SunStar

USER'S MANUAL

KM-1080 Series

Post Bed, 1-Needle
Unison Feed Lock
Stitch M/C

KM-1082 Series

Post Bed, 2-Needle
Unison Feed Lock
Stitch M/C

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-110923

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.

Contents

1. Machine safety regulations ---------- 6

1-1) Transporting machine ---------- 6
1-2) Installing machine ---------- 6
1-3) Repairing machine ---------- 6
1-4) Operating machine ---------- 7
1-5) Safety devices ---------- 7
1-6) Caution mark position ---------- 8
1-7) Contents of marks ---------- 8

2. Names of main parts ---------- 9

3. Specifications ---------- 10

4. Installation ---------- 11

4.1) Installation place ---------- 11
4.2) Machine delivery ---------- 11
4.3) Bending the machine backwards ---------- 11
4.4) Table drawing ---------- 12
4.5) Installation of Sewing Machine Body ---------- 14
4.6) Supplying oil ---------- 19
4.7) Trial run (Pedal operation) ---------- 20
4.8) Machine Stop Position Check ---------- 20
4.9) Back tack button (thread trimming type) ---------- 21
4.10) Functional description of function switches ---------- 21
4.11) Adjusting Parameter of Sub Thread Adjusting Device ---------- 22
4.12) How to Use Dual Tension ---------- 22
4.13) Method for Adjustment of a Potentiometer ---------- 24

5. Preparations for sewing ---------- 25

5.1) Installing needle ---------- 25
5.2) Bobbin Insertion and Removal ---------- 25
5.3) Winding lower thread ---------- 26
5.4) Inserting upper thread ---------- 26

6. Sewing ---------- 27

6.1) Sewing ---------- 27
6.2) Adjusting thread tension ---------- 27
6.3) Adjusting upper thread length after trimming ---------- 29
6.4) Adjustment of the stitch length ---------- 30

6.5) Adjustment of Presser Foot Lift ---------- 30
6.6) Adjustment of Presser Foot Pressure ---------- 31

7. Inspecting and checking ---------- 32

7.1) Daily Cleaning ---------- 32

8. Maintenance and repair ---------- 34

8.1) Adjustment of Thread Take-up Lever Spring ---------- 34
8.2) Adjustment of Thread Guide on Thread Adjusting Device ---------- 35
8.3) Adjustment of Feed Dog Position ---------- 35
8.4) Height adjustment of feed dog ---------- 36
8.5) Adjustment of feed lift shaft cam and lower feed cam ---------- 36
8.6) Needle and Hook Timing ---------- 37
8.7) Clearance adjustment of hook and opener ---------- 38
8.8) Adjustment of Needle Plate Height ---------- 38
8.9) Adjustment of Presser Foot Height ---------- 38
8.10) Timing adjustment of the main · auxiliary presser foot and needle ---------- 39
8.11) Trimmer ---------- 40
8.12) Safety Clutch ---------- 41

9. Causes of troubles and troubleshooting ---------- 42

1

Machine safety regulations

Safety instructions on this manual are defined as Danger, Warning and Notice.
If you do not follow the instructoins, physical injuries and machine damages might be occurred.

Danger : This indication should be observed definitely. If not, there will be a danger during the installation, conveyance and maintenance of the machine.

Warning : When you follow this indication, injuries from the machine can be prevented.

Caution : When you follow this indication, error on the machine can be prevented.

1-1) Transporting machine  Danger	Those in charge of transporting the machine should have a full understanding of the machine. The following indications should be followed when the machine is being transported. ⓐ More than 2 people must transport the machine. ⓑ To prevent accidents from occurring during transportation, wipe off the oil on the machine compeletely.
1-2) Installing machine  Warning	The machine may not work properly or breakdown, if installed in certain places, Install the machine where the following qualifications agree. ⓐ Remove the package and wrappings 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 atomsphere 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. [Refer] Details for machine installation are described in 4. Installation.
1-3) Repairing machine  Caution	When the machine needs to be repaired, only the assigned troubleshooting engineer educated at the company should take charge. ⓐ 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 the machine after the machine has been repaired.

1-4) Operating machine

Warning

KM-1080/KM-1082 Series were designed as industrial sewing machines to perform sewing on fabric, leather, and other similar materials. Please observe the following instructions during machine operation.

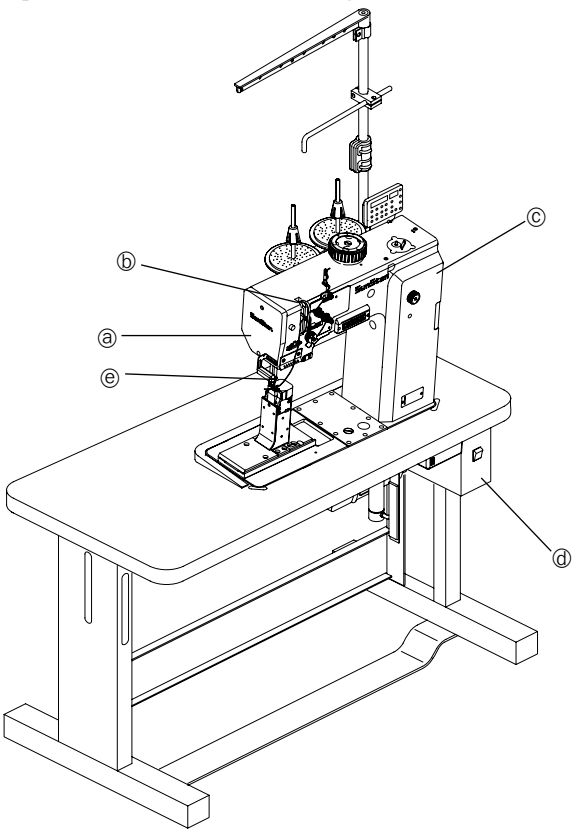
ⓐ Read through this manual carefully and completely before operating the machine.
ⓑ Wear proper clothes for work.
ⓒ Keep hands or other parts of the body away from the machine's operation parts (needle, shuttle, thread take-up lever, pulley, etc.) when the machine is operating.
ⓓ Keep the covers and finger guard on the machine during operation.
ⓔ Be sure to connect the earthing conductor.
ⓕ Turn off the 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.
ⓘ If possible, install the machine away from source of strong electrical noise such as high frequency welding machines

[Warning]
Keep motor cover in place before operating, turn off power before inspecting or adjusting.

1-5) Safety devices

Caution

ⓐ Safety label : It describes cautions during the machine operation.
ⓑ Thread take-up cover : It prevents any contact between body and take-up lever.
ⓒ Belt cover : A device intended to avoid potential risks of getting hands, feet or clothes jammed by the belt
ⓓ Label for specification of power : It describes cautions for safety to protect electric shock during the motors' rotation. (Voltage input / use Hz)
ⓔ Finger guard : It prevent contacts between finger and needle.



1-6) Caution mark position

Caution mark is attached on the machine for safety.
When you operate the machine, follow the directions on the mark.

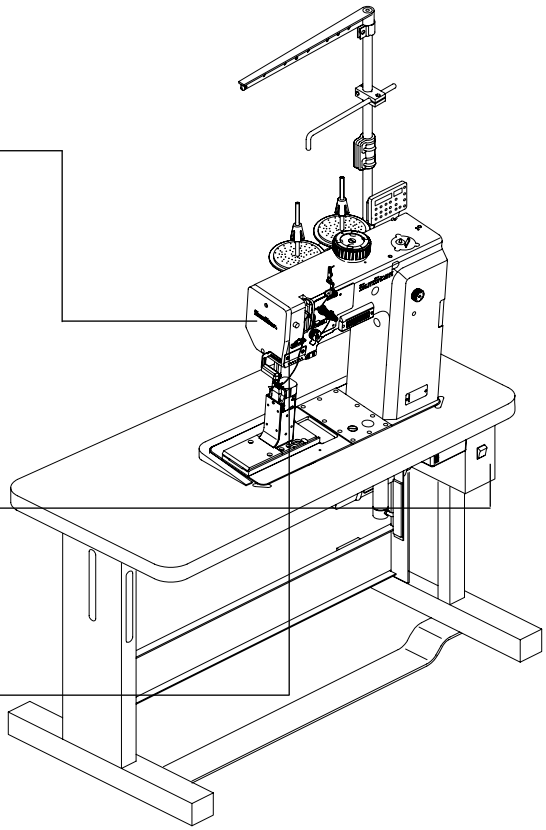
CAUTION
주 의

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.

WARNING
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.

CAUTION
경 고



1-7) Contents of marks

Warning

Caution

1)

CAUTION
주 의

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.
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2)

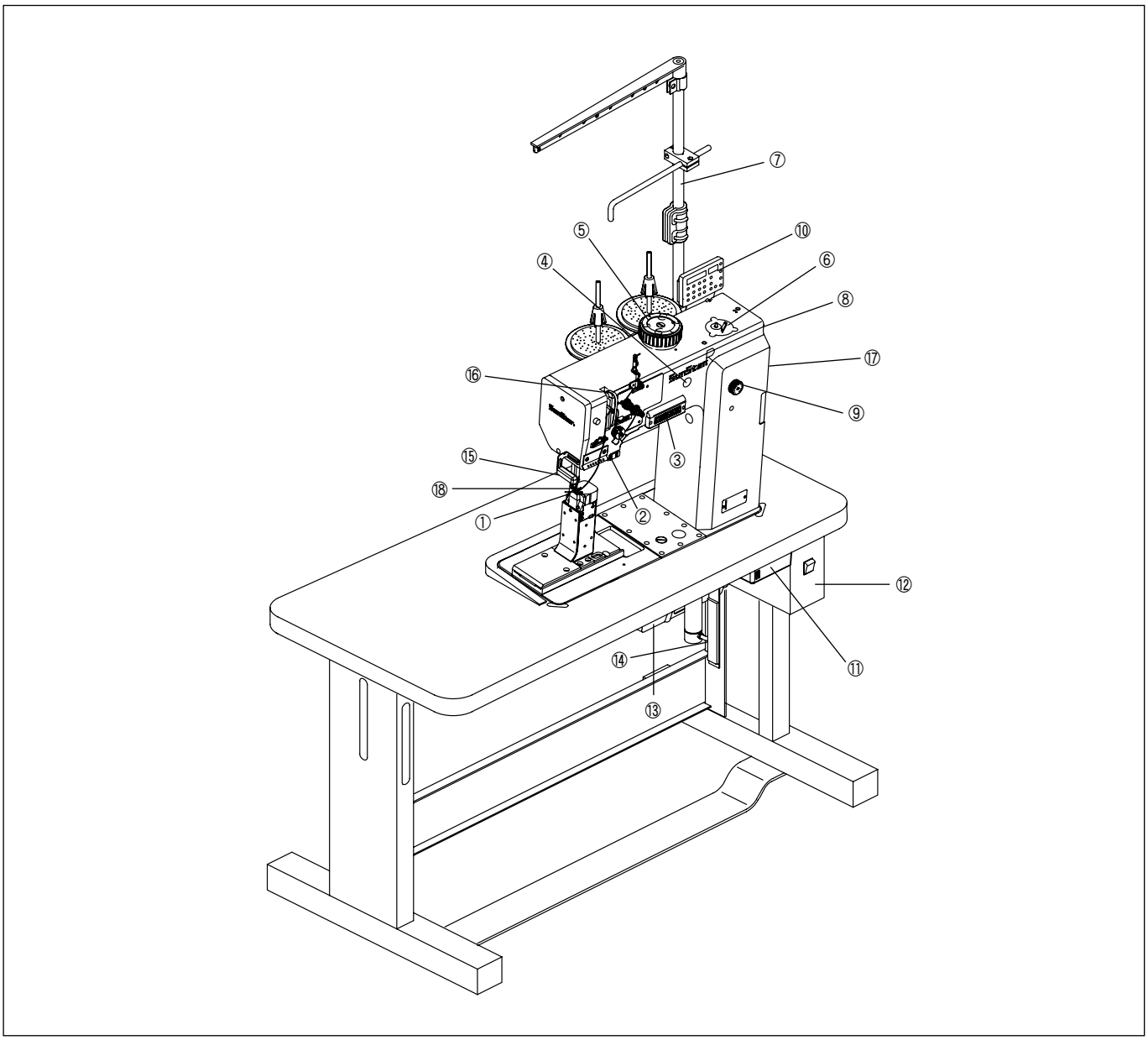
WARNING
경 고

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.

3)

2

Names of main parts



[Fig. 2-1]

① Presser Foot
② Reverse Button
③ Function Switches
④ Oil Window
⑤ Climb Dial
⑥ Thread Winder
⑦ Thread Stand
⑧ Pulley
⑨ Stitch Length Dial
⑩ OP Unit and Panel
⑪ LED Lamp SMPS
⑫ Control Box
⑬ Oil Fan
⑭ Lap Switch
⑮ LED Lamp

Safety Devices

⑯ Thread Take-up Lever Cover
⑰ Belt Cover
⑱ Finger Guard

3

Specifications

Machine Type

KM-108 □ BL □ - □

Code	Needle
0	1 Needle
2	2 Needle

Code	Sewing materials
None	Medium and heavy materials
H	Super heavy materials

Code	Trimming
None	Non-trimming
7	Trimming

Specifications \ Model name		KM-1080BL	KM-1080BL-7	KM-1082BL	KM-1082BL-7	KM-1080BLH	KM-1082BLH
Usage		For medium/heavy materials				For super heavy materials	
Lubrication method		Automatic lubrication type					
Max. sewing speed [spm]		2,500(P=1~7mm) 1,600(P=8~9mm)				2,000(P=1~7mm) 1,600(P=8~12mm)	
Max. stitch length [mm]		9				12	
Needle bar stroke [mm]		34					
Thread take-up lever stroke [mm]		76.2					
Presser Foot life	Manual [mm]	10					
	Automatic [mm]	17					
Hook		Horizontal large hook (1.6x)					
Needle in use		DP × 35 (#19 ~ #23) 134~35 (Nm120~160)				DP × 35 (#22 ~ #25) 134~35 (Nm140~200)	
Gauge [mm]		-		4~12		-	6~12
Sewing space [mm]		330					
Bed size [mm]		568 × 178					
Main motor		Servo motor (750W)					
Manual backtack lever		Basic specifications	-	Basic specifications	-	-	-
Automatic backtack device		-	Basic specifications	-	Basic specifications	Basic specifications	Basic specifications
Automatic trimmer		-	Basic specifications	-	Basic specifications	-	-
Automatic presser foot lift device		Basic specifications	Basic specifications	Basic specifications	Basic specifications	Basic specifications	Basic specifications

Presser foot overlap	Max. sewing speed [SPM]			
	KM-1080BL/KM-1080BL-7	KM-1082BL/KM-1082BL-7	KM-1080BLH	KM-1082BLH
2.5 or below	2,500(2,100)		2,000	
2.5~3.0	2,300		1,900	
3.0~3.5	2,100		1,800	
3.5~4.0	1,900		1,750	
4.0~4.5	1,800		1,700	
4.5~5.0	1,700		1,650	
5.0 or above	1,600		1,600	

Stitch length [mm]	Max. sewing speed [SPM]			
	KM-1080BL/KM-1080BL-7	KM-1082BL/KM-1082BL-7	KM-1080BLH	KM-1082BLH
7.0 or below	Presser foot overlap-based control			
8.0 or above	1,600			

※ The speed is varied depending on stitch length. ※ Equal to commercial rpm.

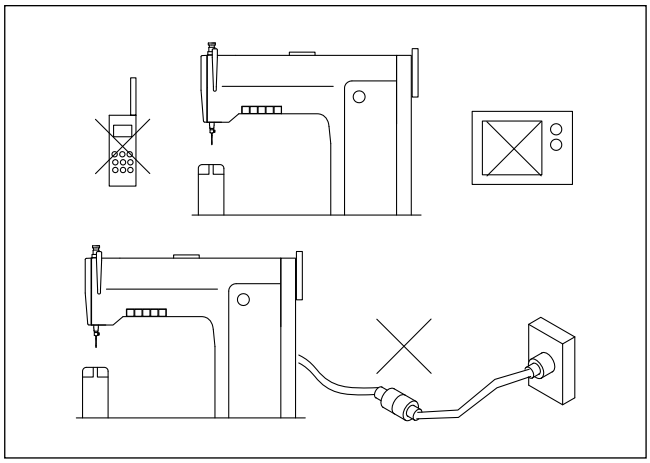
4

Installation

Caution	• Only trained technicians should install and wire up the machine. • The machine weighs over 50 kg. More than two persons should install the machine. • Do not plug in the machine until installation is completed. If the operator mistakenly steps down on the pedal with the plug in, the machine will start automatically and can cause physical injuries. • Use both hands when bending the machine backwards or returning it to the original position. Using only one hand can lead to severe hand injuries due to the weight of the machine.

