

User's Manual

GARUDAN[®]

GPS-0402/D series



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1

Safety rules for machine




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.

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

<p>1-1) Machine Transportation</p> 	<p>Only trained and experienced people should treat the machine who are fully understand the safety rules. For conveyance, follow the below directions.</p> <ul style="list-style-type: none"> Ⓐ More than two people to a minimum should convey the machine. Ⓑ For a protection of safety accident, wipe away the oil stained on machine.
<p>1-2) Machine Installation</p> 	<p>Owing to the improper environment for machine installation, physical damages on the human body and machine can be occurred. Please follow below conditions.</p> <ul style="list-style-type: none"> Ⓐ 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. <p>[Note] Details for installation of machine is described in '4. Machine Installation.'</p>
<p>1-3) Machine Repair</p> 	<p>If you have any problems on the machine, troubleshooting should be handled by the designated A/S engineers.</p> <ul style="list-style-type: none"> Ⓐ Before cleaning and repairing machine, cut off the main 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



GPS/D-0402 series are intended for industrial purposes for bar tacking on textiles and other similar materials. Carefully study the following instructions before operating the machine.

- Ⓐ 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 might be hurt at smacking.

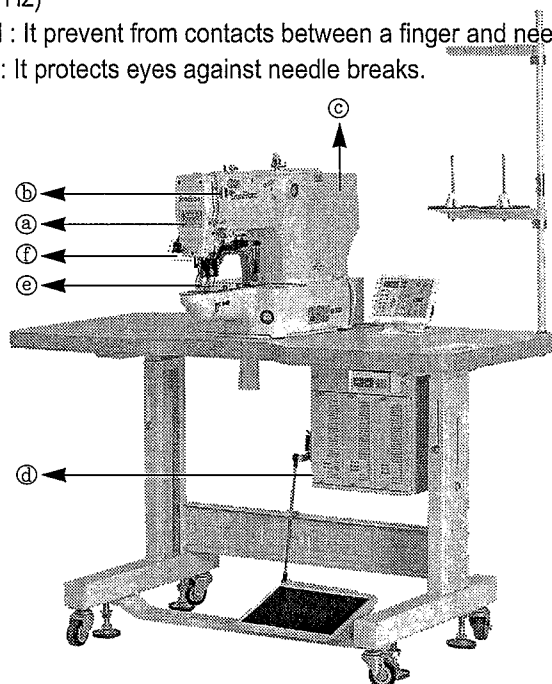
[Caution]

Always start the machine with safety covers in place since fingers or hands could be injured or cut off by the belt. Turn off the power switch when conducting a regular check on the machine.

1-5) Devices for safety




- Ⓐ Safety label : It describes cautions during operating the machine.
- Ⓑ Thread take-up cover : It prevents from any contact between body and take-up lever.
- Ⓒ Motor Cover(D Series) : It prevents from insertion of hands, feet or clothes by Motor.
Belt Cover(C Series) : It prevents from insertion of hands, feet or clothes by V-belt Motor.
- Ⓓ Label for voltage specification: Safety instructions to prevent possible electric shocks. (Voltage and Hz)
- Ⓔ Finger guard : It prevent from contacts between a finger and needle.
- Ⓕ Safety plate : It protects eyes against needle breaks.



1-6) Location of Caution mark

Caution mark is attached on the machine for safety. Read the directions of the Caution mark carefully before running the machine.

CAUTION
경고

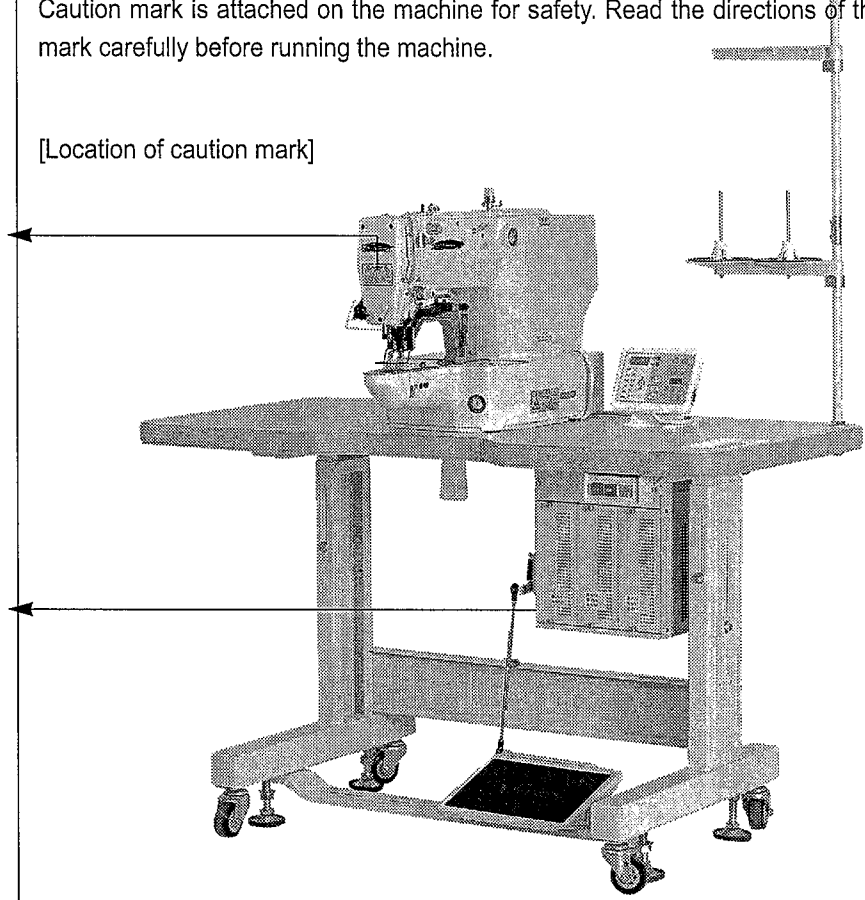
Do not operate without finger guard and safety devices. Before threading, changing bobbin and needle, cleaning etc. switch off main switch.
손가락 보호대와 안전장치 없이 작동하지 마십시오.
실, 보빈, 바늘교환시나 청소전에는 반드시 주전원의 스위치를 꺼 주십시오.

CAUTION
경고




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.

[Location of caution mark]



1-7) Contents of Caution mark



Caution

1)

CAUTION
경고




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)

CAUTION
경고




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.

2

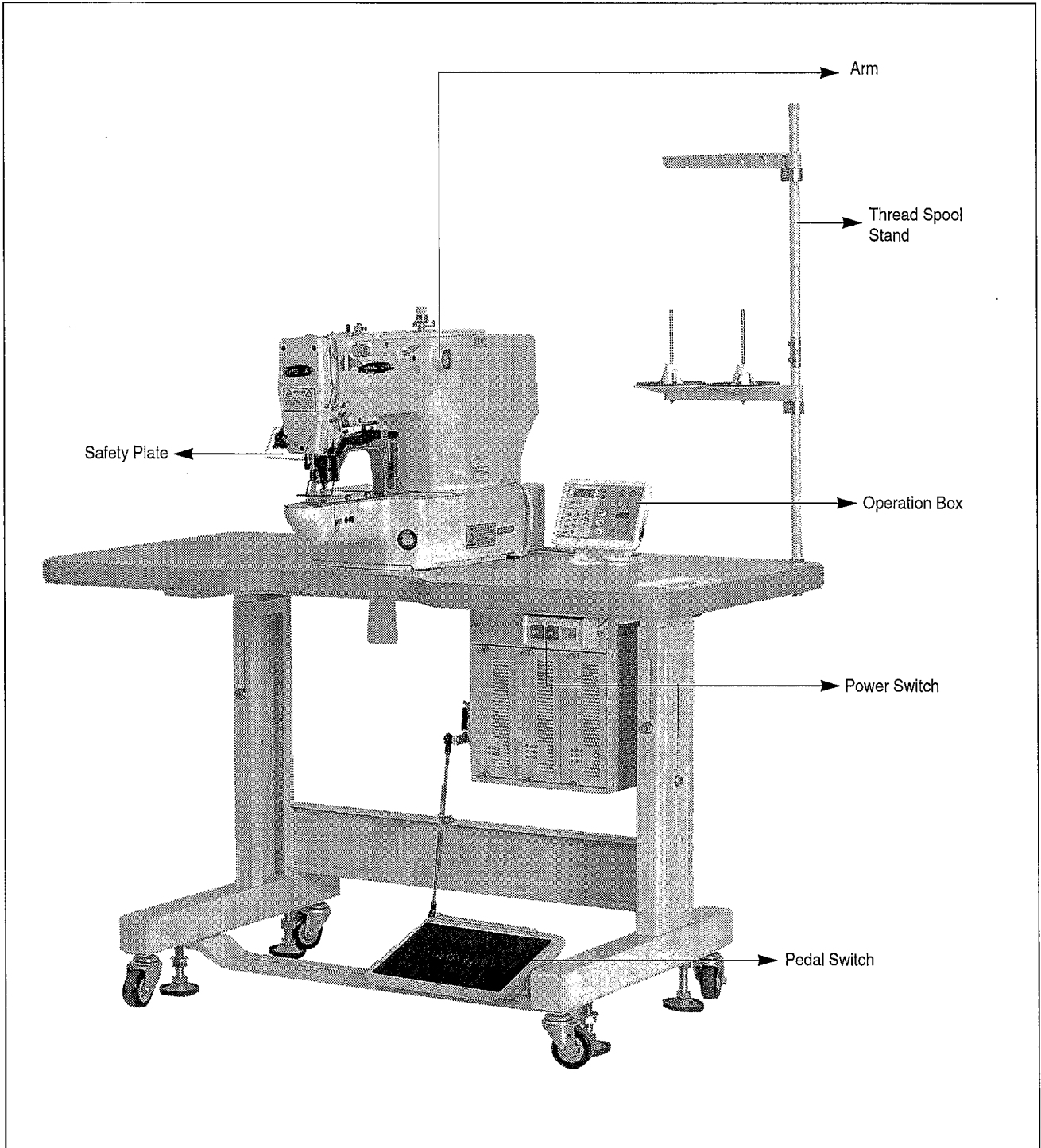
Specifications

Model	GPS/D-0402								
	HA	HA-BL	H	H-BL	M	M-BL	L	K	M(HP)
Sewing area	X: 40mm, Y: 20mm							Max. ϕ 14	
Sewing speed	Max. 2,200spm		Max. 2,700spm			Max. 2,000spm		Max. 2,700spm (2,000spm)	
Stitch length	0.1~10mm								
Feeding system	Feeding by stepping pulse motor								
Needle bar stroke	41.2mm								
Hook used	Standard shuttle hook	Large shuttle hook	Standard shuttle hook	Large shuttle hook	Standard shuttle hook	Large shuttle hook	Standard shuttle hook		
Needle used	DP x 17 #23		DP x 17 #19		DP x 5 #16(#14)		DP x 5 #11	DP x 5 #16	
Presser foot height	Max. 20mm		Max. 17mm						
Trimming device	Installed								
Wiper	Optional		Installed						
No of stitches	Max. 10,000 stitches								
No of patterns	Max. 99 patterns (Standard: 32 patterns)								
Memory	P-ROM								
Enlargement/Reduction Main motor	20%~200%								
Main motor	D Series		Direct drive AC Servo Motor						
	C Series		550W AC Servo motor						
Power consumption	600VA								
Optimal temperature for machine operation	5°C~40°C								
Optimal humidity for machine operation	20%~80%								
Voltage	1-Phase: 100~240V 3-Phase: 220~440V, 50/60Hz								
Air pressure	0.49MPa (5kgf/cm ²)		.						

3

Structure

1) Names of each machine parts



4

Installation

1) Machine installation conditions

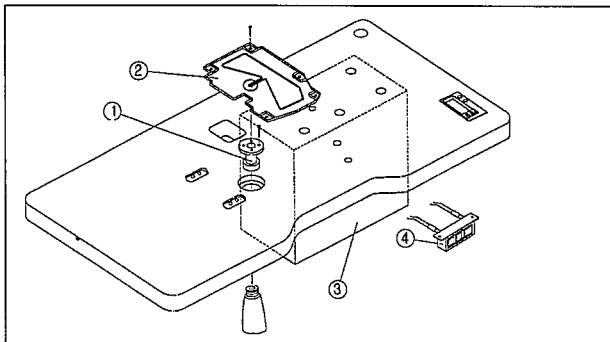
- A. Do not use the machine where the voltage is over or under 10% of the rate current to prevent accidents.
- B. For safe operation, use the machine under the following conditions.
 - ⇒ Room temperature when the machine is in use: 5°C~40°C
 - ⇒ Room temperature when the machine is not in use: -10°C~60°C
- C. Humidity: 20~80% (relative humidity)

2) Electric installation conditions

- A. Voltage
 - The voltage must be between within $\pm 10\%$ of the rated current.
 - The frequency must be within 1% range of the rated current frequency (50/60Hz)
- B. Electromagnetic waves
 - Use separate power for products with strong electromagnetic waves or high frequency. Keep the sewing machine away from them.
- C. Always use low voltage when mounting accessories or supplementary devices on the control box.
- D. Do not spill water or coffee into the control box or motor.
- E. Do not drop the control box or motor.

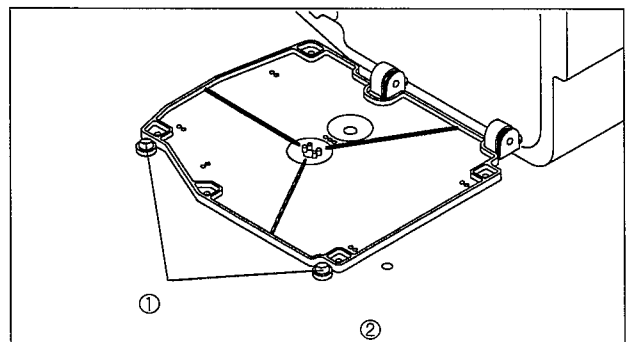
3) Safe installation of the tables

- A. Fix the oil tub holder①, oil tray②, control box③ and power switch④ onto the table.

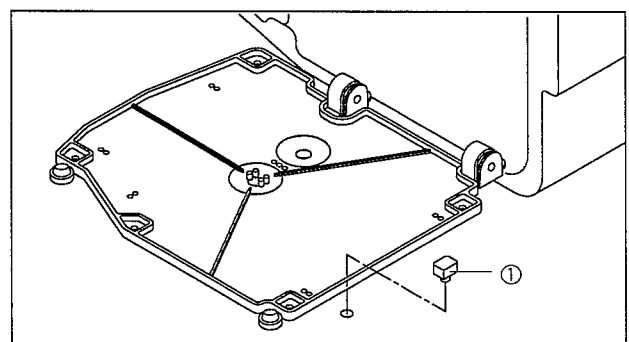


[Figure 1]

attach the safety switch supporting rubber ① to the table.



[Figure 2]

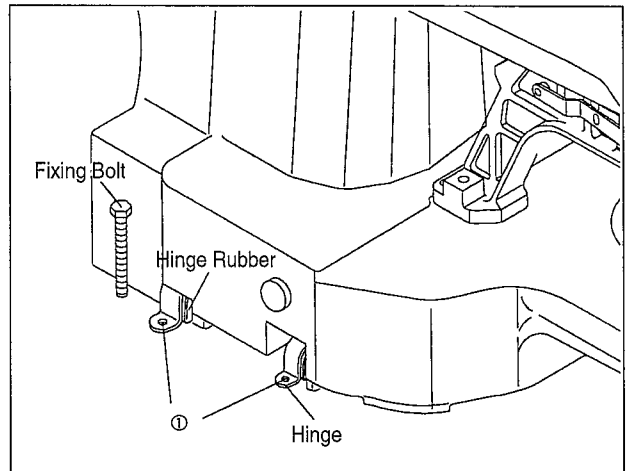


[Figure 3]

D. Attach the hinge metal and the hinge rubber on the bed. Insert a fixing bolt into the hinge metal hole at point① and fix it onto the table.

[Danger]

At least two or more people should move the machine for safety.

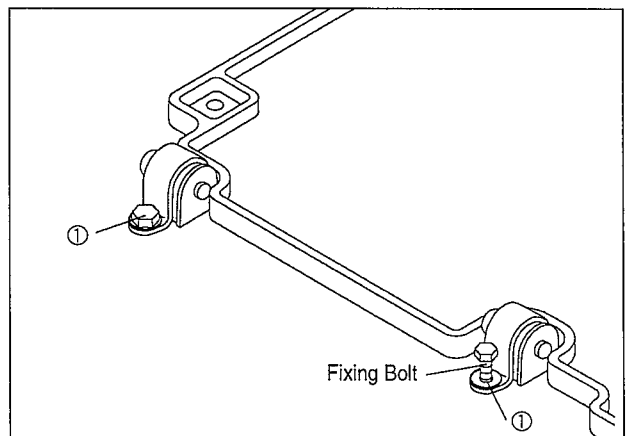


[Figure 4]

E. Set the machine in the upright position as described in the Figure. Insert the fixing bolt into the hinge hole at point① and fix it onto the table.

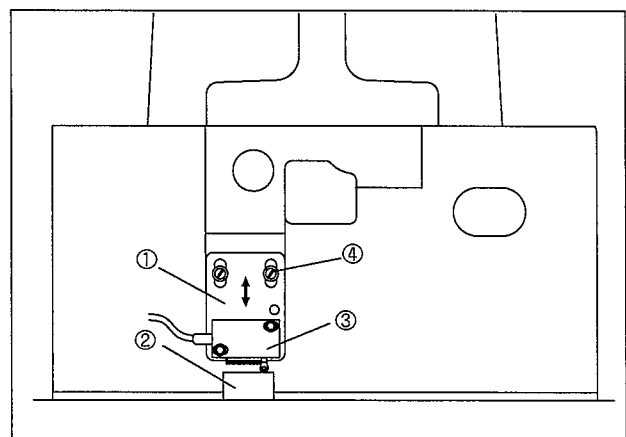
[Danger]

Since the machine is not fully installed onto the table at this point, pay extreme caution when you set the machine in the upright position.



