SunStar®

USER'S MANUAL

SPS/B-2516 SERIES
SPS/A-2516 SERIES

Electronically Controlled
Pattern Sewing 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.

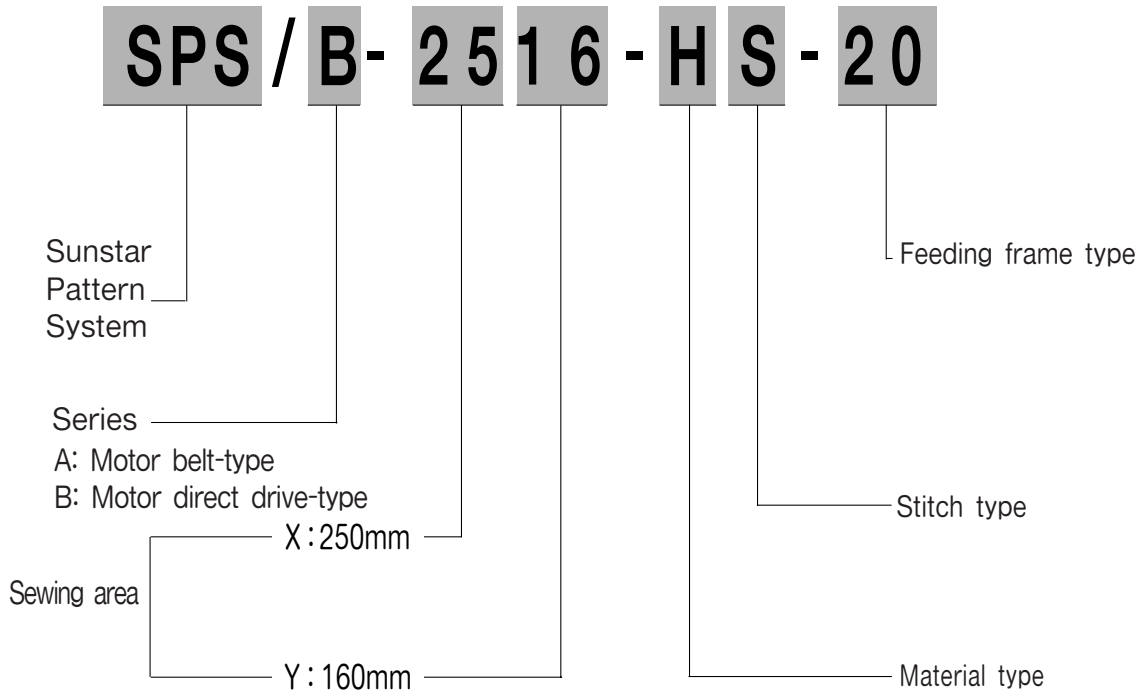
SUNSTAR MACHINERY CO., LTD.

MME-040922

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 MACHINERY CO., LTD.

Organization of the Pattern Sewing Machine Model



☐ Material type
G : General material
H : Heavy material

☐ Stitch type
S : Standard stitch
P : Perfect stitch

☐ Feeding frame type
20 : Pneumatic monolithic feeding frame
22 : Pneumatic separately-driven feeding frame

CONTENT

1

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.

1-1) Machine Transportation  Danger	Only trained and experienced people should treat the machine who are fully understand the safety rules. For conveyance, follow the below directions. ⓐ More than two people to a minimum should convey the machine. ⓑ For a protection of safety accident, wipe away the oil stained on machine.
1-2) Machine Installation  Notice	Owing to the improper environment for machine installation, physical damages on the human body and machine can be occurred. Please follow below conditions. ⓐ When you unwrap the packing of the machine, try from above in order. Especially careful of nails put into edges of wood box packing. ⓑ Since dust and humidity can cause pollution and abrasion, you should install airconditioner with regular cleaning. ⓒ Put in a place of no direct ray of light. If the machine is exposed in direct ray of light for a long time, transformation of color and shape can be happened. ⓓ To get enough space in case of repair, make the machine 50cm apart from the right and left and back side of wall to a minimum. ⓔ 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 machines where 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. **[Refer] Details for installation of machine is described in '4. Installation of Machine.'**
1-3) Machine Repair  Danger	If you have any problems on the machine, troubleshooting should be handled by the designated A/S engineers. ⓐ Before cleaning and repairing machine, turn off the power and wait for 4 minutes until the machine comes to be completely discharged. ⓑ You should not change the specification of machine and any part of machine without consulting with our company. Those changes can threaten the safety of machine during the operation. ⓒ You should exchange from the used one into SWF guaranteed devices. ⓓ After finishing troubleshooting, cover the all covers that are uncovered during repairing.

1-4) Machine Operation

Notice

SPS/B(A)-2516 Series are made for industrial use to perform pattern sewing for fabrics or its similar materials. Please observe the following principles.

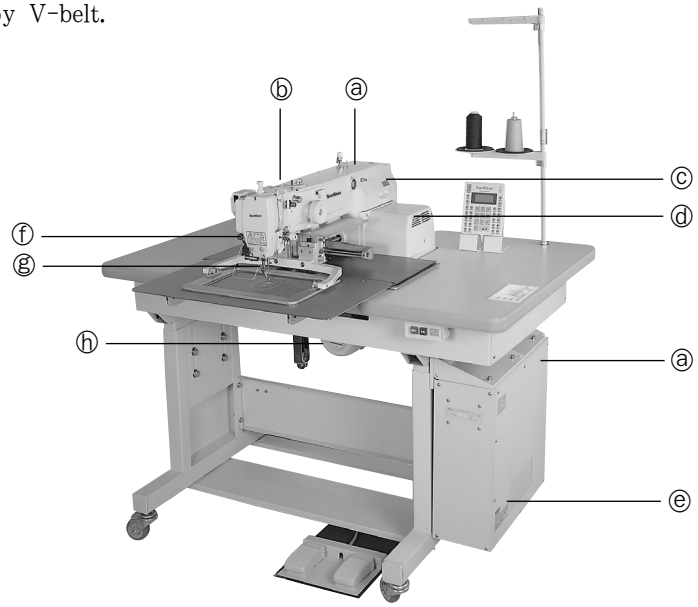
ⓐ Read the manual to understand on the operation of machine perfectly.
ⓑ Wear suitable clothes and cap for safe operation.
ⓒ During operation, don't make you body close to operating part of machine such as needle, hook, take-up lever or pulley.
ⓓ Do not remove a safety plate and covers during operation
ⓔ Be sure the grounding lines in connected.
ⓕ Before opening electricity box such as control box, cut off the supply of electricity and confirm if the switch is "off".
ⓖ When inserting thread into a needle or before inspecting after sewing, be sure the machine is stopped.
ⓗ Do not turn on the power during pedaling.
ⓘ Do not use several motor per a electric outlet.
ⓙ Install the machine apart from noise occurrence area such as high frequency welding machines as far as possible.
ⓚ Be careful- When the upper feed plate comes down to press. Otherwise, the finger or hand height be hurt at smacking.

[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

Notice

ⓐ Safety label : It describes cautions during operating the machine.
ⓑ Thread take-up cover : It prevents from any contact between body and take-up lever.
ⓒ Servo Motor Cover(B Series) : It prevents from insertion of hands, feet or clothes by Motor and Y-drive shaft.
Belt cover · Y-drive shaft cover(A Series) : It prevents from insertion of hands, feetor clothes by V-belt.
ⓓ Step Motor cover : It prevents from accidents during rotation of step motors.
ⓔ Label for specification of power : It describes cautions for safety to protect against electric shock during rotating the motors.
ⓕ Safety plate : It protects eyes against needle breaks.
ⓖ Finger guard : It prevent from contacts between a finger and needle.
ⓗ Motor pulley cover(A Series) : It prevents from insertion of hands, feet or clothes by V-belt.



1-6) Caution Mark Position

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

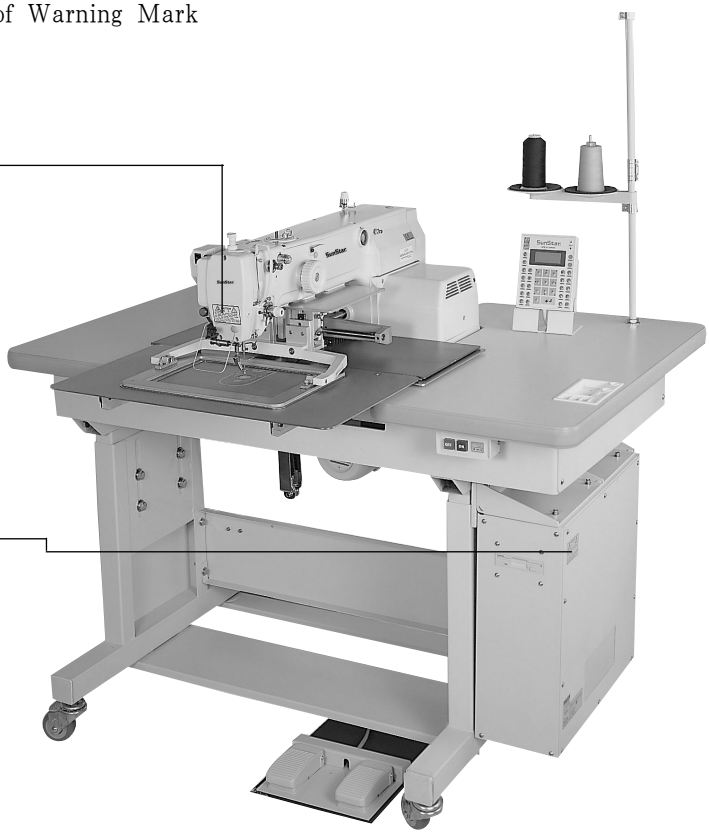
Position of Warning Mark

CAUTION
경 고

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

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.



1-7) Contents of Marks

Warning

Caution

1)

CAUTION
경 고

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

2)

WARNING
경 고

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

2

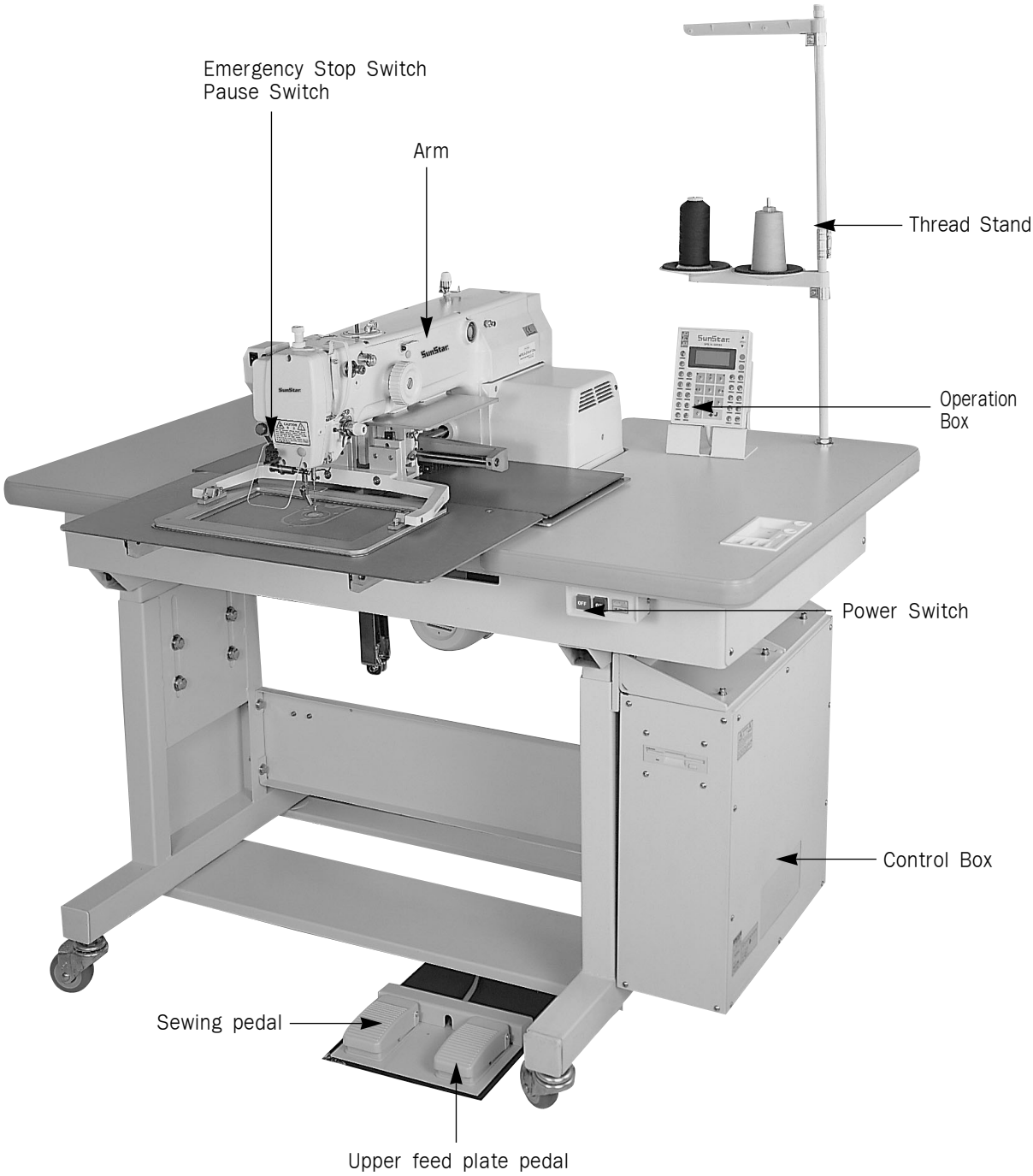
SPECIFICATIONS OF THE MACHINE

Series type	SPS/B-2516(Motor direct drive-type)	SPS/A-2516(Belt drive-type)
Sewing Area	X : 250㎜ × Y : 160㎜	
Sewing Speed	Max. 2,000spm (Stitch Length : 3㎜ or less)	
Stitch Length	0.1～12.7㎜	
Needle	DP×17, DP×5	
Needle Bar Stroke	41.2㎜	
Hook	Semi-rotary Large Shuttle Hook	
Bobbin Case	Bobbin Case for Semi-rotary Large Shuttle Hook	
Bobbin	Bobbin for Large Shuttle Hook	
Presser Foot Stroke	Standard 4㎜ [0.5～10㎜]	
Lifting Amount of Presser Foot	Max 20㎜	
Lifting Amount of Feed Frame	Max 30㎜	
Feeding System	Feeding by pulse motor	
Emergency Stop Function	Available during sewing operation	
Pattern Select Function	Pattern No. can be selected from No.1 to No.999	
Memory	3.5" Floppy Diskette (2HD)	
Memory Backup	The working point is stored in the memory when the machine stops abnormally.	
2nd Origin Function	Another origin point can be set by using jog key.	
Maximum Speed Restriction	The maximum speed can be limited from 200 to 2,000spm	
Number of Patterns	Max. 691 Patterns / Disk	
Safety Device	Emergency Stop Function, Maximum Speed Limit Function	
Main Motor	Direct Drive AC Servo Motor	550W Servo Motor
Power Consumption	600VA	
Recommended Temperature	5℃～40℃(41℉～104℉)	
Recommended Humidity	20%～80%	
Power	1φ : 100～240V, 3φ : 200～440V, 50/60Hz	
Pneumatic Pressure	5～5.5 kgf/㎠ (0.49～0.54Mpa)	

3

STRUCTURE OF THE MACHINE

1) Names of Each Parts of Machine



2) Inside Structure of Control Box

4

INSTALLATION OF THE MACHINE

1) Environment for Machine Installation

A. Do not use in a place where regularity voltage ± 10% is over for preventing from any accident by wrong operation.

B. Check the indicated pressure of the devices that use atmospheric pressure such as the air cylinder to prevent any accidents from occurring.

C. For safe operation of the machine, use the machine under the following conditions.

⇨ Surrounding Temperature During Operation : 5℃ ~ 40℃

⇨ Surrounding Temperature During Maintenance : -10℃ ~ 60℃

D. Humidity : Between 20 ~ 80%(Relative humidity)

2) Environment for Electricity Installation

A. Power voltage

· Use it within 10% change of regularity voltage.

· It is desirable to use the frequency of power within 1% of regularity frequency (50/60Hz)

B. Electric wave noise

To use with strong magnetic or high frequency goods, separate from the main power. Also do not let the machine come close with it if possible.

C. Use low voltage when supplements or accessories are being adhered.

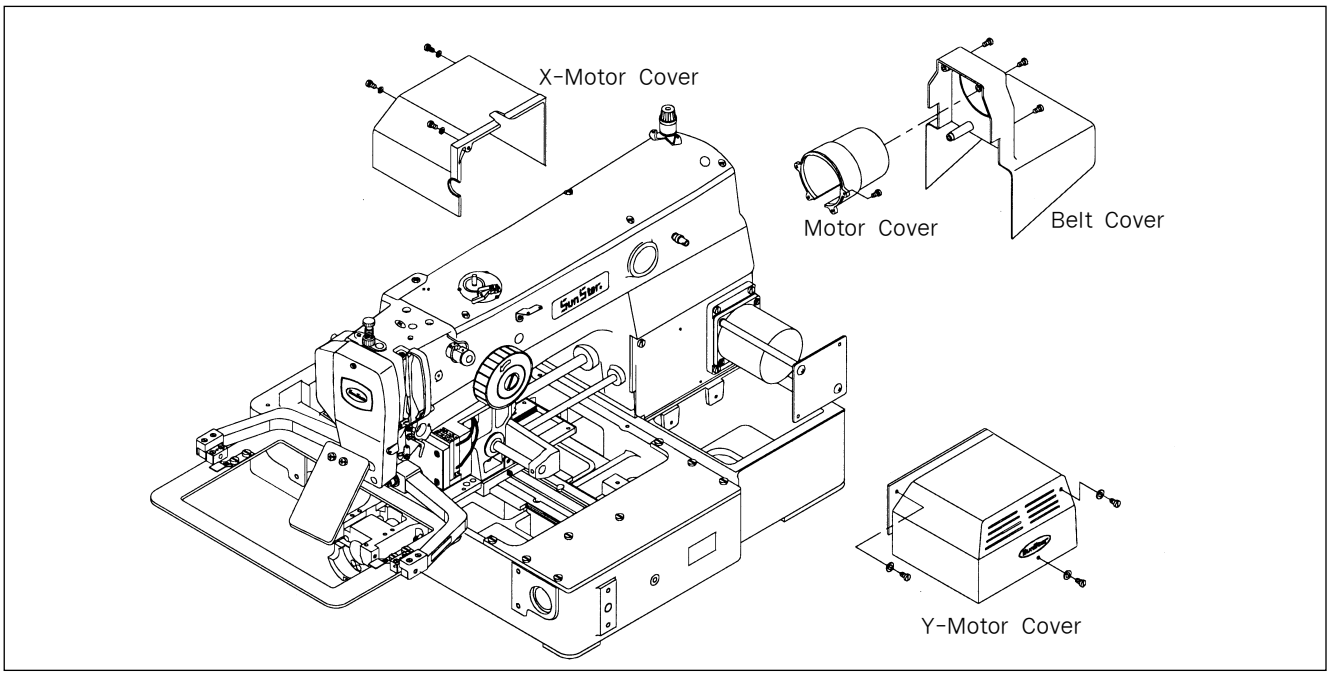
D. Be careful not to drop water or coffer inside of control box and motor.

E. Do not drop the control box and motor.

3) Assembly of Peripheral Construction Parts

A. Attach the X-motor cover, Y-motor cover, motor cover and belt cover to the back side of machine with using fixing screws.

(In case of A series, place the belt cover and the X, Y cover only)

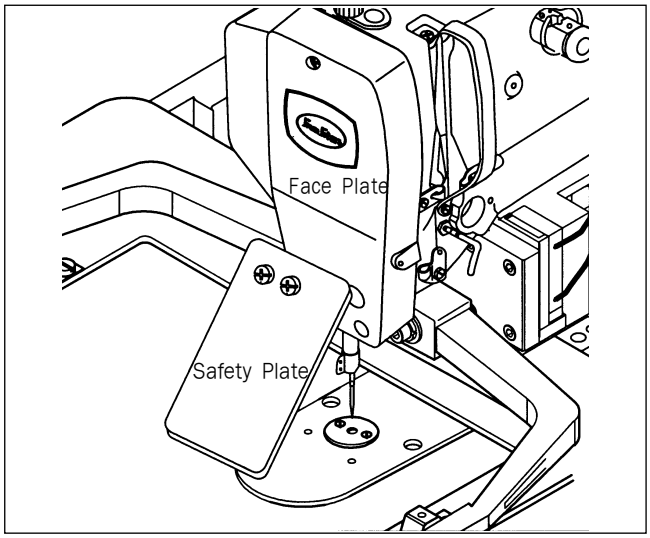


[Fig. 1]

B. Attach the safety plate to the face plate.

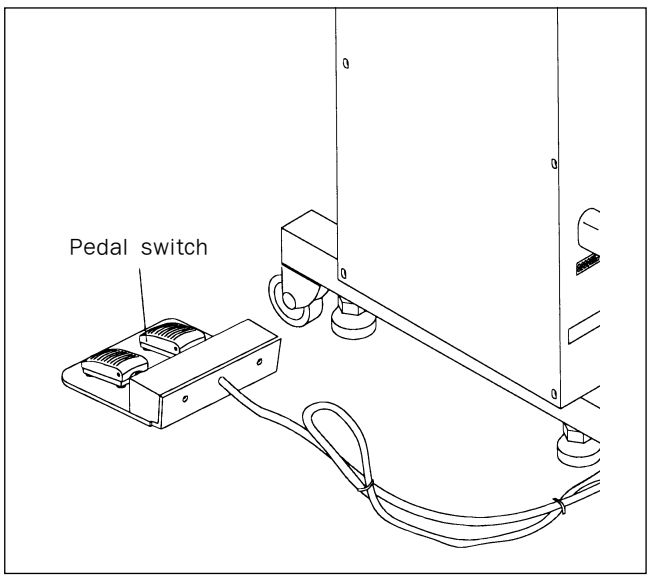
ⓐ You should attach it for sure to prevent from safe accident.

ⓑ Be careful when you start operation. Otherwise, fingers or hand might be hurt at the upper feed plate accidentally.



[Fig. 2]

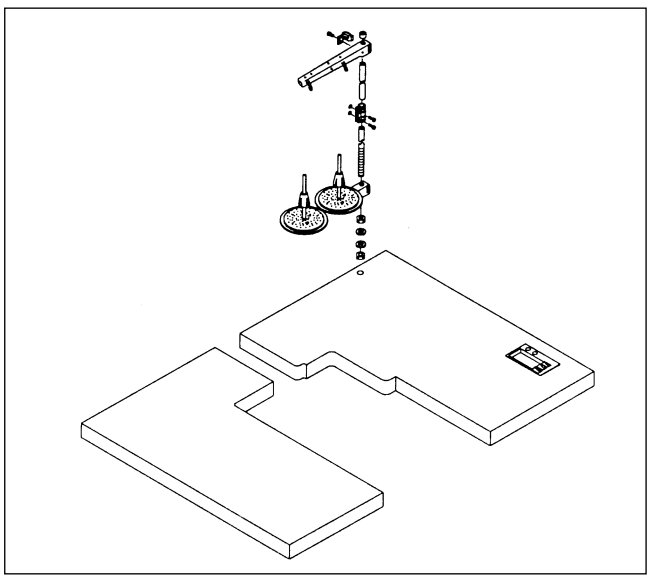
C. Connect a plug of pedal switch with control box.