4.1) Installation place

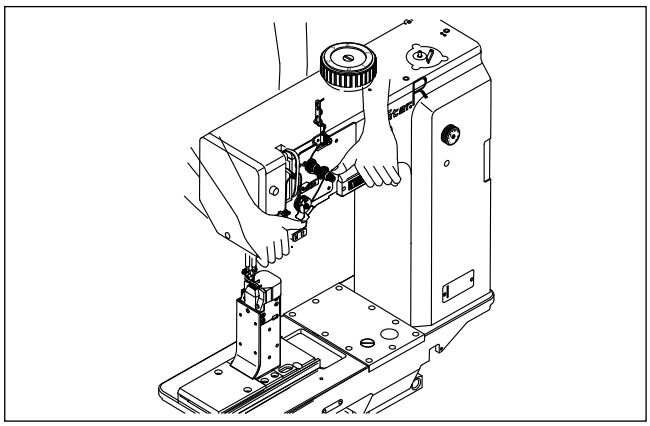
1) Do not install the machine near television, radio or telephone; or the operation of machine can be interfered with by the noise from the appliances.
2) Connect the ground (earth) wire. An unstable connection may result in malfunction



[Fig. 4-1]

4.2) Machine delivery

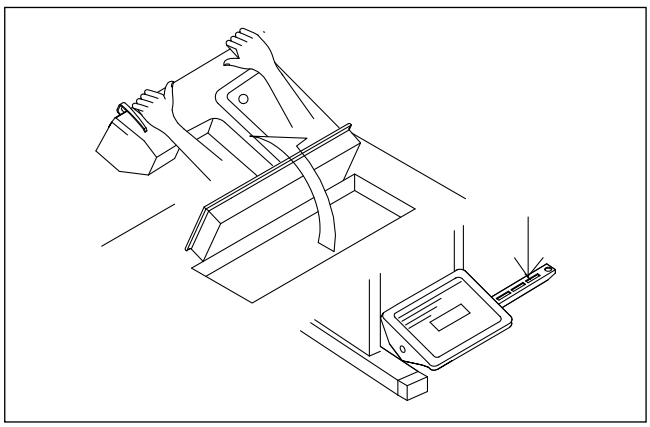
1) There should be two people to move the machine, as in the Figure.



[Fig. 4-2]

4.3) Bending the machine backwards

1) Bend the machine backwards with two hands grabbing upper part of the body. Make sure to press the lower part of the board leg of the machine, or the whole body of machine falls backwards, leading to physical injuries.

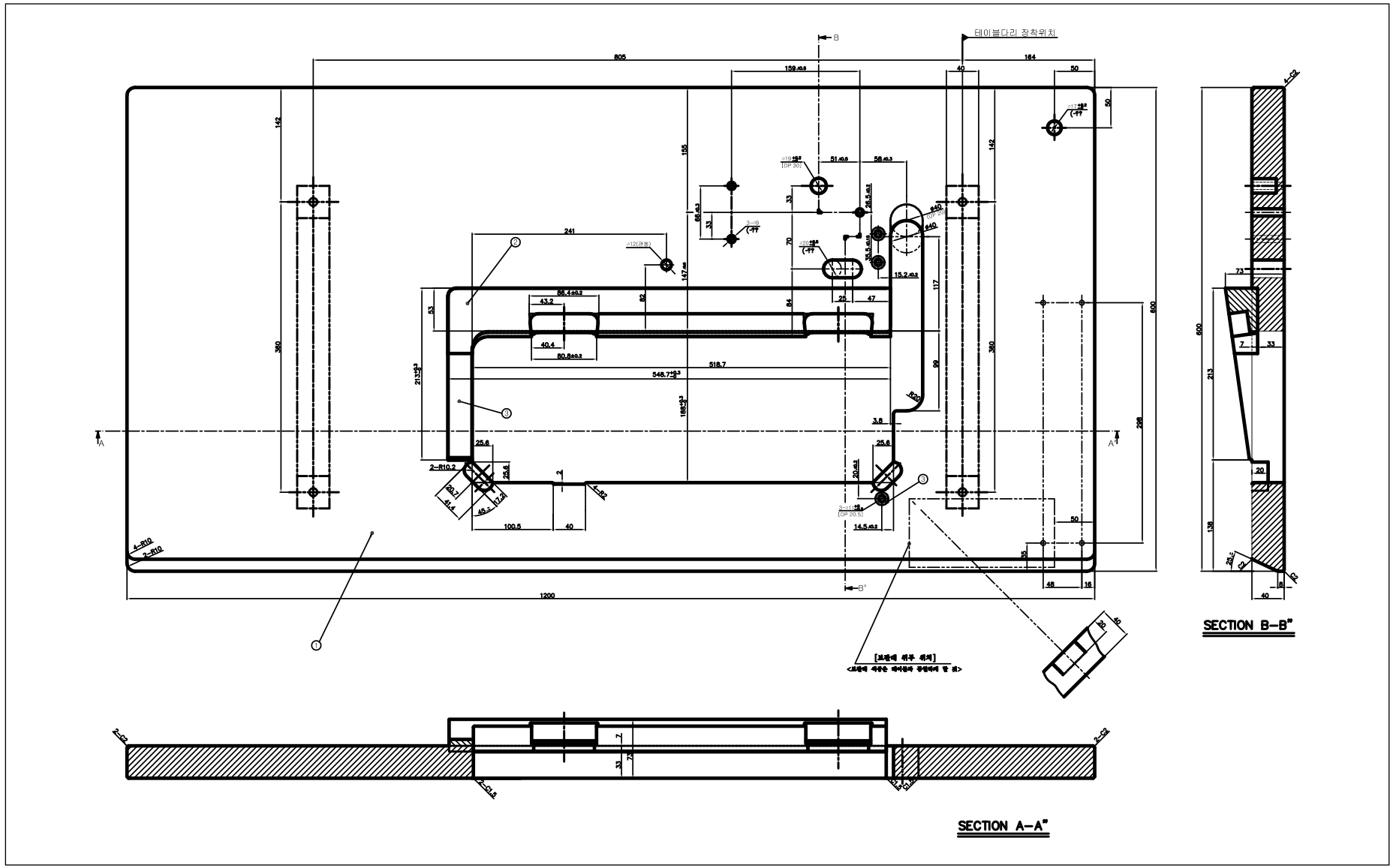


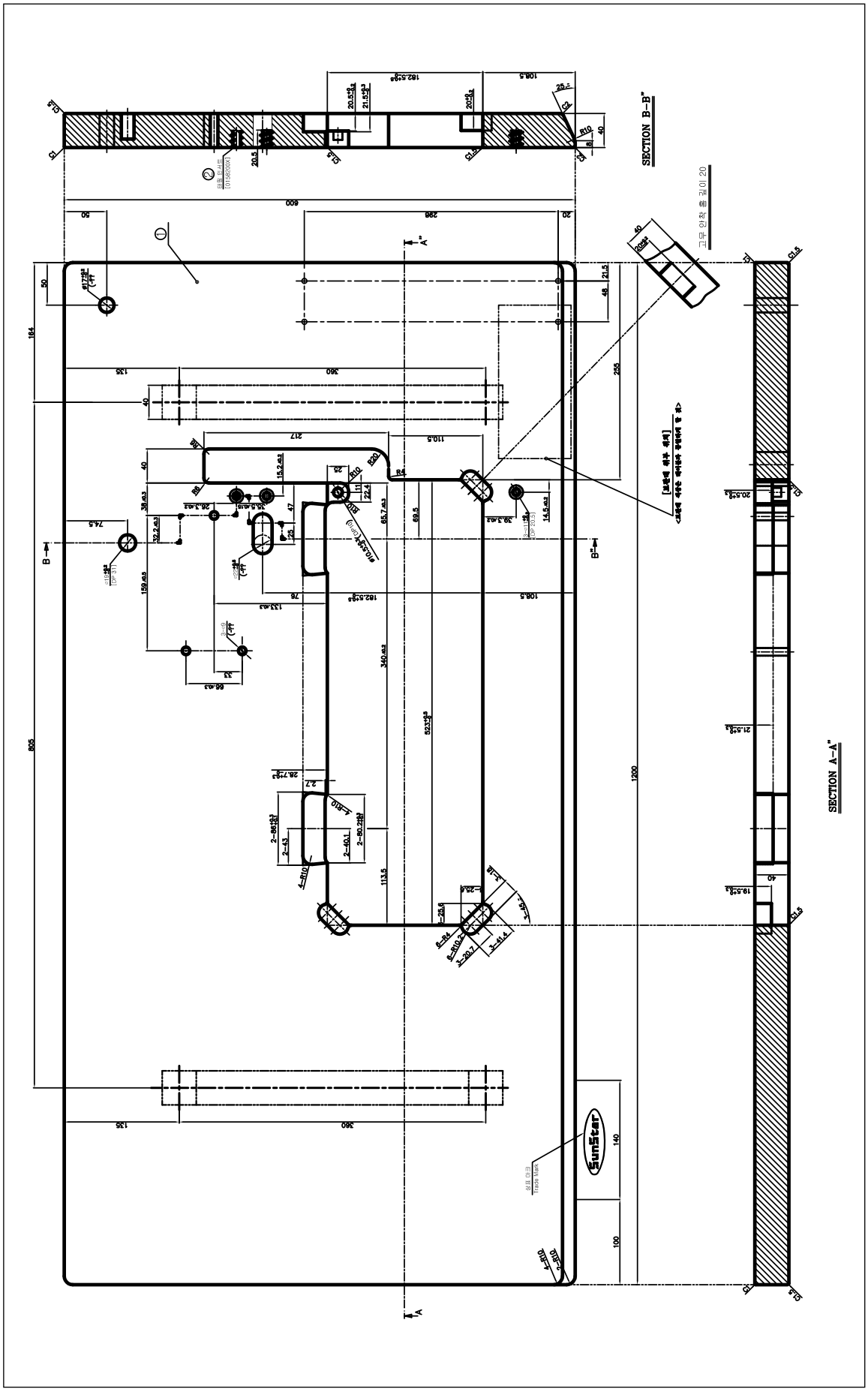
[Fig. 4-3]

4.4) Table drawing

Please use the table provided by Sunstar. When using self-made table , the thick of table should be more than 40mm. Please use table strong enough to sustain the weight of the machine.

4.4.1) Slant table





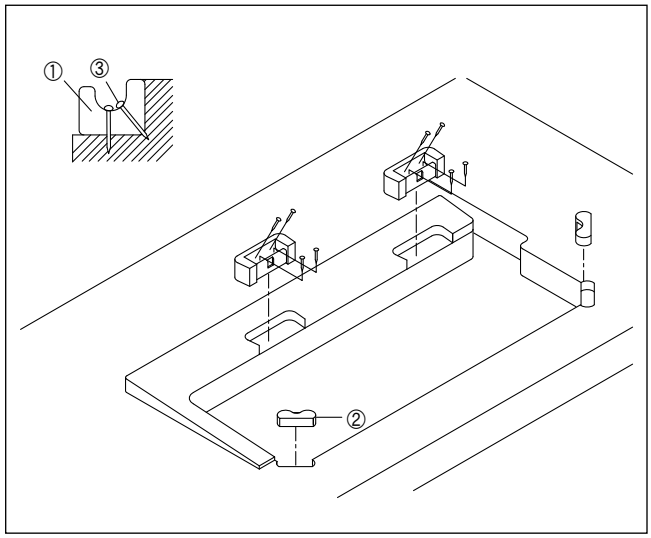
[Fig. 4-4]

4.4.2) Flat table

4.5) Installation of Sewing Machine Body

4.5.1) Hinge and Bed Supporting Rubber

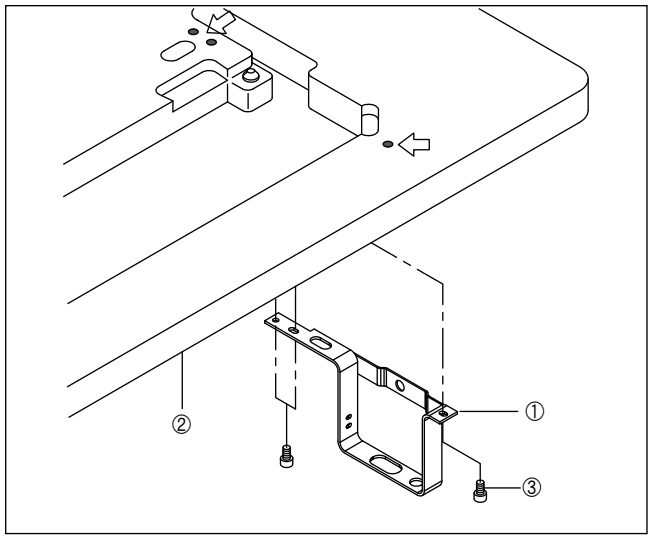
Fix the hinge rubber ① (2EA) and the bed supporting rubber ② (2EA) at the grooves on the table using nails ③.



[Fig. 4-5]

4.5.2) Presser Foot Lift Cylinder Bracket

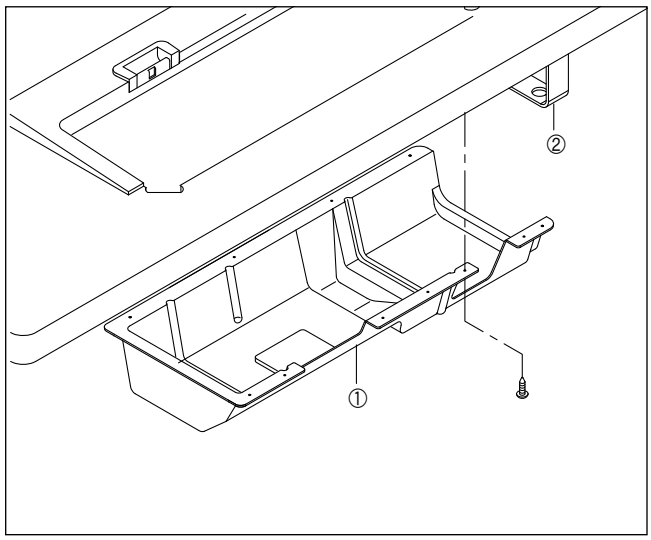
Fix the presser foot lift cylinder bracket① under the table② as in the figure using the M8 hexagonal bolt ③.



[Fig. 4-6]

4.5.3) Oil Fan

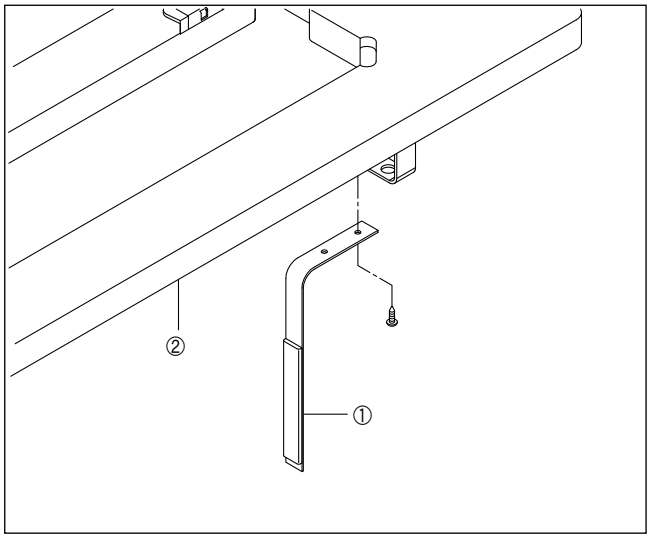
Find the oil fan① in the accessory box and attach it aligned with the presser foot lift cylinder bracket② using screws.



[Fig. 4-7]

4.5.4) Lap Switch

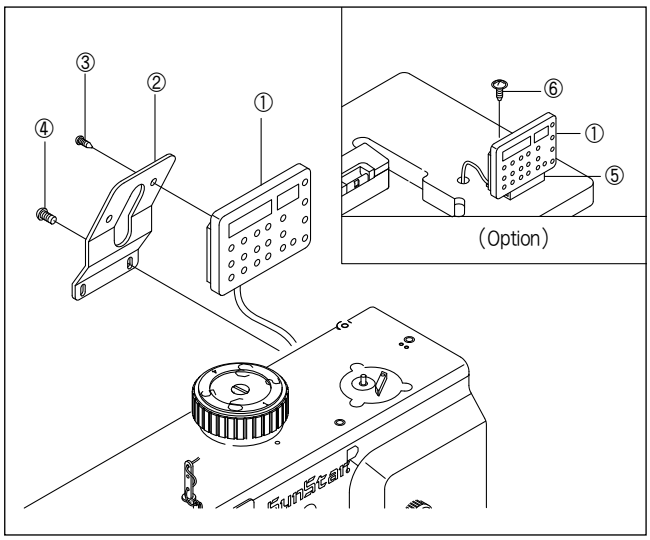
Attach the lap switch ① beneath the table ② considering the user's working position with screws.



[Fig. 4-8]

4.5.5) OP Panel

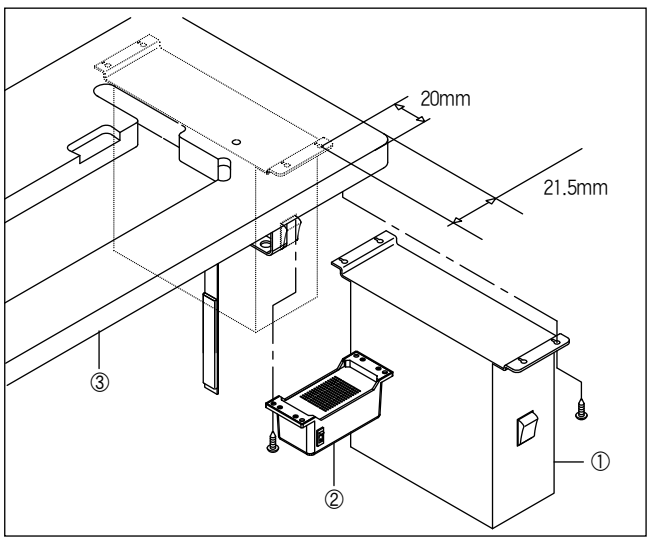
Fix the operating panel① to the bracket② using a bolt③ and then fix it to the upper part of the rear arm using a bolt④.
(Optional : Fix the OP bracket⑤ to the table face using a tapping screw⑥.)