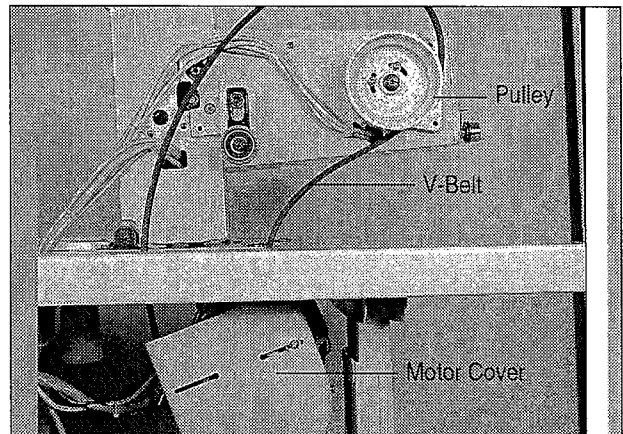
[Figure 5]

F. Assemble the safety switch bracket ① on the bed as in the figure. Move the safety switch bracket up and down to make sure that the safety switch supporting rubber② is tightly pressed by the safety switch③, and then fasten the screw④.



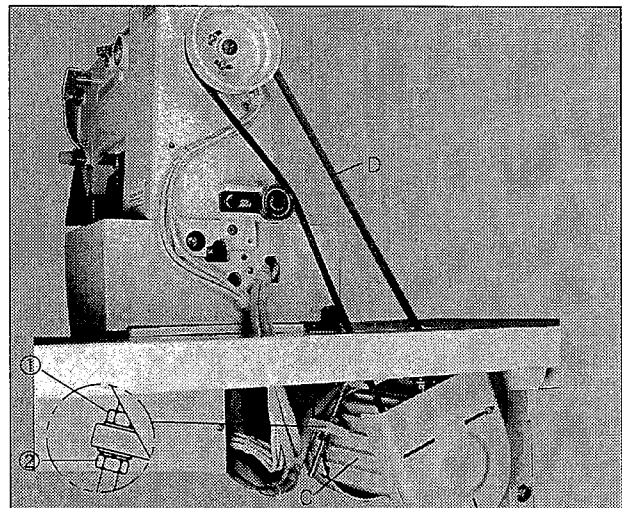
[Figure 6]

G. While the machine is standing as shown in the Figure, put the "V" - belt between the pulley and the motor. (C-Series)



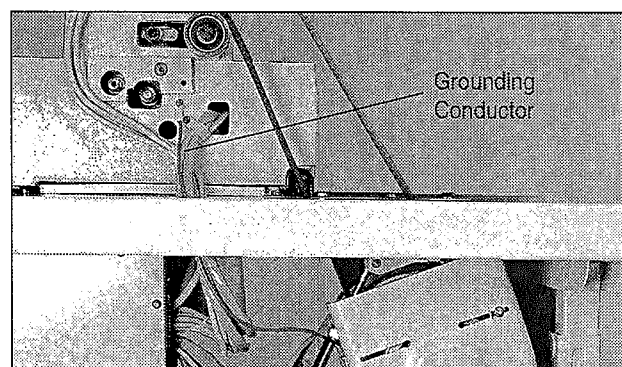
[Figure 7]

H. After connecting the V-belt, unfasten the fixing nuts ① and ② to give tension to the belt (D) by the weight of the motor (C). Then tighten the nut ① and ② consecutively. (C-Series)



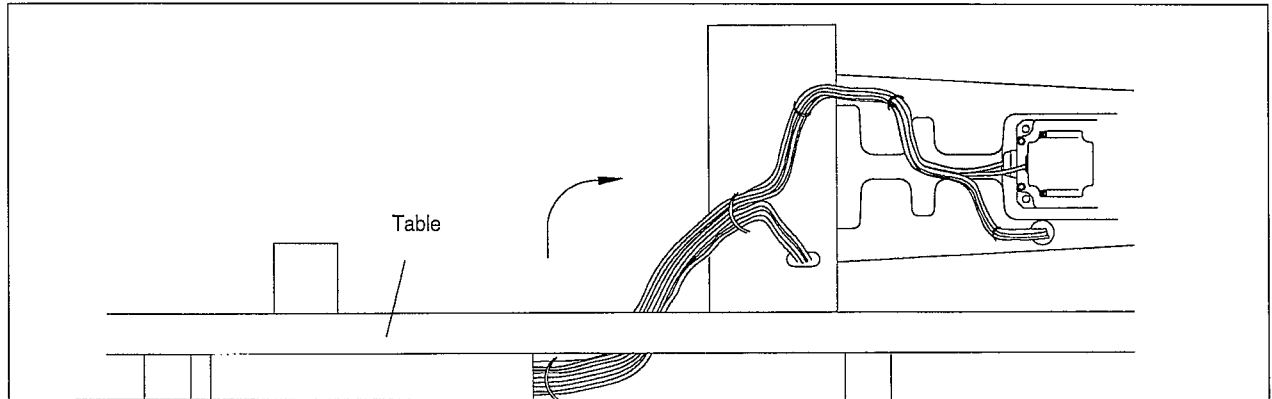
[Figure 8]

I. Be sure to connect the green grounding conductor that links the motor to the machine. Connect the grounding conductor wire between the control box and the motor. (C-Series)



[Figure 9]

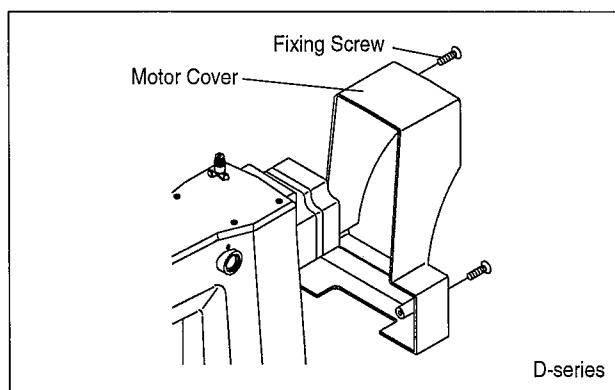
J. After connecting the cables between the machine and the control box, fix the cable wires under the table as described in the Figure. (Adjust the length of the wires to ensure that there is a sufficient length when placing the machine to the upright position.)



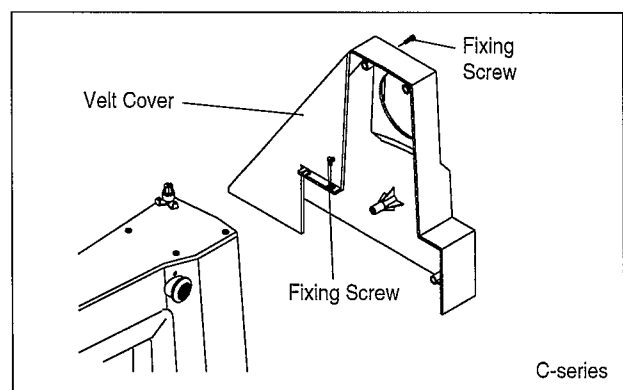
[Figure 10]

4) The assembly of peripheral parts

A. Attach the motor cover to the top (2EA) and bottom (2EA) of the back side of machine and sides by using fixing bolts. (In case of C series, attach the belt cover by using fixing screws for the rear (3EA) and the side (2EA).)



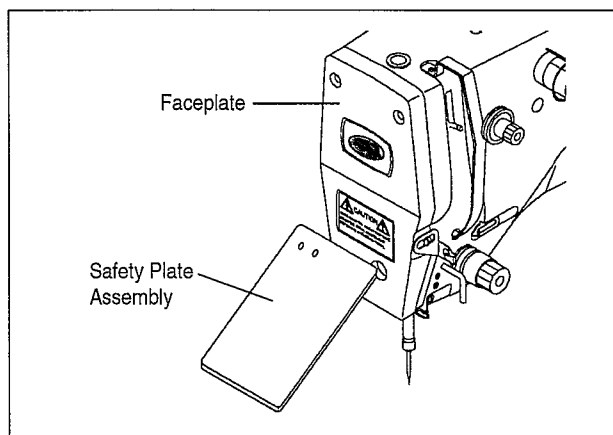
[Figure 11]



[Figure 12]

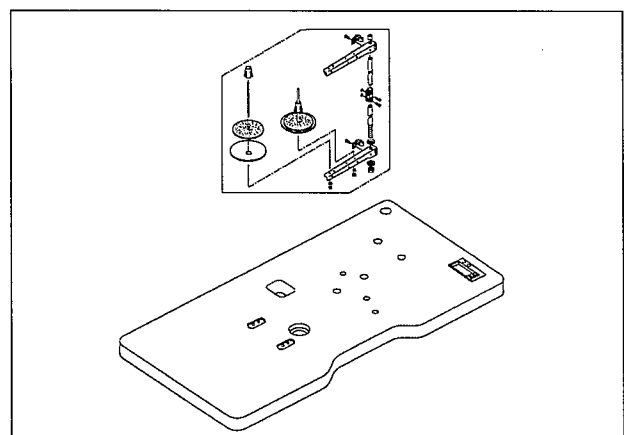
[Caution]
For safety, motor cover and safety plate should be attached to the machine.

B. Attach the safety plate to the backside of the arm.



[Figure 13]

C. Install the thread stand onto the table.

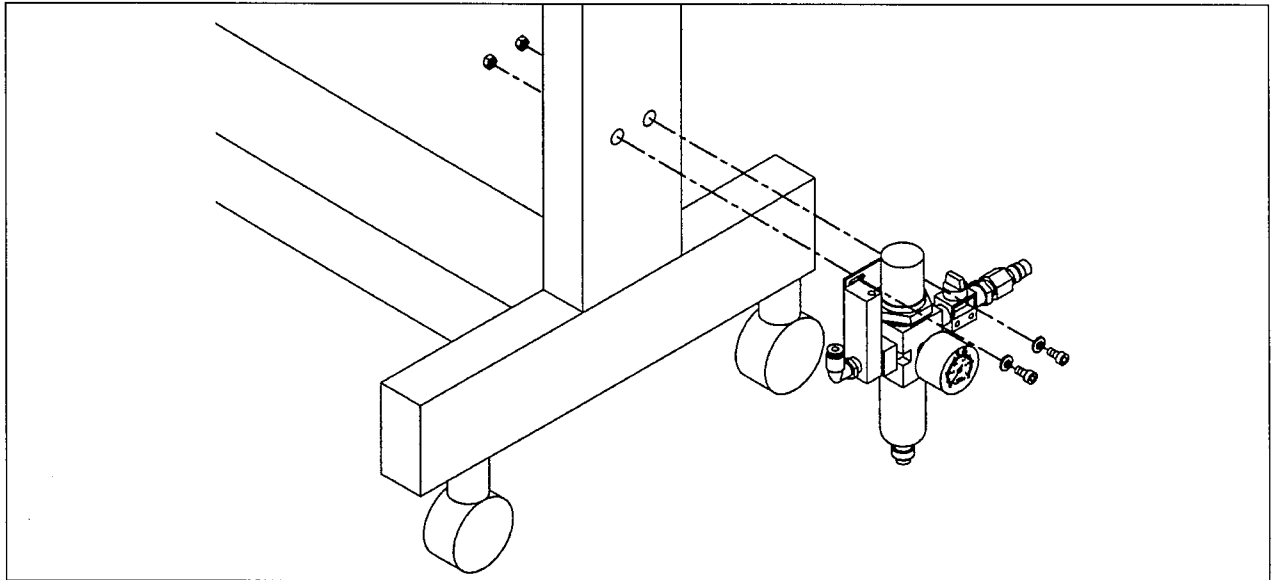


[Figure 14]

5) Installation of air pressure specification (HA type)

(1) How to assemble the filter regulator

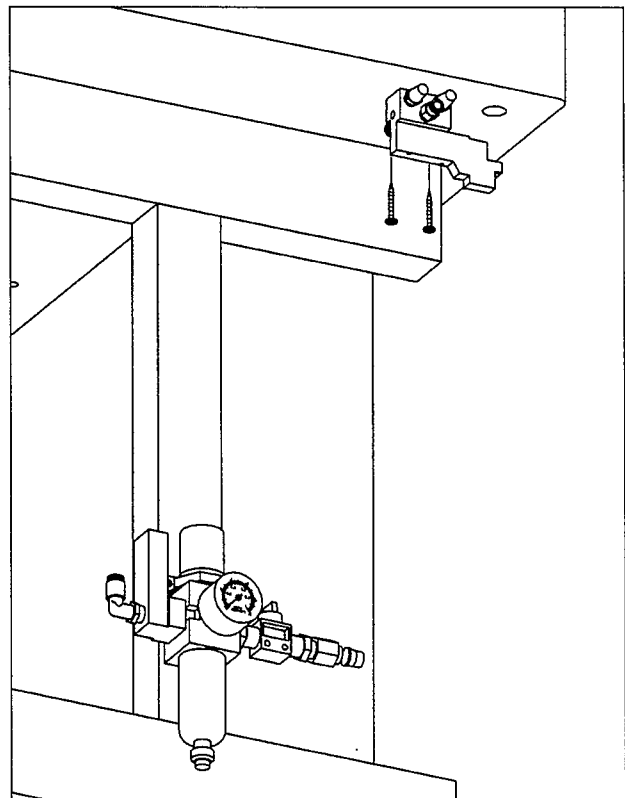
Attach the filter regulator to the right side of the table leg with the bolts as shown in the Figure.



[Figure 15]

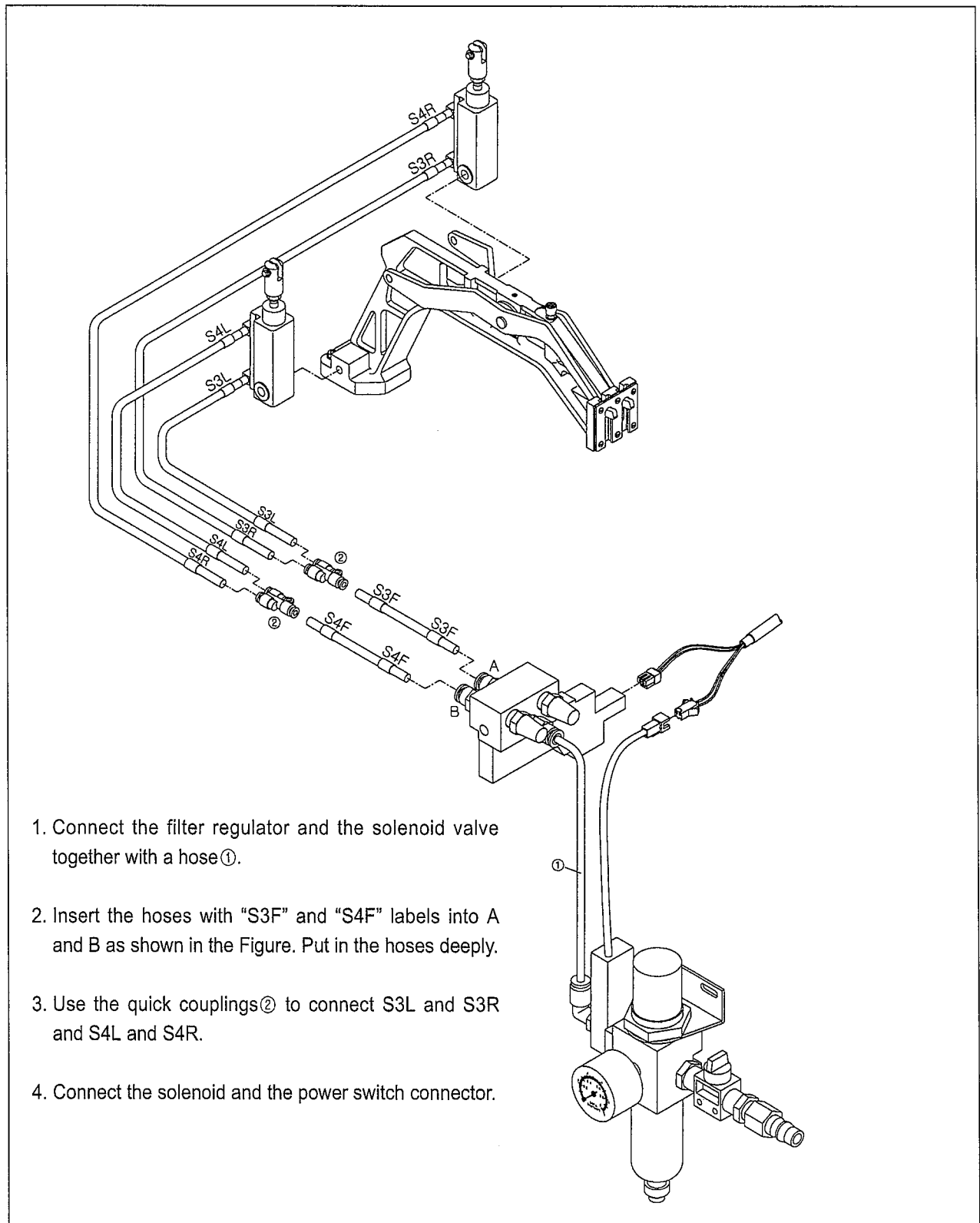
(2) How to assemble the solenoid valve

Fix firmly the solenoid valve to a proper location under the table using the screws.