[Fig. 3]

D. Install a thread stand on the table.

[Caution]
You can be hurt by the dropping device during installation so be careful about it.



[Fig. 4]

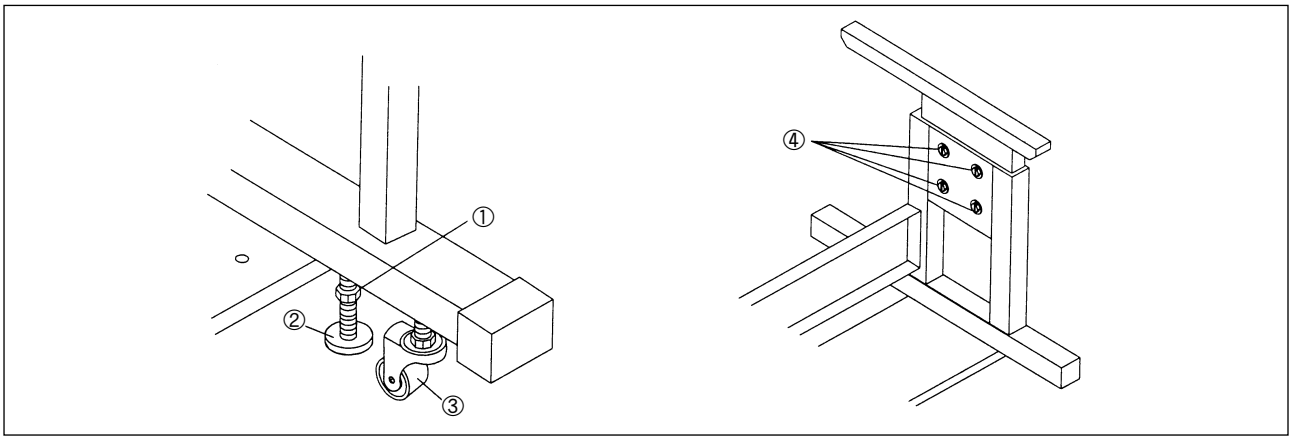
E. Table leg holder

▶ Method

ⓐ Loosening the nut ① and turn and raise the label adjuster ② until the caster ③ is raced.

ⓑ After installation, fasten the nut ① and fix the label adjuster ②.

ⓒ With the bolt ④, adjust the height of table by loosening 8 different spots.



[Fig. 5]

[Caution]
For safety, work with the power cut off.

F. How to attach the accessories for air pressure control.

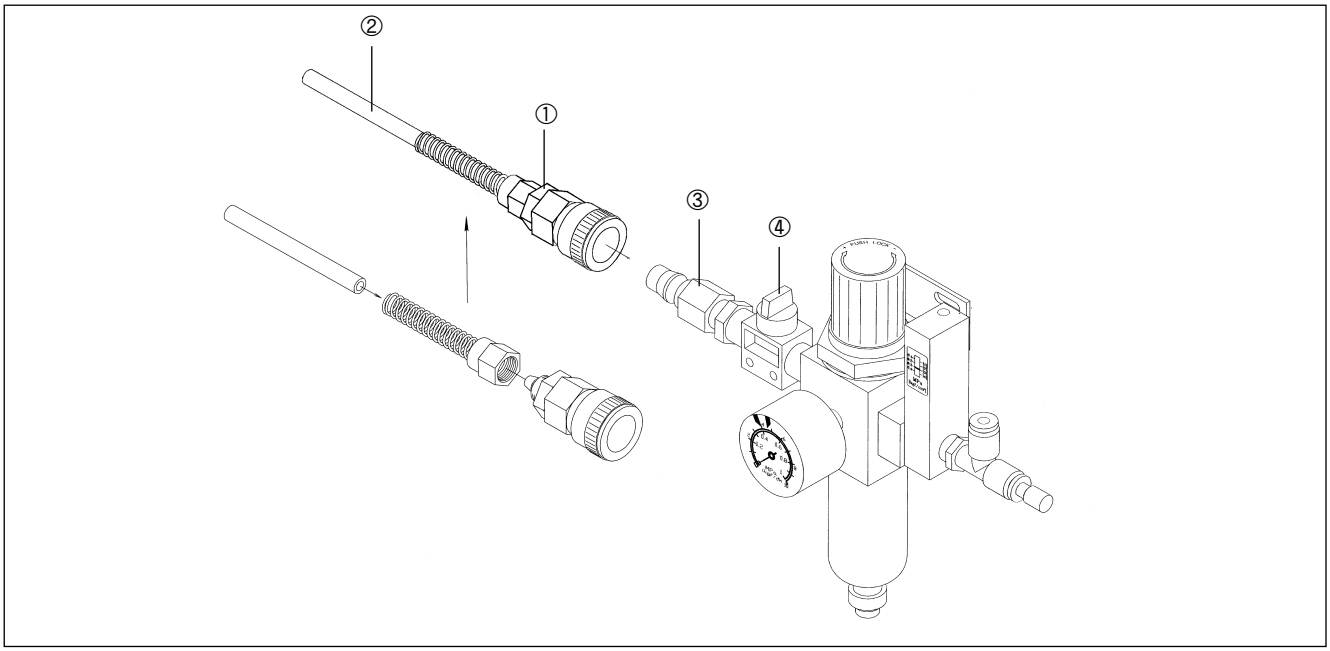
ⓐ Connect air hose ② to quick joint socket ①.

ⓑ Connect quick joint socket ① and quick joint plug ③.

ⓒ Open finger valve ④ and flow air in. Then, adjust the air pressure to 5~5.5kgf/㎠(0.49~0.54MPa).

[Caution]
When the air pressure goes down (under 4kgf/㎠), an error is indicated and the machine operation is stopped.
Error message : Err 24 (Low Pressure !)

[Note] When the finger valve ④ is closed after use, the remaining air is rejected and the pressure is adjusted to 0Mpa(0kgf/㎠).



[Fig. 6]

5

PREPARATION BEFORE USING THE MACHINE

1) Setting the Voltage

A. If a cover of electronically controlled pattern sewing machine is taken off, inside contents are as same as [Fig. 7].

B. Confirm the position of change connector of power voltage on power board [Refer Fig. 7] and transformer if they are properly selected for input voltage like Table 1 and 2.
EX) If power voltage is 220 V:
The model of used transformer is "SPS-□□□□-220"and it is normal for the change connector of power voltage to be placed on "JP5".

※ Sticker for transformer model is attached to the top side of transformer.

Input Voltage	Position of change connector of power voltage
95V~105V	JP4
106V~115V	JP3
116V~125V	JP2
200V~230V	JP5
231V~245V	JP4
345V~415V	JP3
416V~480V	JP2

[Table 1. Position of change connector of voltage]

Power Voltage \ Model	SPS/A-1306-X X - X X	SPS/A-1811-X X - X X	SPS/A-2516-X X - X X
100V~120V	"SPS-1306-110"	"SPS-1811-110"	"SPS-2516-110"
220V~440V	"SPS-1306-110"	"SPS-1811-110"	"SPS-2516-110"

[Table 2. Model of used transformer according to the input power voltage]

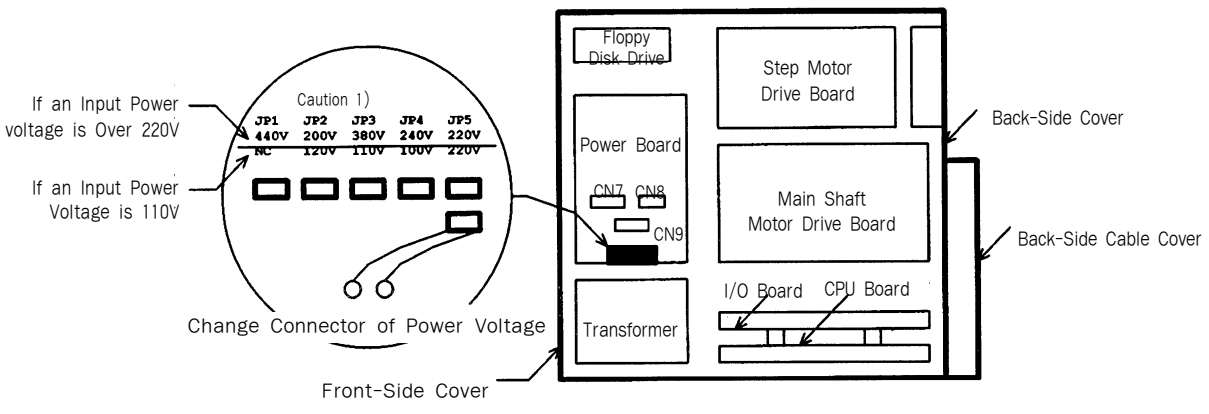
C. Check if a power switch is for 1 phase and 3 phase.

D. If the setting of Ⓑ and Ⓒ is not proper, damage from breakdown can be occurred. If there is any problem, follow below direction.

ⓐ If the position of change connector is wrongly placed :
① Separate the connector linked to transformer from CN7, CN8 and CN9 of power board.
② Insert the power change connector into a proper position on Table 1.
③ Reconnect the connector linked to transformer to CN7, CN8 and CN9 of power board.

ⓑ If the specification of used transformer is not in a accord with that of power switch, ask to the place where you purchased for troubleshooting.

[Caution]
Before turning on the power switch, air should be filled with.

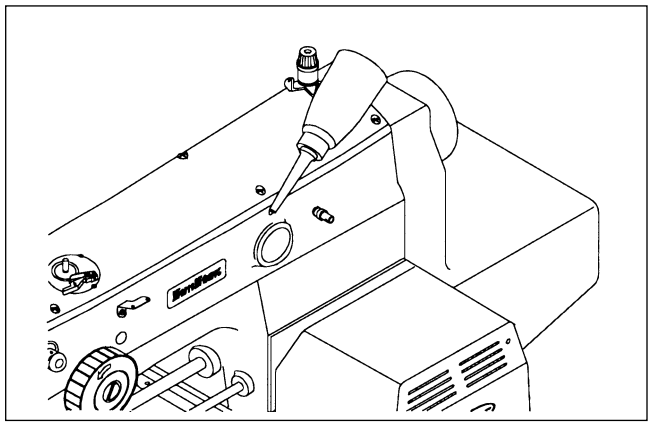


[setting of change connector of power voltage] [Fig. 7]

2) How to Supply Oil

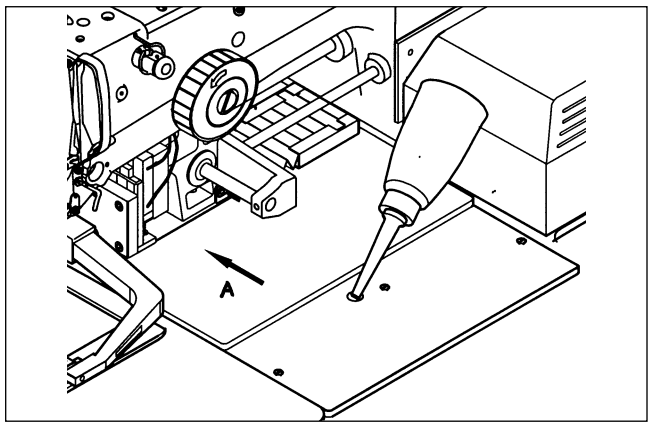
A. Check the amount of oil left in the oil tank which is installed on the arm and supply oil sufficiently.

[Caution]
Be sure to supply oil when operating the machine for the first time or when the machine has not been used for long time.



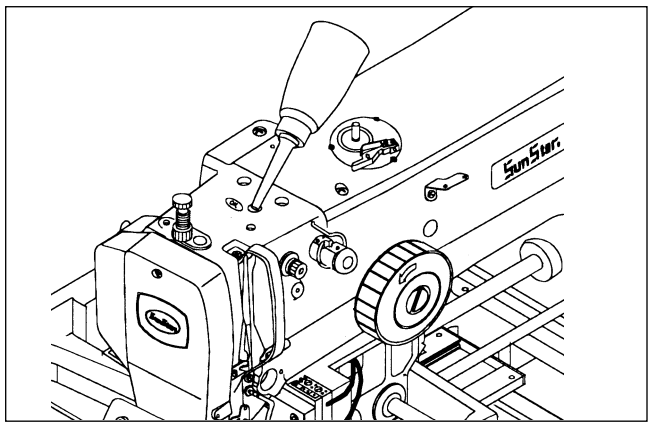
[Fig. 8]

B. As shown in the picture, move the feed bracket in the direction of "A" and supply oil into the bed oil window through the hole on the bed cover.



[Fig. 9]

C. Supply oil into the hole in the upper part of the arm.



[Fig. 10]

D. Open the hook cover and supply oil till the shuttle race ring is surrounded by oil. Put the hook cover back on after finishing.

[Caution]
For safety, keep the hook cover covered during operating.

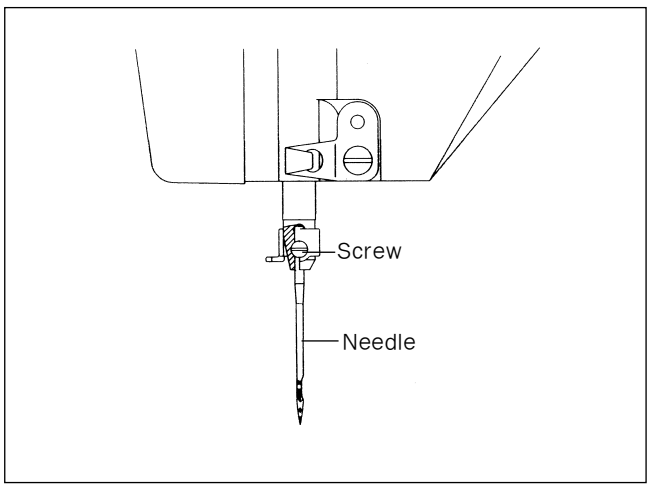
[Fig. 11]

E. Supply silicon oil into the silicon oil tank which is installed on the right side of the arm.

[Fig. 12]

3) How to Install the Needle Bar

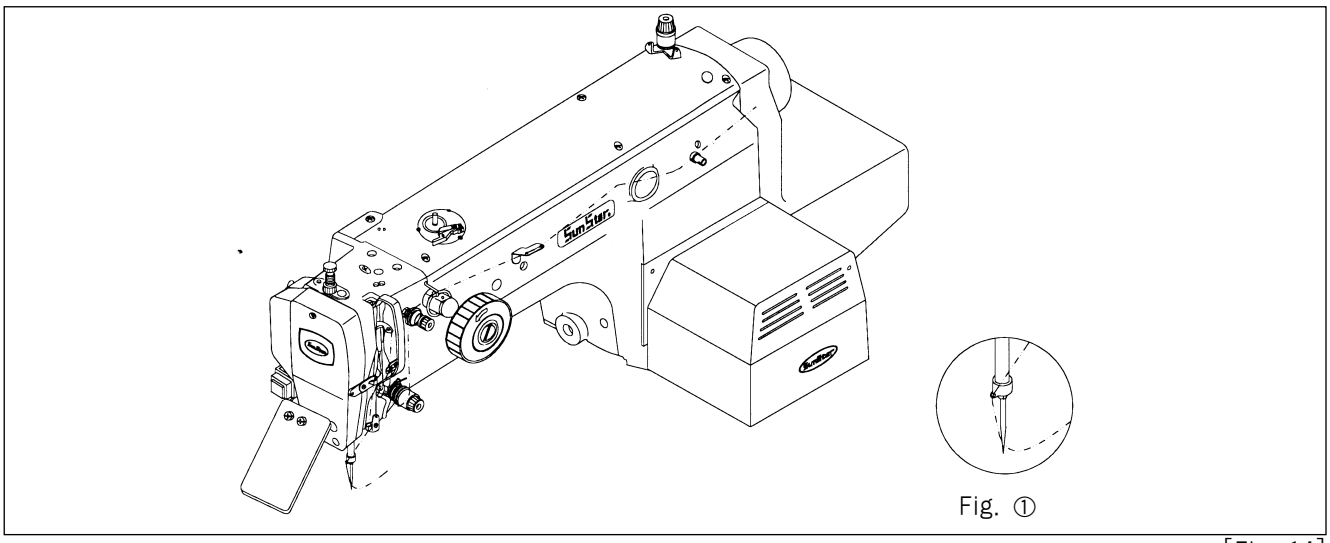
Unfasten the needle fixing screw on the needle bar. Then, with the needle groove facing forward, push the needle until the upper end touches the needle hole of the needle bar. Fix the needle in with the needle fixing screw.



[Fig. 13]

4) How to Thread the Upper Thread

A. Hook the upper as shown in the following picture after setting the thread take-up lever at the highest position. As with the needle bar thread guide, hook the thread as shown in picture ① for heavy materials. (SPS/B(A)-2516-HS)



[Fig. 14]

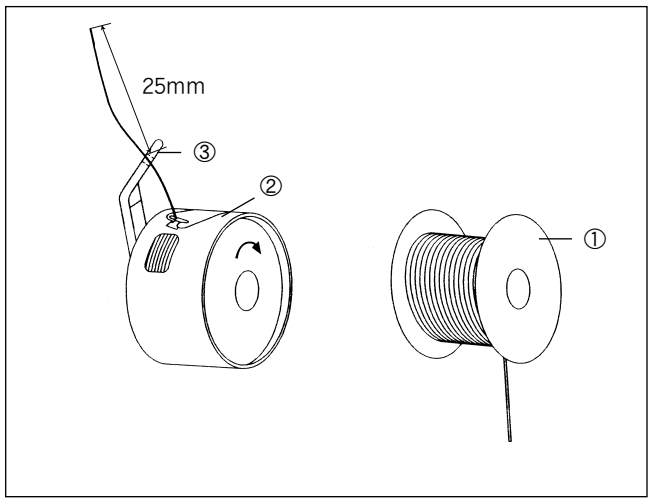
5) Threading the Lower Thread

A. Insert bobbin ① into bobbin case ② as shown in the picture.

> [Caution]
> Insert the bobbin to turn clockwise when seen from behind the bobbin case.

B. After setting the lower thread through the crack of the bobbin case, insert the thread through thread hole ③.

C. Adjust the lower thread to hang 25mm out of thread hole ③.

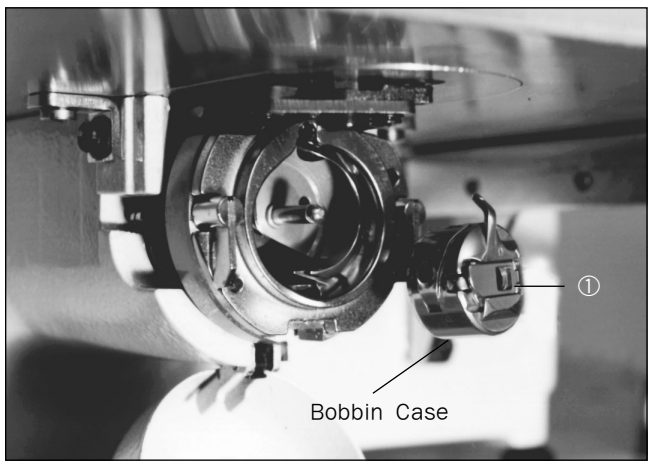


[Fig. 15]

6) How to Take the Bobbin Case On and Off

Hold knob ① of the bobbin case and push into the shuttle until a click sound is heard.

> [Caution]
> If you start operating the machine when a bobbin case is not perfectly installed, thread can be tangled of the bobbin case would be protruded.

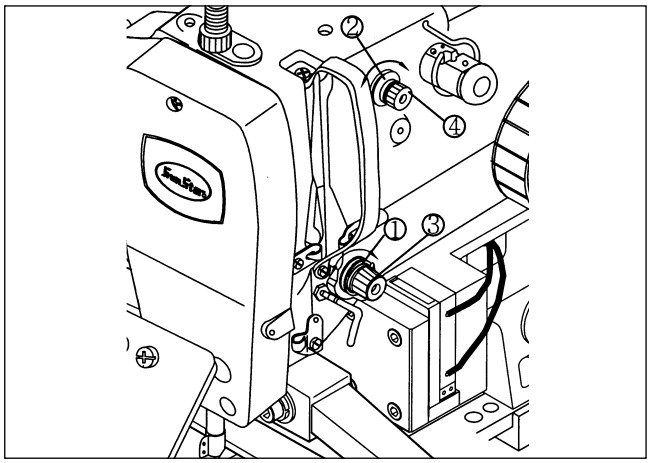


[Fig. 16]

7) How to Adjust the Tension of the Upper Thread and the Lower Thread

A. Adjusting the tension of the upper thread

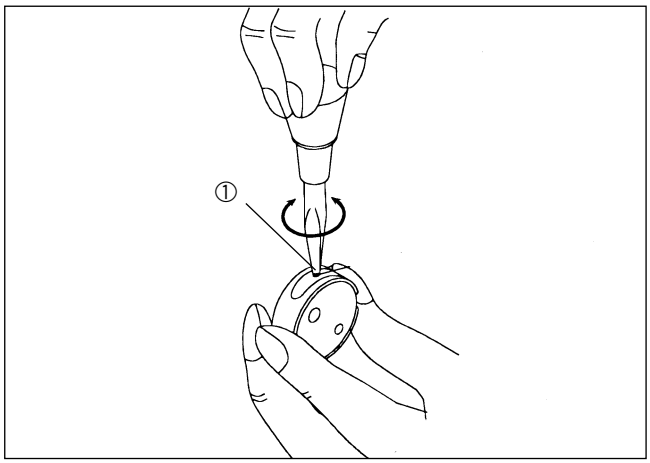
When the tension adjusting nuts ③ and ④, of thread tension adjusting unit ① and sub-tension adjusting unit ②, are turned clockwise the upper thread is tightened. And loosens when turned the other way around.



[Fig. 17]

B. Adjusting the tension of the lower thread

The lower thread becomes tight when tension adjusting screw ① is turned clockwise, as shown in the picture. When the screw is turned the other way the lower thread is loosened.



