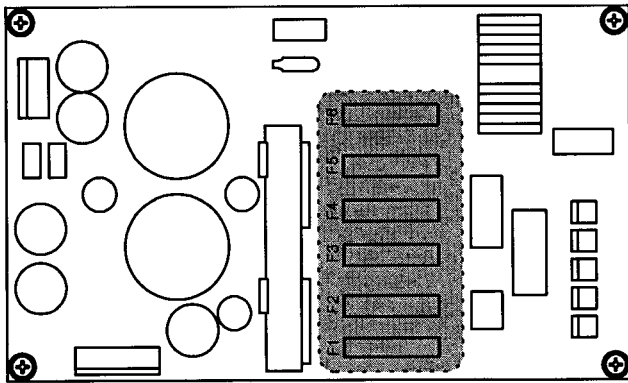


Danger

- To prevent from electric shock, turn off the power and wait 5 minutes, then open the cover.
- Be sure to turn off power and exchange into the fuse of the designated quantity after opening the cover of control box.

(1) Power board

- connection part of fuse for shade part (total 6)

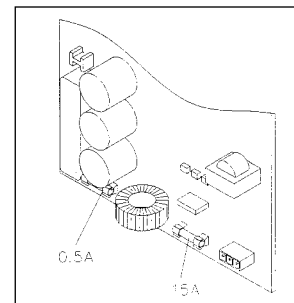


- Fuses are used

No.	Quantity	Use
F6	5A	For the protection of main power
F5	7A	For the protection of solenoid
F4	0.5A	For the protection of air valve
F3	0.5A	For the protection of cooling fan
F2	0.5A	For the protection of step motor
F1	5A	For the protection of step motor driving board control power

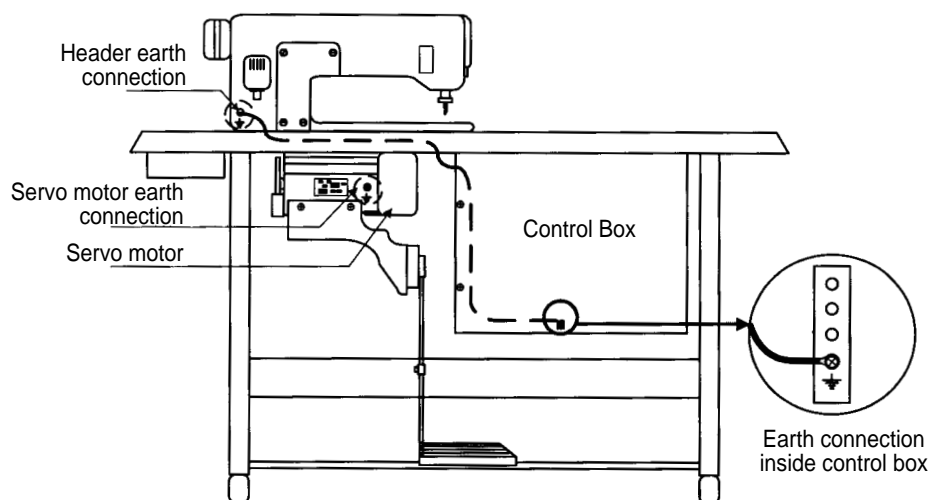
(2) Main motor driving board

- 15A : For the protection of main motor driving board power.
- 0.5A: For the protection of main motor driving board control power.



11) Head Earth Connection

Please connect the header earth connection of KM-2070P as the following pictures.



The back of KM-2070

1) How to Fill lubricating Oil

- A. Push the head backward.
- B. Fill lubricating oil up to the line marked "HIGH".

[Note]

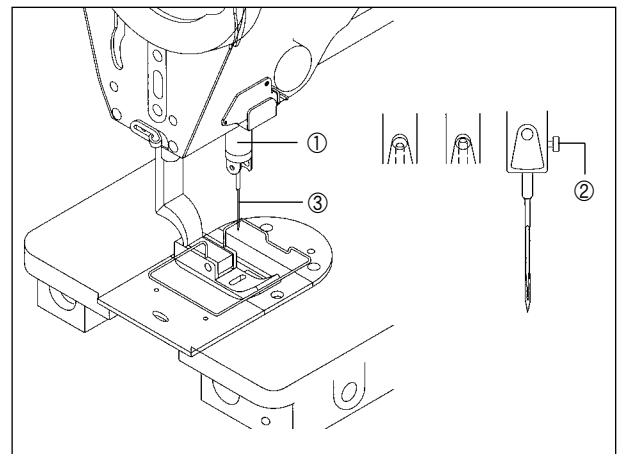
Supply the oil immediately when it gets lower to the line marked "LOW".



[Fig. 14]

2) How to Set a Needle

- A. Place the needle bar ① to the highest location by turning the sewing machine pulley.
- B. Unscrew the needle fixing screw ②.
- C. The long groove of needle ③ turning to the front, insert it until the top end of needle reaches to end of the insertion hole of the needle bar and fasten the needle fixing screw ② tightly.



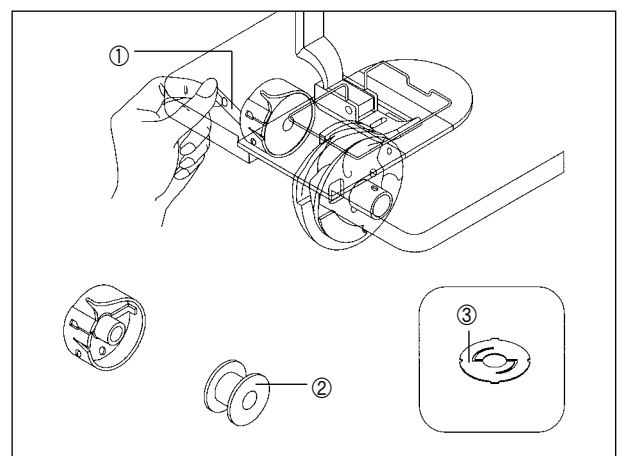
[Fig. 15]

3) How to Remove Bobbin Case

- A. Raise the needle higher than needle plate by turning the sewing machine pulley.
- B. Remove the bobbin case by pulling out the guip ① of case.
- C. Detaching the handle ①, bobbin ② is detached.

[Note]

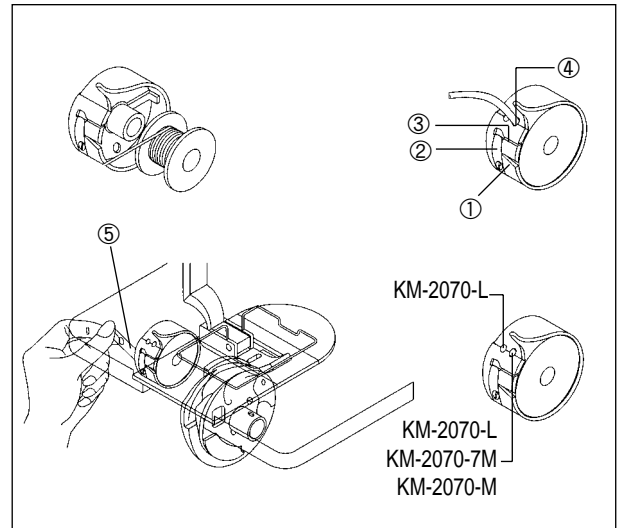
In case of thread trimming type, no-load operation prevention spring ② is attached in bobbin case in order to prevent no-load operation of bobbin.



[Fig. 16]

4) Bobbin Case Attachment Method

- A. Adjust base line of thread take-up lever to meet with U mark of faceplate by turning sewing machine pulley.
- B. Make the thread wound to left and raise the bobbin and put into the bobbin case.
- C. Make the thread go through thread groove① and pass through bottom of spring②.
- D. Make the thread go through thread groove③ once again and pull it from thread guide part④.
 - Properly select and use the thread guide part as shown in the figure according to the machine type.
- E. Confirm whether the bobbin rotate to the left upon taking out the thread.
- F. Raise the grip⑤ of bobbin case and put the bobbin case into hook.



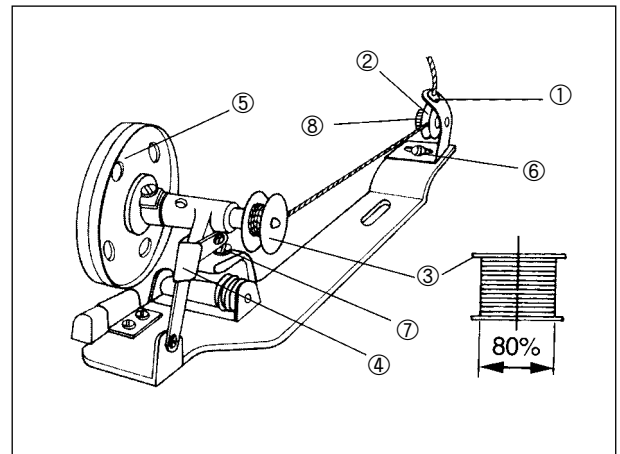
[Fig. 17]

5) How to Wind lower Thread

- A. Lower Thread Winding
 - a. After passing the thread through hole①, turn it from the behind of tension adjustment dish② to the front.
 - b. Bring the thread to bobbin ③ and wind 5~6 times to clockwise direction from the bottom.
 - c. Making pulley⑤ to reach to V-belt by pushing lever ④ and then operate the machine.
 - d. Upon the lower thread is wound all to bobbin, the pulley automatically detaches from V-belt.
 - e. Proper amount of thread wound to bobbin is about 80%.

[Note]

Please make the amount of thread being wound to be 80% to the maximum.



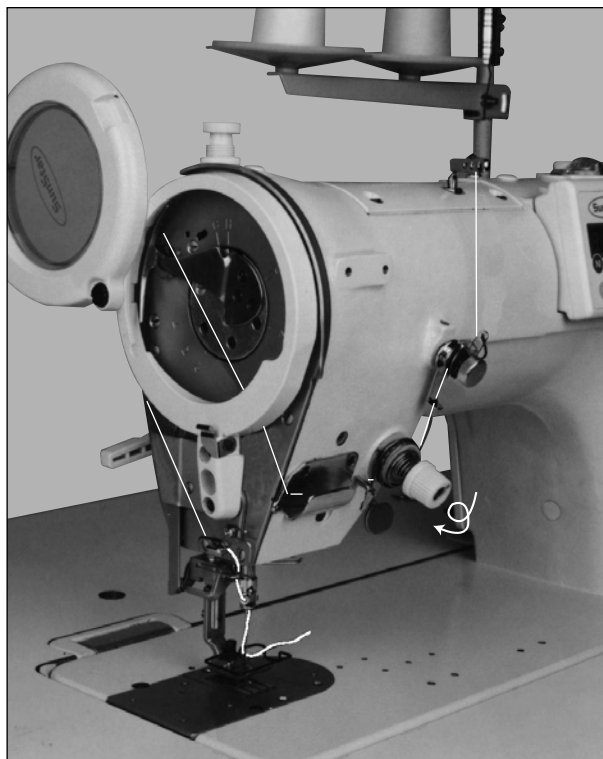
[Fig. 18]

B. Adjustment of Lower Thread Winding

- a. In case that the lower thread is irregularly wound, adjust by unscrewing and moving the screw⑥ to the left and right and then fasten it again.
- b. Winding amount of the lower thread increases turning the adjustment screw⑦ to clockwise direction and decreases turning to the opposite direction.
- c. Tension adjustment of lower thread being wound to bobbin gets strong turning the nut⑧ to clockwise direction and gets weak turning to opposite direction.

