

mitsubishi

Industrial Sewing Machine

TECHNICAL MANUAL

MECHANICAL VERSION

Electronic Pattern Sewing Machine

Model PLK-E1010

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.
- ★ MITSUBISHI ELECTRIC CORPORATION has all the copy rights on this technical manual.
- ★ Reprinting the parts or all of this technical manual is not allowed without permission.






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.

ENVIRONMENT 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).
 - (b) During transportation : The atmosphere temperature should not exceeded more 55°C (131°F) or less -10°C (18°F).
The relative humidity in the atmosphere should not exceeded more 85% or less 45%.
- (2)  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.
- (3)  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.
- (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.

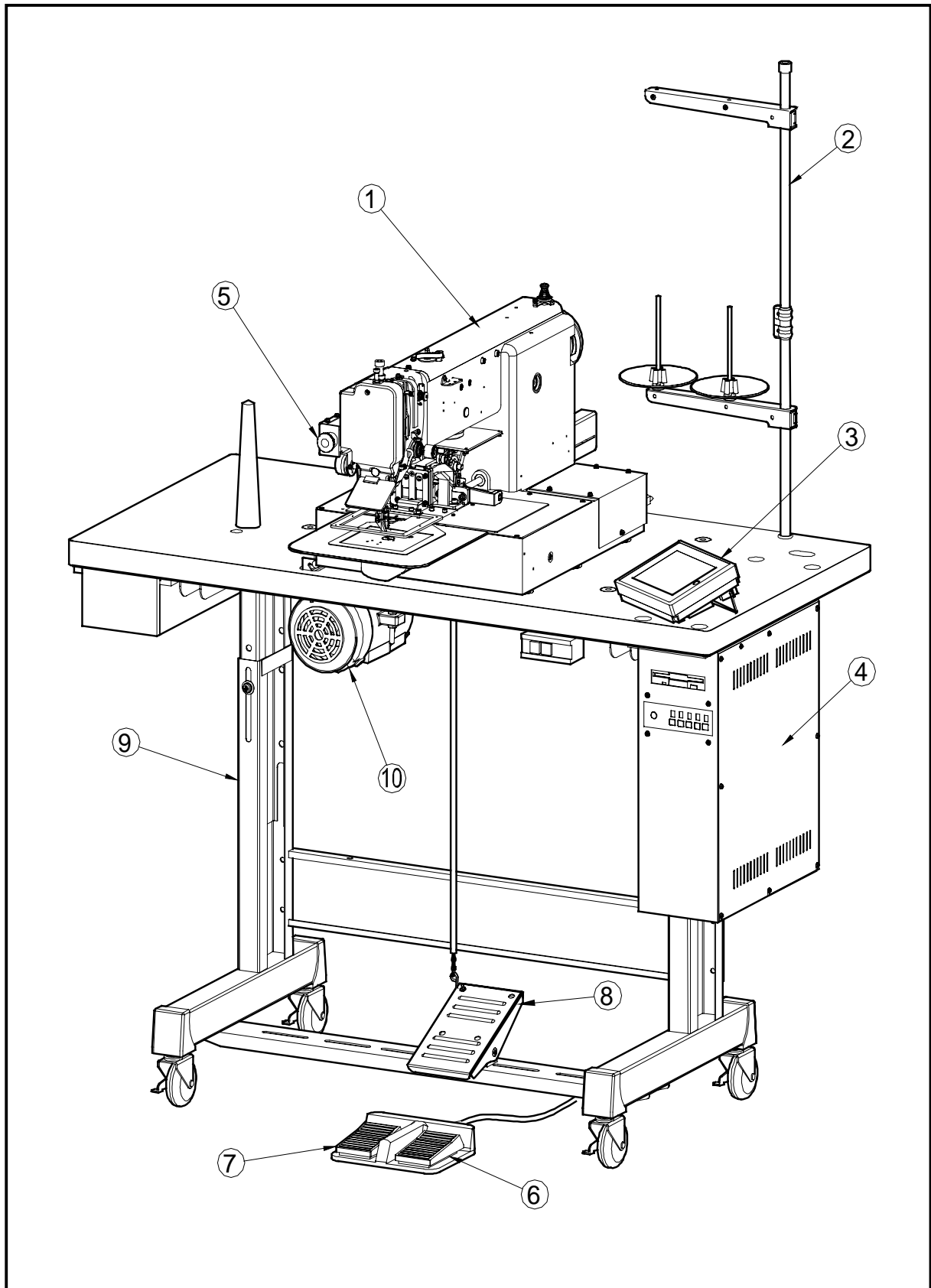
CONTENTS

1. STRUCTURE OF THE MACHINE	1
2. SPECIFICATION	2
3. INSTALLATION	3
3-1. Preparation of the table	3
3-2. Preparation for the steel stand	3
3-3. Installation of the motor	3
3-4. Installation of the control box	3
3-5. Connection of the operation panel	3
3-6. Installation of the power switch	4
3-7. Connection of the foot switch	4
3-8. Installation of the oil pan	5
3-9. Installation of the sewing machine head	5
3-10. Putting across the V-belt	6
3-11. Connection of the electric cables	7
3-12. Installation of the belt cover	8
3-13. Installation of the thread stand	9
3-14. Functioning the work holder pedal	9
4. LUBRICATION	10
5. PROPER OPERATION	11
5-1. Loading the system software to the control box	11
5-2. Installation of the needle	11
5-3 Threading the upper thread	12
5-4. Winding the bobbin thread	12
5-5. Setting the bobbin	14
5-6. Setting the bobbin case	14
6. PROPER SEWING	15
6-1. Operation of the halt switch	15
6-2. The sewing operation	16
6-3. Adjustment of the thread tension	17

7. STANDARD ADJUSTMENT	19
7-1. Adjustment of the needle bar position	19
7-2. Adjustment of the position between the needle and the shuttle hook	20
7-3. Adjustment of the clearance between the shuttle hook and the needle	21
7-4. Adjustment of the clearance between the driver and the needle	21
7-5. Adjustment of the thread guide	22
7-6. Adjustment of the presser foot	22
7-6-1. Adjustment of the presser foot position	22
7-6-2. Adjustment of the presser foot lift during the sewing	25
7-6-3. Adjustment of the presser foot timing	25
7-7. Adjustment of the wiper	26
7-8. Adjustment of the bobbin winder	27
7-9. Adjustment of the work holder	27
7-10. Adjustment of the trimmer cam follower	28
7-11. Adjustment of the position for movable knife point	28
7-12. Adjustment of the fixed knife position	29
7-13. Adjustment of the thread take up spring stroke	29
7-14. Adjustment of the thread take up spring tension	29
7-15. Adjustment of the thread tail after the trimming	30
7-16. Cancellation of the trimming function	30
7-17. Adjustment of the upper thread tension	30
7-18. Adjustment of the synchronizer	31
7-19. Adjustment of the mechanical home position	32
7-19-1. Shifting the mechanical home position X direction	32
7-19-2. Shifting the mechanical home position Y direction	33
7-20. Adjustment of the X-Y contact pressure	34
7-21. Adjustment of the X-Y timing belt tension	34
7-21-1. Adjustment of the X timing belt tension	34
7-21-1. Adjustment of the Y timing belt tension	35
7-22. Adjustment of the V belt tension	35
8. MAINTENANCE	36
8-1. Cleaning	36
8-2. Disposing of oil waste	36
9. BAD SEWING CONDITION & ITS CAUSE AND REMEDY	37
APPENDIX	40
Ref.1. Table cut out drawing	41
Ref.2. Table & stand assembly	41
Ref.3. Stand components drawings	42

1. STRUCTURE OF THE SEWING MACHINE

PLK-E1010 electronic pattern sewing machine is constructed with the following main parts.



- ① Sewing machine head
- ② Thread stand
- ③ Operation Panel
- ④ Control Unit
- ⑤ Halt switch
- ⑥ Work holder foot switch
- ⑦ Start foot switch
- ⑧ Work holder pedal
- ⑨ Steel stand
- ⑩ Limi-servo motor

2. SPECIFICATION

(1) Specification of mechanism

Sewing area	: X-Direction (left/right)	Y-Direction (fore/backward)
	: 100mm	100mm
Maximum sewing speed	: 2500 rpm	
Sewing speed	: 10 steps variable from 200 to 2500 rpm	
Stitch length	: 0.1 to 12.7 mm	
	(Adjustable from 0.1mm to 12.7mm by 0.1mm resolution)	
Stitch type	: Single needle lock stitch	
Needle bar stroke	: 41.2 mm	
Thread take up lever stroke	: 68 mm	
Class of needle	: DP X 17 # 16 (the standard specification)	
Wiper system	: Back to forward wiping system (the standard specification)	
	Left to right wiping system (the optional specification)	
Presser foot lift ^{*1}	: 15 mm (18mm max.)	
Presser foot stroke ^{*2}	: Variable from 4mm to 10mm (4mm is standard)	
Work holder lift ^{*2}	: 25 mm	
Hook	: Large size shuttle hook	
Bobbin case	: With non racing spring	
Bobbin	: Large size 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	: White machining oil	
X-Y drive system	: Stepping motor and timing belt drive	
	Intermittent or continuous feeding	
Machine dimension	: 1,200mm(W) x 565mm(L) x 1,220mm(H)	
Weight	: TOTAL 143Kg	
Type of controller	: PLK-E-CU-20	
Steel stand	: T-shape steel stand for the standing or the sitting operation	

(2) Specification of main motor

Type of motor	: XL-554-20
---------------	-------------

3. INSTALLATION

Caution

- ★ The machine should be installed by the specialists who have enough experience for the sewing machine installations.
- ★ All the necessary electric wiring should be done by electric engineers who are qualified for the electric wiring.
- ★ 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 of 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 APPENDIX 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.1 to Ref.3.

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 other [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 instruction in the paragraph [Installation of the control box] on the other CONTROL UNIT technical manual.

3-5 Connection of the operation panel

Please connect the operation panel with the instructions of Operation Panel manual enclosed in the packing.