[Fig. 4-9]

4.5.6) Control Box and LED Lamp SMPS

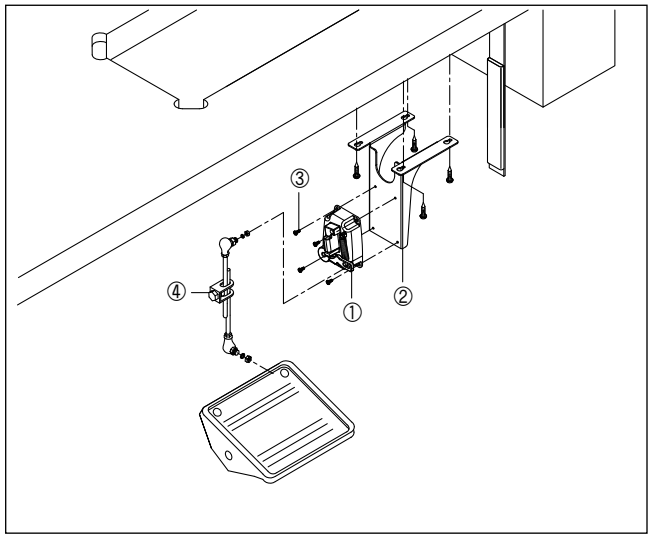
Attach the control box ① and the LED lamp SMPS ② beneath the right side of the table ③ using screws and fix them at the places as in the figure.



[Fig. 4-10]

4.5.7) Pedal switch and connecting rod

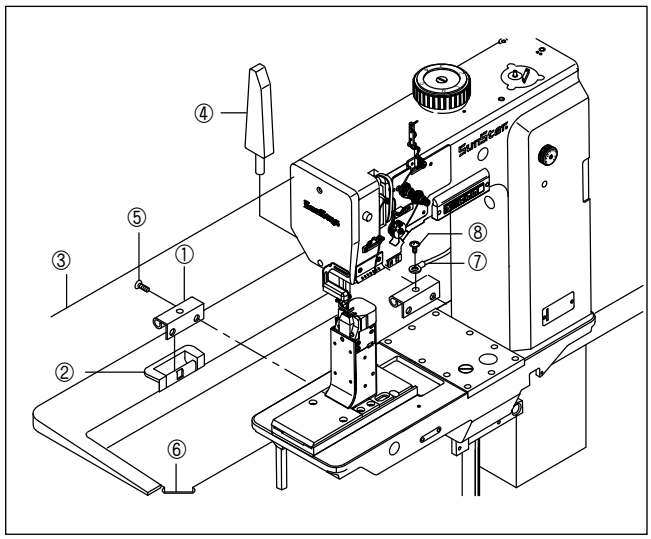
1) Attach pedal switch ① to pedal switch bracket ② with four bolts ③.
2) As in the Figure, attach pedal switch bracket ② to the lower part of table.
3) Connect one end of the connecting rod ④ with pedal switch and the other end with pedal, and then adjust length of the rod.



[Fig. 4-11]

4.5.8) Sewing Machine Body

1) Place the two hinges① on the rear bed of the sewing machine and tightly fasten them using the screw⑤.
2) Settle the hinge ① on the hinge rubber ② of the table ③ and place the sewing machine body on the bed base rubber ⑥.
3) Insert the machine body sustaining pole ④ into table ③ completely. If the pole is not inserted completely, that may cause accidents because the pole cannot sustain the weight of machine body firmly, when the body bent backwards.
4) Install the sewing machine body on the table and fix the grounding wire ⑦ on the hinge ① using a screw ⑧.

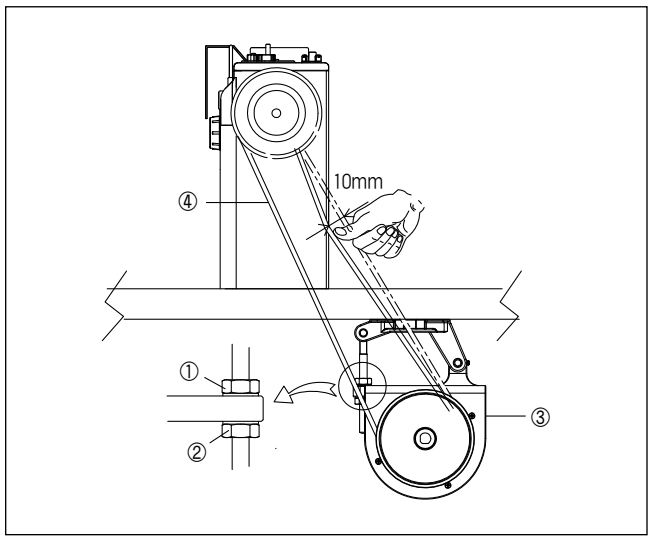


[Fig. 4-12]

4.5.9) Adjustment of Belt Tension

Install the motor and sufficiently loosen the fixing nuts ①, ②. Then due to the weight of the motor ③, tension is generated at the belt ④. Fix the fixing nut ① in this position and then tightly fasten the fixing nut ②.

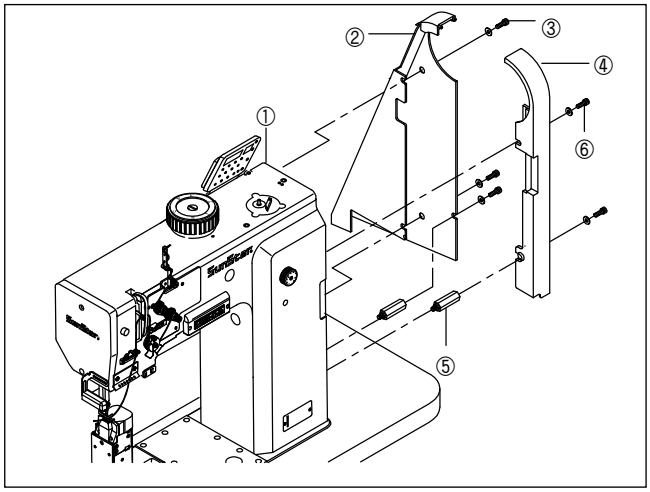
Adjust the tension of the belt to make the belt pressed 10mm when the center is pressed by a finger as in the figure, and tightly fasten the fixing nut ②.



[Fig. 4-13]

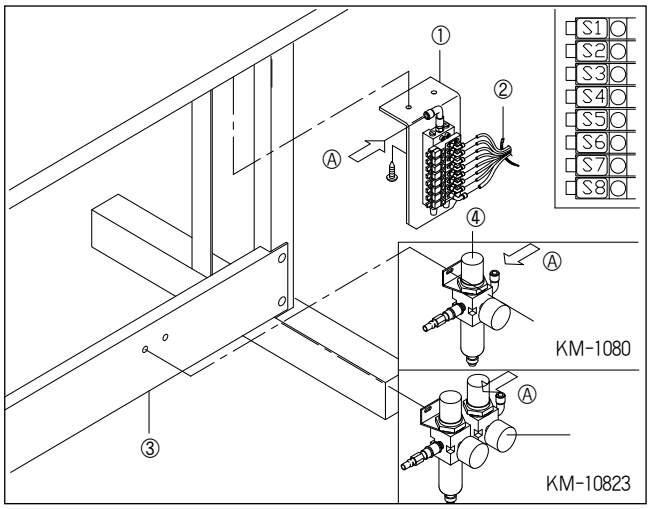
4.5.10) Belt Cover Installation

1) Fix the right top of the arm① and the belt cover (right)② at the fixing groove using the screws③.
2) Accurately assemble the left and right belt covers and fix the belt cover (left)④ with the screws③ applying the same method of fixing the belt cover (right)②. When the assembled belt cover is fixed to the stud nut⑤ with the screw⑥, the installation of the belt cover is completed.



4.5.11) Pneumatic Parts Installation and Function Check

1) Fix the pneumatic bracket① to the table bottom with the tapping screw as in the figure. Fix the regulator to the reinforcing plate of the table T-leg③.
2) Connect the pneumatic tubes according to label signs and bind the tubes with other lead lines using the belt clips②.
3) Use the regulator ④ to set the default pneumatic pressure at 0.5Mpa.
4) When applying the seam center guide presser foot, make sure that the pneumatic pressure of the regualtor ⑤ is no highr than 0.3Mpa.



[Fig. 4-15]

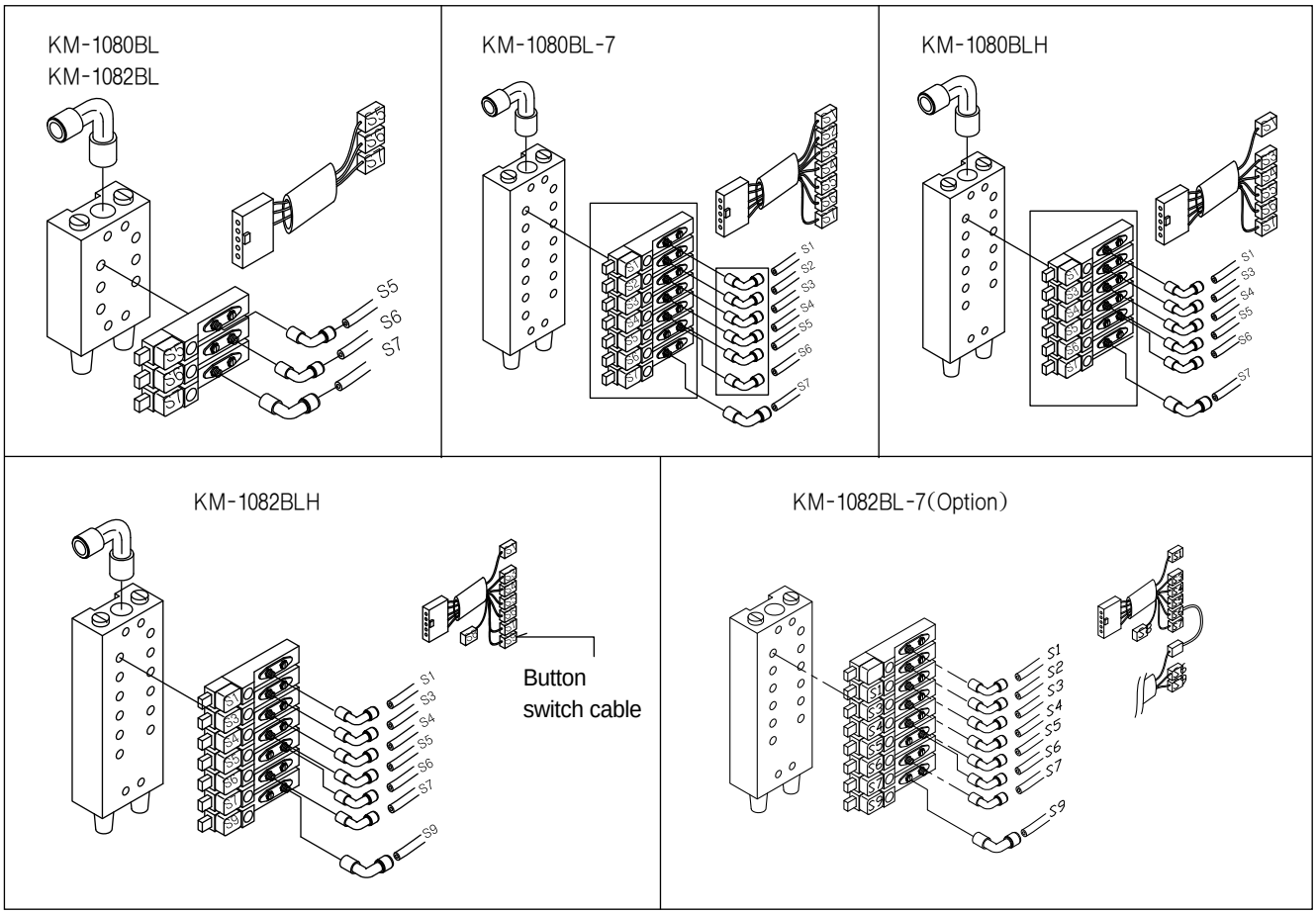
4.5.12) Description of label symbols

Label Sign	Cylinder	Function
S1	Backtack	Add the initial and last backtack sewing function and perform reverse sewing
S2	Trimming	Perform trimming
S3	Hem height difference	When the cylinder is in motion, sewing is performed using the higher value of the two climb dials attached to the machine.
S4	Stitch length conversion	When the cylinder is in motion, sewing is performed using the lower value of the two stitch length dials attached to the machine.
S5	Thread release(Main)	It operates when trimming and presser foot automatic lift are performed to loosen the tension of the upper thread.
S6	Thread release(Sub)	Turn on/off the tension of the upper thread using the function switch.
S7	Presser foot	Lift the presser foot 18mm from the needle plate face.
S8	Seam guide	It is used to create sewing lines in parallel along the seam in case of using two needles.

Note

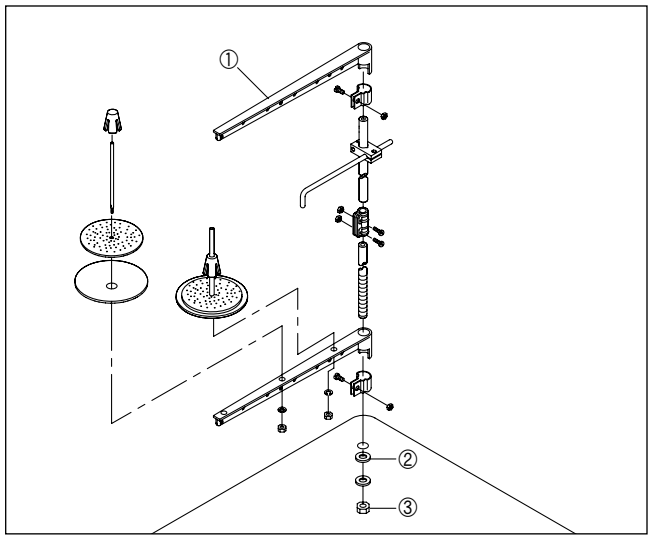
However, when the left/right removable thread adjustment device, an optional device is applied, S6 refers to SubL, and S9 refers to SubR.

4.5.13) Pnematic wiring diagram by model



4.5.14) Thread spool stand assembly

Secure the thread spool stand assembly① onto the table using washer② and nut③ on the right side.



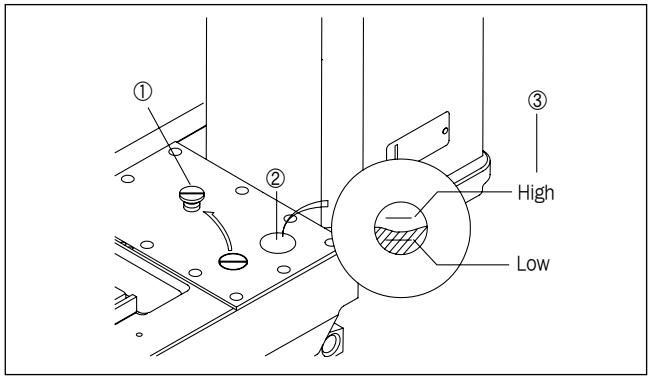
[Fig. 4-16]

4.6) Supplying oil

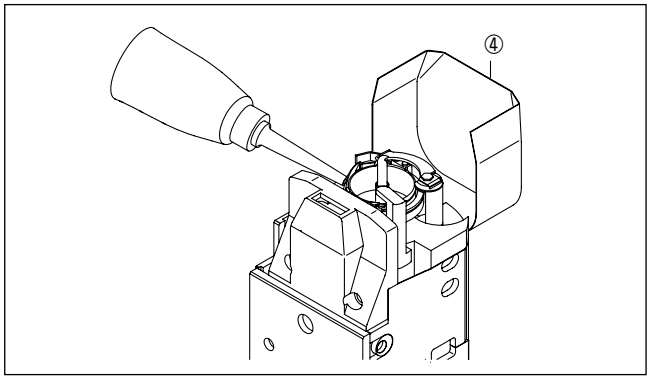
Caution	• Plug in only after oil supply is finished. If the operator mistakenly steps on the pedal with the plug in, the machine will start automatically and can cause severe injuries. • When handling lubricants, wear protective glasses or gloves to prevent lubricants from contacting with your eyes or skin. Wash your hands in running water with soap when they are smeared with lubricant. If lubricant is in the eye, instantly wash it with running water and see a doctor. • Never drink lubricants since they can cause vomiting or diarrhoea. Go to see a doctor, if you mistakenly drink lubricant. • Keep lubricant away from the reach of children and the youth.

Caution	• Operate the machine only after supplying oil when the machine is used for the first time or has been left unused for a long time. • Only use genuine lubricant of this company. (Lubricant is in the accessory box.)