6) Upper Thread Passing Method

After making base line of thread take-up lever to match with U mark on the face plate by turning the sewing machine pulley (Up stop location of need), hang the upper thread as shown in the figure.



[Fig. 19]

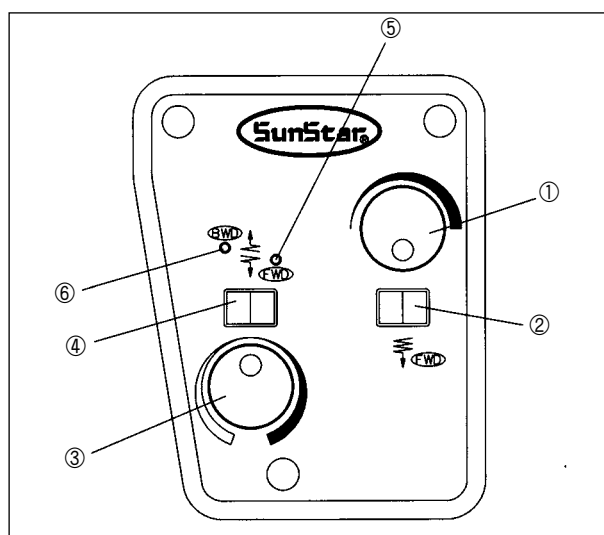
7) Adjusting of Stitch Number

※ Regular Sewing (Forward Sewing)

When the feed adjustment dial ① is turned right and left, the number displayed in ② is changed. As the number displayed in ② gets bigger, the stitches will be longer in the case of regular sewing.

※ Condense Sewing (Backward Sewing)

When the condense adjustment dial ③ is turned right and left, the number displayed in ④ is changed. As the number displayed in ④ gets bigger the stitches will be longer in the case of condense sewing. When the LED above **FWD** turns on, the machine works in the regular sewing (forward sewing) direction. And when the LED below **BWD** turns on, the machine works in the backward sewing direction.



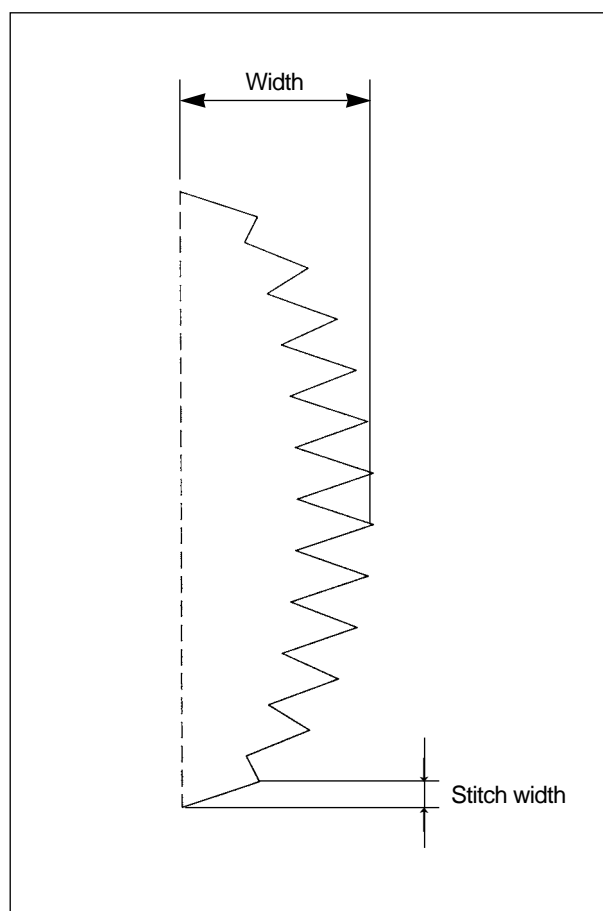
[Fig. 20]

[Note]

- Please attach protection device for safety.
Using without attaching this device, it becomes cause of injury.
- Please turn off the power in the following cases.
Pedaling by mistake, the sewing machine operates and it becomes cause of injury.
 - Upper Thread passing
 - Exchange of bobbin or needle
 - When not using the sewing machine, or in case of being away from the sewing machine
- Please do not touch or press the operating part while sewing.
It becomes cause of injury or breakage of sewing machine.
- Do not touch the solenoid part in case of the sewing machine with automatic presser foot lifter. You can get burns upon touching it.

1) Sewing Method

- A. Turn on the power switch.
- B. Execute required settings such as [sewing pattern] or [width] on the operation panel.
- C. Set the stitch width with feed adjustment dial.
- D. Step the pedal and start sewing.



[Fig. 21]

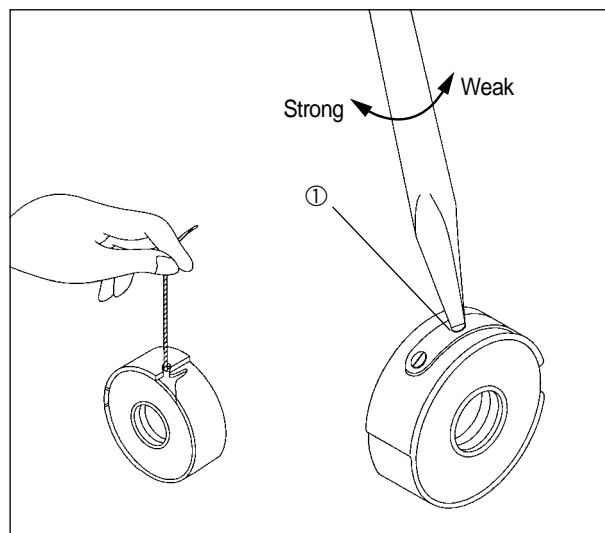
Warning

As the machine was set to the optimal status at the moment of factory shipping, do not adjust the machine status optionally and when exchanging the parts, please change with the genuine parts that the company authorizes.

1) Thread Tension Adjustment

A. Lower Thread Tension

Adjust tension of lower thread by turning the thread tension adjusting screw① of bobbin case. Turning to the clockwise direction, tension gets strong and turning to the opposite direction, it gets weak.



[Fig. 22]

B. Upper Thread Tension

Adjust tension of upper thread after adjusting the tension of lower thread.

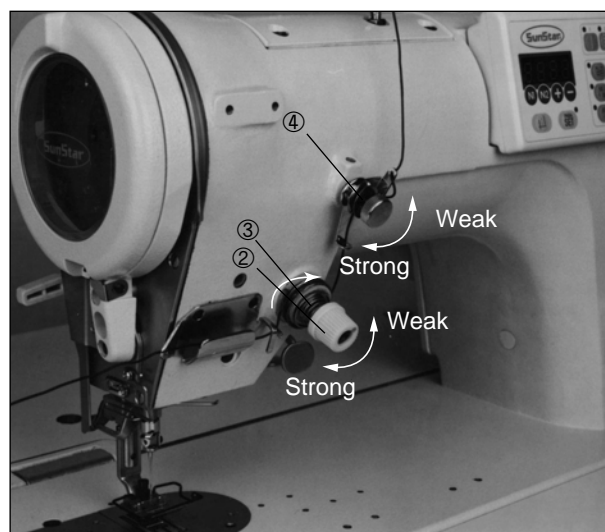
1. Put down the presser foot.
2. Adjust by turning tension adjusting nut②.
3. After adjusting tension of upper thread, check whether rotary dish③ rotates with the upper thread by pulling the upper thread to the arrowed direction.
 - In case that it does not rotate, tighten the auxiliary thread tension adjusting stud④.

[Note]

If tension of auxiliary thread adjusting device stud④ is too weak, thread slides and so rotary dish③ becomes not to rotate.

Auxiliary thread adjusting device stud should be adjust as weak as possible that rotary dish③ rotates smoothly.

Use thread tension adjusting spring in accessory box in case use thick thread or adjust upper thread tension (Recommend three ply or thicker thread)

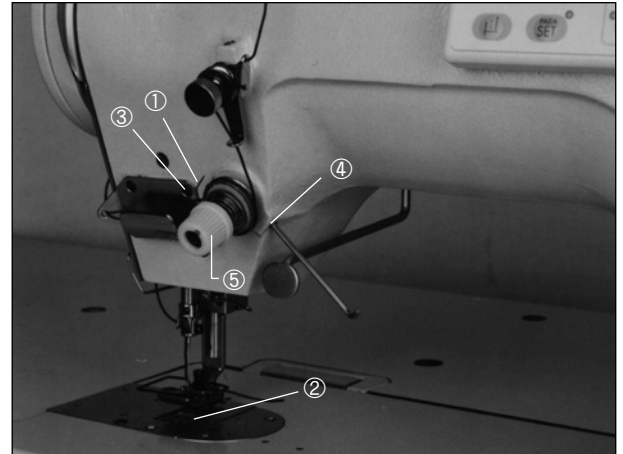


[Fig. 23]

C. Adjustment of Thread Take-Up Spring

Standard location of thread take-up spring is 6-8mm of distance to face of thread guide③ on condition that put down the presser foot②.

1. Put down presser foot②.
2. Unfasten the fixing screw④.
3. Adjust location by turning main thread tension adjusting device⑤.
4. Unfasten the fixing screw④ firmly.

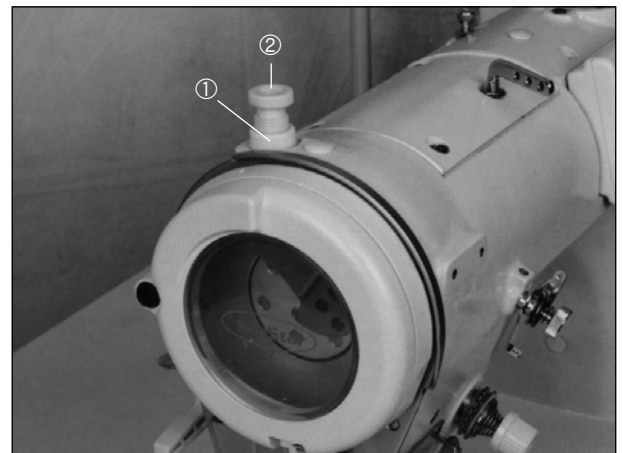


[Fig. 24]

2) Presser Foot Pressure Adjustment

Adjust pressing pressure as weak as possible in order not to be slid the cloth.