3-6 Installation of the power switch

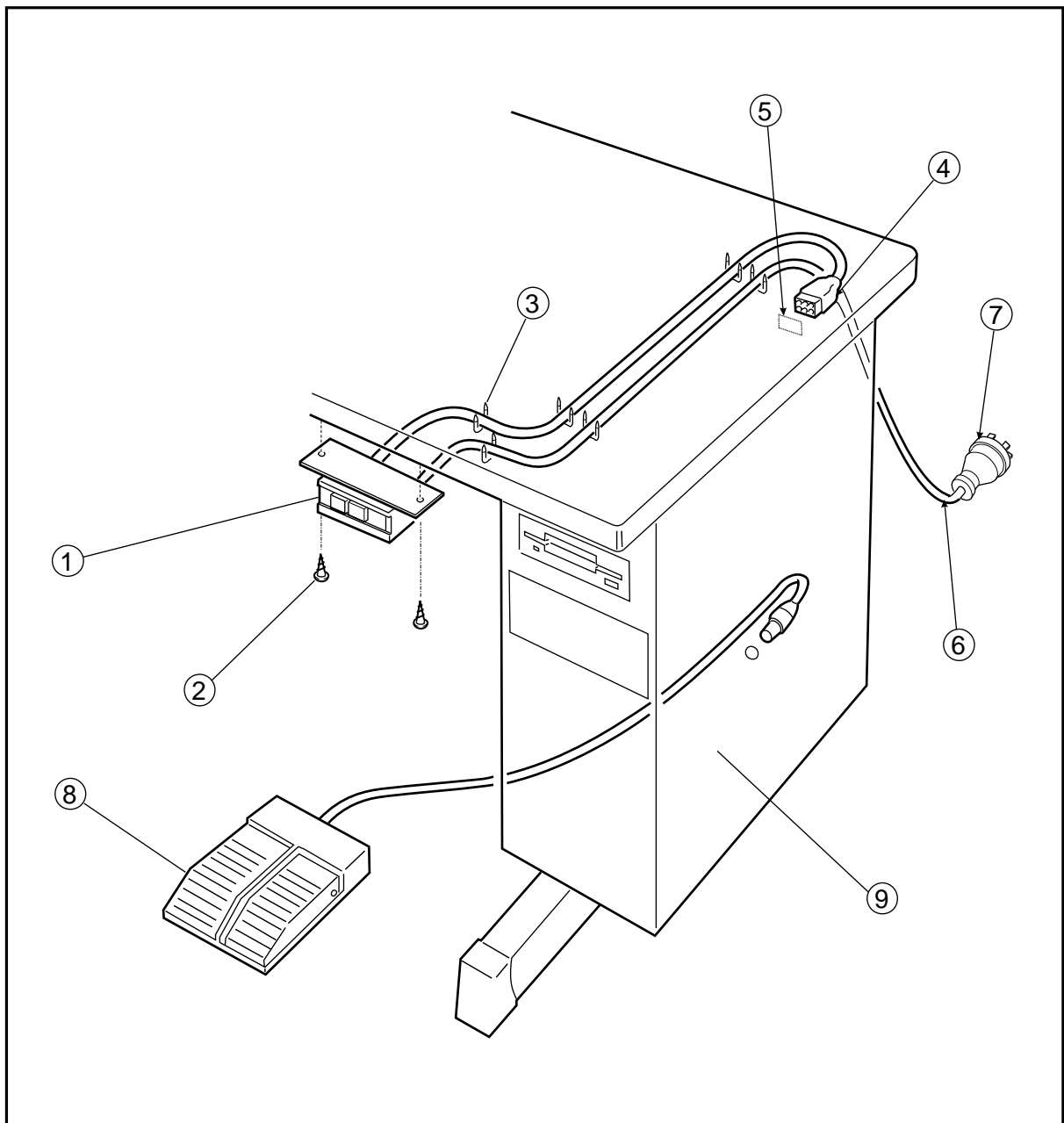
If the power switch is purchased without assembling to the table, the power switch has to be attached with the following procedure.

- (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 another end of the power switch cord (NO.6).

3-7 Connection of the foot switch

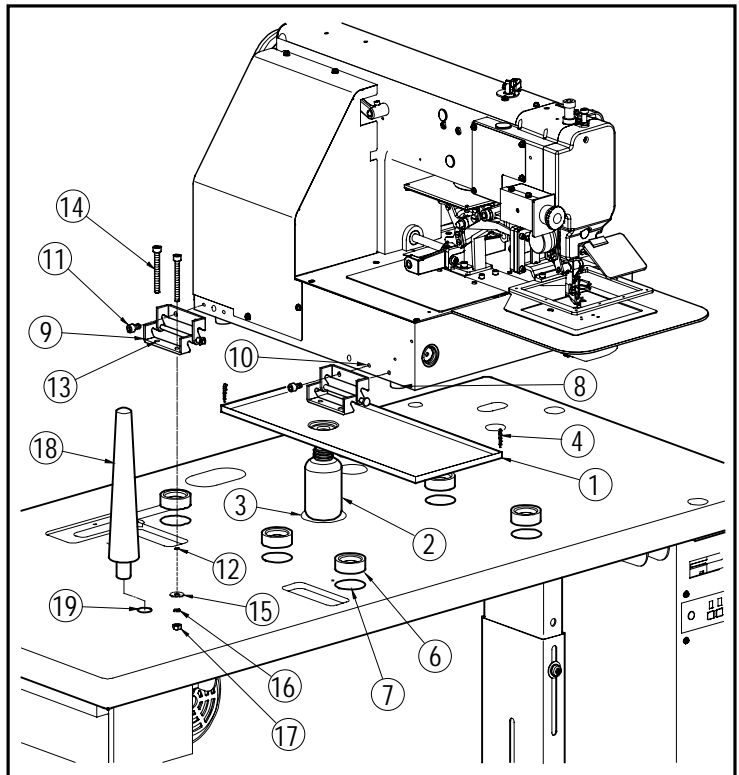
Connect the foot switch (NO.8) to the control box (NO.9)

The foot switch is enclosed in the accessory box.



3-8 Installation of the oil pan

- (1) Assemble the oil pan (NO.1) and oil bottle (NO.2), which are enclosed in the accessory box.
- (2) Insert the oil bottle (NO.2) into the tabletop cut-out hole (NO.3), which has much shorter distance from the bottle center to the front.
- (3) Install the oil pan (NO.1) parallel with the table front edge.
- (4) Fix the oil pan (NO.1) at its four corners on the table top with four staples (NO.4) enclosed in the accessory box.



3-9 Installation of the sewing machine head

Caution

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

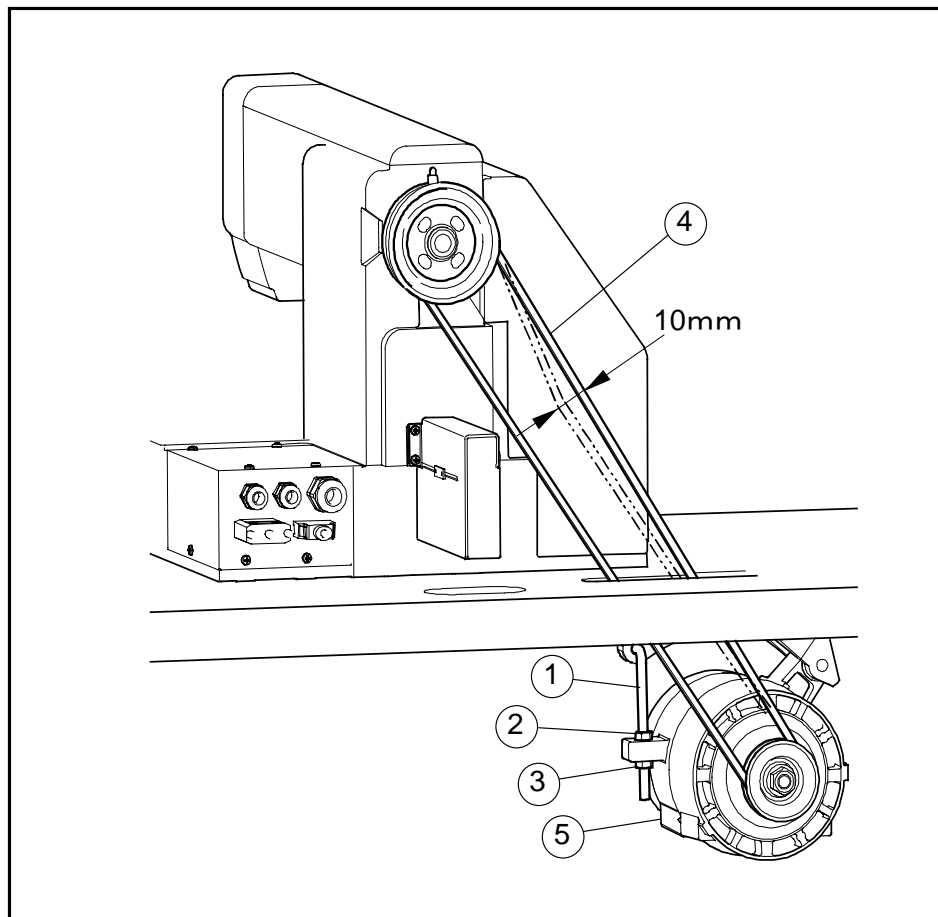
- (1) Make sure to hold the machine table with the caster stopper.
- (2) Fit the rubber cushion pads (NO.6) into the each hole (NO.7) on the tabletop. The rubber cushion pads (NO.6) are enclosed in the accessory box.
- (3) Put the sewing machine head on the table top and set the each leg (NO.8) to the each rubber cushion pad (NO.6)
- (4) Attach two hinges (NO.9) temporarily, make the setting screw (NO.11) fastening with the thread holes (NO.10) light, on the left side surface of the machine bed with the hexagonal socket head set screws (NO.11).
- (5) At this time, take notice that the E-shaped snap ring on the front side hinge must be come to the backside, and E-shaped snap ring on the backside hinge must be come to the front.
- (6) These parts are all enclosed in the accessory box.
- (7) Fit the screw holes (NO.13) of the hinges (NO.9) to the bolt setting holes (NO.12) on the table top then, pass the bolt (NO.14) through these holes and fasten the bolt (NO.14) to fix the hinges (NO.9) with the flat washers (NO.15), the spring washers (NO.16) and the nuts (NO.17).
- (8) Fasten firmly hexagonal socket head set screws (NO.11), which set the hinges (NO.9) temporarily at above procedure (4) then, fix the hinges (NO.9) perfectly.
- (9) Insert the headrest (NO.18) into the hole (NO.19) on the tabletop.

