

mitsubishi

Industrial Sewing Machine

TECHNICAL MANUAL

MECHANICAL VERSION

Single-Needle Lockstitch, Electronic Bar Tack Machine


Model PLK-B03BT

A180E386P02

FOR YOUR SAFETY!

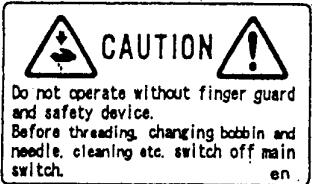



If you operate the sewing machine first time, please make sure to read the following instructions for your safety and proper operation.

In this technical manual, the notice **CAUTION** is mentioned at some paragraph to attract your attention for the safety. Please keep it in mind whenever you work with the sewing machine.

 **CAUTION** is used as the notice to warn a possible danger to cause a wound.

- ★ This technical manual explains the instructions how to operate and maintain the sewing machine.
- ★ All information in this technical manual are subject to change without notice.
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Explanations for the warning signs

No.	Warning sign	Meanings of warning sign
1.		Caution for sewing machine operation: Warning to operate the sewing machine without safety guards and to prohibit doing any operation except sewing while the power is turned ON.
2.		Caution for a wound on the fingers: Warning to a possible danger to cause a wound on the fingers under the specified operation.
3.		Caution for the fingers to be caught in the machine: Warning to a possible danger to be caught the fingers in the machine under the specified operation.
4.		Direction of pulley rotation: Indicating the proper rotating direction of the sewing machine pulley.

ENVIRONMENTAL STANDARD



Caution

★For avoiding the sewing machine from the troubles, please do not operate the sewing machine under the following conditions.

- (1) Temperature and humidity
 - (a) During operating:

The atmosphere temperature should not exceeded more 35°C(95°F) or less 5°C(41°F).

During transportation:

The atmosphere temperature should not exceeded more 55°C (131°F) or less -10°C(18°F).
 - (b) The relative humidity in the atmosphere should not exceeded more 85% or less 45%.
- (2) Location of the installation
 - (a) In the outdoors or in the places are exposed to the sun.
 - (b) Near a heat generator.
- (3) Atmosphere for the machine operation
 - (a) in the atmosphere filled with dust or corrosive gas.
 - (b) in the atmosphere filled with flammable or explosive gas.
- (4) Power source voltage
 - (a) In the place where the power fluctuation exceeds more or less 10 % of the fixed power voltage.
 - (b) In the place where the power source can not supply enough voltage to keep the motor running.
- (5) noise
 - (a) In the place near a high frequency transmitter or a high frequency welder.
 - (b) In the place filled with strong electromagnetic radiation or magnetic field.

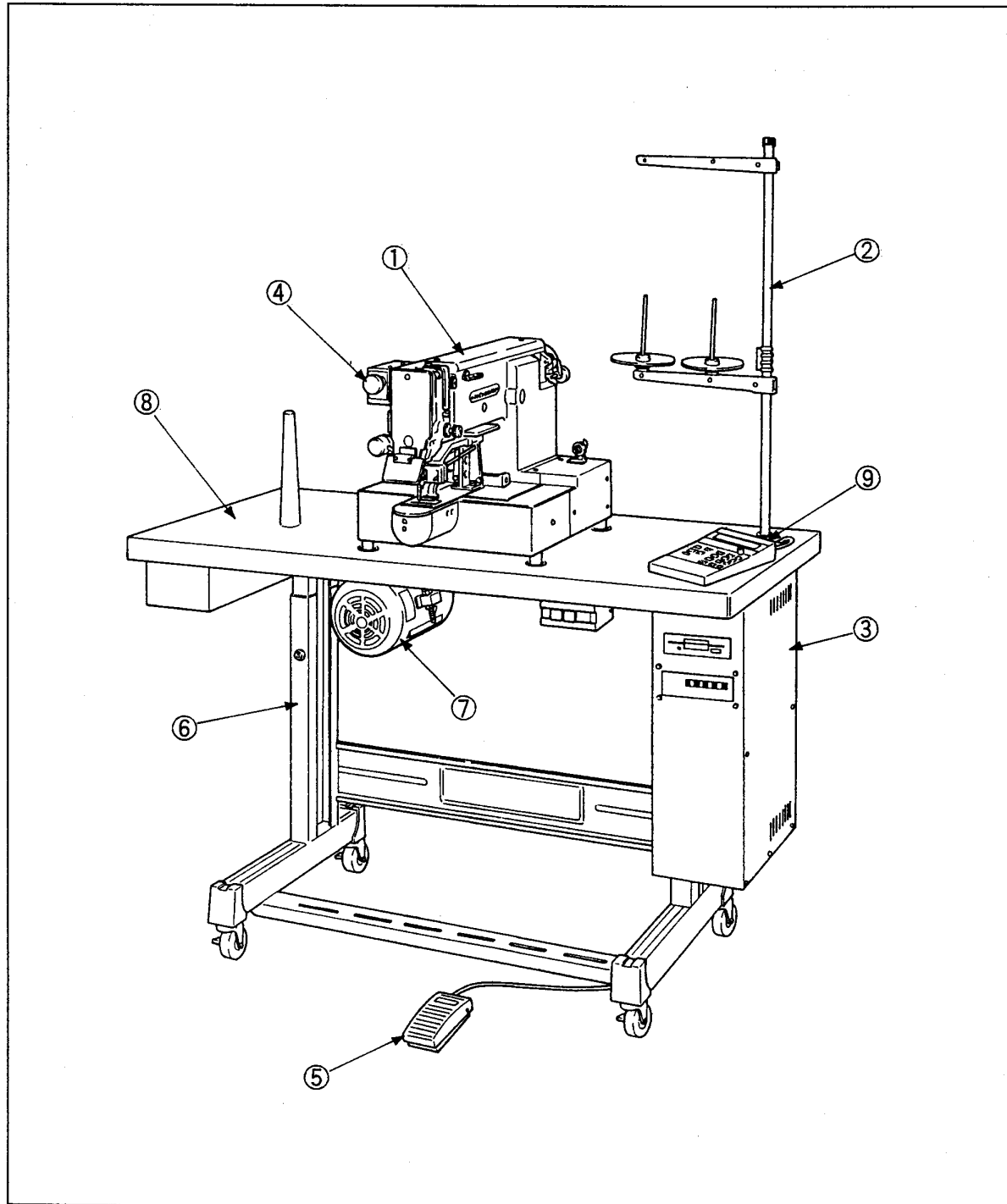
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1 STRUCTURE OF THE MACHINE

The PLK-B03BT electronic pattern sewing machine is constructed with the following main parts.



- ① Sewing machine head. ② Thread stand. ③ Control box. ④ Emergency stop switch.
⑤ Foot switch ⑥ Steel stand. ⑦ Limi-servo motor. ⑧ Wooden table.

Option ⑨ Teaching panel.

2 SPECIFICATIONS

Machine model	: PLK-B03BT
Sewing area	: X Direction (left/right) 30mm : Y Direction (forward/backward) 30mm
Maximum sewing speed	: 2,300 S.P.M. (up to 4mm stitch length)
Sewing speed	: 10 steps variable from 200 S.P.M. to 2,300 S.P.M.
Stitch length	: Adjustable from 0.1mm to 12.7mm by 0.1mm resolution.
Stitch type	: Single needle lockstitch.
Needle bar stroke	: 41.2mm
Thread take up lever stroke	: 68mm
Class of needle	: DP X 5 # 16 (the standard specification)
Wiper system	: Left to right wiping system
Work holder lift	: 15mm (max.)
Hook	: Shuttle hook.
Bobbin case	: With non racing spring.
Bobbin	: Aluminum bobbin
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 *1	: White machining oil.
Machine dimension	: 1,200mm(W) x 565mm(L) x 1,220mm(H)
Steel stand	: T-shape steel stand for the standing or the sitting operation.
Weight	: 120 Kg (total net weight).

*1 The oil which Japanese manufacture's brand name is "Pulley SF oil" is used to this machine.

3 INSTALLATIONS



Caution

- ★ The machine should be installed by the specialists who have enough experience for the sewing machine installations.
- ★ All the necessary electric wirings should be done by electric engineers who are qualified for the electric wirings.
- ★ If any damage or fault is found on the machine at the installation, please do not operate until it is repaired.
- ★ Please do not operate the sewing machine with excessive modifications from the standard specification.

3-1 Preparation for the table

If the table is not MITSUBISHI original, the thickness of the table is required to have 40mm more.

And please refer to the cut out table drawing for your own preparation.

The cut out drawing is shown on the last page of this technical manual as REF. NO.1 drawing.

3-2 Preparation for the steel stand

If the steel stand is not MITSUBISHI original, please refer to the assembling drawing for your own preparation.

The assembling drawing is shown on the last page of this technical manual as REF. NO.2 drawing.

If the steel stand is MITSUBISHI original, please assemble the steel stand with the assembling instructions enclosed in the packing.

3-3 Installation of the motor

If the motor is purchased without assembling to the table, the motor has to be installed underneath the table.

Please install the motor with the instructions explained in the paragraph [installation of the motor] on the another **CONTROL UNIT** technical manual.

3-4 Installation of the control box

If the control box is purchased without assembling to the table, the control box has to be installed underneath the table.

Please install the control box with the instructions in the paragraph [Installation of the control box] on the another **CONTROL UNIT** technical manual.

3-5 Connection of the teaching panel

If the optional teaching panel is purchased for the sewing pattern programming, the teaching panel has to be connected to the control box.

Please connect the teaching panel with the instructions of Teaching Panel Technical manual enclosed in the packing.

3-6 Installation of the power switch

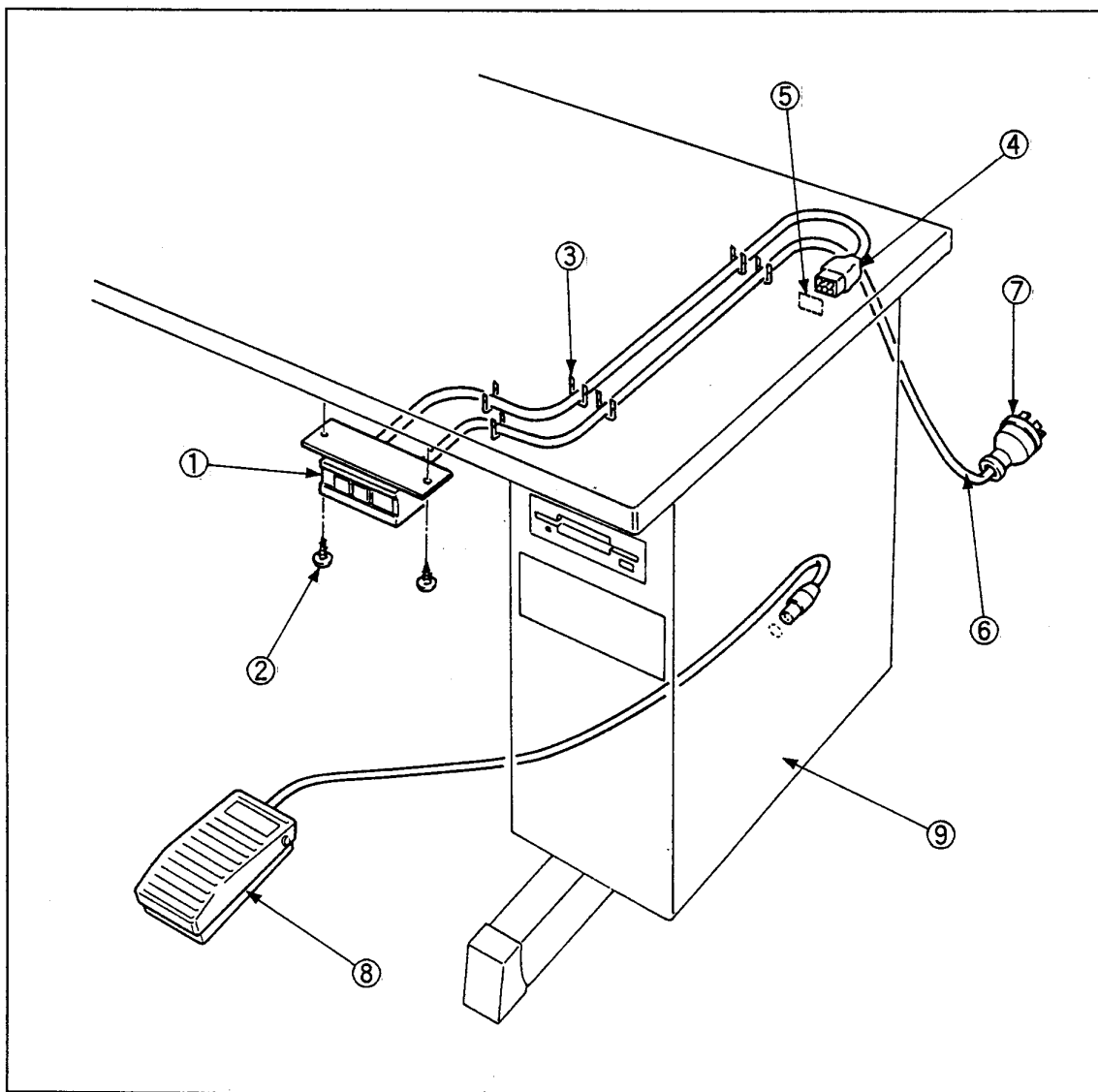
If the power switch is purchased without assembling to the table, the power switch has to be attached with the following procedure.

- (1) Mount the power switch (NO.①) with the wood screw (NO.②) underneath the table as shown on the figure.
- (2) Fix the electric cords with the staples (NO.③) underneath the table.
- (3) Hook up the connector (NO.④) of the power switch (NO.①) to the connector (NO.⑤) of the control box (NO.⑨).
- (4) Attach the power plug (NO.⑦) to the another end of the power switch cord (NO.⑥).

3-7 Connection of the foot switch

Connect the foot switch (NO.⑧) to the control box (NO.⑨).

The foot switch is enclosed in the accessory box



3-8 Installation of the sewing machine head



Caution

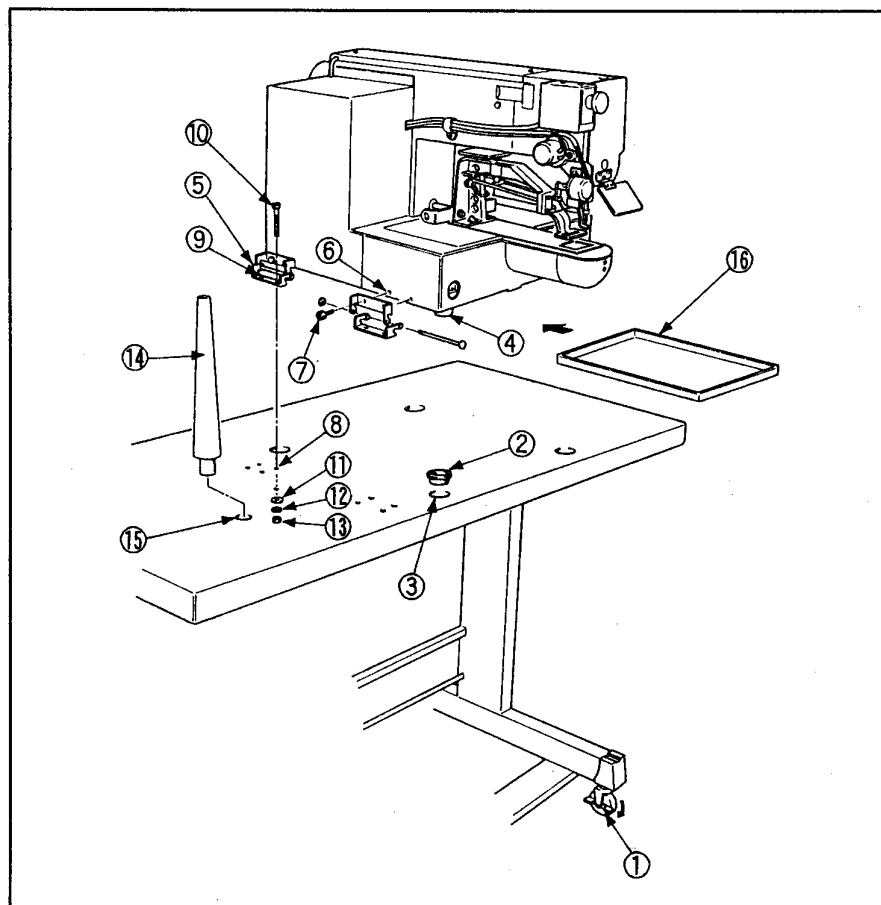
★ For the safety, please make sure to carry the sewing machine head by two people at least.

- (1) Make sure to hold the machine table with the caster stopper (NO.①)
- (2) Fit the rubber cushion pads (NO.②) into the each hole (NO.③) on the table top. The rubber cushion pads (NO.②) are enclosed in the accessory box
- (3) Put the sewing machine head on the table top and set the each leg (NO.④) to the each rubber cushion pad (NO.②).
- (4) Attach two hinges (NO.⑤) temporarily, make the set screws (NO.⑦) fastening with the thread holes (NO.⑥) light, on the left side surface of the machine bed with the hexagonal socket head set screws (NO.⑦).

At this time, take notice of the E- shaped snap ring must be come to the front.

These parts are all enclosed in the accessory box.

- (5) Fit the screw holes (NO.⑨) of the hinges (NO.⑤) to the bolt setting holes (NO.⑧) on the table top then, pass the bolt (NO.⑩) through these holes and fasten the bolt (NO.⑩) to fix the hinges (NO.⑤) with the flat washers (NO.⑪), the spring washers (NO.⑫) and the nuts (NO.⑬).
- (6) Fasten firmly the hexagonal socket head set screws (NO.⑦) which set the hinges (NO.⑤) temporarily at above procedure (4) then, fix the hinges (NO.⑤) perfectly.
- (7) Insert the head rest (NO.⑭) into the hole (NO.⑮) on the table top.
- (8) Please insert oil pan (NO.⑯). The oil pan is enclosed in the accessory box.