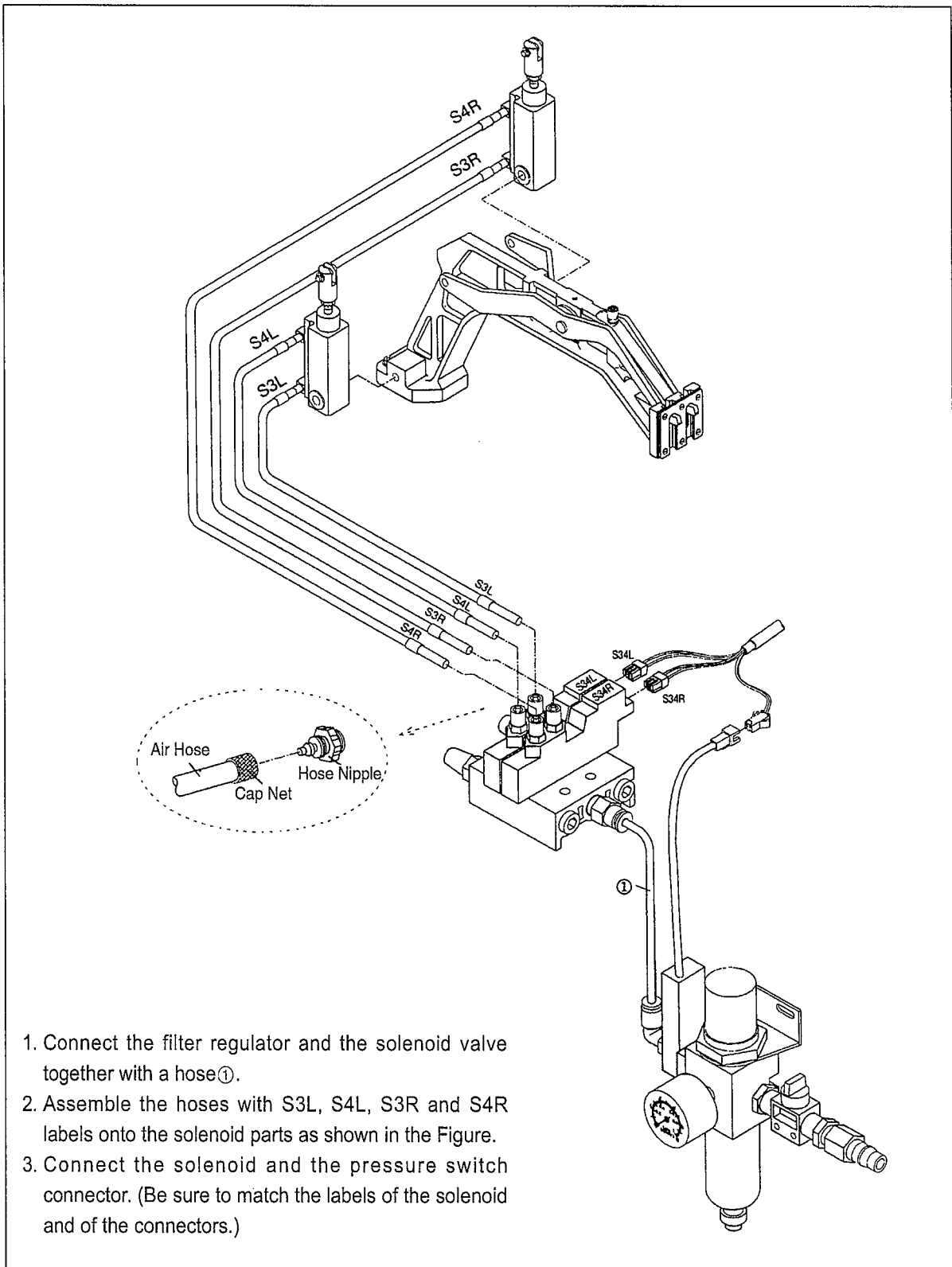
[Figure 16]

(3) How to connect the air hose of the monolithic driven presser foot



[Figure 17]

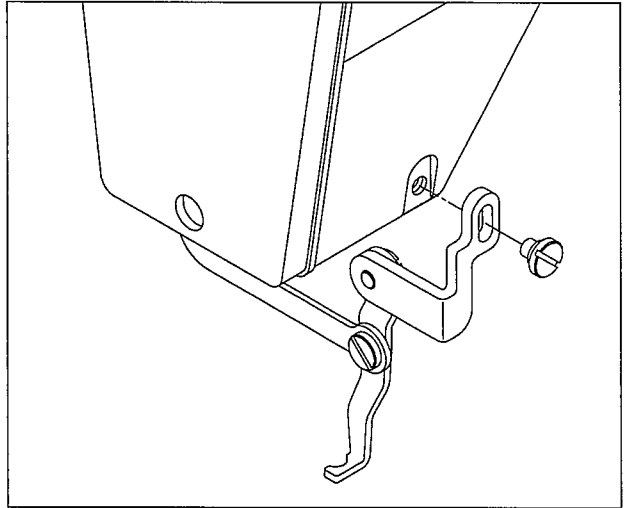
(4) How to connect the air hose of the separate-driven presser foot



[Figure 18]

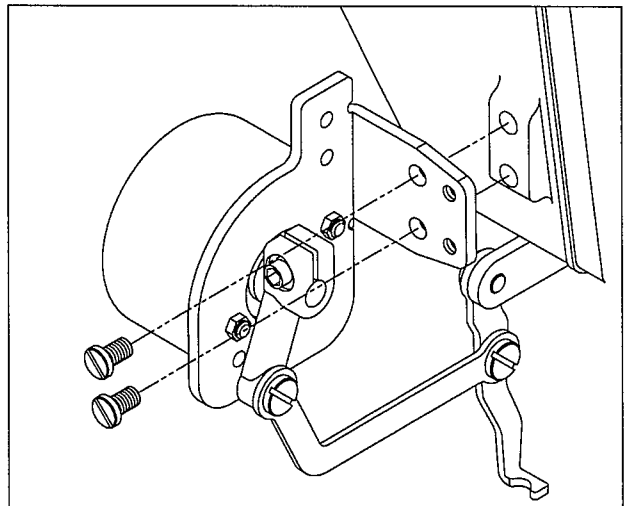
6) Installation and control of the option wiper (HA type)

A. Mount the wiper base plate with a screw as shown in the Figure.



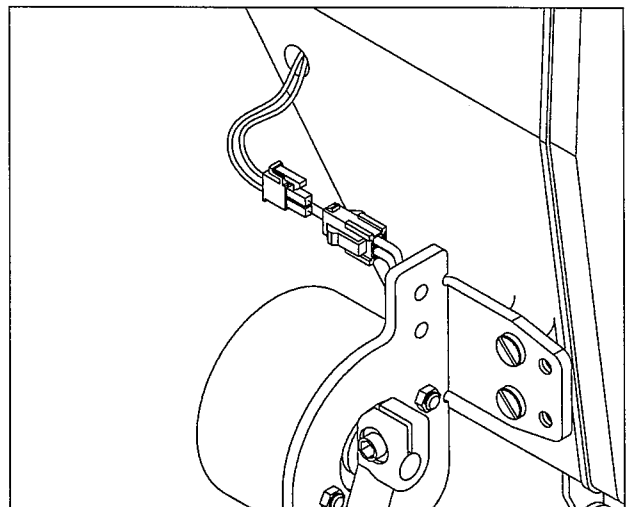
[Figure 19]

B. Fix the wiper base onto the opposite side with two fixing screws as shown in the Figure.



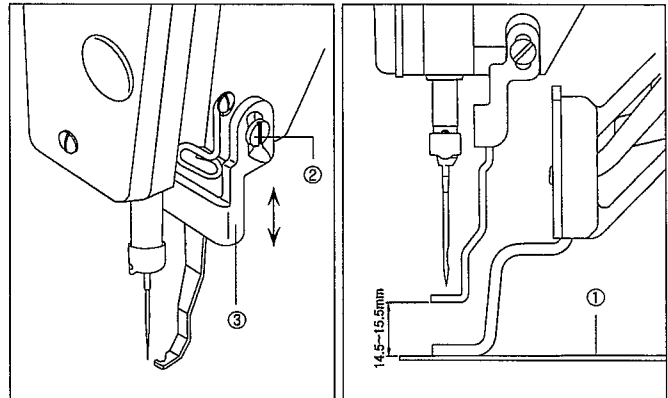
[Figure 20]

C. Link the connector located at the solenoid with the connector from the arm.



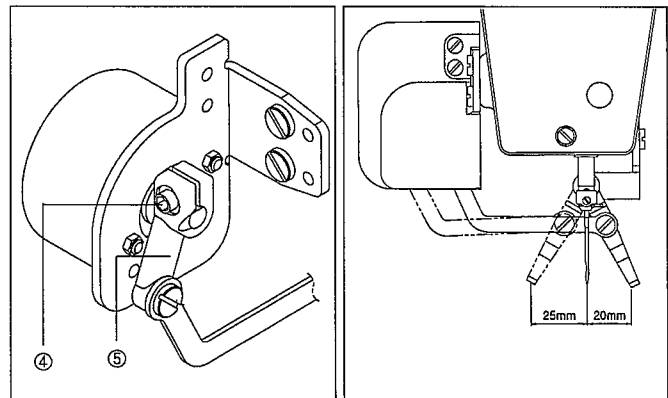
[Figure 21]

D. Un-tighten a clamp screw② of the wiper base plate. When the wiper and the needle center are parallel, move the wiper base plate③ up and down to give a clearance of 14.5~15.5mm between the needle plate① and the wiper. Fasten back the clamp screw② afterwards.



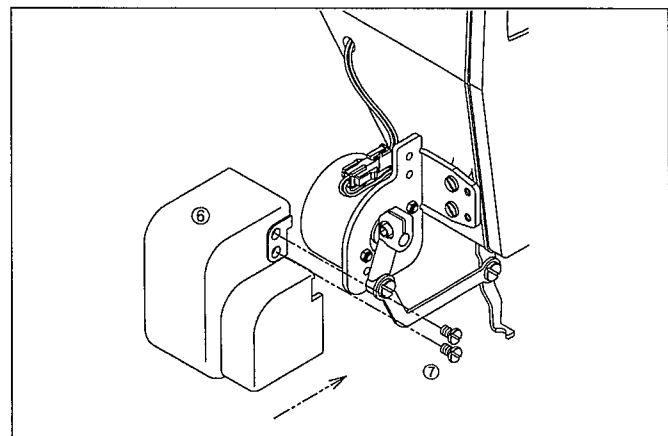
[Figure 22]

E. Unfasten the wiper crank screw④. Move the wiper crank⑤ left and right to set a clearance of 25mm between the needle center and the wiper. Tighten back the clamp screw④ after adjustments.



[Figure 23]

F. After arranging the connectors as shown in the Figure, use the wiper cover clamp screw⑦ to place the wiper cover⑥.



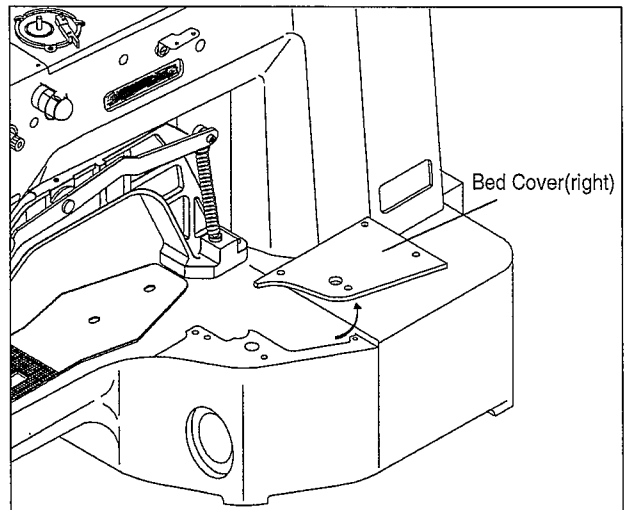
[Figure 24]

[Caution]

To use the wiper solenoid, set function code A-18 related to general sewing at "100".

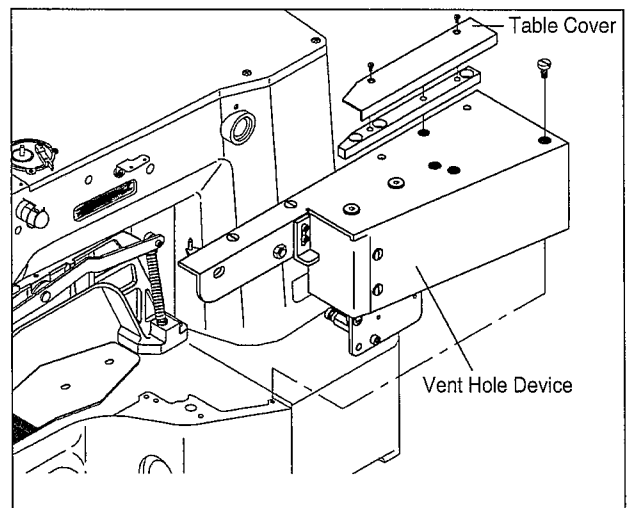
7) Installation of the vent hole 'GPS/D-0402

A. Loosen four clamp screws and take out the bed cover (right) from the bed as shown in the Figure.



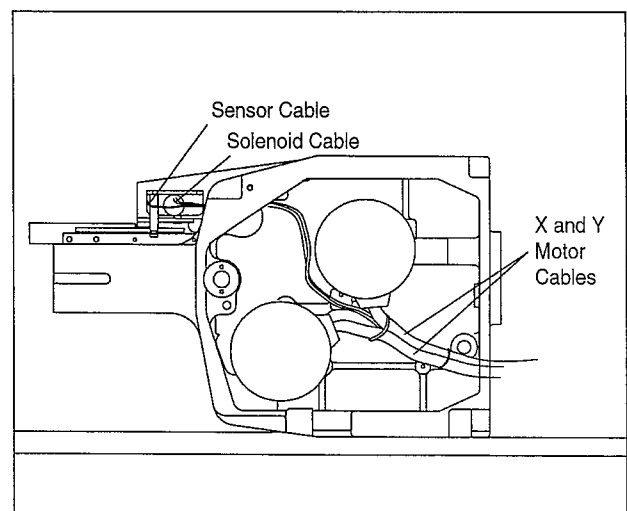
[Figure 25]

B. Attach the vent hole device onto the bed and fix with four clamp screws as illustrated in the Figure. Afterwards, attach the table cover onto the vent hole device using two clamp screws.



[Figure 26]

C. Securely tie the solenoid cable and the sensor cable of the vent hole device, with X and Y motor cables as shown in the Figure.

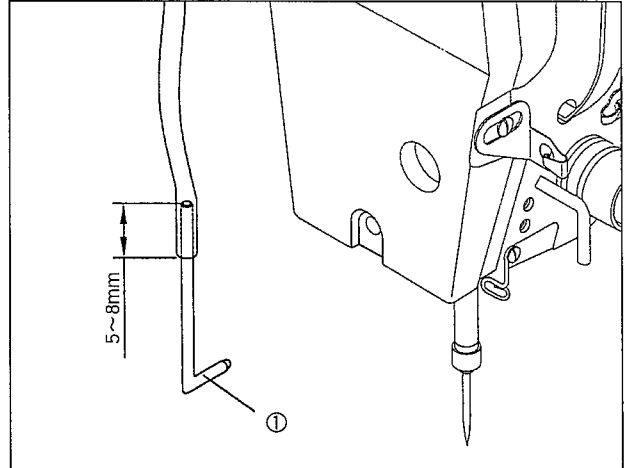


[Figure 27]

8) Installing the needle cooler

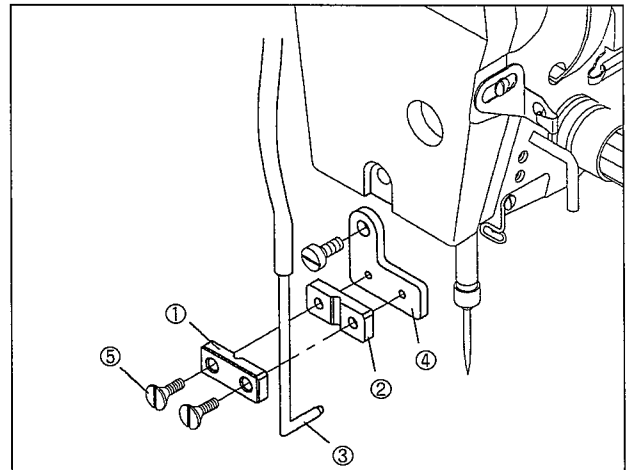
A. Before installation, check if all the parts are in place as described in the Parts Book.

B. Insert the nozzle ① 5~8mm into the one end of the air hose as shown in the figure.



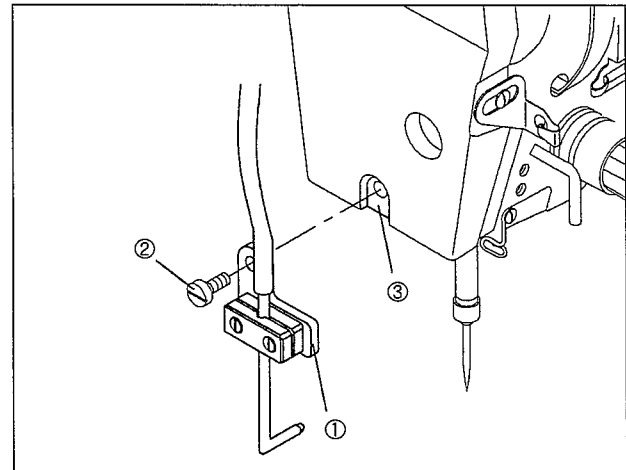
[Figure 28]

C. Use the guide A ① and guide B ② to fix the nozzle ③ onto the guide bracket ④ as illustrated in the figure, and fix temporarily with a screw ⑤.



[Figure 29]

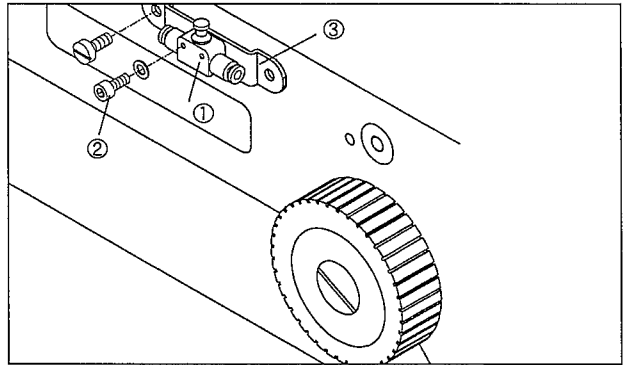
D. Assemble the guide bracket ① assembled on the nozzle, onto the lower fixing screw part ③ of the faceplate, using a screw ②.