3-10 Putting across the V-belt

⚠ Caution

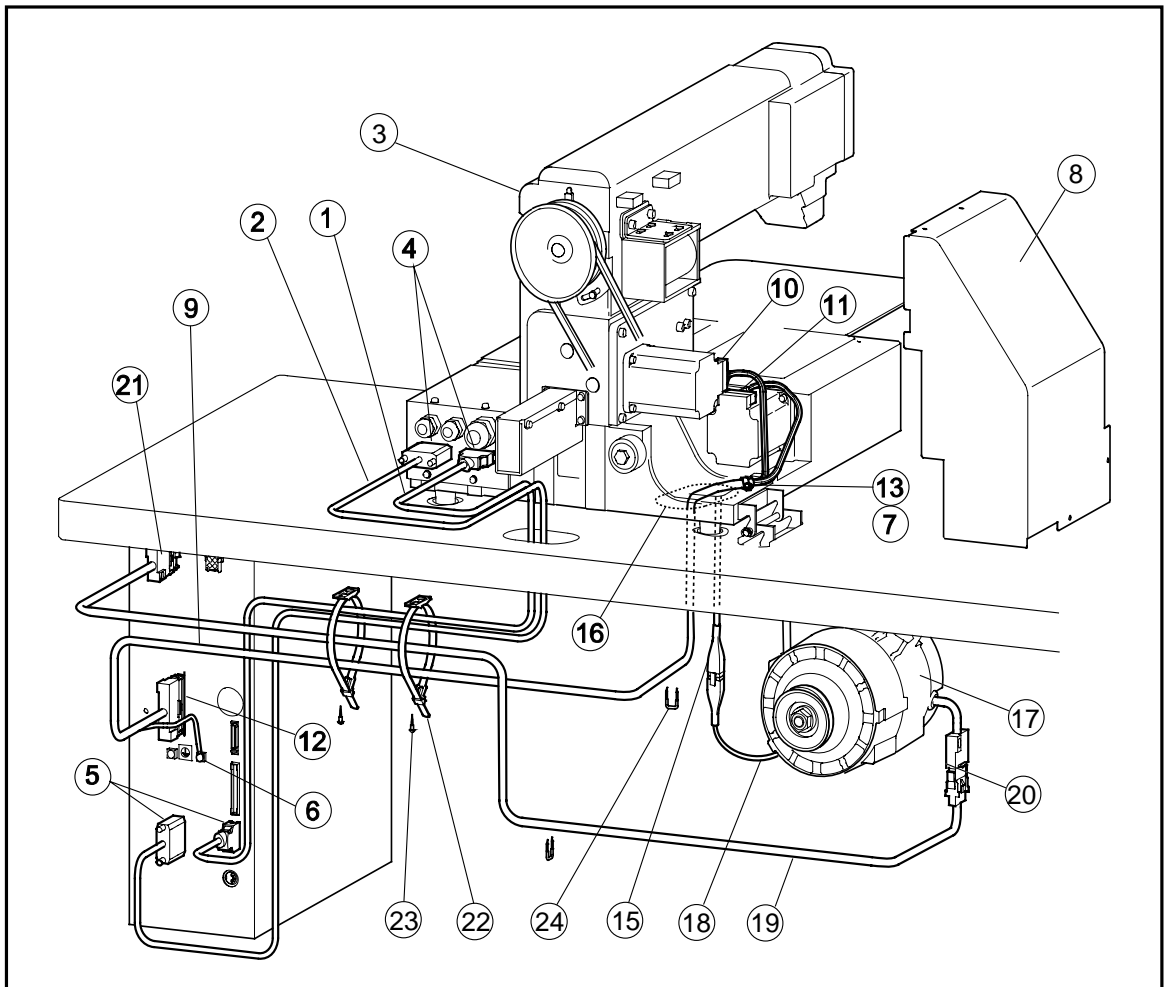
★ For the safety, when tilt or raise the sewing machine head, please make sure to hold the sewing machine head with both hands by two people at least.

- (1) Tilt the sewing machine head to the left, and hold it with the head rest.
- (2) Put the V-belt (NO.4) across the sewing machine pulley and the motor pulley with passing it through the slit on the tabletop.
- (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 1Kg.
If the V-belt tension is proper, it should be yielded about 10 mm.
If the V-belt tension is not proper, please adjust it as follows.
- (5) Loosen two nut (No.2) on the motor .position adjust bolt (No.1).
- (6) Fix the motor (No.5) position with putting the tension to the V belt by its weight and firstly, tighten the upper nut (No.2) then secondly, tighten the lower nut (No.2).
- (7) Put the motor pulley cover on the motor with the set screws.

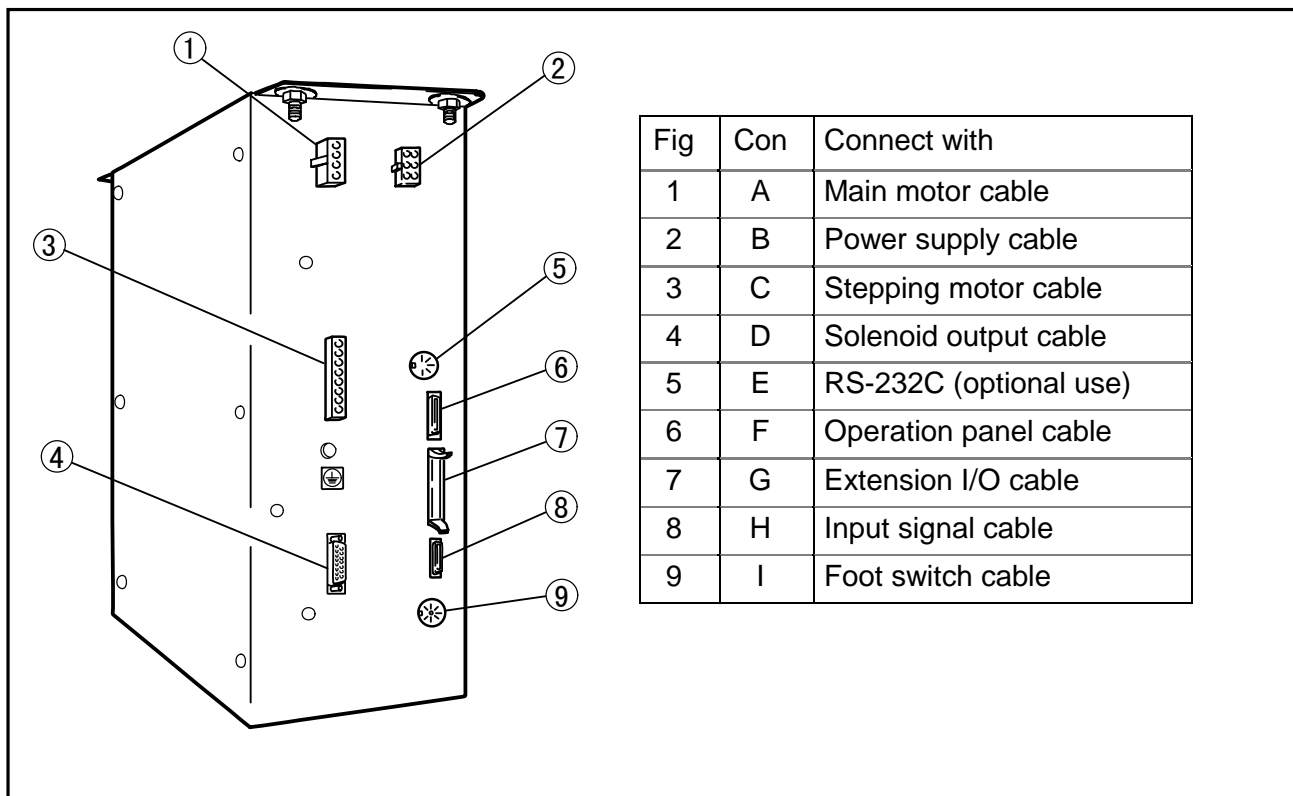


3-11 Connection of the electric cables

- (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. These cables are enclosed in the accessory box.
- (2) Remove the stepping motor cover (NO.8) from 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.16) on the table top then, connect it to the X-stepping motor connector (No.11) and to the Y-stepping motor connector (No.10). At this time, fix this cable with the nylon clip (NO.13) and setscrew (No.7) which are 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.16) on the table top then, connect it to the cable (NO.18) extended from the motor (NO.17)
- (5) Connect the last cable (NO.19) to the other extended cable (NO.20) from the motor then, hook up the other end of the cable (NO.19) to the connector (NO.21) on the control box.
- (6) Attach the tow binder (NO.22) 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.23). The binders (NO.22), the wood screws (NO.23) and the staples (NO.24) are enclosed in the accessory box.