3-9 Putting across the V-belt



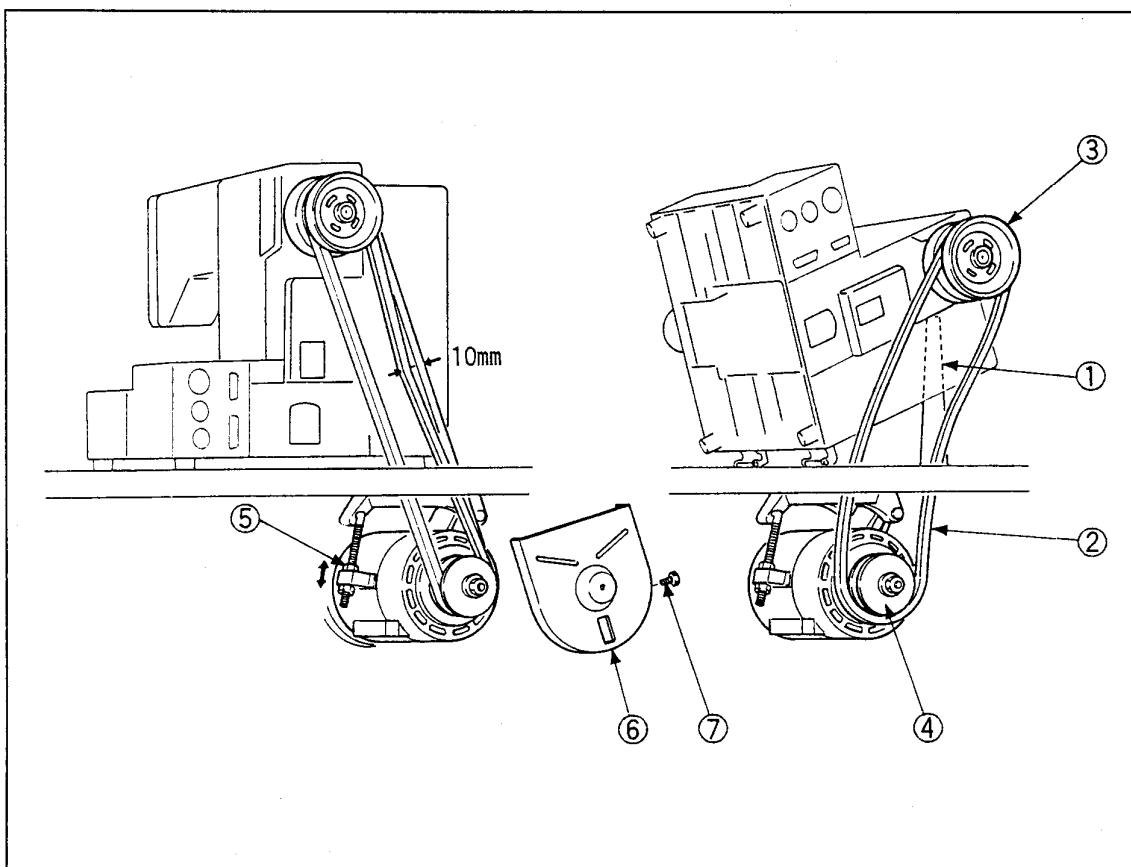
Caution

★ For the safety, when tilt or raise the sewing machine head, please make sure to hold the sewing machine head with both hands by two people at least.

- (1) Tilt the sewing machine head to the left, and hold it with the head rest (NO.①).
- (2) Put the V-belt (NO.②) across the sewing machine pulley (NO.③) and the motor pulley (NO.④) with passing it through the slit on the table top.
The V-belt (NO.②) is enclosed in the accessory box.
- (3) Raise the tilted sewing machine head to the original position.
- (4) Push the center portion of V-belt by the finger with the presser of about 1 kg.
If the V-belt tension is proper, it should be yielded about 10mm.
If the V-belt tension is not proper, please adjust it with changing the motor setting position with loosening the nuts (NO.⑤)
Please make sure to fasten the nuts (NO.⑤) firmly after the adjustment. .
- (5) Put the motor pulley cover (NO. ⑥) on the motor with the set screws (NO.⑦).

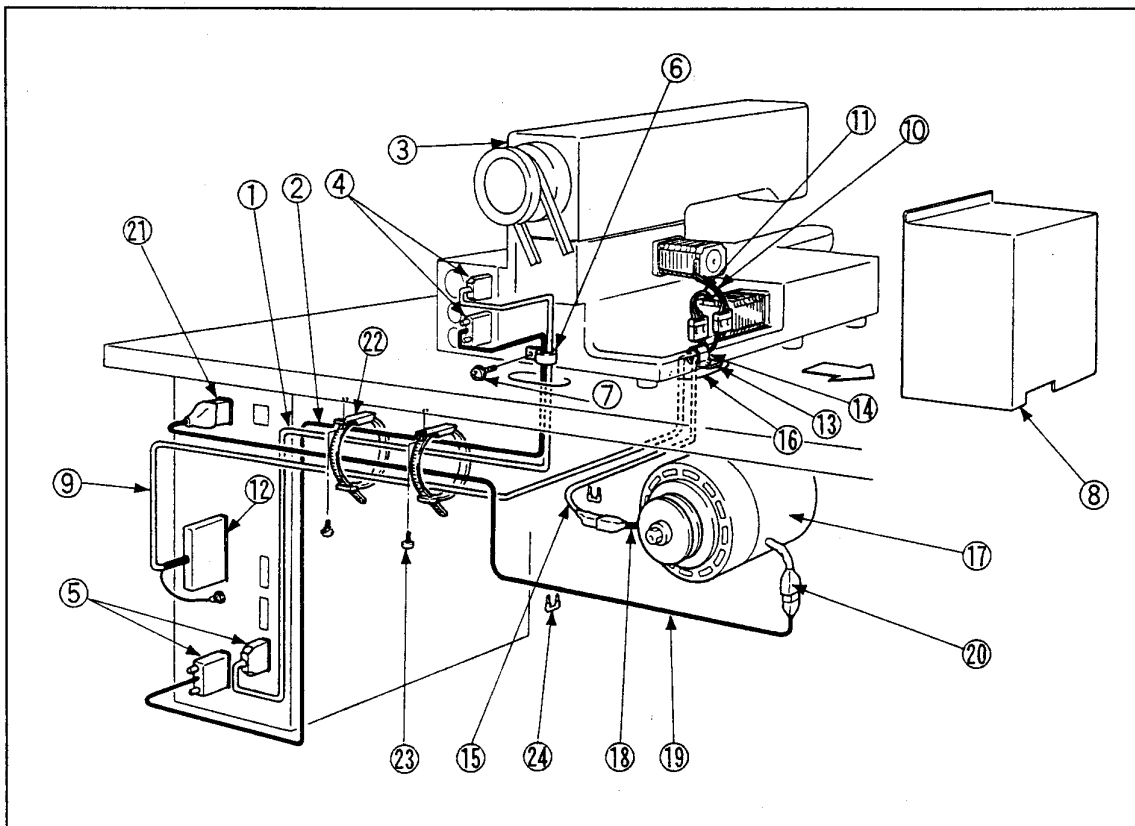
NOTE : The V-belt becomes loose after a long period machine running.

If the looseness is recognized definitely, firstly turn the power OFF then, adjust the V-belt tension again as the above procedure (4).



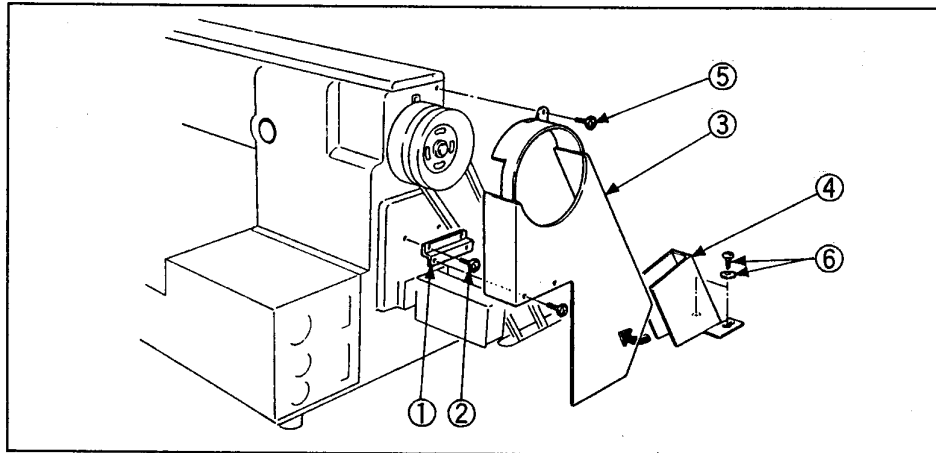
3-10 Connection of the electric cables

- (1) Connect the white color cable (NO.①) and the black color cable (NO.②) across the printed circuit board unit connectors (NO.④) on the sewing machine head (NO.③) rear face and the connectors (NO.⑤) on the control box. At this time, bundle the white color cable (NO.①) and the black color cable (NO.②) with the nylon clip (NO.⑥) and fix them to the sewing machine head (NO.③) rear face with the set screw (NO.⑦). All these parts are enclosed in the accessory box.
- (2) Remove the stepping motor cover (NO.⑧) from the sewing machine head (NO.③).
- (3) Pass upward the cable (NO.⑨) which is attached the two connectors at the end through the cut-out hole (NO.⑬) on the table top then, connect it to the cable (NO.⑩) and (NO.⑪) extended from X and Y stepping motor. At this time, fix this cable with the nylon clip (NO.⑬) provided on the sewing machine head. And also, connect the other end of the cable (NO.⑨) to the connector (NO.⑫) on the control box. The cable (NO.⑨) is enclosed in the accessory box.
- (4) Pass downward the another cable (NO.⑮) which is extended from the sewing machine head through the cut-out hole (NO.⑬) on the table top then, connect it to the cable (NO.⑮) extended from the motor (NO.⑰).
- (5) Connect the last cable (NO.⑱) to the another extended cable (NO.⑲) from the motor then, hook up the other end of the cable (NO.⑱) to the connector (NO.⑲) on the control box. The cable (NO.⑱) is also enclosed in the accessory box.
- (6) Attach the two binder (NO.⑳) underneath the table with the wood screws (NO.㉓) then, bundle and fix all the connected cables with the binders (NO.㉒) and the staples (NO.㉔). The binders (NO.㉒), the wood screws (NO.㉓) and the staples (NO.㉔) are enclosed in the accessory box.



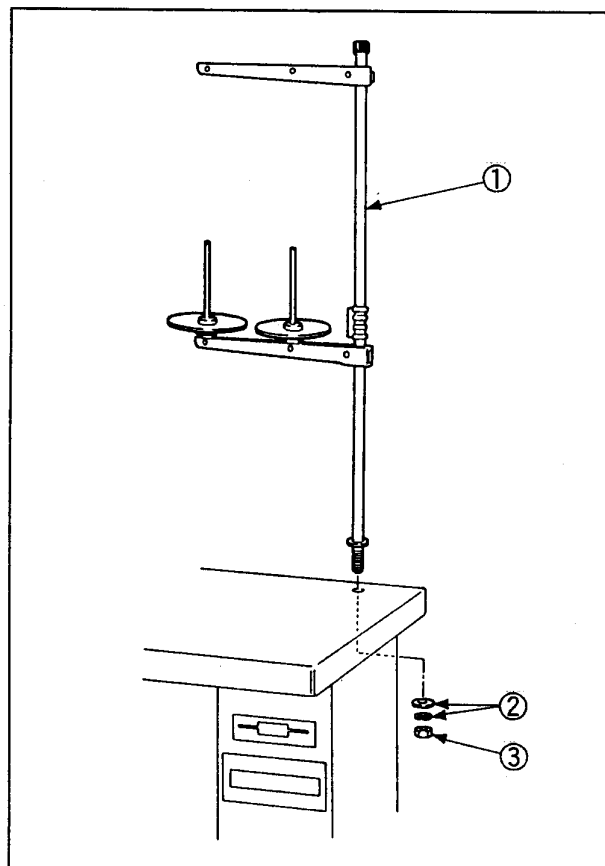
3-11 Installation of the belt cover

- (1) Attach the belt cover mounting plate (NO.①) to the sewing machine head with the set screws (NO.②).
 - (2) Put the large belt cover (NO.③) and small belt cover (NO.④) on the sewing machine head and the table top with the set screws (NO.⑤) and the washers and wood screws (NO.⑥).
- All the necessary parts are enclosed in the accessory box.



3-12 Installation of the thread stand

- (1) Assemble the thread stand with the instructions enclosed in the packing.
- (2) Fit the thread stand (NO.①) in the thread stand hole on the table top.
- (3) Fix the thread stand (NO.①) firmly from the rear side of the table with tightening the nut (NO.③) and the washers (NO.②).



4 LUBRICATION



Caution

- ★ Please make sure to turn the power switch OFF before oiling.
- ★ Please make sure to put some oil before starting the operation of the brand new machine or when the sewing machine is resumed the operation after a long interval.

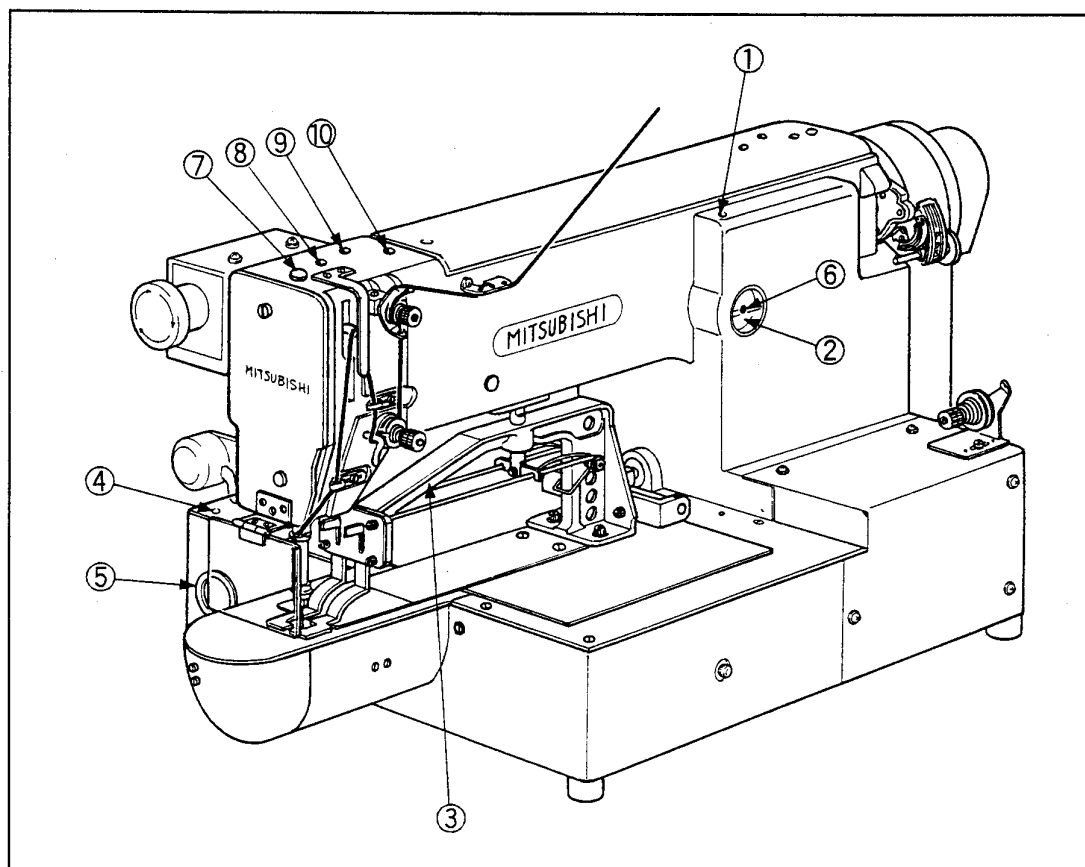
NOTE Please use high quality white machining oil.

4-1 Filling the oil tank

Pour the oil through the oil hole (NO.①) to the oil tank (NO.②) on the machine arm. Move the work holder by hand to the right end then, pour the oil through the oil hole (NO.④) to the oil tank (NO.⑤) on the machine bed. Please fill with the oil over the level mark (NO.⑥) of the oil tank.

4-2 Oiling

Put some oil to the red marked oil holes (NO.⑦~⑩).

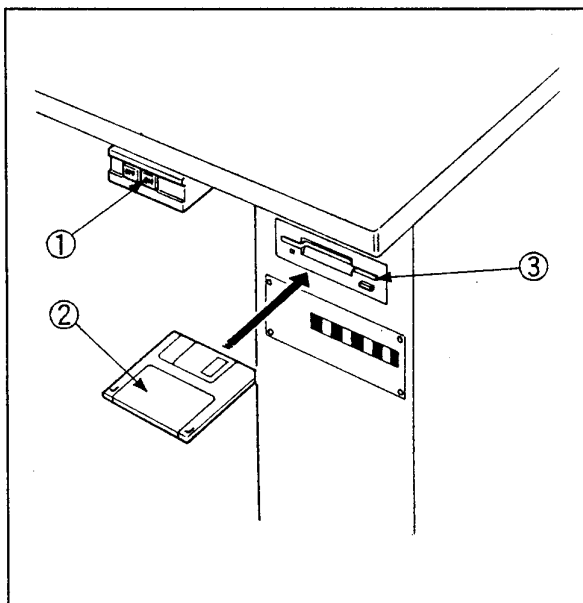


5 PROPER OPERATION

5-1 Loading the system software to the control box

When the brand new machine is operated first time or when the control box is adjusted for the repairing, the system software has to be loaded to the control box.

