



INDUSTRIAL SEWING MACHINE

MODEL

PLK-G3040R

TECHNICAL MANUAL

SEWING MACHINE HEAD

FOR SAFE USE

Before the installation, operation, and inspection for this product, read the “FOR SAFE USE” and the technical manuals carefully. Also read the other technical manuals, “Control Unit” and “Operation Panel” describing some instructions, which are not in this manual, and use the sewing machine properly.

SAFETY INDICATIONS

| | | |
|--|----------------|--|
| | DANGER | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
| | CAUTION | Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage. Note that CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety. |

CAUTION INDICATIONS

| No. | Caution indication | Description |
|-----|--------------------|--|
| 1 | | <p><u>Precaution for sewing machine operation:</u></p> <p>Indicates that removing the safety and operating the sewing machine for some other purposes with power-on are prohibited.</p> <ul style="list-style-type: none"> ● Please do not operate the sewing machine without protective equipment such as a needle guard, an eye guard, a belt cover or the others. ● Please turn off the power switch when threading, changing a needle and a bobbin, cleaning, and lubricating. |
| 2 | | <p><u>Caution for fingers injury:</u></p> <p>Indicates a possibility of fingers (hands) injury in a certain condition.</p> |
| 3 | | <p><u>Caution for squeezing fingers:</u></p> <p>Indicates a possibility of squeezing fingers in a certain condition.</p> |

SAFETY PRECAUTIONS



To prevent from receiving an electric shock, always turn off a power switch and unplug power supply when opening a control box, and then open after ten minutes passes.



USAGE ENVIRONMENT

Please do not operate the sewing machine under the following conditions.

- (1) In the ambient temperature of 35 degrees (95°F) or more than 35 degrees, or the ambient temperature of 5 degrees or less than 5 degrees (41°F).
- (2) In the ambient temperature of 55 degrees (131°F) or more than 55 degrees, or the ambient temperature of -10 degrees or less than -10 degrees (18°F) during transportation.
- (3) In the relative humidity exceeding 85% or less than 45%.
- (4) In the open-air place or the location that receives direct sunlight.
- (5) In the place near heat sources such as heating devices.
- (6) In the atmosphere filled with dust, explosive gas, or corrosive gas.
- (7) In the place where the fluctuation in the power voltage of 10% or more than 10%, or the power voltage of -10% or less than -10% of the fixed power voltage.
- (8) In the place where the power source cannot supply enough voltage to keep the motor running.
- (9) In the place filled with strong electric noises such as high-frequency welders.

INSTALLATION

- (1) Please have some specialists, who have enough experience for the sewing machine installations, install the sewing machine.
- (2) Please have a qualified electrician perform necessary electric wiring.
- (3) Please do not operate until the sewing machine is repaired when any damage or fault is found on the sewing machine at the installation.
- (4) Please do not refurbish the sewing machine.
- (5) The sewing machine is heavy. For the safety, please make sure to install the sewing machine head by more than one person.
- (6) Please make sure to fit the safety protective equipment (the motor cover or the others) and the accessory protective equipment (the eye guard) that removed temporarily for installation.

SEWING

- (1) Please make sure to turn the power switch off before installing or replacing needles.
- (2) Please pay attention for the fingers not to be injured by the needle point.
- (3) Please make sure to turn power switch off before lubricating.
- (4) Please pay attention that oil does not get on your skin or in your eyes as it may cause an inflammation.
- (5) Please make sure to keep oil out of the reach of children who may drink oil by mistake.
- (6) Please make sure to turn the power switch off before threading a needle.
- (7) Before starting the sewing, please make sure the position and the function of the halt switch.
- (8) Please do not touch the operating parts during sewing operation.
- (9) It is very dangerous to operate the sewing machine without safety guards (eye guards, motor covers, link covers, finger guards or the others).
Please make sure to operate the sewing machine with safety guards.
- (10) Please make sure to turn the power switch off when stopping the sewing machine temporarily.

ADJUSTMENT

- (1) Please make sure to turn the power switch off before adjusting the sewing machine.
- (2) If the adjustment is required while the power switch on, do not step on the foot switch by mistake.
- (3) Please be careful not to be injured by a sharp part such as the needle and the shuttle hook point.
- (4) Please make sure to put the safety guards (eye guards, motor covers, link covers, and finger guards or the others) back on the initial position after the sewing machine adjustment.

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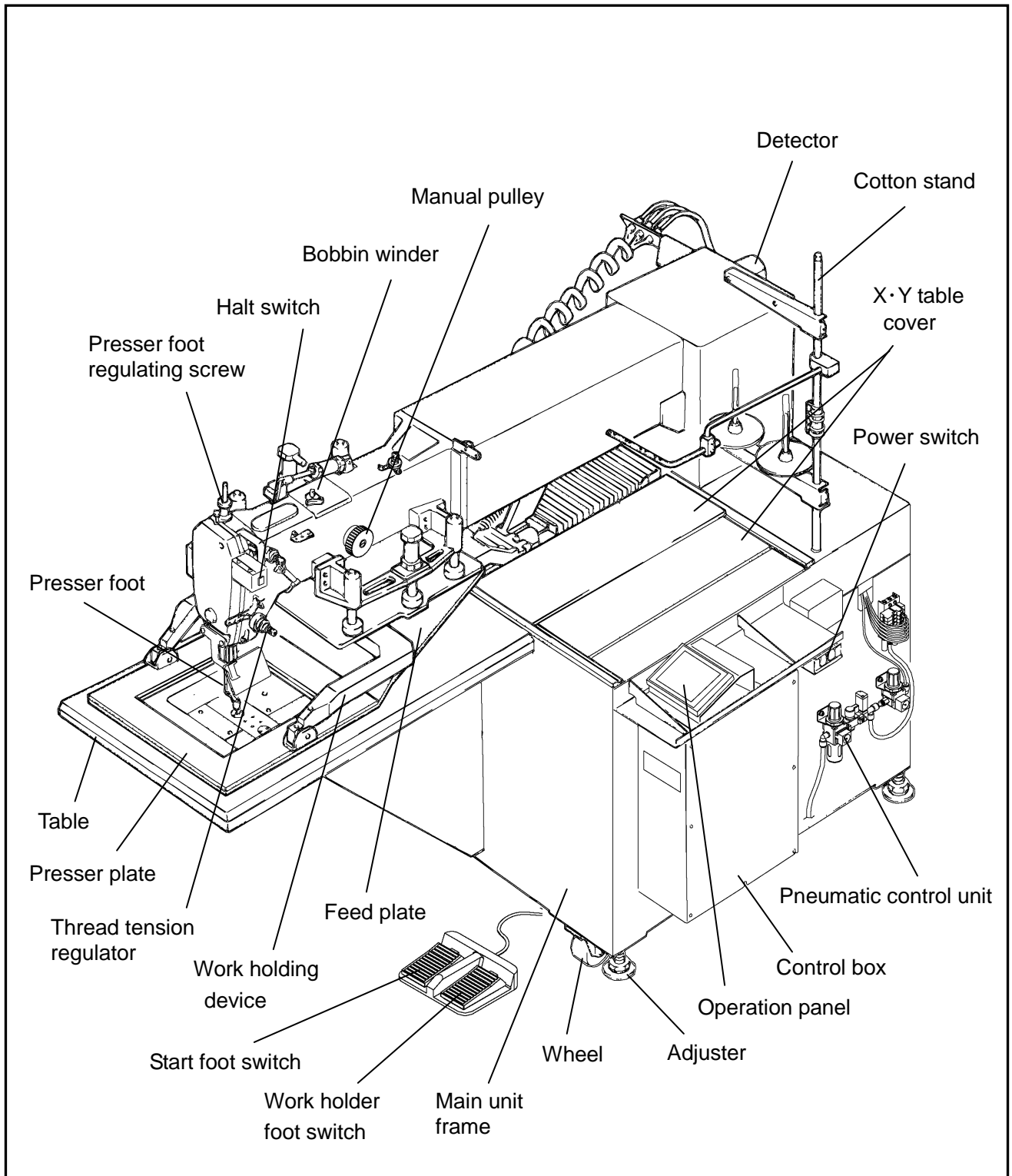
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1. STRUCTURE OF THE SEWING MACHINE

PLK-G3040R electronic pattern sewing machine consists of the following main parts.



2. SPECIFICATIONS

| | |
|-----------------------------------|---|
| Model | PLK-G3040R |
| Sewing area | X-direction (left/right) 300 mm |
| | Y-direction (front / back) 400 mm |
| Maximum sewing speed | 1,000 rpm (for stitch length of less than 4 mm) |
| Setting speed | 10 speed levels in 200 rpm to 1,000 rpm |
| Stitch length | 0.1 to 20.0 mm |
| Stitch type | Single needle lock stitch |
| Maximum number of needles | 20,000 per pattern |
| Storable sewing data item | 900 patterns (internal memory) |
| Data memory | Internal memory, USB memory |
| Needle bar stroke | 50.8 mm |
| Thread take up lever stroke | 100 mm |
| Class of needle | DDX1#26 (at standard installation) |
| Presser foot lift ^{*1} | 15 mm |
| Presser foot stroke ^{*2} | Three phases of 0mm,4.5mm,9mm (9mm as factory default setting) |
| Work holder lift | 50 mm |
| Work holder laden weight | The standard cloth holding device + Max. 4 Kg |
| Hook | Fully-rotating special large size hook |
| Bobbin case | With non racing spring |
| Bobbin | Steel bobbin for special large size hook |
| Thread trimmer system | Horizontal engagement with fixed knife and movable knife |
| Lubrication system | Manual oiling and replenishment with the oil braids from the oil tanks |
| Lubrication oil | Pulley SF oil |
| X-Y drive system | Stepping motor feedback control |
| | Timing belt drive system Intermittent or continuous feeding ^{*3} |
| Machine dimensions (W)x(L)x(H) | 1,280mm x 2,200mm x 1,250mm |
| Weight | Total 620 Kg |
| Type of motor | XL-G554-20(Y) |
| Type of controller | PLK-G-CU-20-M |
| Type of operation panel | PLK-G-PAL |
| Power | The power in 100V to 120V or in 380V to 415V is compatible with power unit (option) |

*1 : Presser foot lift is the height of the presser foot after the sewing has stopped.

*2 : Presser foot stroke is the up and down movement of the presser foot while sewing.

*3 : Recommend intermittent feeding.

3. INSTALLATION

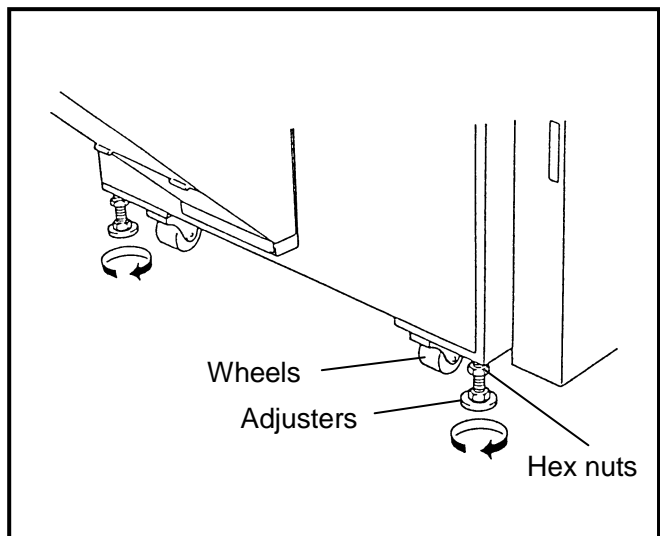


CAUTION

- (1) Please have some specialists, who have enough experience for the sewing machine installations, install the sewing machine.
- (2) Please have a Qualified Electrician perform necessary electric wiring.
- (3) Please do not operate until the sewing machine is repaired when any damage or fault is found on the sewing machine at the installation.
- (4) Please do not refurbish the sewing machine.

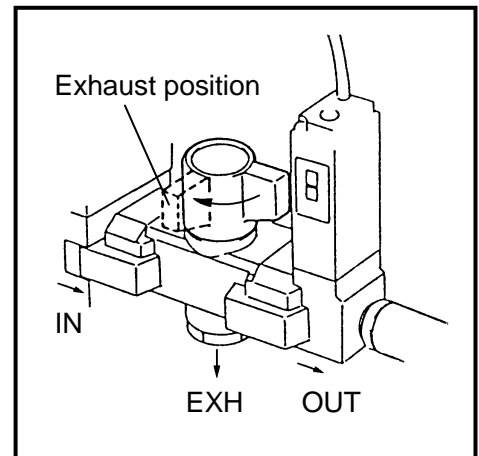
3-1. Securing the Sewing Machine Table

- (1) Install the table at a rigid and flat floor to avoid the chatter.
- (2) When the table was placed in position, lift a little wheels using the adjuster provided at the bottom of table and fix the table. After the fixing, lock it in position with hex nuts attached to the adjusters. (see the right fig.)
- (3) When the sling hooks at 4 corners of table is obstructing the work, remove and keep for the future use.