- A. Unfasten the pressure adjusting screw nut①.
- B. Adjust pressing pressure by turning pressure adjusting screw②.
- C. Fasten the pressure adjusting screw nut①.

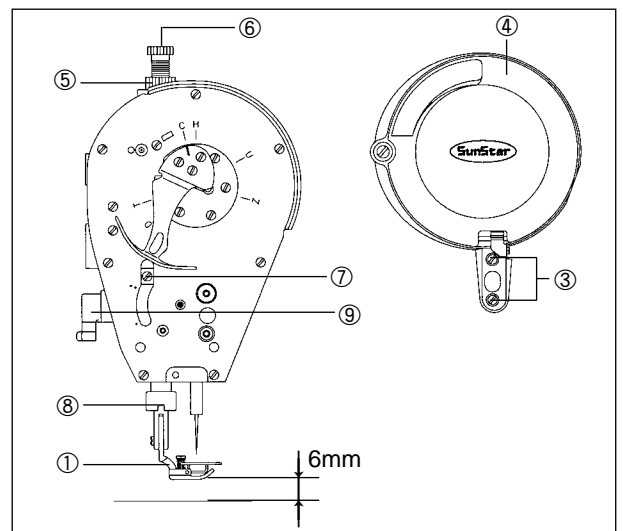


[Fig. 25]

3) Presser Foot Height Adjustment

When put up the presser foot① by presser bar raiser ②, standard rising amount of presser bar is 6mm.

- A. Unscrew the joint screw③ (2 pieces) and remove faceplate guard④.
- B. Unfasten nut⑤, and pressure adjustment screw⑥ in order not to be given pressing pressure.
- C. Put up the presser foot① by presser bar lifter⑨.
- D. Unscrew joint screw⑦, move up and down the presser bar⑧ to adjust height of presser foot① to 6mm.
- E. Fasten the adjustment screw⑦.
- F. Adjust pressing pressure by pressure adjustment screw ⑥ and tighten nut⑤.
- G. Attach the face plate guard④ with joint screw③ (2 pieces).

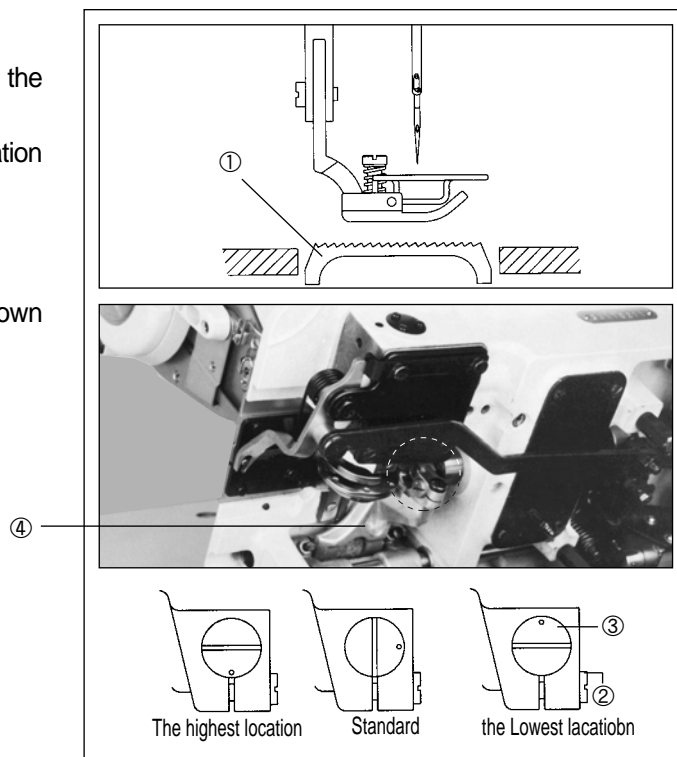


[Fig. 26]

4) Feed Dog Height Adjustment

Standard height is 1mm when the feed dog① went up the most from needle plate upper face.

- Make the transfer value① to stop at the highest location by turning the sewing machine pulley.
- Lay down the sewing machine.
- Unscrew the fixing screw②.
- Adjust feed dog support④ making to move up and down by turning the eccentric axis③ of feed dog support.
- Fasten fixing screw② tightly.



[Fig. 27]

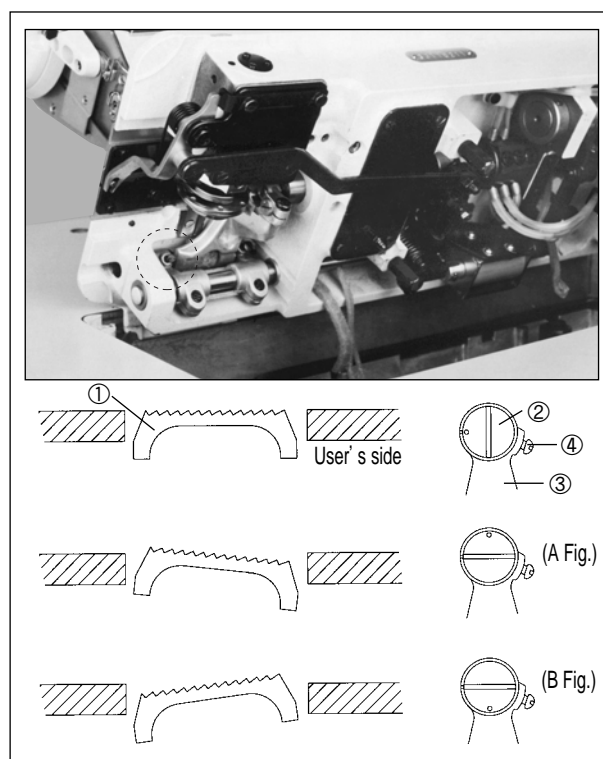
5) Feed Dog Slope Regulation

When the feed dog① went up to the maximum from upper face of needle plate, standard slope is made that upper face of needle plate and upper face of feed dog should be parallel.

(0 mark on eccentric axis ② of feed rolling bracket matches with the mark on feed rolling bracket③.)

- Make the feed dog① to stop at the highest location by turning the sewing machine pulley.
- Lay down the sewing machine.
- Unscrew 2 pieces of stop screw④.
- Adjust eccentric axis② of feed rolling bracket by turning within 90° to arrowed direction against standard location.
 - Place the slope of upper face of feed dog① downward direction to the user's side in order to prevent puckering. (Figure A)
 - Place the slope of upper face of feed dog① upward to the user's side to prevent the cloth to go crisscross. (Figure B)
- Fasten fixing screw④ (2 pieces) tightly.

Adjusting the slope of feed dog①, height of feed dog① and location front and back changes. Hence, please adjust again.

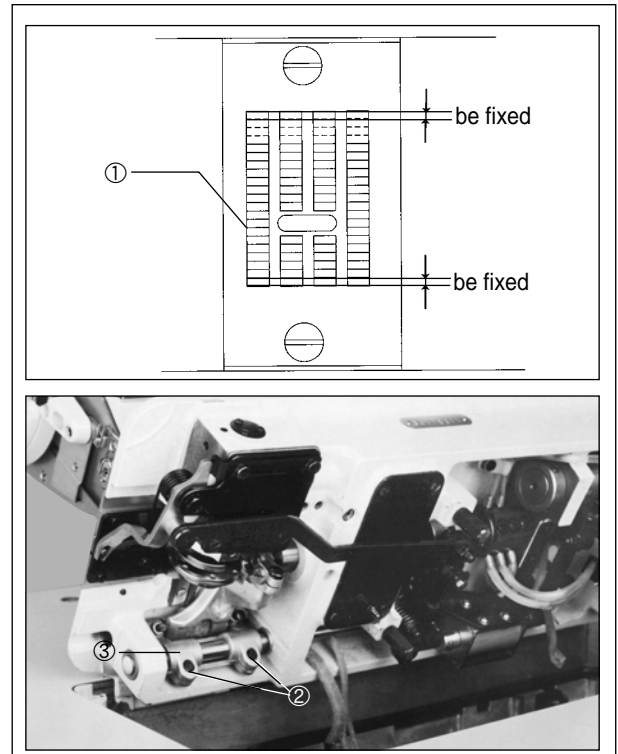


[Fig. 28]

6) Feed Dog Front and Back Adjustment

Gap front and back to the needle plate when the feed dog① moved closest to the user's side and when it moved to the most backward by turning the sewing machine pulley becomes regular.

- Lay down the sewing machine.
- Unscrew the fixing screw② (2 pieces).
- Adjust by turning the feed rolling bracket③ and then moving the feed dog①.
- Fasten fixing screw② tightly.

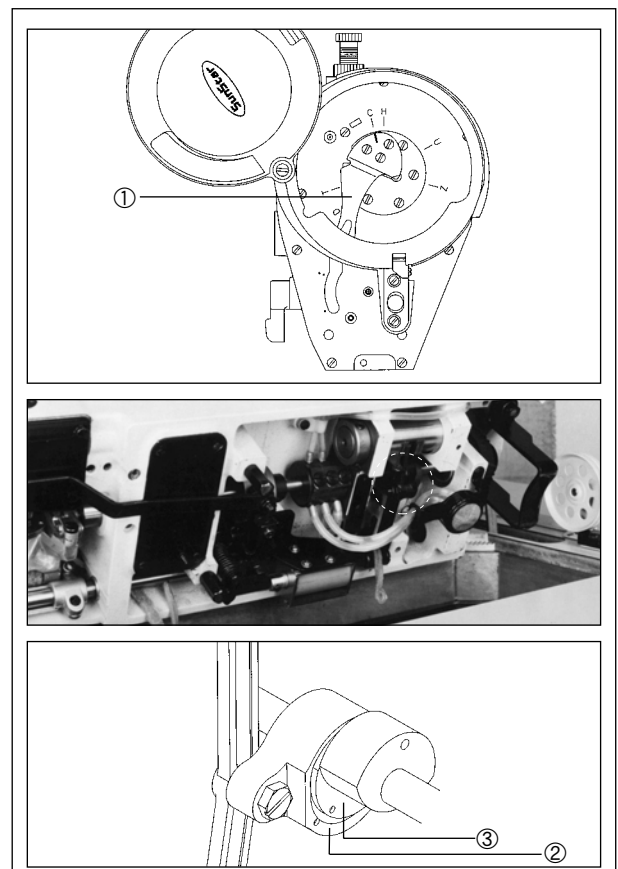


[Fig. 29]

7) Needle and Transfer Timing

Make 0 mark of feed cam bearing cover② and 0 mark of feed cam connection rod③ to match each other when matched base line of thread take-up① to C mark of face plate.