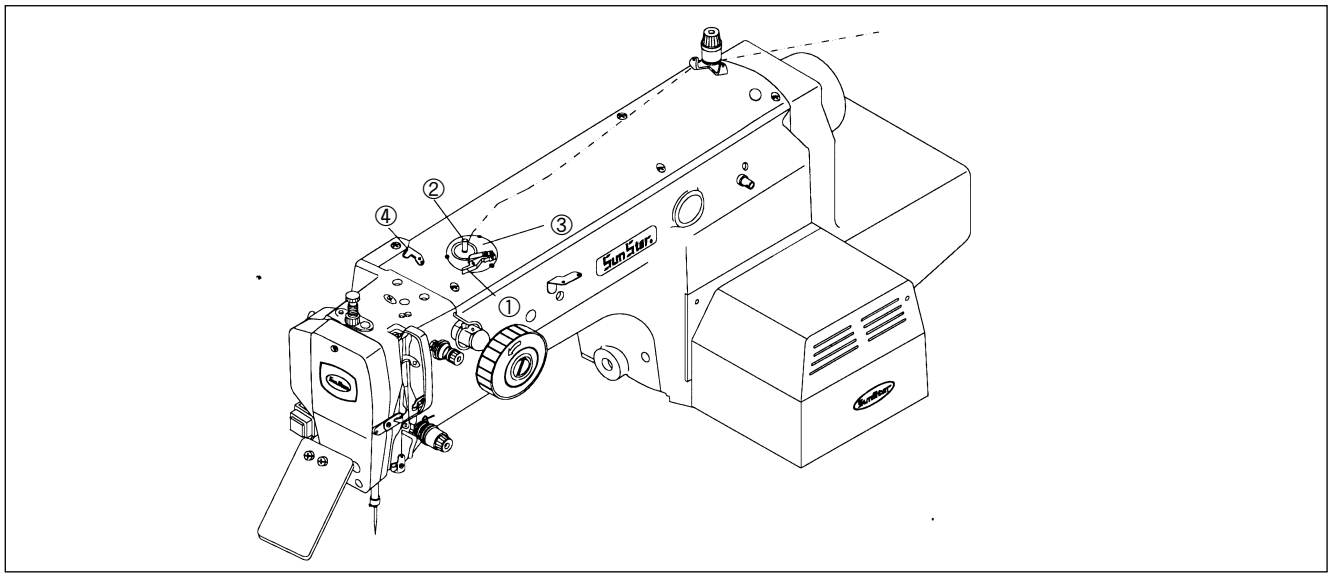
[Fig. 18]

8) How to Wind the Lower Thread

A. Insert the bobbin into thread winding drive shaft ② on thread winding base ① which is installed on the upper top.

B. Operate the machine after sticking the thread winding lever ③ to the bobbin.

C. When the thread winding lever is separated from the bobbin, cut the bobbin thread with thread winding mes ④.



[Fig. 19]

9) Adjusting the Height of the Presser Foot

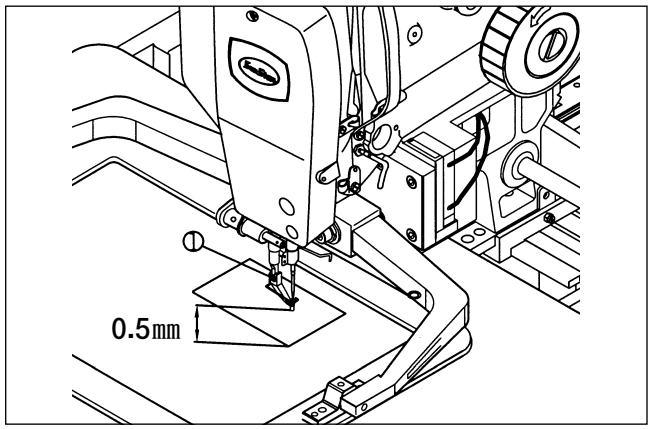
A. Unfasten presser foot screw ① with the needle bar at the lowest position.

B. Adjust the height so that the presser foot bottom comes 0.5mm(the thickness of the thread used)above the sewing material. Then, tighten the screw.

[Caution]

After adjusting the height of presser foot, confirm the position of wiper

- Too excessive gap can cause jumping
- Insufficient gap can cause a failure in thread adjustment



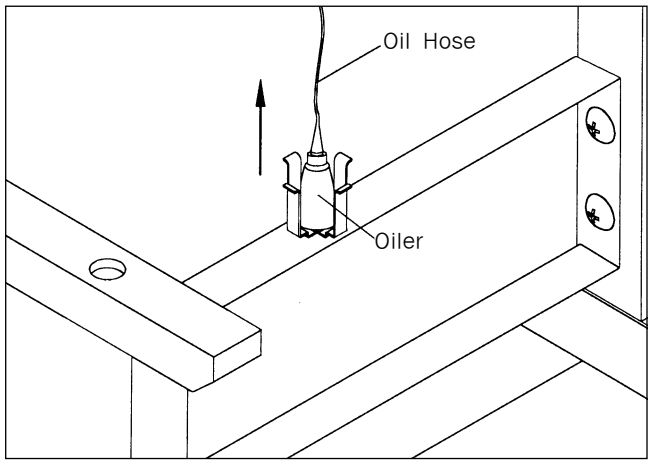
[Fig. 20]

10) Disposing the Waste Oil

When the oil receiving container at the bottom of the table is full, take it off to empty.

[Caution]

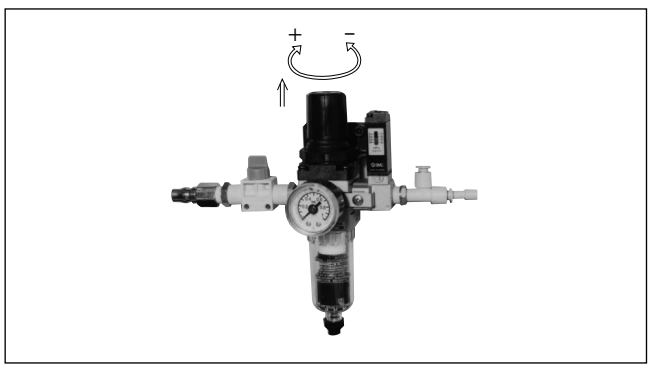
Spread out some fabrics or papers on the floor when you attach or remove the oil receiving container



[Fig. 21]

11) How to Adjust the Air Pressure

Pull the adjustment handle on the upper part of the filter controller, which is attached to the back of the table, up as shown in the picture. When the handle is turned clockwise the pressure goes up and goes down when the handle is turned in the opposite direction. Adjust to the appropriate pressure(5~5.5kgf/㎠) indicated in the pressure gauge, then press and fix the adjustment handle into its place.

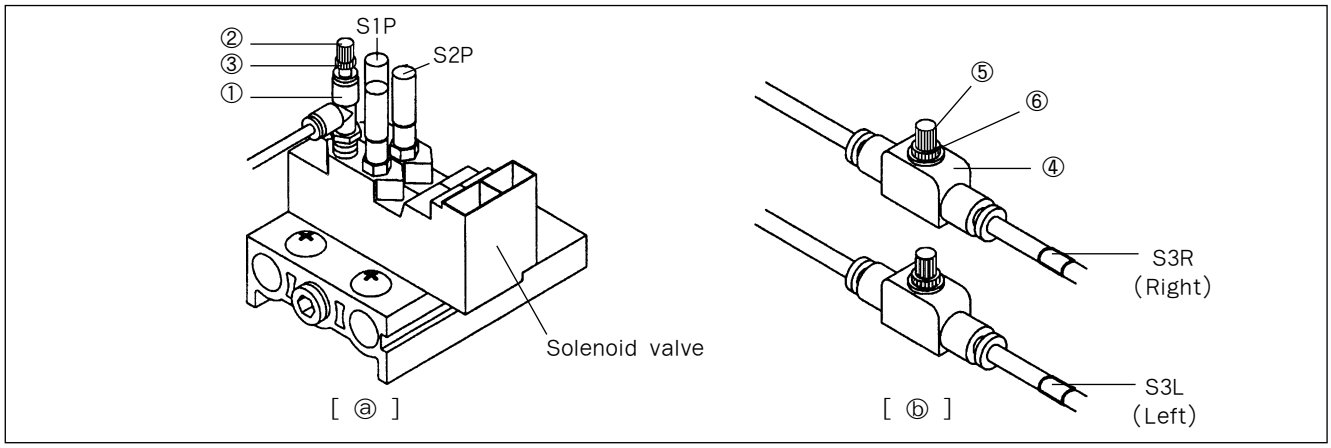


[Fig. 22]

12) Adjusting the Speed for Ascension and Descent of Upper Feed Plate

A. Like the fig. ⓐ, if you turn a handle ② on reducing valve ① of solenoid valve attached to the bottom of table clockwise, the ascending speed of upper feed plate and support pressure during ascending will be increased, if you turn it counterclockwise, they are reduced, so that you should adjust it to be proper speed and fix them with fixing nut ③.

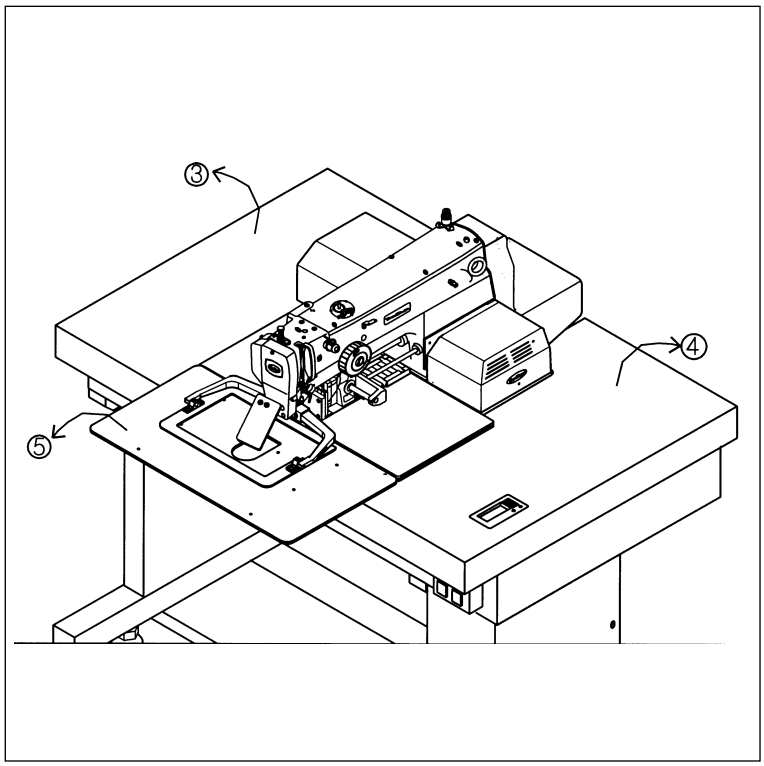
B. Like the fig. ⓑ, if you turn a handle ⑤ of sped controller ④ clockwise, the descending speed of upper feed plate will be reduced, if you turn it counterclockwise, the descending speed will be increased. After adjusting it to be proper speed, fix it with fixing nut ⑥.



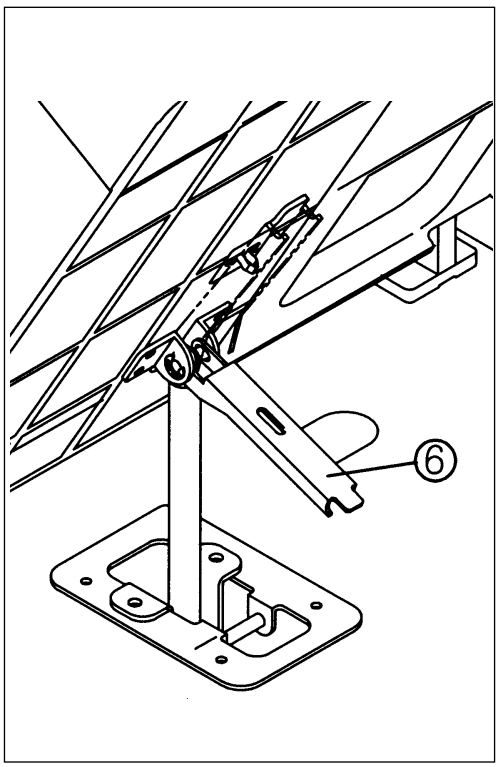
[Fig. 23]

13) How to mount the sewing machine

If you repair or mount up the sewing machine, remove the belt after the above process - 13), and disassemble Table(left)③, Table(right)④, and Presser Foot Support Cover⑤. And if you works during mounting the sewing machine, please use Frame Support Bracket⑥ without fail.



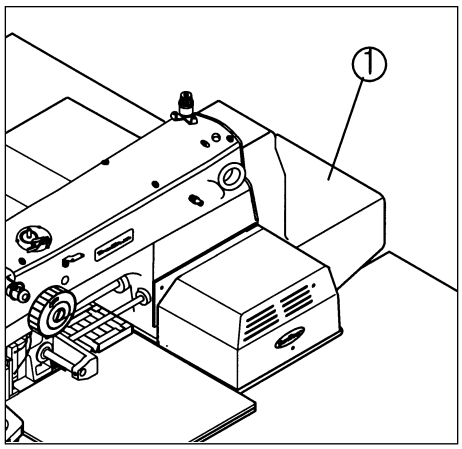
[Fig. 24]



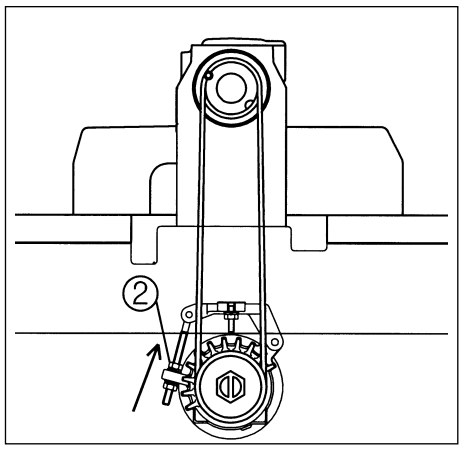
[Fig. 25]

14) How to attach and detach V-Belt (A Series)

A. Loosen a fixing screw of Belt Cover① to disassemble Belt Cover from the sewing machine.
B. Loosen a fixing nut② of Motor to rise it up to the arrow.
C. When V-Belt tension gets loosened, remove V-Belt.



[Fig. 26]



[Fig. 27]

15) Caution When Using the Floppy Disks

Observe the following principles thoroughly when you treat floppy disks.

[Caution]
Use the identified floppy disks after formatting when you get floppy disks in market.

ⓐ Do not put floppy disks near magnetic-related materials such as television.

ⓑ Keep away from overheat, humidity or direct ray of light.

ⓒ Do not put any heavy material on a floppy disk.

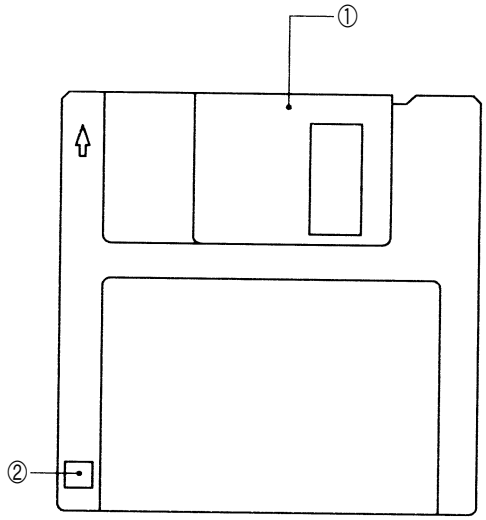
ⓓ During formatting or inputting and outputting floppy disks, do not take out a floppy disk from a disk drive.

ⓔ Do not open a cover of floppy disk.

ⓕ If a write protect tab is opened, you can't input data in a disk

ⓖ If you repeat read and write in a disk many times, error can be occurred in a disk.

ⓗ It is safe to keep important design data in two disks.



① Shuttle ② Write protect tab

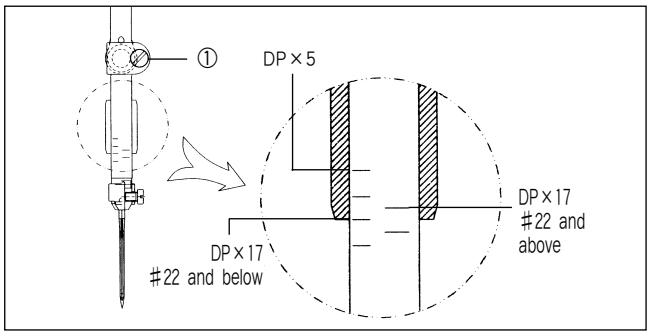
6

HOW TO REPAIR THE MACHINE

Caution	The machine is set to be the best condition at the factory. Do not make any discrete adjustments on the machine and replace accessories approved by the company only.

1) Adjusting the height of the needle bar

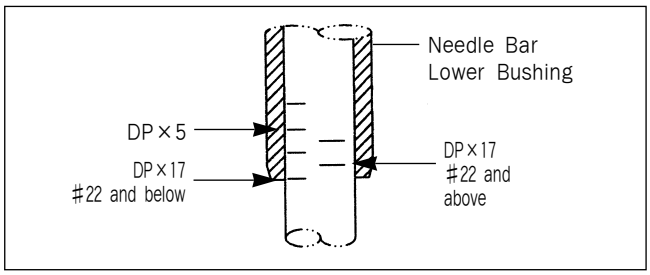
When the needle bar is at its lowest position, unfasten the needle bar holder screw ①. Adjust the desired height by making the specified upper carving line fit in with the needle bar bushing. Then, tighten the needle bar holder screw ① back on firmly.



[Fig. 28]

2) Adjusting the needle and the shuttle

A. Have the lower carving line for the needle that is applied when the needle bar goes up fit in with the lower side of the needle bar bushing as shown in the picture.



[Fig. 29]

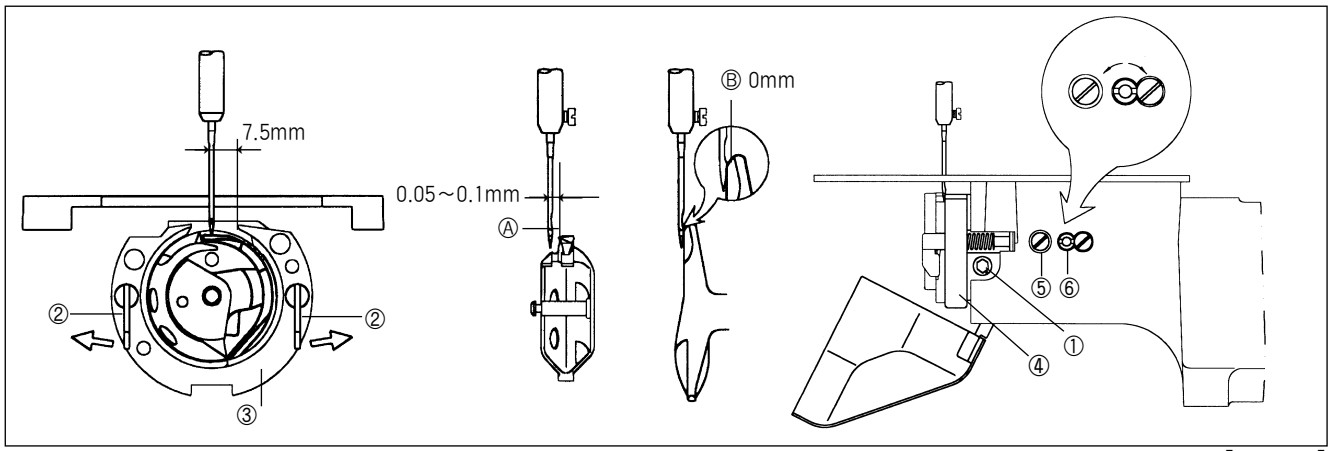
B. After unfastening the shuttle drive screw ①, open the inner hook pressure bar ② left to right and remove the shuttle lace ring ③ from the (large) shuttle ④.

C. Make the shuttle hook point Ⓐ accord with the center of the needle. And make the needle and the front facet of the shuttle drive Ⓑ connect each other to prevent the needle from curving. Then, tighten the drive screw ① firmly.

D. After unfastening the (large) shuttle screw ⑤, turn the large hook adjustment shaft ⑥ to the left to right and adjust the (large) shuttle ④ so that the needle and the shuttle hook point Ⓐ is 0.05~0.1mm apart from each other.

E. After adjusting the (large) shuttle ④ in place, adjust the rotary direction of the (large) shuttle ④ so the needle and the (large) shuttle ④ is 7.5mm apart from each other. Then, tighten the (large) shuttle screw ①.

[Caution]
For safety, make sure all the screws are tightened firmly after adjusting the (large) shuttle.



[Fig. 30]

3) Adjusting the Lower Shaft Gear and the Rocking Shaft Gear

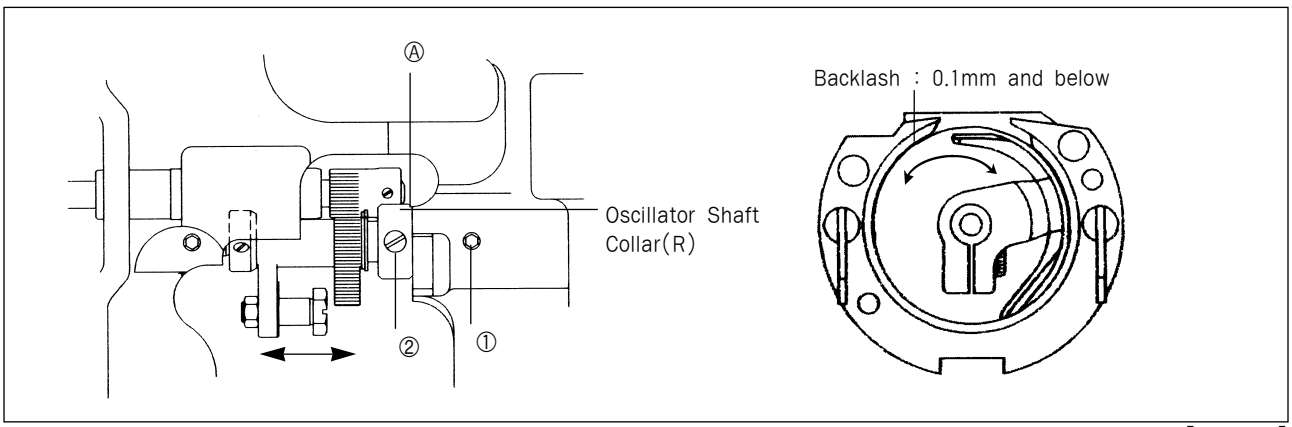
A. Unfasten screws ① and ②.
B. While having the upper shaft turning, move the rocking shaft gear in the direction of the arrow to the position where it will move easily without load.

> [Caution]
> The machine may not operate when the rocking shaft gear in not in the right position.

C. Have the oscillator shaft collar(right) stick to the bed surface Ⓐ, and then tighten the collar screw ②.
D. Turn the oscillator shaft collar(right), still sticking to the bed surface Ⓐ, in the direction of the arrow and make adjustments so the end of the shuttle drive will rotate smoothly with the backlash of under 0.1mm.

> [Caution]
> If there is too much backlash the machine may make more noise than usual during operation. And if there is not enough backlash, the machine may not operate.