[Figure 30]

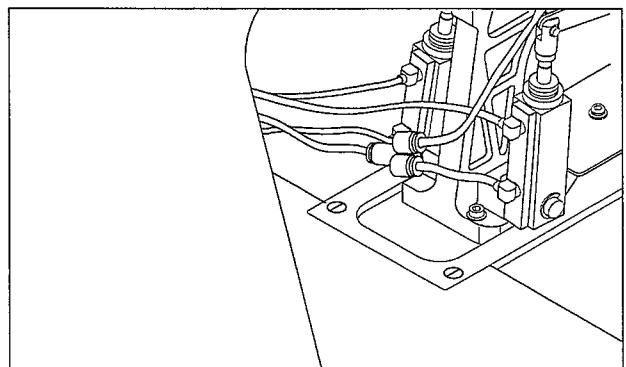
E. Use a screw ② to fix the speed controller ① onto the speed controller bracket ③. Assemble it onto the arm afterwards.

[Caution]
Be careful of the assembly direction of the speed controller.



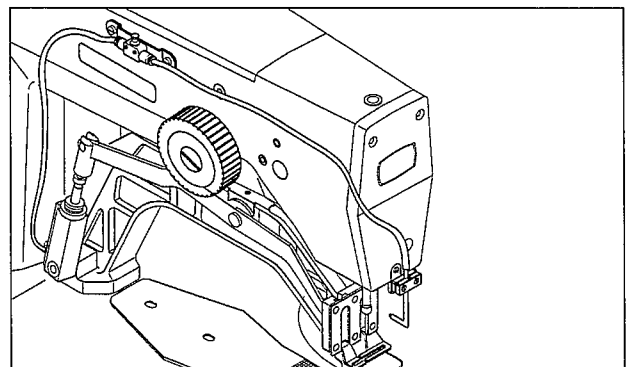
[Figure 31]

F. Cut off the lower hose of the presser foot-driving cylinder. Connect it to the air hose of the needle cooler, using the air fitting.



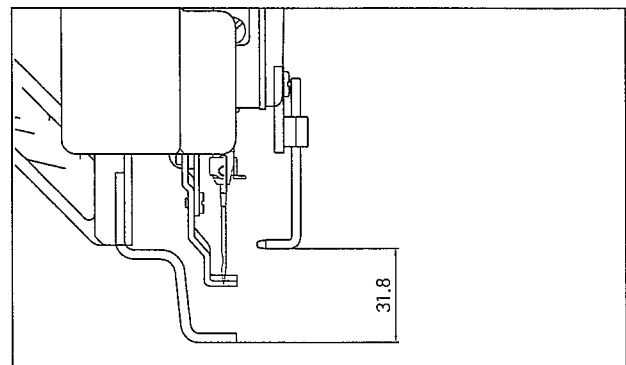
[Figure 32]

G. Link the hose with the left and right side of the speed controller.



[Figure 33]

H. Fix the nozzle as shown in the figure and fix it firmly with a screw.



[Figure 34]

5

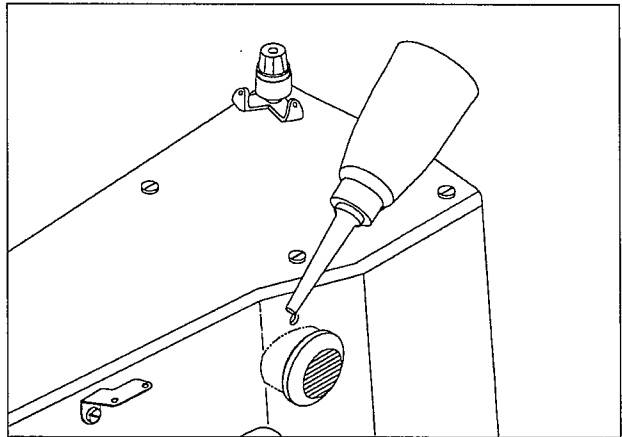
Preparations before using the machine

1) Lubrication

- A. Check the amount of oil left in the oil tank installed on the arm before lubrication.

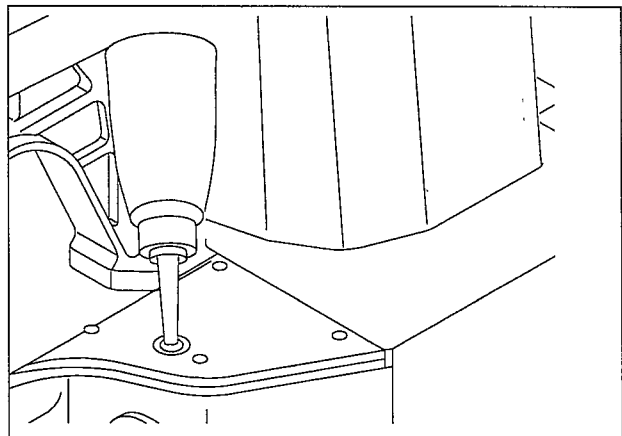
[Caution]

Be sure to supply oil if the machine is being used for the first time or has been left unused for a long time.



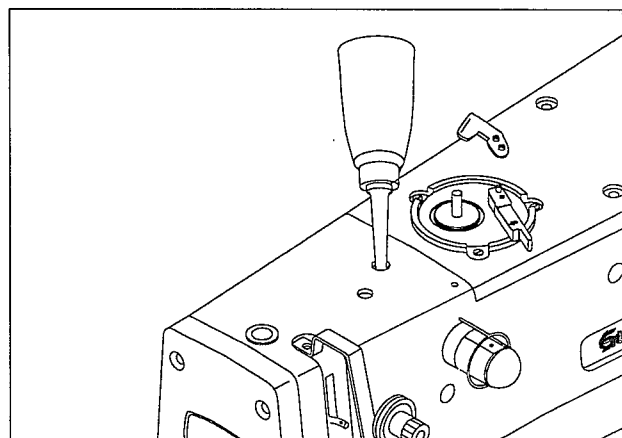
[Figure 35]

- B. Check the remaining amount of oil from the gauge window of the oil tank on the bed, then supply a sufficient level of oil through the lubrication hole on the bed cover.



[Figure 36]

- C. Pour oil into the lubrication hole in the upper part of the arm.

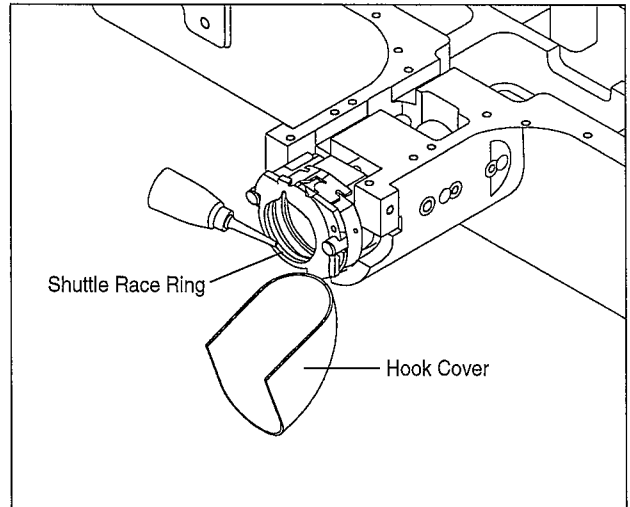


[Figure 37]

D. Open the hook cover to supply oil until the shuttle race ring is covered with oil. Place back the hook cover after lubrication.

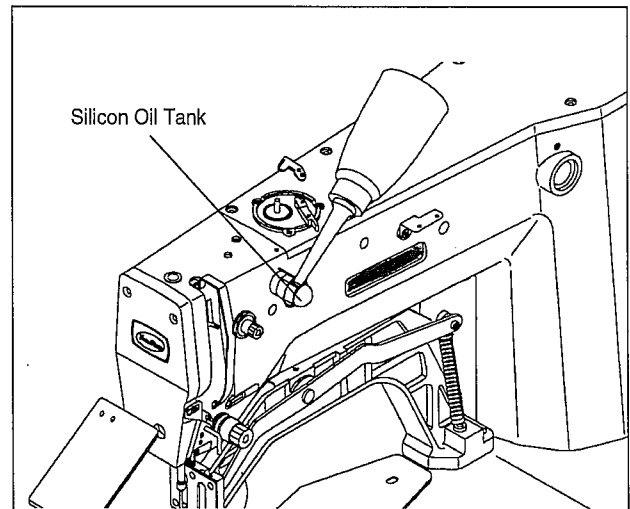
[Caution]

For safety, keep the hook cover on during machine operation.



[Figure 38]

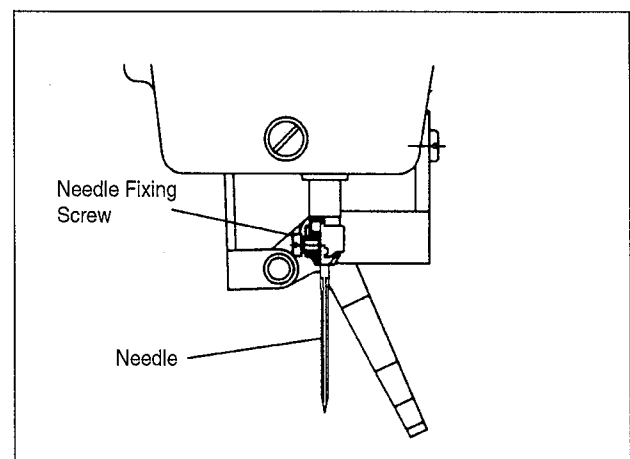
E. Supply silicon oil into the silicon oil tank mounted on the right side of the arm.



[Figure 39]

2) Installation of the needle

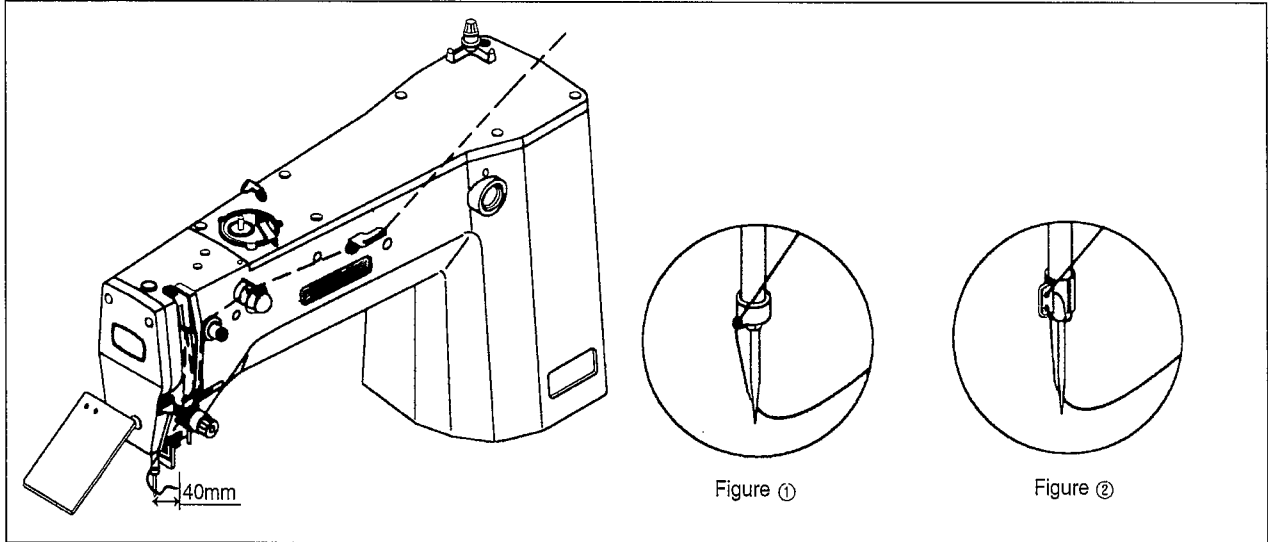
Loosen the needle fixing screw of the needle bar. Then, with the needle groove facing the front, push the needle until its upper end touches the needle hole of the needle bar. Fix the needle in with the needle fixing screw.



[Figure 40]

3) Routing the upper thread

Place the thread take up lever at the highest position to hang the upper thread as shown in the Figure. As for the thread guide of the needle bar, hang the thread as shown in the Figure ① for thick materials and the Figure ② for general and thin materials.



[Figure 41]

4) Placing the lower thread

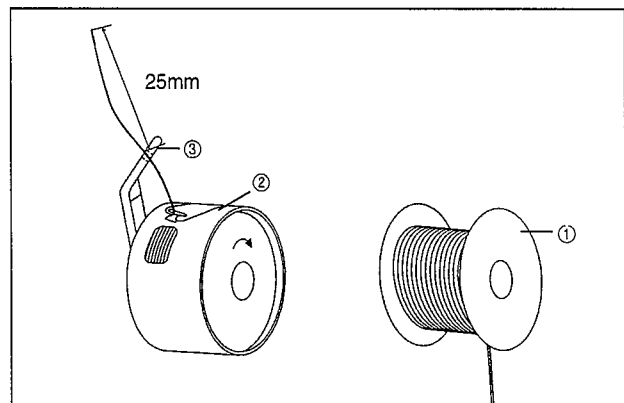
A. Insert the bobbin ① into the bobbin case ② as illustrated in the Figure.

[Caution]

Insert the bobbin to turn clockwise when seen from behind the bobbin case.

B. Pass the lower thread through a crack in the bobbin case and then through a thread hole ③.

C. Let the lower thread hang about 25mm from the thread hole ③.



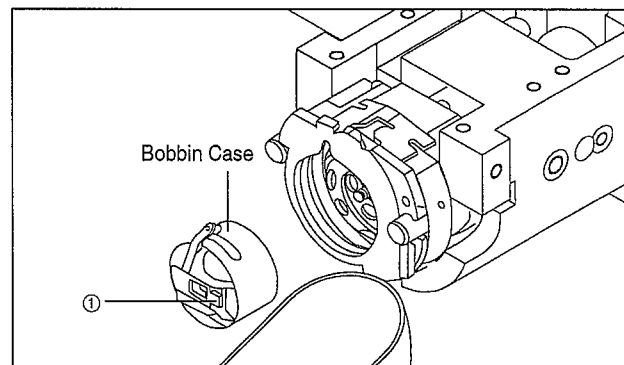
[Figure 42]

5) Installation and separation of the bobbin case

Open the hook cover. Hold the knob ① of the bobbin case and push it into the shuttle until it makes a clicking sound.

[Caution]

If you start operating the machine with the bobbin case not fully installed, threads can get tangled or the bobbin case can pop out.

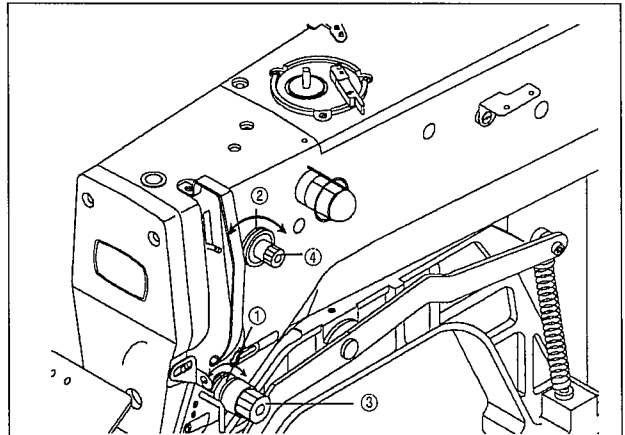


[Figure 43]

6) Tension control of the upper and lower threads

A. Tension adjustment of the upper thread

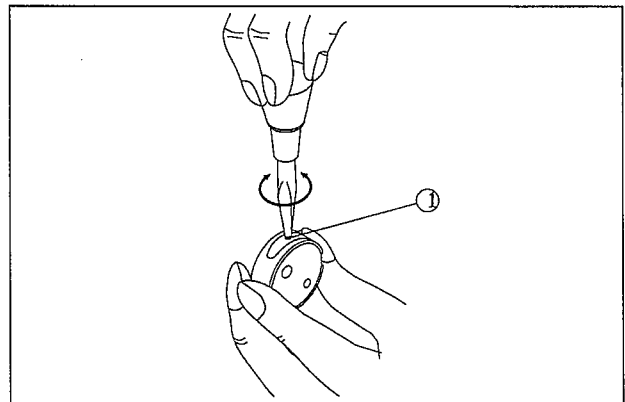
Turn the nuts ③ and ④ of the main thread adjusting device ① and the auxiliary thread adjusting device ② in a clockwise direction for stronger tension of the upper thread. Turn them counterclockwise for weaker tension of the upper thread.



[Figure 44]

B. Tension adjustment of the lower thread

Turn the screw ① of the bobbin case in a clockwise direction to increase tension or in a counterclockwise direction to reduce tension of the lower thread.