- Lay down the sewing machine.
- Match the base line of thread take-up① to B mark of face plate.
- Unscrew the fixing screw (4 pieces) of lower shaft timing pulley.
- Turn the feed cam bearing cover② and match 0 mark to the 0 mark of feed cam connection lot③.
- Fasten fixing tightly (4 pieces) of lower shaft timing pulley.

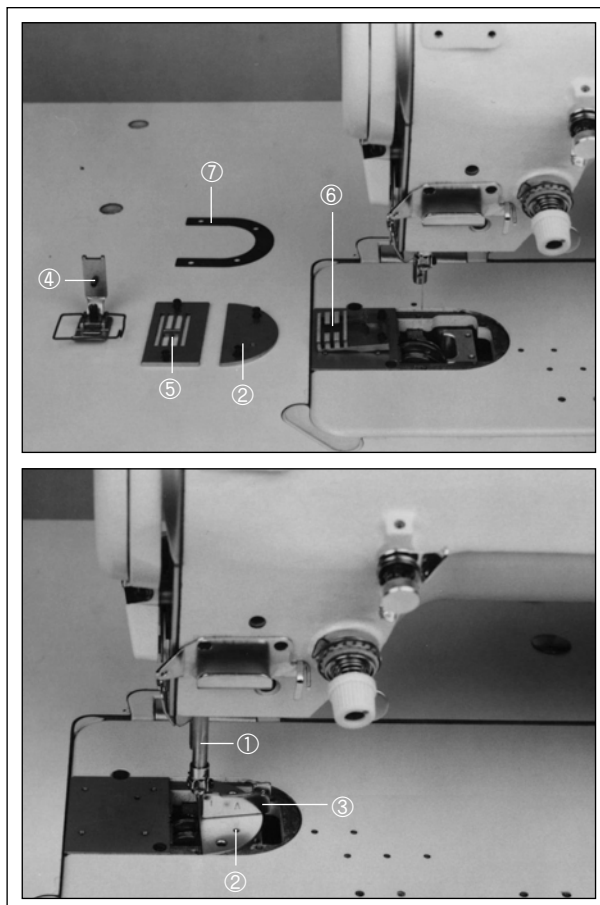


[Fig. 30]

8) Needle Bar Height Adjustment

When the needle bar① came to the lowest point, height is from upper face of auxiliary needle plate② to the bottom of needle bar①, match to the height of timing gauge A③ of the parts.

- A. In case of thread cutting type, take off presser foot④, needle plate⑤, auxiliary needle plate②, and needle plate spacer⑦.
 - B. Place auxiliary needle plate② to the needle plate attachment face on sewing machine bed.
 - C. Put the needle bar① to the lowest point by turning the sewing machine pulley.
 - D. Attach needle plate spacer⑦(in case of thread cutting type) that from upper face of auxiliary needle plate ② to the bottom of needle bar① should be height of timing gauge A③.
- ※ When adjusted needle bar height, adjust timing of needle and hook as well.



[Fig. 31]

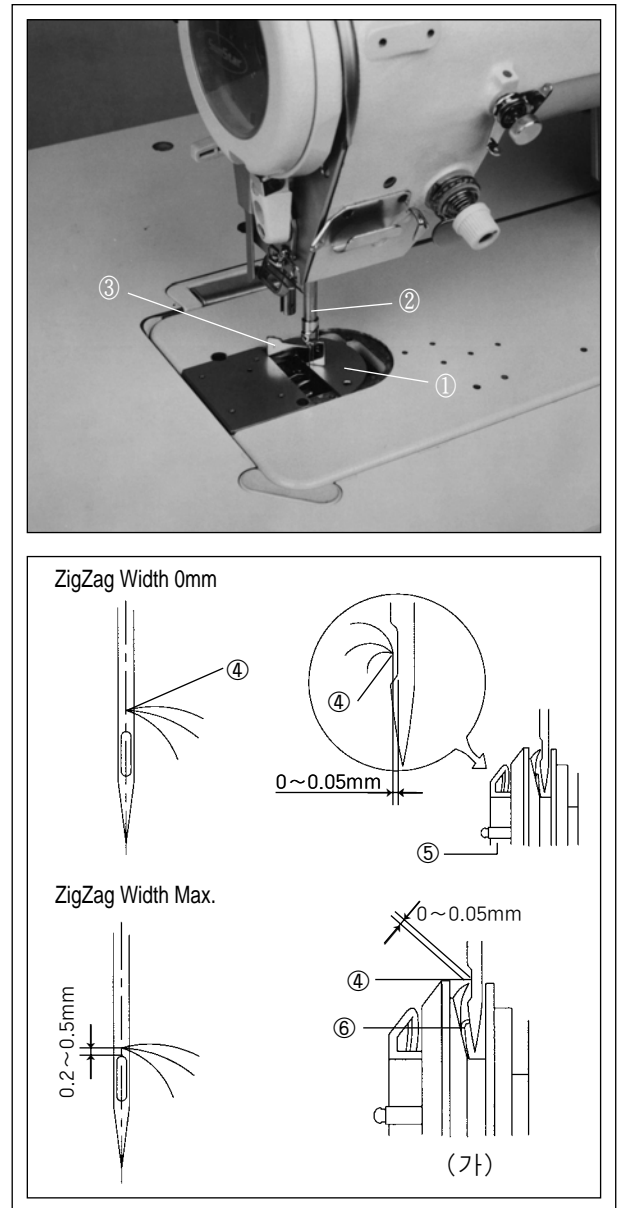
9) Needle and Hook Timing

- A. Turn on the power switch.
- B. Press N1 and N2 key on the operation panel at the same time.
(Refer to hook test function in 14-3)
- C. Take off presser foot, needle plate, auxiliary needle plate, feed dog, and needle plate spacer.
- D. Place auxiliary needle plate① to needle plate attachment part of sewing machine bed.
- E. When matched from the upper face of auxiliary needle plate ① to the bottom of needle bar② with height of timing gauge B③ by turning sewing machine pulley and raising the needle bar② higher than the lowest point, check the followings:
 - Match the sharp end④ of hook with center of needle.
 - Interval of sharp end④ of hook and needle is 0~0.05mm.

[Note]

As thickness of needle plate and auxiliary needle plate① is different, must use auxiliary needle plate② for sure.

- F. If the above status is not made, adjust location of hook⑤ by unscrewing the hook fixing screw.
After adjusting, fasten the fixing screw.
 - G. When the needle is at the closest location to the left, if point ④ of hook matched to the center of needle by turning the sewing machine pulley, check whether size of point④ of hook is 0.2~0.5mm from the upper end.
※ If the size does not meet, adjust height of needle bar.
 - H. In case that over-lapped section sewing causes needle flow, make needle support to contact to needle by bending needle support⑥ as shown in the figure (a).
※ Since then, check whether interval of point④ of hook and needle is 0~0.05 mm.
 - I. Pressing PARA/SET key on operation panel, it is converted to embroidery available status.
- In case of using 10mm
- 1) Move the location of needle to the leftest place.
 - 2) When point④ of hook matched to the center of needle by turning the sewing machine pulley, adjust needle position whether distance is 0.2~0.5mm to point④ of hook from the upper end of needle hole.
 - 3) In case of using ZigZag width 10mm, change needle plate, feed dog, needle bar stopper for 10mm.



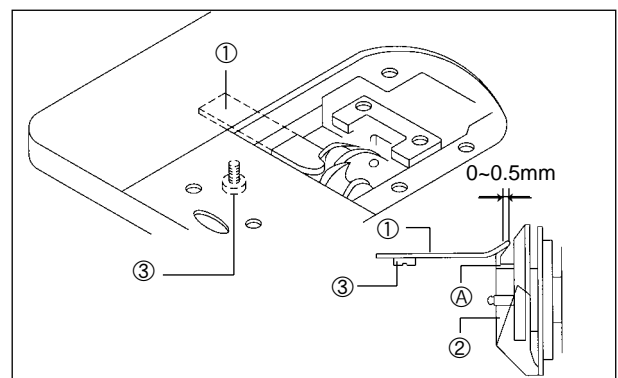
[Fig. 32]

10) Location Adjustment of Hook Holder

Adjust that end of hook holder① should come to the location 0~0.05 away from end of A part of internal hook②.

※ Keep end of hook holder① never comes out to the right than end of A part of internal hook②.

- A. Unscrew the fixing screw③ and adjust location of hook fixing ①.
- B. Fasten fixing screw③ tightly.

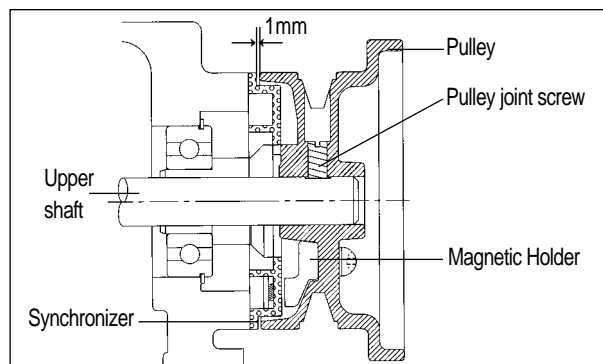


[Fig. 33]

11) Synchronizer Adjustment

A. Mounting of synchronizer

- ① Fix the synchronizer to back side of arm.
- ② After setting the location of pulley that interval between synchronizer and pulley becomes 1mm, fasten pulley joint screw.



[Fig. 34]

B. Needle Up Stop

When turn the power switch on and stop the sewing machine at the location of needle up stop, base line of thread take-up stops at around U mark on face plate (+3mm). When stop the sewing machine at location of needle down stop, base line of thread take-up stops at around D mark on face plate (+4mm).