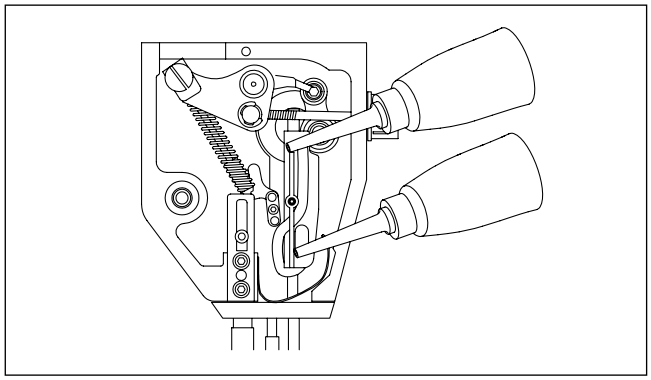
1) Lubrication to Bed
   Loosen the oil tank entrance screw ① and supply oil until the oil gauge ② reaches the "HIGH" mark③. When oil supply is completed, tightly fasten the screw ①. [Fig. 4-17] Upon initial installation, run the machine for 30 minutes and supply oil until the "HIGH" mark.
2) Lubrication to Face Plate
   Loosen the two fixing screws for the face plate for disassembly. Supply lubricant through the entrance marked with an arrow. When oil supply is completed, reassemble the face plate. [Fig. 4-18]
3) Lubrication to Hook
   Open the sliding plate ① and supply oil through the entrance marked with an arrow. [Fig. 4-19]
4) Oil Window Check
   When oil supply to oiled parts is completed, turn on the power. Operate the sewing machine for five minutes at a low speed and check for any oil flow in the oil hose which runs through the oil window③ on the front part of the arm. [Fig. 4-20]
   Operate the sewing machine at the speed of 1,500 spm per minute for the first four to five days of operation, and use the machine at the normal speed afterwards. Then it is able to keep the machine at the best conditions.

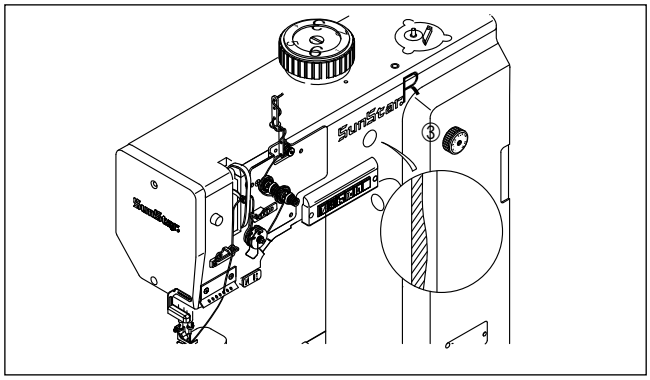


[Fig. 4-17]



[Fig. 4-19]


[Fig. 4-18]



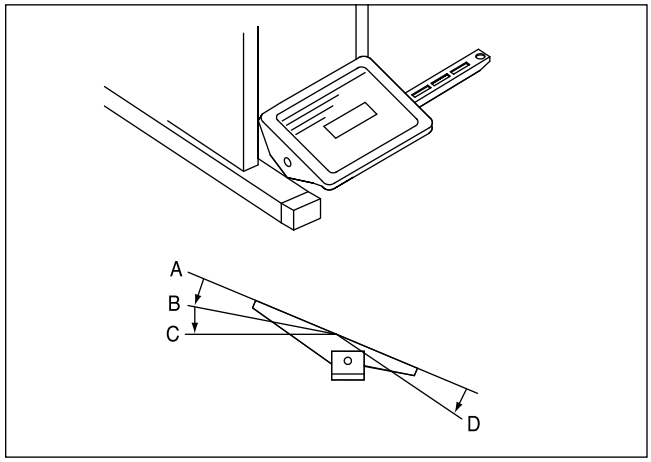
[Fig. 4-20]

4.7) Trial run (Pedal operation)

Caution

Make sure not to touch or press down parts that are operating or moving during operation. Failure to follow the safety rules may result in physical injuries or mechanical damages.

1) Press pedal lightly to the position of B to check if the machine is operating low-speed sewing.
2) Press pedal to the position of C to check if the machine is operating high-speed sewing.
3) Press pedal backward and forward. And then put the pedal at neutral position of A to check if needle stops lower than the upper surface of needle plate.(in case that needle down stop is set)
4) When pressing pedal to the position of D(or pressing pedal the position of to D and then replacing pedal to the position of A), needle will stop higher than the upper surface of needle plate after trimming.



[Fig. 4-21]

4.8) Machine Stop Position Check

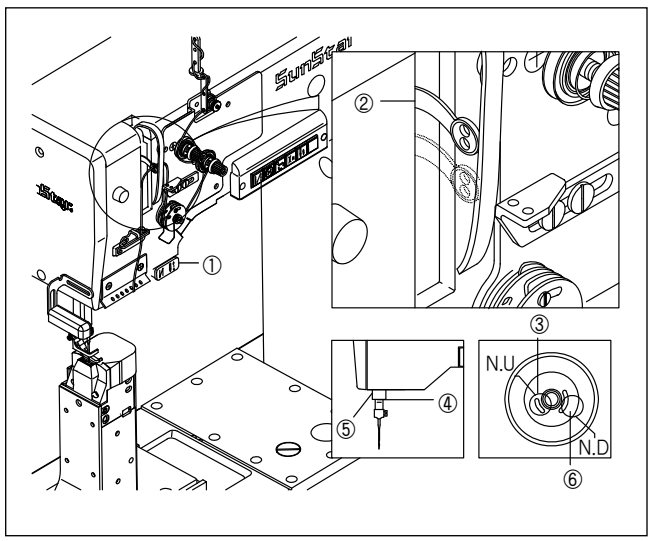
Press the reverse button ① to make the needle to the highest and lowest position, and check the stop position of the machine. When the stop position is improper, trimming may be faulty. In this case, the position of the magnetic holder imbedded in the pulley should be corrected.

4.8.1) Check for up-stop position of needle bar

The needle bar is at the highest stop position when the thread take-up lever② stops at the highest position. If their positions are not proper, adjust the magnetic holder③ embedded at the N.U punched mark of the pulley left or right for correction.

4.8.2) Needle Bar Lower Stop Position Check

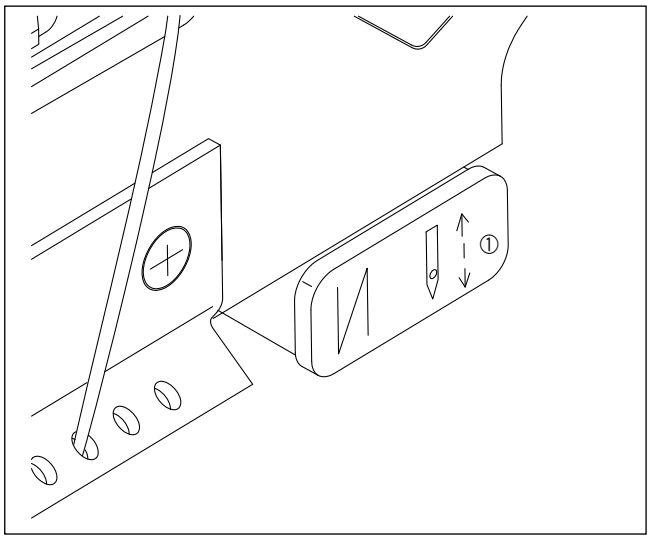
The lower stop position of the needle bar is the position where the punched mark ④ of the needle bar meets the end of the needle bar frame ⑤. When the position is not correct, the position of the magnetic holders ⑥ embedded in the N, D punched marks of the pulley should be moved left or right for readjustment.



[Fig. 4-22]

4.9) Back tack button (thread trimming type)

Pressing the back tack button or reverse button① during forward sewing will start reverse sewing immediately. When you stop the machine and restart it by stepping down on the pedal with the reverse button① already pressed down, you can perform reverse sewing from the beginning. When the machine is in a "stop" mode, you can change up-down position of the needle bar by pressing the reverse button. Lightly pressing the button once will stop the needle bar in a high position. Pressing the reverse button① twice within less than a second will stop the needle bar in a low position. In short, the button delivers two functions: one for reverse sewing and the other for converting vertical position of the needle.



[Fig. 4-23]

4.10) Functional description of function switches

KM-1080BL KM-1082BL	
KM-1080BL-7 KM-1080BLH KM-1080BLH-7	
KM-1082BL-7	
KM-1082BL-7 (Option)	
KM-1082BLH	

[Fig. 4-24]

1) : Stitch length conversion switch
While the switch is turned off, the set value of the stitch count dial attached to the arm is applied. While the switch is turned on, the set value of the stitch count conversion cylinder is applied.

2) : Auto backtack select switch
The switch selects the addition or deletion of the initial and last backtack sewing function.

3) : Presser bar overlapping change switch
When pressing the switch, the lamp is on. Then regardless of the set value at the top cover dial, the overlapping portion of presser bar becomes 7mm at maximum. When pressing it again, the lamp is off and the set value at the top cover dial is applied.

4) : Supplementary thread tension switch
When the switch is not pressed, the tread tension is low. When the switch is pressed, the dish is closed, and the thread tension increases.

5) : Needle bar upper stop switch(1-needle KM-1080)
Regardless of the machine stop position, the switch sends the needle bar to the highest stop position.

6) : Seam guide operation switch(2-needle KM-1082)
The switch is used in case of using two needles. It creates sewing lines in parallel along the seam of the sewing fabric.

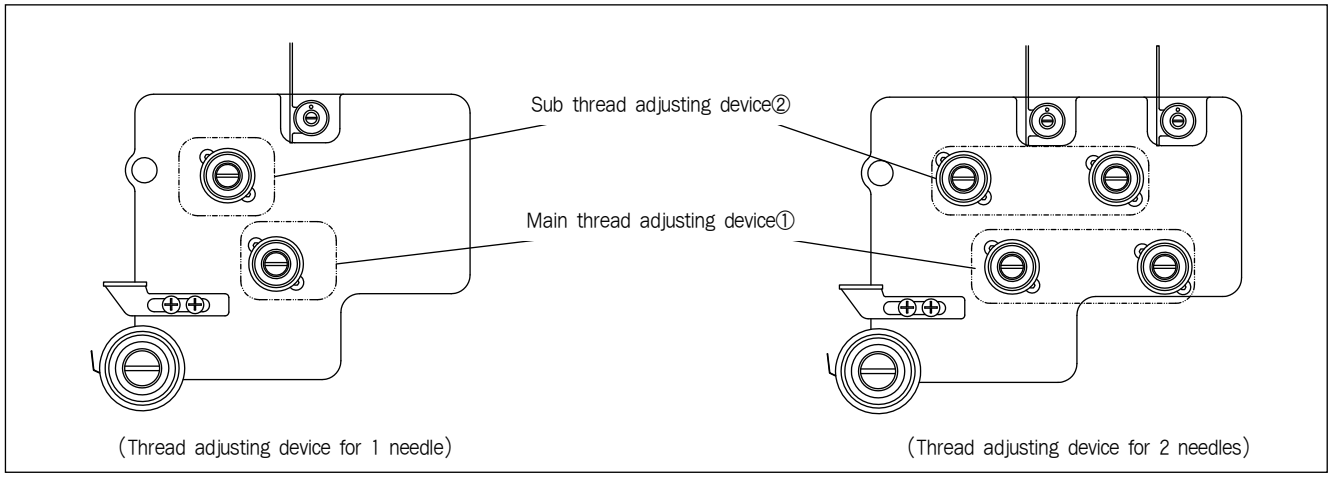
7) : Left auxiliary thread tension switch
When the switch is not in operation, the thread tension is released. When the switch is pressed, the left auxiliary dish is closed, and the thread tension increases.

8) : Right auxiliary thread tension switch
When the switch is not in operation, the thread tension is released. When the stitch is pressed, the right auxiliary dish is closed, and the thread tension increases.

4.11) Adjusting Parameter of Sub Thread Adjusting Device

- The default value of A-95 is “0”.

Parameter No.	Set Value	Function Name
A-95	0	Use the main thread adjusting device①. In order to run the sub thread adjusting device② while using the main device, press the sub thread tension switch. Then with the lamp turned on, the dish for the sub thread adjusting device② is closed. After trimming, the sub thread tension switch is automatically turned off.
	1	In the case where A-95’s parameter is set at “1”, the lamp of the sub thread tension switch is on, and the sub thread adjusting device ② is running like the main thread adjusting device①. In this case, even after trimming, the sub thread tension switch is not automatically turned off. In order to release the tension of the sub thread adjusting device②, press the sub thread tension switch to turn it off.



[Fig. 4-25]

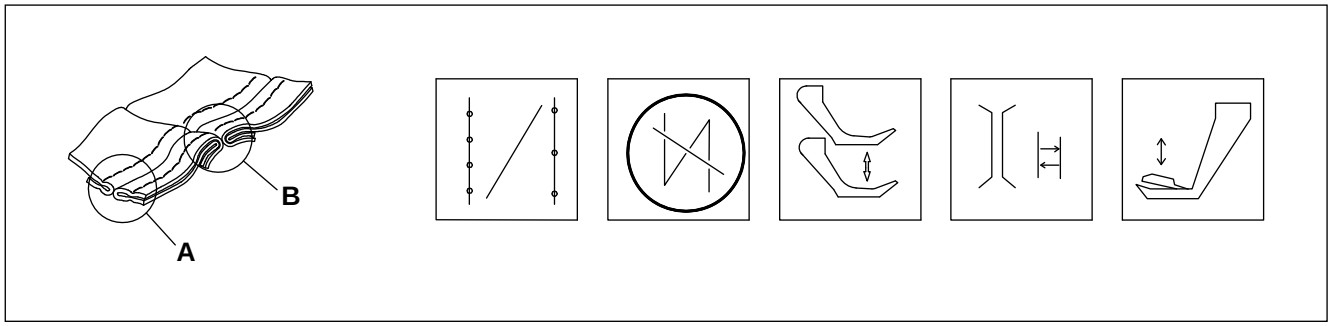
4.12) How to Use Dual Tension

1) Main Thread Adjusting Device
   - Adjust tension of the main thread adjusting device① in line with the main sewing material conditions.
   - Adjust the main thread adjusting device① and the tension of the lower thread in order to create loops at the center of the sewing material at even stitch length.
2) Sub Thread Adjusting Device
   - The sub thread adjusting device② enables users to easily increase the tension of the upper thread according to the sewing material height difference and conditions.
     For two-needle model, if a dual tension individual operating type (optional) is used, the left and right tension of the upper thread can be independently adjusted while sewing materials with height difference on the left and right sides.
   - The sub thread adjusting device② should be adjusted in line with the tension of the main thread adjusting device① and the conditions of sewing materials with height difference.
3) Operating Main · Sub Thread Adjusting Devices
   - The main · sub thread adjusting devices①, ② are run by pneumatic pressure. In particular, the sub thread adjusting device② can be turned on and off easily with functional switches.
   - The sub thread adjusting device can be left, right independently run as an optional function. The left, right function switches can be used to turn on and off the tension.
   - During sewing, when the sub thread adjusting device or the left, right sub thread adjusting device in terms of independently running type is pressed, the lamp is turned on and at the same time the tension of the upper thread increases. When the button is pressed again, the lamp is turned off, and the tension of the upper thread decreases.

4) Examples of Dual Tension Application

4-1) Basic Specifications

- For the sewing process of handling significant height difference of sewing material, the presser foot°Øs cross overlap and the tension of the upper thread should be increased to get best sewing quality.
- Turn off the dual tension button C and adjust the tension of the main thread adjusting device according to the conditions of the main sewing material A.
- Turn on the dual tension button C and adjust the tension of the sub thread adjusting device according to the conditions of the thick sewing material B.
- Proceed with general sewing work after the dual tension button C is turned off. When the machine reaches Point B on the sewing material, press the dual tension button C to increase the upper thread tension. When the sewing for height difference is completed, press the dual tension button C to decrease the upper thread tension and continue sewing.



[Fig. 4-26]

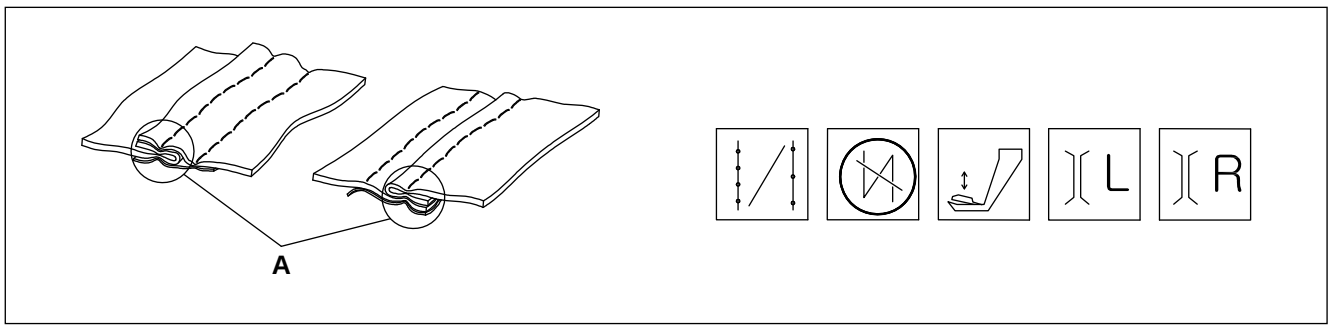
4-2) Optional Specifications

- When sewing the materials with different height on left and right sides, the independently operating (optional) dual tension can be used to get the best sewing quality.
- As in Figure 4-26, when sewing the materials with different height on left and right sides, upper thread tension should be given differently to the left and right sides to get the best sewing quality. As such, the sub thread adjusting device should be adjusted as follows:

① Basic specifications: The sub thread adjusting device that supplies upper thread to the thick part A is reset every time of operation.

② Optional specifications: Turn on the button to operate the sub thread adjusting device that supplies upper thread to the thick part A between the independently operating function switch's dual tension L and R.