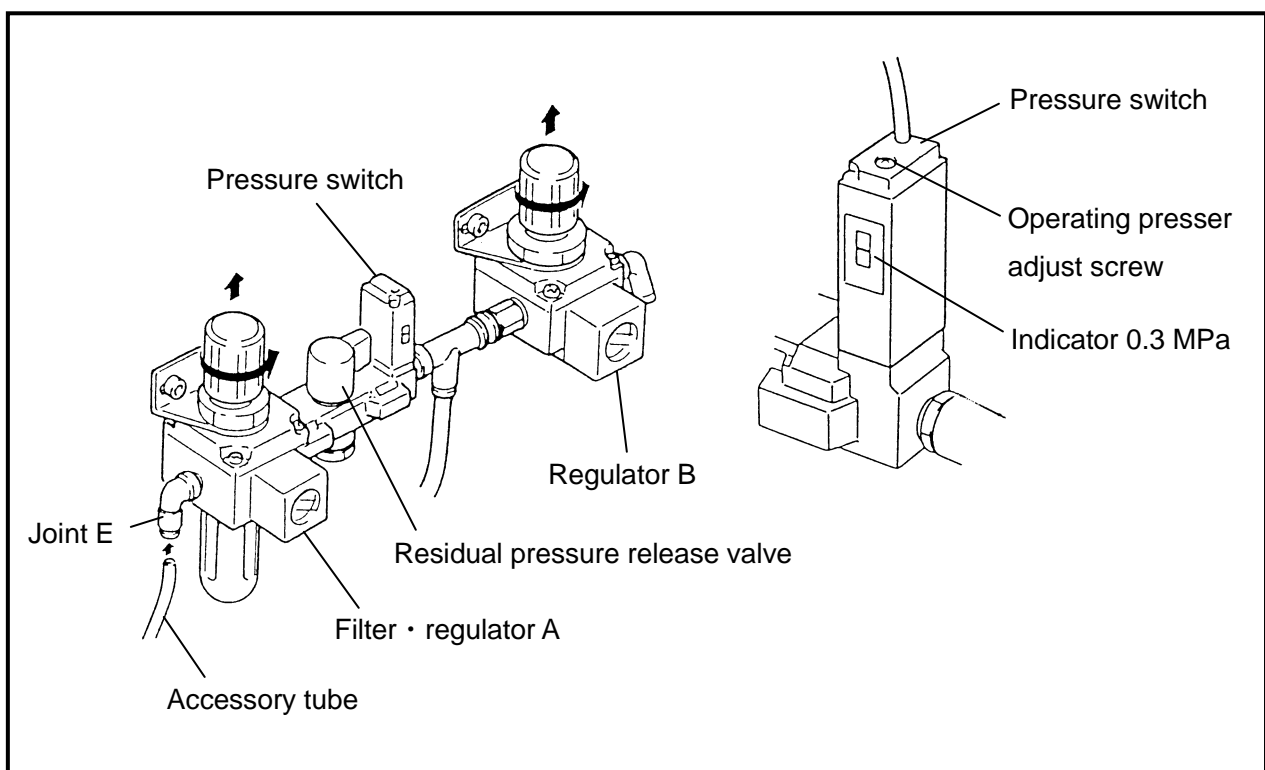
3-2. Connection of Air Tube

- (1) Connect the attached tube between the joint E of air pressure control unit (see the lower fig.) and the compressor.
- (2) Turn the residual pressure exhaust valve lever to right. Compressed air is fed from IN to OUT and supplied to the air cylinder through a solenoid valve. Be careful because this operation starts synchronously all units driven via the air cylinder. By the way, the residual pressure exhaust valve is installed for the safety at the inspection or repair and it releases compressed air from the pipe and prevents unexpected operation of air cylinder. If the residual pressure exhaust valve lever is turned to this side (position indicated with broken line in the right fig.), valve at IN side closes and, synchronously with the compressed air supply interruption, compressed air in the air cylinder is reversed from OUT to EXH and released to the atmosphere.
- (3) Set the air pressure of main circuit at 0.4 MPa with the filter regulator A. Set the pressure to the slider air circuit at 0.2 ± 0.05 MPa with the regulator B.



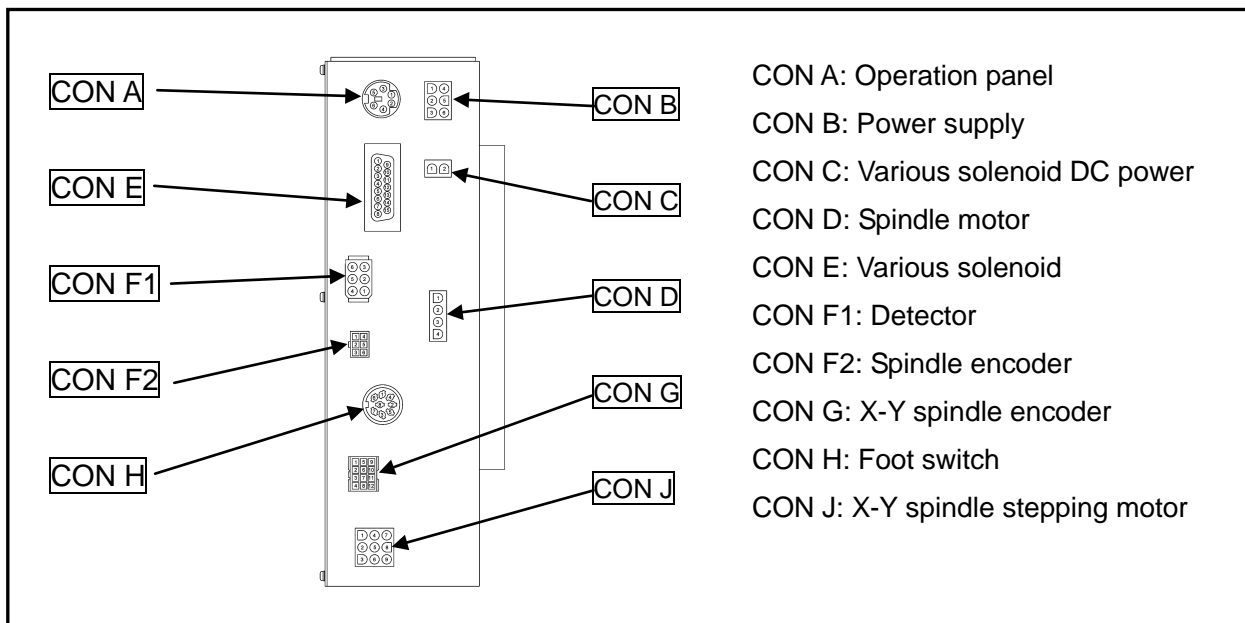
[Notice] Since the pressure of slider air circuit (regulator B) is related to the stitching tension, do not adjust it below 0.15 MPa or beyond 0.25 MPa.

- (4) Confirm that the operating pressure of pressure switch is set at 0.3 MPa. If it is not correct, turn the operating pressure adjust screw with a flat head screwdriver and set the needle at 0.3 MPa. This value is the pressure drop detecting pressure.



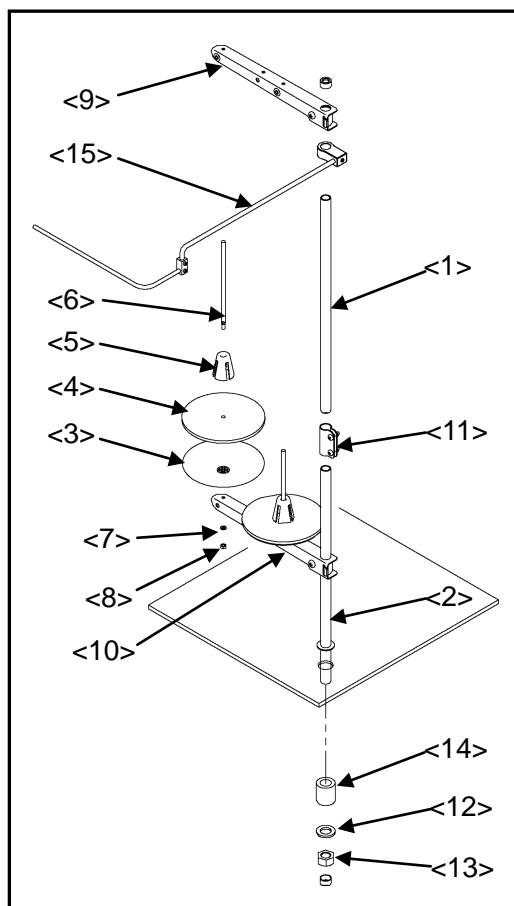
3-3. Installation of the foot switch, and connection of the control cables

Connect the foot switch to the connector CON H. The foot switch is enclosed in the accessory box. Control cable to connect to already be connected as shown on the figure below.



3-4. Installation of the thread stand

- (1) Assemble the parts (No.1 to No.11 , and No.15) of the thread stand as shown on the figure.
- (2) Fit the thread stand into the hole at the far right on the table stand with the nut (No.13) , the washer (No.12) and the collar (No.14).



- <1>: Upper column pipe
- <2>: Lower column pipe
- <3>: Spool stand base (two stand bases)
- <4>: Spool mat (two mats)
- <5>: Spool holder (two holders)
- <6>: Spool shaft (two shafts)
- <7>: Spring washer (two washers)
- <8>: Nut (four nuts)
- <9>: Thread hunger
- <10>: Spool holder
- <11>: Column joint
- <12>: Washer
- <13>: Nut
- <14>: Collar
- <15>: Thread tension guide

4. LUBRICATION



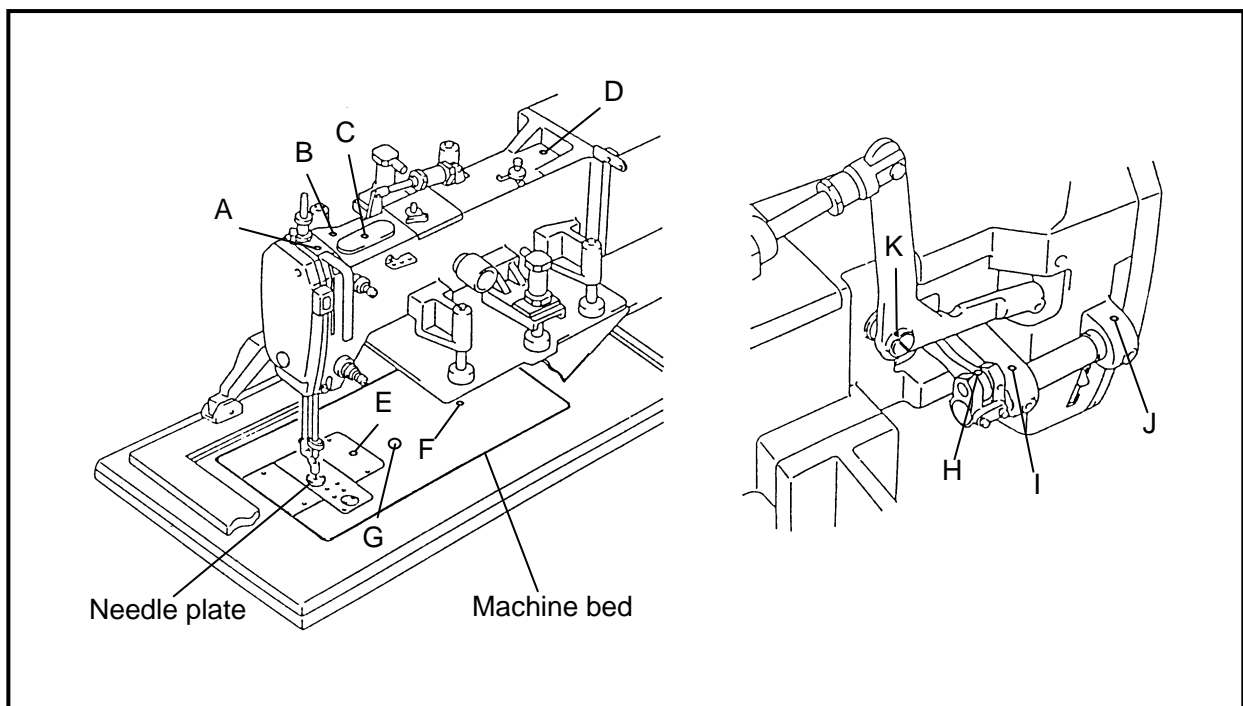
CAUTION

- (1) Please make sure to turn power switch off before lubricating.
- (2) Please pay attention that oil does not get on your skin or in your eyes as it may cause an inflammation.
- (3) Please make sure to keep oil out of the reach of children who may drink oil by mistake.
- (4) Please make sure to lubricate when operating for the first time after the installation. Also, please make sure to check the amount of oil when the machine has not been used for a long time.

[Notice] Please use a pulley oil SF oil.

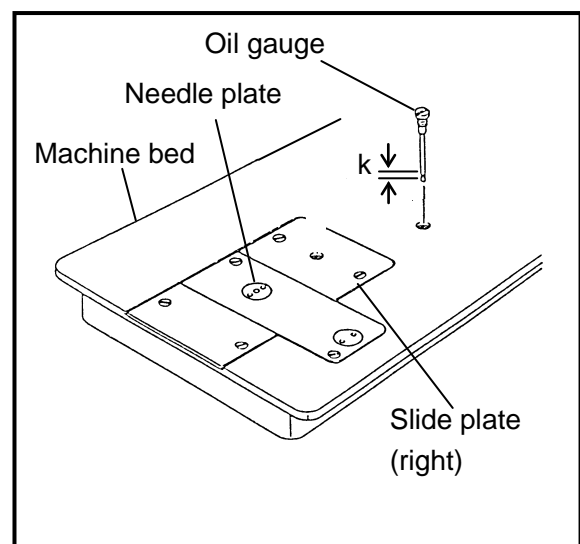
4-1. Oiling

Before proceeding with operation, be sure to lubricate, as necessary, parts A to K indicated by the arrows in the figure.



4-2. Filling the oil tank

Draw out the oil gauge at top face of machine bed, supply oil up to the depth k. Insufficient oil reservation may induce the burning due to interrupted oil supply to the hook, each section of bed. Make sure to check the indication on the oil gauge so as to replenish oil timely.



5. PROPER OPERATION

5-1. Initial setting of the control box

When using the sewing machine for the first time, the model and the language of the sewing machine in use have to be set.

Refer to the instructions in the paragraph “[6] Initial Setting of System (Model/language Setting)” in the **CONTROL UNIT** technical manual.

5-2. Installation of the needle

CAUTION

(1) Please make sure to turn the power switch off before installing or replacing needles.

(2) Please pay attention for the fingers not to be injured by the needle point.

(1) Before installing or removing the needle, turn off the power so that the sewing machine will not be started up in error.

(2) Insert the needle into the needle socket as far as it will go.

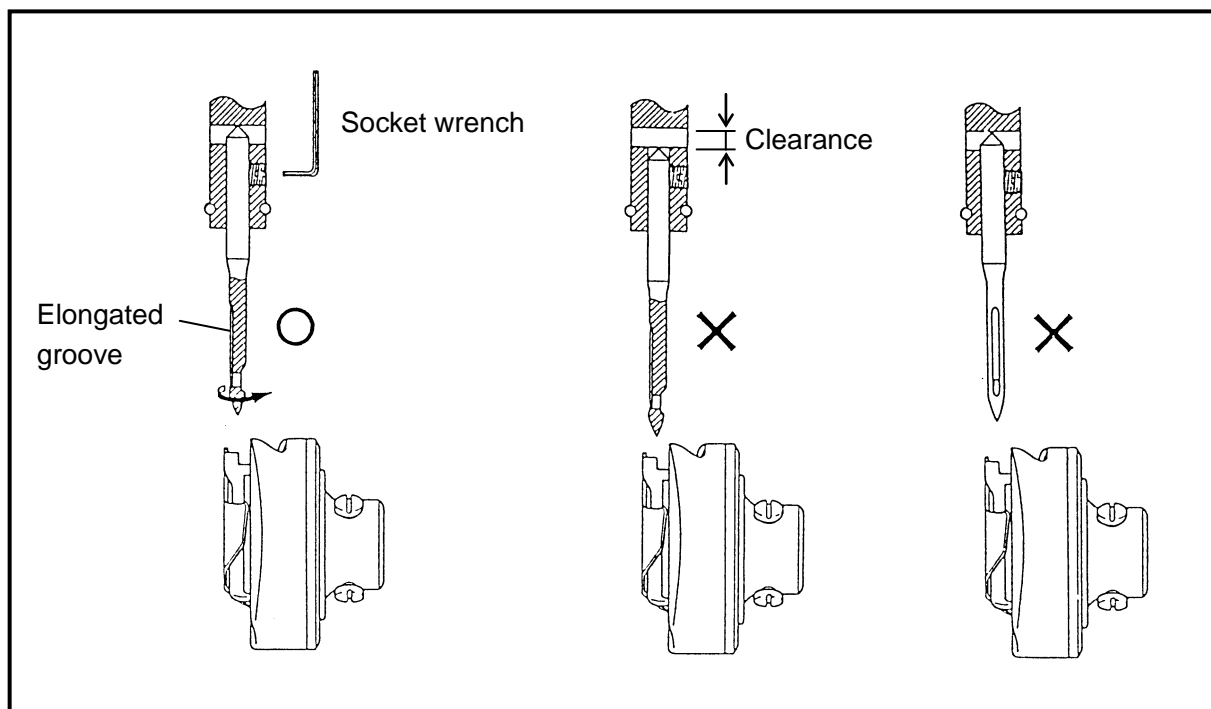
(3) Place the elongated groove at the opposite position against the hook head.