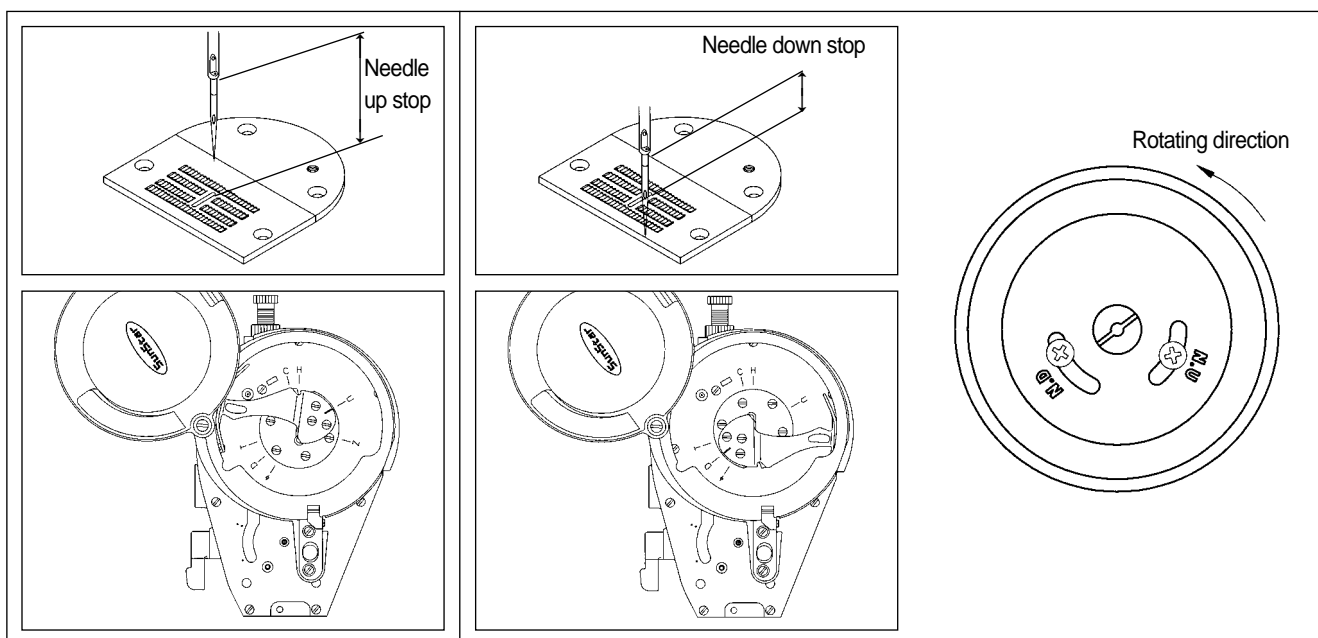
- ① Turn off the power switch.
- ② Unfasten fixing screw①(2 pieces).
- ③ Moving the fixing screw① to rotating direction of sewing machine pulley, needle bar② stops at high position.
- ④ Fasten the fixing screw①.

C. Adjustment of needle down stop location

Do not adjust needle down stop location.

[Note]

- Attachment location of synchronizer was set at the moment of shipping. When taking off the pulley, do not take off the synchronizer. Also, attach the fixing screw(2 pieces) of pulley to around of the screw of upper shaft against the pulley rotating direction.



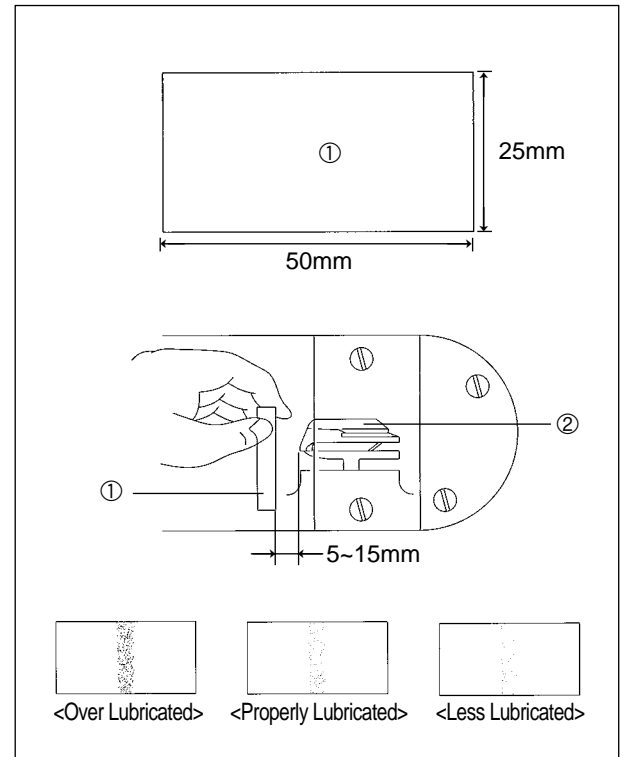
[Fig. 35]

12) Lubrication Adjustment for Hook

When you replace the hook or change sewing speed, adjust lubrication amount of hook as the following order.

■ Confirmation of lubrication amount

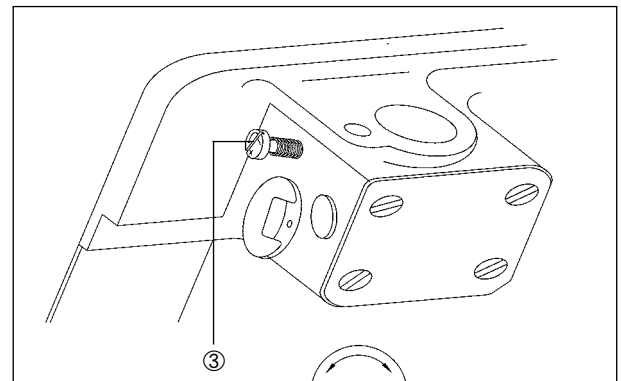
- A. Perform no load operation over 1 minute at rotation number of sewing machine that actually sews.
- B. After inserting the lubrication check list① to the left of hook, operate the sewing machine for about 10 seconds at the speed number of sewing machine that actually sews. (Quality of lubrication check paper① does not matter.)
- C Confirm the oil quantity spread on the paper.
 - ※ You must check the average lubrication amount by repeating 3~4 times.



[Fig. 36]

■ Lubrication Adjustment

- A. Lay down the sewing machine.
- B. Adjust lubrication amount by turning oil adjusting screw③.
- C. Confirm the lubrication amount by referring to [Confirmation of lubrication amount] above.
 - ※ Repeat adjustment of oil adjusting screw③ and confirmation of lubrication amount until it becomes proper amount.
- D. After sewing for about 2 hour, confirm the lubrication amount again.



[Fig. 37]

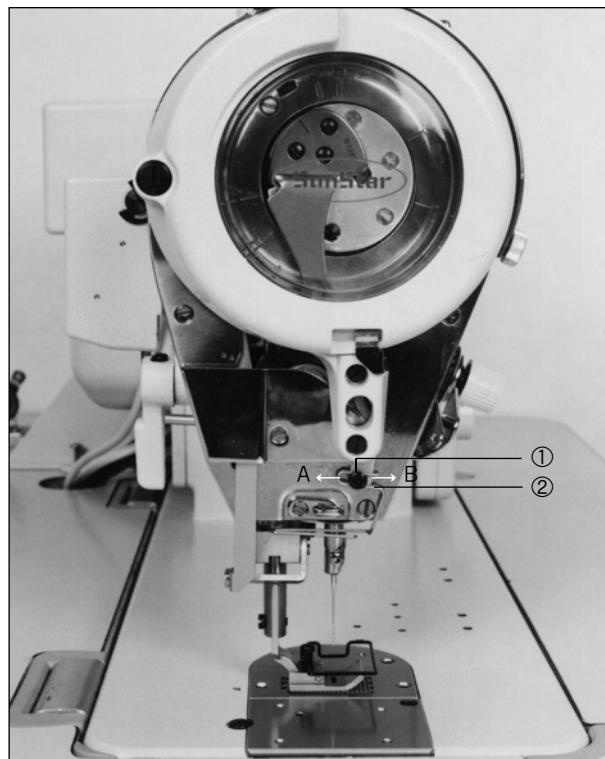
13) Adjustment of Upper Thread Remainder after Thread Cutting

Standard remainder of upper thread after thread cutting is as shown in the following table according to thread type.

Upper Thread	Upper Thread Remainder
Filament #60	50~60mm
Span(dex) #60	40~50mm

■ Adjusting Upper Thread Feeding Wire

After unfasten the fixing screw①, adjust remainder of upper thread by moving upper thread feeding wire②. In order to make the remainder short, move to arrow A direction and to make the remainder long, move to arrow B direction.



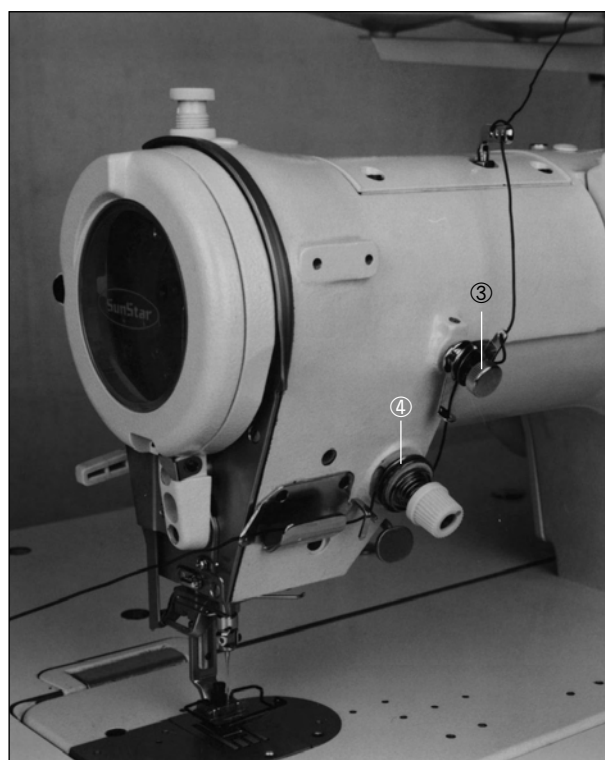
[Fig. 38]

[Note]

If tension of auxiliary thread tension adjusting device stud③ is too strong, it becomes difficult to adjust remainder of upper thread.

Adjust auxiliary thread tension adjusting device stud③ as weak as possible that thread adjusting device dish④ rotates gently.

※ At this time, upper thread tension changes and so adjust upper thread tension.