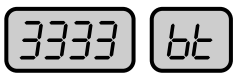
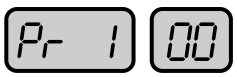
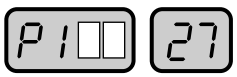
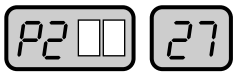
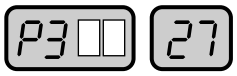
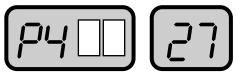
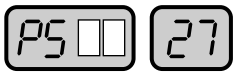
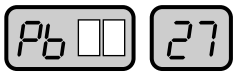
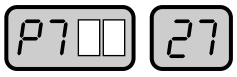
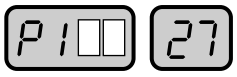
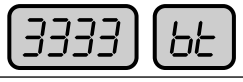
- After the sewing with height difference is done, manually adjust the tension of the sub thread adjusting device to return to default value in case of basic specifications, and press the dual tension L, R button to reduce the upper thread tension in case of the optional specifications.



[Fig. 4-27]

4.13) Method for Adjustment of a Potentiometer

■ **How to set**

No	How to operate	Screen display	Details
1	Turn on the power		• Sewing initial screen
2	Press PROG button, then press A button while holding down PROG button to change screen		• Initial screen for parameter group A
3	Press E and F button to move to parameter number 27		• P1 setting screen for group A item 27
4	Set the the adjustment dial for mutual overlapping portion of presser foot to 2.5[mm] and press the ENTER key then the screen is automatically changed with the buzzer sound.		• P2 setting screen for group A item 27
5	Set the the adjustment dial for mutual overlapping portion of presser foot to 3[mm] and press the ENTER key then the screen is automatically changed with the buzzer sound.		• P3 setting screen for group A item 27
6	Set the the adjustment dial for mutual overlapping portion of presser foot to 3.5[mm] and press the ENTER key then the screen is automatically changed with the buzzer sound.		• P4 setting screen for group A item 27
7	Set the the adjustment dial for mutual overlapping portion of presser foot to 4[mm] and press the ENTER key then the screen is automatically changed with the buzzer sound.		• P5 setting screen for group A item 27
8	Set the the adjustment dial for mutual overlapping portion of presser foot to 4.5[mm] and press the ENTER key then the screen is automatically changed with the buzzer sound.		• P6 setting screen for group A item 27
9	Set the the adjustment dial for mutual overlapping portion of presser foot to 5[mm] and press the ENTER key then the screen is automatically changed with the buzzer sound.		• P7 setting screen for group A item 27
10	Set the the adjustment dial for mutual overlapping portion of presser foot to 6[mm] and press the ENTER key then the screen is automatically changed with the buzzer sound.		• Set Completion
11	After setting is complete, push PROG button to go back to the initial screen		• Sewing initial screen

▶When setting each step of P1, P2 and P3, be sure to press PROG button to save the set value. Otherwise, the set value will not be saved.

▶If you turn off the power before completing step 10, you will have to start over again.

▶The set value of the Potentiometer will be erased if you initialize. Initialize only when it is necessary. Remember that you have to reset the Potentiometer after initialization.

▶If the potentiometer connector is not connected or the cabel is broken, the number in □□ display area remains fixed.

■ **Relation between presser foot lifting amount and maximum speed of the sewing machine (page 10. Will have to refe)**

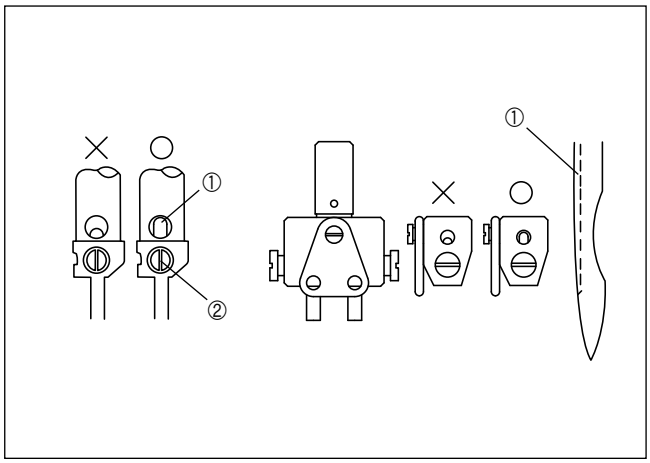
5

Preparations for sewing

5.1) Installing needle

> **Caution**
>
> Always turn off the power when mounting a needle.
> If the pedal is accidentally stepped, the machine might unexpectedly operate, causing injury.

1) Turn the pulley of machine to raise needle bar to its highest position.
2) Unfasten the fixing screw ②.
3) Place the long groove of the needle① headed upward. As in the figure, fully insert it to the end and tightly fasten the fixing screw②.



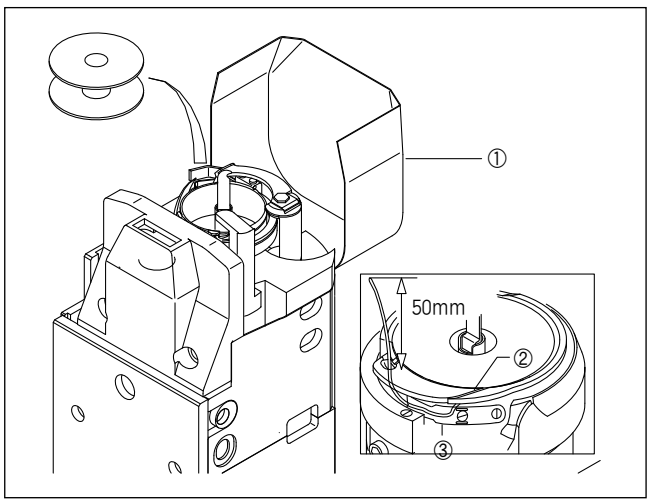
[Fig. 5-1]

5.2) Bobbin Insertion and Removal

> **Caution**
>
> Make sure to turn off the power switch when removing the bobbin case.
> If the pedal is accidentally stepped, the machine might unexpectedly operate, causing injury.

5.2.1) Bobbin Removal

- Turn the sewing machine pulley to place the needle above the needle plate.
- Open the hook cover① and vertically erect the flap holding the bobbin.
- Remove the bobbin from the bobbin case using tweezers.



[Fig. 5-2]

5.2.2) Bobbin Insertion

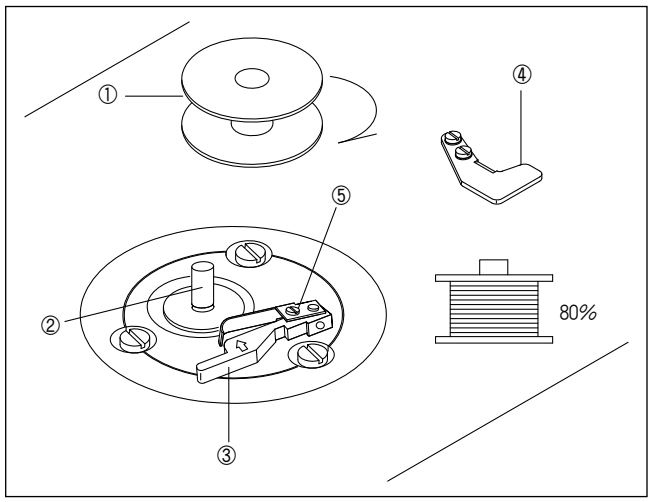
Take out the lower thread from the bobbin through the thread passage② and below the tension spring plate③, and make the loose lower thread length 50mm.

Bobbin can be inserted in the reverse order of the bobbin removal.

5.3) Winding lower thread

Caution	Make sure not to touch or press down parts that are operating or moving during thread winding. Failure to follow the safety rules may result in physical injuries or mechanical damages.

1) Turn on the power switch.
2) Insert bobbin① into bobbin winder shaft②.
3) Wind thread on bobbin① several times in the arrow direction.
4) Push bobbin operating plate③ in the direction of bobbin.
5) Lift the presser foot with the presser foot lift lever.
6) When pressing pedal, the machine starts to operate and thread winds on bobbin.
7) When thread winding is done, bobbin operating plate ③ returns automatically.
8) Remove bobbin and cut thread with bobbin winder knife④.
   ※ To adjust the amount of bobbin winding, loosen screw⑤ and adjust bobbin winder adjusting plate ③.



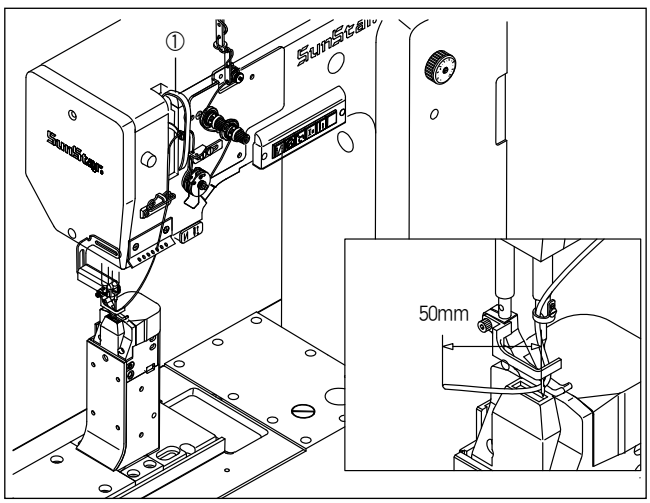
[Fig. 5-3]

Caution	Make sure that thread should be regulated to wind 80% of bobbin capacity.

5.4) Inserting upper thread

Caution	Always turn off the power when inserting upper thread. If the pedal is accidentally stepped, the machine might unexpectedly operate, causing injury.

1) Place the thread take-up ① at its the highest position by turning pulley before inserting the upper thread.
2) The adequate length of upper thread extending from the needle hole is 50mm.



[Fig. 5-4]

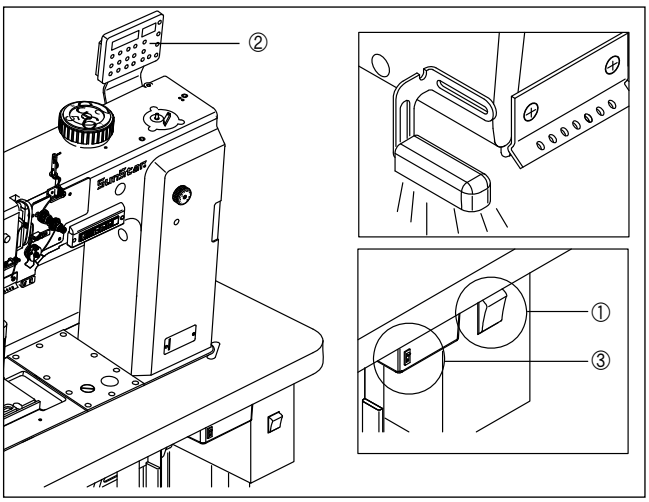
6

Sewing

Caution	• Wear protective gears for safety. Operation without them may lead to physical injuries. • Turn off the machine in the following situations. If the operator mistakenly steps on the pedal with the plug in, the machine will start automatically and can cause severe injuries. – When inserting upper thread – When replacing bobbin or needle – When the machine not in use or the operator leaving the work place.

6.1) Sewing

1) Press ON button of power switch①.
2) Lamp on the control panel② turns on and machine is ready to operate.
3) Control sewing conditions by using control panel②. (See user's manual of Fortuna IV.)
4) When the button③ is pressed to LED On, LED lamp blinks.
5) Step on the pedal to operate.



[Fig. 6-1]

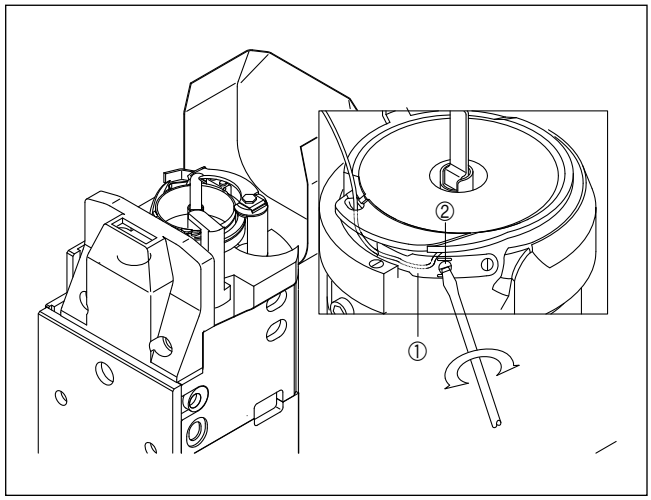
6.2) Adjusting thread tension

Caution	When inserting and removing bobbin case, make sure to turn off the power switch. If the pedal is accidentally stepped, the machine might unexpectedly operate, causing injury.

Sewing Type	Cause	Troubleshooting
	Good sewing in balance	
	Upper thread tension is too weak Lower thread tension is too strong	Make upper thread tension strong or make lower thread tension weak
	Upper thread tension is too strong Lower thread tension is too weak	Make upper thread tension weak or make lower thread tension strong

6.2.1) Tension adjustment of the lower thread

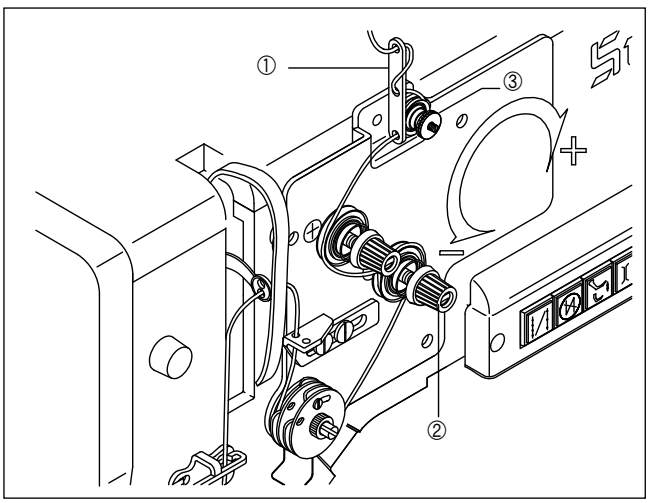
If you turn screw② on the spring plate① mounted in hook in a clockwise direction, the lower thread tension will become stronger and when turned in a counterclockwise direction, weaker.



[Fig. 6-2]

6.2.2) Upper arm thread guide

The tension of the upper arm thread guide① should be set lower than that of the main thread adjusting devices②. When the nut③ is turned clockwise, the tension increases. When the nut is turned counter-clockwise, the tension weakens.



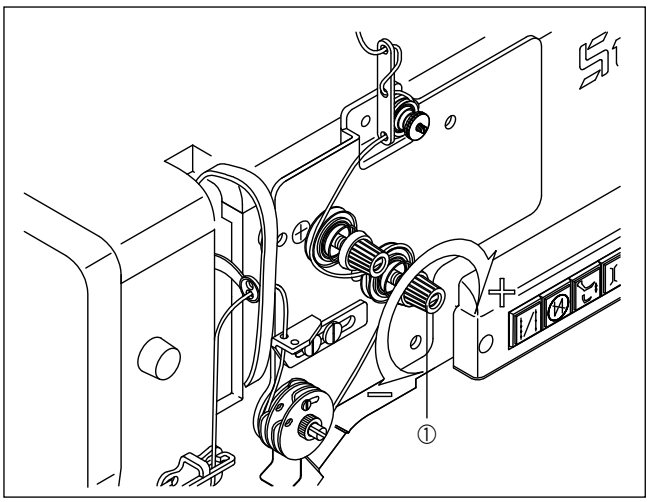
[Fig. 6-3]

Caution

After the upper arm thread guide is adjusted, the tension of the main thread adjusting devices② should be reset.

6.2.3) Main thread adjusting device

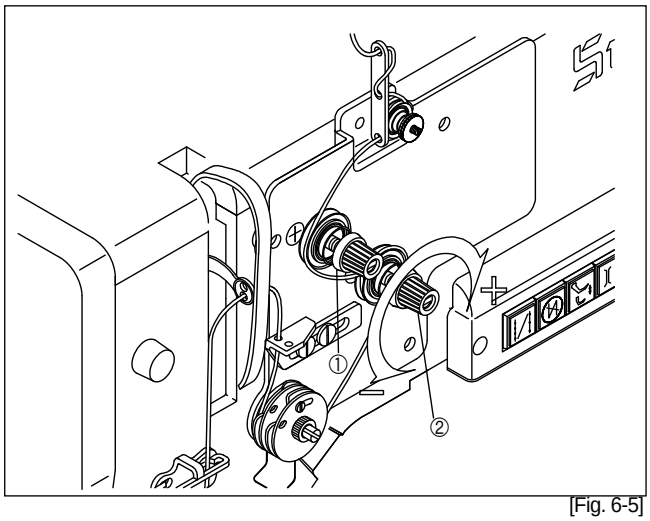
1) The tension of the main thread adjusting devices ① should be set at the minimum as possible.
2) Loops should be created at the center of the sewing material. Make sure that thread break does not occur on the ultra light material due to strong thread tension.
3) Adjust the main thread adjusting devices① to create stitches at regular length. When the nut is turned clockwise, the tension increases. When the nut is turned counter-clockwise, the tension weakens.



[Fig. 6-4]

6.2.4) Supplementary thread adjusting device

1) The supplementary thread adjusting devices① play a supplementary role in strengthening thread tension in a prompt manner.
2) The tension of the supplementary thread adjusting devices① should be set lower than that of the main thread adjusting devices②. The tension can be turned on/off with the functional switch.
3) The tension of the supplementary thread adjusting device gets stronger when it is turned clockwise. It gets weaker when the device is turned counter-clockwise.