E. Tighten screw ① back on firmly.

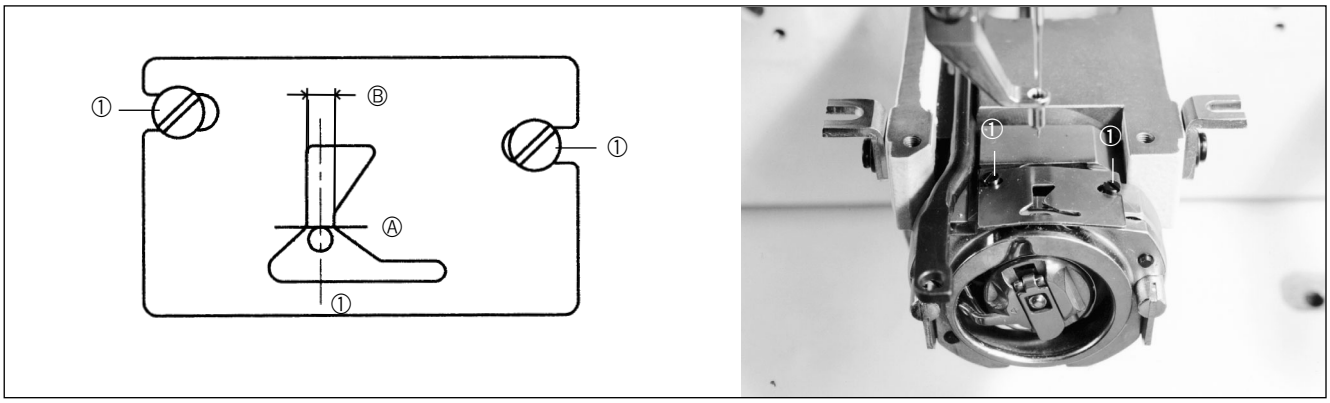


[Fig. 31]

4) Adjusting the Spring on the Upper Side of the Shuttle

After removing the lower feed plate and the needle plate from the machine, unfasten the screw of the spring on the upper side. Then, adjust the spring on the upper side of the shuttle so that the backside of the needle and comes to point Ⓐ in the vertical direction, and the center of the needle will come to the middle of interval Ⓑ horizontally. After the adjustment is done, tighten the screw back on firmly.

> [Caution]
> The thread may be disconnected or the thread strand may be unfastened if there are scratches or if the surface is rough around the spring groove on the upper side of the shuttle. Always check the surface of the spring before operating the machine.

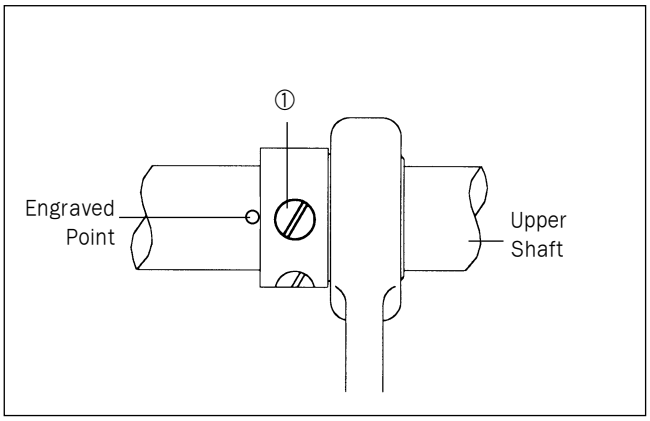


[Fig. 32]

5) Adjusting the Presser Foot Devices

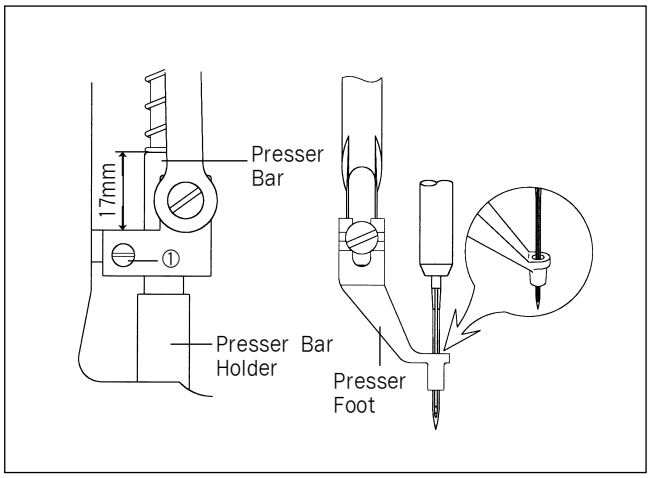
A. Conform the end of presser foot operating cam to the center of punched mark, and conform the cam's punched line to the punched mark of upper axis, and then tighten Clamp①.

> [Cautions]
> If the presser foot operating cam is improperly positioned, The up-and-down moving of presser foot is in inconformity, therefore the presser foot may collide with the needle bar.



[Fig. 33]

B. Project the presser bar about 17㎜ from the presser bar holder, check if the needle passes through the center of presser foot, then tighten Clamp①.



[Fig. 34]

C. Loosen Fork Crank Clamp①, and place the single screw② of presser foot link to the right of the adjusting arm.

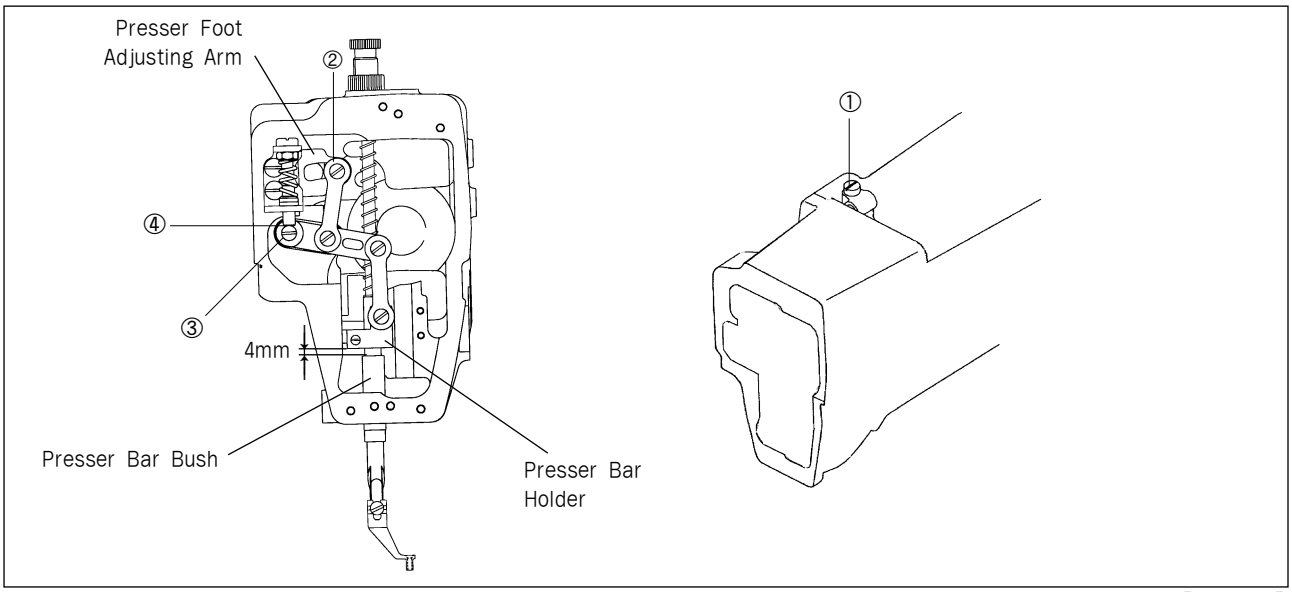
D. Conform the fixing single screw③ of presser foot moving link to the end④ of position link stopper.

> [Caution]
> If there is space between presser bar handle and presser bar bush, interference and noise is occurring during machine operation. Screws are not fastened tightly after adjustment; it can cause breakage during operation.

E. To set up 4㎜ of the interval between Presser Bar Holder and Presser Bar Bushing, rise up the presser bar and tighten Fork Crank Clamp①.

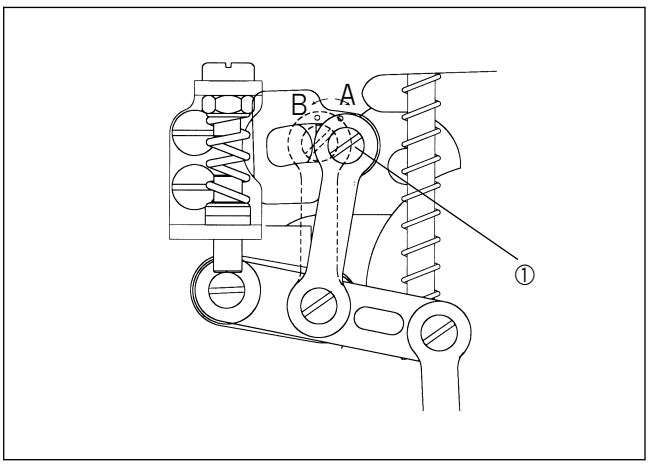
F. Check the tightening status of screws, and adjust the presser foot's stroke.

[Cautions]
If there is no interval between Presser Bar Holder and Presser Bushing, the machine may be interfered during its operation. If the handle is completely tightened, the machine may be damaged during its operation.



[Fig. 35]

G. Adjustment of Presser Foot Stroke(Adjustment of Presser Foot UP/DOWN Motion)
After unfastening stud screw① of presser foot adjusting arm, placing it to A direction, presser foot stroke increases. Placing to direction B, stroke decreases.(It is set to 4mm at the moment of factory shipping).



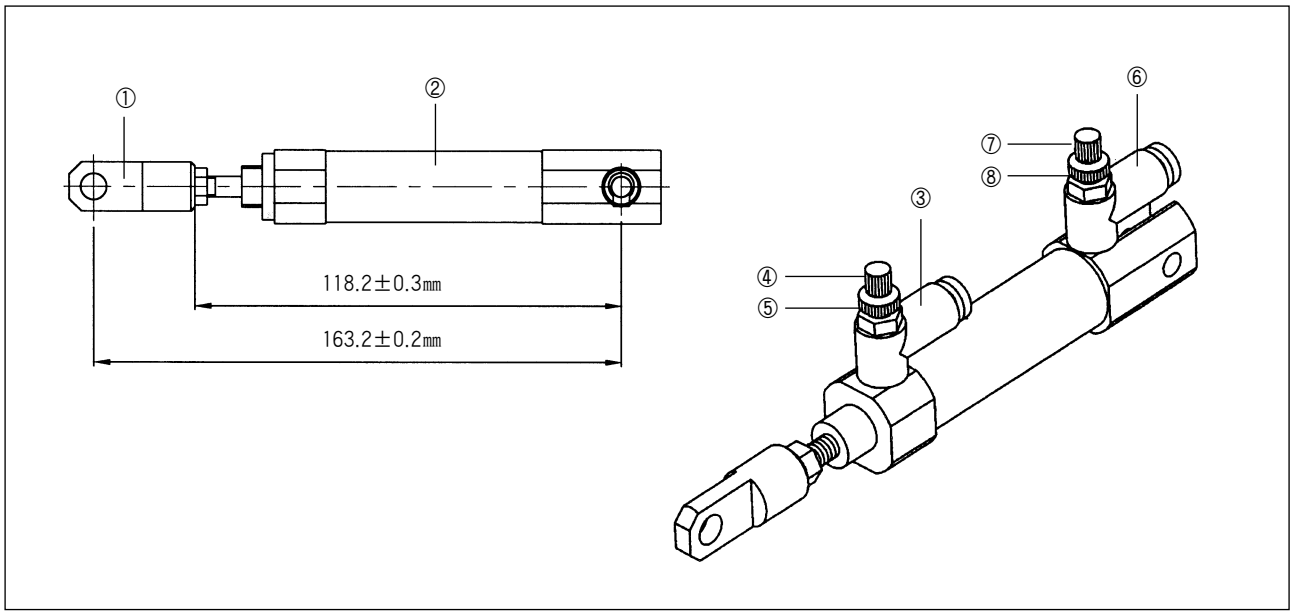
[Fig. 36]

6) Adjusting the Presser Foot Lifter Cylinder

A. The distance between the hole center of cylinder knuckle ① and the hole center of presser foot lifter cylinder ② to be 163.2±0.2mm to maximum.

B. If you turn a handle ④ of speed controller ③ on presser foot lifter cylinder ② clockwise, the ascending speed of presser foot will be reduced, if you turn it counterclockwise, they are increased, so that you should adjust it to be proper speed and fix them with fixing nut ⑤.

C. If you turn a handle ⑦ of speed controller ⑥ on presser foot lifter cylinder ② clockwise, the descending speed of presser foot will be reduced, if you turn it counterclockwise, they become increased, so that you should adjust it to be proper speed and fix them with fixing nut ⑧.

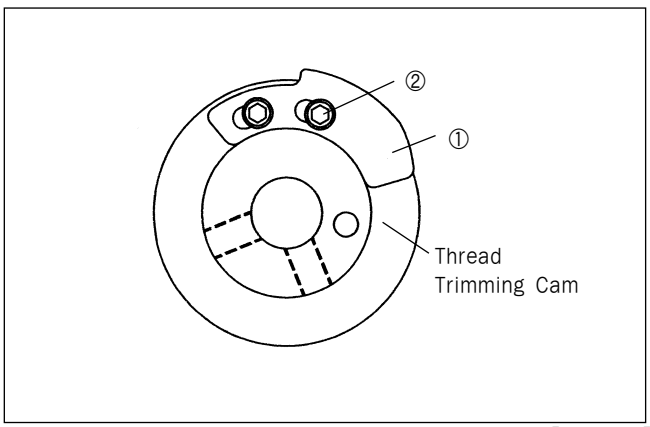


[Fig. 37]

7) Adjusting The Parts for Thread Release

A. How to set the thread release notch
Place the notch so that the right side of the oval share of the thread release notch ① touches circumference of the notch screw ②, and then fix with a screw.

[Caution]
The remaining amount of thread may not be enough or not be regular and the thread may be unfastened from the needle if the notch is not set in the right position.



[Fig. 38]

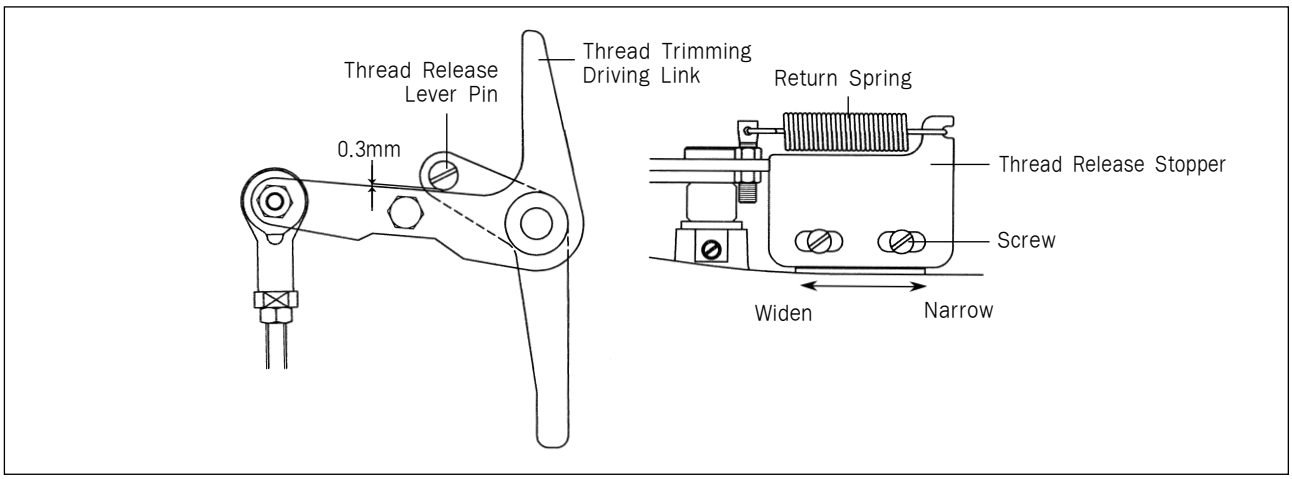
B. How to set the thread release stopper

ⓐ Remove the thread release return spring.

ⓑ After unfastening the thread release stopper screw, adjust the trimming drive link and the thread release lever pin 0.3mm apart from each other. Then, attach the arm to the thread release stopper completely. When the thread release stopper is pushed to the right, the space between the trimming drive link and the thread release lever pin is reduced. And it is enlarged when the stopper is pushed to the left.

ⓒ Hang on the thread release return spring.

[Caution]
Use a tool when removing or attaching the thread release spring to prevent accidents.



[Fig. 39]

C. How to adjust the opening capacity of the thread guide dish

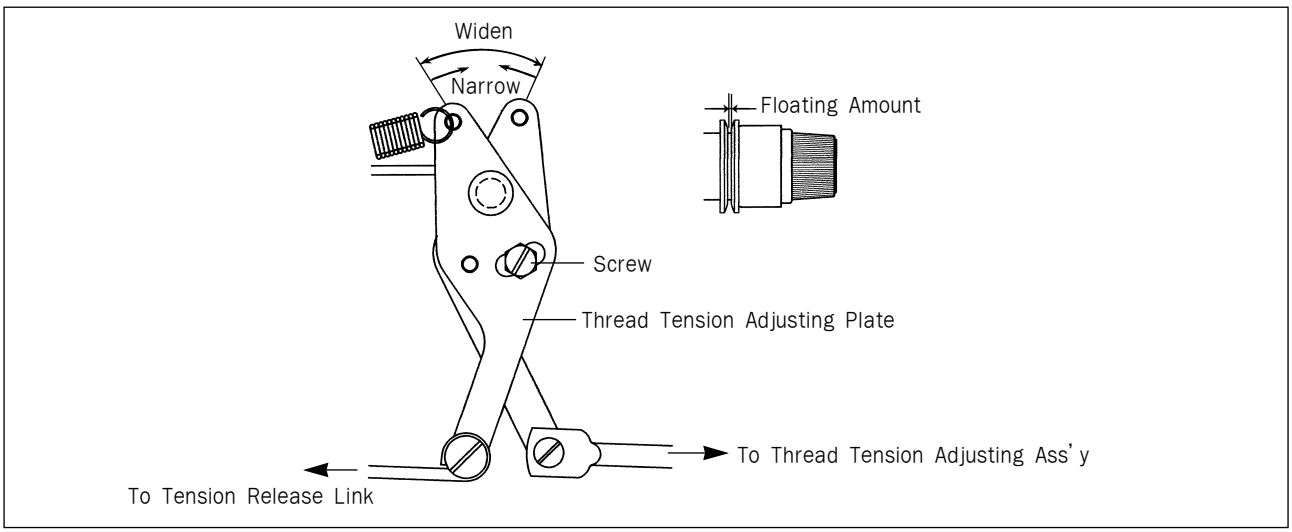
ⓐ Unfasten the thread release control plate screw.

ⓑ Open the thread guide dish by operating the trimming devices.

ⓒ Adjust the opening capacity to 0.6~0.8mm for normal material and 0.8~1mm for heavy material. To increase the opening capacity, widen the angle between the thread release plate and narrow the angle to reduce the opening capacity.

ⓓ Tighten the screw after the adjustment.

[Caution]
If the dish is not opened appropriately, the amount of remaining thread may be not enough or not regular, and the dish may not be closed completely.



[Fig. 40]

8) Adjusting Accessories for the Wiper

A. Adjusting the wiper position

ⓐ Unfasten the wiper rotary shaft collar screw ① and the wiper crank screw ② when the needle tip is 19.5mm above the throat plate.

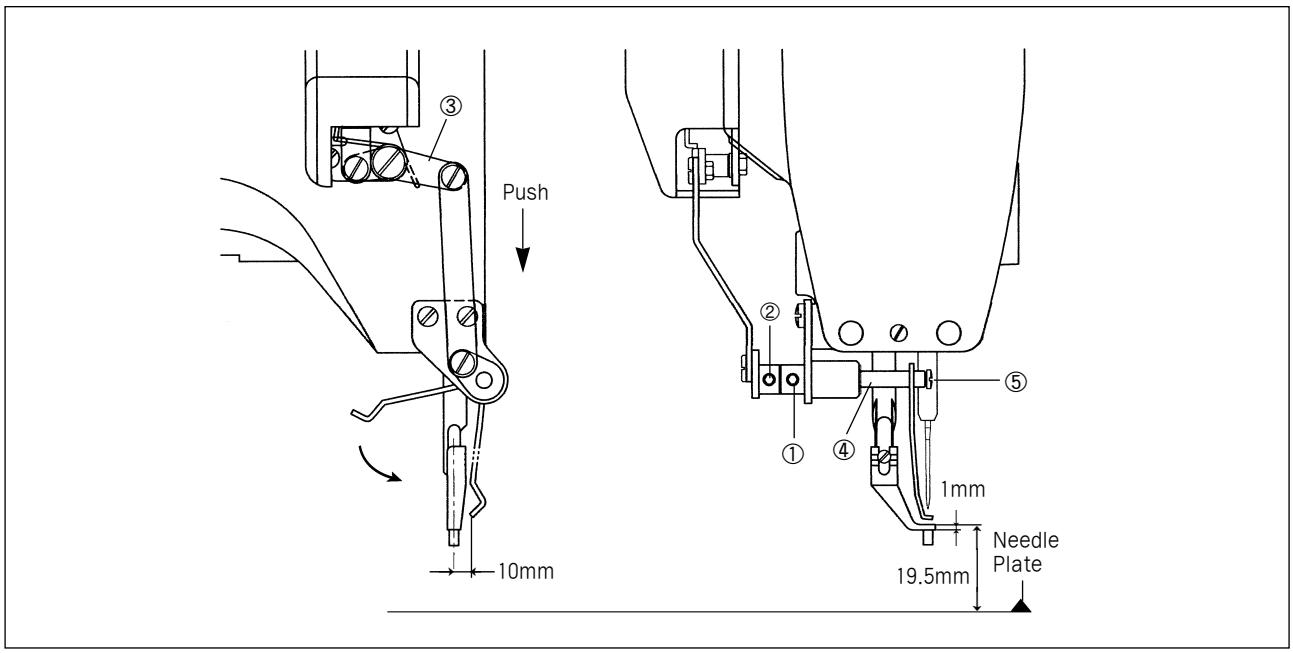
ⓑ Press the wiper rocking link ③, then adjust the wiper shaft ④ so the wiper and the needle is about 10mm apart from each other.

ⓒ Tighten the wiper rotary shaft collar screw ① and the wiper crank screw ②.

ⓓ Unfasten the wiper screw ⑤ and adjust the wiper so that the end of the wiper is about 1mm apart from the needle end. Then, tighten the screw back on firmly.

[Caution]

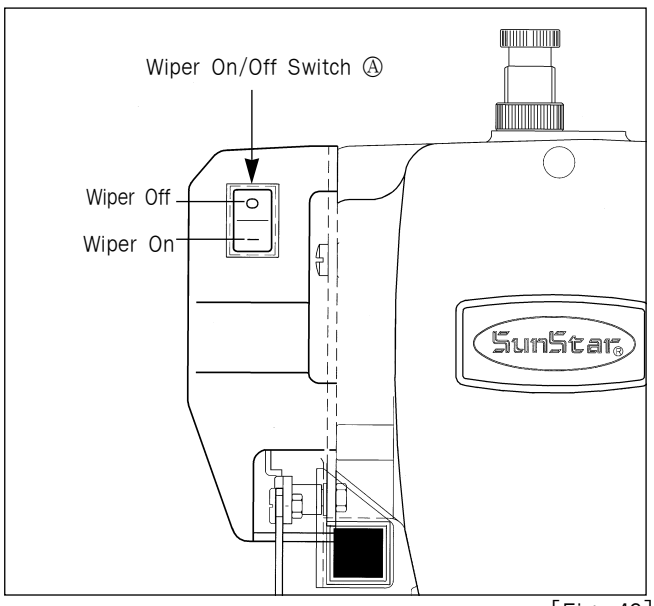
If the wiper is not placed in the right position, the wiper may collide with the presser foot or needle during the operation, and the wiper may not move properly.