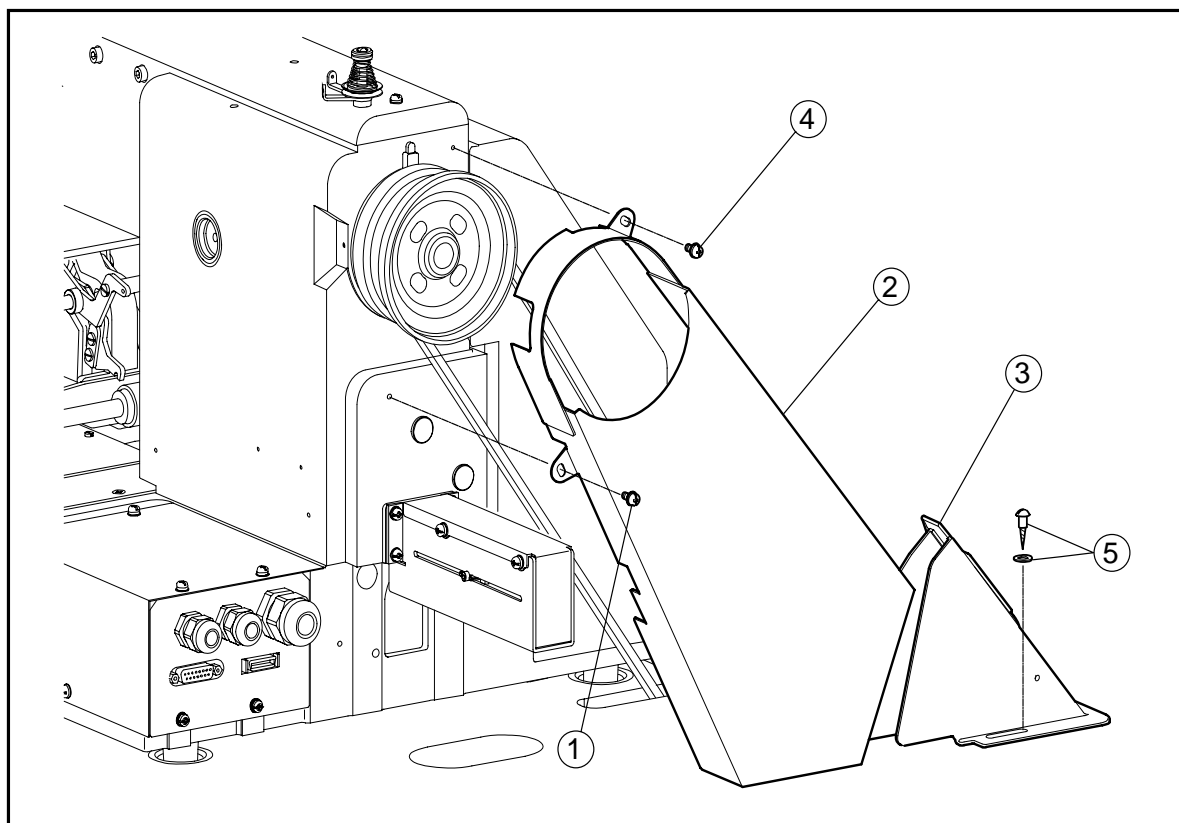
< Back side view of the Control box >



3-12 Installation of the belt cover

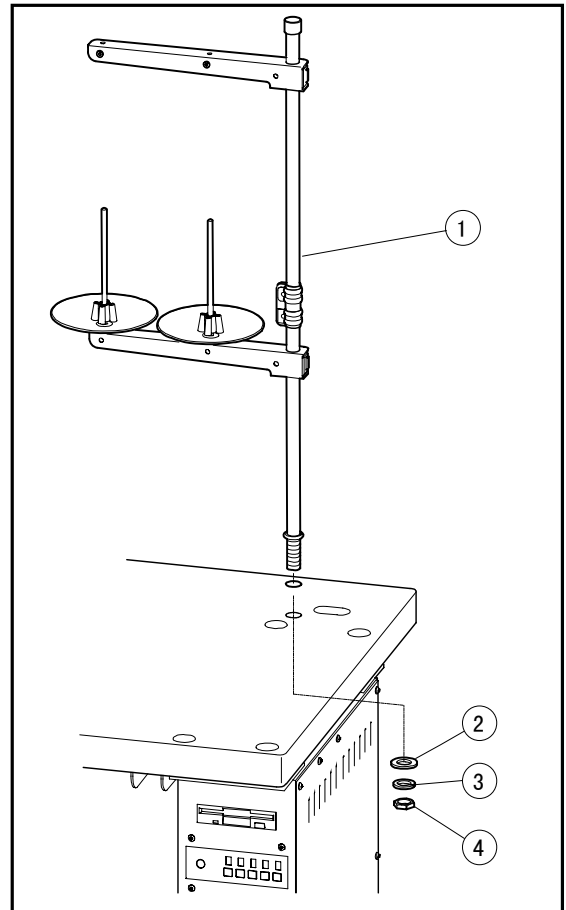
Put the large belt cover (NO.2) on the sewing machine head with the set screws (NO.1 & 4) and small belt cover (NO.3) on the table top with the set screws (NO.5)

All the necessary parts are enclosed in the accessory box.



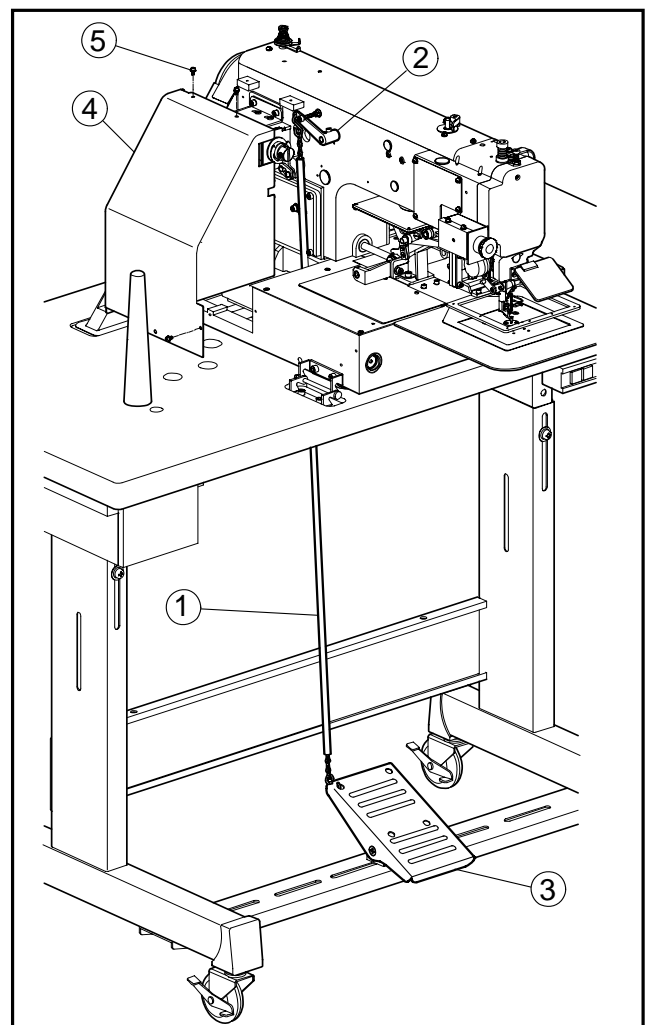
3-13 Installation of the thread stand

- (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 tabletop.
- (3) Fix the thread stand (NO.1) firmly from the rear side of the table with tightening the nut (NO.4) and the washers (NO.2, 3).



3-14 Functioning the work holder pedal

- (1) Connect the chain (NO.1) across the lever (NO.2) located at the left side of the sewing machine head and the work holder pedal mounted on the steel stand bottom beam. The chain (NO.1) is enclosed in the accessory box.
- (2) Put the stepping motor cover (NO.4) back on the sewing machine head with the screw (NO.5) after the chain (NO.1) connection.



4. LUBRICATION

⚠ Caution

- ★ Please make sure to turn power switch OFF before oiling.
- ★ Please make sure to put some oil before starting the operation of the brand new machine or

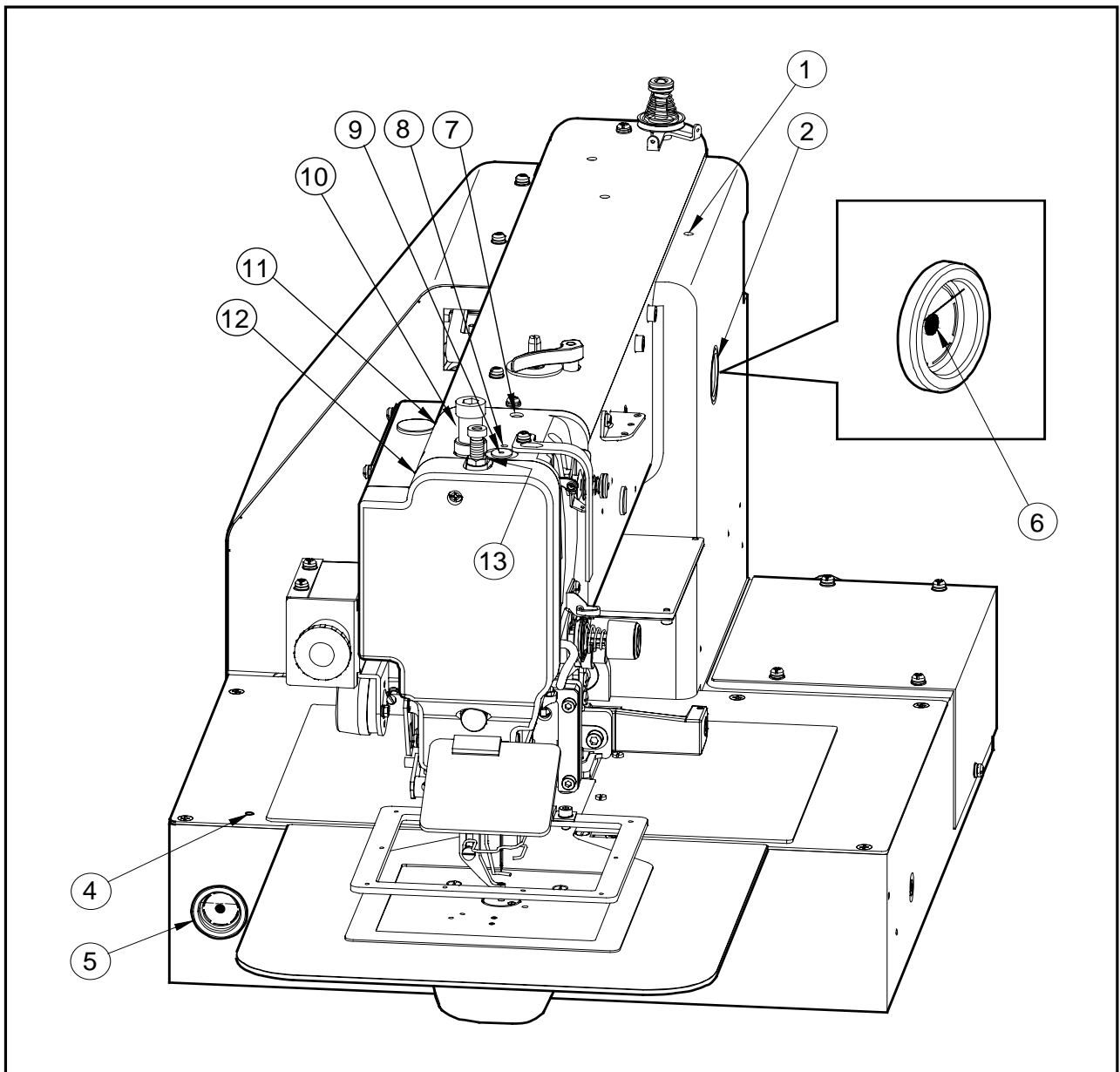
NOTE Please use high quality white machining oil.

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, machine bed. Please fill with the oil over level mark (NO.6) of the oil tank.

4-2 Oiling

Put some oil to red marked oil holes (NO.7 ~ 13).

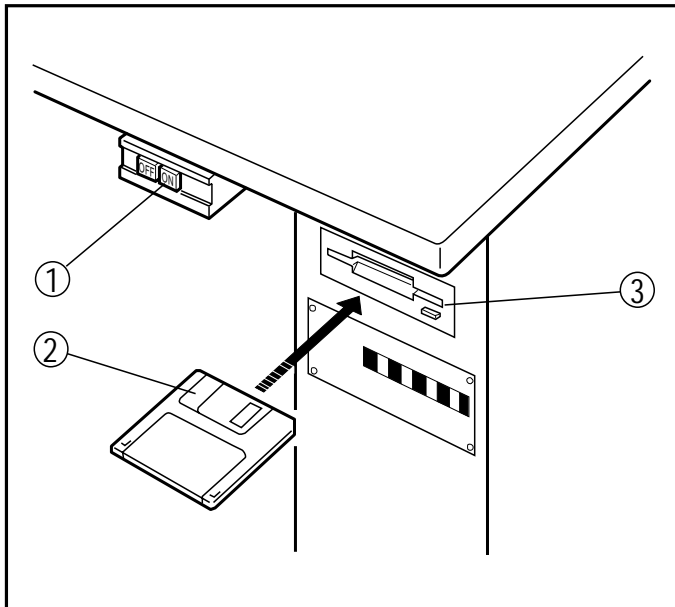


5. PROPER OPERATION

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.