For this loading, please take the following procedure.



(1) Insert the system floppy disc (NO.②) into the disc drive (NO.③) of the control box. The system floppy disc is enclosed in the accessory box.

(2) Turn the power switch (NO.①) ON.

(3) Load the system software with following the instructions [loading the system software] in the paragraph "Let's start to operate the sewing machine" on the technical manual **CONTROL UNIT**.

NOTE It takes about 4 to 5 minutes for the loading.

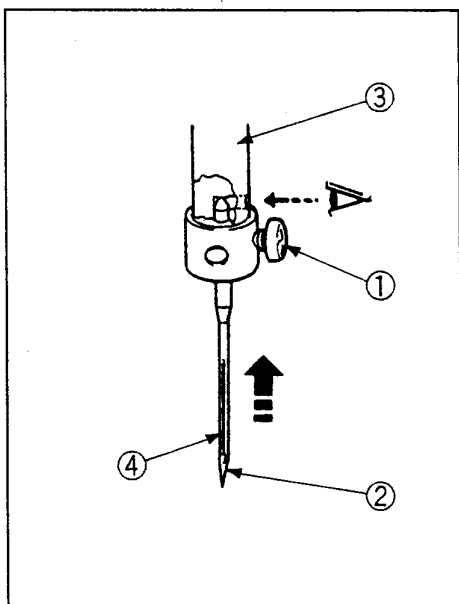
(4) Remove the system floppy disc (NO.②) from the disc drive (NO.③) of the control box and keep it with care.

5-2 Installation of the needle



Caution

- ★Please make sure to turn the power switch OFF before installing or replacing the needle.
- ★Please pay attention for the fingers not to be wounded by the needle point.



(1) Loosen the needle set screw (NO.①) then, insert the new needle (NO.②) until the needle head is reached the hole end of the needle bar (NO.③).

(2) Fasten the set screw (NO.①) with facing the needle groove (NO.④) to the front.

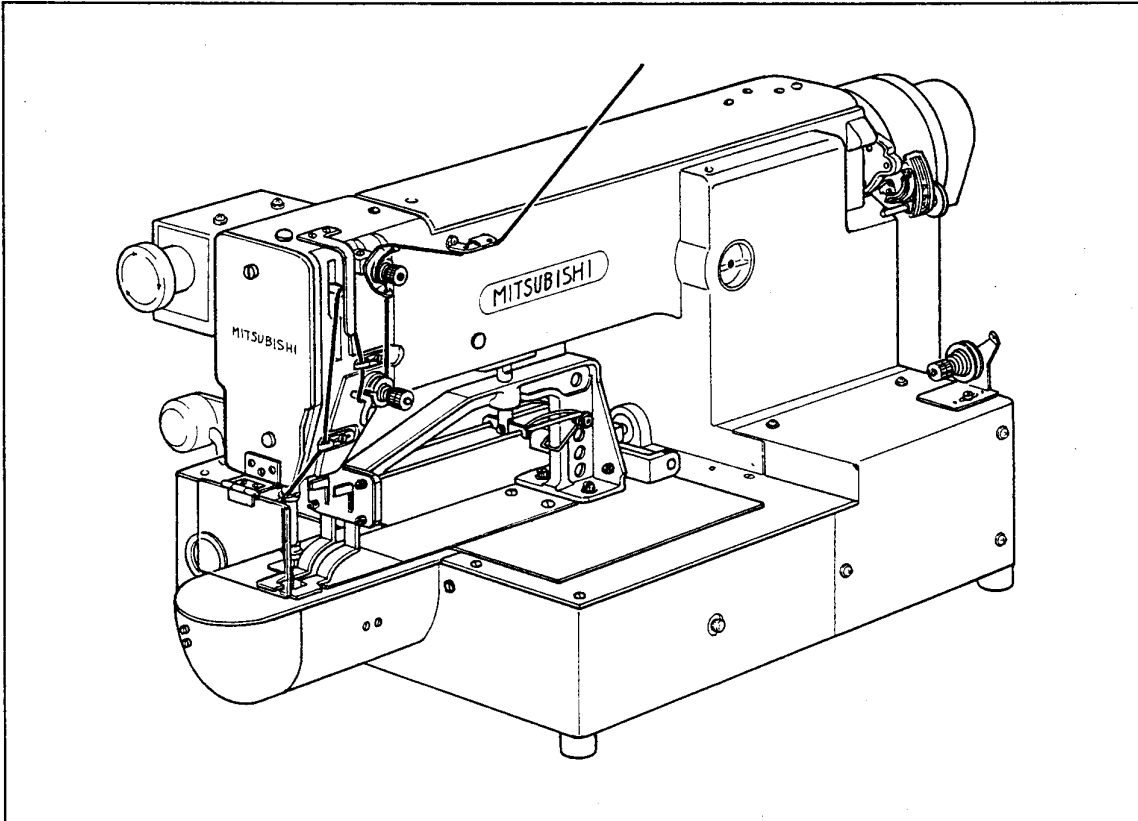
5-3 Threading the upper thread



Caution

★ Please make sure to turn the power switch OFF before threading the upper thread.

Please thread the upper thread with referring to the below figures.




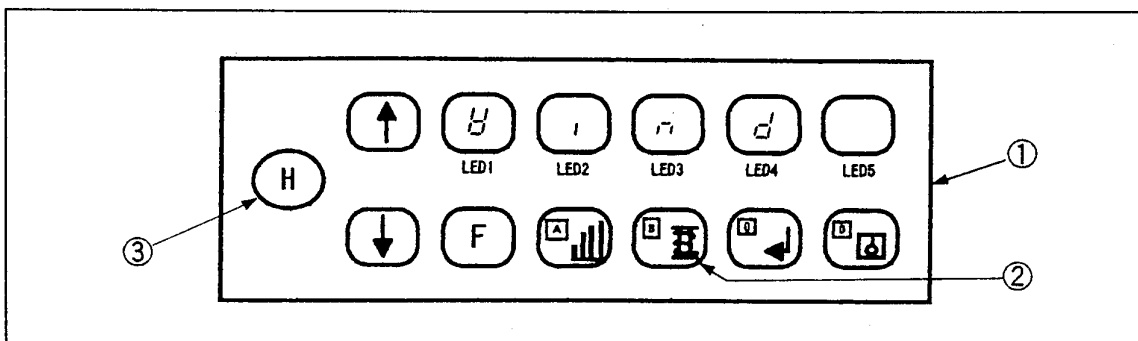
5-4 Winding the bobbin thread



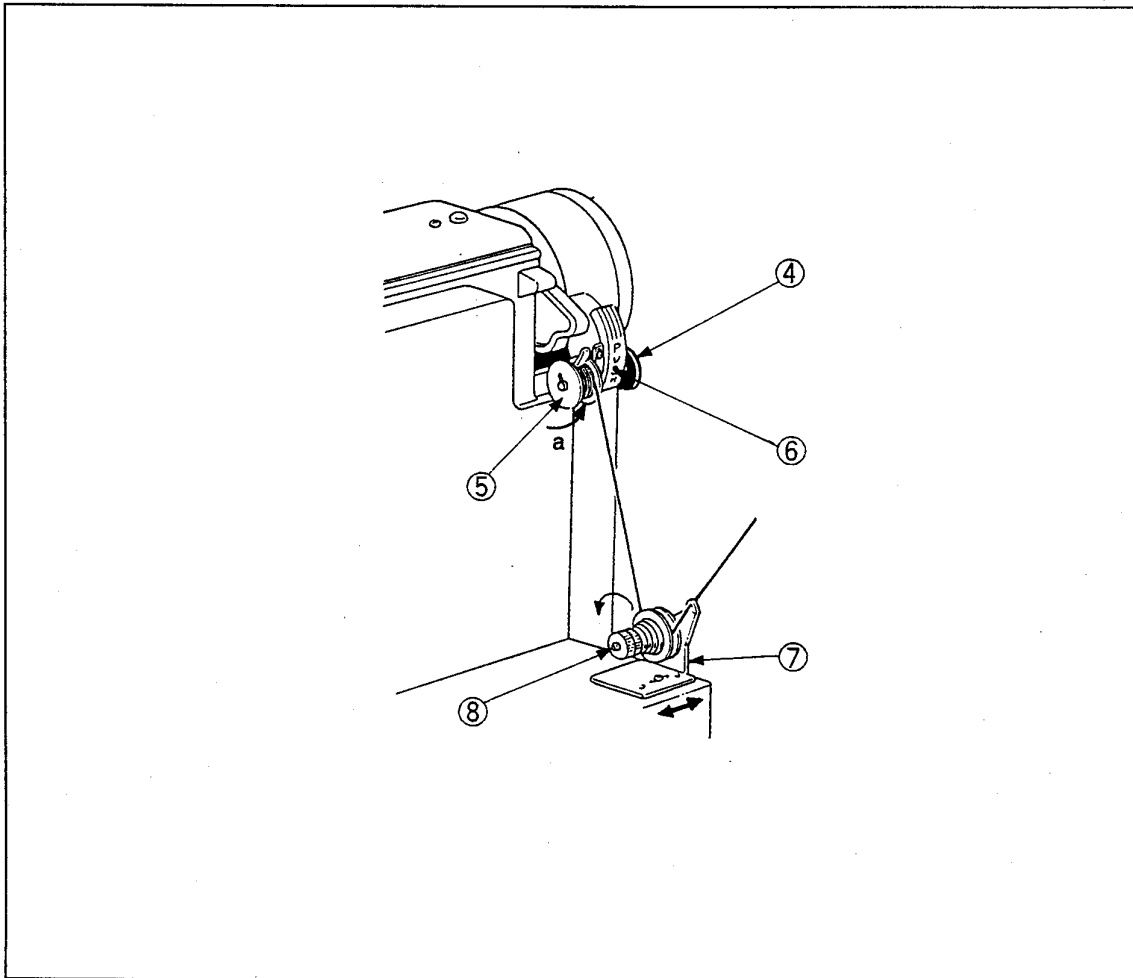
Caution

★ Please make sure to pull the upper thread out of the needle before winding the bobbin thread.

- (1) Turn the power switch ON.
- (2) Set the control box setting panel (NO.①) to the thread winding mode with pushing  key (NO.②).



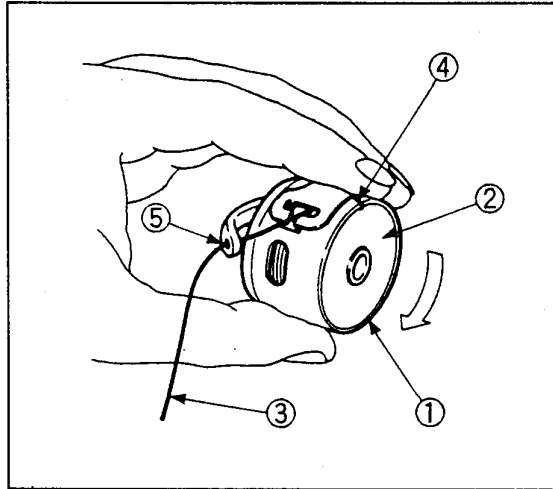
- (3) Pass through the thread from the thread stand as shown on the below figure then, wind the thread to the empty bobbin (NO.⑤) in the arrow mark "a" direction couple times and insert the bobbin (NO.⑤) into the bobbin winder (NO.④).
- (4) PUSH lever (NO.⑥) of the bobbin winder is pushed.
- (5) Please depress the foot switch deeply.
The thread is kept winding to the bobbin (NO.⑤) while the foot switch stepping on.
- (6) After finished the bobbin winding, the PUSH lever (NO.⑥) is returned to the original position and the bobbin winder (NO.④) is stopped automatically.
- (7) Return the setting panel (NO.①) of the control box to the normal mode condition with pushing **H** (NO.③) key after finished the bobbin winding.
- (8) To wind the bobbin thread during the sewing operation, carry out above (3) and (4) procedure then, the bobbin winding is performed automatically.
- (9) If the thread is wound up conically, move the thread guide (NO.⑦) toward smaller diameter of wound thread layers.
- (10) It is recommended that polyester thread or nylon thread is wound with low tension.
Adjust with tension adjust nut (NO.⑧).



5-5 Setting the bobbin

- (1) Set the bobbin (NO.②) into the bobbin case (NO.①).
- (2) Pull the bobbin thread (NO.③) into the slit (NO.④) and pass the thread through the thread hole (NO.⑤).

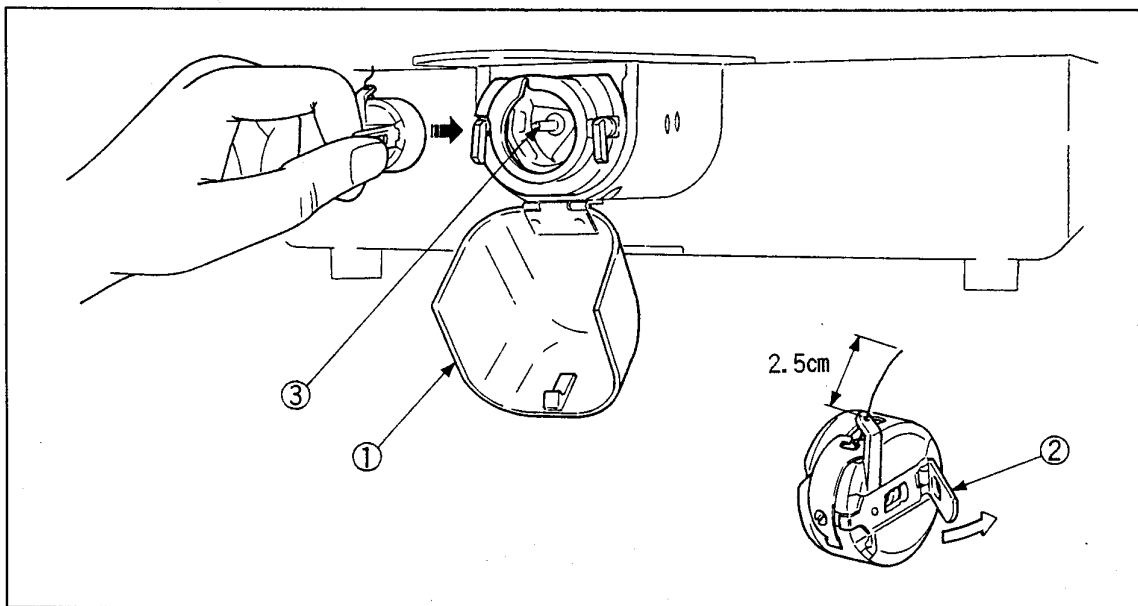
At this time, pull the bobbin thread (NO.③) then, check with the bobbin (NO.②) if it is rotated to the arrow direction. If it is not, set the bobbin (NO.②) into the bobbin case (NO.①) over again to get the proper rotation.



5-6 Setting the bobbin case

- (1) Set the needle bar to its highest position then, open the cylinder cover (NO.①).
- (2) Open the bobbin case latch lever (NO.②) fully then, fit it securely in the inner hook (NO.③).

NOTE Please pull the bobbin thread about 25mm out of the thread hole (NO.⑤) of the bobbin case.



6 PROPER SEWING

6-1 Operation of the emergency stop switch

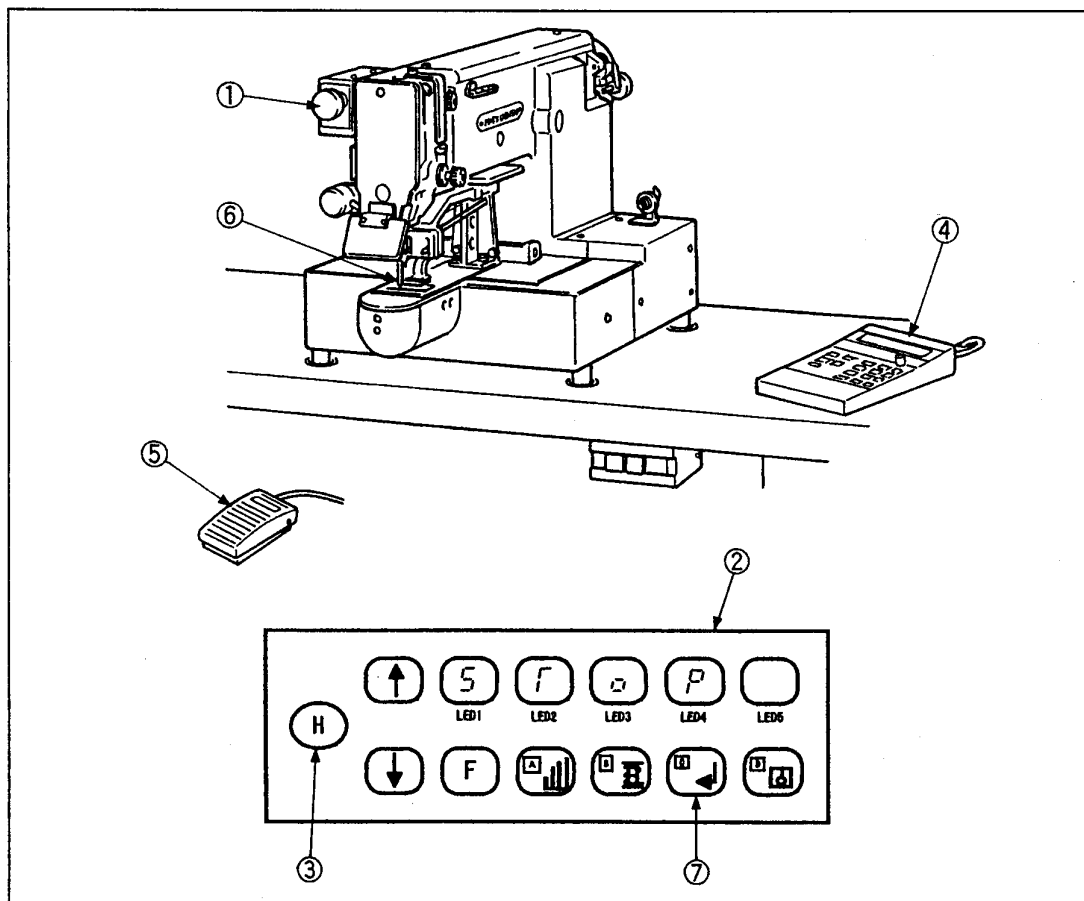
If an emergency such as a thread breakage, needle breakage and any other emergency is happened during the sewing operation, please hit immediately the emergency stop switch.