(4) For more satisfactory stitching results, it is recommended that the needle be turned by about 10° in the direction of the arrow in the figure.

Insert the needle until it comes to the end, turn the elongated groove toward you, and tighten up the screw.

Needle has not been inserted far enough.

Pointing in wrong direction.

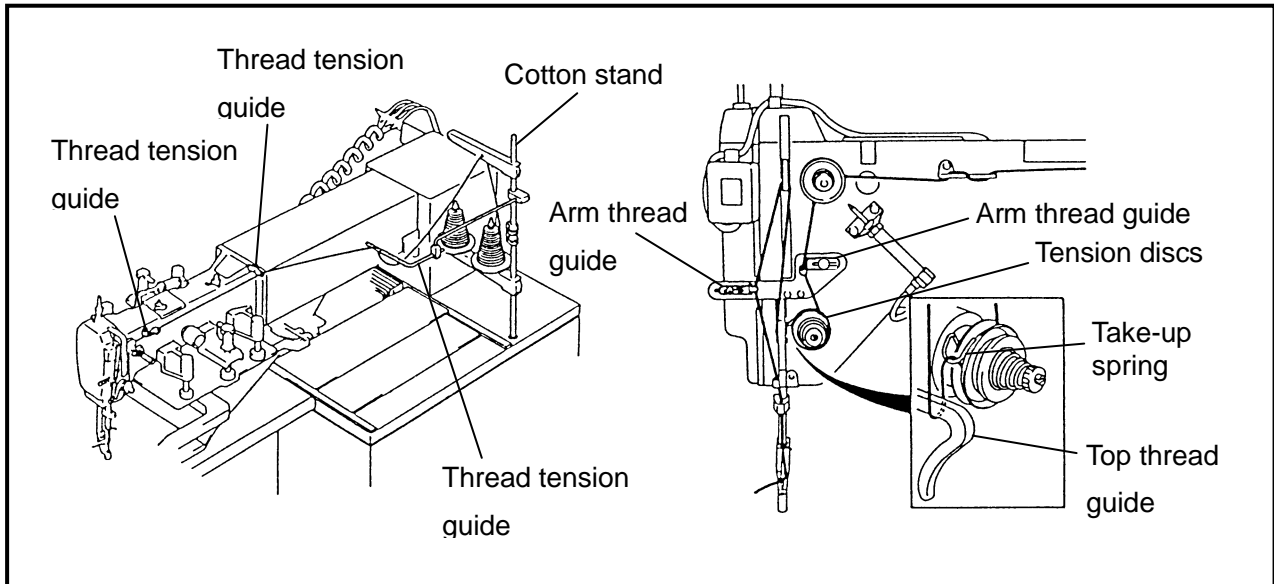


5-3. Threading the upper thread



(1) Please turn the power switch off when threading a needle.

The needle thread should be threaded, as shown on the figure, with the thread end extended about 4 cm from the needle.



5-4. Winding the bobbin thread



(1) Please do not touch the rotating part during winding thread. Doing so may cause injury and/or the machine failure.

(2) Please make sure to pull the upper thread out of the needle before winding the bobbin thread.

(1) Route the thread as shown in the below figure then, wind the thread to the bobbin (No.1) in the direction of "a" arrow several times. Then fit the bobbin to the bobbin winder (No.2) and push in the bobbin presser arm (No.3) to the direction "b".

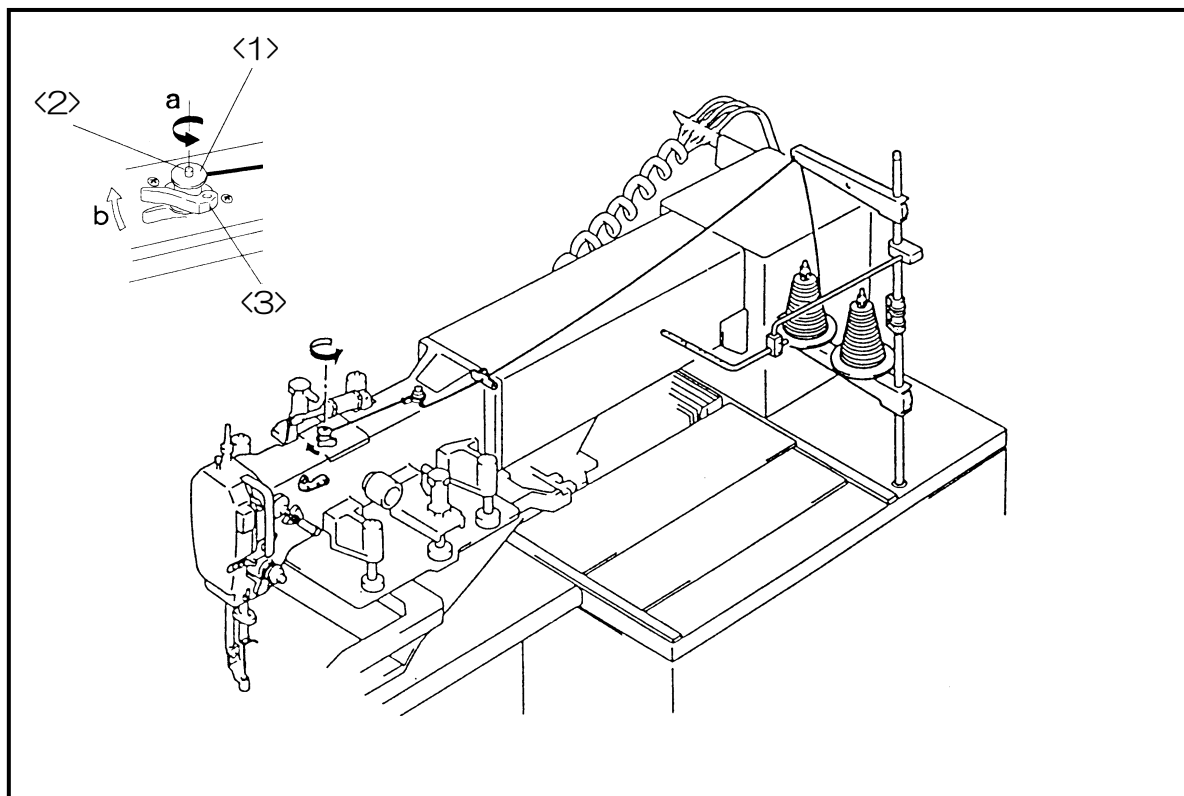
(2) With the machine in the Bobbin Wind Mode, step on the work holder foot switch first and then the start switch second so that the thread continues winding to the bobbin while the start switch is stepped on.

(3) When the bobbin finishes winding a certain amount (80 to 90 % of the outside diameter of bobbin) of thread, the bobbin presser arm is returned to the initial position.

(4) To wind the bobbin thread during the sewing operation, carry out the procedure (1) above then, the bobbin winding is performed automatically.

For the bobbin winding mode, refer to the instructions in the paragraph "[3] Explanations of basic screen, icons and operation "5. The Bobbin Winding screen" is explained below" in the

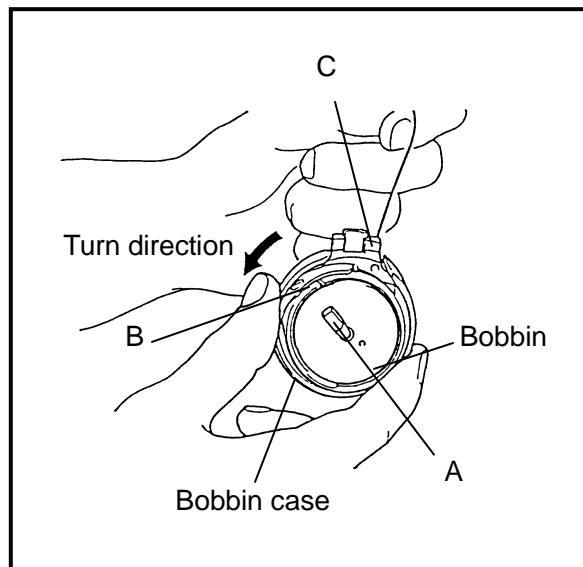
OPERATION PANEL technical manual.



<1>: Bobbin <2>: Bobbin winder <3>: Bobbin presser arm

5-5. Setting the bobbin

- (1) Set a bobbin in the bobbin case.
- (2) Raise the bobbin holding lever A of bobbin case to set.
- (3) Introduce the thread in the cut groove B of bobbin case and pass through the thread hole C.
- (4) Pull the thread and confirm the bobbin turns in the counterclockwise direction. If it turns in reverse direction, invert the bobbin.

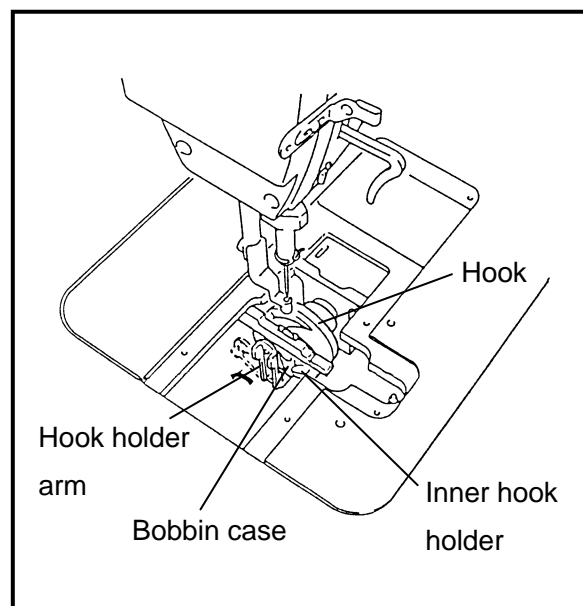


5-6. Setting the bobbin case

- (1) Open the hook cover.
- (2) Bring the thread take up lever at the highest position.
- (3) Turn to left the hook holder arm under the machine table.

[Notice] Pull the thread end about 3 cm out of the bobbin case.

- (4) Insert securely the bobbin case, from its head first, into the hook.
- (5) Turn to right the hook holder arm to lock the bobbin case in position.
- (6) Close the hook cover.




6. SEWING





CAUTION

- (1) Before starting the sewing, please make sure the position and the function of the halt switch.
- (2) Please do not touch the operating parts during sewing operation.
- (3) It is very dangerous to operate the sewing machine without safety guards (eye guards, belt covers, link covers, finger guards or the others). Please make sure to operate the sewing machine with safety guards.
- (4) Please make sure to turn the power switch off when stopping the sewing machine temporarily.


6-1. The sewing operation


- (1) Turn the power switch on.
- (2) When the black foot switch is stepped on, the presser plate goes down.
- (3) Press the home position return icon .
- (4) Select a sewing data.


Press the  on the standard screen then, press the .

- (5) Select a target (internal memory/USB memory) to read the data from.

The screen as default setting is set to the reading from internal memory mode.


(The mode display at the left top on the screen is )

Press the , when switching the reading from the internal memory to the reading from USB memory mode.



(Pressing the  also can switch the target.)

Press the  to switch the page with full of data.

- (6) Select a data then, set the data.

Press the target data number then, press the .

- (7) Set the sewing speed.

Set the appropriate sewing speed by selecting  or . (10 selections of 0 to 9)

- (8) Set the sewing material upper the feed plate.


- (9) When the black foot switch is stepped on, the presser plate goes down.

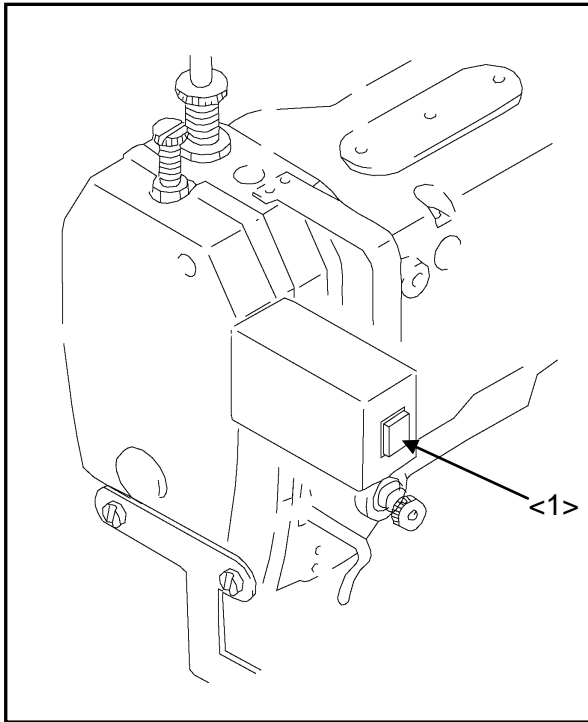
(When the sewing material has to be reset, step the black color foot switch again to make the presser plate go up.)

- (10) Step on the gray color start switch so that the sewing machine starts sewing,

- (11) After the sewing finishes, the presser plate is lifted automatically then, the sewing material is released.

6-2. Operation of the halt switch

- (1) If accidents such as a thread breakage, needle breakage and others happened during the sewing, press the halt switch immediately.
The sewing machine stops instantly.
- (2) To cancel the halt state, press the halt switch again.
- (3) When continuing sewing, step on the grey foot switch to restart at the halted position. (Press the jogging in forward/reverse direction icon so that the sewing start position will move.)
- (4) To cancel sewing, press the home position return icon .