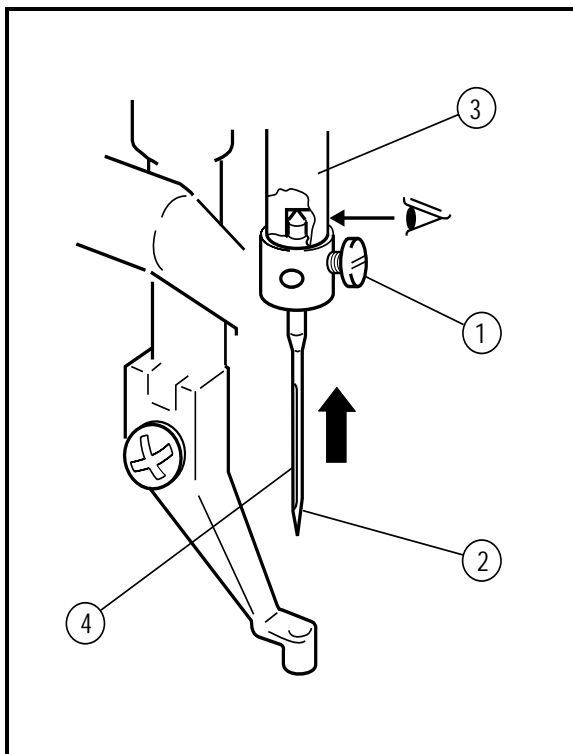


- (1) Insert the system floppy disc printed [F1] (NO.2) into the disc drive (NO.3) of the control box.
- (2) The system floppy discs are enclosed in the accessory box.
- (3) Turn the power switch (NO.1) ON.
- (4) Load the system software with following the instructions [Loading the system software] on the technical manual [CONTROL UNIT].
- (5) After loading the system software, keep the system floppy disks with in care.



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 needlepoint.



- (1) Loosen the needle set screw (NO.1) then, insert the new needle (NO.2) until the needle head is reached the end of the hole of the needle bar (NO.3).
- (2) Fasten the setting screw (NO.1) with facing the needle groove (NO.4) to the front.

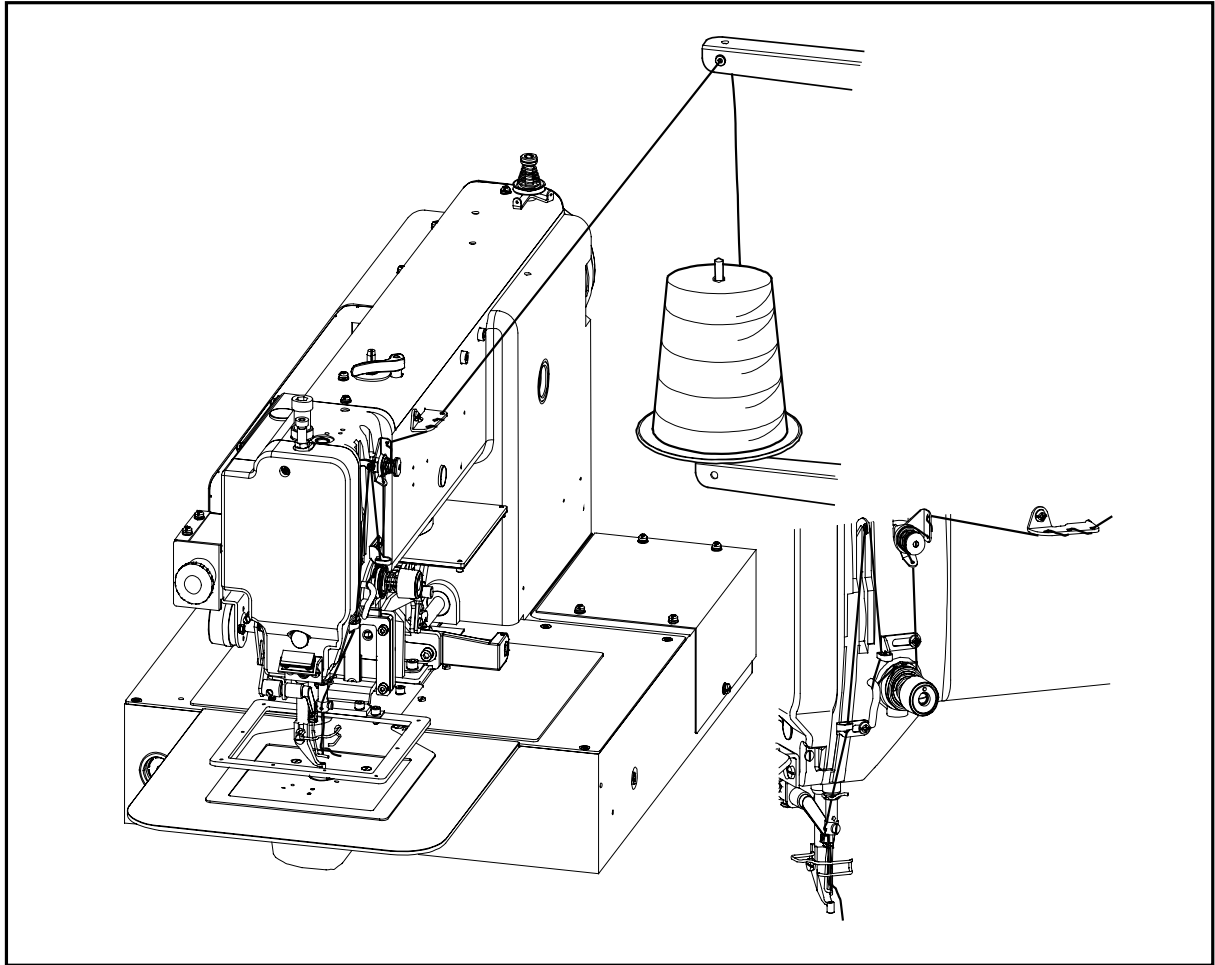
5-3 Threading the upper thread



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.

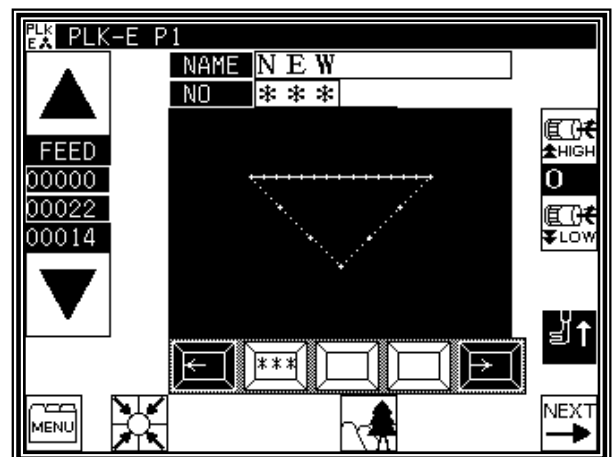
(1) Turn the power switch ON.





(2) Press the  key on the operation panel to enter the second operation window.

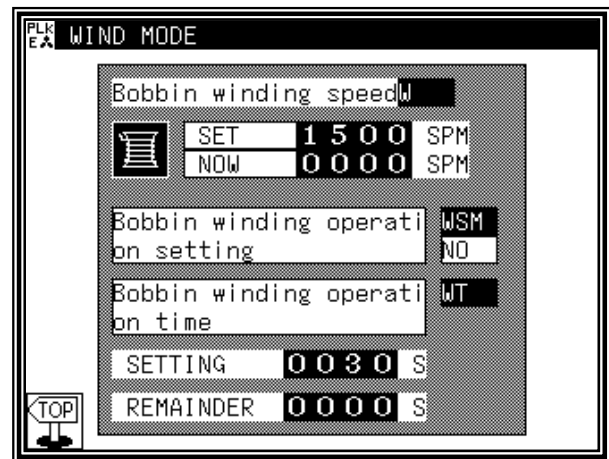
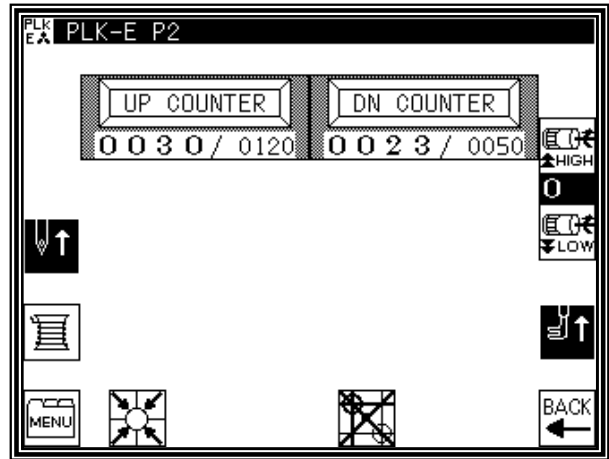
(3) Pass through the thread from the thread stand (NO.3) as shown on the below figure then, wind the thread to the empty bobbin (NO.4) in the arrow mark "a" direction couple times and insert the bobbin (NO.4) into the bobbin winder (NO.5).

(4) Push the adjust lever (NO.6) in the arrow mark "b" direction.