The sewing machine running is stopped instantly.

Caution

- ★ Before start the sewing operation, please make sure the location of the emergency stop switch and keep it in mind the function and how to use it.
- ★ Please Keep away the hands and the face from the needle during the sewing operation.

- (1) Press the HALT switch (NO.①). All operations will stop, and the sewing machine will stop at the needle UP state without trimming the thread.
- (2) Remove the cause of the abnormality.
- (3) To continue sewing, turn the HALT switch button to the right.
The switch will be unlocked.
Next, when the start switch (NO.⑤) (gray foot switch) is pressed again, the operation will resume from the halted position.
- (4) To cancel sewing, turn the HALT switch (NO.①) button to the right, and unlock the switch. Then, press the **[H]** key (NO.③) on the control box's setting panel (NO.②). The work holder (NO.⑥) will return to the home from the stopped position and will stop.



6-2 The sewing operation



Caution

- ★ It is very dangerous to operate the sewing machine without the safety guards (Eye guard, Belt cover, Link cover, Finger guard etc.).
- ★ Please make sure to always operate the sewing machine with the safety guards.
Please do not put unnecessary articles except for the sewing operation on the table top.
- ★ Please keep the hands and the face away from the needle.

(1) Turn the power switch (NO.①) ON.

The work holder (NO.②) automatically stands ready to operate at the home position. (This is the standard set up condition when the sewing machine is shipped from the factory.)

(2) Program the required sewing pattern.

The sewing pattern programming can be performed with the optional teaching panel (NO.⑥).

For the details of the sewing pattern programming, please refer to the instructions on the another technical manual **TEACHING PANEL**.

* The pattern of 16 standard patterns as following below is input to the data floppy disk.

The data floppy disk is enclosed in the accessory box.

● Standard Patterns (16 Types)

No.	Description	Stitch Size at 100% Scale	Stitch Pattern	No.	Description	Stitch Size at 100% Scale	Stitch Pattern
100	42-stitch type large bar tacking	16×2.5mm		108	20-stitch type eyelet bar tacking	6×2.5mm	
101	36-stitch type large bar tacking	16×2.5mm		109	28-stitch type fabric bar tacking	6×2mm	
102	28-stitch type large bar tacking	16×2.5mm		110	21-stitch type fabric bar tacking	6×2mm	
103	70-stitch type large bar tacking	16×2.5mm		111	14-stitch type fabric bar tacking	6×2mm	
104	28-stitch type small bar tacking	8×2.5mm		112	25-stitch type alternate labeling	18×0mm	
105	21-stitch type small bar tacking	8×2.5mm		113	12-stitch type labeling	18×0mm	
106	36-stitch type eyelet bar tacking	6×2.5mm		114	26-stitch type belt-looping	14×0mm	
107	28-stitch type eyelet bar tacking	6×2.5mm		115	21-stitch type belt-looping	14×0mm	

(3) Select the desired sewing pattern. This pattern can be selected with pattern reading mode **D** key (NO.⑩) on the setting panel (NO.④) of the control box.

For the detail of this pattern selection, please refer to the instructions [5.Display and function of each key in the pattern mode] in the paragraph **8** Try operating the setting panel keys of the technical manual **CONTROL UNIT**.

- (4) Set the sewing speed. This speed setting can be done with speed setting mode [A] key (NO.11) or the speed dial (NO.7) of the optional teaching panel (NO.6).

For the detail of the speed setting, please refer to the instructions [3. Display and function of each key in speed setting mode] in the paragraph [8] Try operating the setting panel keys of the technical manual **CONTROL UNIT**.

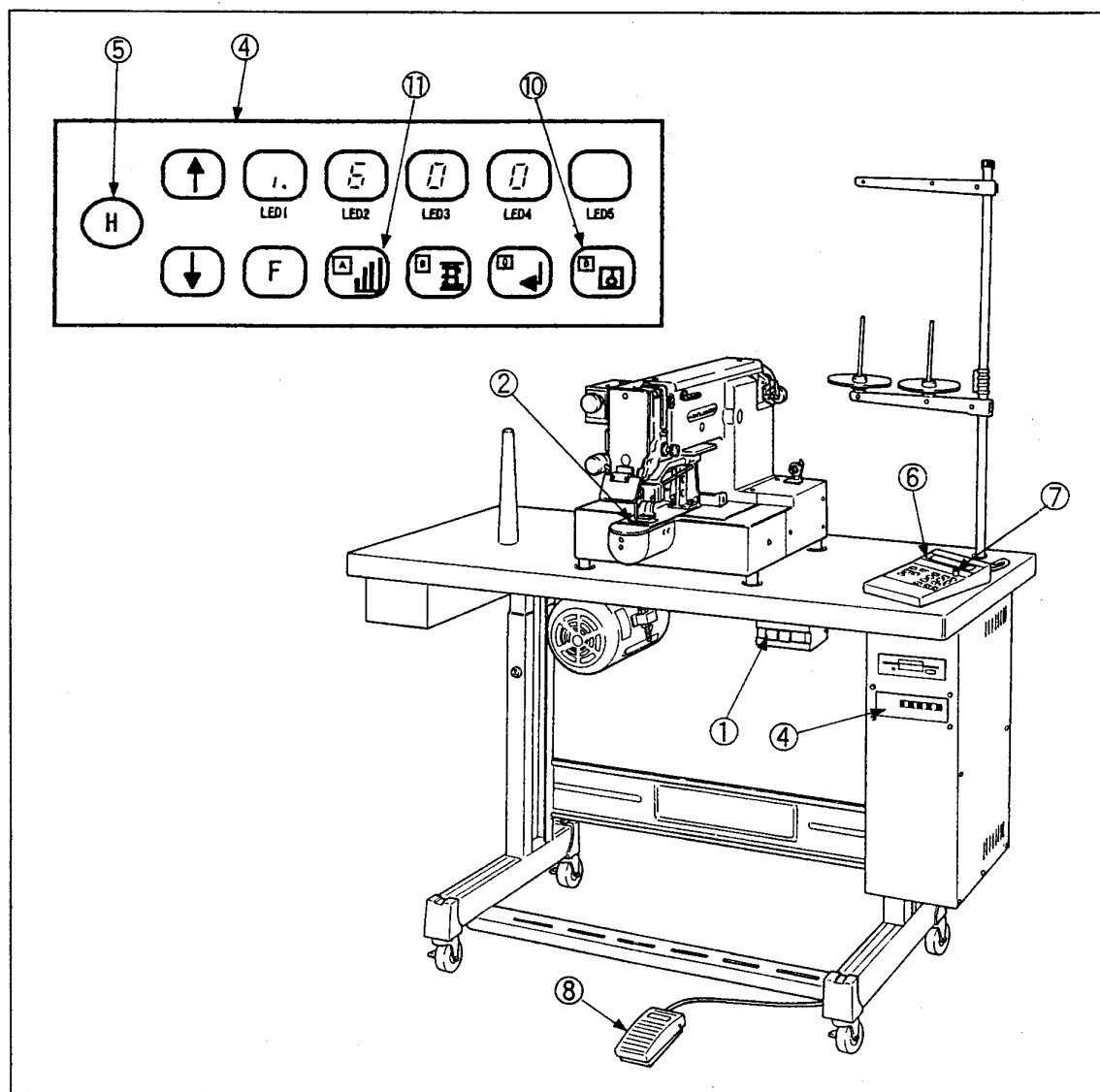
- (5) Insert the sewing material under the work holder (NO.2) then, step on the foot switch (NO.8) lightly. The work holder comes down to press the sewing material.
- (6) When the foot switch (NO.8) is depressed further deeper from the lightly depressed position, stitching is initiated beginning with home position.

NOTE The sewing material will be released after the foot switch (NO.8) become free again before starting the machine.

- (7) After finished the sewing, the work holder (NO.2) is lifted automatically then, the sewing material is released.

Caution

★ In case of (5), if the foot switch (NO.8) is stepped strongly and rapidly, the machine will start sewing immediately after work holder goes down.

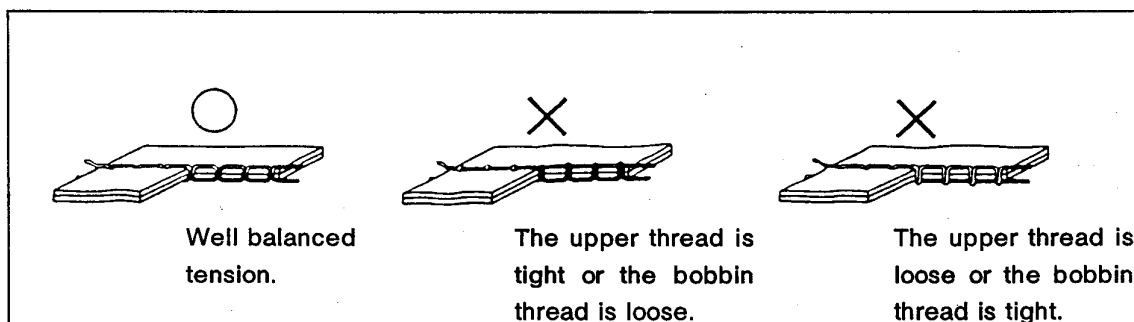


6-3 Adjustment of the thread tension

The thread tension between the upper and bobbin thread should be balanced in the best condition.

When the upper thread tension is well balanced with the bobbin thread tension, the both threads are interlocked along the center line of fabric layers as shown on the below figures.

NOTE The thread tension balance should be adjusted according to the sewing materials.



(1) Bobbin thread tension

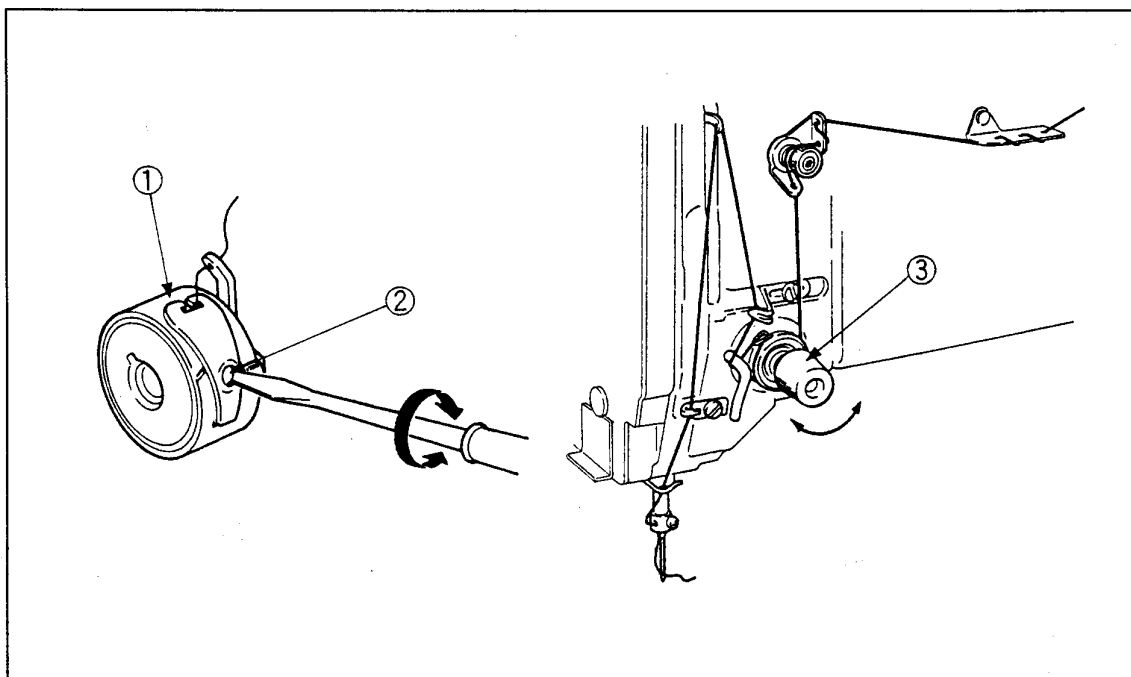
Adjust the bobbin thread tension with the thread tension adjusting screw (NO.②) on the bobbin case (NO.①). The thread tension becomes loose if turn the thread tension adjusting screw (NO.②) to the counter clockwise, and the thread tension becomes tight if turn it to the clockwise.

(2) Upper thread tension

Adjust the upper thread tension based on the bobbin thread tension.

For this adjustment, turn the thread tension adjusting nut (NO.③).

The upper thread tension becomes tight if turn the thread tension adjusting nut (NO.③) to the clockwise, and the upper thread tension becomes loose if turn it to the counter clockwise.



7 STANDARD ADJUSTMENT

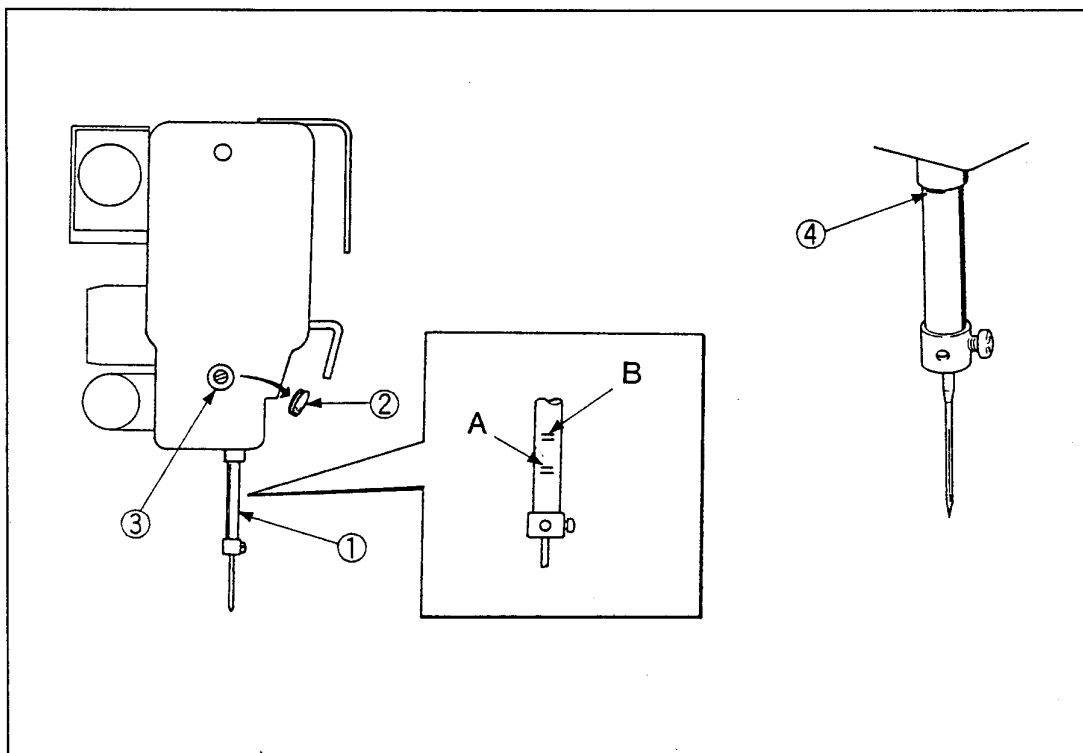
Caution

- ★ Please make sure to turn the power switch OFF before adjust the sewing machine.
- ★ If the adjustment is required under the power switch is ON, keep the foot switch away from the foot.
- ★ Be careful not to be wounded by the needle or the inner hook point.
- ★ Please make sure to put the safety guards (Eye guard, Belt guard, Link cover and finger guard etc.) back on the original location after the sewing machine adjustment.

7-1 Adjustment of the needle bar position

- (1) Turn the power switch OFF.
- (2) Turn the sewing machine pulley by hand then, stop the needle bar (NO.①) at the lowest position.
- (3) Remove the rubber plug (NO.②) from the face plate then, loosen the needle bar holder set screw (NO.③).
- (4) Move the needle bar (NO.①) to the position where the needle bar timing mark B is matched to the needle bar bushing bottom line (NO.④) then, tighten the needle bar holder set screw (NO.③).

NOTE If the needle class is DP x 17, match the needle bar timing mark A to the needle bar bushing bottom line (NO.④).