[Figure 45]

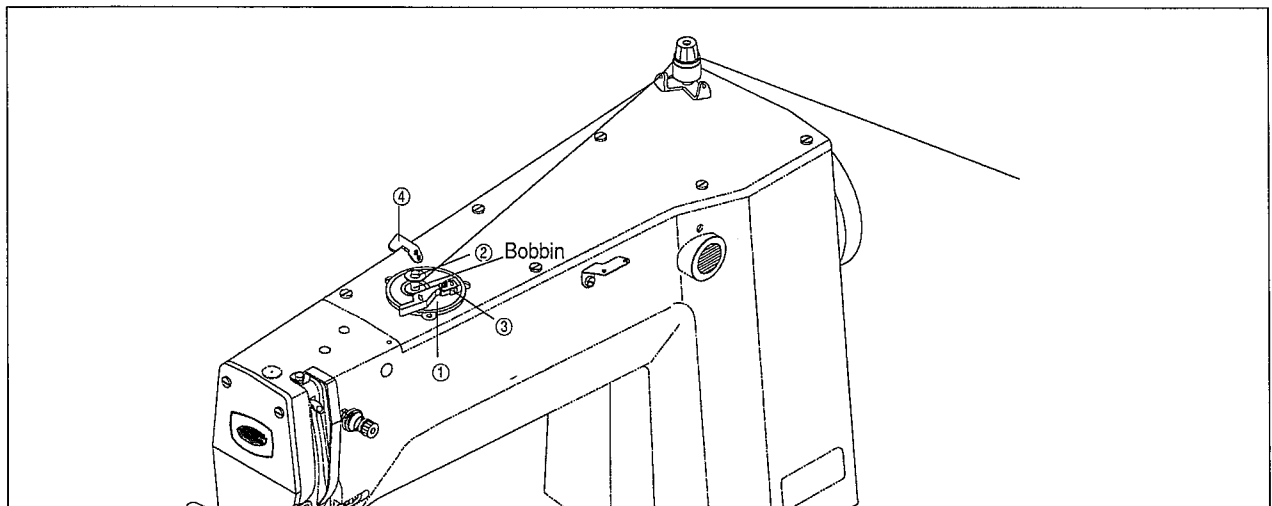
7) Winding the lower thread

A. Press **SELECT** in the operation box to select  WINDER.

B. Insert the bobbin into the bobbin winder driving shaft ② of the bobbin winder base ① attached onto the upper cover.

C. Place the bobbin winder lever ③ tightly to the bobbin and step down on the pedal to start the machine.

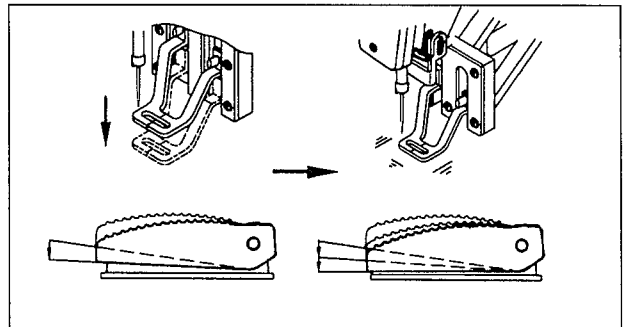
D. After the bobbin winder lever separates from the bobbin, use the bobbin winder blade ④ to cut the thread from the bobbin.



[Figure 46]

8) Operation of the pedal (H, M, L, K types)

- A. Install the pedal switch in the suitable position for your convenience.
- B. If you step on the pedal once, the presser foot will go down and if you take your foot off, the presser foot will go up.
- C. If you press down on the pedal switch consecutively, sewing will start. After sewing is finished, the presser foot will go up.



[Figure 47]

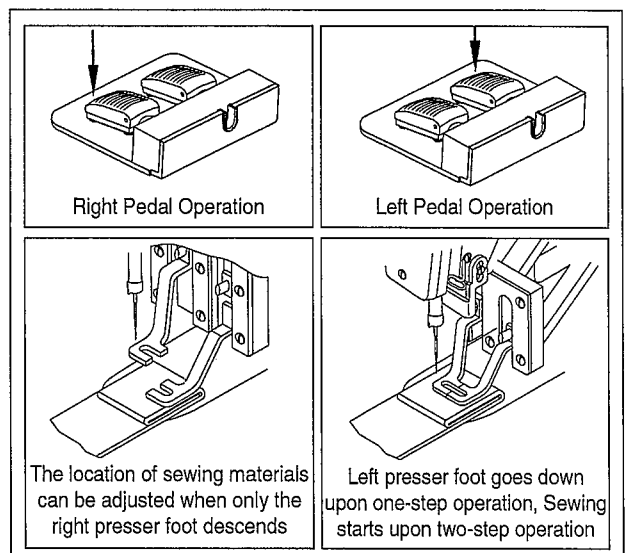
9) Operation of the pedal (HA type)

A. GPS/D-0402-20 (Monolithic presser foot)

The same as the pedal operation method of electronic bar tacking machines. Refer to the 8) Operation of the pedal as described above.

B. GPS/D-0402-22 (Separate-driven presser foot)

- ① Two footholds in the pedal switch. Press the right pedal to lower the right presser foot and press the pedal again to lift the presser foot.
- ② Press the left pedal once to lower the left presser foot and step off to lift the presser foot. ③ When you press down on the pedal consecutively, sewing will start. After sewing is done, the presser foot will go up automatically.
- ④ As for how to select the separate-driven pedal parameters, refer to the page 18 of the electrical and electronic manual.



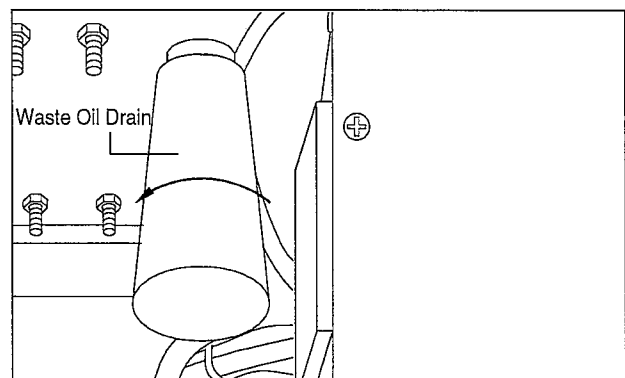
[Figure 48]

10) Disposal of the waste oil

When the oil fills up the waste oil drain located under the table, remove and empty.

[Caution]

The oil may spill on the floor when you attach or remove the waste oil drain. Be sure to place paper or cloth on the floor beforehand.



[Figure 49]

11) Input of the compressed air and control of the air pressure (HA type)

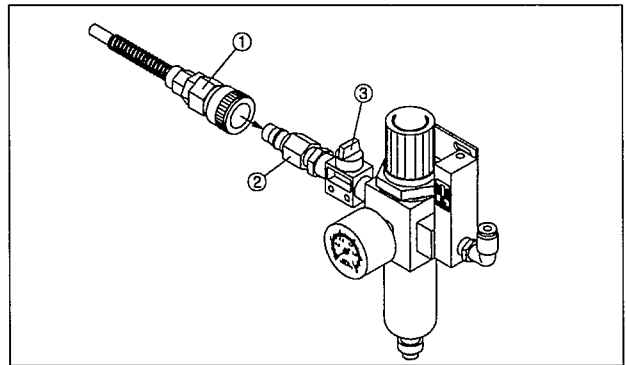
[Caution]

For safety, be sure to turn the power off during adjustments.

- A. Connect the quick joint socket① where pressed air is connected to, with the quick joint plug② mounted to the table.
- B. Open the finger valve③ to put in the compressed air.

[Note]

When you close the finger valve after use, the remaining air will be discharged automatically and the remaining pressure will be indicated as 0 MPa (0kgf/cm²)

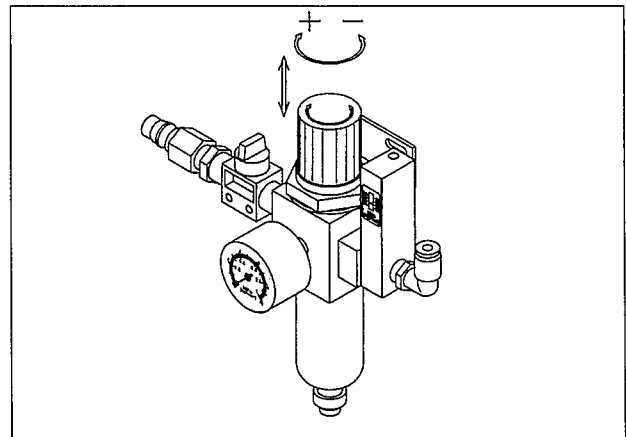


[Figure 50]

- C. Pull the control handle at the upper part of the filter regulator as shown above and turn it clockwise to increase pressure and counterclockwise to decrease pressure. After setting the pressure at 0.49~0.54MPa (5~5.5 kgf/cm²) as indicated on the pressure gauge, press back and fix the control handle to its original position.

[Caution]

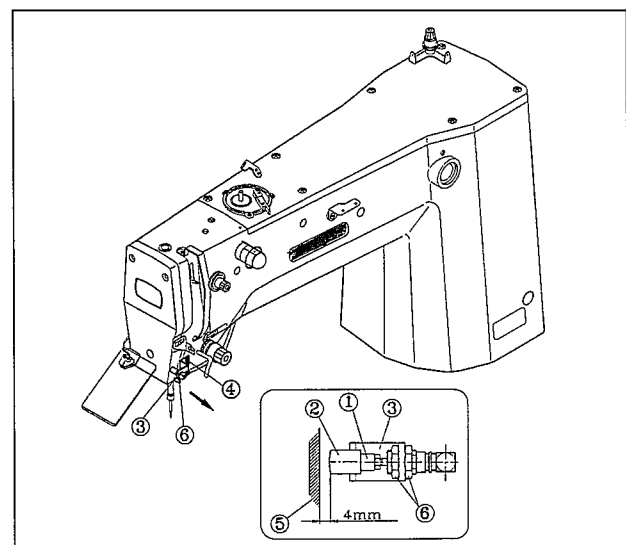
If the air pressure drops (under 4 kgf/cm²) during use, the error sign [Er07] will appear and the machine will stop automatically.



[Figure 51]

12) Control of the upper thread holding device (optional)

- A. Check if the pin cylinder knuckle① and the cap② of the upper thread holder are positioned at the center of the upper thread passage.
- B. If they are not at the center, loosen two screws④ of the pin cylinder bracket③ to bring them towards the center. Fasten the screws afterwards.
- C. The recommended distance between the end point of the knuckle cap② and the ARM⑤ is 4mm.
- D. To adjust the clearance, unfasten two pin cylinder nuts⑥ for adjustment and fasten them afterwards.



[Figure 52]

6

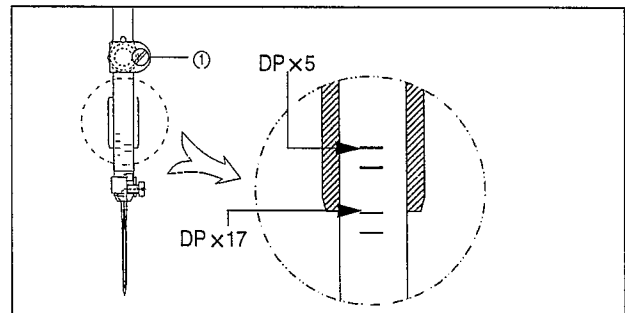
Maintenance and repair

Warning

The machine is set to be in optimal condition when it is shipped out from the factory. Do not make arbitrary adjustments to the machine and replace only with standard OEM parts

1) Adjustment of the needle bar height

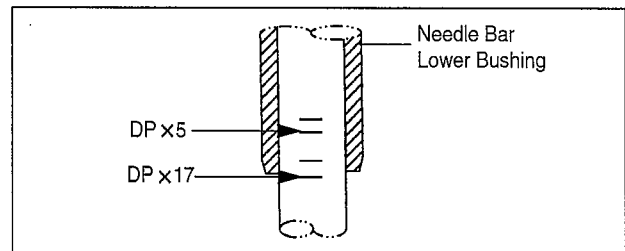
Unfasten the needle bar holding screw ① when the needle bar is at its lowest position. Fit the upper carved line (one that is suitable for the needle used) with the lower side of the needle bar bushing to adjust the height as shown in the Figure. Firmly tighten the screw ① afterwards.



[Figure 53]

2) Adjustment of the needle and the shuttle

A. At the lowest point of the needle bar, fit the lower carved line (one that is suitable for the needle used) with the lower side of the needle bar bushing as shown in the Figure.

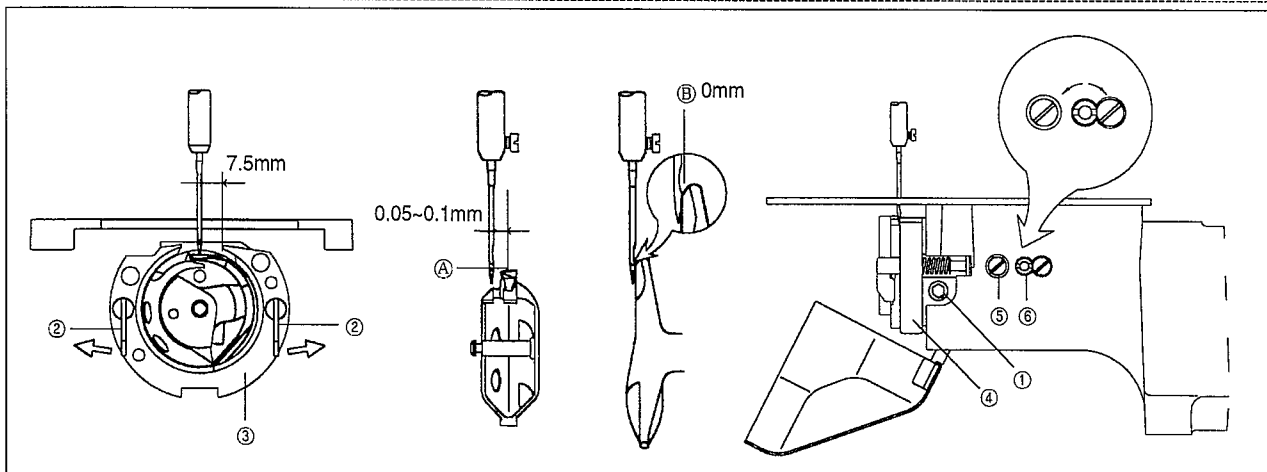


[Figure 54]

- B. After loosening the shuttle driver screw ①, open the inner hook pressure bar ② left and right to take the shuttle race ring ③ out from the shuttle (large) ④.
- C. Make sure the shuttle hook point (A) is parallel to the needle center. Be sure to press the needle and the front side of the shuttle driver (B) firmly together to prevent the needle from bending. Then, tighten the shuttle driver screw ① firmly.
- D. Unfasten the shuttle (large) screw ⑤. Turn the large hook control shaft ⑥ left and right, then adjust the front/back position of the shuttle (large) ④ to set a clearance of 0.05~0.1mm between the needle and the shuttle hook point (A).
- E. After adjusting the front/back position of the shuttle ④, adjust the rotating direction of the shuttle ④ to set a gap of 7.5mm between the needle and the shuttle ④. Fasten the shuttle screw ① tightly afterwards.

[Caution]

For safety, make sure to firmly tighten all the screws after shuttle (large) adjustments.



[Figure 55]

3) Adjustment of the lower shaft gear and the shaking shaft gear

A. Loosen the screws ①, ② and ③.

B. While rotating the upper shaft, move the shaking shaft gear towards the arrow direction to find a position where the gear moves smoothly without any load.

[Caution]

The machine may not operate if the shaking shaft gear is not in the right position.

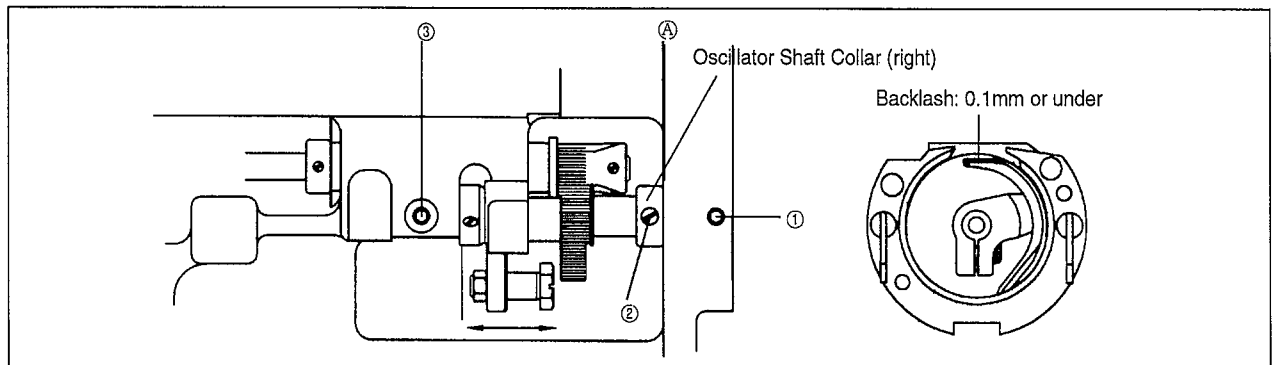
C. Press the oscillator shaft collar (right) to the bed surface ④ firmly together and fasten the collar screw ②.

D. With the oscillator shaft collar (right) stuck to the bed surface ④, turn the oscillator shaft collar towards the arrow direction. Adjust it so that the end point of the shuttle driver rotates smoothly with less than 0.1mm of backlash.

[Caution]

If there is too much backlash, the machine may generate much more noise than usual in operation, and if there is too little, the machine may not operate at all.