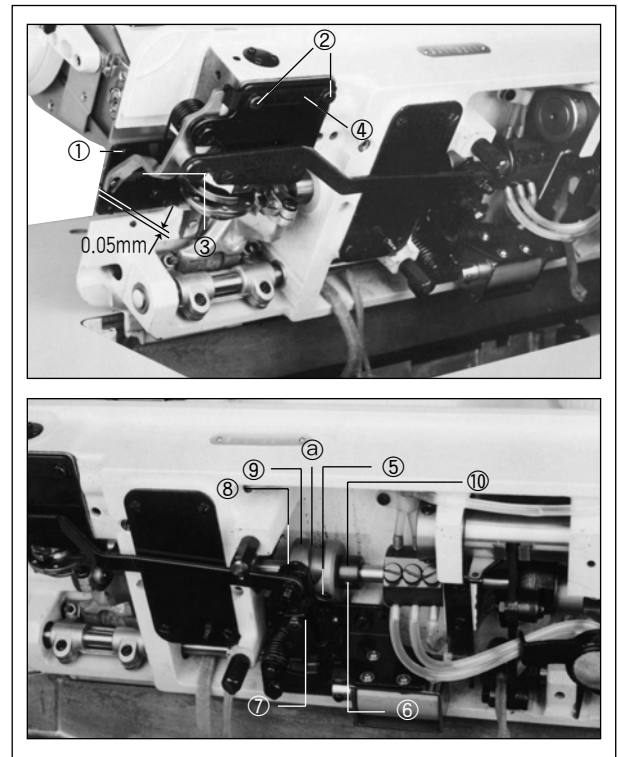
[Fig. 39]

14) Location Adjustment of Thread Cutting Cam

Adjust as shown in the figure on condition that mess unit① is properly attached.

■ Left/Right Location Adjustment

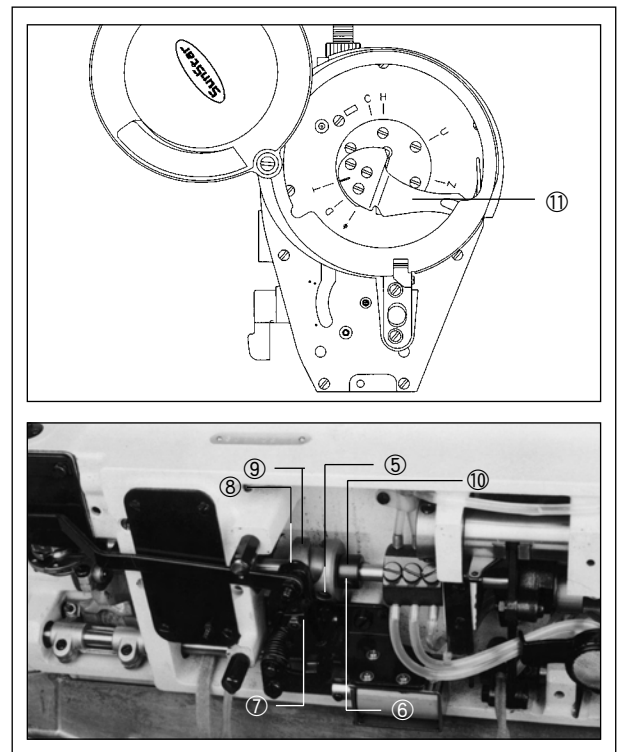
- A. Lay down the sewing machine.
- B. Unscrew the fixing screw②.
- C. Adjust by operating thread cutting operation crank stopper④ that section of mobile mess③ enters about 0.5mm more than section of mess bracket①.
- D. Fasten fixing screw② tightly.
- E. Unscrew the stop screw⑤ and⑥.
- F. While pressing thread cutting roller arm⑦ by hand, adjust left/right location of thread cutting cam that thread cutting roller comes in and out of groove straight line part⑧ of thread cutting cam⑨ easily.
- G. Fasten the stop screw⑤.
- H. Fasten stop screw⑥ tightly by closing thread cutting cam collar⑩ to thread cutting cam⑨.



[Fig. 40]

■ Adjustment of Rotating Direction

- A. While pressing thread cutting roller arm⑦ by hands, turn the sewing machine pulley toward oneself slowly and when base line of thread take-up⑪ matches with T mark of face plate, adjust rotating location of thread cutting cam⑨ that mess starts to move.
- B. Fasten stop screw⑤ tightly.
- C. While pressing thread cutting roller arm⑦ by hands, turn the sewing machine pulley toward oneself and check whether mess starts to operate when base line of thread take-up ⑪ matches with T mark of face plate and mess returns to the original status until it matches with U mark.

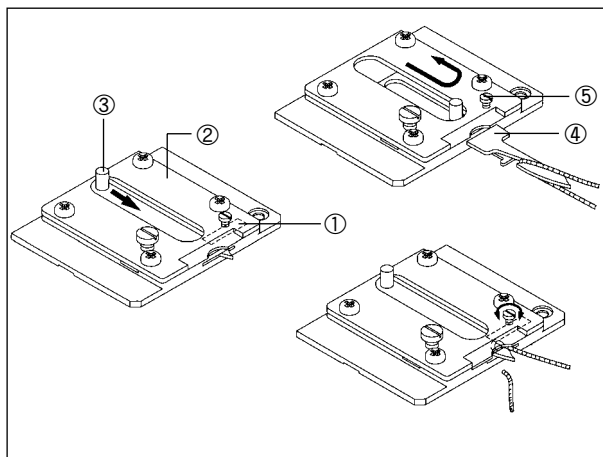


[Fig. 41]

15) Tension Adjustment of Lower Thread Presser

After cutting thread, adjust tension when pulling out the thread holding by lower thread presser① to 0.03~0.08N(3~8gf) in case of filament thread (#60).

- Take off mess unit②.
- Draw out the mobile mess④ by moving handle③ and hang the thread on the groove as shown in the figure.
- Cut the thread by turning the mobile mess④ to original status. Then, measure the tension when pulling out the thread holding by lower thread presser①.
- Adjust tension of lower thread presser① to 0.03~0.08N (3~8gf) by turning screw⑤.

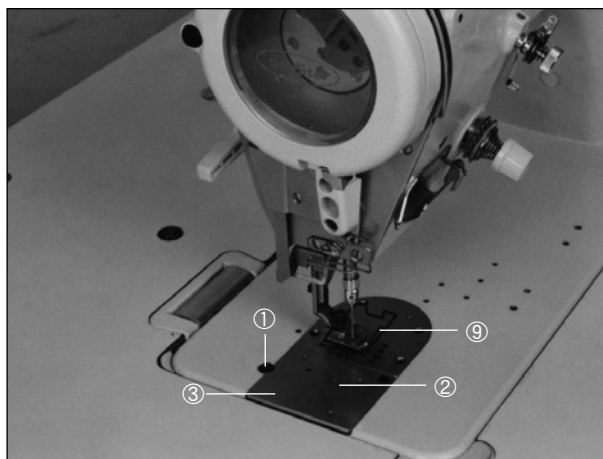


[Fig. 42]

16) Exchange of Fixed Mess and Moving Mess

■ Removing method

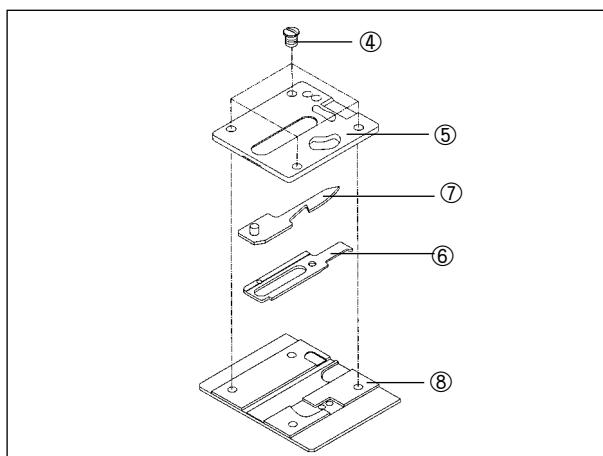
- Remove joint screw① and ②, and remove mess unit③.
- Remove joint screw④ and remove mess presser ⑤.
- Remove fixed mess⑥ and mobile mess⑦.



[Fig. 43]

■ Attachment Method

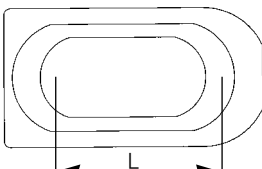
- Attach fixed mess⑥ and mobile mess⑦ to mess bracket⑧.
- Attach mess presser⑤ with joint screw④.
- Put mess unit③ close to section of needle plate ⑨ and attach with joint screw① and ②.



[Fig. 44]

17) Gauge Parts

In case of using presser foot, needle plate, and feed dog for other except 8mm of width, when operating the sewing machine, needle can contact to needle plate or needle can be broken. Hence, limit width as follows and exchange needle bar stopper.

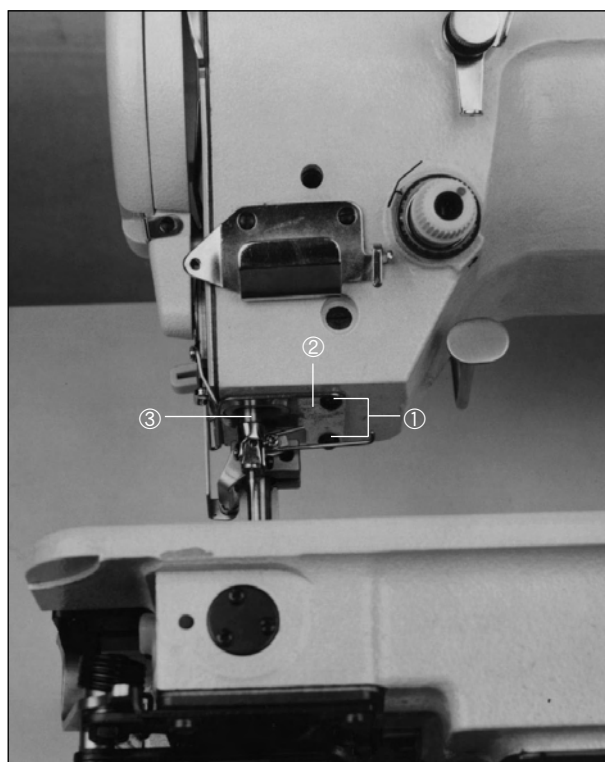
	Classification	L(mm)	Remarks
	A	16.4	For 8mm, basic specification
	B	18.4	For 10mm
	C	13.4	For 5mm
	D	11.4	For 3mm

※ Needle bar stopper for other 8mm can be mounted as standard parts according to specification. In such case, check the parts by L size.

■ Replacing Method of Needle Bar Stopper

- In case of using presser foot and needle plate (option parts) for 10, 8, 5, and 3mm of width, exchange the needle bar stopper for 10, 8, 5 and 3mm.