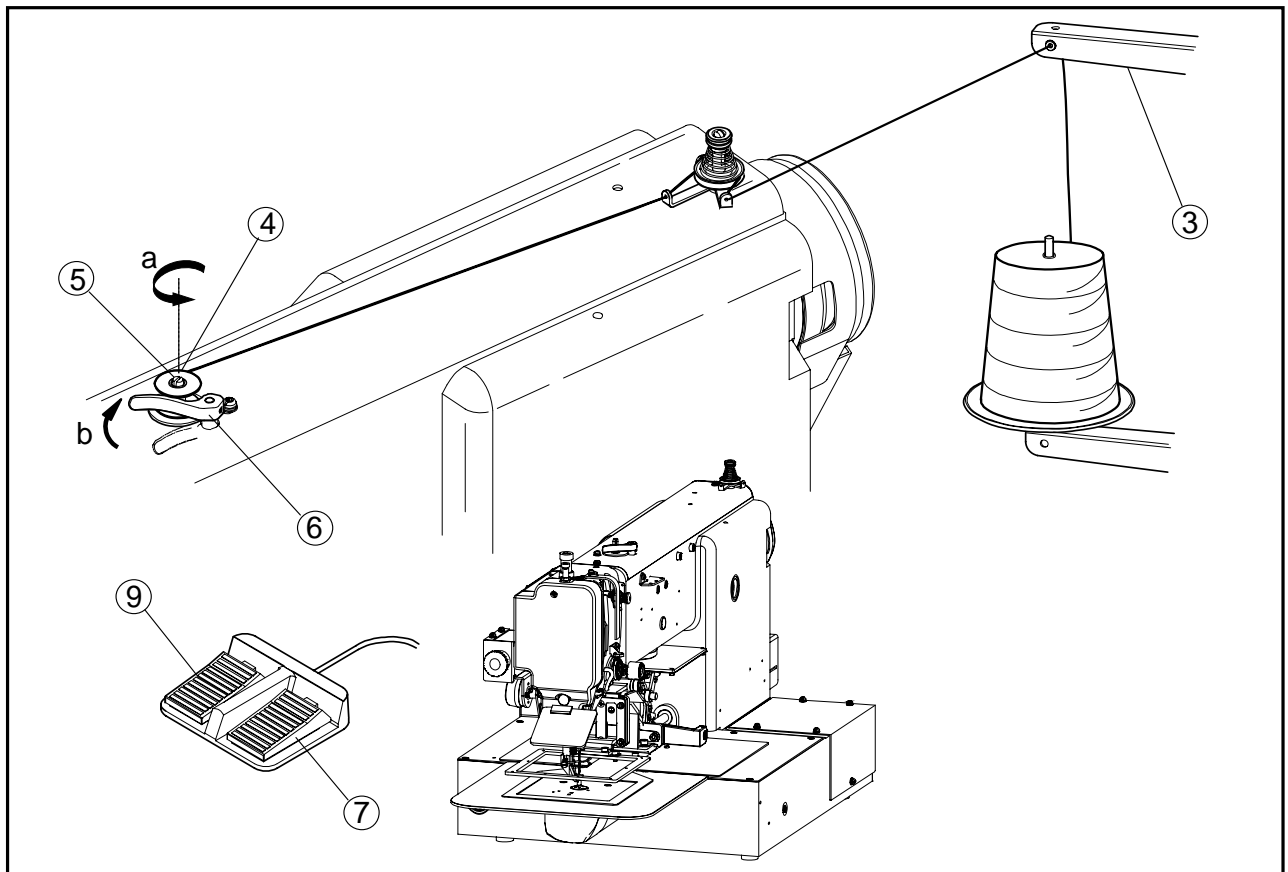
(5) Step on the black color foot switch (NO.7) then work holder goes down.



- (6) Press the  key, then work holder moves to home position.
- (7) Press  key on the operation panel.
Then presser foot goes down automatically, and wind mode window will be appeared.
- (8) Step on the black color foot switch (NO.7) again to make work holder down.
- (9) Step on the gray color start foot switch (NO.9). The thread is kept winding to the bobbin (NO.5) while the gray color start switch is stepping on.
- (10) When the bobbin becomes full of the thread, the adjust lever (NO.6) is returned to the original position.
- (11) Stop to step the gray foot switch and press the  key to exit winding mode, and press the  key, to back to the standard operation windows will be appeared.

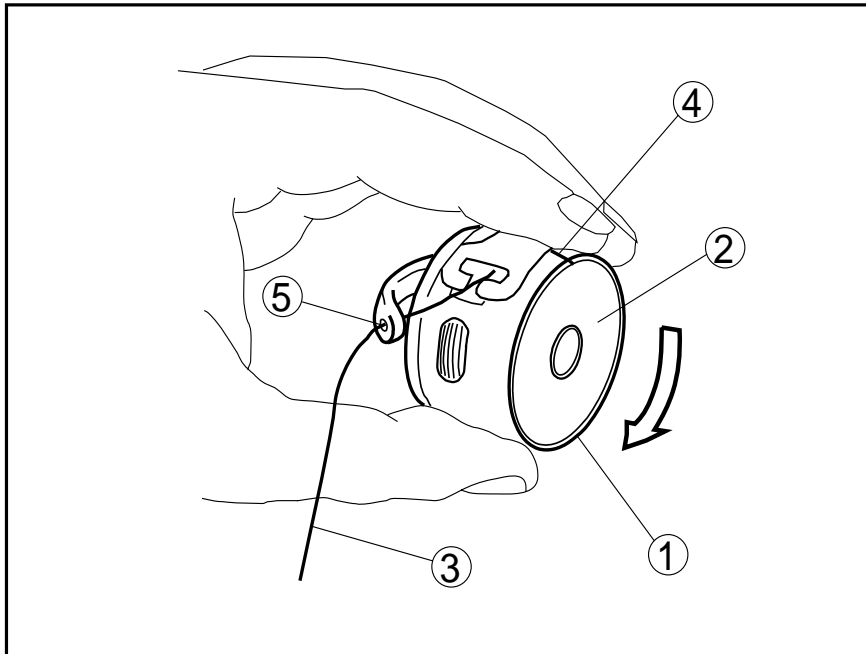


- (12) To wind the bobbin thread during the sewing operation, carry out above (3) and (4) procedure then, the bobbin winding is performed automatically.
- (13) Regarding the adjustment for the bobbin thread winding volume, please refer to the instructions in the paragraph 7-11 Adjustment of the bobbin winder in the following page.



5-5. Settling the bobbin

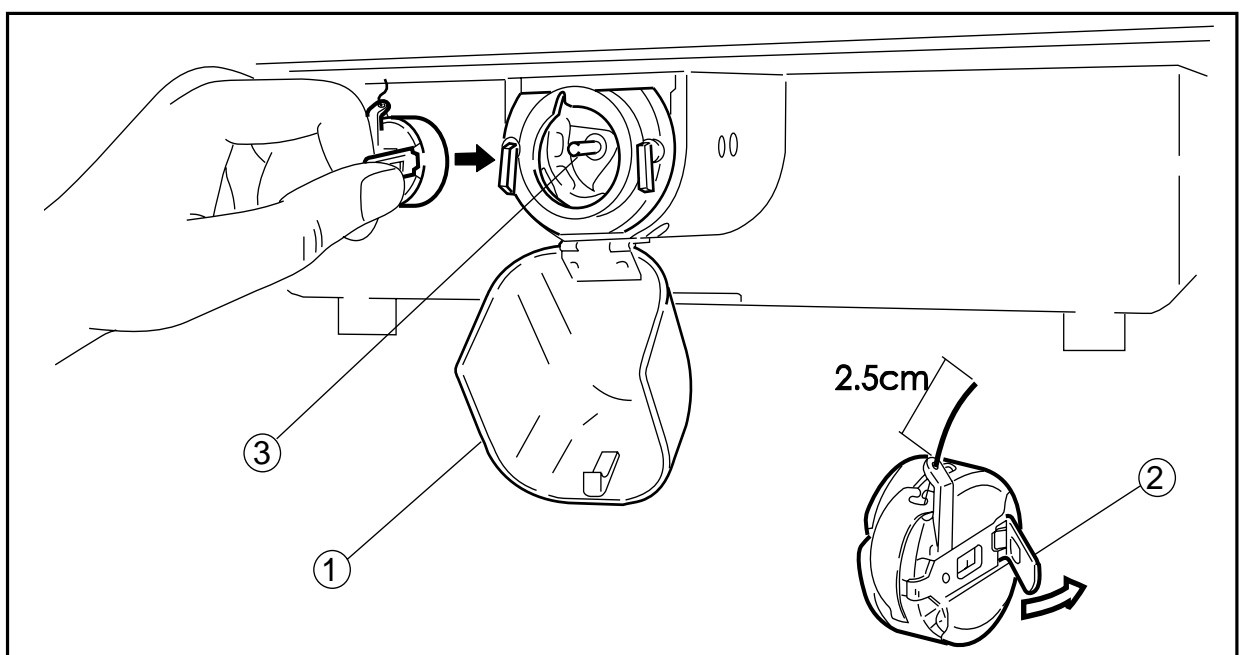
- (1) Set the bobbin (NO.2) into the bobbin case (NO.1).
- (2) Pull the bobbin thread (NO.3) into the slit (NO.4) and pass the thread through the thread hole (NO.5).
- (3) At this time, pull the bobbin thread (NO.3) then, check with the bobbin (NO.2) if it is rotated to the arrow direction. If it is 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.4) of the bobbin case.



6. PROPER SEWING

6-1. Operation of the halt switch

If an incident such as a thread breakage, needle breakage and any other incidents are happened during the sewing operation, please hit immediately the halt switch. The sewing machine running is stopped instantly.



Caution


★ Before start the sewing operation, please make sure the location of the halt 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.

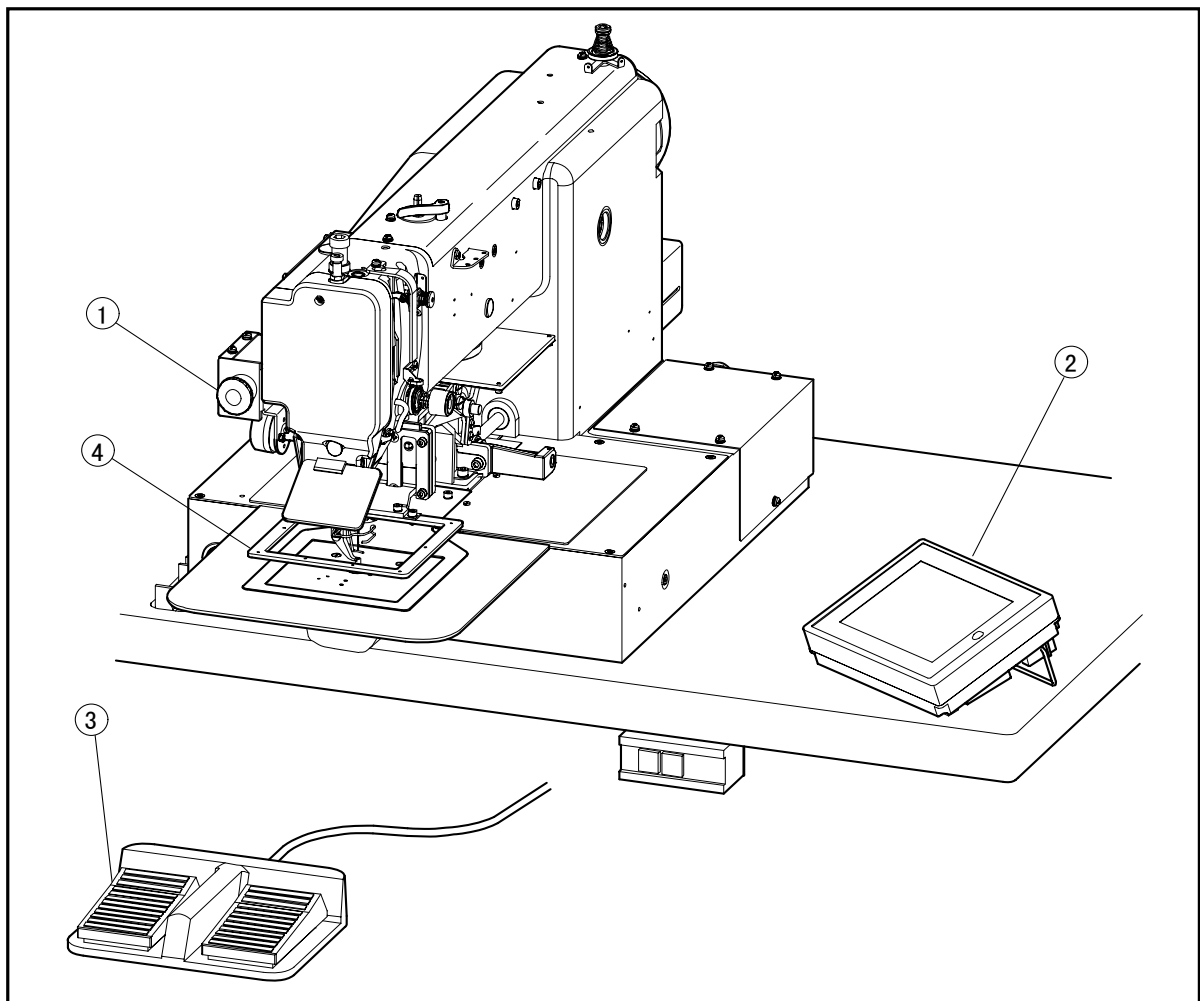
- (1) Press the HALT switch (NO.1), All operations will stop, and the sewing machine will stop at the needle UP state without trimming the thread.
- (2) Remove the cause of the abnormality.
- (3) To continue sewing, turn the HALT switch to the right.
The switch will be unlocked.