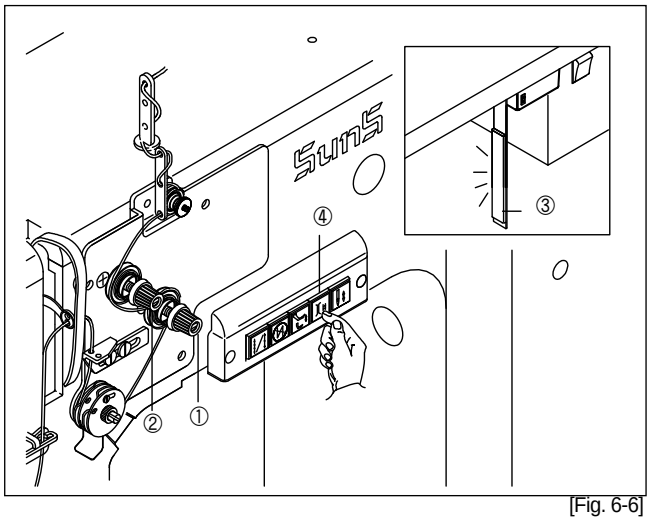


[Fig. 6-5]

6.2.5) Operation of thread adjusting device

The main and supplementary thread adjusting devices①,② are automatically in operation.

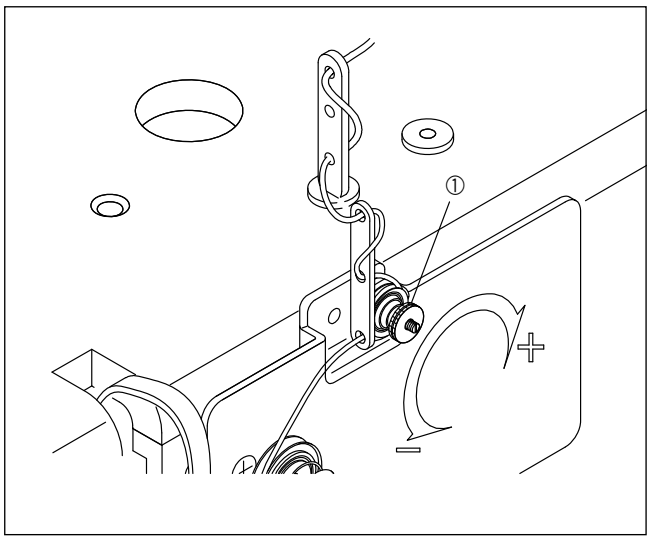
※ When trimming or auto presser bar lift③ is activated, the tension of the main and supplementary thread adjusting devices is released. The supplementary thread adjusting devices① can be turned on/off with the functional switch④.



[Fig. 6-6]

6.3) Adjusting upper thread length after trimming

1) During the trimming process, main thread release tension is not created but only auxiliary thread release ① tension is created.
2) The adequate length of upper thread after trimming is 50 ~ 60mm.
3) Increasing auxiliary thread release ① tension will make upper thread after trimming short and decreasing the tension will make it long.

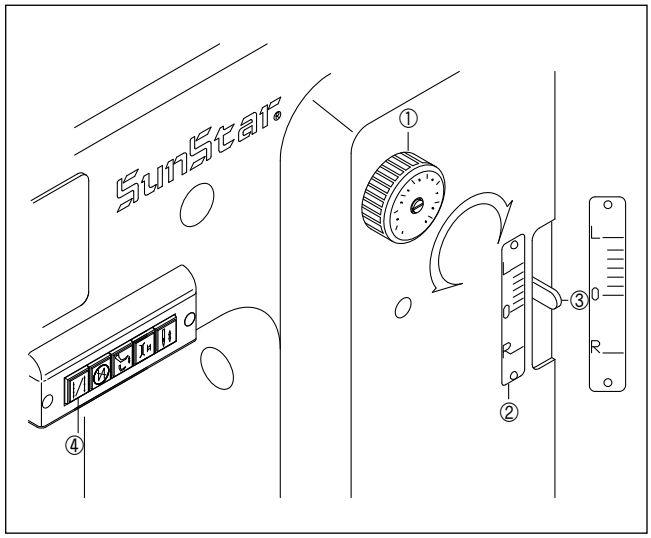


[Fig. 6-7]

6.4) Adjustment of the stitch length

The number of stitches can be checked using the stitch count adjusting dial①, the reverse lever③, and the stitch count adjusting mark②. In addition, when the stitch count conversion switch④ is put to operate, the number of stitches is changed by the set cylinder.

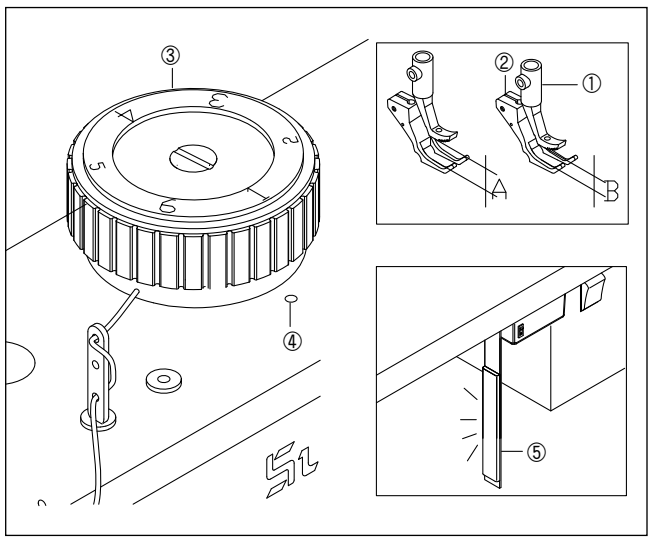
- When the stitch count adjusting dial① is turned clockwise, the reverse lever③ ascends, and stitch count increases.
- When the stitch count adjusting dial① is turned counter-clockwise, the reverse lever③ descends and stitch count decreases.



[Fig. 6-8]

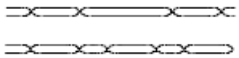
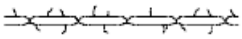
6.5) Adjustment of Presser Foot Lift

The overlap between the main presser foot ① and the sub presser foot ② could be set at 1~7mm using the climb dials which adjust the presser foot lift ③. Place the desired numbers of the climb dials ③ at the punched mark ④, and the main presser foot ① and the sub presser foot ② overlap according to the set value. For the sewing section where presser foot height difference is severe due to fabric thickness, press the lap switch⑤ and this will change the presser foot cross volume to 7mm immediately. When the lap switch is pressed once again, the value is returned to the set value at the dial③.



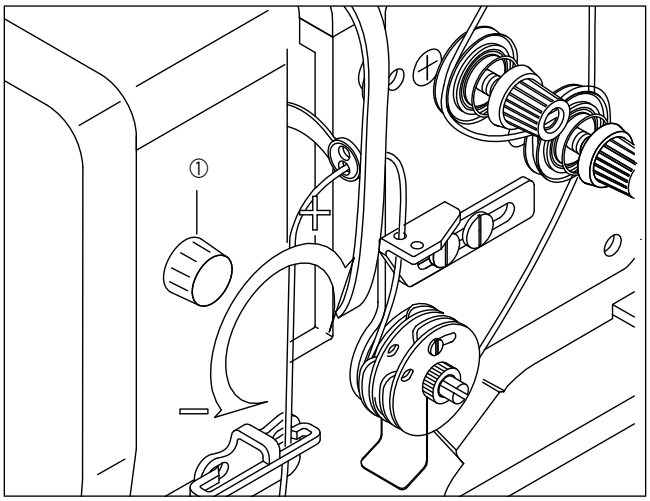
[Fig. 6-9]

6.6) Adjustment of Presser Foot Pressure

Stitch Type	Cause	Solution
	Balanced good stitch	
	Stitch skipped, inconsistent stitch length	Increase pressure
	Puckering	Decrease pressure

6.6.1) Presser Foot Pressure

1) Adjust the presser foot pressure to remain weak if possible (to the extent that the sewing fabric is slipped away)
2) Turn the pressure adjusting dial① to adjust the presser foot pressure.
3) When the dial is turned clockwise, the pressure gets stronger. Otherwise, the pressure gets weaker.



[Fig. 6-10]

7

Inspecting and checking

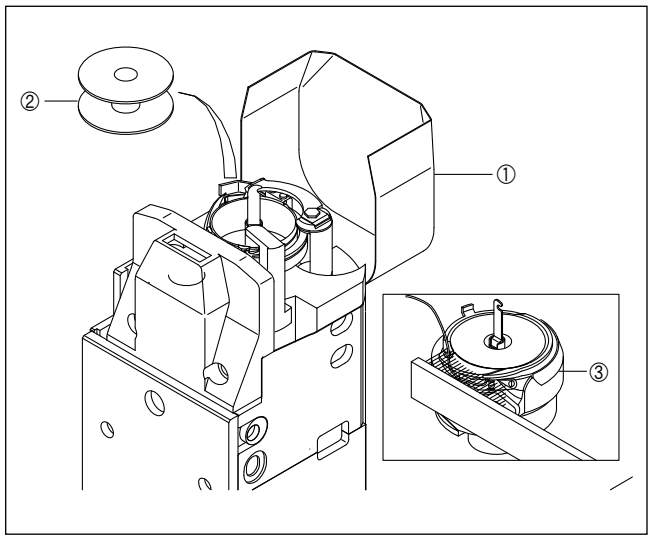
Caution	To maintain proper performance of machine and use it for a long time, clean machine regularly according to the following way. Evan when machine is not in use for a long time, clean according to the following way before using the sewing machine.

Caution	• Turn off the power switch before operation. Pressing pedal by mistake may operate machine and result in injuries. • When handling lubricants, wear protective glasses or gloves to prevent lubricant from contacting with your eyes or skin. Wash your hands in running water with soap when they are smeared with lubricant. If lubricant is in the eye, instantly wash it with running water and see a doctor. • Never drink lubricants since they can cause vomiting or diarrhea. Go to see a doctor, if you mistakenly drink lubricant. • Keep the oil out of the reach of children. Keep the oil away from heat. • Use both hands when bending the machine backwards or returning it to the original position. Using only one hand can lead to severe hand injuries due to the weight of the machine.

7.1) Daily Cleaning

7.1.1) Cleaning

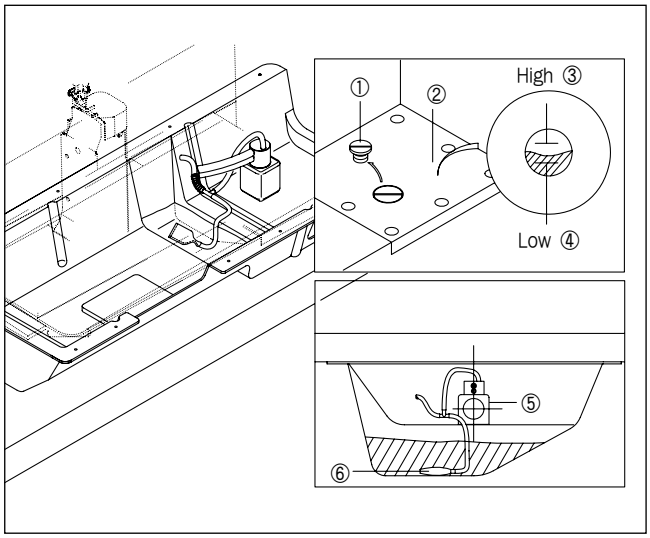
1) Open the hook cover① and remove the bobbin② from the hook③.
2) Remove dust from the hook③ using soft cloth or brush and check if there is any damage done.
3) When cleaning is finished, install the bobbin② to the hook③.



[Fig. 7-1]

7.1.2) Oil Supply

1) Oil Volume Check
   - Look at the oil window ② on the bed cover. When the oil is at the “HIGH” mark ③, it means oil is sufficient.
   - If oil is below the “LOW” line ④, supply more lubricant following the order below.
2) Oil Supply
   - Use the authentic SunStar lubricant. (Lubricant can be found in the accessory box).
   - Loosen the oil supply entrance screw ①.
   - Supply lubricant until the oil reaches the “HIGH” line ③ on the oil window ② of the bed cover. Make sure that lubricant does not overflow.



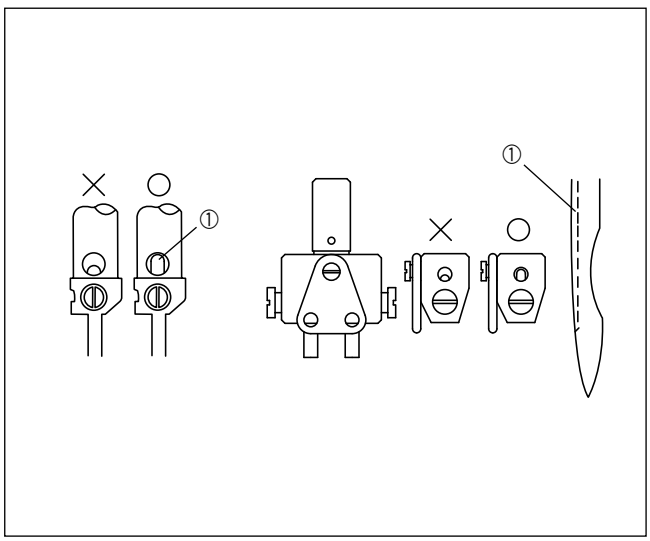
[Fig. 7-2]

Caution

1) Make sure that lubricant does not go over the “HIGH” mark③. This may cause the leakage of lubricant. Tightly fasten the screw① at the oil thank outlet.
2) When the oil tank⑤ settles at the table, make sure that it is vertically positioned. If it leans to one side, oil might leak out.
3) Make sure to place the reflux felt⑥ at the groove of the oil fan. Otherwise, oil cannot be properly inhaled.

7.1.3) Checking

1) When needle① is deformed or the end of needle is damaged, change the needle.
2) Check if upper thread is inserted correctly. (Refer to 5.4 Inserting upper thread)
3) Run trial sewing.



[Fig. 7-3]

8

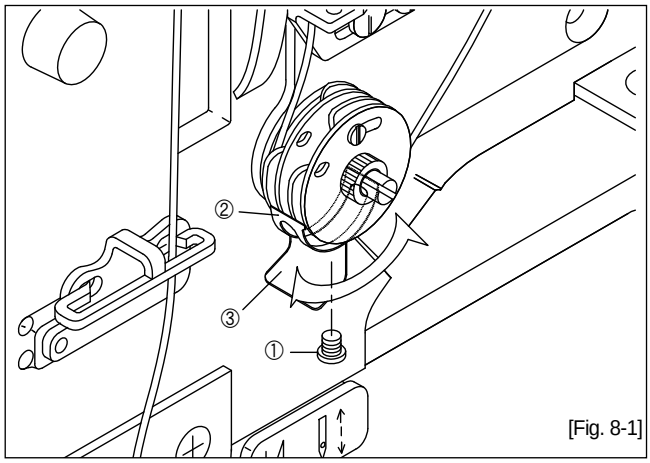
Maintenance and repair

Caution

- For machine maintenance and repair, consult with qualified technicians.
- For electrical maintenance and repair, consult with qualified technicians or agencies.
- When safety devices are disassembled, make sure to return them to original positions.
- Use both hands when bending the machine backwards or returning it to the original position. Using only one hand can lead to severe hand injuries due to the weight of the machine.
- Turn off the switch and pull the plug. Pressing pedal by mistake may result in physical injuries.
  - Inspection, maintenance, repair
  - Exchanging expendable parts such as needle, hook, knife.
  - Adjusting hook oil flow
- In case you operate the machine when the power is on, please take special precaution.

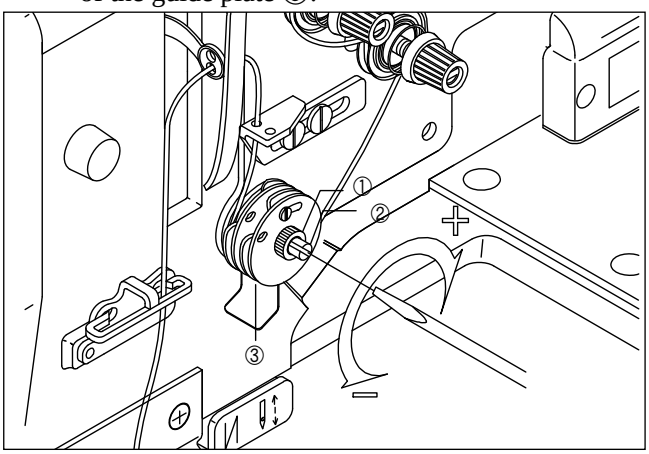
8.1) Adjustment of Thread Take-up Lever Spring

1) Loosen the stopper tightening screw ① as in the figure and turn the thread take-up spring stopper ② counterclockwise. Then the operating scope of the thread take-up lever spring becomes narrower. Otherwise, the operating scope becomes wider.
   ※ The standard operating scope of the thread take-up lever is 5~10mm.