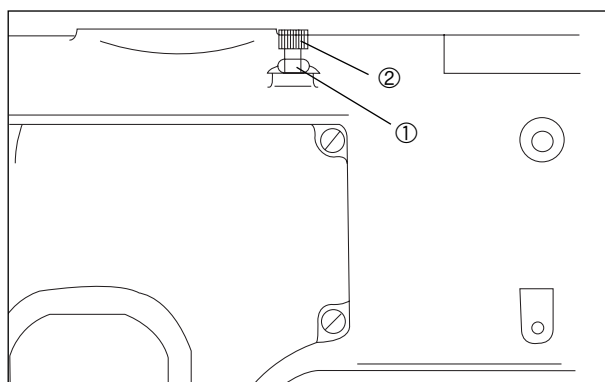
- Remove needle bar stopper② by unscrewing the fixing screw① (2 pieces).
- Attach needle bar stopper③ inserted into needle bar stopper plate②.
- Attach needle bar stopper plate② to head part of sewing machine and fasten fixing screw① tightly.
- Turn on the power.
- Set the width to the maximum width of gauge.
- Confirm that needle hole of needle and each gauge part, and needle bar and needle bar stopper③ do not contact by turning the sewing machine pulley by hands.



[Fig. 45]

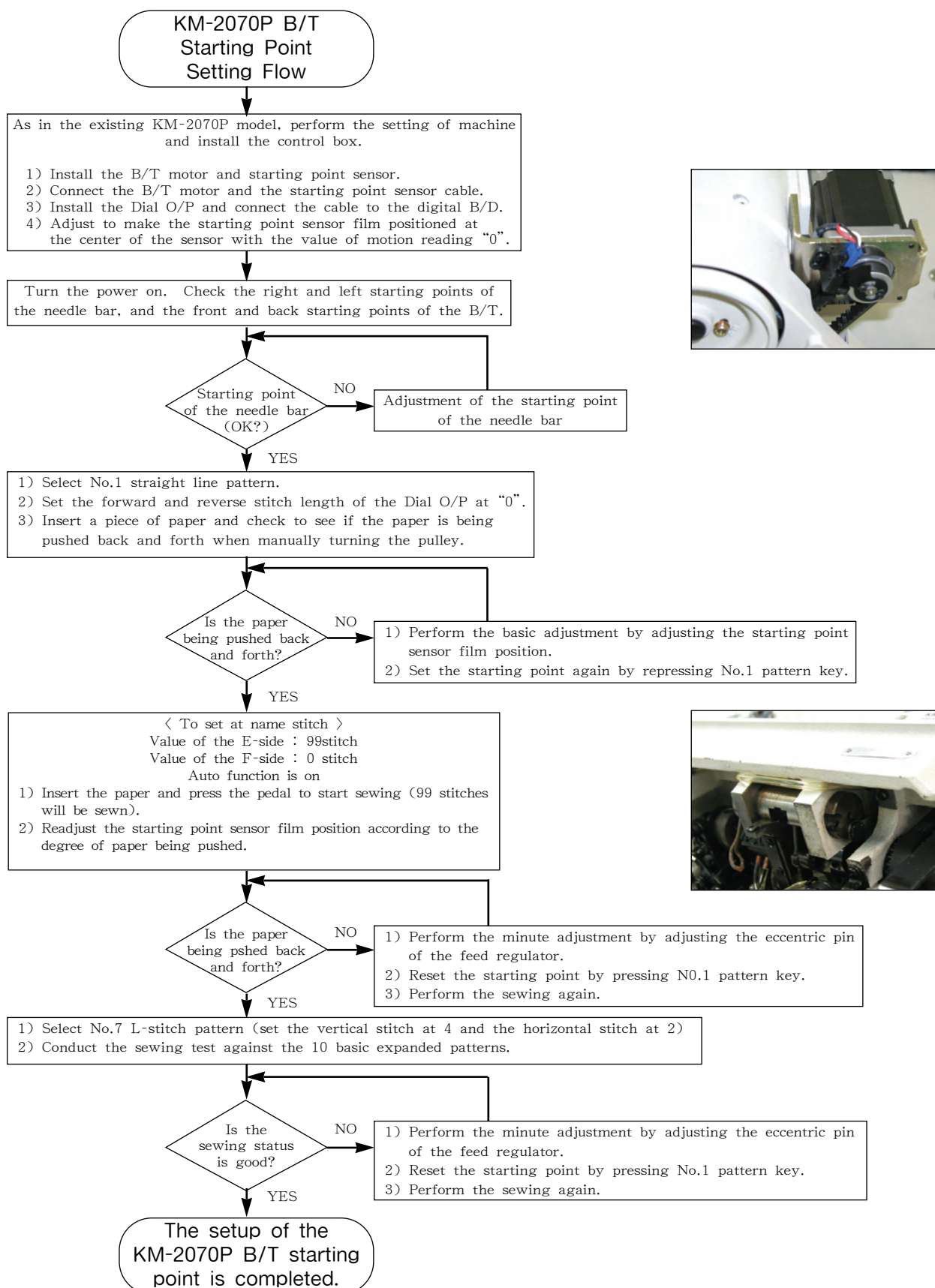
18) Adjustment of the Device for Rasing Presser Foot Minutely.

- Take down the presser foot.
- Unfasten the nut① in back side of sewing machine.
- Adjust the proper presser of wroking fabric and presse foot by twiming the screw②.
- Fasten the nut① tightly.



[Fig. 46]

19) Method of Setting the Starting Point

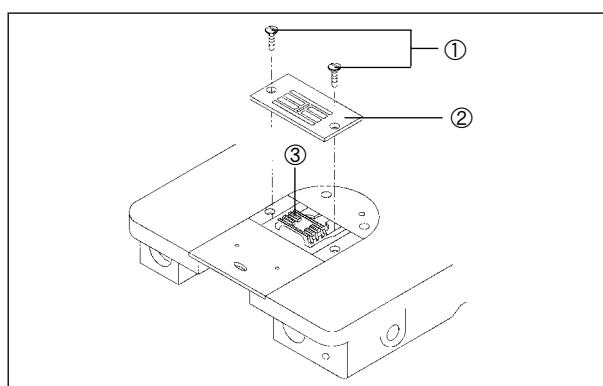


Please execute trimming every day in order to maintain function of the sewing machine and use for long. Also in case that it was not used for long, use the sewing machine after trimming as followings.

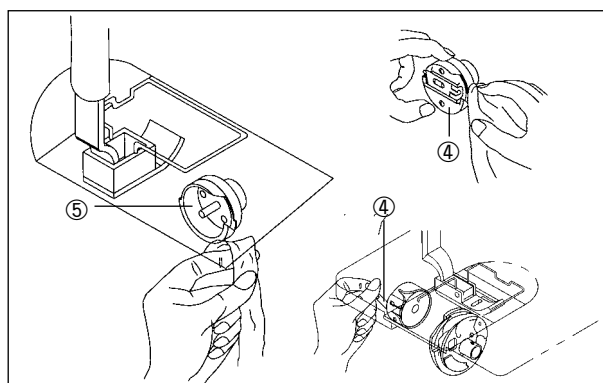
Note

- Turn off the power switch before work.
Stepping on the pedal by mistake, it becomes cause of injury as the sewing machine starts operation.
- When handling lubricant, use protection glasses or protection gloves that it does not contact to eyes or skin.
It becomes cause of inflammation. Also do not drink lubricant. It can cause vomiting.
Place it where children cannot reach.

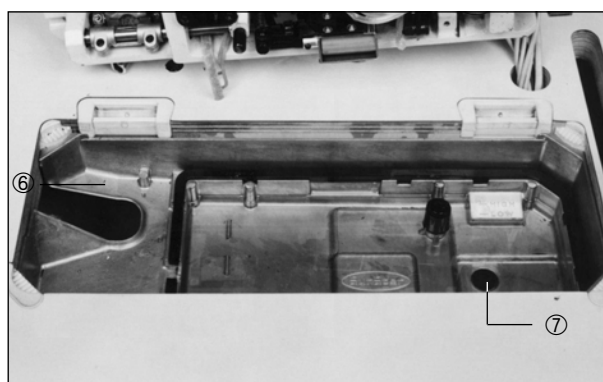
- Put up the presser foot.
- Remove the joint screw① (2 pieces) and remove needle plate②.
- Remove dust on the feed dog③ by using smooth brush.
- Attach needle plate② with joint screw① (2 pieces).
- Remove bobbin④ case.
- Remove dust on hook⑤ with smooth cloth and if there is a scratch or not clean or remove.
- Take off bobbin from bobbin case④ and wash out the foreign substances from bobbin case④ with cloth.
- Put bobbin into bobbin case④ and set bobbin case④ to sewing machine.
- Lay down head part of sewing machine.
- Wash foreign substances on remove, clean⑥ with cloth.
- If oil is lower than arrow of <LOW>, supply lubricant.
 - ※ Use the designated oil for lubricant.
 - ※ When lubricant gets dirty, remove oil fan cork screw and replace lubricant.
 - ※ Wash foreign substances stuck on magnet⑦ and oil fan.
 - ※ Dispose waste oil properly pursuant to regulations.
- Return the head part of sewing machine to original status.
- Check if lubrication amount of hook is proper.
If it is not proper, handle it by adjusting.
- If needle is bent or gets stumpy, replace the needle.
- Check if upper thread passes properly.
- Execute test sewing.



[Fig. 47]