[Fig. 41]

B. Wiper operating switch

If you want to use the wiper, press the wiper operating switch Ⓐ —, if you don't, presser the press the wiper operating switch Ⓐ O.



[Fig. 42]

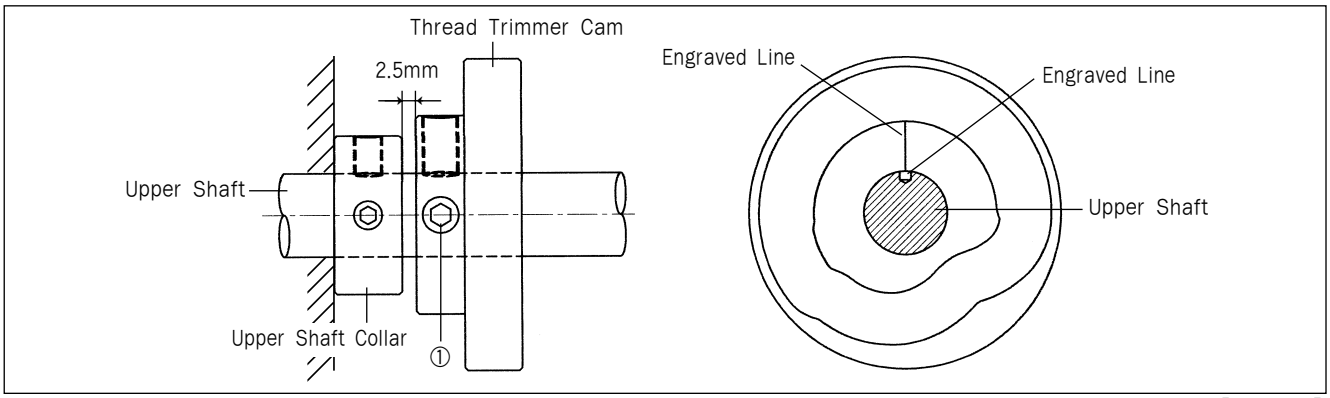
9) Adjusting the Trimming Parts

A. Setting the position of the trimming cam

Set the upper shaft collar and the trimming cam 2.5mm apart from each other and place the trimming cam where the trimming cam carving line accords with the upper shaft carving point. Then, tighten screw ①.

[Caution]

If the trimming cam is not placed in the right position, the trimming operation may not be made correctly in the machine may be struck.



[Fig. 43]

B. How to adjust the link stopper

ⓐ With the needle bar in its lowest position, check if there is enough space between the trimming cam roller and both ends of the trimming cam when the trimming drive link is pushed in the direction of the arrow (⇐) within the trimming cam moving part.

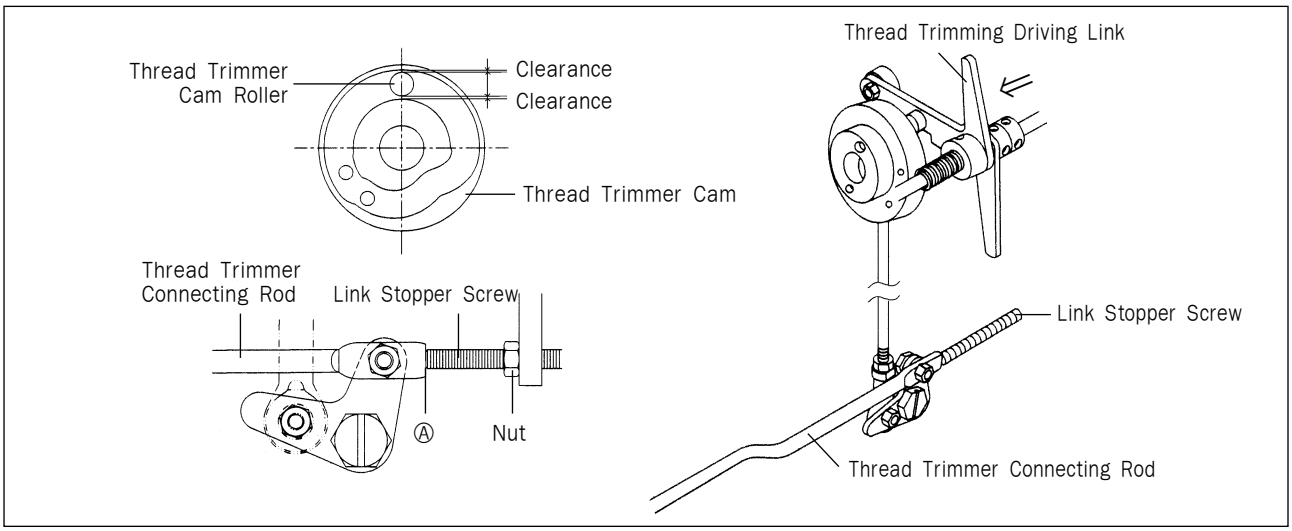
[Caution]

If there is not enough space between the trimming cam roller and both ends of the trimming cam, trimming may not be operated correctly or the machine may be struck when beginning to sew or trimming.

ⓑ Make the end of the link stopper screw touch part Ⓐ of the trimming link stick when the trimming cam roller is inserted into the trimming cam moving part. Then, tighten the nut.

[Caution]

If the position is not set appropriately, the return to the previous point after trimming may be delayed and the first stitch may not be tight enough.



[Fig. 44]

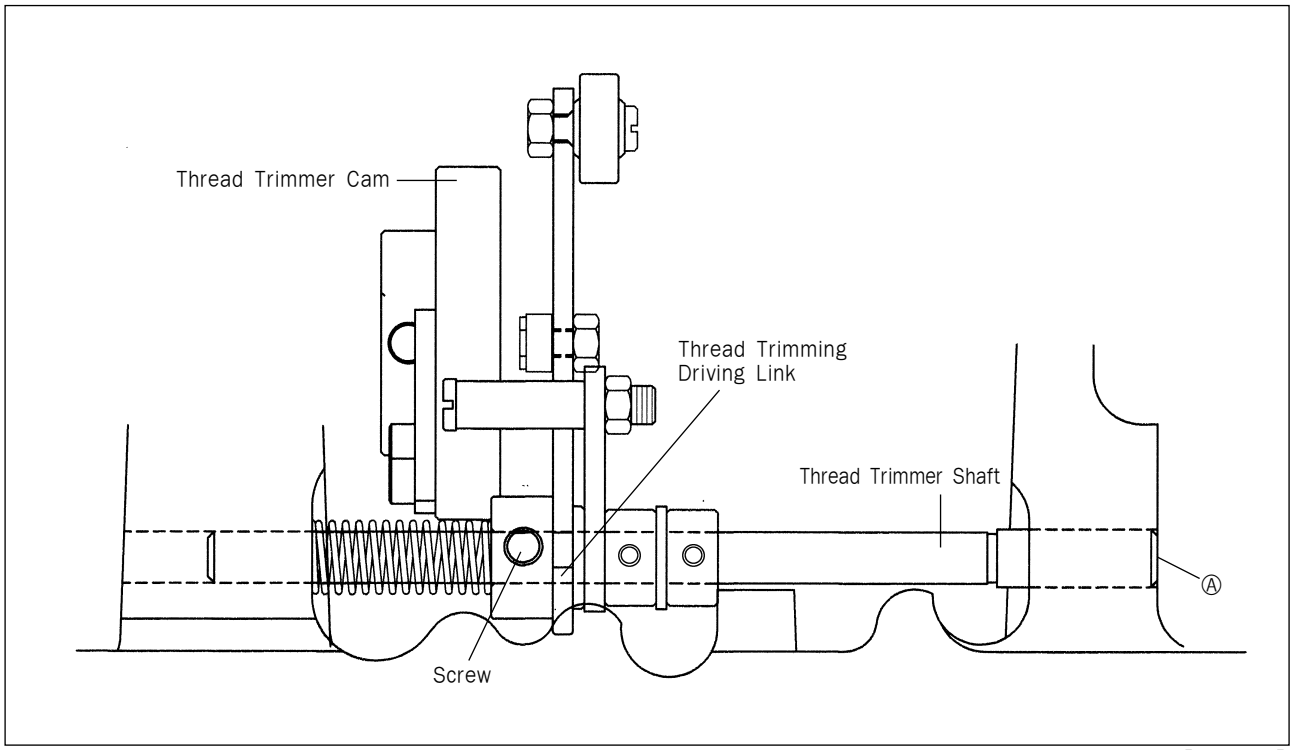
C. Setting the trimming shaft in place

ⓐ Unfasten the trimming drive link screw and the trimming shaft collar screw.

ⓑ Make the trimming shaft tip accord with part Ⓐ of the arm.

ⓒ Tighten the screws.

[Caution]
If the position is not adjusted appropriately, trimming may not be operated correctly or the machine may be struck.



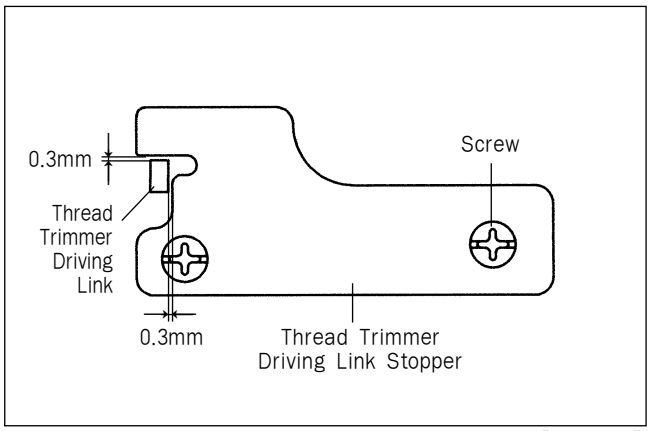
[Fig. 45]

D. Unfasten the link stopper in place

ⓐ Unfasten the trimming drive link stopper screw while trimming is not operated and have the trimming drive link and the trimming drive link stopper notch 0.3mm apart from each other.

ⓑ Tighten the screw.

[Caution]
If the link stopper is not set in the right position, trimming may not be operated correctly and the machine may be struck.



[Fig. 46]

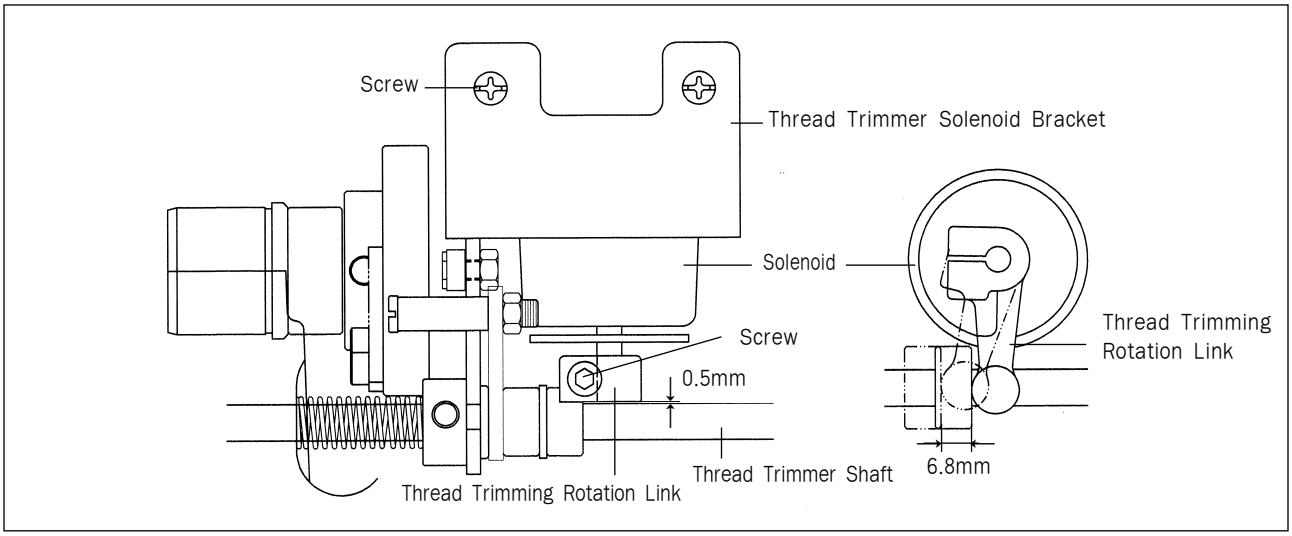
E. Setting the thread trimming solenoid in place

ⓐ After unfastening the thread trimming solenoid bracket screw, have the trimming shaft and the thread trimming solenoid rotary link 0.5mm apart from each other and tighten the screw back on.

ⓑ Unfasten the thread trimming solenoid rotary link screw and drive the thread trimming solenoid rotary link manually to move the trimming shaft collar 6.8mm in the direction of the arrow. Then, tighten the screw back on.

ⓒ Check if the trimming shaft collar returns to its place when the thread trimming solenoid rotary link returns.

[Caution]
If the position is not set right, the trimming return or the thread delay may be delayed to bring poor sewing quality.



[Fig. 47]

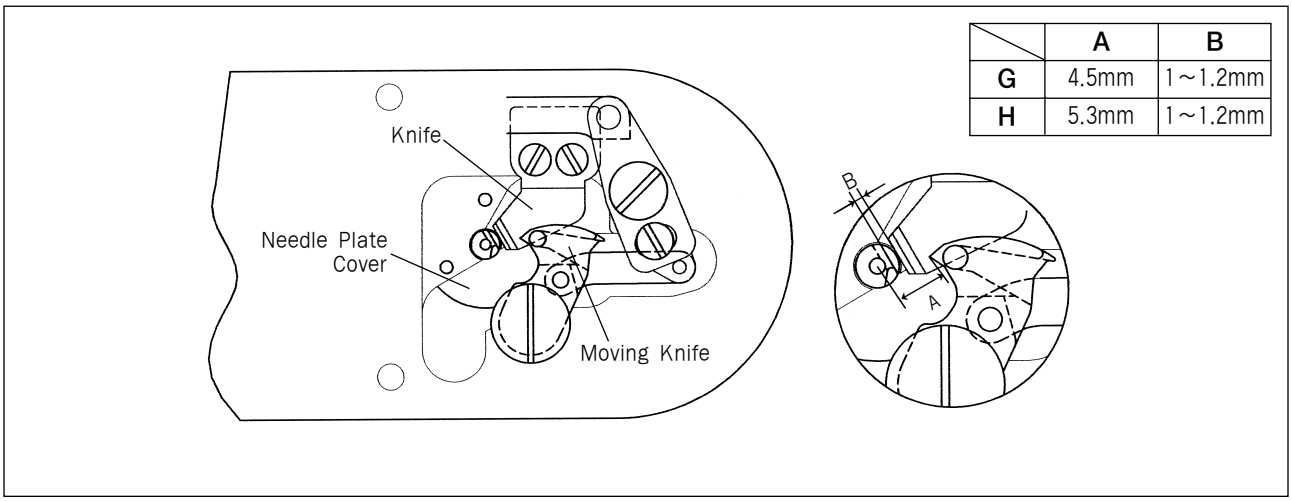
F. Adjusting the moving Knife and the fixed Knife

ⓐ When the needle bar stops at the upper position, use the trimming lever adjustment screw to adjust space A between the thread separation point of the moving knife and the needle plate hole as indicated in the table.

ⓑ Use the fixed knife screw to adjust space B between the fixed knife and the needle plate cover as indicated in the table.

ⓒ After the adjustment, check the position of the knife by manual trimming operation.

[Caution]
Trimming may not be operated or there may not be enough remaining knife if the knife is set inappropriately.



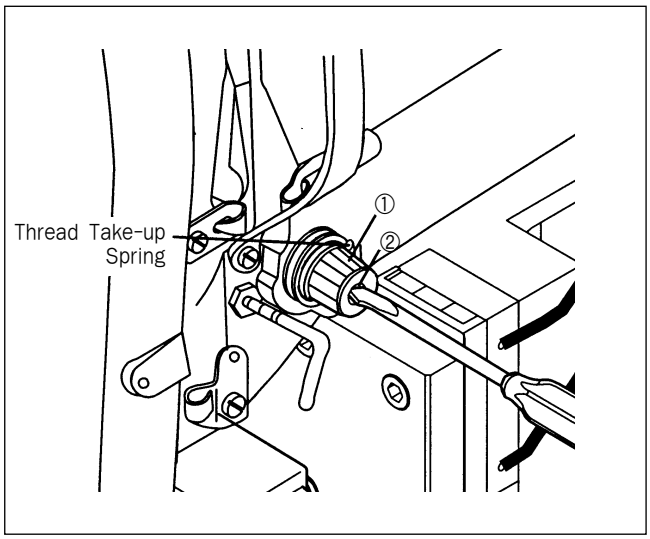
	A	B
G	4.5mm	1~1.2mm
H	5.3mm	1~1.2mm

[Fig. 48]

10) Adjusting the Main Thread Control Device

A. When the tension control nut ① of the thread control device is turned clockwise, the upper thread is tightened and becomes loose as the nut is turned counterclockwise. Adjust the tension according to the sewing conditions such as material, thread, number of stitches etc.

B. To tighten the take-up lever spring, use a driver to turn the groove ② on the edge facet of the thread tension control device shaft clockwise. And to make the spring lax, turn it counterclockwise.



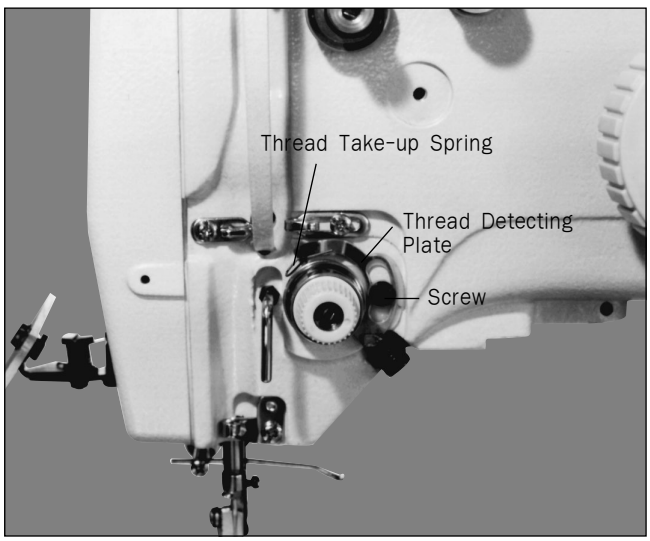
[Fig. 49]

11) Adjusting the Upper Thread Detecting Device

A. Unfasten the thread detecting plate screw with the thread off the take-up spring and make the take-up lever spring touch the detecting plate. Then, tighten the screw.

B. Be sure to adjust the detecting plate so the take-up lever spring and the detecting plate will connect with each other even when the take-up lever spring stroke changes.

[Caution]
Be careful not to touch with any other metals except take-up lever spring. If it does, detection may be failed.



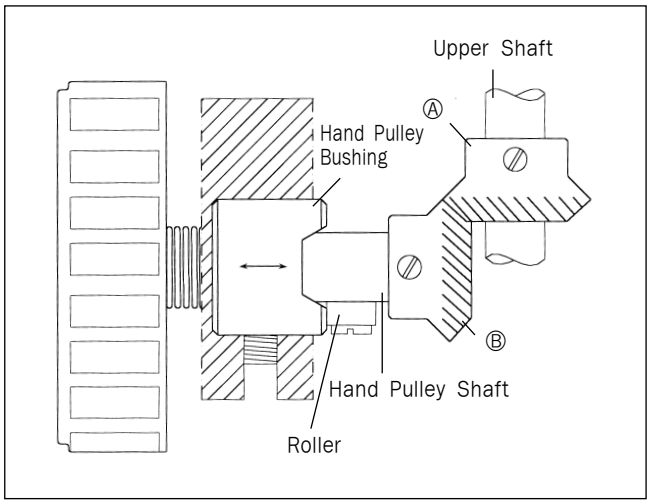
[Fig. 50]

12) Adjusting the Hand Pulley Device

A. Tighten the screw after putting the hand pulley gear Ⓑ and the hand pulley shaft tip in accord.

B. Adjust the variation of hand pulley gears Ⓐ and Ⓑ and tighten the screws.

C. Move the bushing in the direction of the arrow to reduce the backlash between gears Ⓐ and Ⓑ when the roller is on the end of the pulley bushing.

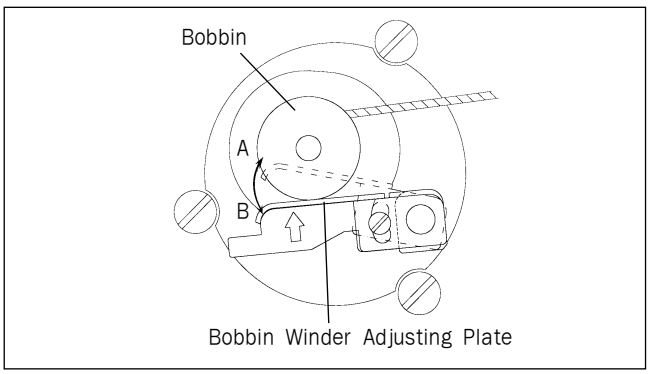


[Fig. 51]

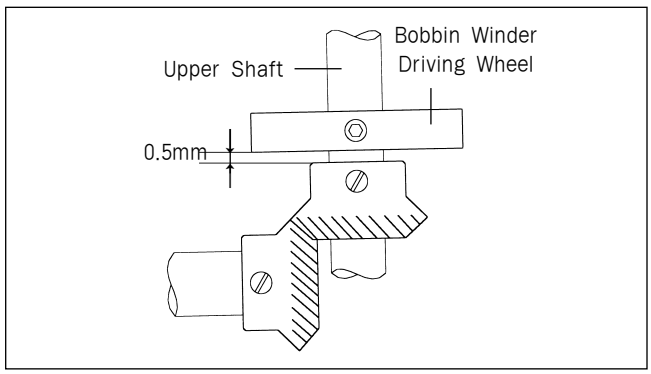
13) Adjusting the Winding Device

A. To adjust the winding capacity of the bobbin, use the beginning position of the winding control plate, and after unfastening the screw, turn the plate in direction A for large winding capacity and turn in direction B for small winding capacity.