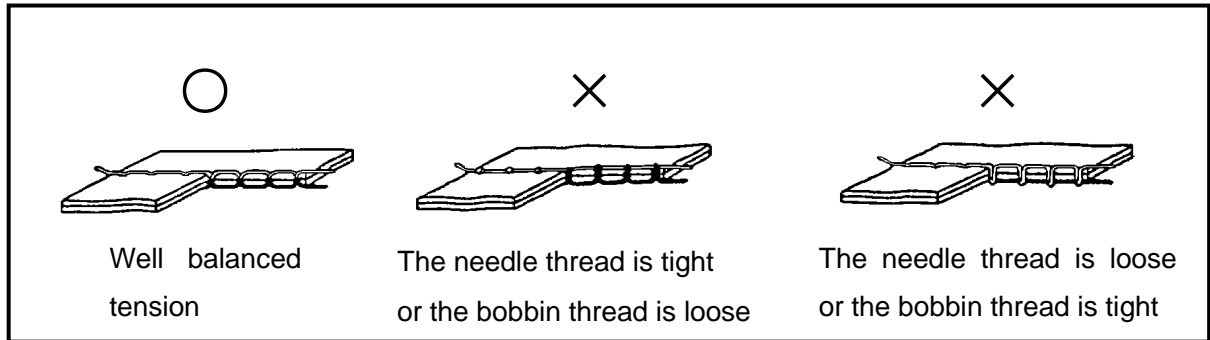


<1>: Halt switch

6-3. Thread tension

Attain a balance between the needle thread tension and bobbin thread tension.

- (1) As shown in Figure, the optimum tension balance is yielded when the needle thread is interlocked with the bobbin thread along the center line of the fabric layers.

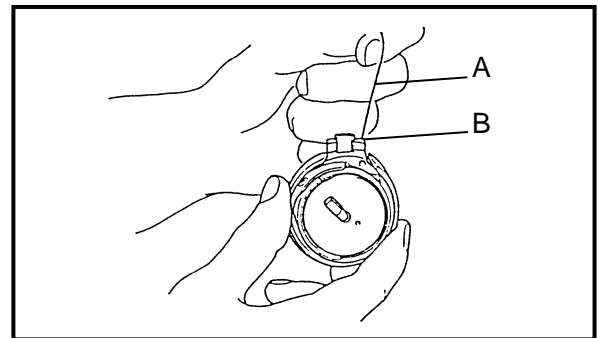


- (2) Needle thread tension is adjusted based on the bobbin thread tension. Bobbin thread is adjusted with the pressure of tension adjusting spring while the needle thread is adjusted with the pressure of thread tension discs of thread tension regulator (lower), intensity of thread take-up spring, shift distance of the spring and thread tension discs of thread tension regulator (upper).

6-4. Adjustment of the thread tension

6-4-1. Adjustment of the bobbin thread tension

- (1) Insert the thread wound bobbin in the bobbin case and pass the thread end A through the thread slit B. Following explanation is based on the case where the #0 Polyester thread is used.



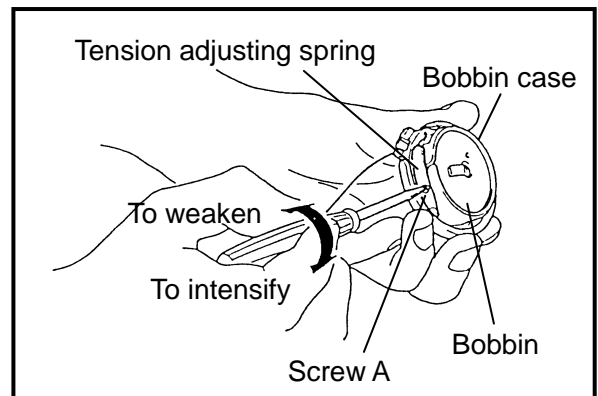
- (2) Pull the thread end A.

Standard tension ... 2~2.5 N

Adjust the tension with which the thread is taken out from the bobbin case, with the bobbin case tension adjusting spring screw A.

Right turns ... Intensified.

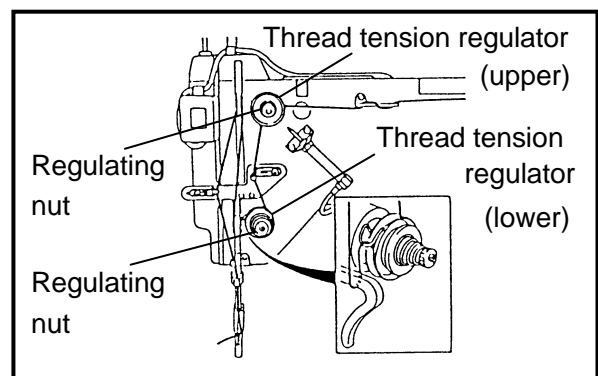
Left turns ... Weakened.



6-4-2. Adjustment of the needle thread tension

- (1) Adjustment of thread tension disc pressure

Adjust the intensity with the regulating nut of thread tension regulator (lower) and that of thread tension regulator (upper).



7. STANDARD ADJUSTMENT



CAUTION

- (1) Please make sure to turn the power switch off before adjusting the sewing machine.
- (2) When adjusting the sewing machine with the power switch on, please be careful not to step on the foot switch by mistake.
- (3) Please be careful not to be injured by a sharp part such as the needle and the shuttle hook point.
- (4) Please make sure to put the safety guards (eye guards, belt guards, link covers, and finger guards or the others) back on the initial position after the sewing machine adjustment.

7-1. Adjustment of the thread take up spring tension

- (1) Turn to left by half turn the tension bar to loosen the adjust bushing.
- (2) Turn the adjust bushing to adjust the take-up spring intensity.
Right turns ... Intensified.
Left turns ... Weakened.

Standard tension ... Approx. 2.5 N

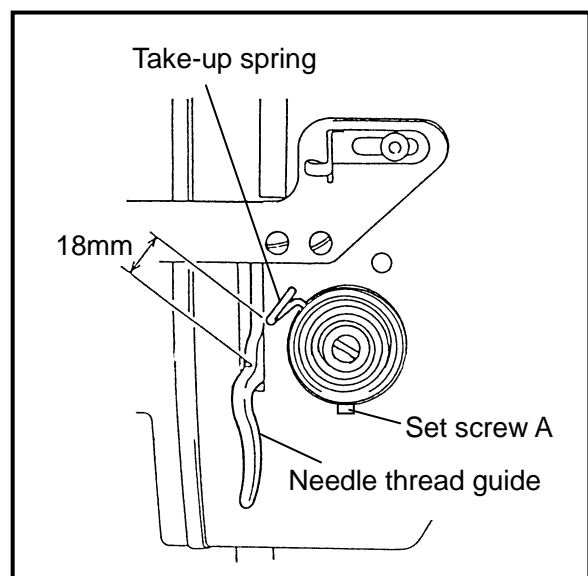
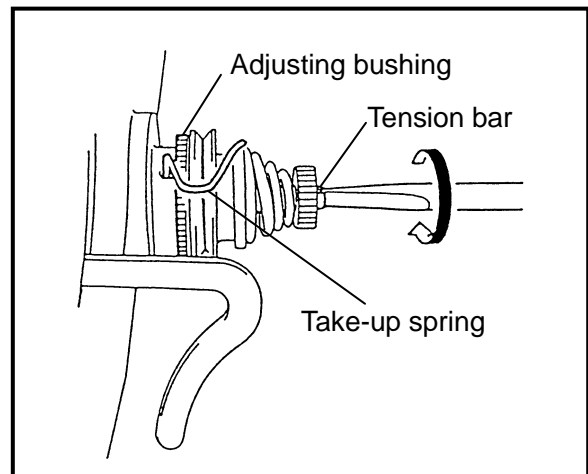
To obtain the standard tension, loosen the adjust bushing, reduce the tension of take-up spring to 0 and turn the adjust bushing about 1/2 to left from that position.

- (3) After the adjustment, turn to right the tension bar to tighten up.

7-2. Adjustment of the thread take up spring swing stroke

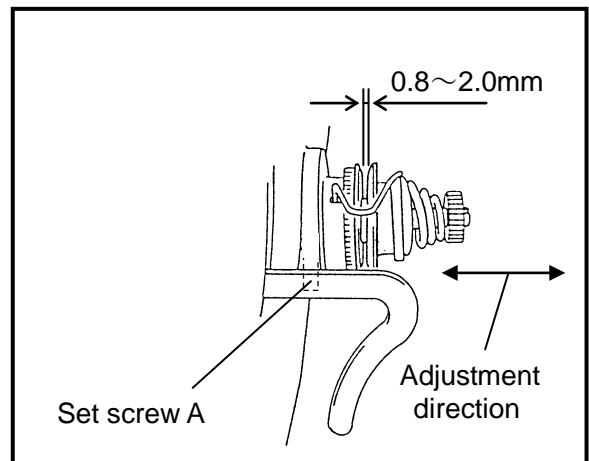
- (1) Slacken the set screw A of thread tension regulator.
- (2) Turn the thread tension regulator to right or left to determine the operating amount.
- (3) After the adjustment, tighten the set screw A.
Right turns ... Intensified.
Left turns ... Weakened.

* Standard operating amount of take-up spring (distance between the take-up spring and needle thread guide) is 18 mm.



7-3. Adjustment of slackness of tension discs of thread tension regulator (lower)

- (1) Raise the presser foot.
- (2) Slacken set screw A of thread tension regulator.
- (3) Adjust the bushing position in the arrow direction in the figure to adjust the slackness at 0.8 to 2.0 mm.
- (4) After the adjustment, tighten the set screw of thread tension regulator.

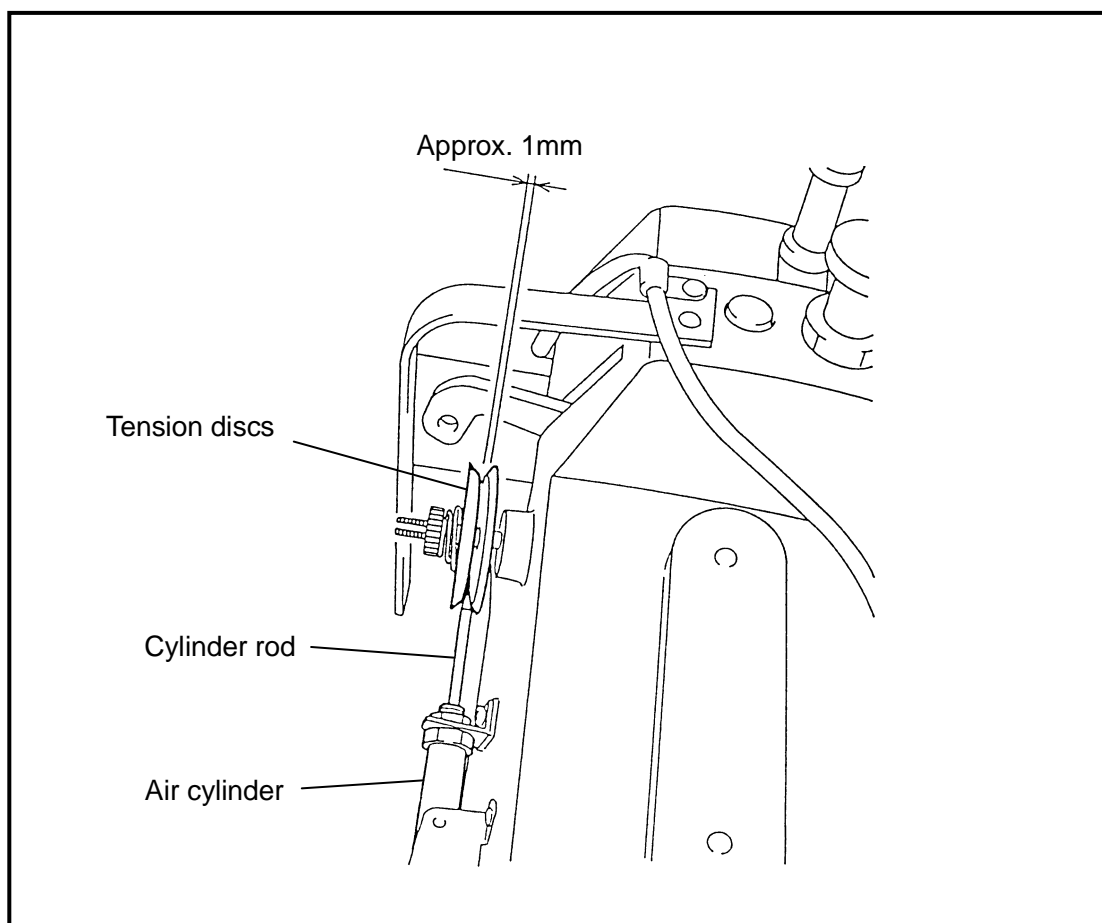


[Notice] When the thread tension regulator set screw was slackened, make sure that the slackness of thread tension discs is about 0.8 to 2.0 mm.

7-4. Adjustment of slackness of tension discs of thread tension regulator (upper)

- (1) Raise the presser foot.
- (2) Cylinder rod comes in between the tension discs. Under the state, confirm the slackness of tension discs is about 1 mm.

[Notice] This adjustment cannot be made because the air cylinder is at the pulled state when the presser foot is at bottom or when the control power is turned off.



7-5. Operation and Adjustment of the work holding device

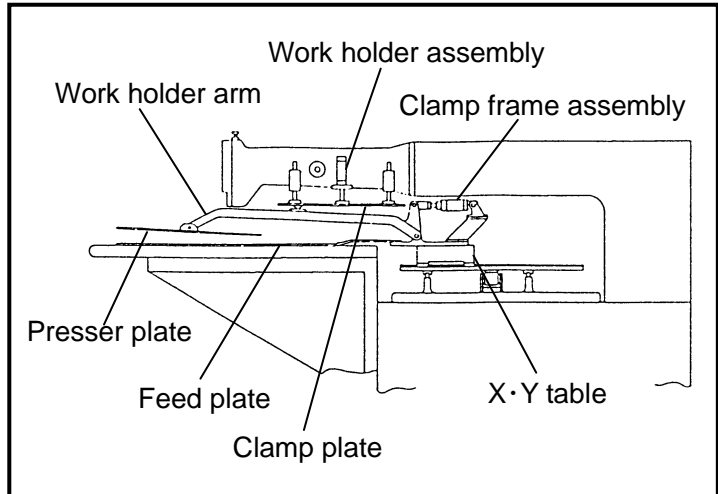
Work holding device is largely divided to the clamp frame assembly, which clamps the sewing cloth, and the work holder assembly which prevents the lift of clamp frame assembly.

7-5-1. Holding motion

Control and operation before the sewing cloth is clamped and the stitching starts are conducted with following sequence.