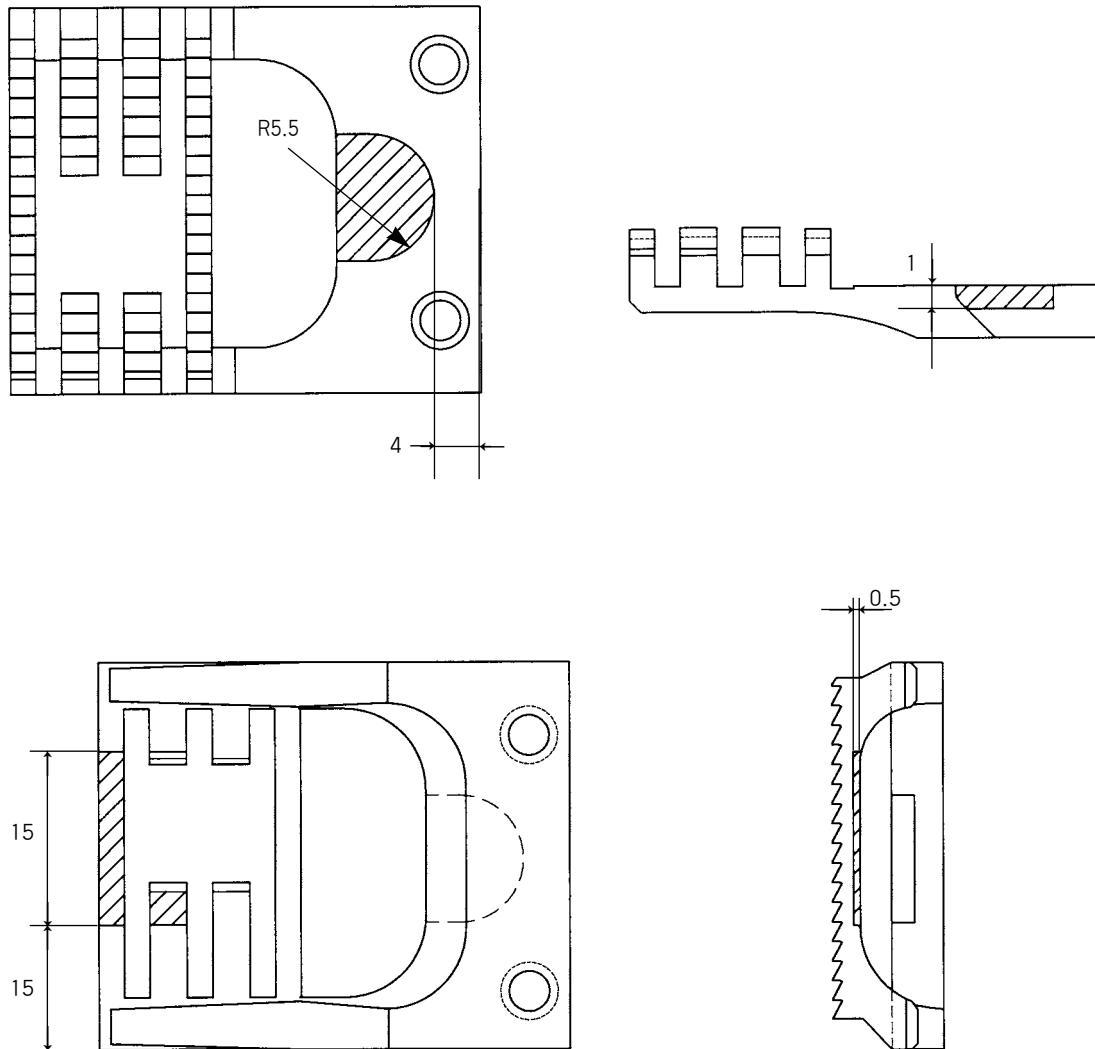
[Fig. 48]



[Fig. 49]

In case of using feed dog on the market, process the feed dog as shown in the figure.

※ If you use the feed dog without processing, rotary mess and fixed mess are damaged.



FAILURE CAUSES AND COUNTERMEASURES

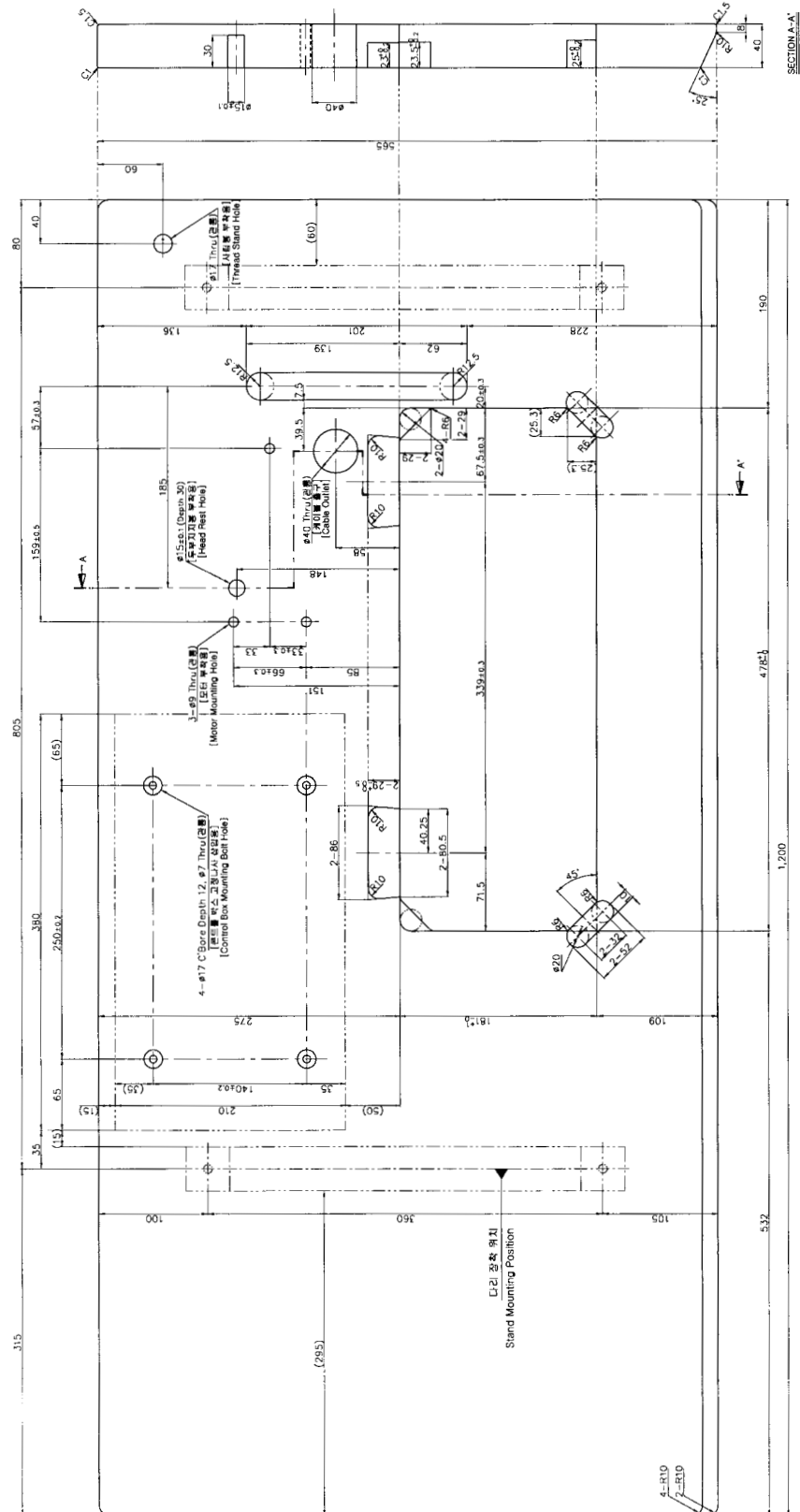
- Check the below points before you request the repair service.
- If the below process does not improve the status, turn off the power switch and ask to the purchase sales agent.

Danger

- Turn off the power switch before work and pull of the plug.
If you step on the pedal by mistake, the sewing machine starts operating and it becomes cause of injury.

Order	Failure Status	Failure Cause	Actions
1	Problem in machine driving and operation	Excessive relaxation of belt tension or belt breakage	Belt tension adjustment and belt replacement
		Short of fuse for power supply or circuit	After checking short of main motor drive fuse in control box and replace
2	Defect of Stop Location	Relaxation of main driving belt	Belt tension adjustment
		Defect of synchro location	Readjustment of synchro location
3	Needle broken	Damage to needle (bending of needle or abrasion and deformation of needle hole or groove in groove part and needle string)	Needle replacement
		Mounting of wrong needle	Proper mounting of needle
		Contact of needle and shuttle	Interval adjustment of needle and shuttle
4	Cutting phenomenon of thread	Thread inserting is not correct	Proper insertion of needle
		Defective mounting of needle (height, direction and etc.)	Needle remounting
		Needle damage (bending or abrasion and deformation of needle hole or groove in groove part and needle string)	Needle replacement
		Strong tension of upper thread and lower thread	Tension adjustment
		Excessive spring tension and operation of thread take-up spring	Adjustment of thread take-up spring tension and operation

Order	Failure Status	Failure Cause	Actions
5	Skip of sewing point	Using bent needle	Needle replacement
		Using improper needle comparing to using thread	Needle replacement
		Defective needle mounting	Needle remounting
		Improper needle and hook timing	Readjustment of needle and hook timing
		Interval of groove on needle and hook point is too large.	Readjustment of needle bottom dead point
		Excessive spring tension and operation of thread take-up spring	Adjustment of thread take-up spring tension and operation
6	Defective Thread Jointing Status	Weak upper thread tension	Upper thread tension adjustment
		Weak lower thread tension	Lower thread tension adjustment
		Improper needle and hook timing	Readjustment of needle and hook timing
7	Occurrence of thread Cutting mistake	Exchange tension of mobile mess and fixed mess is relaxed.	Tension adjustment of fixed mess
		Abrasion of groove on knife part of mobile mess and fixed mess.	Replacement of mobile mess and fixed mess
		Defective location of thread cutting cam	Readjustment of thread cutting cam location



Zigzag Width (진폭)	Part Name (품명)			
	Needle Plate (침판)	Feed Dog (톱니)	Presser Foot (노루발)	Stopper (스토퍼)
10mm	<p>01-137A-2070</p>	<p>06-188A-207L Max. Stitch (최대밧폭) : 2.5mm</p> <p>06-189A-207M Max. Stitch (최대밧폭) : 5mm</p>	<p>05-117A-2070</p>	<p>04-009C-2070</p>
8mm	<p>01-037A-2070</p> <p>01-437A-2070</p>	<p>06-389A-207L Max. Stitch (최대밧폭) : 2mm</p> <p>06-088A-207L Max. Stitch (최대밧폭) : 2.5mm</p> <p>06-089A-207M Max. Stitch (최대밧폭) : 5mm</p>	<p>05-017A-2070</p> <p>05-317A-2070</p> <p>05-817A-2070</p> <p>05-517A-2070</p>	<p>04-010C-2070</p>
5mm	<p>01-537A-2070</p>	<p>06-389A-207L Max. Stitch (최대밧폭) : 2mm</p> <p>06-088A-207L Max. Stitch (최대밧폭) : 2.5mm</p> <p>06-089A-207M Max. Stitch (최대밧폭) : 5mm</p>	<p>05-617A-2070</p>	<p>04-011C-2070</p>

Zigzag Width (진 폭)	Part Name (품명)			
	Needle Plate (침 판)	Feed Dog (톱니)	Presser Foot (노루발)	Stopper (스토퍼)
5mm	<p>01-637A-2070</p> <p>01-237A-207L</p>	<p>06-488A-207L Max. Stitch (최대맴폭) : 2.5mm</p> <p>06-288A-207L Max. Stitch (최대맴폭) : 5mm</p>	<p>05-217A-2070</p>	
	<p>01-337A-207M</p>	<p>06-588A-207L Max. Stitch (최대맴폭) : 2.5mm</p> <p>06-289A-207M Max. Stitch (최대맴폭) : 5mm</p>	<p>05-917A-2070</p>	<p>04-011C-2070</p>
	<p>01-737A-2070</p>	<p>06-688A-207L Max. Stitch (최대맴폭) : 2.5mm</p> <p>06-389A-207M Max. Stitch (최대맴폭) : 5mm</p>	<p>05-717A-2070</p>	
3mm	—	—	—	<p>04-012C-2070</p>