B. Place the winding drive wheel 0.5mm away from the hand pulley gear and tighten the screw.



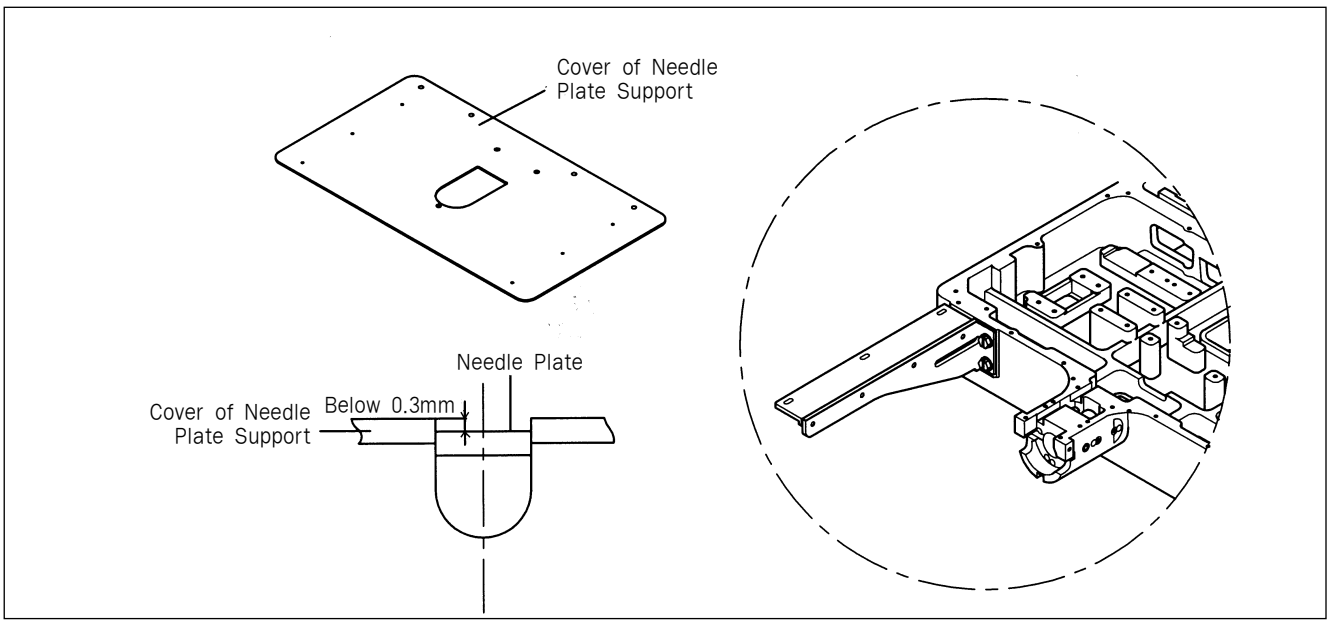
[Fig. 52]



[Fig. 53]

14) Adjusting the Height to Needle Plate Support Cover

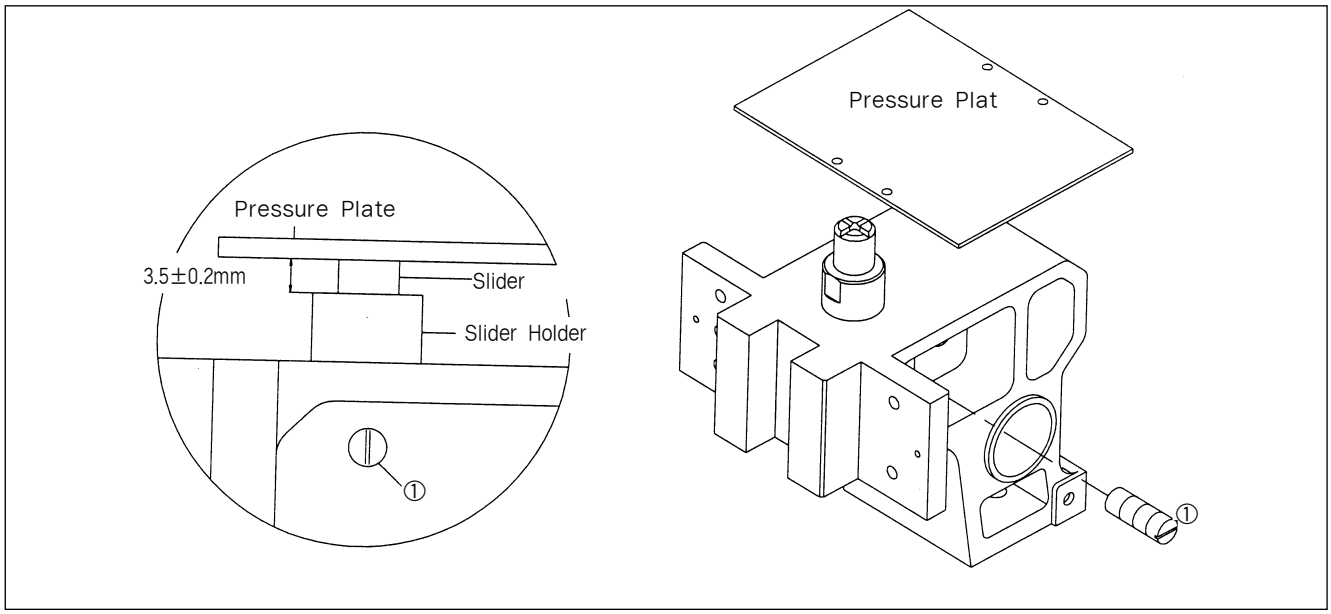
Loose the cover bracket fastening screw ① of needle plate support and the cover bracket A fastening screw ② of needle plate support, then fix the distance to be 0.3mm between the needle plate and cover of needle plate support.



[Fig. 54]

15) Adjusting the Height of Slider

Loosen the fixing screw ① of slide holder and adjust the gap of slider holder to be 0.3±0.2mm by turning the slider holder with a spanner.

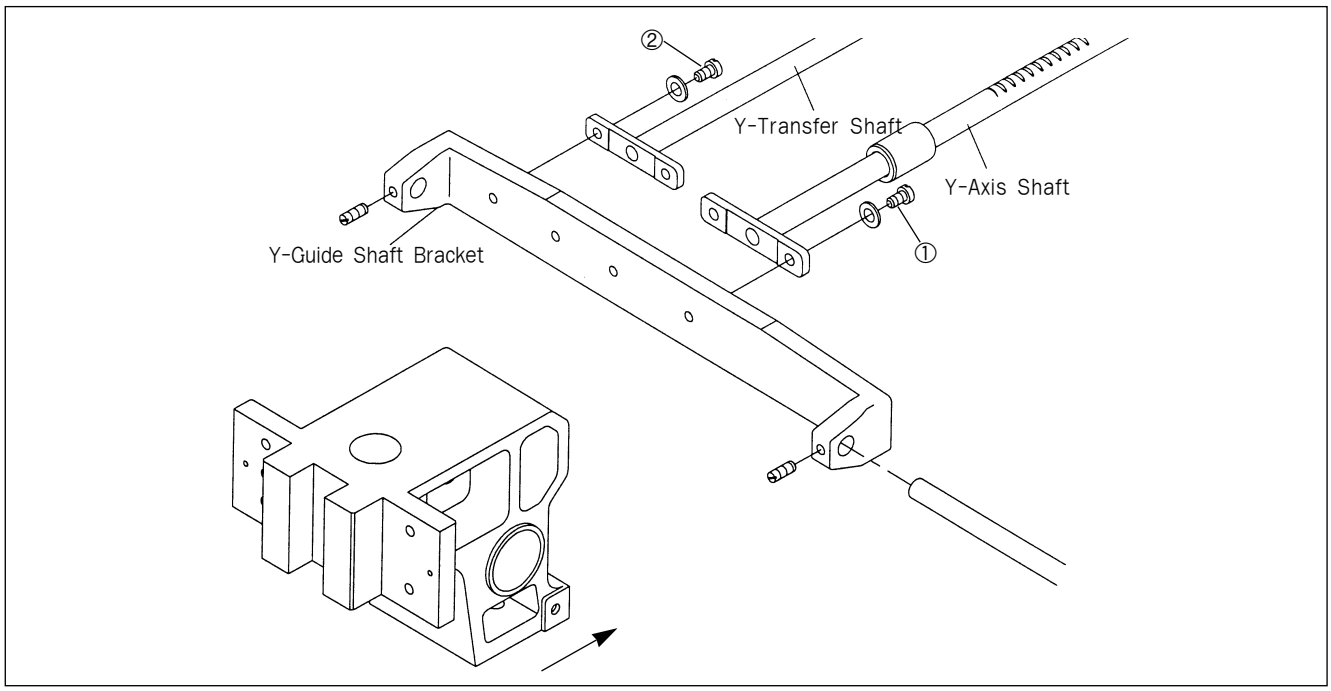


[Fig. 55]

16) Adjusting the X-Guide Bracket

Incline the guide bracket to the direction of " → " to the maximum manually. Loosen the fixing screws for Y-transfer shaft ① and adhere the side of y-transfer shaft and the side of X-guide shaft bracket closely, then fix the Y-transfer shaft ①.

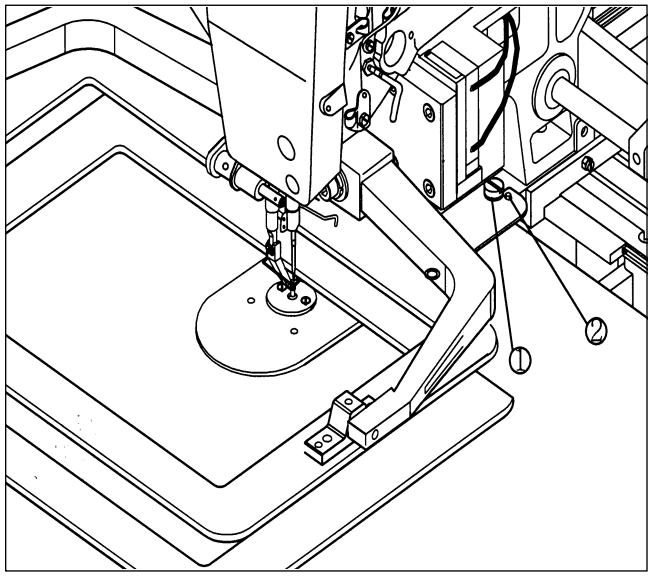
[Caution]
After fixing the Y-transfer shaft screws ①, the X-guide shaft bracket should not move at all by load even though when you move manually the feed bracket to the right and left.



[Fig. 56]

17) Adjusting the Under Feed Plate

When the fixing screws ① and pin ② are fixed, location of under plate is settled. If you want to change the position of under plate, you can take off the pin ②.

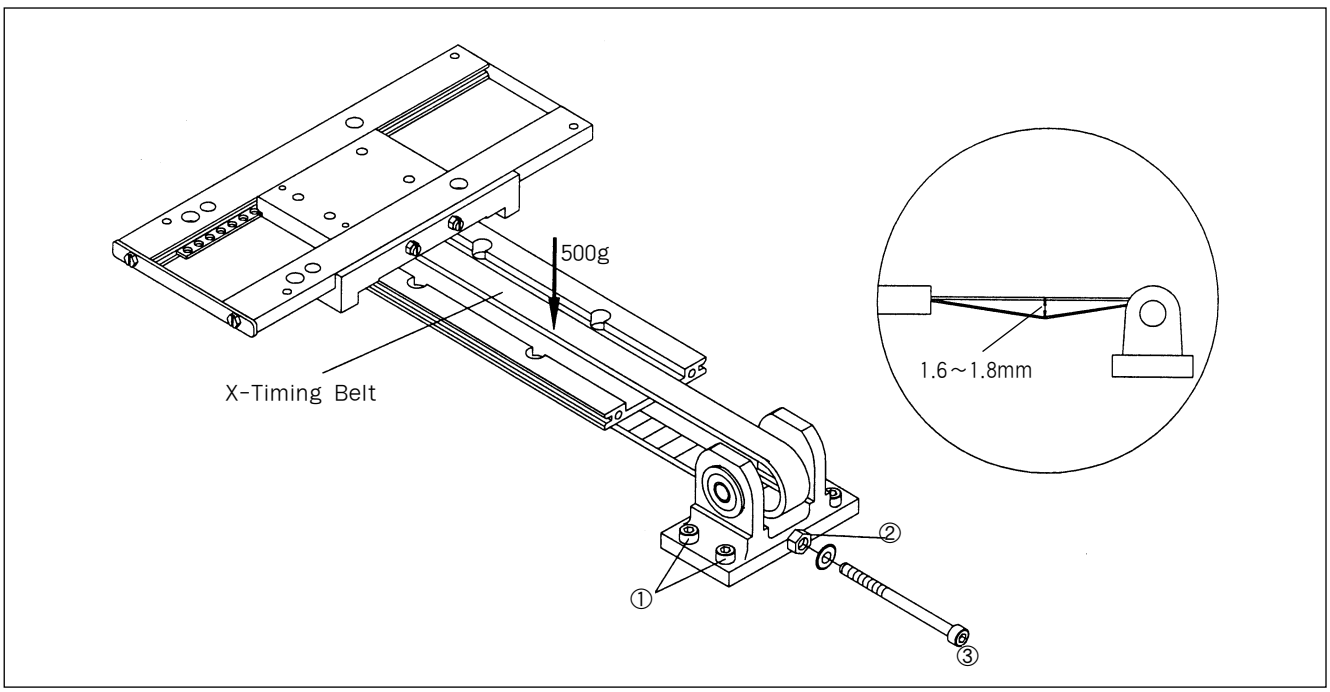


[Fig. 57]

18) Adjusting the Tension of X-Timing Belt

When you make X-Y rail move to the left limit and hang 500g load on the center in the right side of X-timing belt, the X-timing belt will be drooping about 1.6~1.8mm. At this time, for the fine adjustment of tension, loosen the fixing screw ① and nut ② to use the adjusting bolt ③ for timing belt tension.

[Caution]
After adjusting the tension with the adjusting bolt ③ for timing belt tension, if you fasten the fixing screw ① and nut ②, the tension can be changed, so that you should confirm the bending capacity.



[Fig. 58]

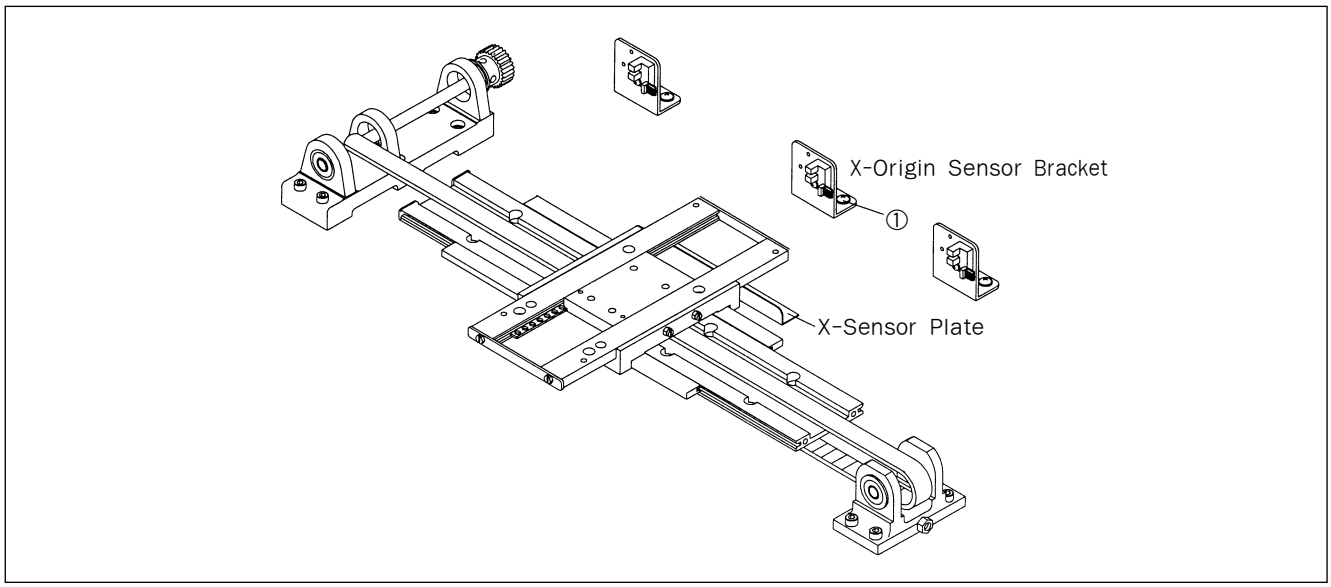
19) Setting the X-Y Origin

A. How to set the X-shaft origin

ⓐ Separate the under feed plate from X-fixing cover and transfer cover.

ⓑ Move the center of upper feed plate to be located the center in the direction of X shaft.

ⓒ As seen in the below figure, release the 2 fastening screws ① of X shaft origin sensor bracket and make the X-sensor plate that is adhered to X-Y transfer devices locate the center of sensor, then fasten the screws with (+) driver.



[Fig. 59]

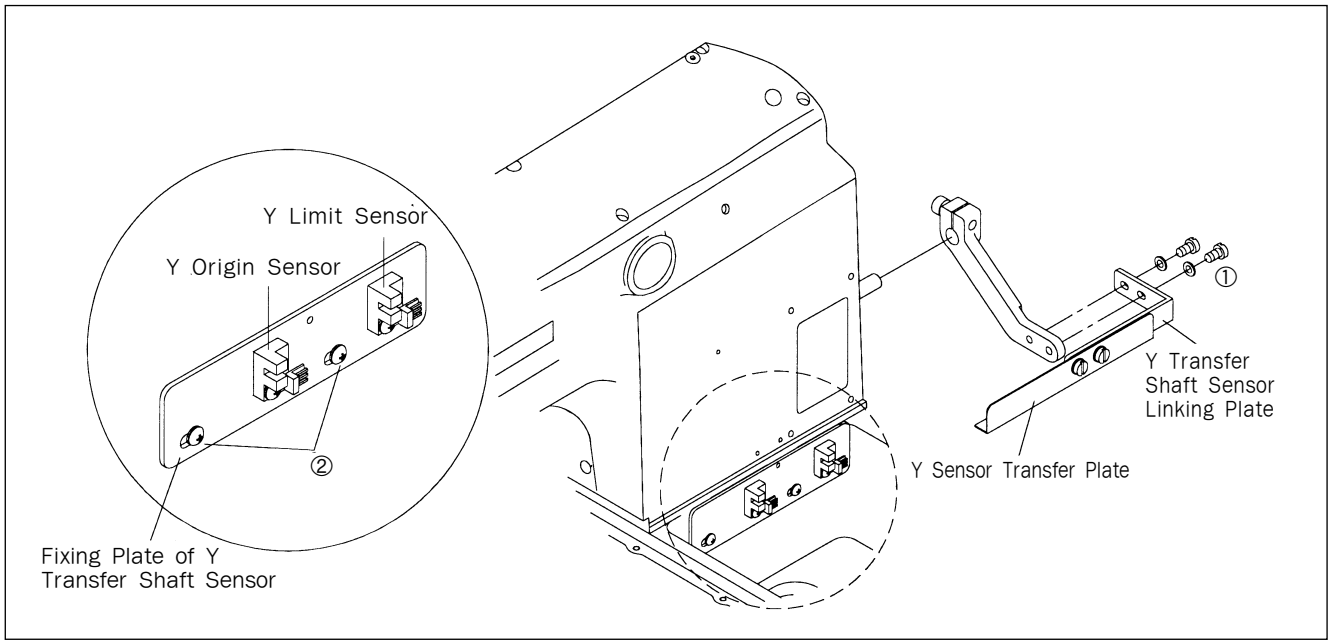
B. How to set the Y-shaft origin

ⓐ Separate the set the Y-shaft origin.

ⓑ Move the center of upper feed plate to be located the center in the direction of Y shaft.

ⓒ As seen in the below figure, release the 2 fastening screws ① of Y transfer shaft sensor linking plate and confirm if the Y-sensor transfer plate and sensor works independently, then the fixing screws ①.

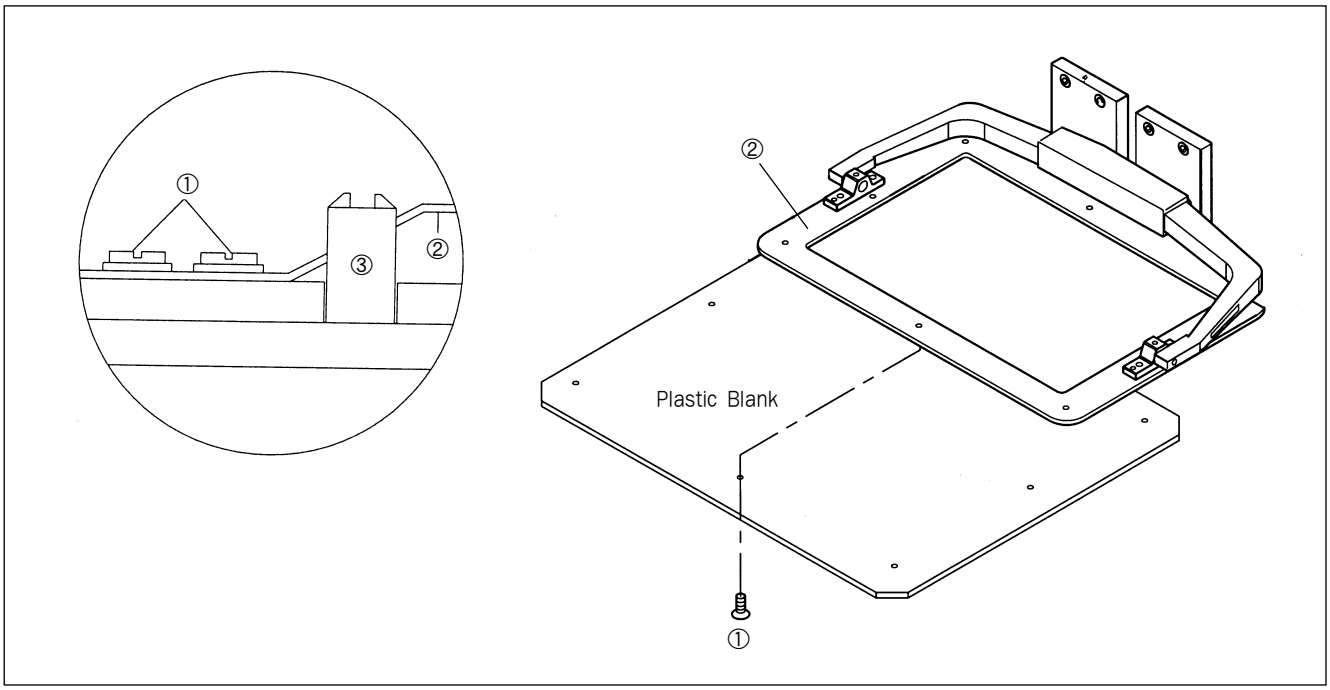
ⓓ Adjust the Y direction origin with the fixing screws ② of Y-transfer shaft sensor fixing plate.



[Fig. 60]

20) Adjusting the position of plastic blank

After unfastening the fixing screws ① and pressing down the plastic blank handle ② to the A direction, adjust the position of plastic blank to be adhered to a hinge pin ③, then fasten again the fixing screw ①.