E. Tighten the screws ① and ③.



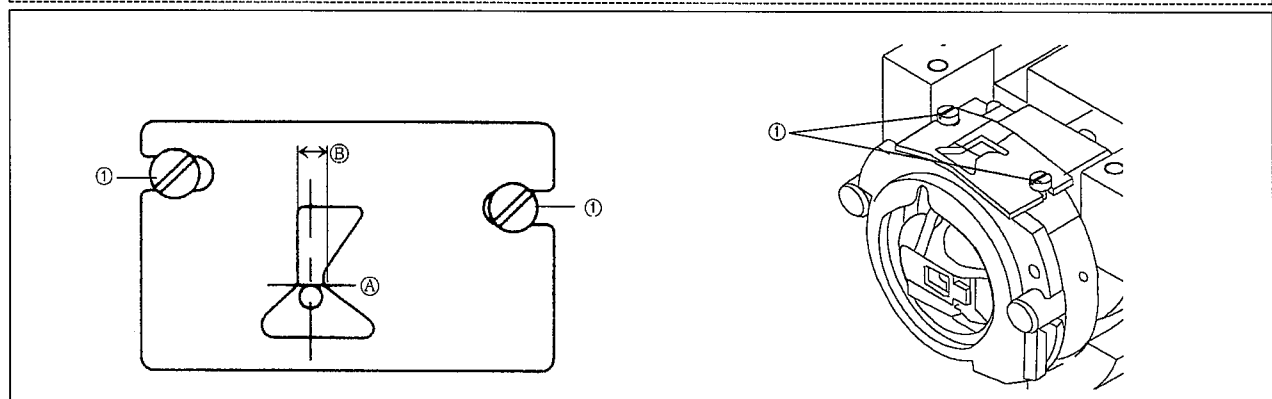
[Figure 56]

4) Adjustment of the position of the shuttle upper spring

Remove the lower feed plate and the needle plate from the machine and unfasten the screw ① of the shuttle upper spring. Adjust the position of the shuttle upper spring to bring the backside of the needle to the point ④ vertically, and the needle center to the middle of the width ⑤ horizontally. Fasten the screws after adjustments.

[Caution]

The thread may break or thread strands may unravel if there are scratches or the surface is rough around the groove of the shuttle upper spring. Be sure to check the status of the spring surface before use.

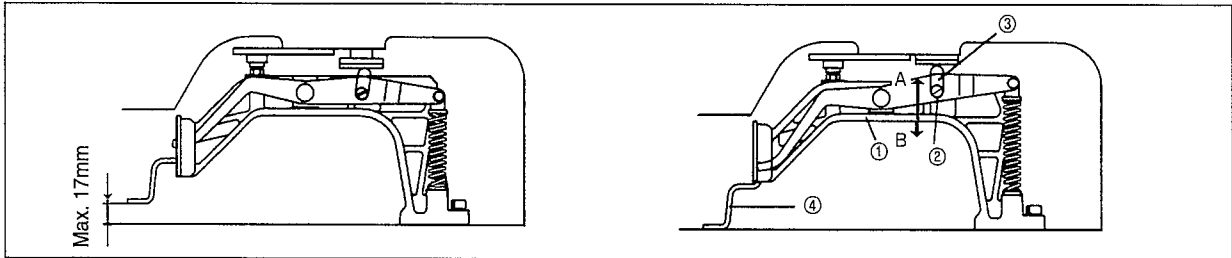


[Figure 57]

5) Adjustment of the presser foot height

A. For general, thick, thin or knitted materials

Unfasten the screws ② of the lift lever control plate on the left and right side of the feed bracket ①. When you raise the control plate ③ to the A direction, the height of the presser foot ④ will go down and to the B direction, the height will go up. After fine-tuning the height, securely tighten the screws ②.



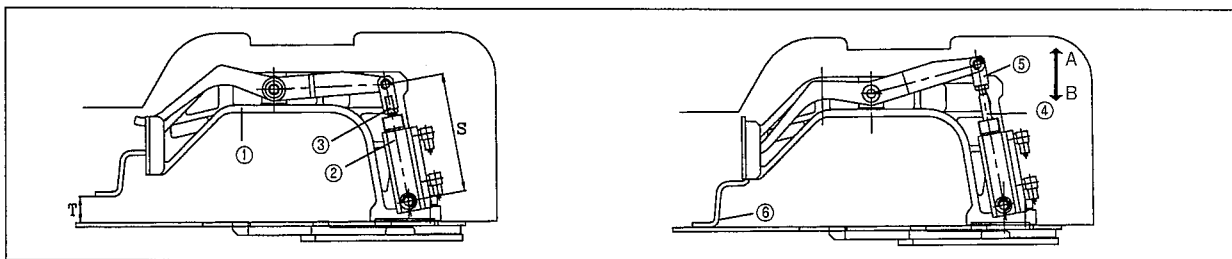
[Figure 58]

[Caution]

Fasten all the screws tightly after adjusting the height of the presser foot.

B. For air-pressure type (HA type)

Unfasten the cylinder knuckle nut ③ attached to the left and right cylinder ② of the feed bracket ①. When you turn the cylinder axis ④ to move the cylinder knuckle ⑤ up towards the A direction, the height of the presser foot ⑥ will decrease, and when you move it down towards the B direction, the height will increase. After adjustments, securely fix the cylinder knuckle nut ③.



[Figure 59]

• The value of cylinder adjustment to presser foot height

T	14	15	16	17	18
S	85.4	84.5	83.7	82.8	82.0

[Caution]

When adjusting the presser foot height over the maximum value (14mm), be sure to remove the wiper unit.

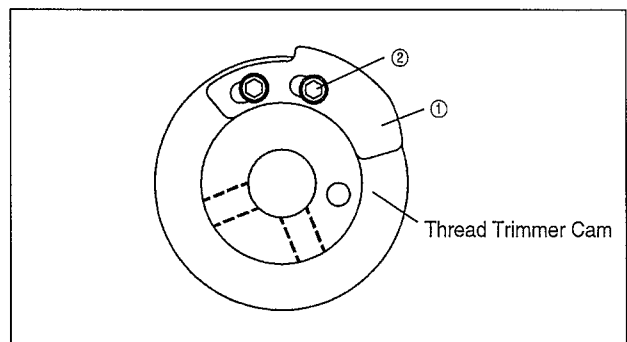
6) Adjustment of thread release-related parts

A. Setting the position of the thread release notch

Place the notch so that the right side of a slot of the thread release notch ① touches the circumference of the notch screw ②, and fix with a screw.

[Caution]

If the positioning is not correct, the remaining length of the thread may be too short or inconsistent, and/or the thread may come out of the needle when sewing starts.



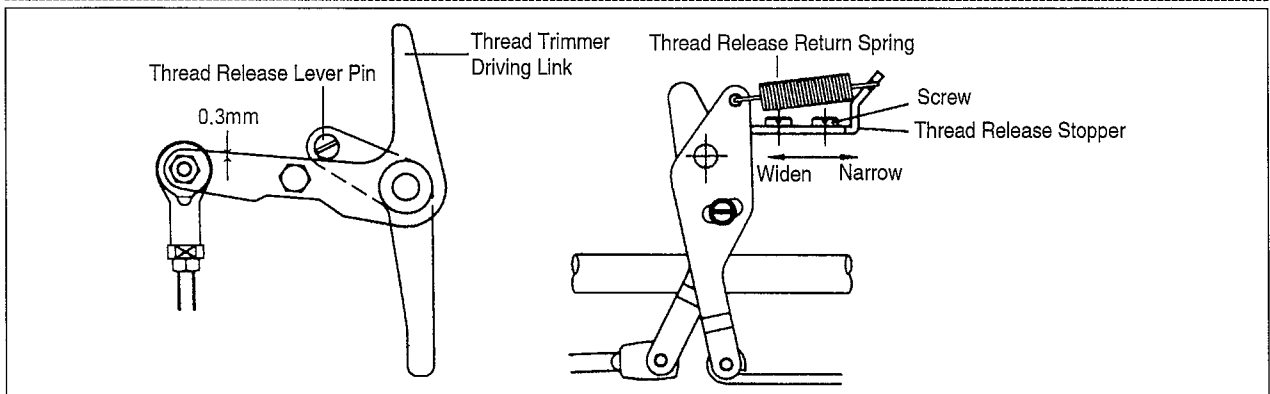
[Figure 60]

B. Setting the position of the thread release stopper

- Ⓐ Remove the thread release return spring.
- Ⓑ Loosen the thread release stopper screw and set a clearance between the trimming drive link and the thread release lever pin at 0.3mm. Push the stopper to the right to narrow the clearance, and to the left to widen the clearance between the trimmer driving link and the thread release lever pin.
- Ⓒ Replace the thread release return spring.

[Caution]

For safety, use a tool when removing or attaching the thread release return spring.



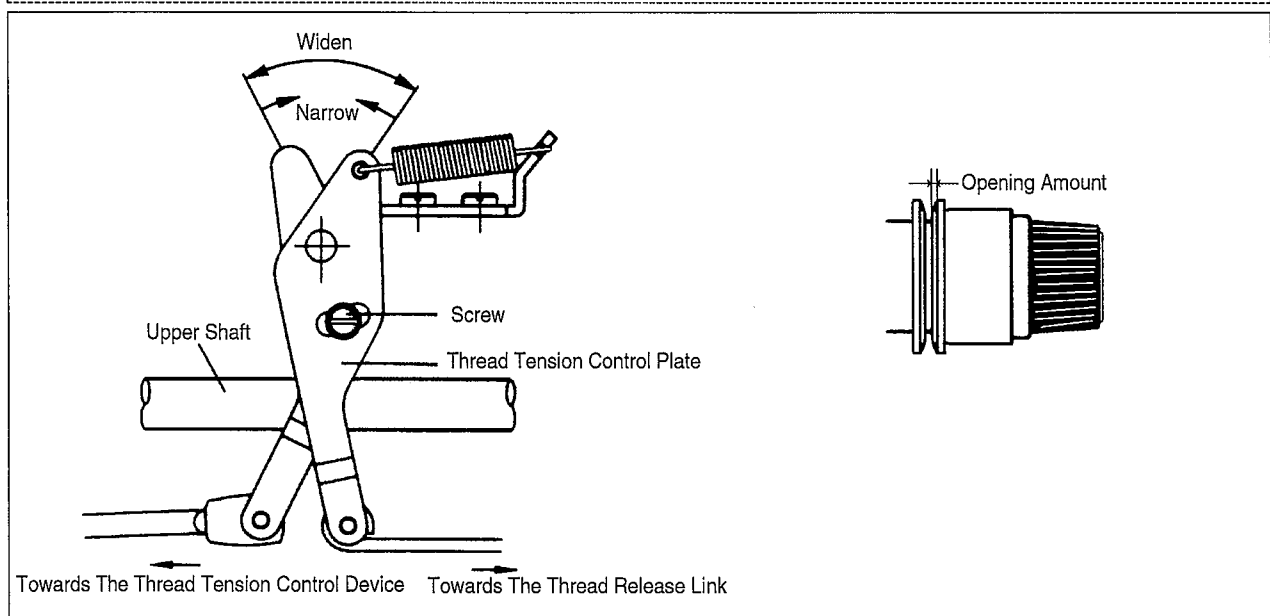
[Figure 61]

C. Adjusting the opening of the thread guide disk

- Ⓐ Loosen the screw of the thread release control plate.
- Ⓑ Start trimming to open the thread guide disk.
- Ⓒ Adjust the opening at 0.6~0.8mm for general materials, and at 0.8~1mm for thick materials. Widen the angle between the thread release control plate to increase the opening, and narrow the angle to reduce the opening.
- Ⓓ After adjustments, fasten the screw.

[Caution]

If the opening is not appropriate, the amount of the remaining thread may not be sufficient or consistent, and/or the disk may not close completely.



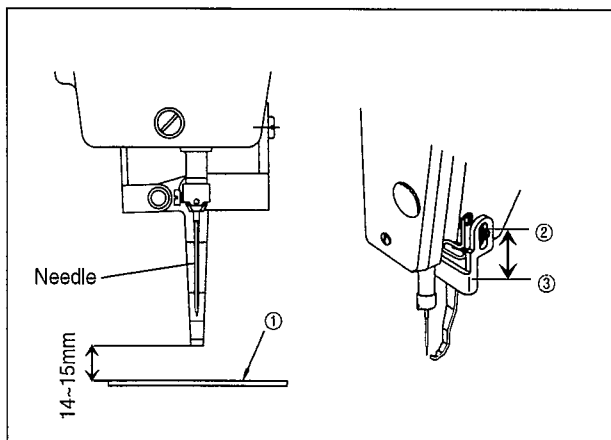
[Figure 62]

7) Adjustment of wiper-related parts

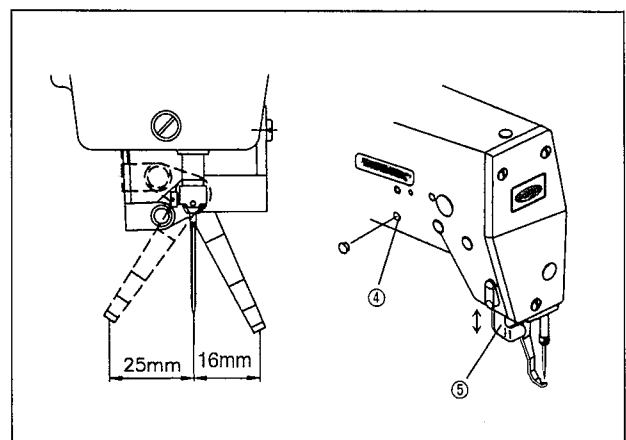
- a) Unfasten the screw② of the wiper base plate.
- b) When the wiper and the needle center are parallel to each other, move the wiper base plate③ up and down to give a clearance of 14~15mm between the needle plate① and the wiper. Tighten the screw② afterwards.
- c) Loosen the screw④ of the wiper rod.
- d) Adjust the wiper connecting rod⑤ up and down to set a clearance of 25mm between the needle center and the wiper, when the wiper is running at its maximum. Fasten the wiper rod screw④ afterwards.

[Caution]

If the wiper is not positioned properly, the wiper may collide with the presser foot or the needle, and/or the wiper may not move correctly.



[Figure 63]



[Figure 64]

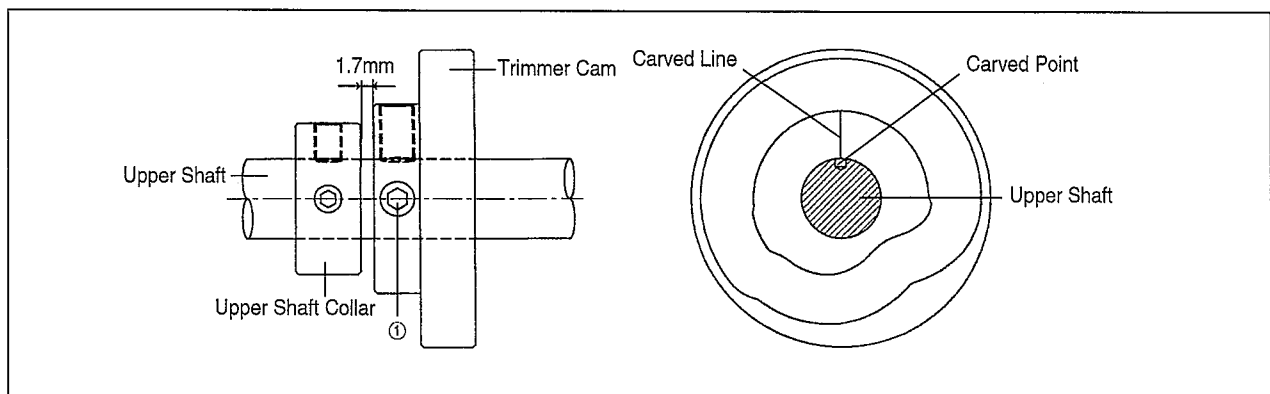
8) Adjustment of trimming-related parts

A. Setting the position of the trimmer cam

Set the upper shaft collar and the trimmer cam 1.7mm apart from each other. Place the trimmer cam where its carved line fits with that of the upper shaft. Fasten the screw① afterwards.

[Caution]

If the trimmer cam is not positioned correctly, trimming may not function properly or the machine could be jammed.



[Figure 65]

B. Adjusting the link stopper screw

- ① When the needle is at its lowest position, push the trimmer driving link in the arrow (\leftarrow) direction within the moving range of the trimmer cam. Check if there is enough room between the trimming cam roller and both ends of the trimmer cam.

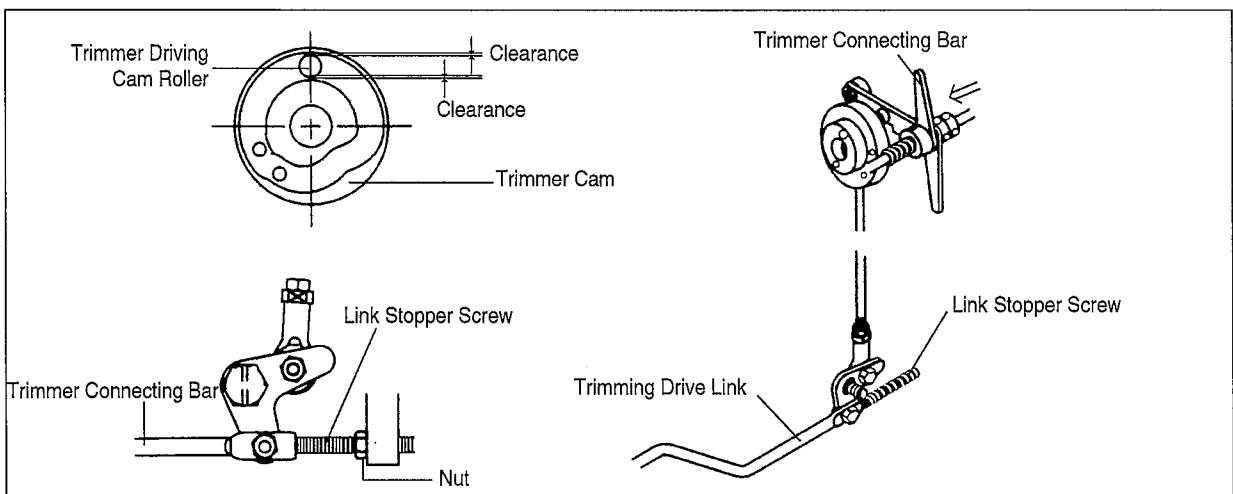
[Caution]

If there is an insufficient clearance between the trimming cam roller and both ends of the trimmer cam, trimming may not perform correctly, or the machine could be jammed at the beginning or at the end of sewing or trimming.

- ② With the trimming cam roller inserted into the moving range of the trimmer cam, adjust the end of the link stopper screw to touch the trimmer connecting bar[Ⓐ]. Then tighten the nut afterwards.