Next, when the start switch (NO.3) (gray foot switch) is pressed again, the operation will resume from the halted position.

- (4) To cancel sewing, turn the HALT switch (NO.1) to the right, and unlock the switch.

Then, press the  key on the operation panel (NO.2).

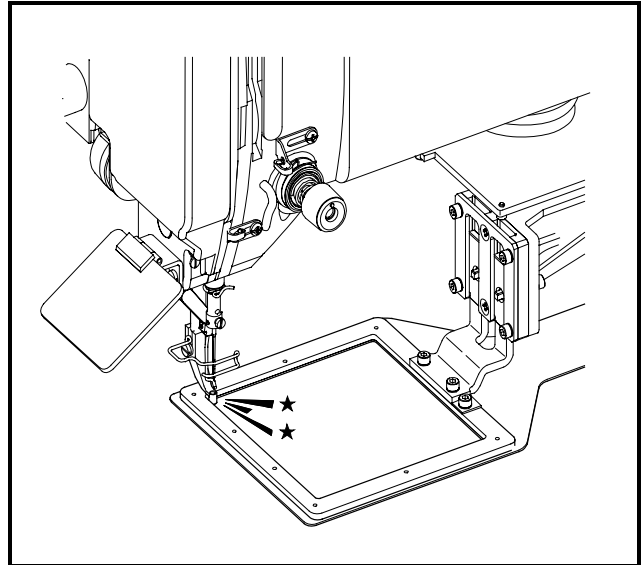
The work holder (NO.4) will return to the home position from the stopped position and will stop.





Caution

- ★ Depending on the shape of the work holder, the collision may be happened with the work holder and the presser foot while the work holder is on the way back to the home position. For avoidance of this accident, before starting the sewing operation, program the work holder returning home with the operation panel of the control box to trace the sewing pattern.
- For this setting, refer to the [Wiper Setting] in the [PROGRAM MODE] on the operation panel.



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 tabletop.
- ★ Please keep the hands and the face away from the needle.



- (1) Turn the power switch (NO.1) ON.

NOTE The collision may be happened with the work holder (No.2) and the presser foot (No.3) depending on the work holder shape when the work holder is moved to original position.



In this case, if home positioning method [HPF] is set to ON, home positioning switch  becomes inactivate during the work holder goes up.

- (2) Program or select the required sewing pattern by selecting following icon.

Programming -----  >> 

Selecting pattern ----  >> 

The sewing pattern programming or selecting can be performed with the operation panel. For the details, please refer to the instructions on the technical manual [Operation Panel].

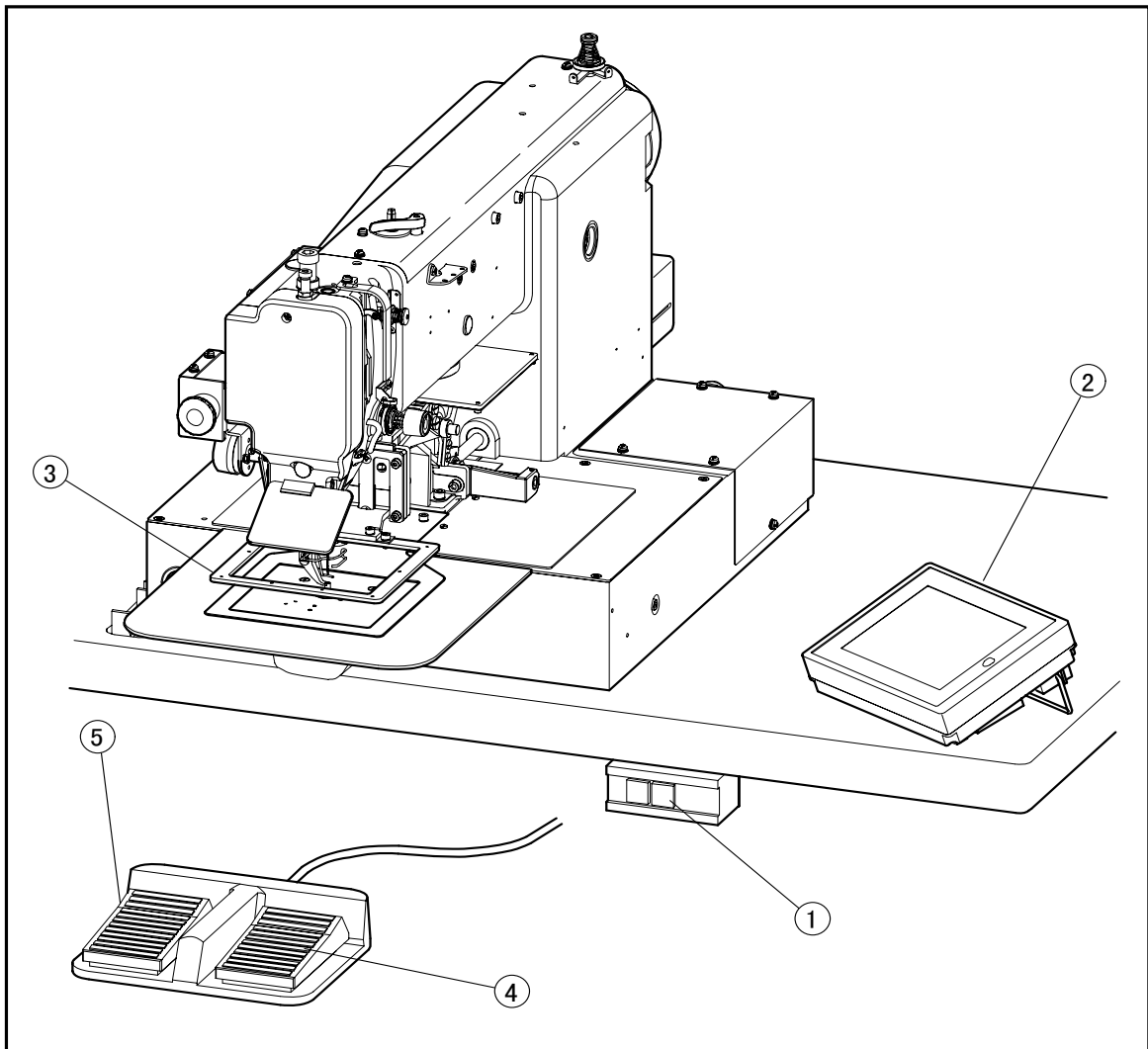
- (3) Set the sewing speed by selecting  or  icon.

- (4) Insert the sewing material under the work holder (NO.3) then, step on the black color foot switch (NO.4). The work holder comes down to press the sewing material.

[NOTE] If the sewing material has to be reset, step the black color foot switch (NO.4) again then; the work holder goes up to release the sewing material.

(6) Step on the gray color start switch (NO.5). The sewing machine starts the sewing.

(7) After finished the sewing, the work holder is lifted automatically then, the sewing material is released.



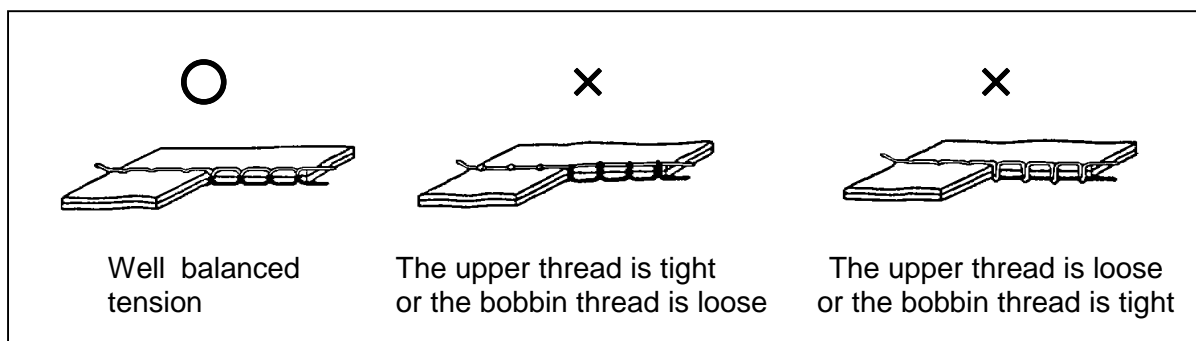
6-3. Adjustment of the thread tension

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

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

NOTE Normally weaker bobbin thread tension brings better sewing quality.

So it is prefer to set bobbin thread tension first and then set upper thread tension.