[Fig. 61]

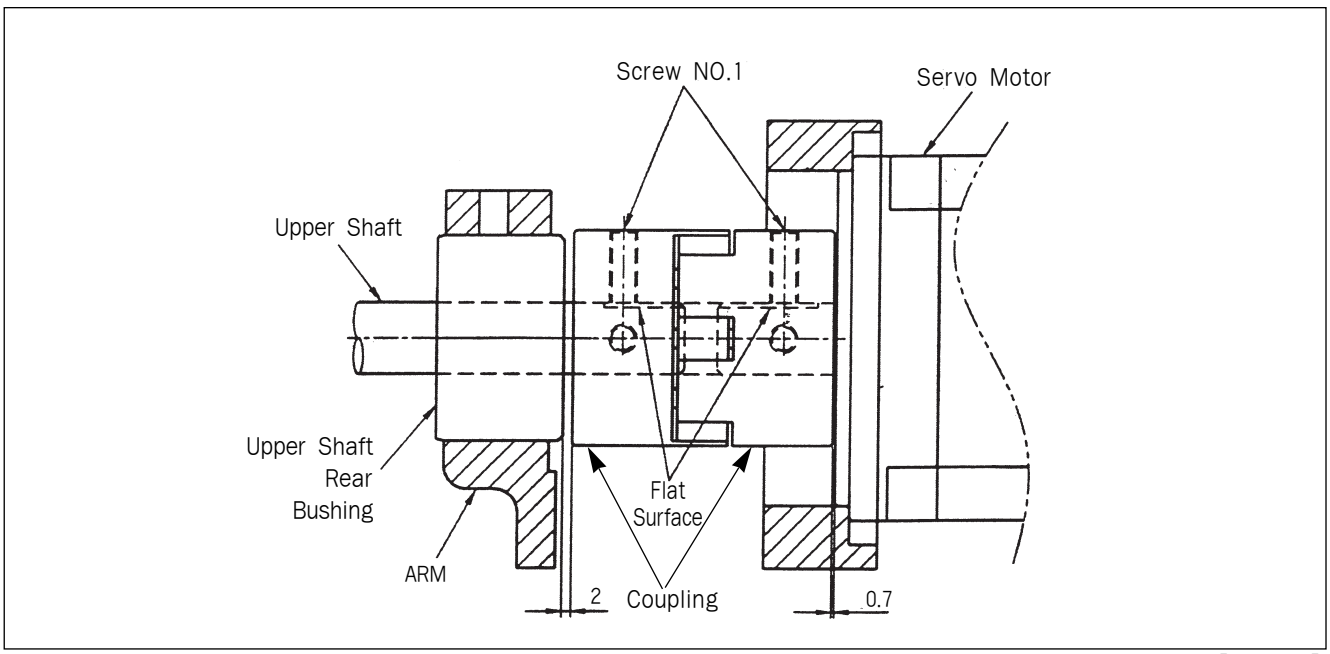
21) Mounting the Direct Motor and Adjusting Method (B Series)

A. When you mount the coupling on the servo-motor, fit the screw No.1 of coupling to the flat surface of the servo motor shaft and make the clearance between the coupling and servo motor 0.7mm.

B. When you mount the coupling on the upper shaft, fit the screw No.1 of coupling to the flat surface of the upper shaft and make the clearance between the coupling and upper shaft bushing(R) 2mm.

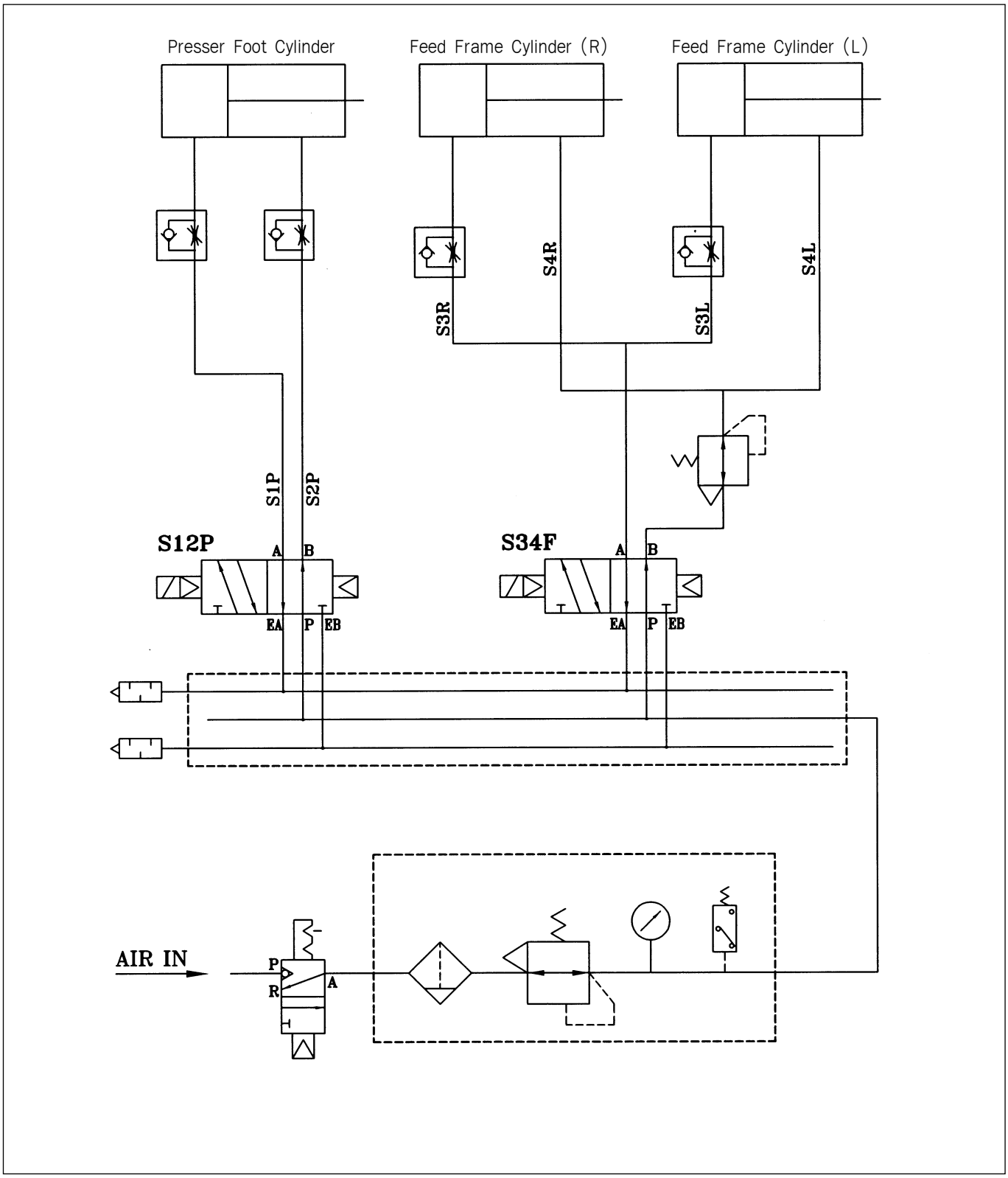
C. After mounting both coupling, check the positions of each screws to the aligned.

※ If the positions of each screws are not aligned, the needle does not stop normal position.



[Fig. 62]

22) Air System Circuit Diagram



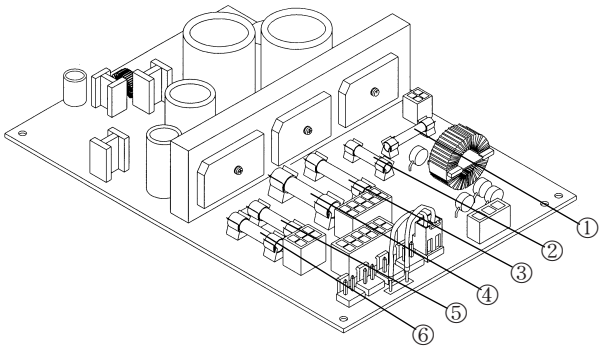
23) Exchanging the Fuse

Caution

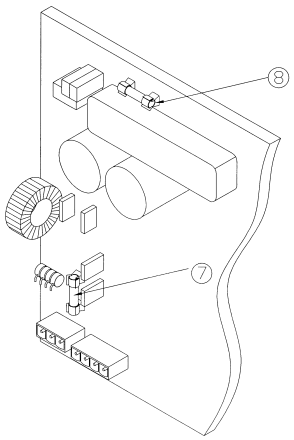
- To prevent from electric shock, turn off the power and wait 5 minutes, then open the cover.
- Be sure to turn off the power and exchange into the fuse of the designated quantity after opening the cover of control box.

No	Quantity		Use
①	0.5A		For the Protection of thread sensor
②	3A		For the Protection of control power
③	7A		For the Protection of actuator
④	8A		For the Protection of step driver
⑤	0.5A		For the Protection of step-aux
⑥	INPUT 110V	7A	For the Protection of main power
	INPUT 220V	5A	
⑦	6.3A		For the Protection of servo motor
⑧	0.5A		For the Protection of servo motor drive

〈 Power Board 〉



〈 Main shaft Motor drive Board 〉



7

CAUSES OF BREAK-DOWN AND TROUBLESHOOTING

No.	Typed of Break-down	Cause	Troubleshooting
1	Error on operation or drive of machine	Loosing of belt tension and damage on belt	Adjust the belt tension or exchange it
		Fuse shortage for main power or circuit	Check the fuse shortage of main shaft drive motor in a controller box or exchange it
		Deviation from Y and Y limit of feed bracket	Move the feed bracket to normal place (inside limit switch)
2	Bad position of stopping position	Slackness of main drive belt	Adjust the belt tension
		Wrong position of upper shaft sensor plate or photo sensor	Adjust the position of upper shaft sensor plate or exchange the photo sensor
3	Needle bent	Damage on needle(Bending of needle, cracks on needle hole or groove, and abrasion or transformation of needle tip)	Exchange the needle
		Wrong installation of needle	Install the needle properly
		Contact of needle with shuttle	Adjust the distance properly between a needle and shuttle
4	Thread is cut	Wrong insertion of thread	Insert the thread properly
		Wrong installation of needle (Height of needle or direction of needle)	Reinstall the needle
		Damage on needle(Bending of needle, cracks on needle hole or groove, and abrasion or transformation of needle tip)	Exchange the needle
		Excessive tension of upper thread and under thread	Adjust the tension
		Excessive tension and stroke of take-up lever spring	Adjust the tension and stroke of take-up lever spring
		Crack on the controlling hole of shuttle surface spring	Exchange the shuttle surface spring
5	Stitch skipping	Use of bending needle	Exchange the needle
		Use of improper sized needle compared with using thread	Exchange the needle
		Wrong installing of needle	Reinstall of needle
		Improper timing for a needle and shuttle	Reinstall the timing for a needle and shuttle
		Large interval between a needle groove and shuttle point	Reinstall the timing for a needle and shuttle
		Excessive tension of take-up lever spring and stroke	Reinstall the timing for a needle and shuttle

No.	Type of Break-down	Cause	Troubleshooting
6	Ineffective sense of upper thread	Bad connection between take-up lever spring and detecting plate	Clean up the take-up lever spring and detecting plate. Adjust the tension of take-up lever spring and connecting condition of detecting plate
		Bad connection of wire with thread sensor plate	Reconnect the wire with thread sensor plate
7	Poor quality of thread tightening	Weak tension of upper thread	Adjust the tension of upper sensor
		Weak tension of under thread	Adjust the tension of upper sensor
		Improper timing of needle and shuttle	Readjust the timing of needle and shuttle
8	Mistakes of trimming	Slackness of exchange tension between moving mes and fixed mes	Adjust the tension of fixed mes
		Groove abrasion on blade of moving mes and fixed mes	Exchange the moving and fixed mes
		Wrong position of trimming cam	Readjust the position of trimming cam

8

SPS/B(A)-2516-HS-22

1) Specification

It is the same as the specification of SPS/B(A)-2516-HS-20.

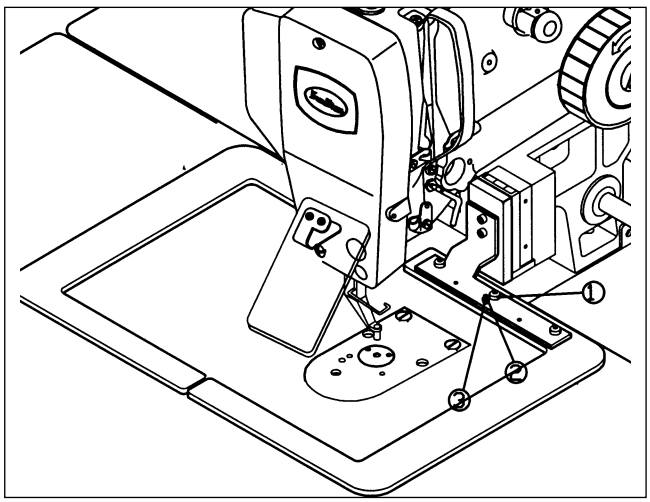
2) Adjusting the angle of upper feed plate (both right and left)

When the upper feed plate (both right and left) is parallel with a needle plate, pressure to press down the sewing materials of the front side of upper feed plate is insufficient. In that case, keep the upper feed plate (both right and left) 3mm above surface of the needle plate.

▶ How to adjust

ⓐ After loosen a cramp fixing screw ① of feed plate and linking nut ③, turn the linking screw ② clockwise, the front side of upper feed plate comes to descend.

ⓑ After adjusting angle, fasten the cramp fixing screw ① of feed plate and linking nut ③.

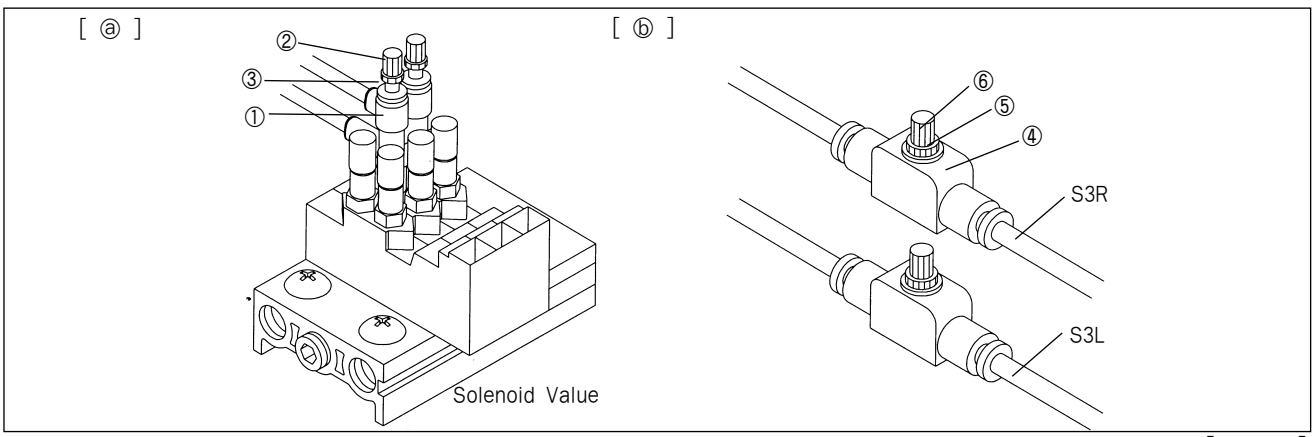


[Fig. 63]

3) How to adjust the ascending and descending velocity of upper feed plate

A. As shown in Figure63ⓐ, clockwise turn the holder② of pressure-reducing valve① including the solenoid attached to the bottom of table, then the ascending speed and supporting pressure upon ascending get increased. Counter clockwise turn it, they get down. Adjust the proper speed and pressure, and fix it with a fixing nut③ (Initial Pressure Upon Delivery : 2.0~2.5kgf/㎠)

B. As shown in Figure63ⓑ, clockwise turn the holder⑤ of speed controller④, the its descending speed gets reduced. If counter turn it, the ascending speed gets increased. Then adjust the proper speed to fix with a fix nut⑥.



[Fig. 64]

4) How to use the pedal switch

A. Check the parameter, related to general sewing(function no.60), is set to "2". If not, please set the parameter to "2".(Refer to 7.29) Change of parameter related to general sewing).

B. The pedal switch has three pedals, the right one ① moves the right upper feed plate, the intermediate one ② moves the left upper feed plate and the left one ③ makes the sewing machine start.

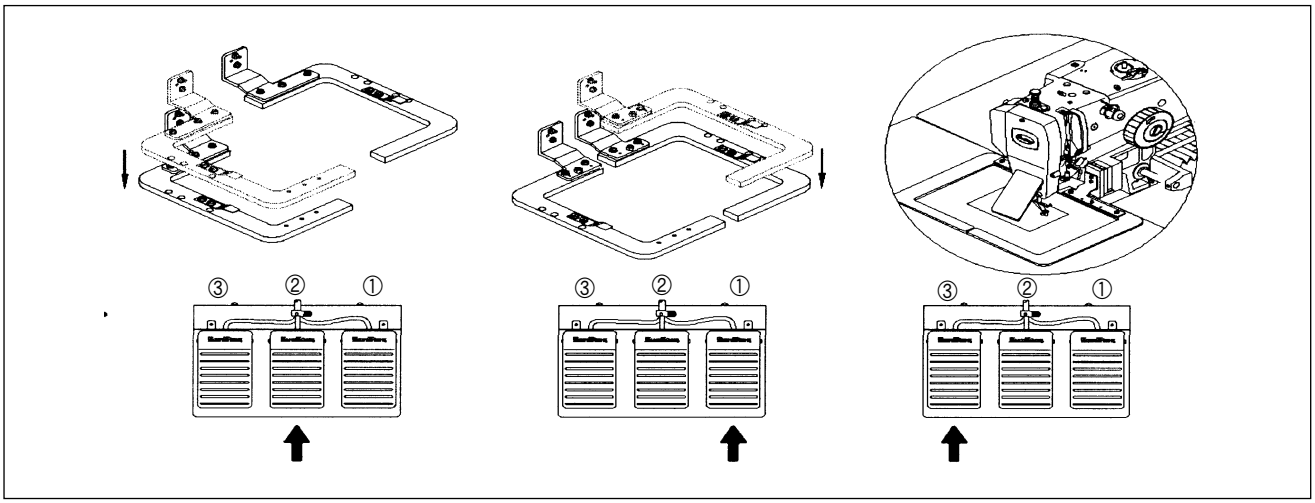
C. Application (Basic)

ⓐ If you step on the intermediate pedal ②, the left upper feed plate descends to hold the sewing material.

ⓑ When you step on the right pedal ①, the right upper feed plate descends to hold the sewing material. (When you step on the pedal ① again, the right upper feed plate ascends to the initial position)

ⓒ When both of the upper feed plates are descended, if you step on the left pedal ③, the machine starts.

※ This model does not have 2-step stroke option.



[Fig. 65]

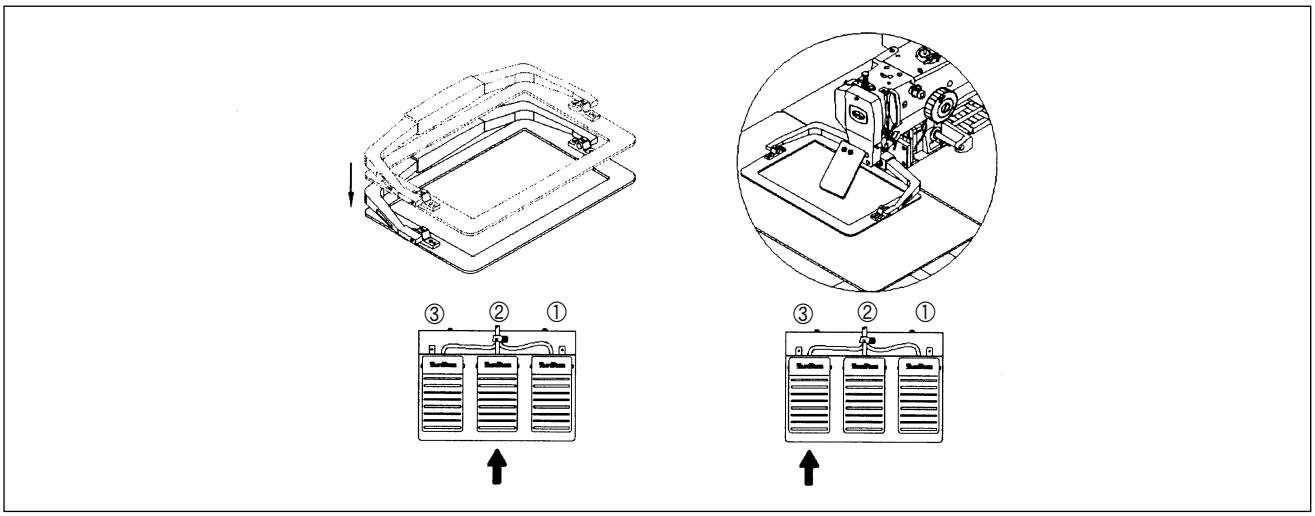
D. In case of using monolithic feed frame.

ⓐ Set the parameter, related to general sewing(function no. 60), to "0".

ⓑ If you step on the intermediate pedal ②, the upper feed plate descends to hold the sewing material.

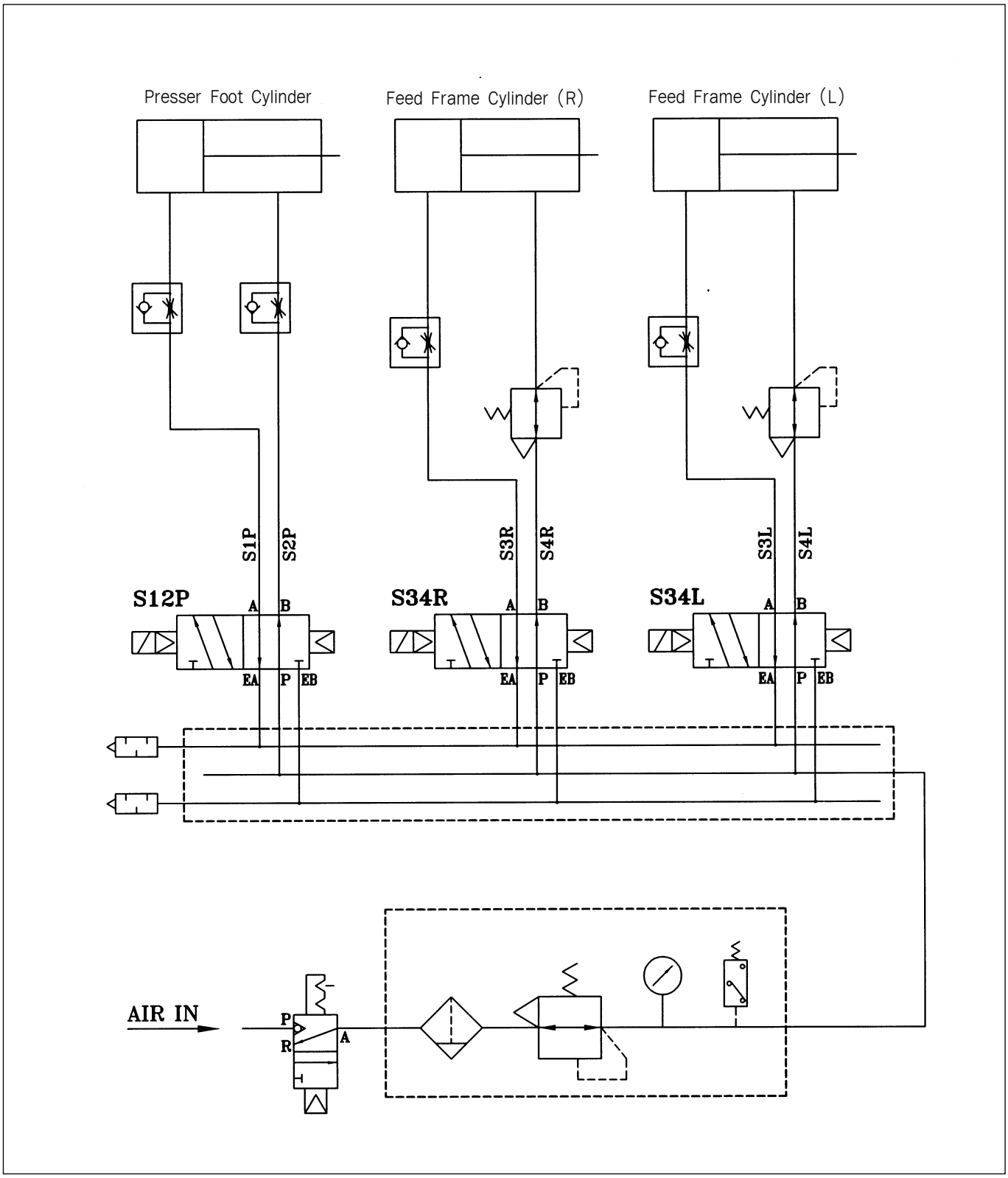
ⓒ After the upper feed plate descends, if you step on the left pedal ③, the machine starts sewing.