[Caution]

If the positioning is not correct, returning to the previous position after trimming could be delayed, and the first stitch may not be tight enough.



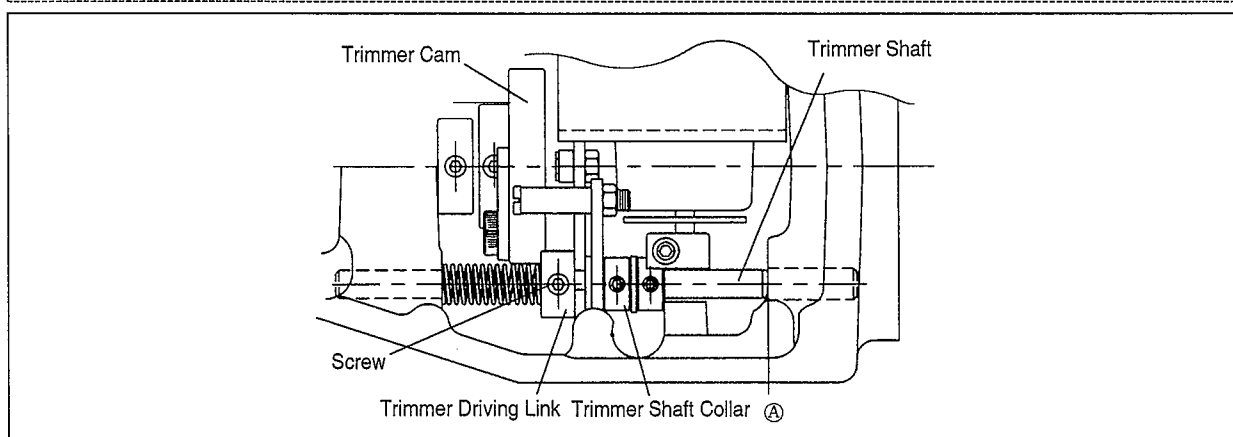
[Figure 66]

C. Setting the position of the trimming shaft

- ① Loosen screws of the trimmer driving link and the trimming shaft collar.
② Bring the trimming shaft tip to fit with the [Ⓐ]side of the arm.
③ Fasten the screws afterwards.

[Caution]

If the positioning is not appropriate, trimming may not perform correctly or the machine could be jammed.

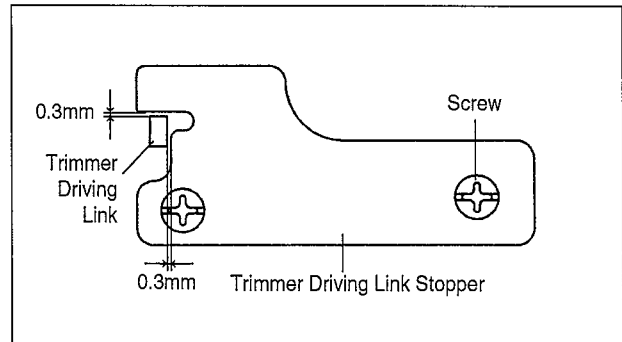


[Figure 67]

D. Setting the link stopper

- Ⓐ Loosen the screw of the trimmer driving link stopper while trimming is not in operation. Set the trimmer driving link and the trimmer driving link stopper notch 0.3mm apart from each other.
- Ⓑ Tighten the screw.

[Caution]
If the positioning is not appropriate, trimming may not function correctly and the machine could be jammed.

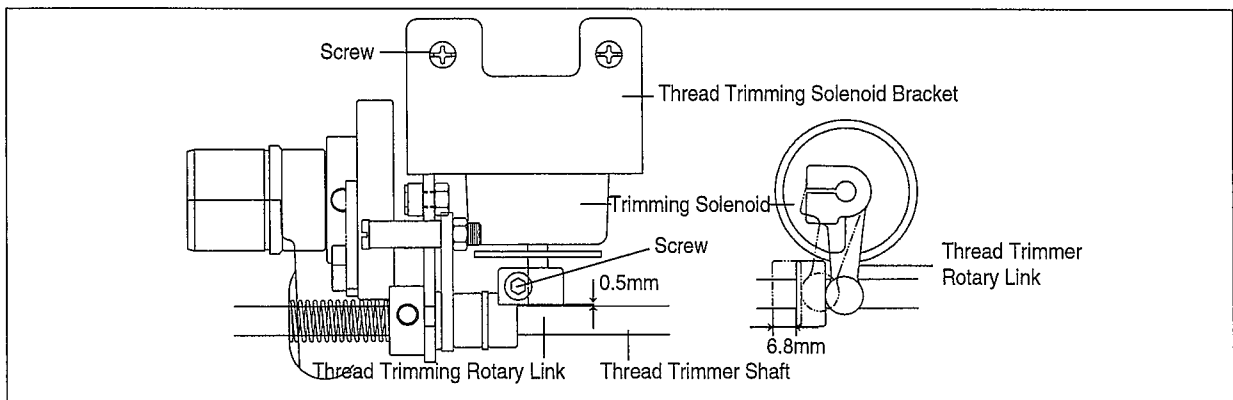


[Figure 68]

E. Setting the position of the trimming solenoid

- Ⓐ Unfasten the screw of the thread trimming solenoid bracket and set the trimmer shaft and the trimming solenoid rotary link 0.5 mm apart from each other. Tighten the screw afterwards.
- Ⓑ Loosen the screw of the thread trimming solenoid rotary link. Manually move the trimming solenoid rotary link to push the trimming shaft collar 6.8mm in the arrow direction. Then fasten the screw.
- Ⓒ Check if the trimming shaft collar returns to its place after the trimming solenoid rotary link returns.

[Caution]
If the positioning is not appropriate, thread release may be delayed and result in poor sewing quality.

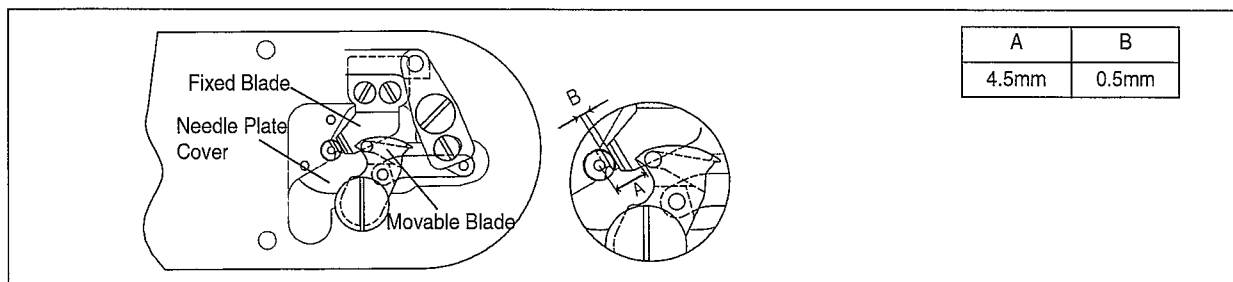


[Figure 69]

F. Adjusting the movable and the fixed blades

- Ⓐ When the needle bar stops in the high position, use a trimming lever screw to set a clearance A between the thread separation point of the movable blade and the needle plate hole as described in the table below.
- Ⓑ Adjust the clearance B between the fixed blade and the needle plate cover with a fixed blade screw, as indicated in the table below.
- Ⓒ Start trimming operation manually to check the position of the blades after adjustments.

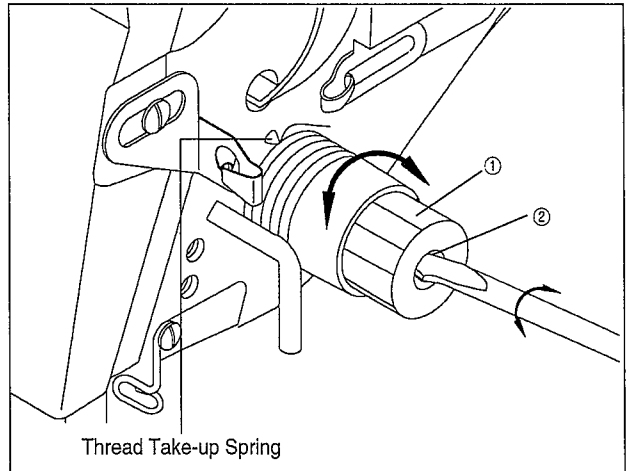
[Caution]
If the positioning is not appropriate, trimming may not function or the remaining thread quantity may not be sufficient.



[Figure 70]

9) Adjustment of the main thread adjustment device

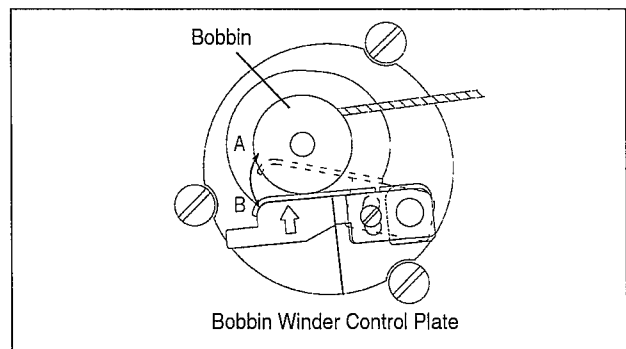
- A. To increase tension of the upper thread, turn the nut① of the thread control device in a clockwise direction, and turn it counterclockwise to lower the tension. Adjust the tension depending on various sewing conditions, e.g., sewing materials, threads, number of stitches, etc.
- B. For controlling tension of the thread take-up lever spring, use a driver to turn the groove on the edge of the thread tension control device② clockwise for more tension on the spring, and counterclockwise for less tension on the spring. (Normally, it moves 6~8mm and has tension of 30~50g)



[Figure 71]

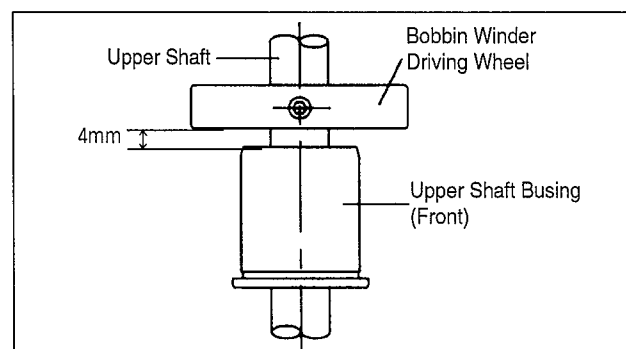
10) Adjustment of the bobbin winder

- A. Use the starting (initial) position of the winder control plate to adjust the winding capacity of the bobbin winder. Unfasten the screw to turn the control plate in the A direction for a large winding capacity, and turn it in the B direction for a small winding capacity.



[Figure 72]

- B. Set the thread winder driving wheel 4mm apart from the upper shaft busing (front) and tighten the screw.

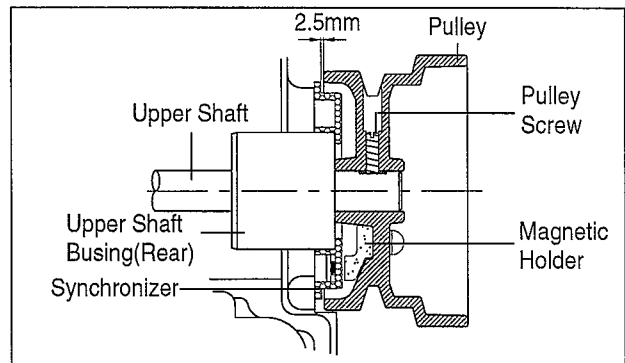


[Figure 73]

11) Positioning of the synchronizer (C-Series)

A. Installing the synchronizer

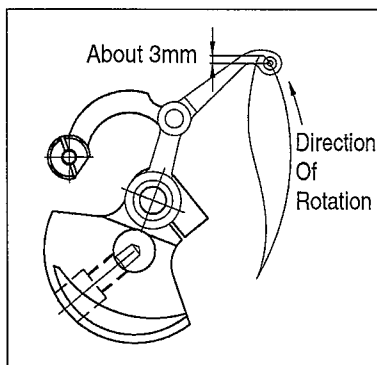
- a) Mount the synchronizer onto the backside of the arm.
- b) Set a clearance between the pulley and the synchronizer at 2.5mm, and then fasten the screw.



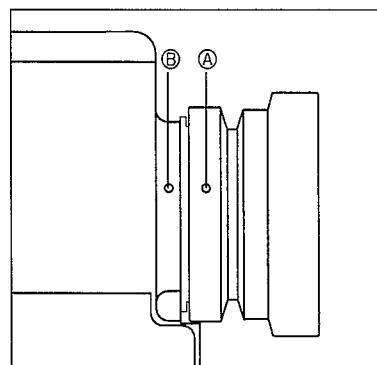
[Figure 74]

B. Adjusting the position of the synchronizer (position detector)

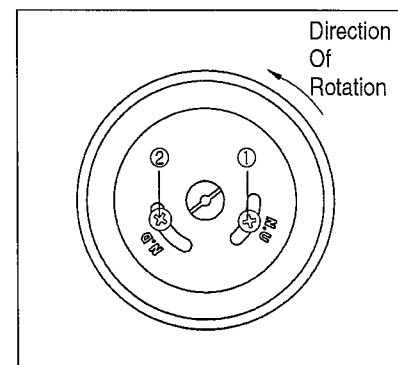
- a) Turn the pulley to adjust the position of the thread take-up lever as shown in the Figure. At this point, the white carved slot ① of the pulley should be parallel to the white carved slot ② of the arm.
- b) Adjust the screw ① on the carved N.U sign in the pulley until the carved point of the pulley ① and the carved point of the arm ② meet, and fasten the screw ①.
- c) Unfasten and move the screw ② of the carved N.D sign left and right. Position the screw at a point where the needle bar just starts to ascend from its lowest position.



[Figure 75]



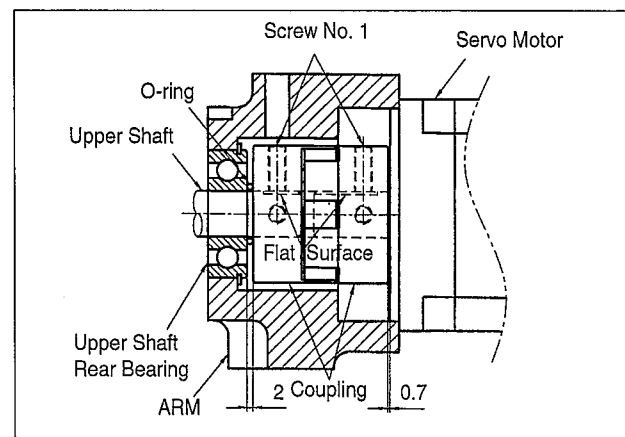
[Figure 76]



[Figure 77]

12) Installation and control of the direct drive motor (D-Series)

- A. To mount the coupling onto the Servo motor, accurately place the screw no. 1 of the coupling on the flat surface area of the Servo motor. Set a clearance between the coupling and the Servo motor at 0.7mm, and then fasten the screw.
 - B. To mount the coupling onto the upper shaft, accurately place the screw no. 1 of the coupling on the flat surface area of the upper shaft, and press it firmly towards the O-ring of the upper shaft rear bearing, leaving a clearance of 2mm. Then fasten the screw no. 1 of the coupling.
 - C. When binding the two couplings together, make sure that each screw of the couplings is aligned with each other.
- ※ If the coupling screws are not aligned with each other, the needle will not stop in normal position.

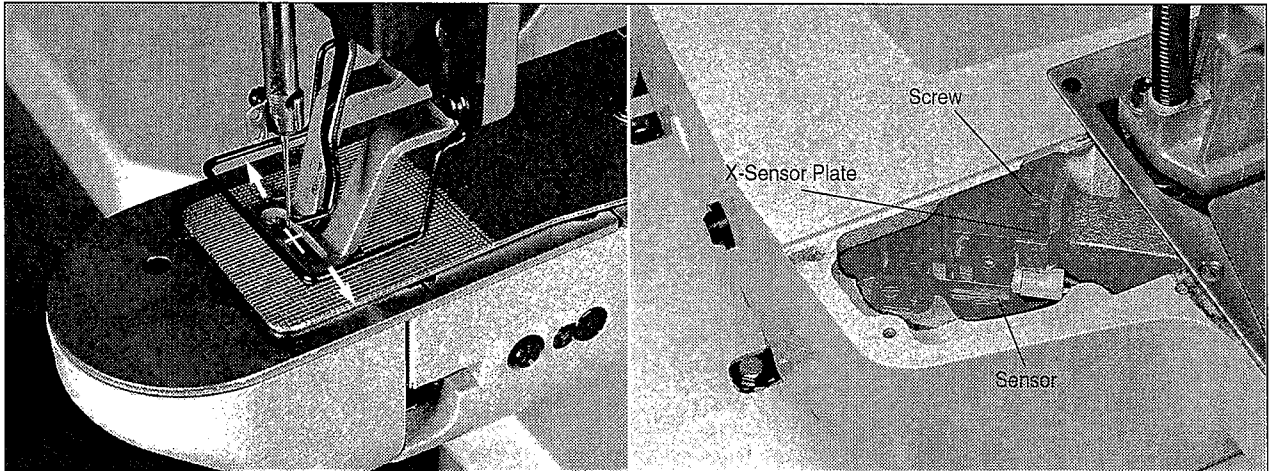


[Figure 78]

13) Setting up the X-Y origin

A. Setting up the X-axis origin

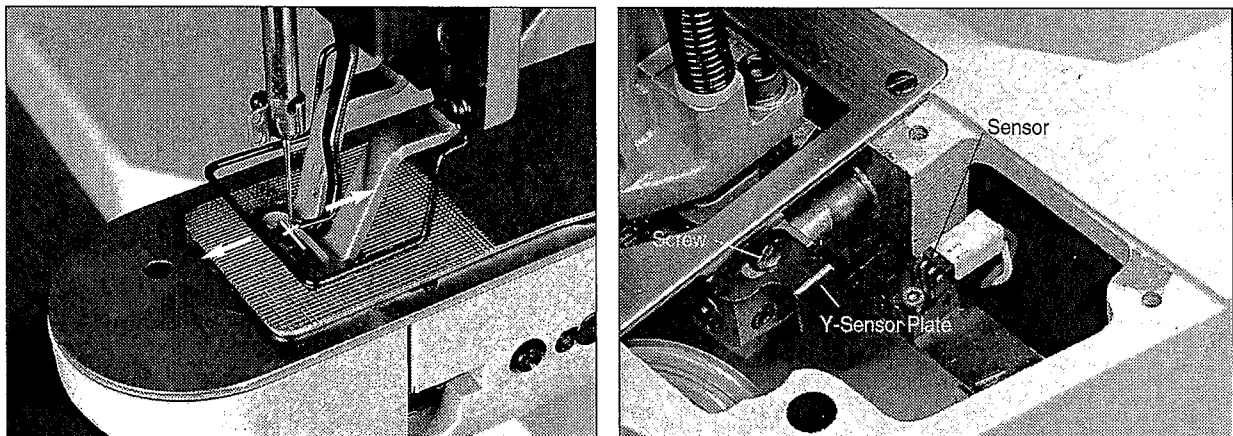
- Ⓐ Remove the bed cover (left).
- Ⓑ Move the center of the presser foot towards the center of the X-axis.
- Ⓒ Loosen the screw of the X-sensor plate as shown in the Figure. Move the end of the X-sensor plate towards the center of the sensor, and then tighten the screw with a screwdriver.