Caution

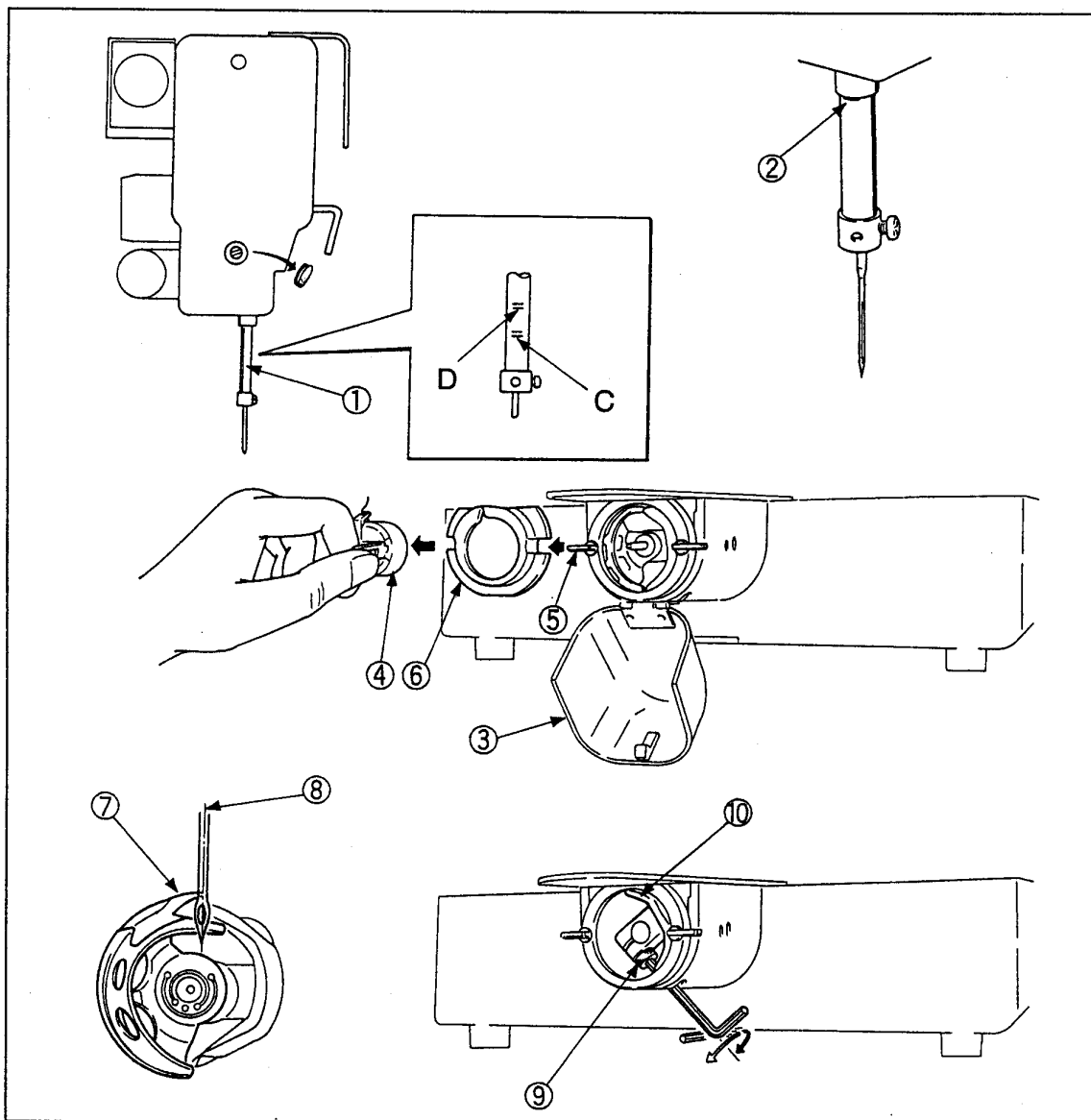
- ★ For the safety, when tilt or raise the sewing machine head, please make sure to hold the sewing machine head with both hands by two people at least.

7-2 Adjustment of the position between the needle and the shuttle hook.

- (1) Turn the power switch OFF.
- (2) Turn the sewing machine pulley by hand then, move up the needle bar (NO.①) from the lowest position and stop it at the position (NO.②) where the needle bar timing mark D is matched to the needle bar bushing bottom line.

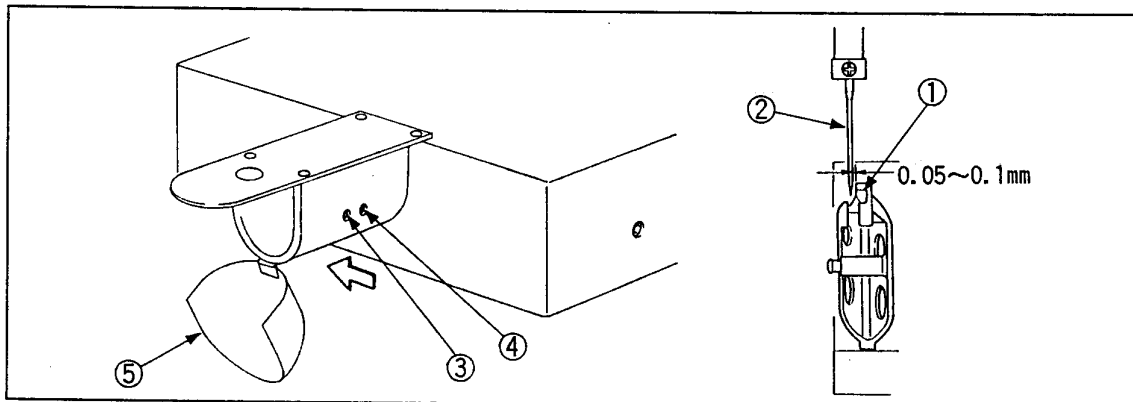
NOTE If the needle class is DP x 17, match the needle bar timing mark C to the needle bar bushing bottom line (NO.②).

- (3) Open the cylinder cover(NO.③).
- (4) Remove the bobbin case (NO.④).
- (5) Turn the hook retainer lever (NO.⑤) then, remove the hook retainer (NO.⑥).
- (6) Loosen the driver set screw (NO.⑨) then, move the driver (NO.⑩) and adjust the shuttle hook point (NO.⑦) to be matched with the center line (NO.⑧) of the needle.
- (7) After the adjustment, tighten the driver set screw (NO.⑨) and put the bobbin case (NO.④), the hook retainer (NO.⑥) and the hook retainer lever (NO.⑤) back to the original location then, close the cylinder cover (NO.③).



7-3 Adjustment of the clearance between the shuttle hook and the needle

- (1) Please take the same procedures as above paragraph 7-2. from (1) to (5).
- (2) Loosen the outer hook set screw (NO.③) and turn the eccentric pin (NO.④) so that the clearance between the shuttle hook point and the needle becomes 0.05~0.1mm.
- (3) After the adjustment, securely tighten the outer hook set screw (NO.③) and put the hook retainer and the bobbin case back to the original location then, close the cylinder cover(NO.⑤).



7-4 Adjustment of the clearance between the driver and the needle

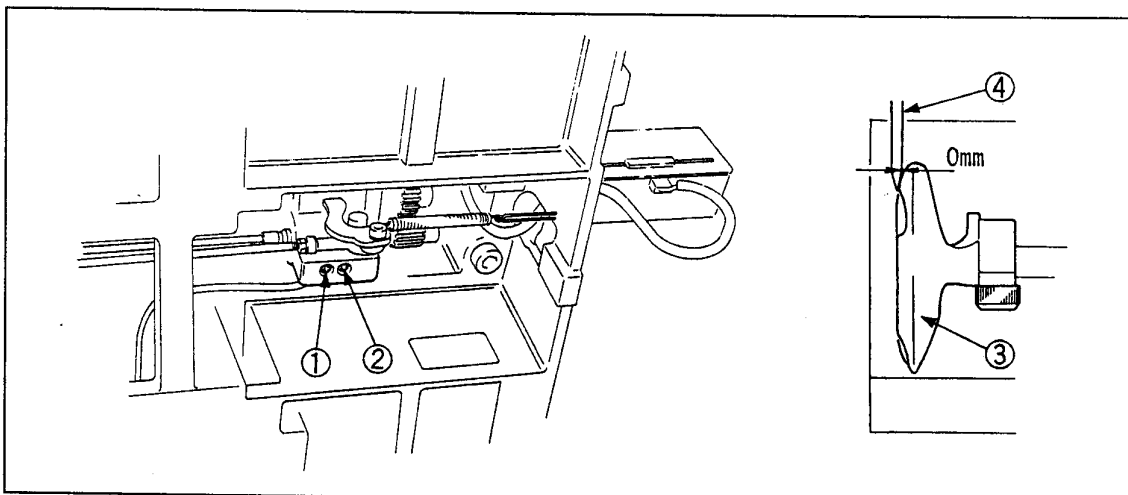
- (1) Please take the same procedures as above paragraph 7-2. from (1) to (5).
- (2) Please make sure the clearance between the shuttle hook point and the needle has been adjusted 0.05~0.1mm at above procedure 7-3 Adjustment of the clearance between the shuttle hook and the needle
- (3) Tilt the sewing machine head to the left so that the bottom components of the sewing machine can be seen.



Caution

★ Please make sure to remove the small belt cover from the table top before tilting sewing machine head.

- (4) Loosen the driver set screw (NO.①) and turn the eccentric pin (NO.②) so that the clearance between the driver (NO.③) and the needle (NO.④) can become 0.
- (5) After the adjustment, securely tighten the driver set screw (NO.①) and raise the sewing machine head back to the original position, and put the hook retainer and the bobbin case back to the original location then, close the cylinder cover.

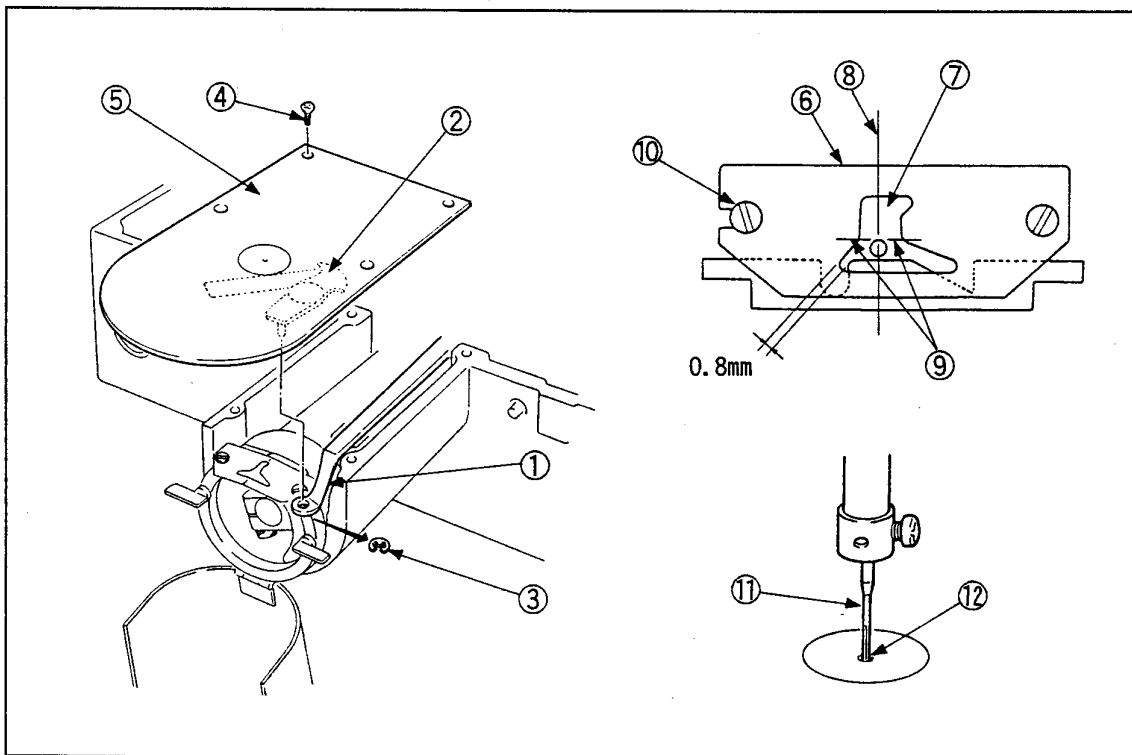


7-5 Adjustment of the thread guide

- (1) Remove the E shaped snap ring (NO.③) which is engaging the movable knife (NO.②) and the link (NO.①) then, loosen the set screws (NO.④) and remove the sliding plate (NO.⑤).
- (2) Loosen the set screws (NO.⑩) and move the thread guide (NO.⑥) to the position where the needle center line (NO.⑧) divides the needle groove (NO.⑦) evenly and the rear side line (NO.⑨) of the needle is aligned with the shoulder (NO.⑨) of the thread guide (NO.⑥). At this time, make sure that there is some clearance between the hook retainer and the thread guide (NO.⑥) at least the upper thread can be passed smoothly through it (standard clearance is 0.8mm).

If this clearance is too wide, it causes the trimming failure and if this clearance is too narrow, it causes the sewing condition disturbance, the trimmed upper thread tail uneven and the locking up the hook with the upper thread.

- (3) After the adjustment, engage the link (NO.①) of the trimmer mechanism with the movable knife (NO.②) with the E shaped snap ring (NO.③) and put the sliding plate (NO.⑤) back on the original location then, tighten the set screws (NO.④). At this time, set the sliding plate (NO.⑤) so that the needle (NO.⑪) can come down to the center (NO.⑫) of the needle hole of the needle plate.

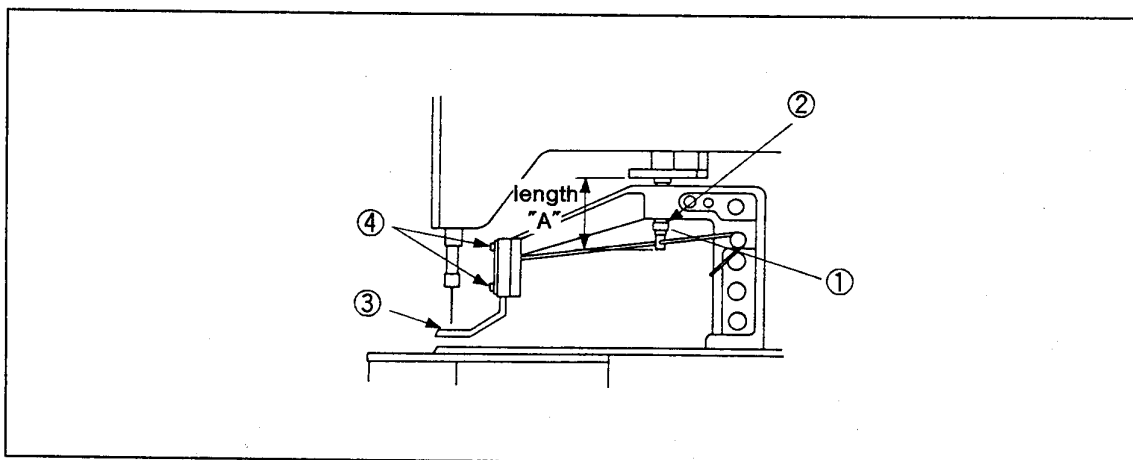


7-6 Adjustment of the work holder pressure

- (1) To increase pressure, loosen the nut (NO.①) and turn the work holder shaft (NO.②) counterclockwise using a spanner (thereby length "A" becomes larger).
- (2) To decrease pressure, turn the work holder shaft (NO.②) clockwise.
- (3) When the pressure is set higher than the standard pressure, fabric(s) to be held down becomes thinner.

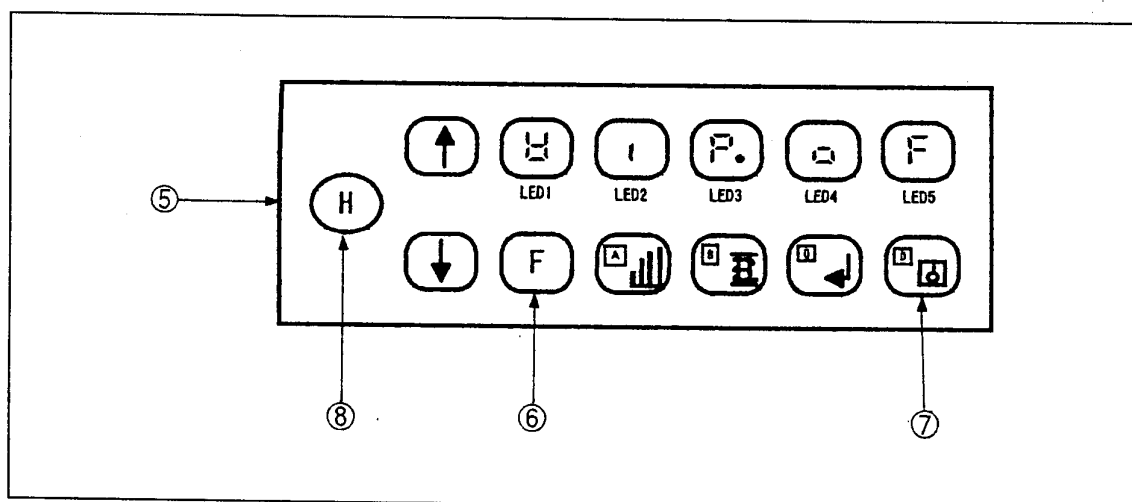
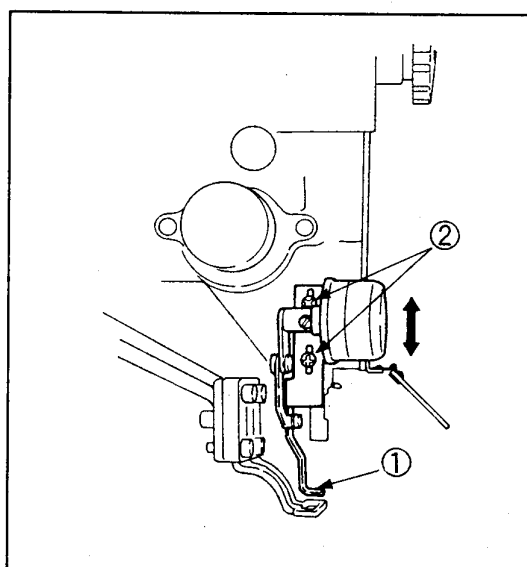
7-7 Replacing the work holder clamp frame

- (1) To replace the clamp frame (NO.③), remove the set screws (NO.④), remove the clamp frame and install a desired clamp frame.