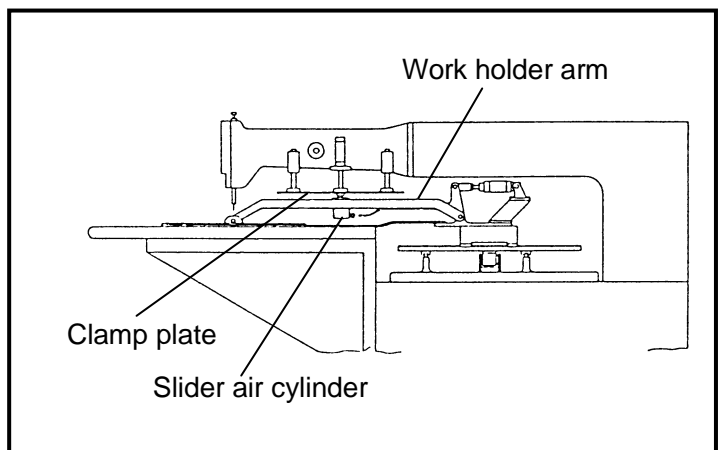
- (1) Work holding device is set at the mechanical home position with the home position return operation.

Work holding device is fed to the limit at this side and, synchronously with the home position stop, the presser plate and arm of work holder assembly go up and the presser plate is released.

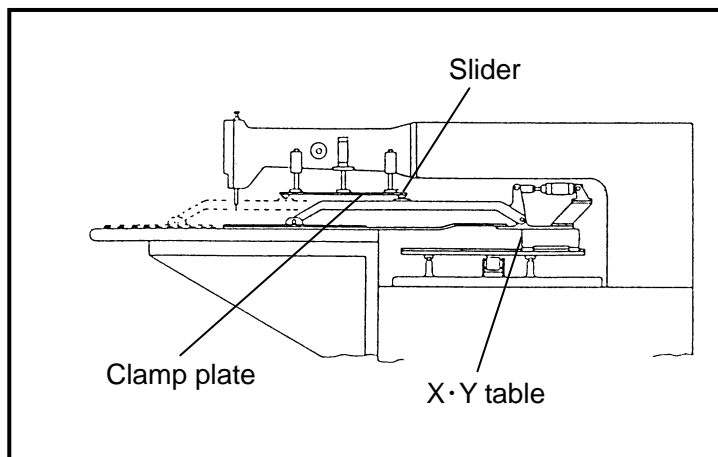


- (2) When the sewing cloth was set on the feed plate, turn on the 'Presser (black)' of foot switch. Clamp plate and work holder arm go down together. Work holder arm has a slider, which is driven with the air cylinder, and the sewing cloth is clamped with the retracting force pressing the clamp plate of this slider.

To cancel the clamp, turn on again the 'Presser (black)', of foot switch.



- (3) When the holding was completed, turn on the 'Start (gray)' of foot switch and start to stitch. Slider operates to push up the bottom face of clamp plate and, while its retracting force maintains the clamping of sewing cloth, the work holding mechanism moves with the drive of X-Y table.



7-5-2. Adjustment of the holding pressure

Air pressure to the air cylinder, which drives respective mechanisms of work holding device, consists of following 2 lines. Refer to the paragraph 3-2 and adjust.

Main circuit : 0.4 MPa ··· Work holder up/down, clamp frame up/down

(There are the thread release, presser foot and bobbin thread trimming in addition to the above.)

Slider circuit : 0.2 ± 0.05 MPa ··· Slider

[Notice] Since the air pressure is directly related with the thread tension and the mechanical operation, make sure to honor the above standard pressure.

7-5-3. Replacement of the presser parts

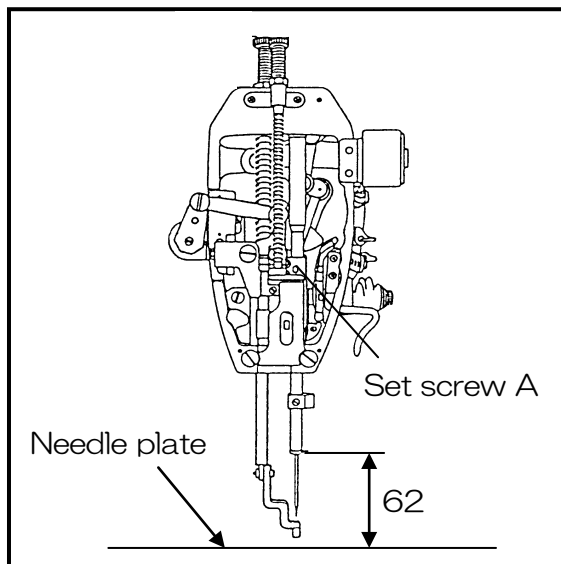
Presser plate is located with bolts on the work holder arm and the feed plate on the mounting block. To assemble again after removal, align the needle down hole with both the presser plate and the feed plate at respective home position at the center of needle hole of sewing machine bed.

7-5-4. Maintenance of the slider

Slider is made with oil less resin material to enable the sliding motion along the lower face of clamp plate. Therefore, it wears with progress of time. Should it wear as much as the top of flat head screw, which is locking the slider, is exposed, it could damage the opposite clamp plate resulting in the not-smooth stitching feed. Worn slider should be replaced at an earlier opportunity.

7-6. Height Adjustment of the needle bar

- (1) Remove the face plate from machine.
- (2) Turn the manual pulley and stop the thread take up lever at the highest position.
- (3) Slacken the set screw A connecting the needle bar.
- (4) After having regulated a needle bar end face and the distance with the needle plate to 62mm, tighten the set screw A connecting the needle bar.



7-7. Adjustment of the hook position

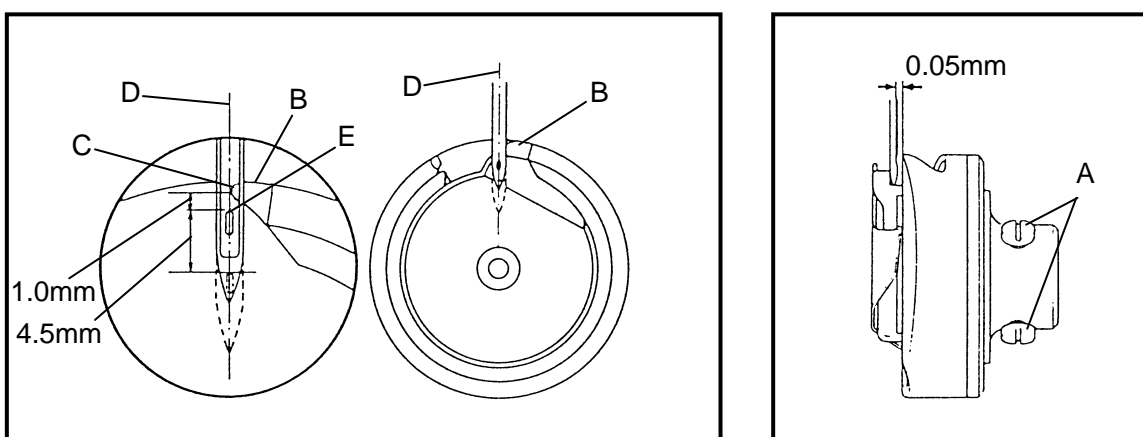
- (1) Loosen hook set screw A.
- (2) Turn the hook and adjust the timing of hook head B.

* Hook head timing

With the standard timing, the following relation is established when the needle bar is lifted 4.5 mm from the lowest position.

- Hook head C matches with the needle center D.
- Distance between the upper part of needle's thread hole E and the hook head C is 1.0 mm.

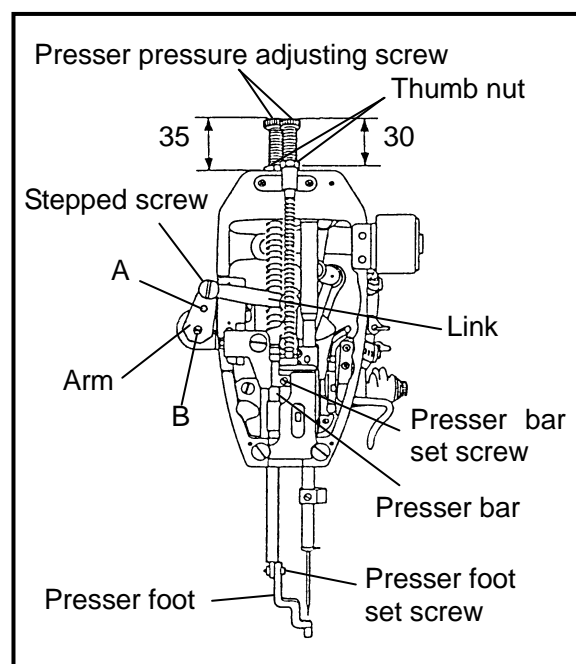
- (3) Distance between the needle and the hook head B is approx. 0.05 mm. (equivalent to thickness of a hair of human).
- (4) Tight securely the hook set screws A (3 position).



7-8. Adjustment of the presser foot

7-8-1. Height adjustment of the presser foot

To adjust the height of presser foot, turn the manual pulley to loosen the presser bar set screw in the right fig. till its bottom of foot touches lightly the surface of sewing cloth (0 to 0.5 mm). Should the presser foot is lowered excessively, the cloth or pattern could be displaced, improper tension of needle thread may result or, if it is too large, the stitching could be skipped or improper stitching tension may result. When the adjustment is over, confirm the needle passes the center of hole at the end tube of presser foot.



[Notice] When thickness of sewing cloth changed, it is necessary to change the height of presser foot.

7-8-2. Adjustment of up/down motion extent of the presser foot

Up/down motion extent of presser foot can be adjusted with 3 steps of 0, 4.5 and 9 mm. When the connection of stepped screw between the link and the arm is as shown by figure of section 7-8-1, the up/down motion extent is 9 mm, it is 4.5 mm when connected with the screw hole A or 0 with the screw hole B. It is at the position in figure of clause 7-8-1, 9 mm when the machine is shipped from factory. By the way, if the connecting hole A or B is used, the lift of presser foot at the stop changes about 1 to 2 mm. In addition, the height of presser foot also changes so that it is necessary to readjust the height of presser bar after loosening the presser foot set screw.

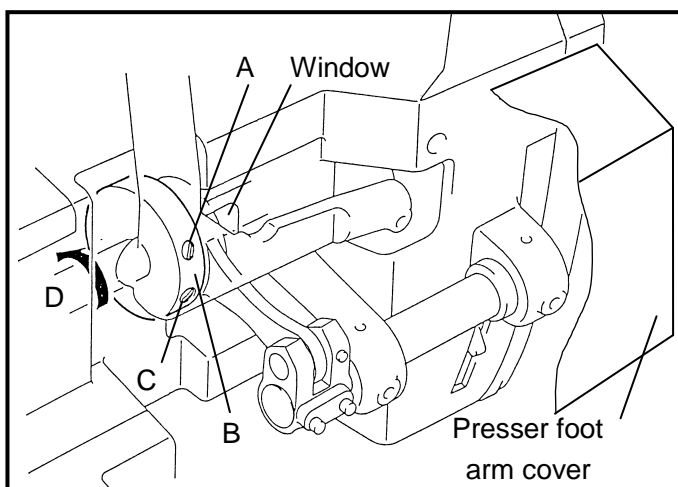
7-8-3. Adjustment of the presser foot pressure

At the adjustment of presser foot pressure, loosen the larger thumb nut in figure of clause 7-8-1 and turn the presser adjust screw in clockwise direction to intensify or turn to counterclockwise direction to weaken. Do not change the smaller thumb nut from the setting of 30 mm as shown in the figure.

7-8-4. Adjustment of the presser foot timing

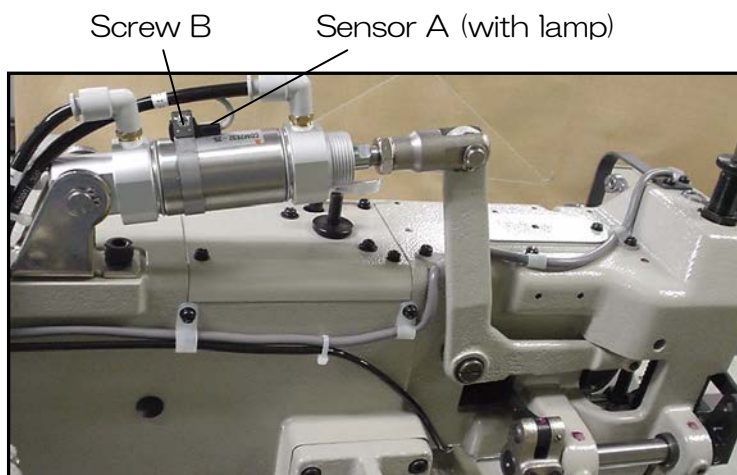
Adjust the presser up/down timing through the window.

- (1) Take off the presser foot arm cover, and loosen the eccentric ring set screw A.
- (2) As the manual pulley is turned and stopped at the lowest position of needle bar, the eccentric ring set screw C comes to the front position. (Standard position)
- (3) Loosen the eccentric ring set screw C.
- (4) While the eccentric ring B is stopped by hand, turn slowly the manual pulley to separate its position from the upper shaft.
- (5) If the upper shaft is turned in the plus direction (arrow D), it is delayed more than the standard while it is quickened with reverse turns.
- (6) When the adjustment is over, tighten the set screws C and A, starting from C. Looking from the front at the window then, please confirm that an eccentric wheel and a gap with bearing Bush are around 0.5mm. (If no gap is correct, you may manual pulley becomes heavy.)
- (7) Lock again the upper up/down arm with the lock screw so that, when the take-up lever was brought to the highest position, the vertical center of bell crank becomes parallel with the presser bar.