[Figure 79]

B. Setting up the Y-axis origin

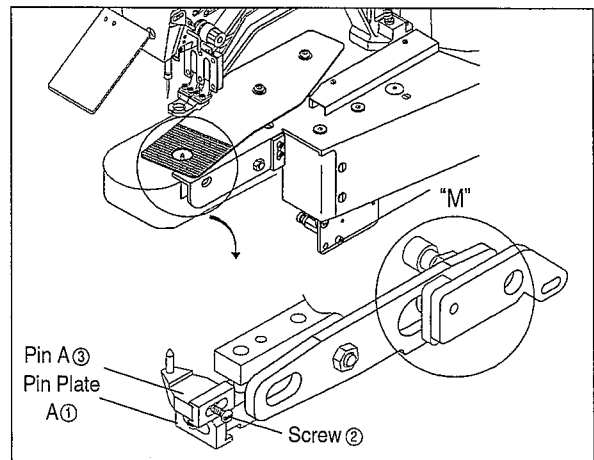
- Ⓐ Separate the bed cover (right).
- Ⓑ Move the center of the presser foot towards the center of the Y-axis.
- Ⓒ Loosen the screw of the Y-sensor plate as shown in the Figure. Move the end of the Y-sensor plate towards the center of the sensor, and then tighten the screw with a screwdriver.



[Figure 80]

14) Adjustment of the vent hole device

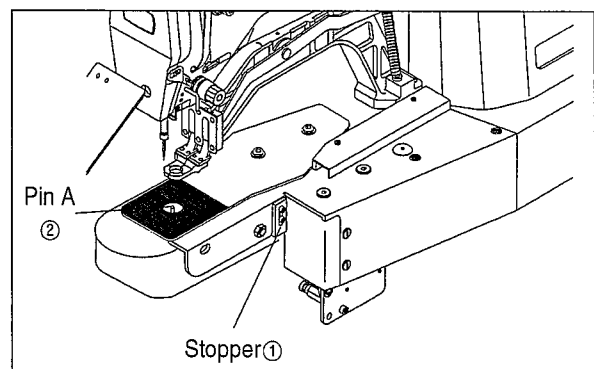
- A. Unfasten the screw ② of the pin plate A①. With your finger, push "M" part up and down to adjust the pin plate A①. The pin A③ should move vertically at the center of the needle plate groove. Tighten with a screw ② afterwards.



[Figure 81]

15) When the vent hold device is not used

- A. Check if the supporting plate of the stopper ① is facing inside. Adjust the stopper ① up and down to lower the pin A② below the needle plate. Fix with a screw afterwards.



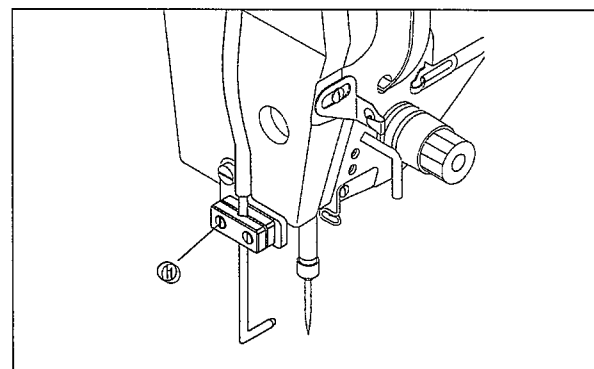
[Figure 82]

16) Adjusting and operating the needle cooler

The needle cooler moves simultaneously with the presser foot. When the presser foot begins to descend, operate the needle cooler and when the presser foot begins to ascend, stop the needle cooler.

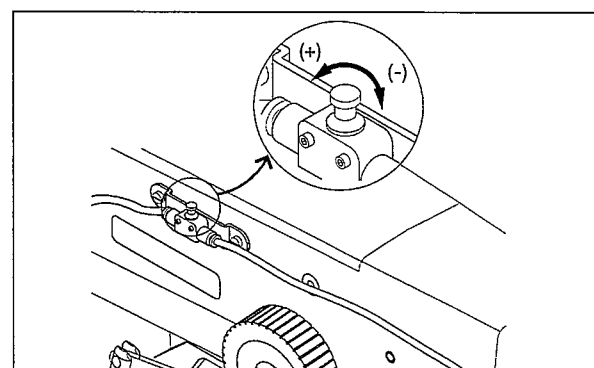
A. Adjusting the nozzle

Loosen two fixing screws ① only a little bit as shown in the figure. Set the nozzle in an optimal position and firmly tighten it back with the screws.



[Figure 83]

- B. Adjust the amount of air with the speed controller attached on the left part of the arm as shown in the figure. Refer to the figure for adjustments.



[Figure 84]

7

Cause of troubles and troubleshooting

1) Machine parts

No	Problems	Causes	Troubleshooting
1	Abnormal operation or driving of the machine	Excessive loosening of belt tension or damaged belt	Adjust the belt tension or exchange the belt
		Fuse shortage in the main power or circuit	Check the fuse shortage of the main shaft driving motor in the control box for replacement
		Deviation of the feed bracket from the X or Y threshold	Move the feed bracket to its normal position (within the range of the threshold switch)
2	Incorrect stop position	Loose main driving belt	Control the belt tension
		Improper position of the synchronizer	Adjust the position of the synchronizer
3	Needle breaks	Damaged needle (bent needle, cracks on the needle eye or the groove, abrasion or distortion of the needle tip)	Replace the needle
		Wrong installation of the needle	Install the needle correctly
		Needle contacting the shuttle	Control the clearance between the needle and the shuttle
4	Insert the thread properly	Thread breaks	Incorrect insertion of threads
		Wrong installation of the needle (Needle height or direction)	Reinsert the needle
		Damaged needle (bent needle, cracks on the needle eye or the groove, abrasion or distortion of the needle tip)	Replace the needle
		Excessive tension of upper and lower threads	Control the tension
		Excessive tension and stroke of the thread take-up lever spring	Control the tension and stroke of the thread take-up lever spring
		Cracks on the controlling hole of the shuttle surface spring	Replace the shuttle surface spring
5	Skipped stitches	Bent needle used	Replace the needle
		Improper needle size for threads used	Replace the needle
		Wrong installation of the needle	Reinstall the needle
		Improper timing of the needle and the shuttle	Adjust the timing of the needle and the shuttle
		Wide clearance between the groove and the shuttle point	Adjust the timing of the needle and the shuttle
		Excessive tension and stroke of thread take-up lever spring	Adjust the tension and stroke of the thread take-up lever spring

No	Problems	Causes	Troubleshooting
6	Errors in thread tension	Weak tension of the upper thread	Adjust the tension of the upper thread
		Weak tension of the lower thread	Adjust the tension of the lower thread
		Incorrect timing of the needle and the shuttle	Adjust the timing of the needle and the shuttle
7	Errors in trimming	Loose crossing tension between the movable and fixed blades	Adjust the tension of the fixed blade
		Abrasion of blade edges of the movable and fixed blades	Replace the movable and fixed blades
		Wrong position of the trimmer cam	Adjust the position of the trimmer cam

8

Pattern list

Use	No	Patten	No of stitches	Sewing area	
				X(mm)	Y(mm)
Thick and general materials	1		28	10	2
	2			16	2.5
	3		36	10	2
	4			16	2.5
	5		42	10	2
	6			16	2
	7			16	2.5
	8			24	3
	9		56	24	3
	10		64	24	3
Thin materials	11		21	6	2.5
	12		28	6	2.5
	13		36	6	2.5
Knitted materials	14		14	8	2
	15		21	8	2
	16		28	8	2
Straight line	17		21	10	0

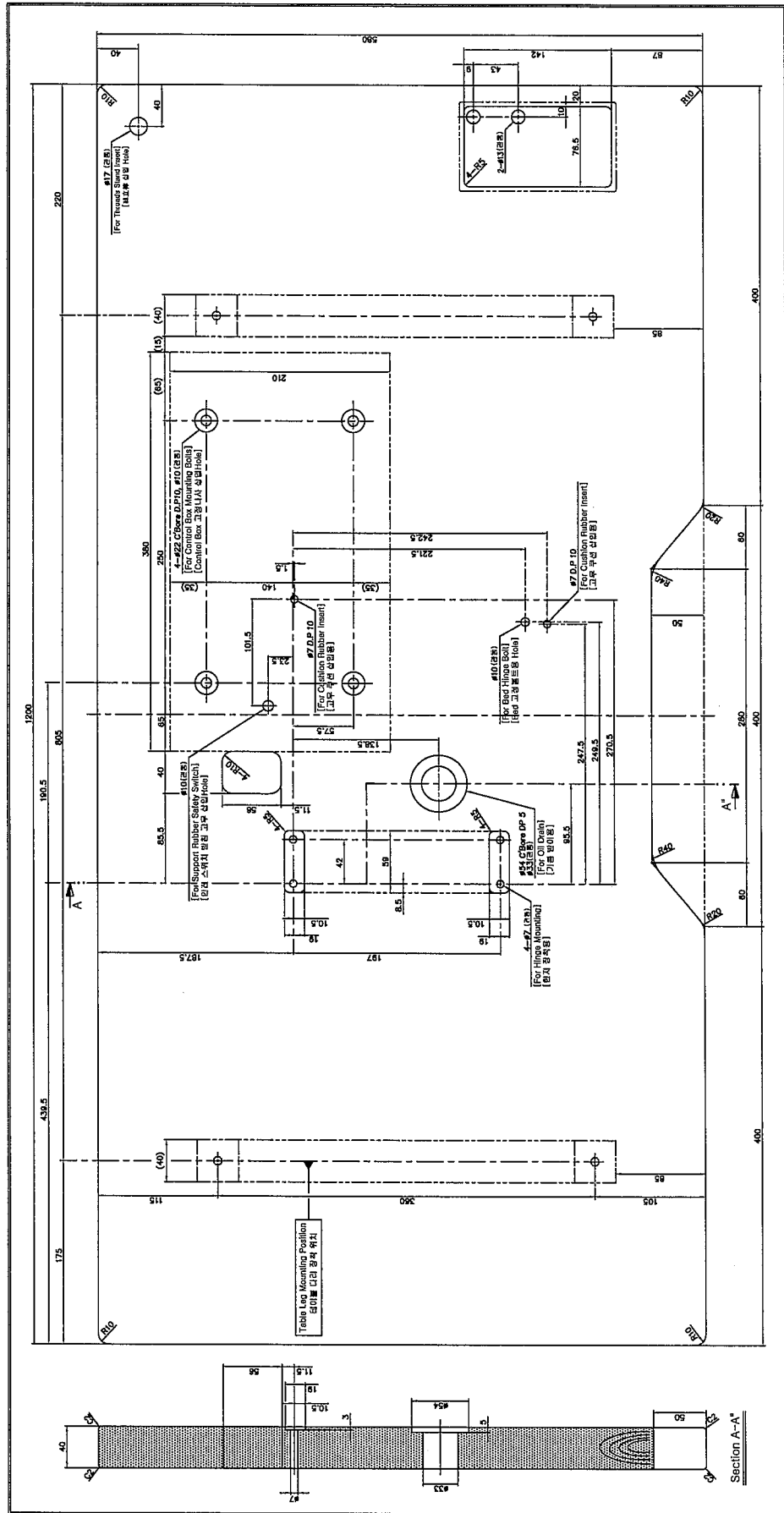
Use	No	Patten	No of stitches	Sewing area	
				X(mm)	Y(mm)
Straight line	18		28	10	0
	19			25	0
	20		36	25	0
	21		41	25	0
	22		44	35	0
Half-moon	31		42	11	7
	32		42	11	7

Vertical				
No.	23	24	25	26
Pattern				
No of stitches	28	36	42	56
Sewing area	X(mm)	4	4	4
	Y(mm)	20	20	20

Linear vertical				
No.	27	28	29	30
Pattern				
No of stitches	18	21	21	28
Sewing area	X(mm)	0	0	0
	Y(mm)	20	10	20















- Note) 1. 67 additional patterns available besides 32 basic patterns.
 2. Select a presser foot and a feeding plate appropriate for the sewing area of the pattern used.

Table drawing



10

Gauge list

No	Name					
		HA(Pneumatic)	H(Heavy materials)	M(Medium materials)	L (Light materials)	K (Knitted materials)
1	Thread take-up lever (ass'y) 	▽ 08S001P-306H			△ 08S001S-306H	
2	Link cam 	02-102A-120H			△ 02S002S-306H	
3	Thread guide of needle bar 	04-007A-120H		04-008A-120M		
4	Needle 	DP x17 #23	DP x17 #19	DP x5 #16	DP x5 #11	
5	Shuttle race ring 	07-021A-120H(carved H)		07-022A-120H (carved M)	07-023A-120L(carved L)	
6	Shuttle 	07-028A-120H		07-029A-120M		
7	Shuttle upper spring 	◇ 07S040S-306G			07-041G-120L 07-042G-120L	
8	Thread tension control device 	○ 40S001S-306H		◇ 40S001S-306G		
9	Needle plate cover 	10A042S-811E (φ 2.4)	10-041A-120H (φ 2.3)	10-043A-120H (φ 1.6 slit)	10-143A-120K (φ 1.6)	
10	Fixed blade 	○ 10S045S-306H	10-101A-120H			
11	Movable blade	○ 10S047S-306H	10-106A-120H			
12	Movable blade shoulder screw	○ 10S048S-306H	10-048A-120H			
13	Lifting lever spring 	-	22-016G-120H	22-016G-120M		
14	Presser foot (ass'y)	22-501A-120H	-	-	-	-
14-1	Presser foot (left) 	22-601A-120H(upper)	22-019A-120H	22-021A-120M	22-023A-120L	22-023A-120K
		22-602A-120H(lower)				22-123A-120K
14-2	Presser foot (right) 	22-603A-120H(upper)	22-020A-120H	22-022A-120M	22-024A-120L	22-024A-120K
		22-604A-120H(lower)				22-124A-120K
15	Feeding plate 	22-143A-120H	22-029A-120H	22-030A-120M	22-033A-120L	22-035A-120K
					22-034A-120L (without Knurling)	22-135A-120K (without Knurling)

NOTE) ○ : Common use with
 ◇ : Common use with
 △ : Common use with
 ▽ : Common use with

(Heavy materials)
 (Medium materials)
 (Standard stitch)
 (Perfect stitch)

Option list

● Standard type

Name	HA (Pneumatic pressure)		H (Heavy materials)		M (Medium materials)	
	Presser foot, Ass'y					
Ass'y	22-501A-120H		-		-	
Left	U: 22-601A-120H D: 22-602A-120H		22-019A-120H		22-021A-120M	
Right	U: 22-603A-120H D: 22-604A-120H		22-020A-120H		22-022A-120M	
Feeding plate						
	22-143A-120H		22-029A-120H		22-146A-120H	
22-146A-120H		22-030A-120M				
Name	L (For light materials)			K (For knitted materials)		
				Without Knurling		Without Knurling
Presser foot						
Left	22-023A-120L			22-023A-120K		22-123A-120K
Right	22-024A-120L			22-024A-120K		22-124A-120K
Feeding plate		Without Knurling	t=0.8	t=0.8 Without Knurling		Without Knurling
	22-033A-120L	22-034A-120L	22-035A-120L		22-035A-120K	22-135A-120K

● Option type

Name	Option-1	Option-2	Option-3	Option-4	Option-5	Option-5-1	Option-6
Presser foot							
Left	22-119A-120H	22-121A-120H	22-126A-120H	22-135A-120H	22-141A-120H	22-502A-120H (Ass'y)	22-144A-120H
Right	22-120A-120H	22-122A-120H	22-127A-120H	22-136A-120H	22-142A-120H		22-145A-120H
Feeding plate							
	22-129A-120H	22-130A-120H	22-128A-120H	22-030A-120M	22-143A-120H		22-147A-120H

Name	Option-Lengthwise	Option-Half-moon		Option-Circle		
Presser foot						
Left	22-123A-120L	22-131A-120H	22-231A-120H	22-138A-120H	22-238A-120H	22-539A-120H (Ass'y)
Right	22-124A-120L	22-132A-120H	22-232A-120H	22-139A-120H	22-239A-120H	
Feeding plate	Without Knurling 					
	22-133A-120L	22-134A-120H	22-234A-120H	22-140A-120H	22-240A-120H	
Finger guard		—	—			
	22-125A-120H	—	—	22-125A-120H		

12

Circuit diagram of air pressure system (HA type)