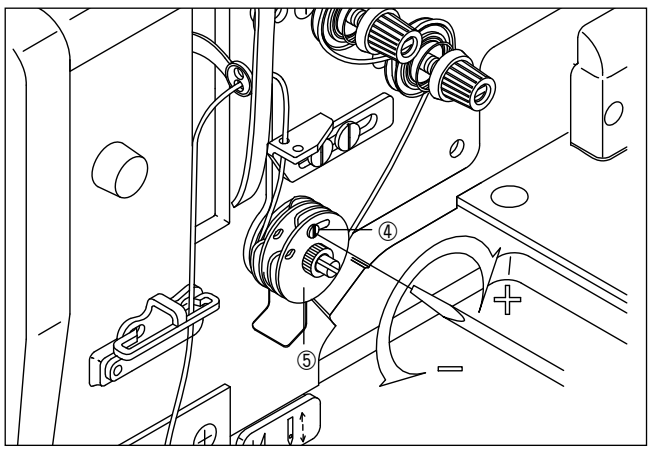


[Fig. 8-1]

2) Adjustment of Thread Take-up Lever Spring Tension
   Loosen the thread adjusting device shaft nut ① and turn the groove of the thread adjusting device shaft ② clockwise using a screwdriver. Then the tension of the thread take-up spring ③ becomes stronger. Otherwise, it gets weaker. [Fig. 8-2]
3) Adjustment of Thread Take-up Lever Spring Operation Timing
   Loosen the stopper screw ④ and turn the thread take-up spring guide ⑤ clockwise. Then the thread take-up spring③'s operation timing gets faster. Otherwise, the operation timing gets slower. [Fig. 8-3]
   ※ The operation timing of the thread take-up lever spring is standard when the stopper screw ④ is at the center of the guide plate ⑤.



[Fig. 8-2]

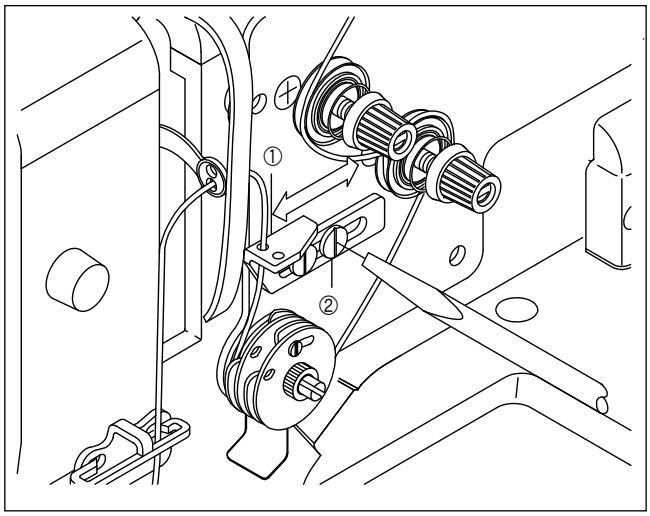


[Fig. 8-3]

8.2) Adjustment of Thread Guide on Thread Adjusting Device

When the two tightening screws ② are at the center of the thread guide ① on the thread adjusting device, this is a standard position.

1) Loosen the tightening screw ② and move the thread guide ① on the thread adjusting device left or right.
2) For heavy material sewing, move the thread guide ① on the thread adjusting device to the left (The thread length held by the thread take-up lever increases).
3) For light material sewing, move the thread guide ① on the thread adjusting device to the right (The thread length held by the thread take-up lever decreases).



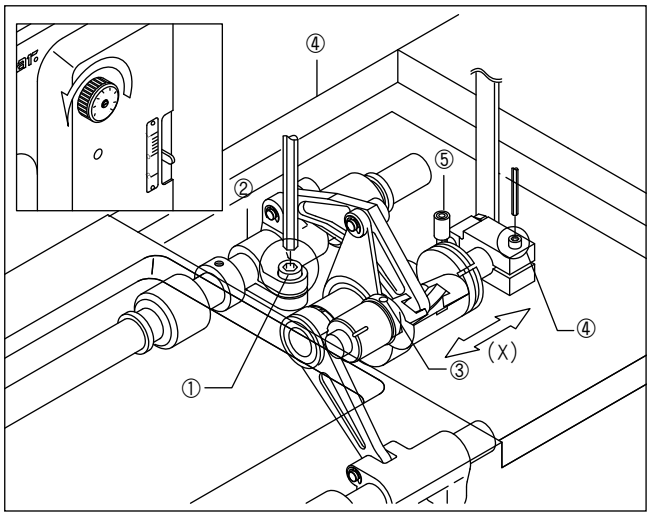
[Fig. 8-4]

8.3) Adjustment of Feed Dog Position.

8.3.1) Feed Dog Position When Stitch Length is 0

When stitch length is 0, the feed dog's feed is 0. In this case, if the feed dog's feed is not 0, please perform the follow setting.

1) Open the bed cover.
2) Loosen the fixing screw for the feed rock shaft crank① and turn the upper shaft pulley. Check if the feed rock shaft crank② is moving.
3) If the feed rock shaft crank② is moving, loosen the fixing screw for the changer connection crank ④ and use the changer angle adjusting hole③ to adjust the changer's angle.
4) If the feed rock shaft crank is not moving when the upper shaft pulley is turned, completely fasten all fixing screws.



[Fig. 8-5]

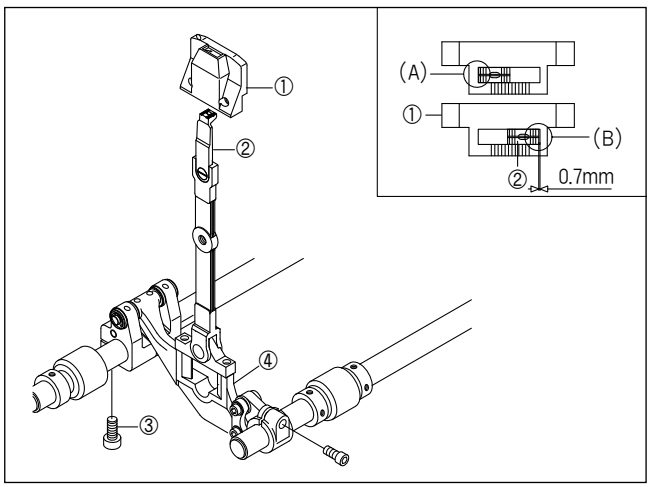
Caution

1) In the case of wrong feed adjustment, stitch length could be different when moving forward and backward.
2) Fix the changer with the changer guide pin⑤. Given that the strong fixing would disturb the movement of the changer, make sure to fix the changer to the extent that it does not move in the arrow(X) direction.

8.3.2) Feed Dog Position on Needle Plate

When the stitch length is maximum, the feed dog position ② in the needle plate hole ① should be identical from the front (A) and back (B) on the needle plate. The minimum figure is 0.7mm. If they are not identical, please perform the follow setting.

1) Loosen the fixing screw for the feed dog base crank③.
2) Adjust the feed dog base④ to set (A) and (B) to be same. Then tightly fasten the fixing screw for the feed dog base crank③.

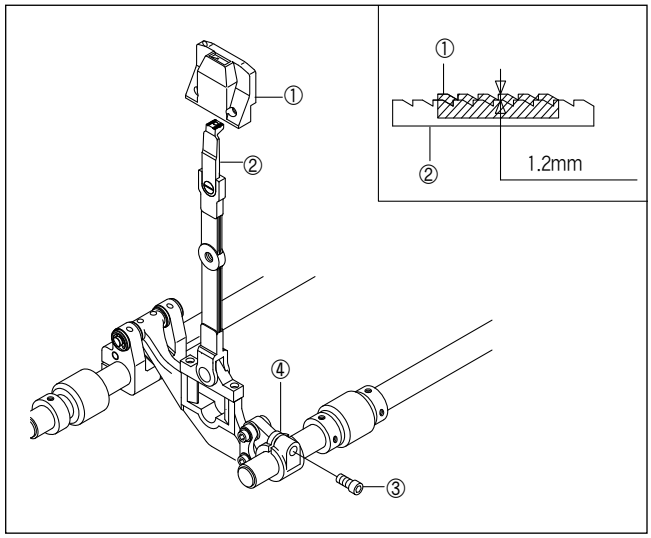


[Fig. 8-6]

8.4) Height adjustment of feed dog

Set the stitch count at the minimum and place the feed dog① at the maximum height. The normal condition is that the feed dog① is located 1.2mm above the needle plate②. If it is not in the normal condition, take actions as below to adjust the feed dog height.

1) Turn the upper shaft pulley of the sewing machine to place the feed dog at the highest position.
2) Lean the sewing machine backward.
3) Slightly loosen the fixing screw for the feed lift shaft crank③.
4) Turn the feed lift shaft crank④ to adjust the feed dog height to be 1.2mm.
5) When adjustment is completed, tightly fasten the fixing screw③.



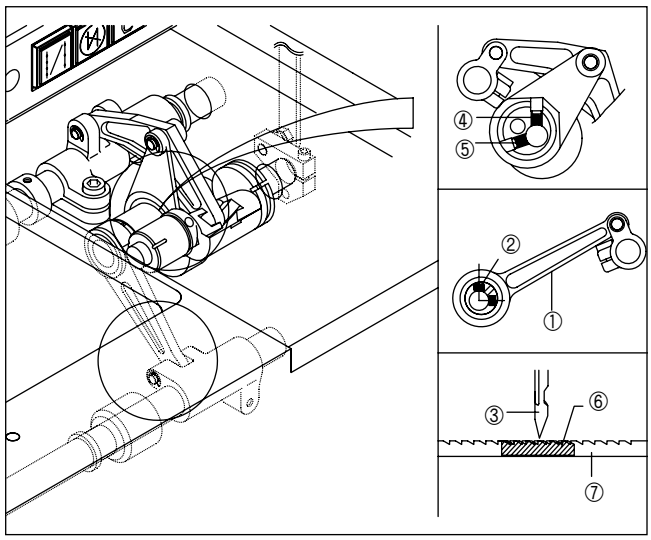
[Fig. 8-7]

Caution

When the feed lift shaft crank ④ is turned, make sure that it does not move toward the shaft.

8.5) Adjustment of feed lift shaft cam and lower feed cam

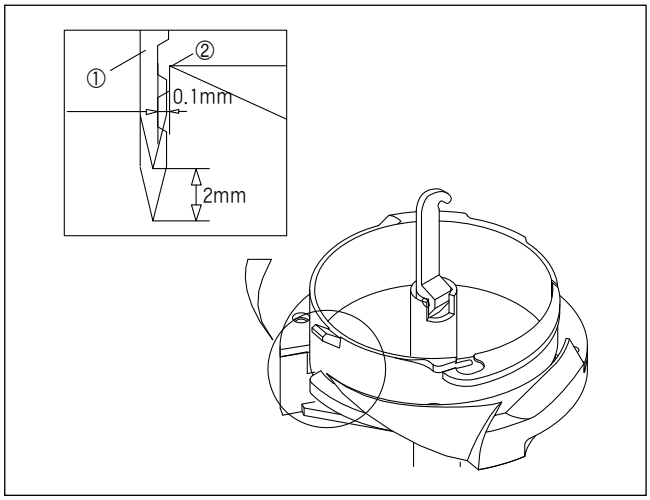
1) Set the stitch count at maximum and pull down the needle bar at the lowest point.
2) Make the second fixing screw② of the feed lift shaft cam① move vertically and tighten the fixing screw.
3) Lower the needle bar③ to the lowest point.
4) Move the first fixing screw④ of the lower feed cam ⑤ vertically, and tighten the fixing screw.
5) When the adjustment is made as above, the tips of the needle③ and the feed dog⑥ contact the face of the needle plate⑦.
   Otherwise, make adjustment as above following the above methods.



[Fig. 8-8]

8.6) Needle and Hook Timing

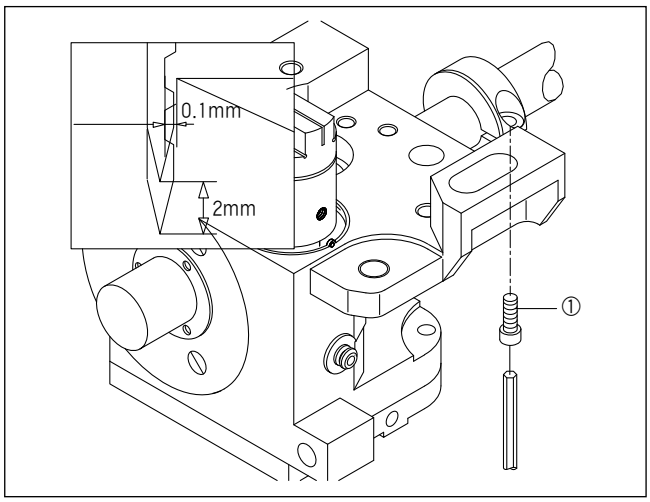
Set the stitch length at minimum and place the needle ① at 2mm above the lowest position. Then the hook edge ② is positioned at the needle center. The appropriate distance between the needle groove and the hook edge ② is 0.1mm. At this time, the hook edge ② should not contact the needle ①. If the above conditions are not met, perform the following adjustments.



[Fig. 8-9]

8.6.1) Adjustment of Needle and Hook Timing

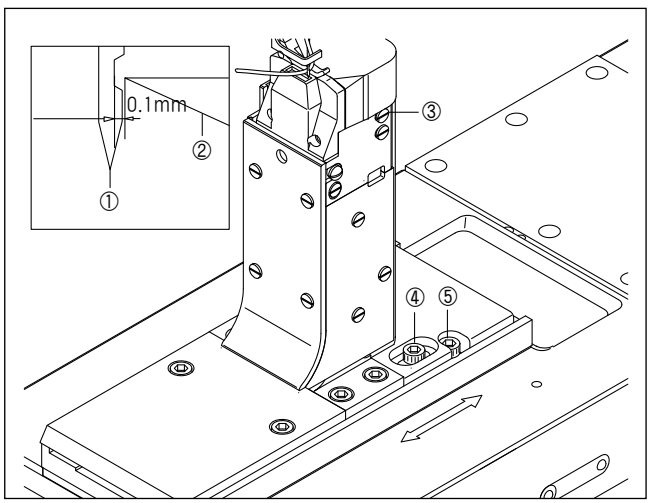
1) Open the hook cover.
2) Lean the machine backward. Loosen the lower shaft collar fixing screw ① and set the needle position 2mm above the lowest position.
3) Turn the hook shaft to place the hook edge at the center of the needle and tightly fasten the fixing screw ① for the lower shaft collar.



[Fig. 8-10]

8.6.2) Clearance adjustment between needle and hook

1) Loosen the needle plate base fixing screw③ and then the hook base fixing screws④,⑤. Adjust the hook base in the arrow direction and set the distance between the needle① and the hook edge ② to be 0.1mm.
2) Tightly fasten the hook base fixing screws④,⑤ after adjustment is complete.
3) Adjust the hook base to set the hook shaft center of the hook base in line with the hook shaft center of the hook base.



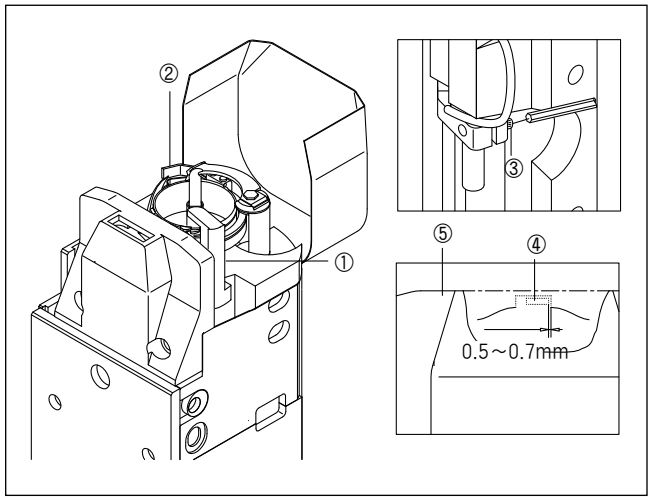
[Fig. 8-11]

Caution

1) When adjusting the distance between the needle and the hook, make sure that the needle guide and the needle do not contact each other.
2) When replacing a needle, check the distance between the needle and the hook.

8.7) Clearance adjustment of hook and opener

Place the opener① close to the hook② to a maximum, and then unfasten the fixing screw for the opener shaft crank③. Manually adjust the opener to set the distance between the hook stopper④ and the needle plate⑤ groove at 0.5~0.7mm. When adjustment is complete, tightly fasten the fixing screw for the opener shaft crank ③.

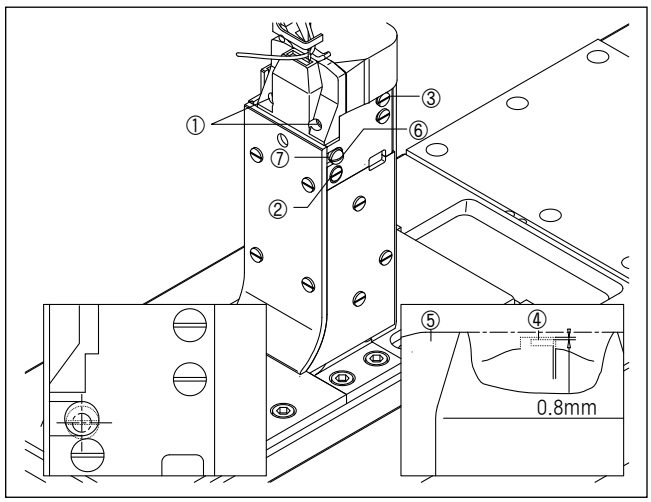


[Fig. 8-12]

8.8) Adjustment of Needle Plate Height

The standard distance between the needle plate⑤ and the hook stopper④ is 0.8mm at minimum. Adjustment can be made in the following order:

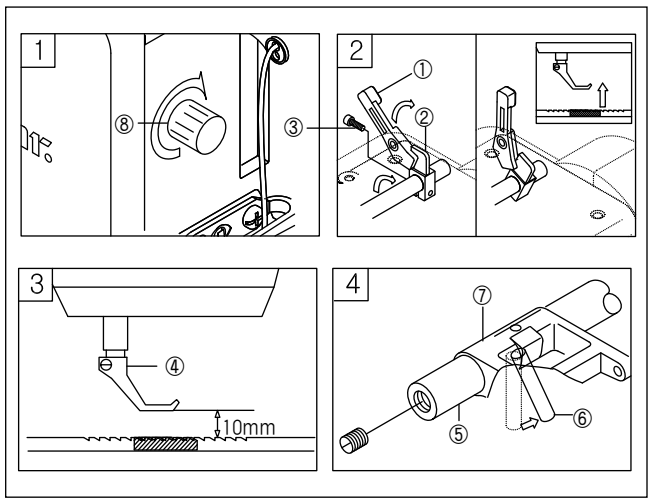
1) Unfasten the needle plate fixing screw①, the needle plate base adjusting screw②, and the needle plate base fixing screw③.
2) Unfasten the fixing screw⑥ for the needle plate base adjusting cam on the inner side of the needle plate base and use the needle plate base adjusting cam⑦ to adjust the needle plate height.
3) When adjustment is completed, tightly fasten the fixing screw for the needle plate base adjusting cam ⑥, the needle plate base adjusting screw②, and the needle plate base fixing screw③.