7-8-5. Adjustment of the presser foot sensor

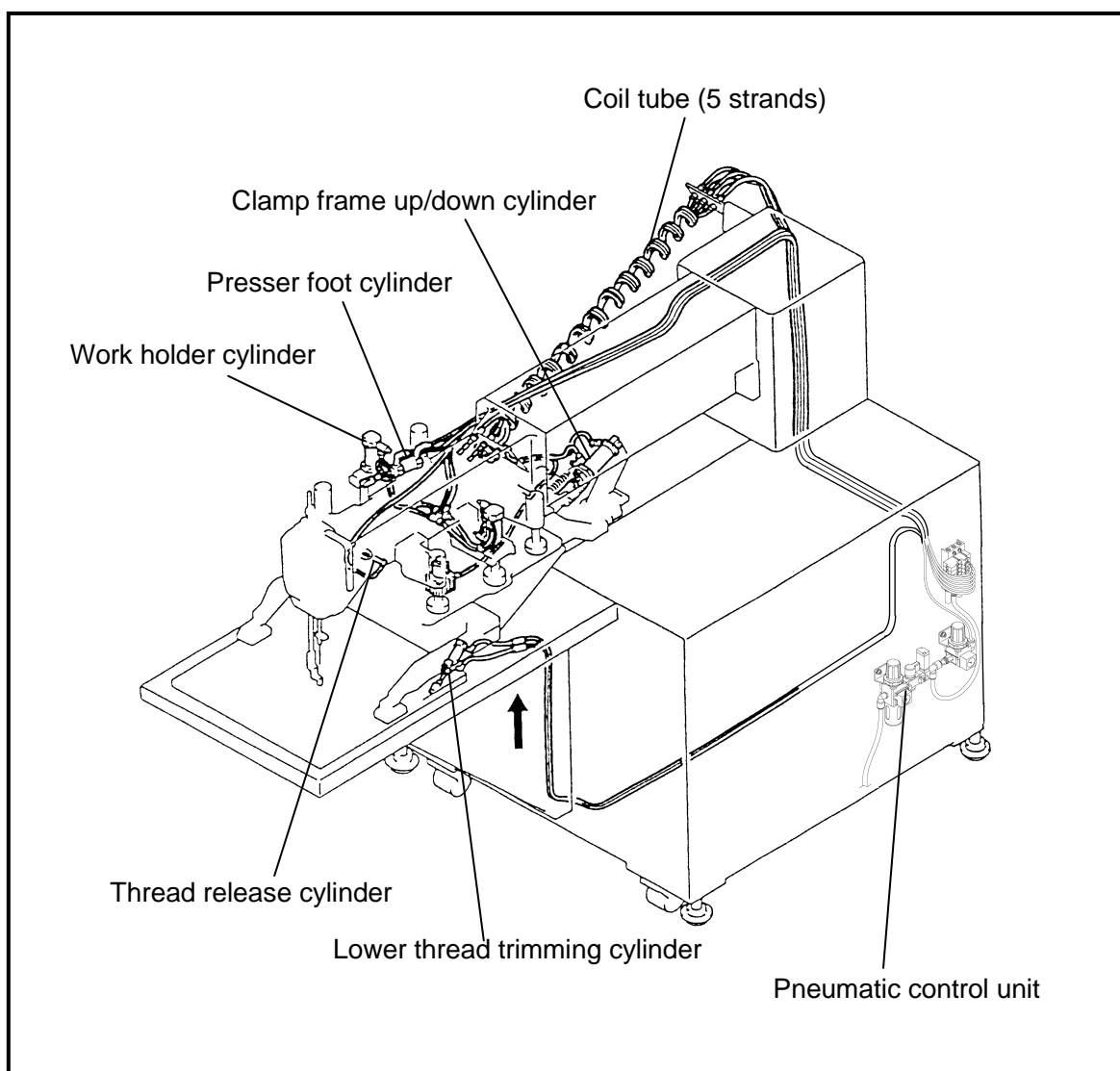
Presser foot is raised when at the end of the sewing program or at the return to home position as shown on the right figure, the cylinder is shrunken. At this time, the sensor A is to detect (lamp lights up), loosen the mounting screw B, please adjust the sensor position. Even if you adjust the presser foot mechanism of decomposition, please check whether the sensor is running.



7-9. Air Pipes Related

Outline pipe arrangement from the pneumatic pressure control unit to the machine is as shown on the figure.

- (1) Straight joint, which relays the pipe to the bobbin thread trimming air cylinder, and connector, which relays the sensor cable of said air cylinder, are arranged at the section indicated with the arrow. When the machine head is removed from the table, it is necessary to disconnect the straight joint and the wiring connector.
- (2) If the work holding device is left at the mechanical home position for a long time, the coil tube is stretched too much to recover the original coil so that it could droop so much as in contacts the X movement cover face. When the machine is stopped for a long time, make sure to bring the work holding device to the column side.



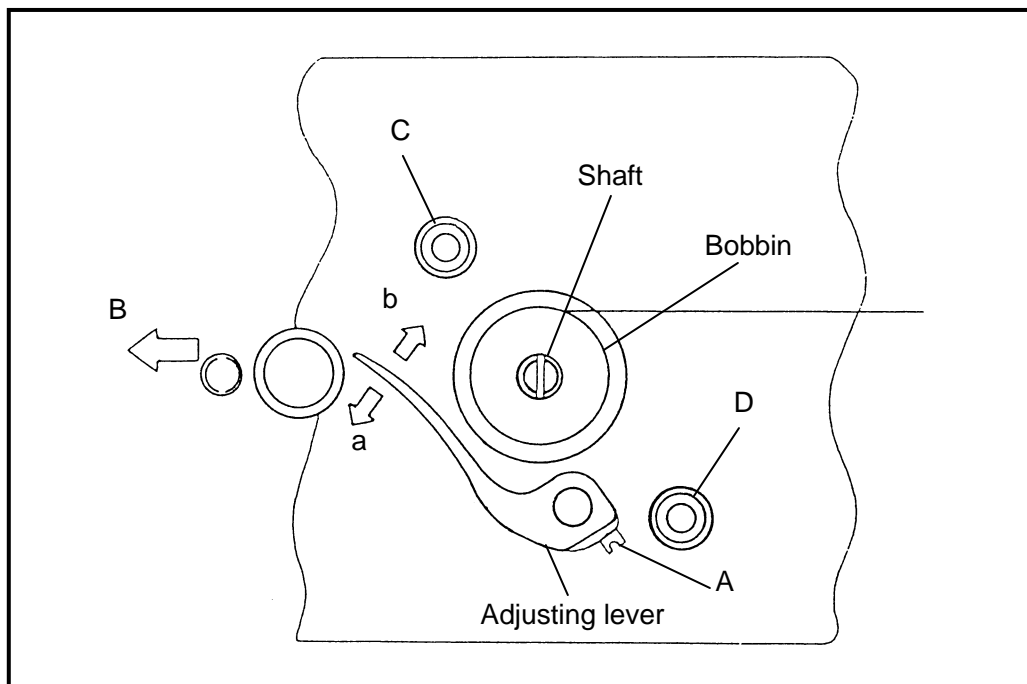
8. ADJUSTMENT AND MAINTENANCE

8-1. Adjustment of the bobbin winder

(1) Adjusting the winding volume

To reduce the winding volume, first loosen screw A and move the adjust lever toward the bobbin, conversely, to increase the volume, move it in the opposite direction.

The adjust lever is set so that it will return in the direction of arrow "a" with the thread wound up to 80% of its full volume on the bobbin.



(2) Adjusting the turning of the bobbin

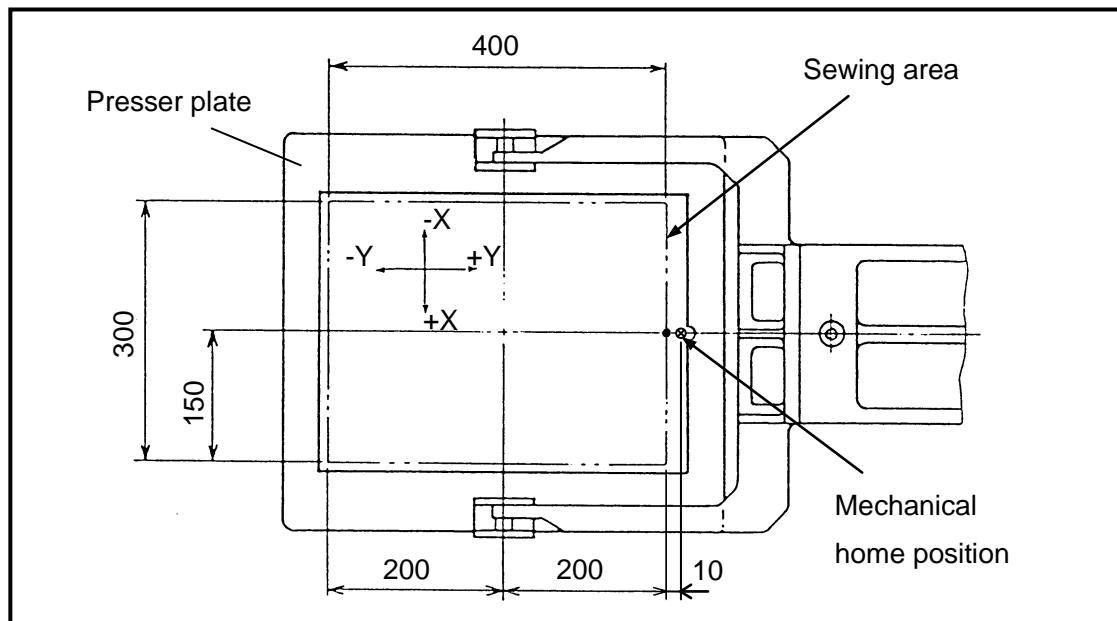
Loosen screws C and D of the bobbin winder complete, mount onto the shaft a bobbin on which thread has been appropriately wound, and push the adjust lever in the direction of arrow "b".

Next, move the bobbin winder complete in the direction of arrow B in the center of the figure.

Once resistance is felt, tighten up screws C and D to finalize the positioning operation.

8-2. Adjustment of the home position

Mechanical home position is adjusted at the position shown on the figure. This position can be adjusted finely within the range to show to the list shown below but it is impossible to move the position itself (change of home position).



| | |
|------------------------|-----|
| X-axis plus direction | 5mm |
| X-axis Minus direction | 5mm |
| Y-axis plus direction | 0mm |
| Y-axis Minus direction | 5mm |

[Notice] The machine has a function that the motor memorizes the home position at the first home position returning operation after the switch is turned on. Therefore, from the second home position returning, it does not use the home position return sensor. Make sure to turn the power switch off to change the mechanical home position.

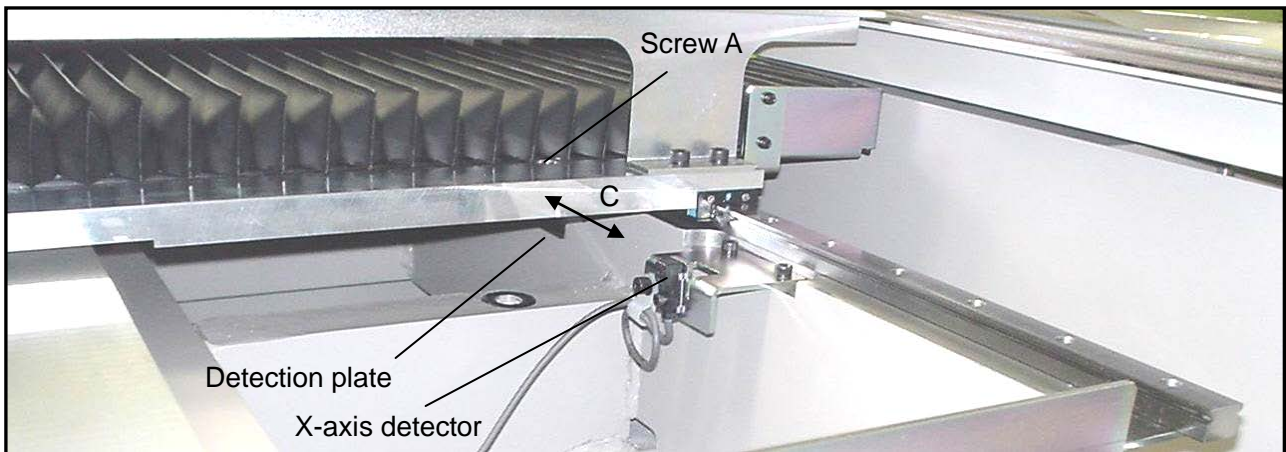
To use the sensor from the send returning, press Program → home position → SHP

[Home returning method since the second time returning] on the standard screen and set it ON.

[Notice] If the detector clearance becomes more than 1.5mm, the work holder stop position becomes unstable, furthermore, if the clearance becomes far bigger than 1.5mm the work holder does not stop and becomes out of control.

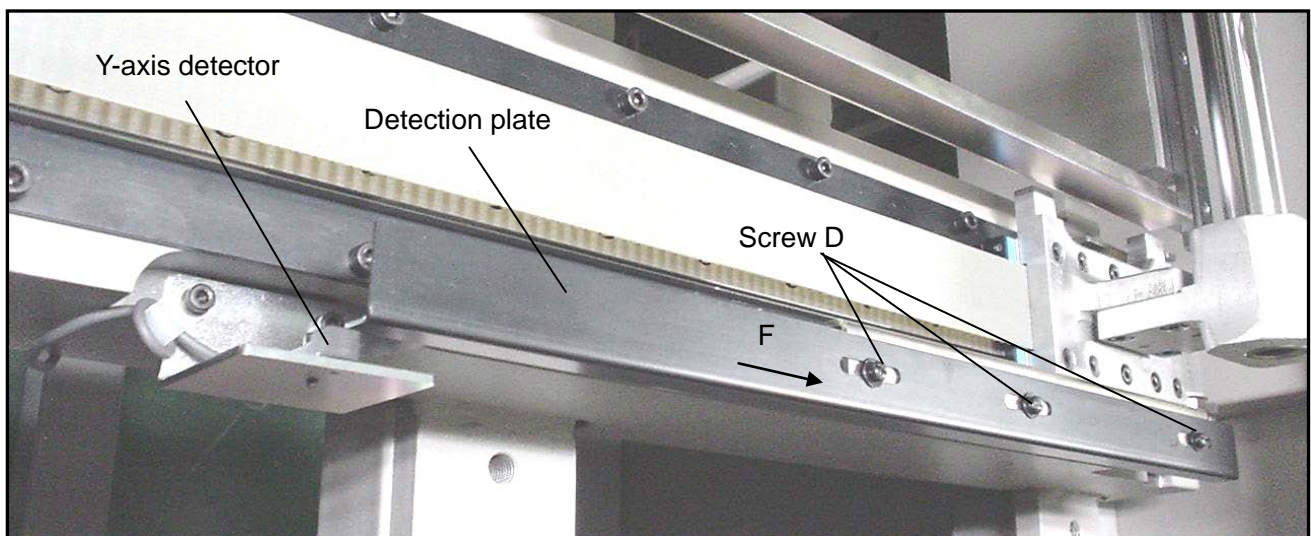
8-2-1. Fine adjustment of the home position in X direction

- (1) Remove the left cover (black plastic) of X-Y table and set it as shown on the figure.
- (2) Loosen two places of screw A. The home position moves to a course same as detection plate movement when you move detection plate to arrow C.
- (3) Adjust the clearance between the surface of the X-axis detector and the detection plate to 1.0~1.5 mm.
- (4) Press the "Returned to home position" key on the operation panel to initiate the home position return and confirm that it moves to the target position.



8-2-2. Fine adjustment of the home position in Y direction

- (1) Remove the left side cover (silver color-plated steel plate) of X-Y table and set is as shown on the figure.
- (2) Loosen Three places of screw D. The home position moves to a course same as detection plate movement when you move detection plate to arrow F.
- (3) Adjust the clearance between the surface of the Y-axis detector and the detection plate to 1.0~1.5 mm.
- (4) Operate the "Returned to home position" key on the operation panel to initiate the home position return and confirm it moves to the target position.