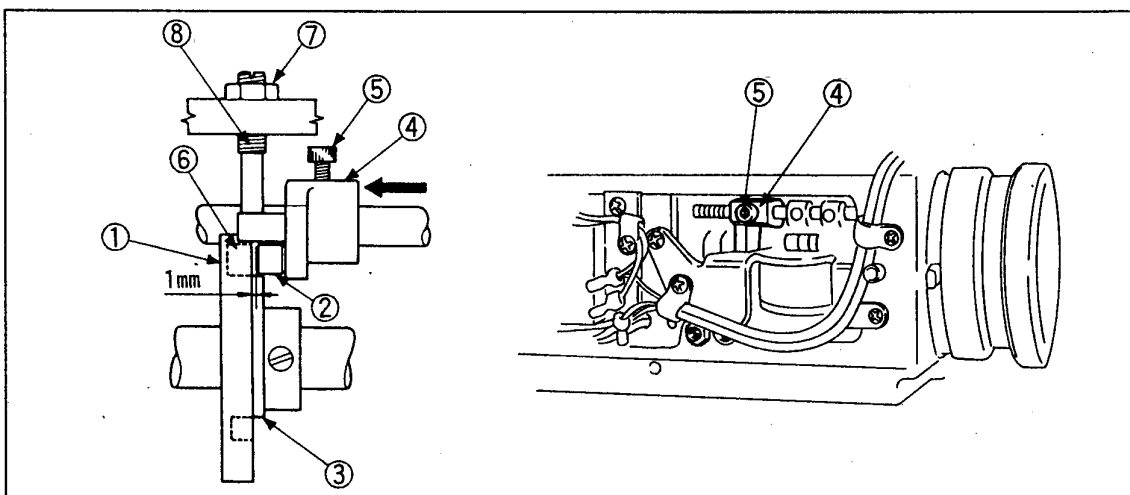
7-8 Adjustment of the wiper

- (1) Loosen the wiper set screw (NO.②) and adjust the wiper (NO.①) to be positioned where the wiper (NO.①) passes under the needle point with about 2 mm clearances right after the sewing machine is stopped running at the needle upper position (the thread take up lever's highest position).
- (2) If do not use the wiper (NO.①), cancel the wiper function with **[F]** (NO.⑥) and **[D]** keys (NO.⑦) on the setting panel (NO.⑤) of the control box. For this cancellation, push **[F]** (NO.⑥) key then, press **[D]** keys (NO.⑦) for more than 2 seconds until the display **W I P O F** is appeared on the setting panel.



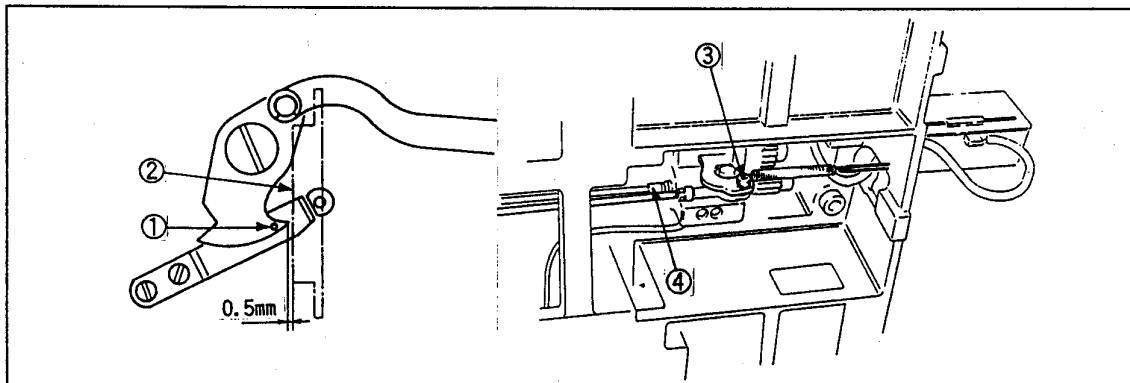
7-9 Adjustment of the trimmer cam follower

- (1) Turn the power switch OFF and remove the top cover.
- (2) Under the sewing machine regular stop condition (the needle stop position is upper and the take up lever stop position is highest), loosen the set screw (NO.⑤) of the cam follower lever (NO.④) and adjust the cam follower (NO.②) to be positioned to contact with the shoulder portion (NO.③) of the trimmer cam (NO.①) with having about 1mm clearance between the cam follower (NO.②) and the trimmer cam (NO.①). After this adjustment, tighten the set screw (NO.⑤) of the cam follower lever (NO.④).
- (3) Push the cam follower lever (NO.④) by hand to the ← arrow direction and make sure that the cam follower (NO.②) is engaged into the cam groove (NO.③) smoothly.
- (4) If the cam follower (NO.②) is not engaged smoothly, under confirming with the condition which the cam follower (NO.②) contacts with the shoulder portion (NO.②) of the trimmer cam (NO.①), loosen the nut (NO.⑦) and tighten the stopper screw (NO.⑧) until it touches with the stopper (NO.⑨) of the cam follower lever (NO.④) then, loosen the stopper screw (NO.⑧) back about 1/3 turn and fix the nut (NO.⑦) firmly.



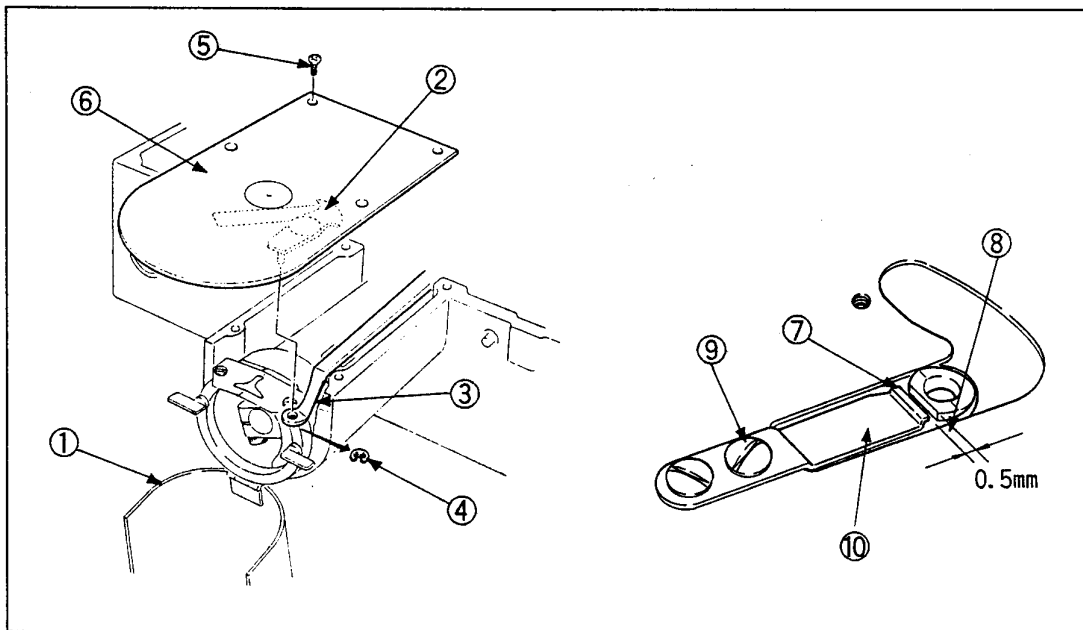
7-10 Adjustment of the position for the movable knife point

- (1) Tilt the sewing machine head to the left to be able to see the bottom component parts.
- (2) Open the cylinder cover.
- (3) Check with the point (NO.①) of the movable knife whether it is located at the position apart 0.5mm from the front face (NO.②) of the hook retainer.
- (4) For the adjustment of the movable knife point (NO.①), loosen the adjusting screw (NO.③) and move the rod end (NO.④) right and left then, adjust the position of the movable knife point.
- (5) After the adjustment, tighten the adjusting screw (NO.③) securely.



7-11 Adjustment of the fixed knife position

- (1) Open the cylinder cover (NO.①).
- (2) Remove the E shaped snap ring (NO.④) which engages the movable knife (NO.②) and the link (NO.③).
- (3) Loosen the set screws (NO.⑤) then, remove the sliding plate (NO.⑥).
- (4) Turn the sliding plate (NO.⑥) upside down and loosen two set screws (NO.⑨) then, adjust the fixed knife (NO.⑩) position to be positioned for the blade edge (NO.⑦) to have the clearance 0.5mm from the edge of the needle plate (NO.⑧).
- (5) After the adjustment, tighten the set screws (NO.⑨) securely.
- (6) Put all the parts removed for this adjustment back to the original locations.



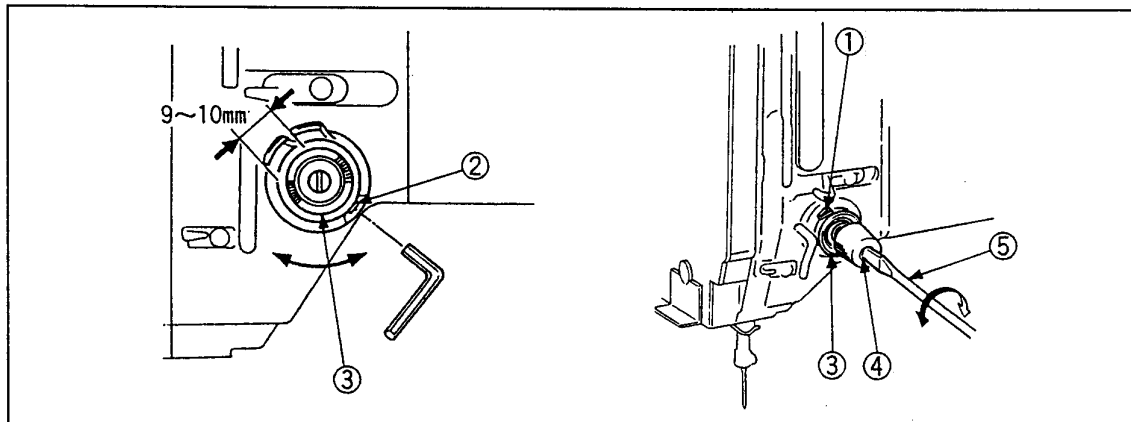
7-12 Adjustment of the thread take up spring swing stroke

Loosen the set screw (NO.②) and turn the whole thread tension regulator (NO.③) then, adjust the thread take up spring swing stroke to be become 9~10mm. After the adjustment, tighten the set screw (NO.②) securely.

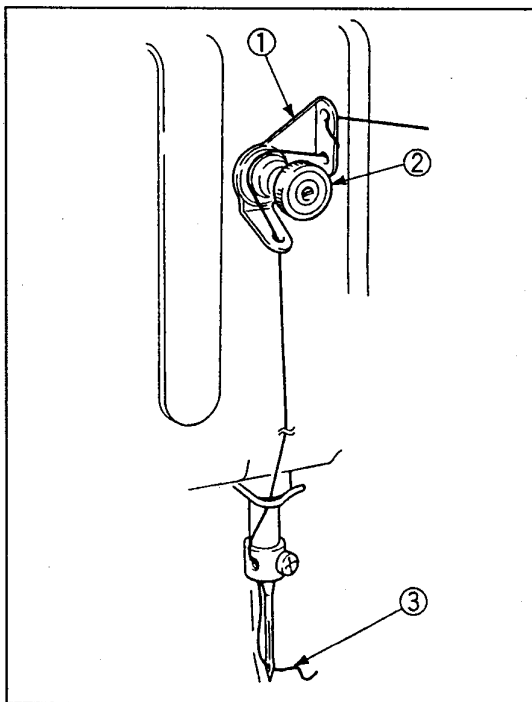
7-13 Adjustment of the thread take up spring tension

Insert the screw driver (NO.⑤) into the slit (NO.④) of the thread tension regulator (NO.③) and adjust the thread take up spring (NO.①) tension.

If turn the screw driver to the clockwise, the thread take up spring tension becomes tight, and if turn the screw driver to the counter clockwise, the thread take up spring tension becomes loose.



7-14 Adjustment of the thread tail (NO.③) after the trimming



Adjust the thread tail (NO.③) from the needle after the trimming with turning the nut (NO.②) of the pre-tension (NO.①).

If turn the nut (NO.②) to the clockwise, the thread tail becomes shorter and if turn the nut (NO.②) to the counter clockwise, the thread tail becomes longer.

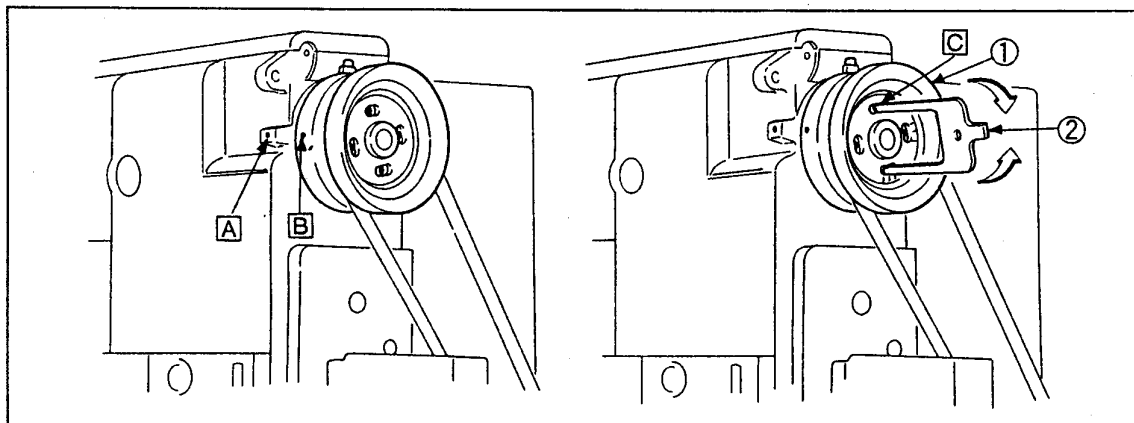
7-15 Cancellation of the trimming function

If the automatic trimming is not required during the sewing operation, cancel the trimming function with the setting panel of the control box. For the detail of this instructions, please refer to the paragraph [4.Program 4 mode display] on [9] Basic mode operation of the technical manual **CONTROL UNIT**.

7-16 Adjustment of the synchronizer

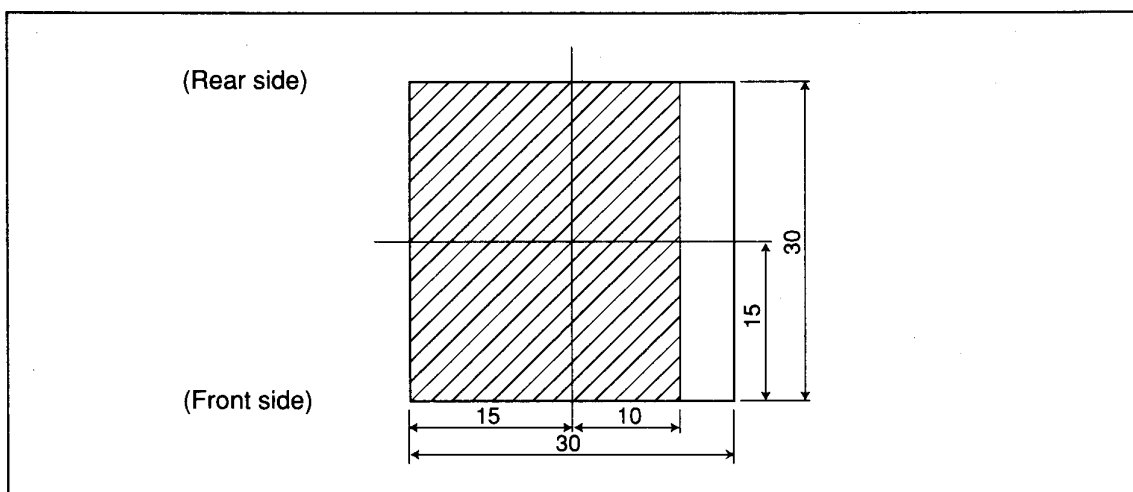
- NOTE** (a) When the sewing is finished, the arm timing mark **A** and the pulley timing mark **B** are matched with each other then, the sewing machine is stopped the running. This is the normal condition.
- (b) If these timing mark **A** and **B** get out of the matching more than 3mm, adjust the timing mark matching.

Hold the sewing machine pulley (NO.①) by hand and insert the angle adjuster (NO.②) into the hole **C** then, turn the angle adjuster (NO.②). If turn the angle adjuster (NO.②) to the clockwise, the pulley timing mark **B** goes up and if turn it to the counter clockwise, the pulley timing mark **B** comes down. The angle adjuster (NO.②) is enclosed in the accessory box.

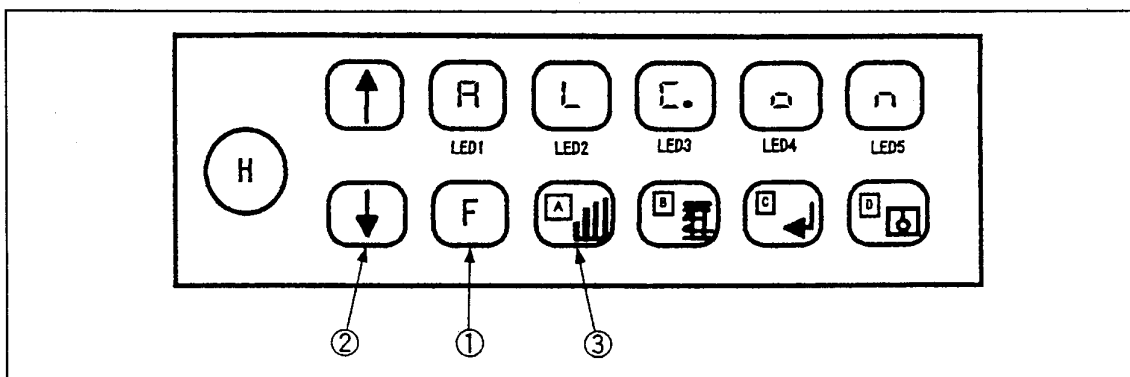


7-17 Adjustment of the mechanical home position

NOTE The mechanical home position is fixed at the center of the clamp frame area when the sewing machine is shipped from the factory. However, it can be moved within the area covered with diagonal lines.