[Fig. 8-13]

8.9) Adjustment of Presser Foot Height

1) To ensure presser foot's smooth vertical movement, release the presser foot presser adjusting dial⑧.
2) Fix the presser foot as lifted by pulling the presser foot lift lever① and loosen the fixing screw③ on the presser foot lift block②.
3) Lift the auxiliary presser foot④ 10mm above the needle plate.
4) Place the pin⑥ inserted into the presser bar lift shaft ⑤ closely to the presser bar lift bracket⑦ and tighten the fixing screw③ while the presser foot lift lever pulled back① and the presser foot lift block are closely contacted.



[Fig. 8-14]

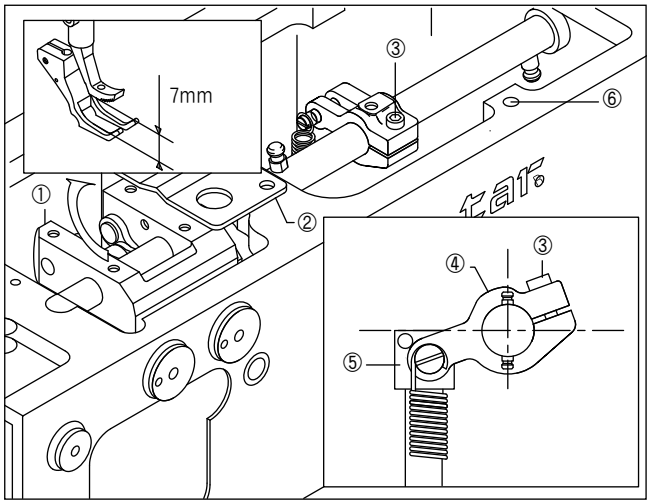
Caution

Please be noted that the presser bar lifting spring could be separated when the presser foot pressure adjusting dial⑧ is fully released.

8.10) Timing adjustment of the main · auxiliary presser foot and needle

8.10.1) Adjustment of maximum ascending amount of the main · auxiliary presser foot

The maximum lifting quantity of the main and auxiliary presser foot is 7 mm. First, set the upper lid dial at "1" and take out the upper lid. Move the body① of a climb device towards the arrow direction until it reaches the stopper plate②. (At this time, make the surface of the climb shaft cylinder knuckle⑤ contact the upper cross section of the arm ⑥ and then fasten the tightening screw③.) Tighten the crank clamp screw⑥. After adjustment, reassemble the upper lid.

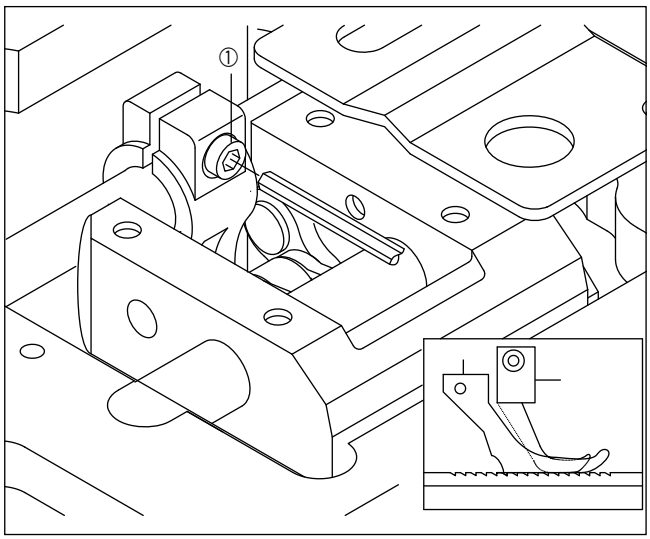


[Fig. 8-15]

8.10.2) Adjustment of lifting amount of the main · auxiliary presser foot

The height of lifting amount of the main · auxiliary presser foot must be equal. Make the adjustment as indicated below.

1) Set the presser foot overlap at the maximum.
2) Take out the rubber cap from the upper lid.
3) Loosen the clamp screw① and turn the machine until the needle tip and the upper part of the feed dog come to meet on the surface of the needle plate.
4) As in 2 above, make the main and subordinate presser feet contact the needle plate at the same time and after that, tightly fasten the tightening screw① to finish the adjustment.
5) After adjustment, place back the rubber cap on the upper lid.

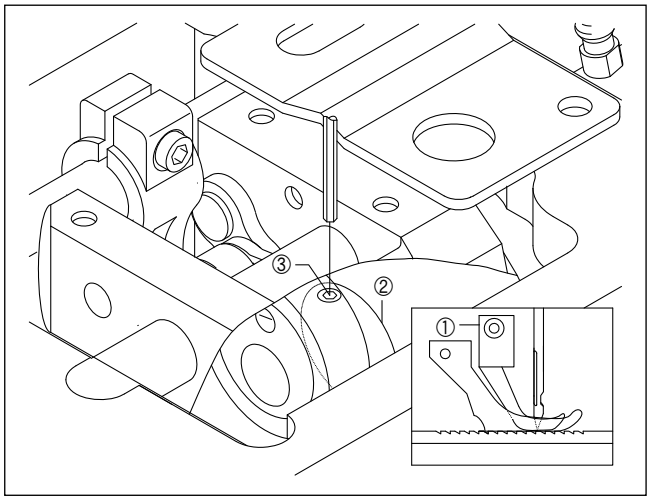


[Fig. 8-16]

8.10.3) Timing adjustment of the main · auxiliary presser foot and needle

As a standard, the needle tip enters the needle hole of the feed dog immediately after the main presser foot ① touches the feed dog. Likewise, the main presser foot① comes apart from the feed dog right after the needle tip comes out of the feed dog. Refer to the following for adjustments.

1) Disassemble the upper lid with the dial set at "1".
2) Loosen two fixing screws of vertical movement cam② of the presser foot.
3) After securing the needle bar in the highest position, hold the No.1 screw③ of the cam② so that it faces up perpendicularly. Afterwards, tighten the cam-fixing screws.
4) Place back the upper lid after adjustment.



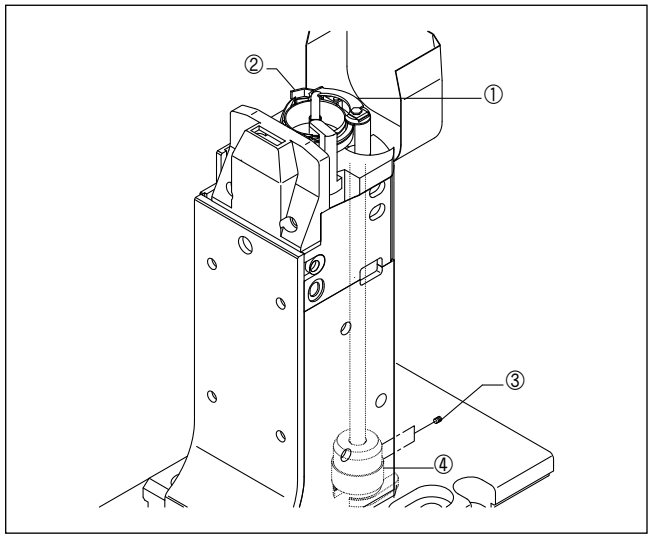
[Fig. 8-17]

8.11) Trimmer

8.11.1) Adjustment of Moving Blade

The moving blade① feeds the upper and lower thread to the fixed blade. The moving blade① conducts the rotary movement to the extent that it does not touch the bobbin case. Trimming is conducted through the contact with the fixed blade② at the 1/3 point in length. Adjustment can be made in the following order.

1) Loosen the fixing screw for the moving blade shaft crank③.
2) When the thread take-up lever is at the highest point, adjust the tip of the moving blade to be 1mm away from the fixed blade.
3) Press the moving blade. While the moving blade shaft crank④ is being lifted, tightly fasten the fixing screw for the moving blade shaft crank③.

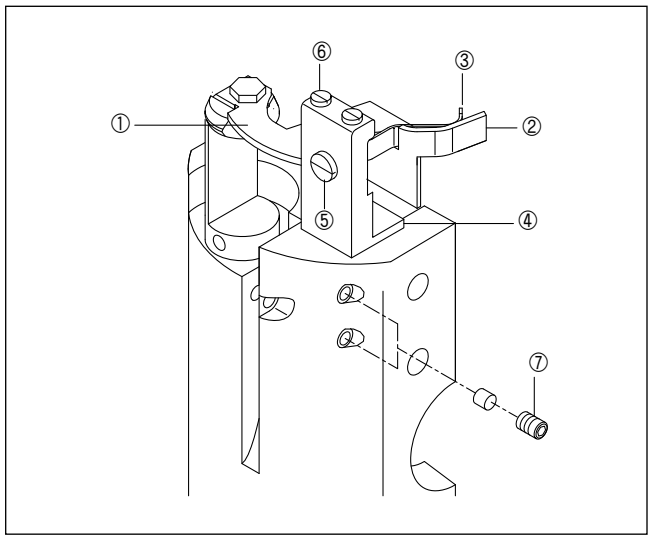


[Fig. 8-18]

8.11.2) Fixed blade and Lower Thread Holder

The moving blade① contacts the fixed blade② at the 1/3 point of its length to conduct trimming as safe as possible with the minimum pressure. When trimming is made, the lower thread holder③ contacts the moving blade①, securely holding the lower thread. Adjustment can be made in the following order.

1) Insert the lower thread holder③ and the fixed blade② into the groove on the fixed blade base ④, and tightly fasten them using the fixing screw ⑤ and the tightening screw⑥.
2) Adjust the top of the fixed blade and the top of the moving blade to overlap.
   Place the moving blade at the 1/4 or 1/3 point of the fixed blade. Make sure that the fixed blade stays firm, and tightly fix the fixed blade using the fixed blade base fixing screw⑦.

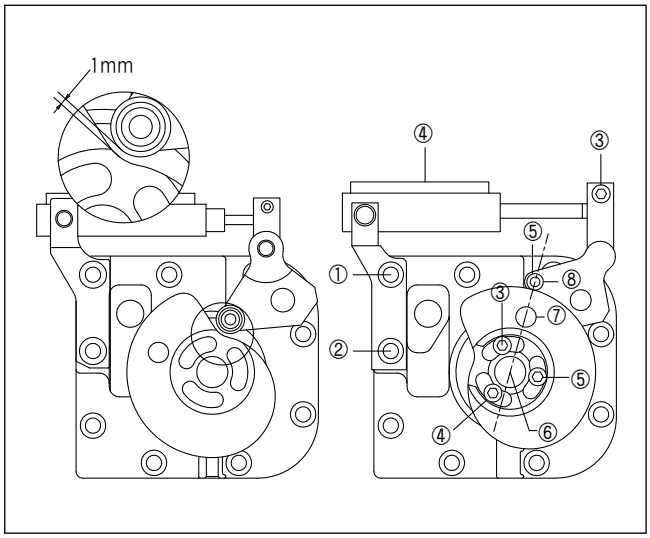


[Fig. 8-19]

8.11.3) Adjustment of Trimmer Cam and Lever Positions

The rotary movement of the fixed blade is determined by the position of the trimmer cam⑨. When the thread take-up lever is at the highest position, the trimmer lever roller⑧ touches the highest tip of the trimmer cam⑨,⑩. However, during sewing, the roller and the cam do not contact each other and the distance between them is maintained at 0.1mm. Adjustment can be made in the following order:

1) Unfasten the trimmer cylinder block fixing screws①,②.
2) Adjust the trimmer cylinder piston to place the roller 1mm away from the lowest point of the trimmer cam. Then fasten the fixing screws①,②.
3) Unfasten the trimmer cam fixing screws③,④,⑤.
4) Adjust the trimmer cam with the needle bar at the lowest point. Arrange ⑥,⑦,⑧ in a straight line and fasten the trimmer cam fixing screws③,④, ⑤.

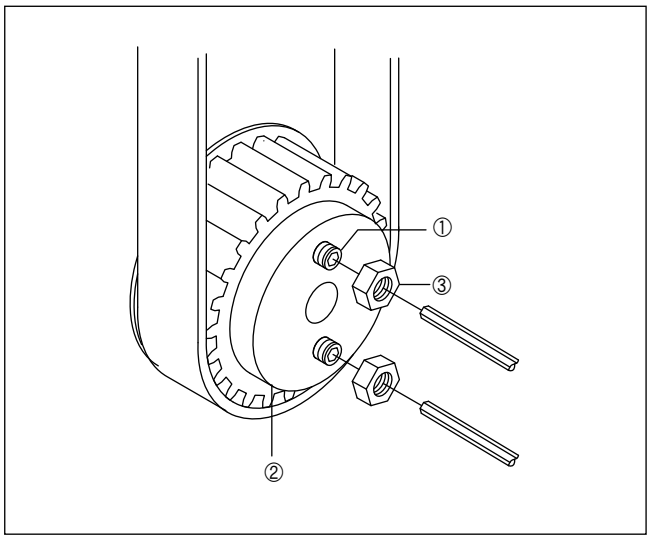


[Fig. 8-20]

8.12) Safety Clutch

The safety device for the lower shaft timing pulley ② is to prevent hook damage caused by thread winding around the hook or the setting disruption.

1) Slightly loosen two piston stopper screw nuts③.
2) When the two piston stopper screws① are turned clockwise, it increases torque, and vice versa. After torque adjustment, tightly fasten the nut③.



[Fig. 8-21]

9

Causes of troubles and troubleshooting

No	Symptom	Checkpoints	Root cause	Corrective action
1	Needle breaks	Direction and height of needle	Needle is inserted into wrong direction.	Reinsert the needle correctly.
		Needle	Needle is bent.	Replace the needle.
			Bad timing of feed dog.	Adjust the timing of feed dog.
		Ascending level of needle bar	Bad timing of needle and hook.	Adjust the timing of needle and hook.
		Height of needle	Bad timing of needle and hook.	Adjust the timing of needle and hook.
		Gap between needle and hook	Bad timing of needle and hook.	Adjust the timing of needle and hook.
2	Thread breaks	Threading method	Wrong threading.	Thread the needle correctly.
		Needle	Bent needle or broken needle tip.	Replace the needle.
		Direction and height of needle	Needle inserted in the wrong position.	Insert the needle correctly.
		Upper thread tension	Too tight upper thread tension.	Reduce tension of upper thread.
		Lower thread tension	Too tight lower thread tension.	Reduce tension of lower thread.
		Working capacity of take-up lever spring	Loose upper thread.	Adjust take-up lever spring.
3	Stitch skips	Direction and height of needle	Needle inserted in the wrong position.	Reinsert the needle in the right direction.
		Needle	Bent needle or broken needle tip.	Replace the needle.
		Threading	Thread passing at wrong position.	Replace the needle.
		Ascending level of needle bar	Wrong timing of needle and hook.	Adjust the timing of needle and hook.
		Height of needle bar	Wrong timing of needle and hook.	Adjust the timing of needle and hook.
		Gap between needle and hook	Wrong timing of needle and hook.	Adjust the timing of needle and hook.
			Remaining length of upper thread is short .	Adjust the thread adjusting device.
		Racing-proof spring of bobbin case	Due to bobbin racing during trimming, lower thread dropping from bobbin case becomes too short to go up.	Replace the racing protection spring.
		Take-up lever spring	Unable to lift lower thread due to weak take-up lever spring.	Adjust the working capacity of take-up lever spring.

No	Symptom	Checkpoints	Root cause	Corrective action
4	Upper thread does not sink.		Too tight upper thread tension.	Reduce tension of upper thread.
			Too loose lower thread tension.	Increase tension of lower thread.
5	Lower thread does not sink.		Too weak upper thread tension.	Increase upper thread tension.
			Too strong lower thread tension.	Decrease tension of lower thread.
6	Trimming errors	Tension of fixed blade	Tension not aligned between movable and fixed blades.	Adjust tension of movable and fixed blade.
		Edge of movable and fixed blades	Abrasion in blade groove of movable and fixed blades.	Replace movable and fixed blades.
		Direction of needle	Wrong needle insertion.	Reinsert the needle correctly.
		Check the crossing of trimmer cam notch mark and blade	Insufficient crossing quantity of movable and fixed blade.	Adjust the strokes of movable and fixed blades.
7	Upper thread is pulled out when sewing commences.		Too strong upper thread tension.	Adjust tension of upper thread.
			Too thick a needle for thread.	Check thickness of needle.
		Check the Up-stop position of needle	Take-up lever pulls out the upper thread because the needle up and down position is too high.	Adjust the up-stop position of needle.