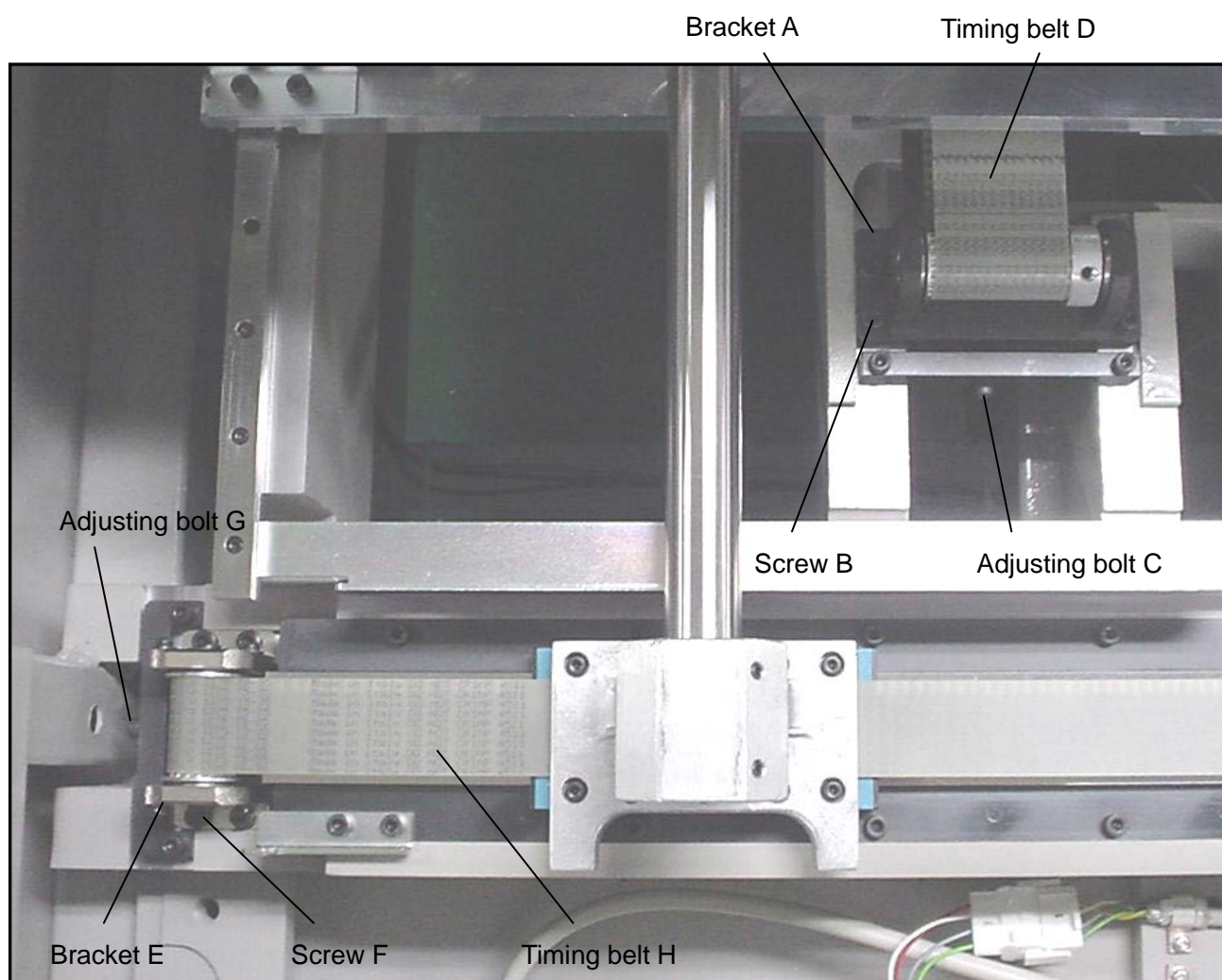
8-3. Adjustment of the X-Y table belt tension

8-3-1. Adjustment of X-axis timing belt tension

- (1) Remove the right and cover of X-Y table (silver color-plated steel plate).
- (2) Loosen lock screw B (4 pieces) of bracket A, turn the adjust bolt C to adjust the tension of timing belt D.
- (3) Belt is tensed as the adjust bolt C is screwed in firmly.
- (4) Guideline of belt tension is as much as the belt will not be warped when it is pressed lightly with hand. Make sure to tighten the lock screw B after the adjustment. (Adequate tension will be obtained if the screw is turned further about 90° after it was fastened till it is felt heavy.)

8-3-2. Adjustment of the Y-axis driven side timing belt tension

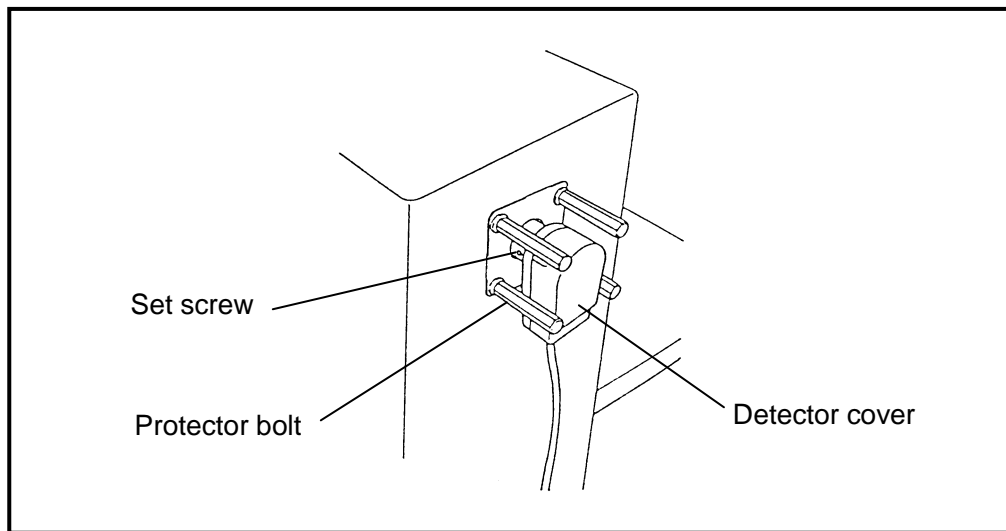
- (1) Remove the covers at both ends of X-Y table (plated steel plate with white paint). Y-axis driven side timing belts are provided at both sides and driven synchronously. Figure below indicates the timing belt at right side.
- (2) Loosen lock screw F, 4 pieces, of bracket E and turn the adjust bolt G to adjust the tension of timing belt H. Detail of adjustment is same as the section 8-3-1 (3) and (4). Be sure to tense these timing belts with nearly same strength.



8-4. Adjustment of the position detector

8-4-1. Adjustment of the stop position (UP position) of the needle bar

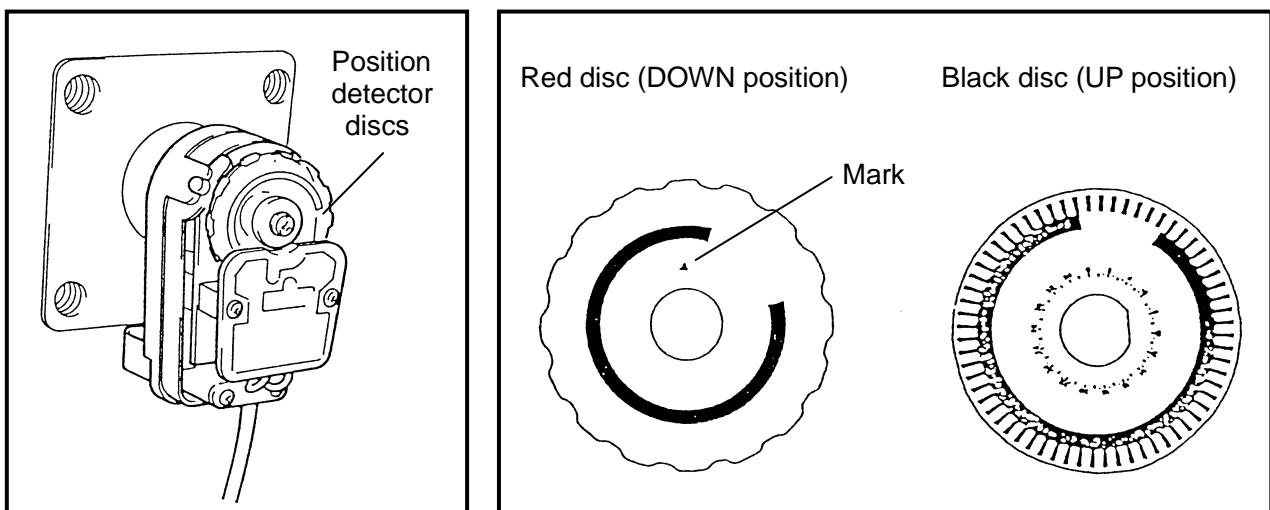
- (1) When the stitching is over, the machine stops with the take-up lever at the highest position.
- (2) When the position is displaced more than 3 mm, loosen the set screw of detector and turn the joint to adjust the stop position correctly. Clockwise turn delays the stop position while the reverse turn quickens the stop position.
- (3) A set of 4 protect bolts are installed around the detector to protect it from any damage. If the detector is installed in such a position, where such protection is unnecessary, these bolts can be removed.



8-4-2. Adjusting the position detector discs

The 2 position detector discs do not normally need to be adjusted but it should be checked that their positions stand in the relationship indicated below.

- (1) Draw out the detector cover toward the cable and remove it.
- (2) The detector comes with 2 position detector discs. The front disc (red) is used to detect the DOWN position, the middle disc (black) to detect the UP position.
- (3) The middle disc (black) has a scale. Align the triangular mark of the front disc (red) at the 80° position on this scale.



8-5. Adjustment of the thread trimming mechanism

This thread trimming mechanism employs the air driven knife operation, which consists of the knife section which is assembled on the slide plate (center) and the knife section which is assembled on the bed and driven by cylinder.

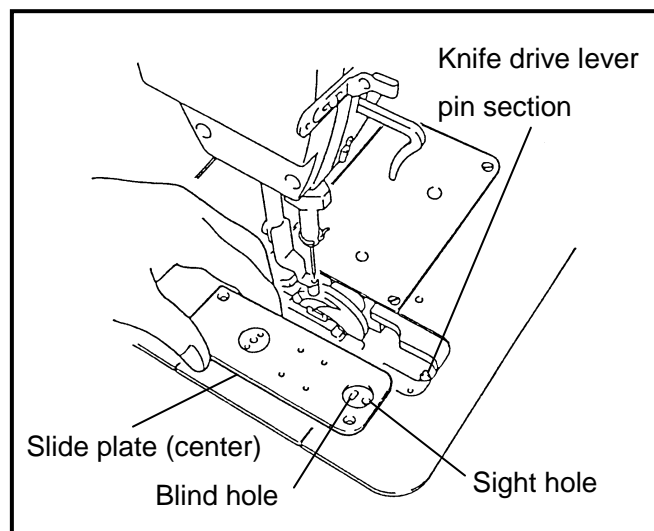
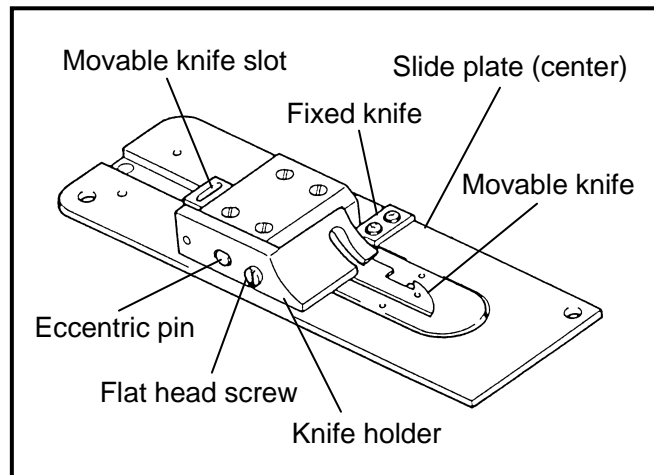
8-5-1. Adjustment of the knife engagement

- (1) Remove the slide plate (center).
- (2) Loosen flat head screw and turn the eccentric pin to adjust the engagement pressure of knife so that the thread can be clipped lightly. Look it there with the flat head screw.

[Notice]

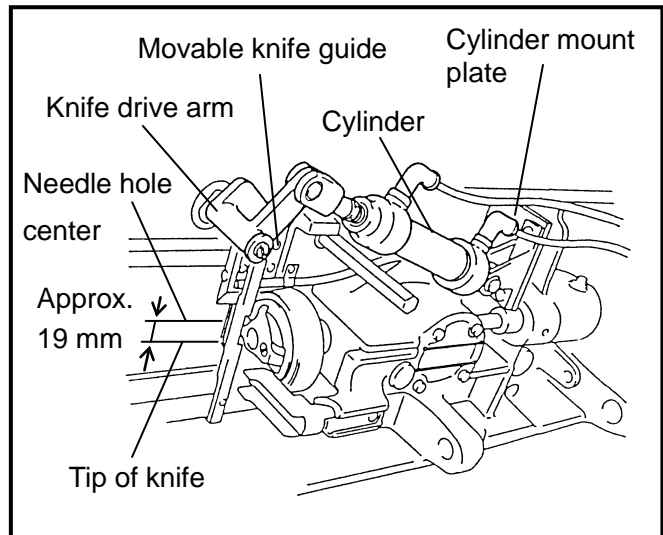
If the movable knife is mounted in reverse, it causes the motion error due to thread clogging. When the knife is replaced, confirm it is mounted as shown by the figure.

- (3) Remove the blind cover from slide plate (center) and pull the movable knife to align its slot with the sight hole. Engage the slot of the movable knife with the knife drive lever pin section of bed and install the slide plate on the bed.



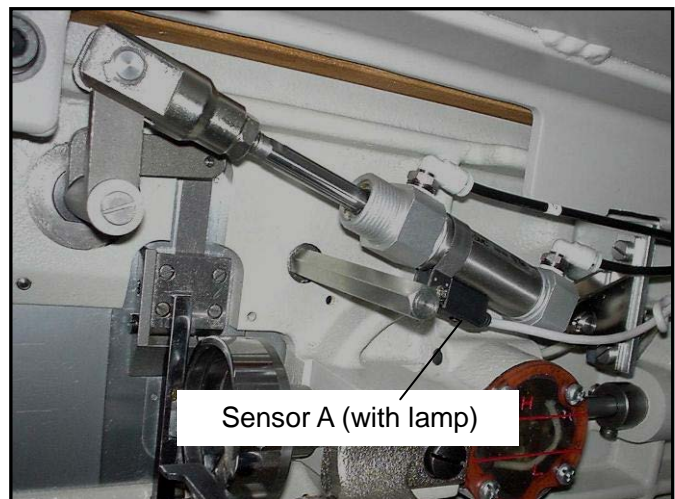
8-5-2. Adjustment of the movable knife stroke

Relation of movable knife, when it protruded, and the needle hole is as shows on the figure. Adjustment is made by changing the position of cylinder mount plate. (Be sure to provide a clearance between the knife drive arm and the movable knife guide during the driving.)