※ This model does not have 2-step stroke option.



[Fig. 66]

5) Air System Circuit Diagram



9

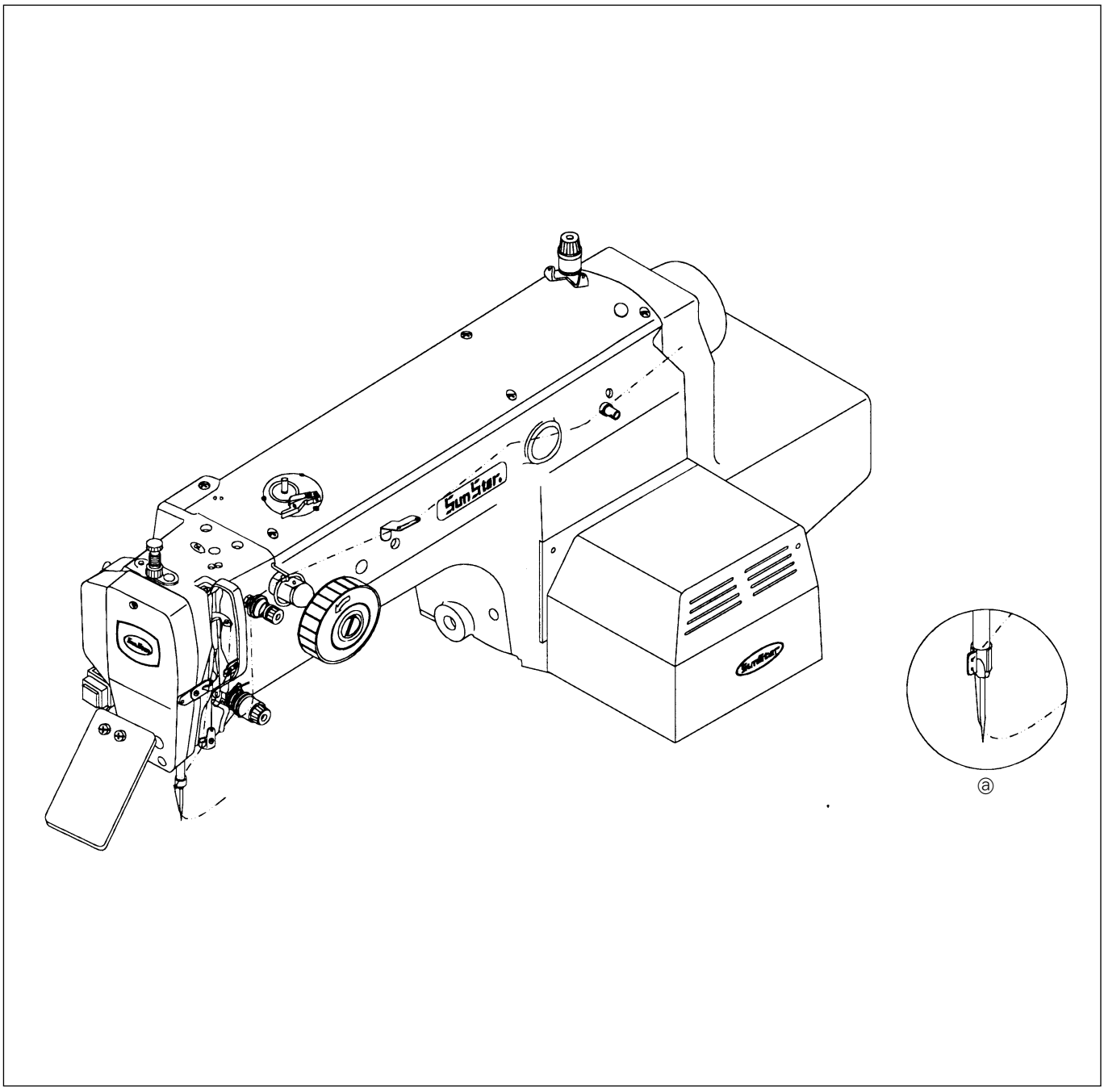
SPS/B(A)-2516-GS-20 (22)

1) Specification

The same as SPS/B(A)-2516.

2) How to thread the upper thread

After placing the thread take-up at the highest position hook the thread as indicated in the picture below. Hook the thread as shown in picture ⓐ for the needle bar thread guide.



10

SPS/B(A)-2516-HP(GP)-20(22)

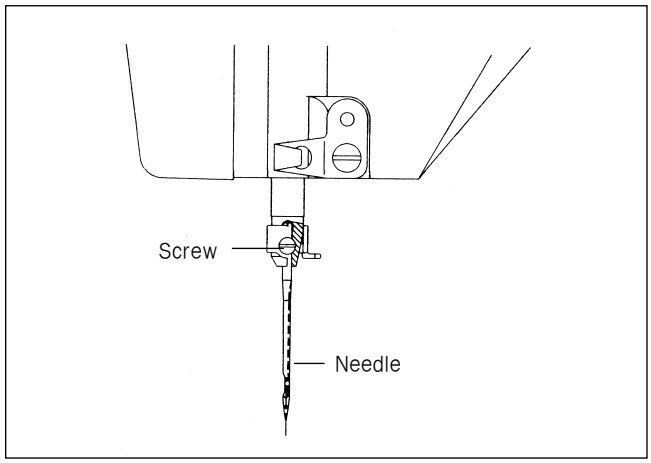
1) Specification

Series type	SPS/B-2516(Motor direct drive-type)	SPS/A-2516(Belt drive-type)
Sewing Area	X: 250mm × Y: 160mm	
Sewing speed	Max. 2,000spm (Stitch Length : 3mm or less)	
Stitch Length	0.1～12.7mm	
Needle	DP×17, DP×5	
Needle Bar Stroke	41.2mm	
Hook	Semi-rotary large hook (for perfect stitch)	
Bobbin Case	Bobbin case for semi-rotary large hook (for perfect stitch)	
Bobbin	Bobbin for large hook	
Presser Foot Stroke	Standard 4mm [0.5～10mm]	
Lifting Amount of Presser Foot	Max. 20mm	
Lifting Amount of Feed Frame	Max. 30mm	
Feeding System	Feeding by pulse motor	
Emergency Stop Function	Available during sewing	
Pattern Select Function	Pattern No. can be selected from no.1 to no.999	
Memory	3.5″ Floppy Diskette (2HD)	
Memory Backup	The working point is stored in the memory when the machine stops abnormally	
2nd Origin Function	Another origin point can be set by using jog key	
maximum Speed Limit	The maximum speed can be limited from 200 to 2,000spm	
Number of Patterns	Max. 691Patterns/Disk	
Safety Device	Emergency stop function, maximum speed limit function.	
Main Motor	Direct Drive AC Servo Motor	550W Servo Motor
Power Consumption	600VA	
Recommended Temperature	5℃～40℃ (41℉～104℉)	
Recommended Humidity	20%～80%	
Power	1φ : 100～280V, 3φ : 200～400V, 50/60Hz	
Pneumatic Pressure	5～5.5kgf/㎠ (0.49～0.54㎫)	

2) How to attach the needle

After unfastening the needle fixing screw on the needle bar, have the long groove of the needle face the back and push the needle till it touches the needle insertion hole and then tighten the needle fixing screw.

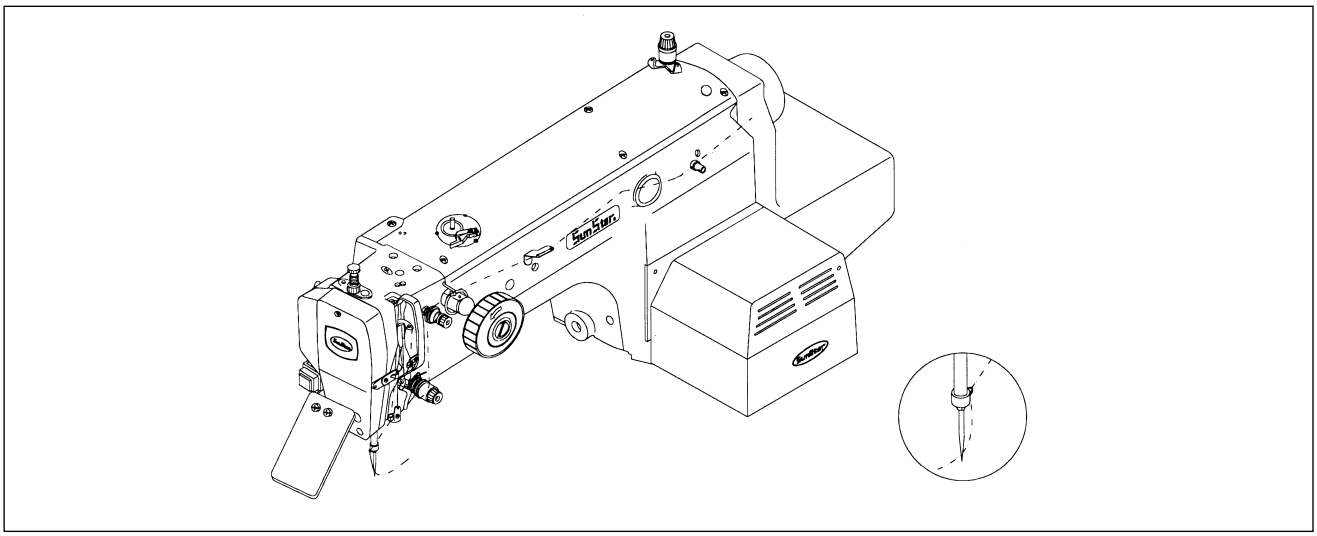
[Caution]
For type SPS/B(A)-2516-HP(GP)-20(22) the needle is inserted in the opposite directions of SPS/B-2516-HS(GS)-20(22) machine.



[Fig. 67]

3) How to thread the upper thread

After placing the thread take-up at the highest position, hook the thread as shown in the picture below.



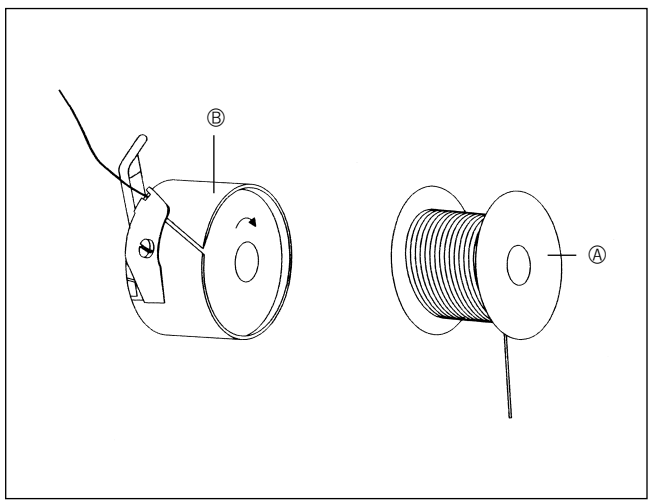
[Fig. 68]

4) How to thread the lower thread

A. Insert bobbin Ⓐ into bobbin case Ⓑ as shown in the picture.

[Caution]
The bobbin must turn clockwise when seen from the back of the bobbin case.

B. Place the lower thread through the crack in the bobbin case.

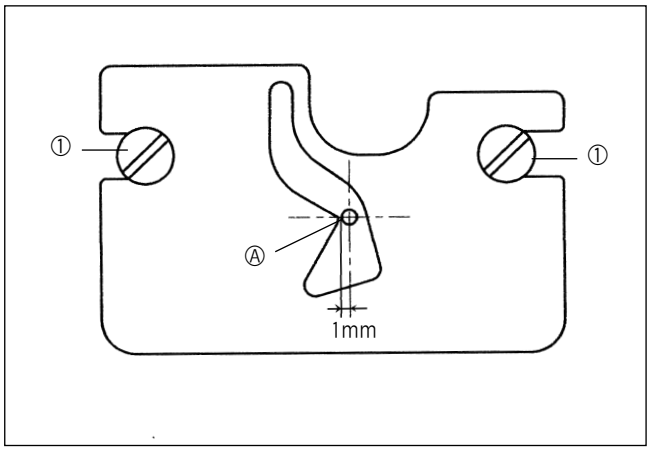


[Fig. 69]

5) Adjusting the spring on the upper side of the shuttle

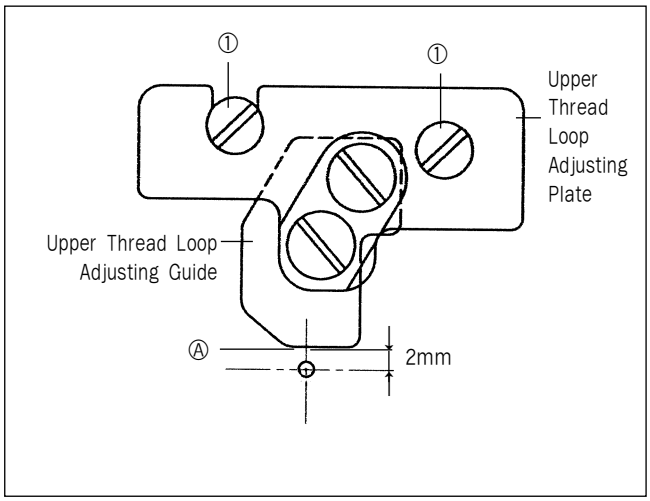
A. Adjusting the spring on the upper side of the shuttle.
After removing the lower feed plate and the needle plate from the machine, unfasten the upper side spring screw. Place the spring on the upper side of the shuttle so that the center of the needle meets point Ⓐ vertically, and is 1mm apart from point Ⓐ horizontally. Then tighten the screw.

[Caution]
If the surface around the spring is rough or scratched, the thread may be disconnected or the thread strand may be unfastened. Always check the surface before operating the machine.



[Fig. 70]

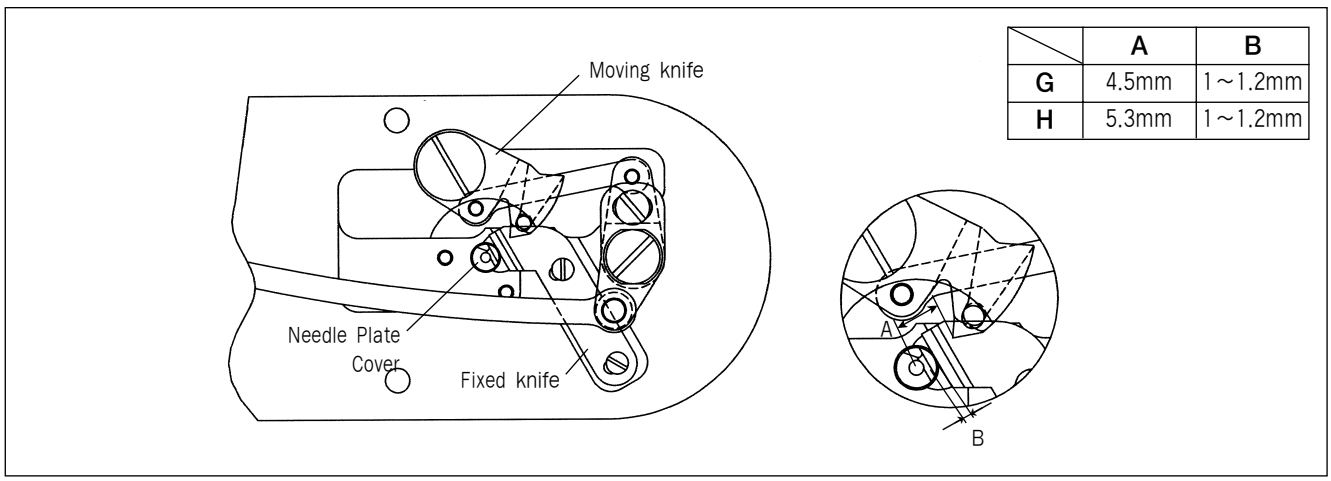
B. How to set the upper thread loop control plate in place
Unfasten the upper thread loop control plate screw ①, then place the upper thread loop control plate so that the end of the upper thread loop control guide Ⓐ is 2mm apart from the center of the needle. Then, tighten the upper thread loop control plate screw.



[Fig. 71]

6) Adjusting the moving knife and the fixed knife

A. Use the trimming lever control screw to adjust the space between the thread removing point of the moving knife and the needle plate hole as indicated in the table with the needle bar stopped at the upper position.
B. Use the fixed knife screw to adjust space B between the fixed knife and the needle plate cover as indicated in the table.
C. Check the position of the mes by trimming manually after the adjustment.



	A	B
G	4.5mm	1~1.2mm
H	5.3mm	1~1.2mm

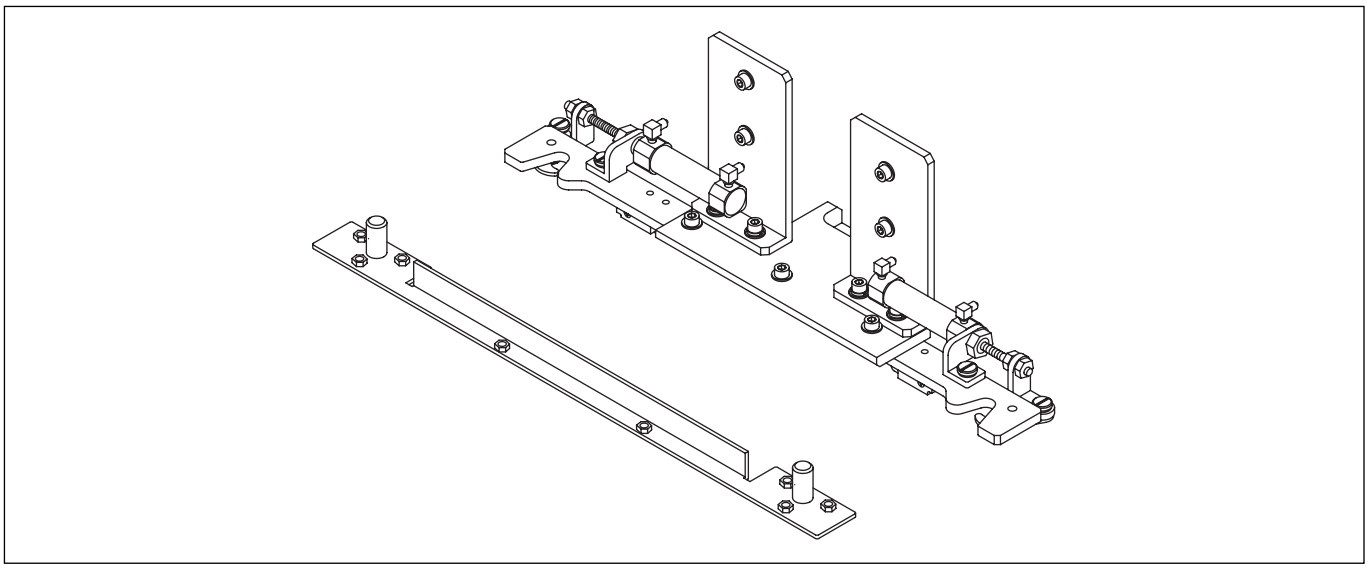
[Fig. 72]

11

PNEUMATIC HOOK-TYPE CLOTH FEED

1) Mechanical specifications

As in the figure, the cloth feed area is different from the regular type.



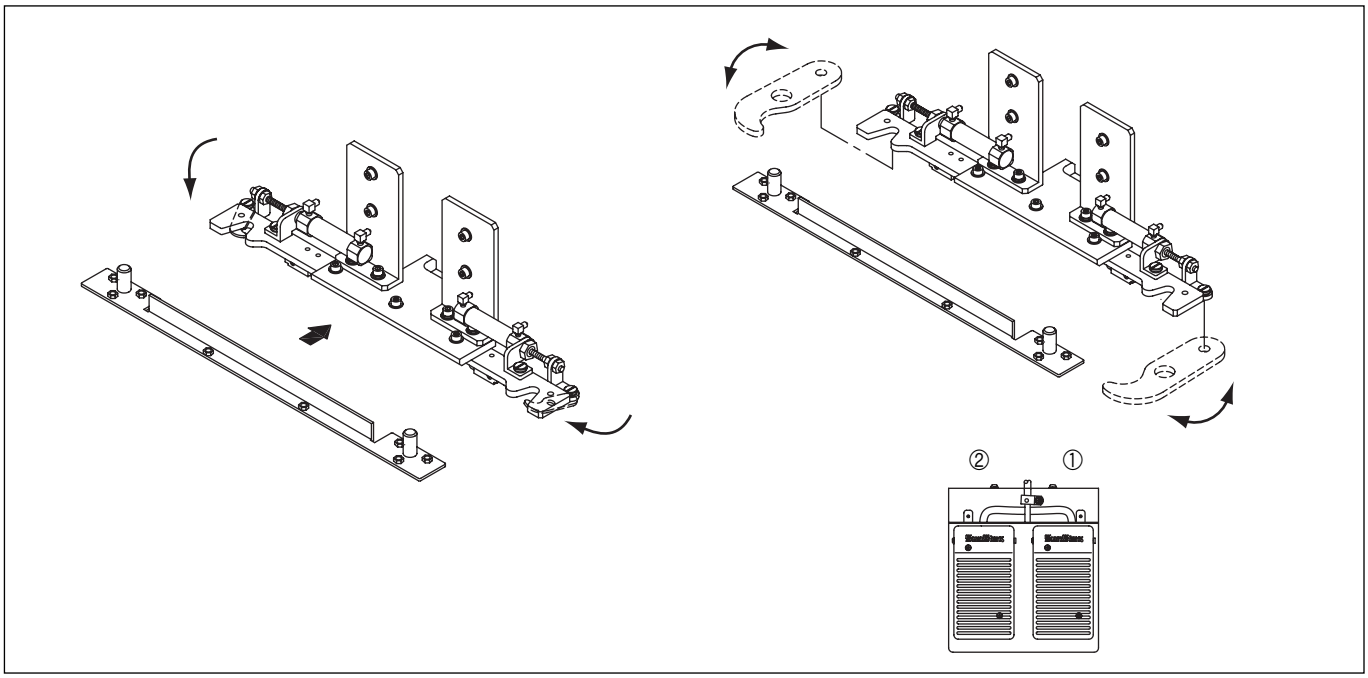
[Fig. 73]

2) How to operate

A. When the pallet is inserted into the coupling, the sensor detects the pallet, and the presser foot automatically descends to fix it.

B. When the left foot pedal② is pressed, sewing begins. In order to separate the pallet from the fixing device, press the right foot pedal①.

C. When sewing is complete, the pallet is automatically separated from the fixing device.



[Fig. 74]