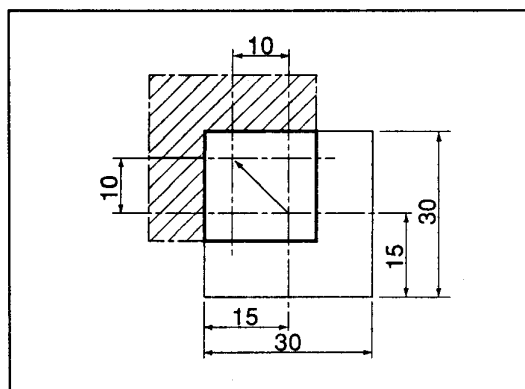


- (1) Turn the power switch ON and cancel the sewing area limit with the setting panel of the control box. For this cancellation, at the normal mode condition of the setting panel, push **[F]** key (NO.①) then, press **[↓]** key (NO.②) and **[A]** Key (NO.③) at the same time for more than 2 seconds. The display **A L C o n** is appeared and the sewing area limit is canceled.



NOTE If do not cancel the sewing area limit, shifting the mechanical home position make the effective sewing area narrower than the original.

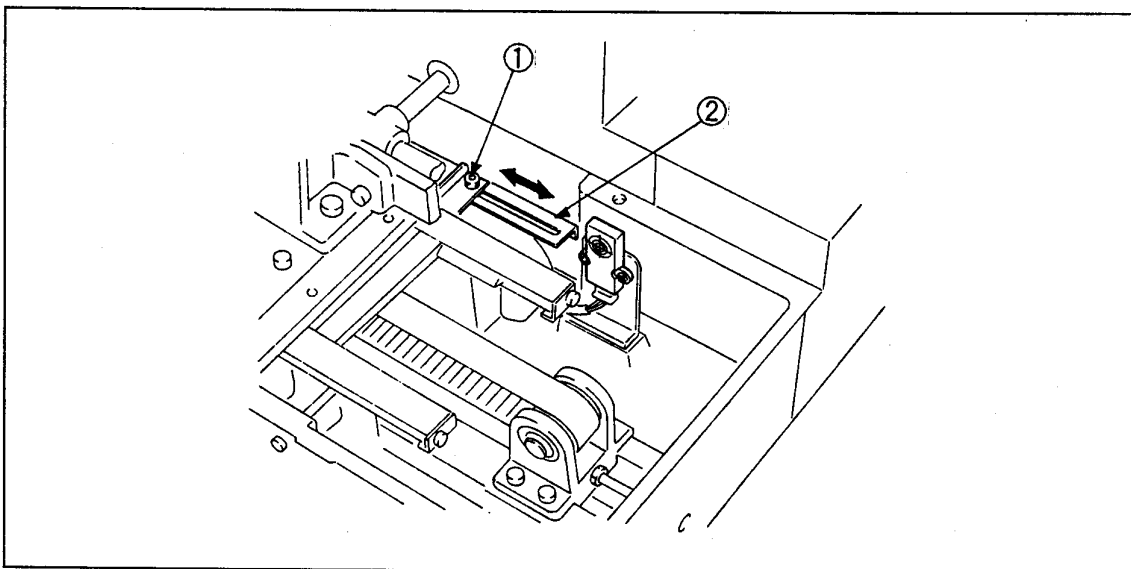
(Example) If shift the mechanical home position to the X direction 10mm, the Y direction 10mm without canceling the sewing area limit, the area covered with diagonal lines becomes invalid and the effective sewing area becomes narrower as a bold rectangle shown on the figure.



- (2) After the cancellation of the sewing area limit, once, turn the power switch OFF.

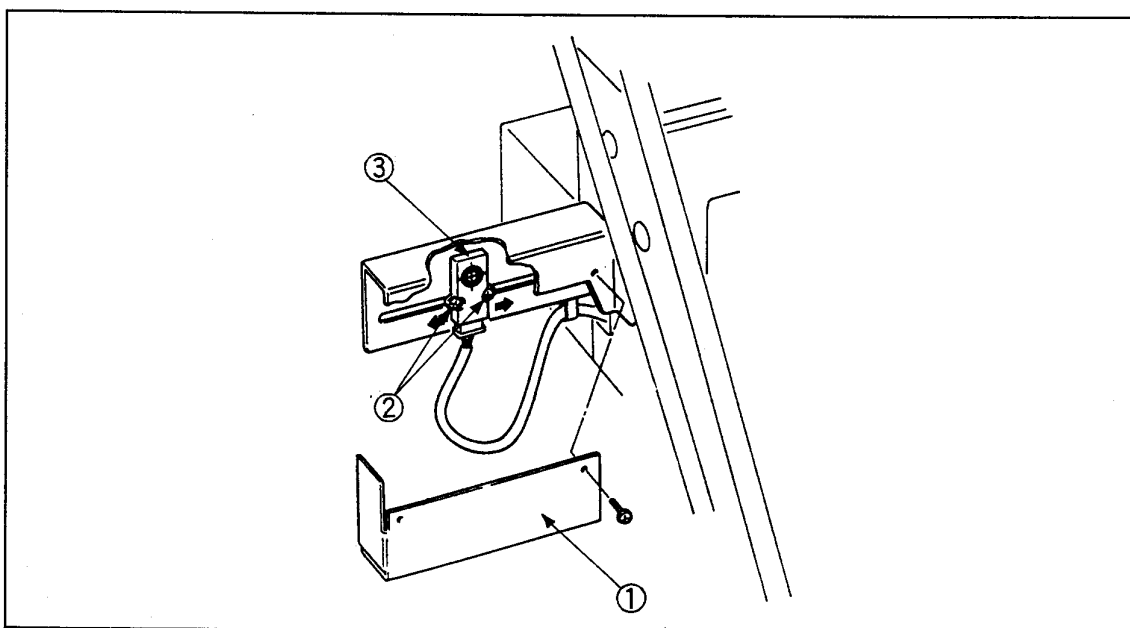
7-17-1 Shifting the mechanical home position to the X direction

- (1) Remove the X-Y cover (right), (left) and X cover plate.
- (2) Loosen the detector plate fix screws (2 pieces) (NO.①). If move the detector plate (NO.②) to the right, the mechanical home position is shifted to the left and if it is moved to the left, the mechanical home position is shifted to the right.
- (3) After the mechanical home position shifting, tighten the detector plate fix screws (2 pieces) securely.



7-17-2 Shifting the mechanical home position to the Y direction

- (1) Remove the Y detector protection cover (NO.①).
- (2) Loosen the Y detector set screws (2 pieces)(NO.②). If move the Y detector (NO.③) to the right, the mechanical home position is shifted to the backward and if move it to the left, the mechanical home position is shifted to the front.
- (3) After the mechanical home position shifting, tighten the detector set screws (2 pieces) (NO.②) securely.



7-17-3 Fine adjustment of the mechanical home position in the X, Y direction

NOTE When the original mechanical home position is shifted to the another position or it is required to move a little, a fine adjustment of the mechanical home position in the X, Y direction can be done with the setting panel of the control box. For this fine adjustment, refer to the instructions [1. Program 1 mode display and the function of each key] in the paragraph [9] Basic mode operation of the technical manual **CONTROL UNIT**.

7-18 Adjustment of the X-Y detector clearance

NOTE The work holder stop position which is the mechanical home position is detected by the X-Y detectors. If the clearance between the detector and the detector plate is changed, the mechanical home position is also changed. If such aberration is happened, make the following adjustment. Please keep it in mind if the detector senses the home position, the red pilot light of the detector goes on each time.

7-18-1 Adjustment of the X detector clearance

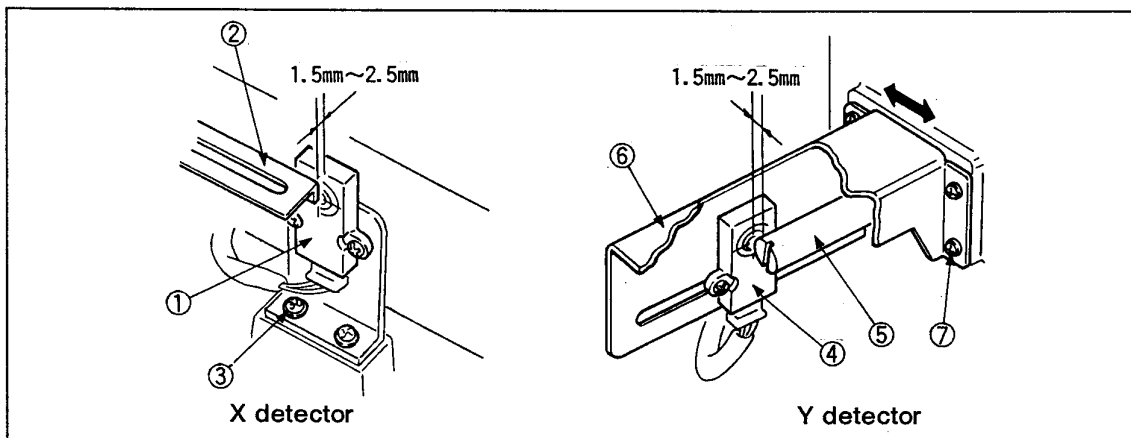
- (1) Remove the X cover (right) and the X cover plate (right).
- (2) Check the clearance between the surface of the detector (NO.①) and the detector plate (NO.②). If this clearance is about 1.5~2.5mm, it is the normal condition.
- (3) If this clearance is out of the normal condition, loosen the detector set screws (NO.③) and move the detector by hand then, adjust the clearance to be proper.
- (4) After the adjustment, make the detector surface (NO.①) parallel with the detector plate (NO.②) then, tighten the detector set screws (NO.③) securely.

7-18-2 Adjustment of the Y detector clearance

- (1) Remove the Y detector cover.
- (2) Check the clearance between the detector surface (NO. ④) and the Y driving shaft (NO. ⑤). If this clearance is about 1.5~2.5mm, it is the normal condition.
- (3) If this clearance is out of the normal condition, loosen the set screws (NO.⑦) and reset the detector mounting plate (NO.⑥) to the proper position to be able to get the normal detector clearance.
- (4) After the adjustment, tighten the set screws (NO.⑦) of the detector mounting plate (NO.⑥) securely.

Caution

★ If the detector clearance becomes more than 2.5mm, the work holder stop position becomes unstable, furthermore, if the clearance becomes far bigger than 2.5mm the work holder does not stop and becomes out of control.



7-19 Adjustment of the X-Y table contact presser

NOTE When take the X-Y table apart or the X-Y table became weak in the joints, adjust the X-Y table contact presser. The adjustment should be made the X-Y table movement as smooth as possible without having play. If the X-Y table contact presser is too tight, the over presser induces the out of control on the X-Y table movement.

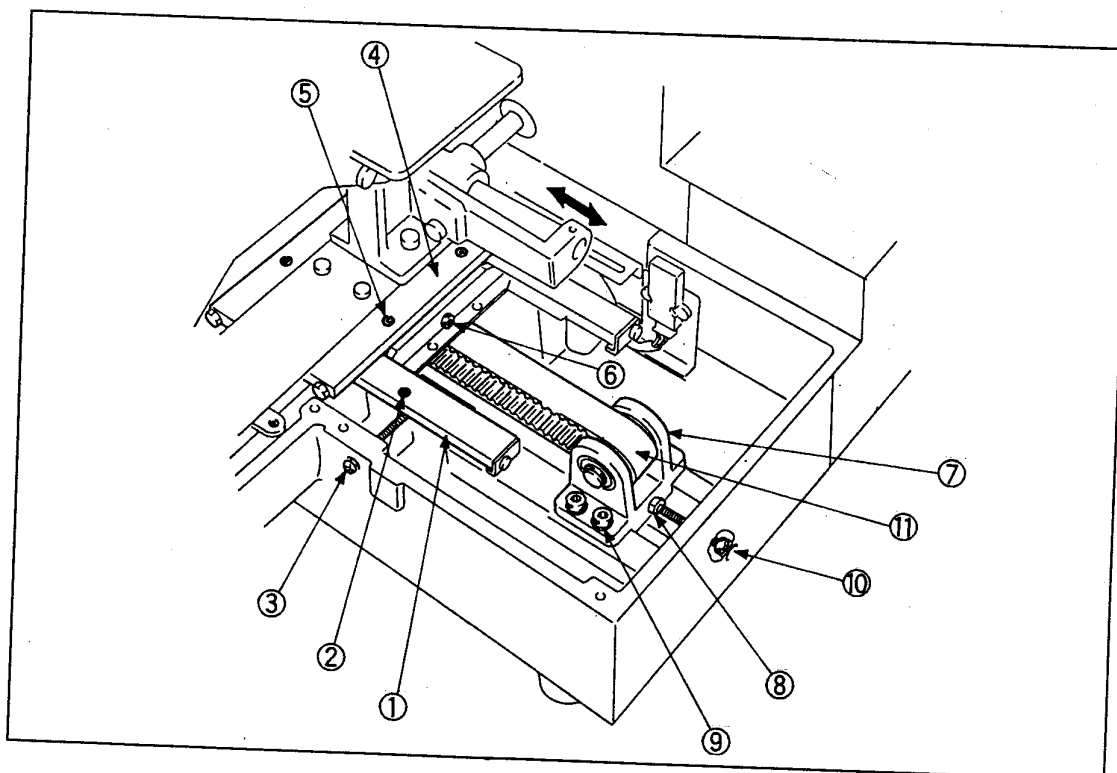
- (1) Remove the right and left X-Y covers and the right X cover plate.
- (2) Loosen the set screws (2 pieces) (NO.②) so that the X fixed race (NO.①) can be moved slightly.
- (3) If tighten the both right and left contact presser adjusting screws (NO.③), the X table contact presser is increased.
- (4) Loosen the set screws (2 pieces) (NO.⑤) so that the Y fixed race (NO.④) can be moved slightly.
- (5) If tighten the contact presser adjusting screws (NO.⑥), the Y table contact presser is increased.
- (6) After the adjustment, tighten the set screws (NO.②) and (NO.⑤) securely.

7-20 Adjustment of the X-Y timing belt tension

NOTE The proper condition of the X-Y timing belt tension is standing that they will not be got any yield even it is slightly pushed by hand.

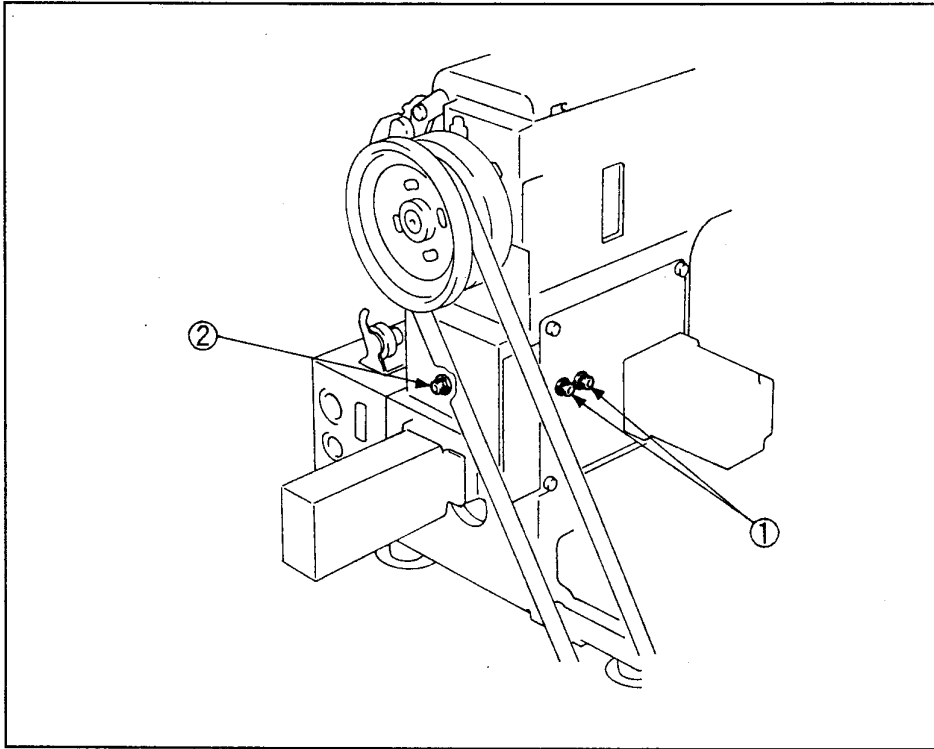
7-20-1 Adjustment of the X timing belt tension

- (1) Remove the right X cover and the right X cover plate.
- (2) Loosen the nut (NO.⑧) and the set screw (NO.⑨) of the bracket (NO.⑦).
- (3) If tighten the tension adjust screw (NO.⑩), the X timing belt (NO.⑪) tension will be increased.
- (4) After the adjustment, securely tighten the nut (NO.⑧) and the set screw (NO.⑨) of the bracket (NO.⑦) and put the right X cover and the right X cover plate back on the original locations.