8-5-3. Adjustment of the thread trimming sensor

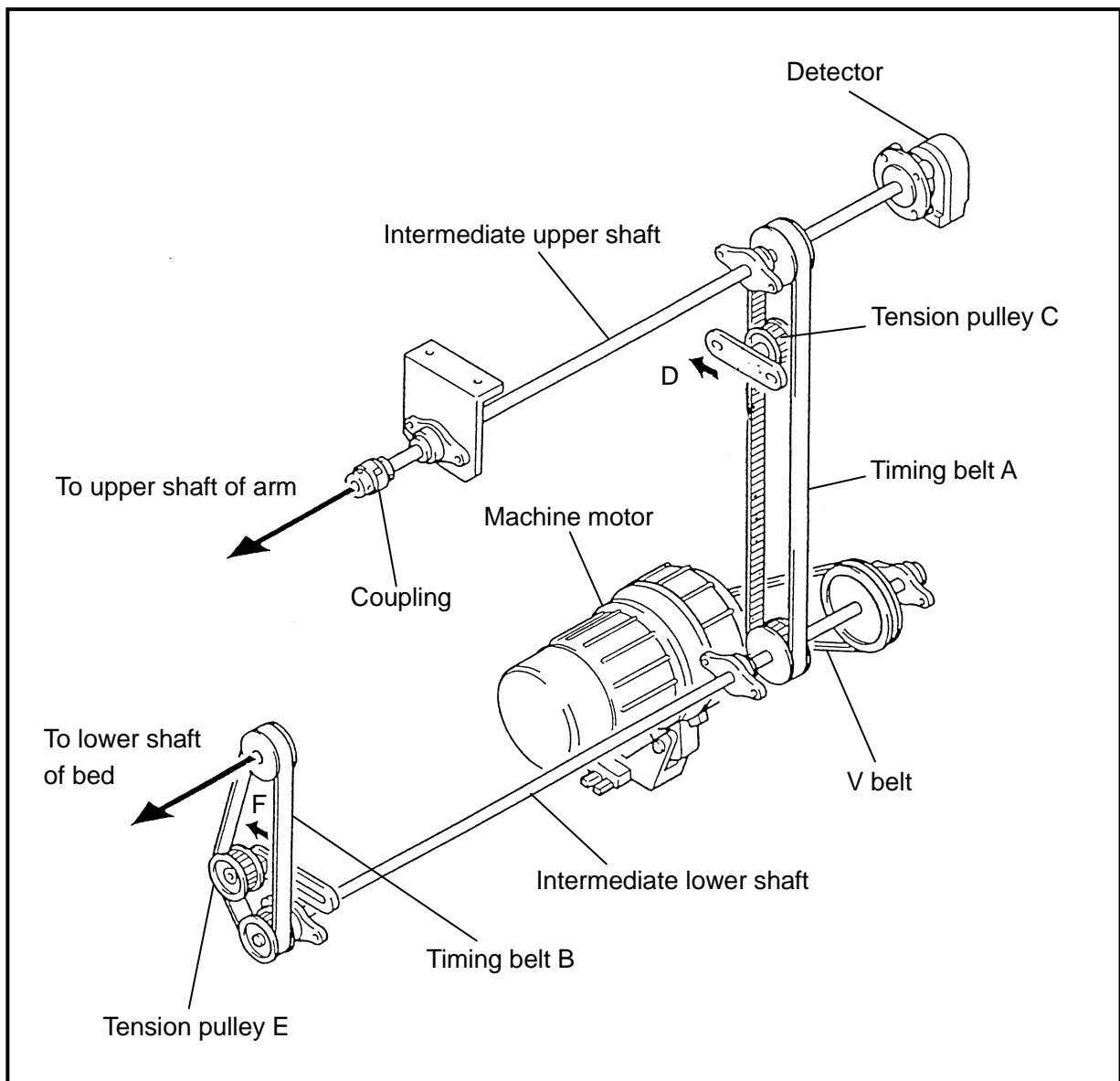
Movable knife is recede when at the during sewing or at the return to home position as shown on the right figure, the cylinder is extend. At this time, the sensor A is to detect (lamp lights up), loosen the mounting screw, please adjust the sensor position. Even if you adjust the thread trimming mechanism of decomposition, please check whether the sensor is running.



8-6. Belt Tension Adjustment of the machine head drive system

Lower figure shows the drive transmission route of machine motor. Drive with motor is transmitted to the intermediate lower shaft via V belt and divided there to 2 lines of upper and lower shafts. Timing belt A transmits the drive to the intermediate upper shaft and the upper shaft, which is connected with the coupling, drives the needle bar. A detector is provided at the rear part of intermediate shaft in order to detect the rotation angle and number of revolutions of upper shaft. (See the Section 9-5. for further detail.)

On the other hand, the drive of motor is directly transmitted to the lower shaft by means of the timing belt B so as to drive the hook.



8-6-1. Adjustment of the upper shaft timing belt tension

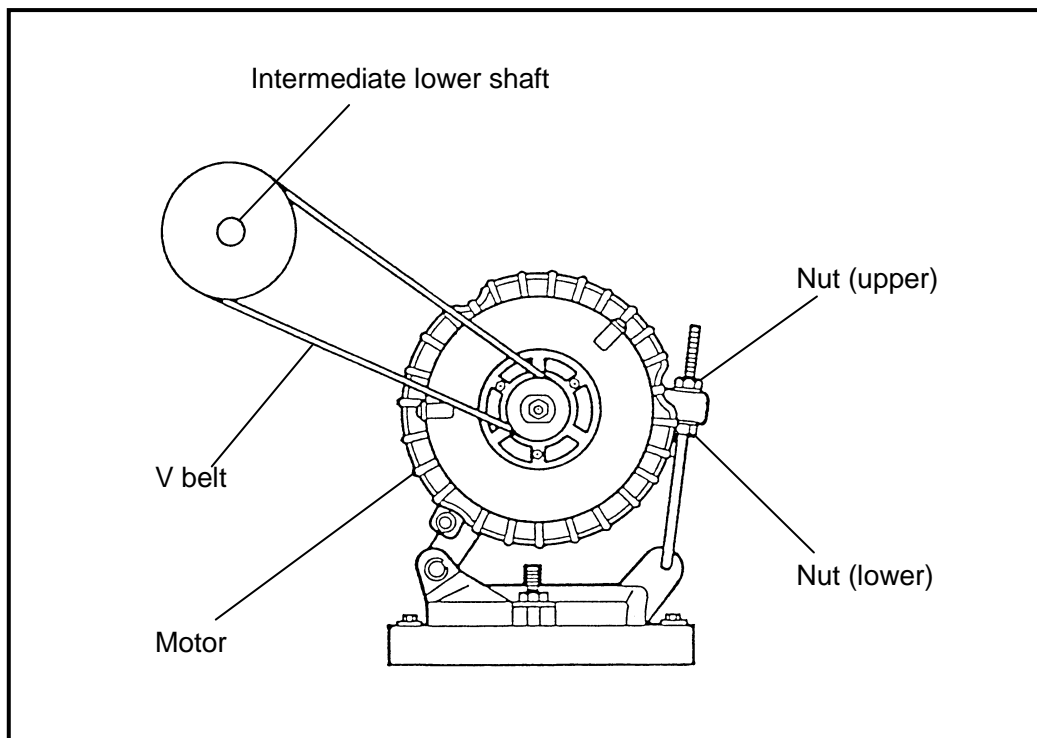
- (1) Remove the cover of main unit frame (column).
- (2) Move the tension pulley C in the arrow D direction and adjust the tension so that the timing belt A is not warped with a light pressing.

8-6-2. Adjustment of the lower shaft timing belt tension

- (1) Remove the bed cover directly under the table, which accommodates the machine head.
- (2) Move the tension pulley E, which is installed in front of the main unit frame, in the arrow F direction and adjust the tension so that the timing belt B will not be warped with a light pressing.

8-6-3. Adjustment of the machine motor V belt tension

- (1) Remove the rear cover of main unit frame. The motor shown by Fig. 9.16 can be seen.
- (2) Loosen 2 pieces of nuts.
- (3) Let the belt being tensed with the weight of motor, determine the position with the upper nut and lock with the lower nut.


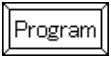
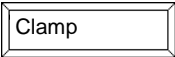










9. HOW TO SET UP THE TWO STAGE WORK HOLDER

If two stage work holder is required, the device is necessary to be prepared by user side. Following is example for typical setting of two stage work holder.

Example : How to press the work holder foot switch(Foot switch black) to the pressing operation of the first, and press the newly added switch to the pressing operation of the second.

9-1. How to set up

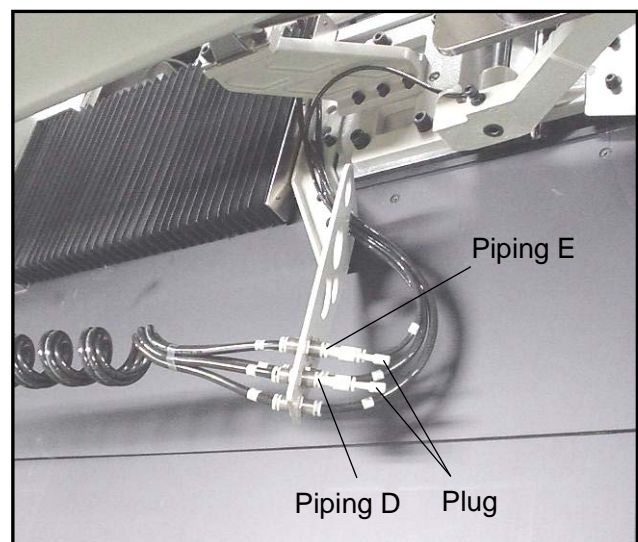
- (1) Press the  on the standard screen operation panel.
- (2) Press the  on the menu. The screen switches to program mode.
- (3) Press the  on the mode selection screen. The screen switches to setting screen.
- (4) Sets the priority pressing behavior. Press the  [Priority of clamp mode].
- (5) Switched from disabled  to enabled  the display of priority, and then press the .
- (6) Set the effective number of work holder. press the  [Setting for valid number of clamp].
- (7) Press the key of number 2, then press the .
- (8) To press the , return to the mode selection screen.
- (9) To press the , return to the standard screen.

9-2. Input and output configuration

- (1) Input setting : At the "SET MODE OF VARIOUS INPUT / OUTPUT", set the "IF2" to any of I8 ~ IF9 input port.
- (2) Output setting : "OF2" to O7 of the output port has been initialized. If you want to connect to O7 does not require configuration.
- (3) Wiring : Refer to the guide "Control Unit" for more information about the number table [14] Pin number of connectors, and connect the newly added switch.

9-3. Air piping

Remove the plug of air piping buried in the sewing machine head as shown in the figure, please air cylinder piping to it. To piping for the work holder are labeled E. To piping for releasing work holder is labeled D.



10. TROUBLESHOOTING



CAUTION

- (1) Please make sure to turn the power switch off before adjusting the sewing machine.
 (2) If the adjustment is required while the power switch on, do not step on the foot switch by mistake.

| Condition | Cause | Corrective action | Reference |
|----------------------------------|--|--|-------------------------|
| Upper thread is broken. | Upper thread tension is too tight. | Adjust thread tension. | 6-4 |
| | Strength of thread take up spring is inappropriate. | Adjust thread take up spring. | 7-1 |
| | Parts on needle plate, hook, and presser foot touching thread are damaged. | Grind parts or change parts. | - |
| | The needle size is bigger than the thread size. | Change the needle size to suitable size. | - |
| | Thread melts with heat. | Slow down the sewing speed | 6-1 |
| Bobbin thread is broken. | Bobbin thread tension is too tight. | Adjust thread tension. | 6-4 |
| | Parts on needle plate and presser foot touching thread are damaged. | Buff parts or change parts. | - |
| Frequent skip stitching happens. | Clearance between needle and shuttle hook is too big. | Adjust clearance between needle and shuttle hook properly. | 7-7 |
| | Timing of needle and shuttle hook is not proper. | Adjust position of needle and shuttle properly. | 7-7 |
| | Needle is bent. | Change needle. | - |
| | Needle is at wrong position. | Fix position properly. | 5-2 |
| Trimming is not functioned. | Fixed knife is dull. | Sharpen fixed knife or change fixed knife. | 8-4 |
| | Movable knife is dull. | Change movable knife. | 8-4 |
| | Movable knife is at wrong position. | Adjust position of movable knife properly. | 8-4 |
| | Skip stitching happens in trimming. | Refer to the condition "Frequent skip stitching happens". | - |
| | Trimming setting is off. | Turn trimming setting on. | Operation panel section |
| Stitch forming is loose. | Upper thread tension is too loose. | Adjust upper thread tension. | 6-4 |

| | | | |
|---|---|---|-----|
| Stitch forming is loose. | Bobbin thread tension is too loose. | Adjust bobbin thread tension. | 6-4 |
| | Strength of thread take up spring is inadequate. | Adjust strength of thread take up spring. | 7-1 |
| | Presser foot position is not proper. | Adjust presser foot position properly. | 7-8 |
| | Presser foot up and down timing is not proper. | Adjust presser foot up and down properly. | 7-8 |
| Work holder does not fall. | Foot switch is broken. | Change foot switch. | - |
| | Work holder presser is not strong enough | Increase work holder presser | 7-5 |
| | Work holder switch is out of order | Change it new work holder switch | - |
| Sewing pattern is changed. | Sewing material is not pressed properly. | Adjust work holder pressure. | 7-5 |
| | Sewing material in work clamp slips. | Put slip stopper on presser plate. | - |
| | Sewing material is too heavy. | Slow down sewing speed. | 6-1 |
| | X-Y timing belt tension is loose. | Adjust X-Y belt tension properly. | 8-6 |
| Returned home position is changed. | Ambient temperature is out of use range. | Use sewing machine in ambient temperature in 5 degrees to 35 degrees. | - |
| | Clearance between detector and detecting subject is too wide. | Adjust clearance in 1 to 1.5mm. | 8-2 |
| Operation panel that is displayed when "M-042". | Thread trimming sensor is not detected | Adjust the position of the sensor thread trimming | 8-5 |
| | Movable knife is not back | Verify the operation of the thread trimming | 8-5 |
| Operation panel that is displayed when "E-060". | Presser foot sensor is not detected | Adjust the position of the sensor presser foot. | 7-8 |
| | Presser foot is not raise | Make sure there is nothing wrong with the mechanism presser foot. | 7-8 |
| Operation panel that is displayed when "E-025". | Air pressure is weak | Check that the air is supplied | - |
| | Set value of air pressure is too low | Check the setting of regulator | 3-2 |
| | Detection threshold of air pressure is too high | Check the setting of pressure switch | 3-2 |

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