7-20-2 Adjustment of the Y timing belt tension

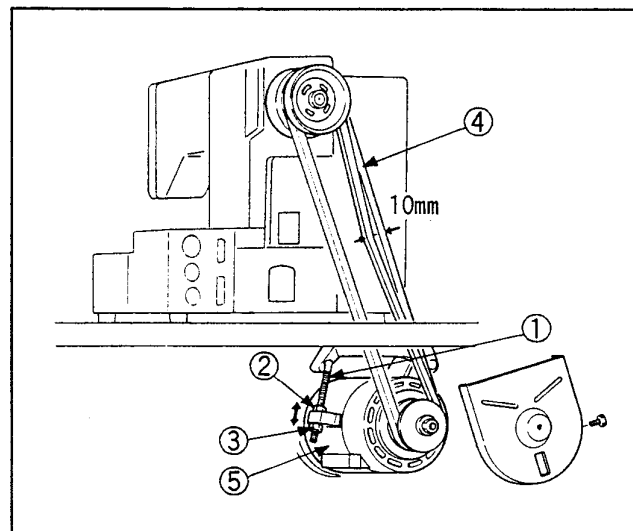
- (1) Remove the stepping motor cover and the V belt covers.
- (2) Loosen the bracket set screws (NO.①).
- (3) Tighten the tension adjust screw (NO.②). The Y timing belt tension will be increased.
- (4) After the adjustment, tighten the bracket set screws (NO.①) securely and the stepping motor cover and the v belt cover back to the original locations.



7-21 Adjustment of the V belt tension

NOTE After operated the sewing machine for a long period, the V belt tension becomes loose. Adjust the V belt tension periodically. The proper V belt tension is standing that it is bent about 10mm with the hand presser of 1.0kg as it shown on the figure.

- (1) Turn the power switch OFF.
- (2) Remove the V belt covers.
- (3) Loosen two nut (NO.②) on the motor position adjust bolt (NO.①).
- (4) Fix the motor (NO.⑤) position with putting the tension to the V belt by its weigh and firstly, tighten the upper nut (NO. ②) then secondly, tighten the lower nut (NO.②).



8 MAINTENANCE

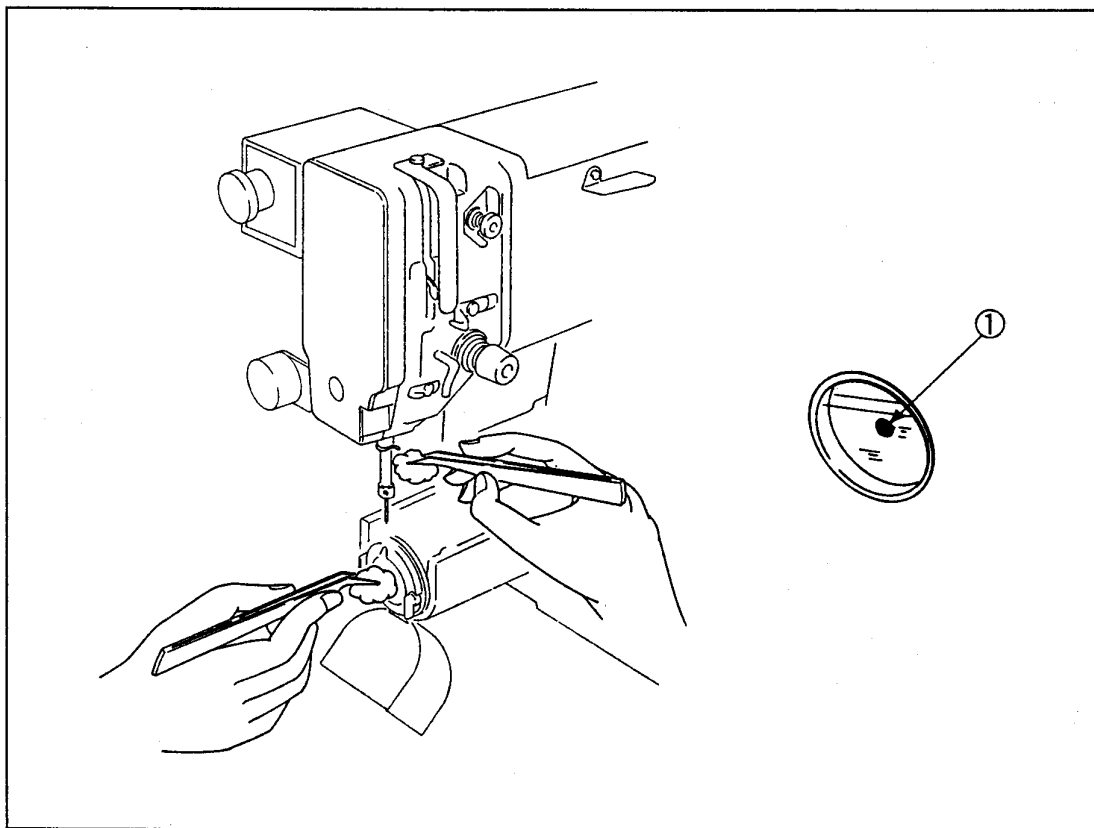


Caution

- ★ Please make sure to turn the power switch always OFF when clean up the sewing machine.
- ★ Before or after the sewing operation, clean up the sewing machine and check the oil level in the oil tank.

8-1 Cleaning

- (1) Turn the power switch OFF.
- (2) Remove the dust and the thread waste sticking around the threading parts or the shuttle hook area.
- (3) Check the oil level in the oil tank. If the oil is under the red mark (NO.①) level supply the oil to be over the red mark level.



8-2 Disposing of oil waste

If the waste oil is full filled in the oil pan, remove the oil pan then, dispose of the waste oil.

9 BAD SEWING CONDITION & ITS CAUSE AND REMEDY

NOTE Please fix the troubles during the sewing machine operation with referring to the following instructions.

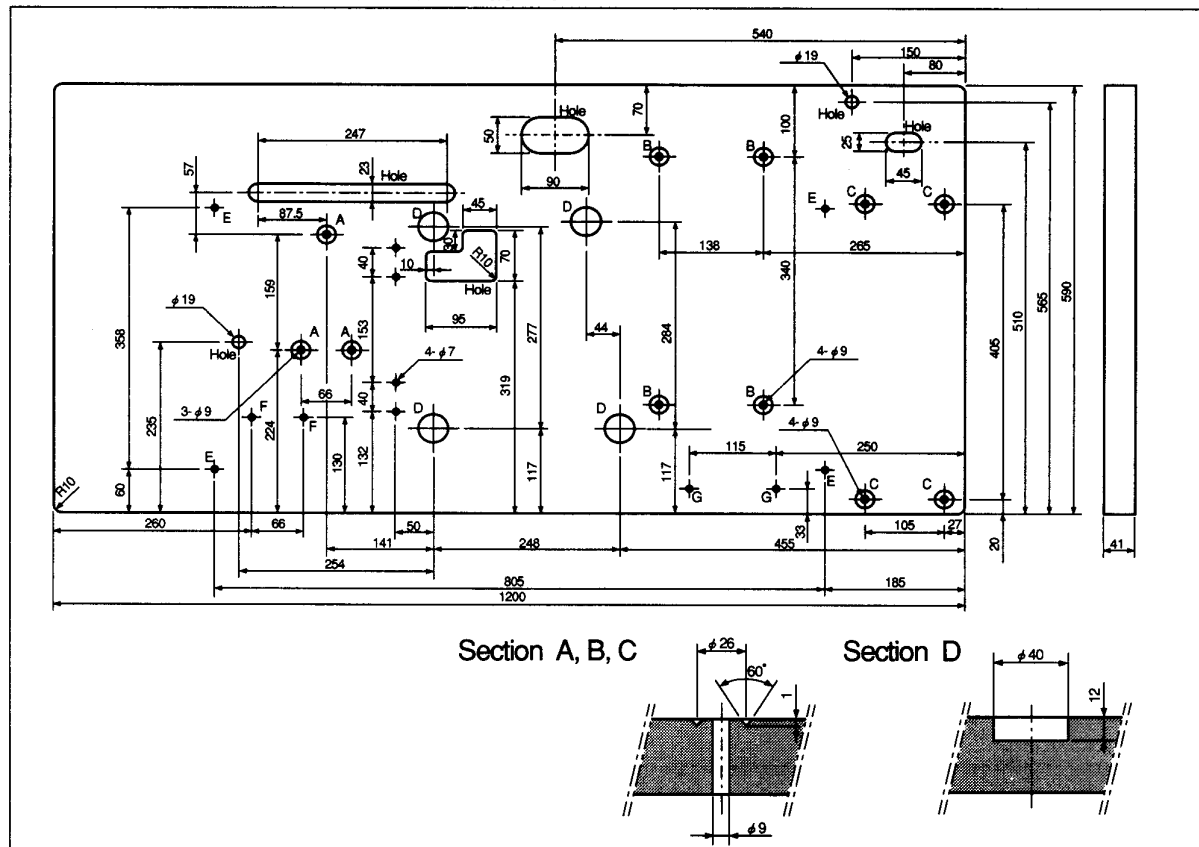
Beside, if the trouble conditions are not coming under these classification, please contact the sewing machine dealers nearby.

Bad condition	Cause	Remedy	Ref. page & item
1. Upper thread breakage often happens	Poor thread quality	Use better quality thread	—
	Tight upper thread tension	Adjust thread tension	P17-6-3.(2)
	Strong thread take up spring	Adjust thread take up spring properly	P24-7-13.
	Upper thread is thicker than needle size	Change needle to suitable size	—
	Damages on shuttle hook or driver	Change them new ones or grind them with buffing wheel or grind stone	—
	Damages inside needle plate needle hole	Change it new one or grind it with buffing wheel	—
	Needle and shuttle hook are not in proper timing	Adjust the timing	P19,20
	Thread melts with needle heat	Slow down sewing speed	P16-6-2.(4)
		Use silicon oil	—
Use needle cooler		—	
2. Upper thread is pulled out from needle	Thread take up spring swings too much	Adjust thread take up spring's swing stroke	P24-7-13.
	Upper thread is broken before regular trimming	Adjust fixed knife and needle plate position	P24-7-11.
	Needle size is bigger than thread size	Change needle to suitable size	—
	Pre-tension is too tight	Adjust pre-tension	P25-7-14.
	Thread guide is in wrong position	Adjust thread guide position properly	P21-7-5.
	Needle and shuttle hook are in bad timing	Adjust the timing properly	P19,20
	Trimmer timing is not correct	Adjust trimmer cam position	P23-7-9.
		Adjust movable knife position	P23-7-10.
Adjust synchronizer position		P25-7-16.	
3. Skip stitch happens at start sewing	Too short bobbin thread by bobbin spinning at trimming	Use non racing spring with bobbin	—
	Bobbin thread tension is too tight	Loosen bobbin thread tension spring	P17-6-3.(1)
	Thread tail from needle is very short after trimming	Decrease pre-tension	P25-7-14.
		Adjust trimmer cam position	P23-7-9.
		Adjust synchronizer position	P25-7-16.
		Make thread take up swing stroke smaller	P24-7-13.
	Thread tail from needle is very short after trimming	Advance thread tension release timing	Control unit
Adjust thread guide position properly		P21-7-5	

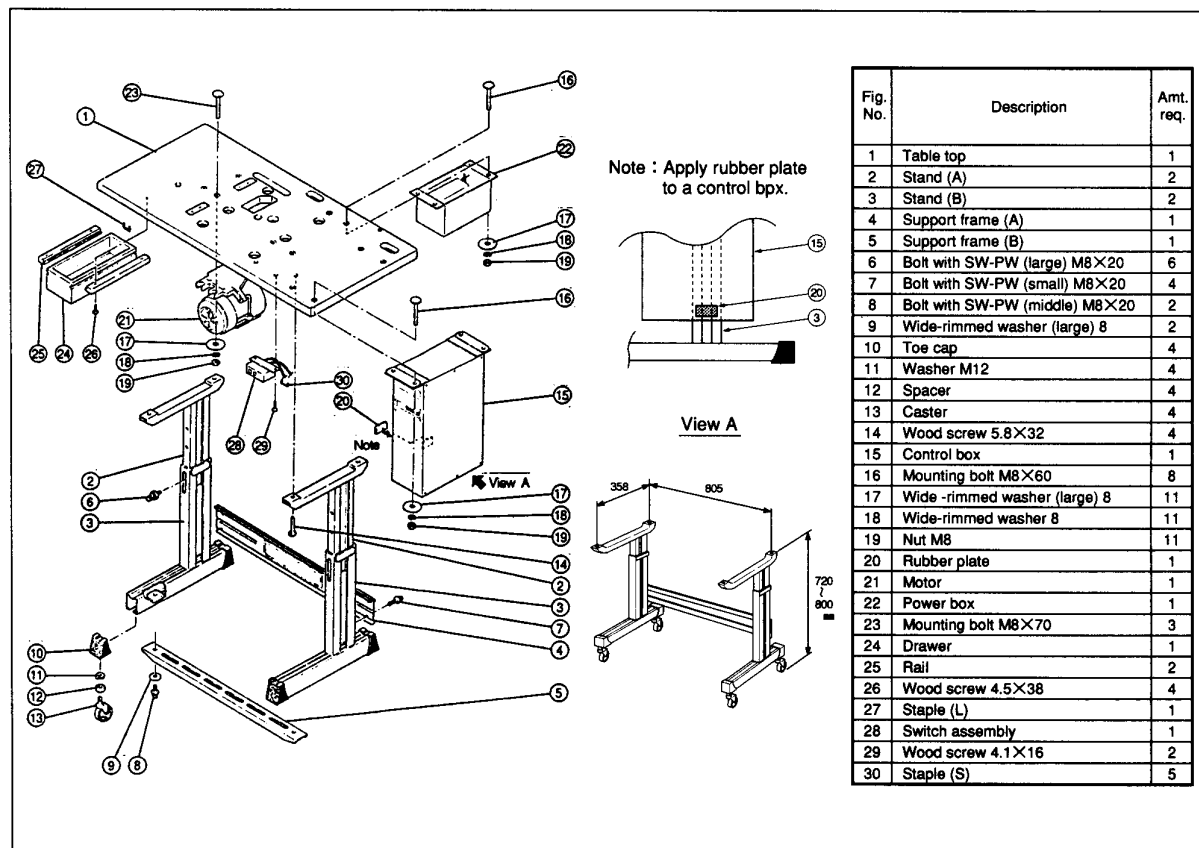
Bad condition	Cause	Remedy	Ref.page & item
4. Thread tail from needle is too long after	Pre-tension is too loose	Make pre-tension tighter	P25-7-14.
	Trimmer trimming is delayed	Adjust trimmer cam position	P23-7-9.
		Adjust synchronizer position	P25-7-16.
	Upper thread tension release timing is too fast	Delay tension release timing	Control unit
5. Trimming is not functioned	Thread guide is in wrong position	Adjust thread guide position properly	P21-7-5
	Trimmer function is canceled	Resume trimmer function	Control unit
	Fixed knife is dull	Change it new knife	P24-7-11.
	Movable knife is in wrong position	Adjust movable knife position properly	P23-7-10.
	Skip stitching happens at trimming	Fix skip stitching	P33-6.
	Trimmer solenoid is out of order	Change it new solenoid	—
6. Skip stitching often happens	Trimmer timing is wrong	Adjust trimmer cam position	P23-7-9.
		Adjust synchronizer position	P25-7-16.
	Needle and shuttle hook clearance is too big	Adjust needle and shuttle hook clearance properly	P20-7-3.
	Needle and shuttle hook timing is not correct	Adjust needle and shuttle hook timing properly	P19-7-2.
	Needle is bent	Change it new needle	P10-5-2.
7. Stitch forming is loose	Needle is bent by driver	Adjust needle and driver clearance properly	P20-7-4.
	Needle is in wrong position	Amend needle position	P10-5-2.
8. Sewing machine does not work even start switch is turned ON	Upper thread tension is not tight enough	Increase upper thread tension	P17-6-3.(2)
	Driver and shuttle hook clearance is very small	Change shuttle hook	—
8. Sewing machine does not work even start switch is turned ON	Cables wiring is disconnected	Connect all cables precisely	P7-3-10.
	System software is not loaded	Load system software to control box	P10-5-1.
	Emergency stop switch is kept ON	Release emergency stop switch lock	P14-6-1.(3)
	Start switch is out of order	Change it new start switch	—

Bad condition	Cause	Remedy	Ref.page & item
9. Sewing machine runs idle at high speed when power switch is turned ON	Synchronizer cable is disconnected	Connect synchronizer cable precisely	Control unit
	Synchronizer is out of order	Change it new synchronizer	—
10. Work holder does not work	Work holder activate cable is disconnected	Connect the cable precisely	Control unit
	Work holder presser is not strong enough	Increase work holder presser	P21-7-6.
	Work holder switch is out of order	Change it new work holder switch	—
11. Sewing pattern is distorted	X-Y table have a play	Adjust X-Y table sliding contact presser properly	P29-7-19.
	Work holder presser is not strong enough	Increase work holder presser	P21-7-6.
	Sewing material weight is very heavy	Slow down sewing speed	P16-6-2.(4)
		Slow down feeding speed	Control unit
		Select sewing material weight level at feeding	Control unit
	X-Y timing belts are loose	Adjust X-Y timing belt tension properly	P29-7-20-1 P30-7-20-2
12. Work holder does not stop at home position	X-Y detector cables are disconnected	Connect X-Y cables precisely	Control unit
	X-Y detectors are out of order (Red pilot lamps do not go on at home position)	Change them new detectors (Make sure red pilot lamps go on at home position)	P28-7-18.
	Detector and detector plate clearance is too big	Adjust the clearance properly	P28-7-18.
13. Work holder stops at not original home position	Detector or detector plate mounting is loose	Check set screws and tighten them securely	P28-7-18.
	Detector and detector plate clearance is bigger than standard	Adjust detector and detector plate clearance properly	P28-7-18.
	Home position correction function is in working	Cancel home position correction function	Control unit

Ref. 1 <Table cut-out for PLK-B03BT machine>



Ref. 2 <Table and stand>



MEMO

A series of horizontal dashed lines for writing.