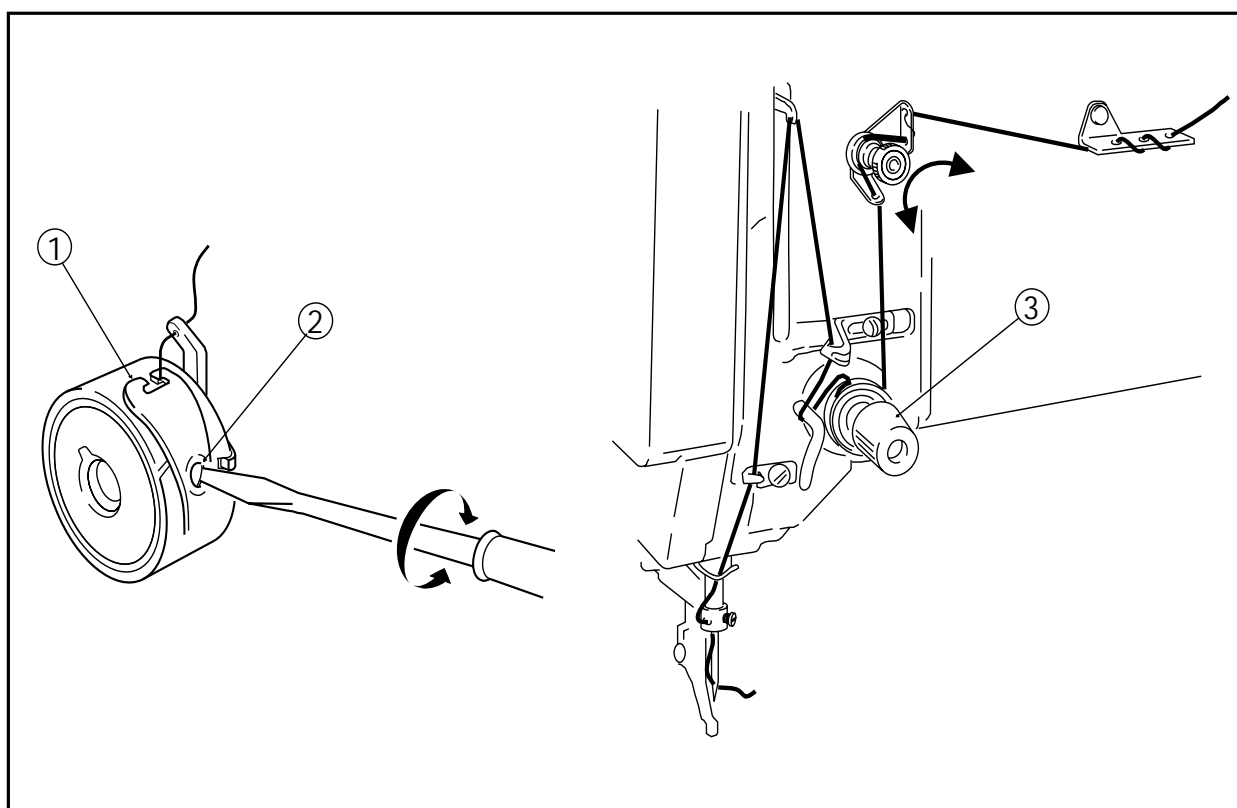
(1) Bobbin thread tension

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 counterclockwise, 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 turns it to the counterclockwise.



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 start 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

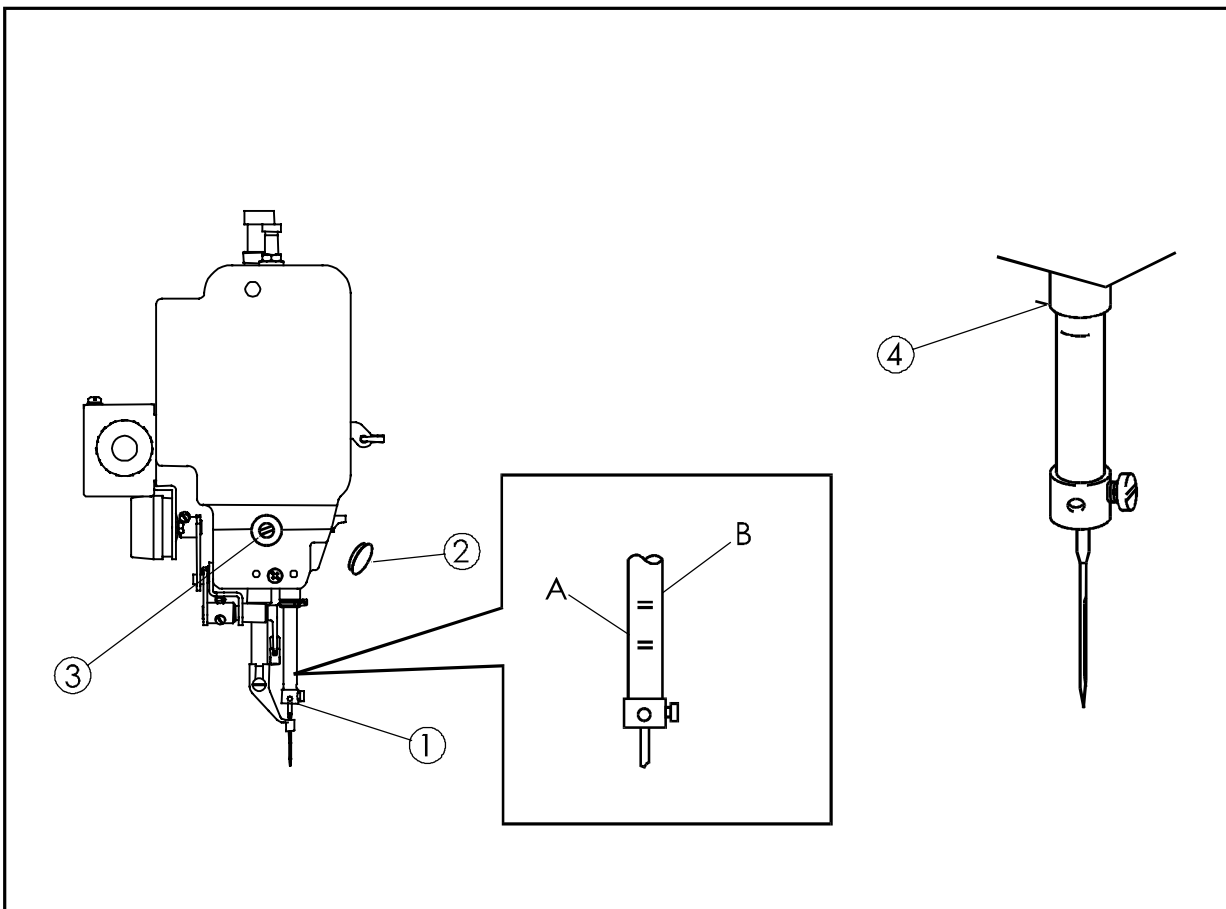
(1) Turn the power switch OFF.

(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 setscrew (No.3).

(4) Move the needle bar (No.1) to the position where the needle bar timing mark A is matched to the needle bar bushing bottom line (No.4) then, tighten the needle bar holder setscrew (No.3).

[NOTE] If the needle class is DP x 5, match the needle bar timing mark B to the needle bar bushing bottom line (No.4).



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 C is matched to the needle bar bushing bottom line.

[NOTE] If the needle class is DP x 5, match the needle bar timing mark D to the needle bar bushing bottom line (No.2).

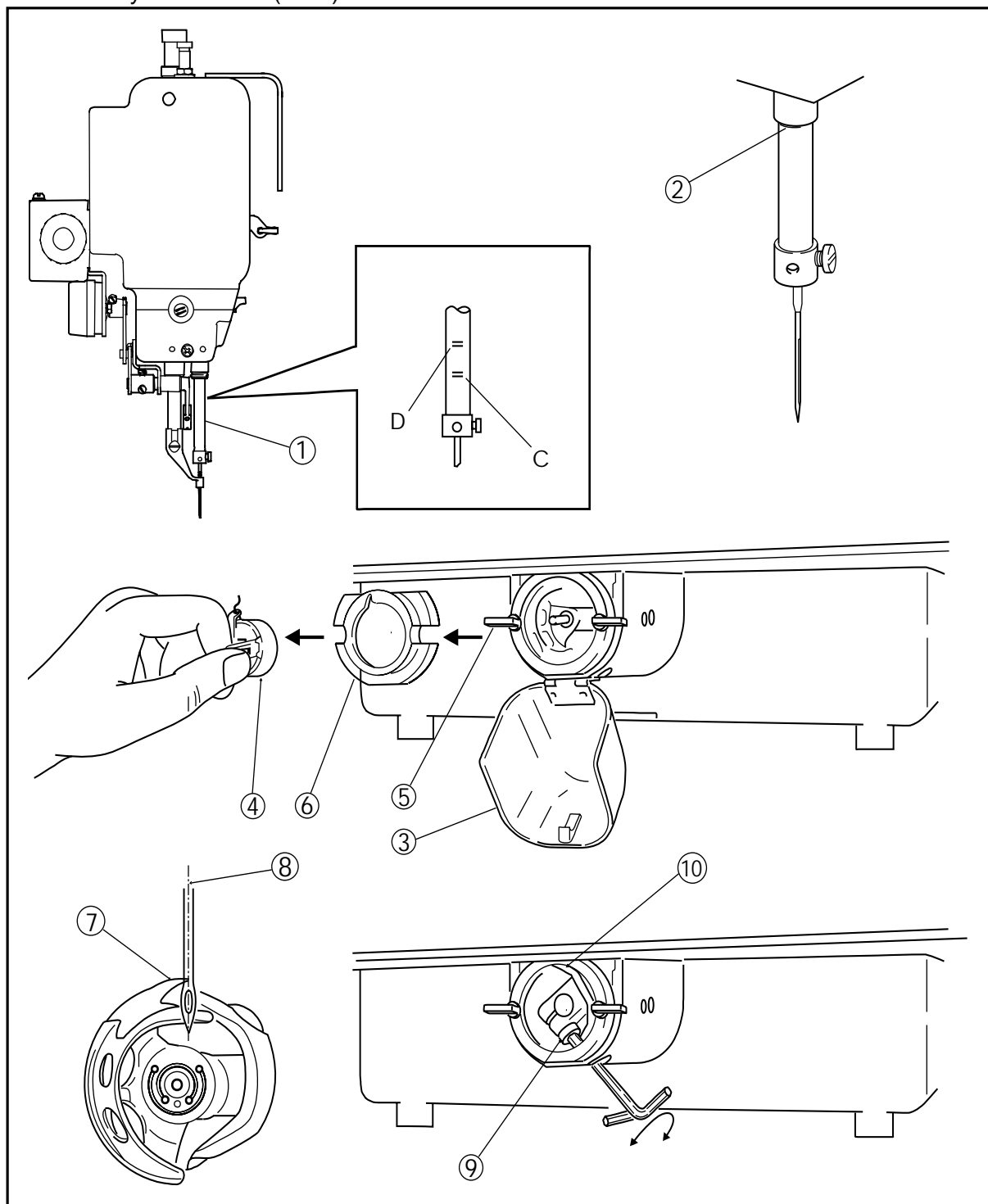
(3) Open the cylinder cover(No.2).

(4) Remove the bobbin case (No.3).

(5) Turn the hook retainer lever (No.5) then, remove the hook retainer (No.6).

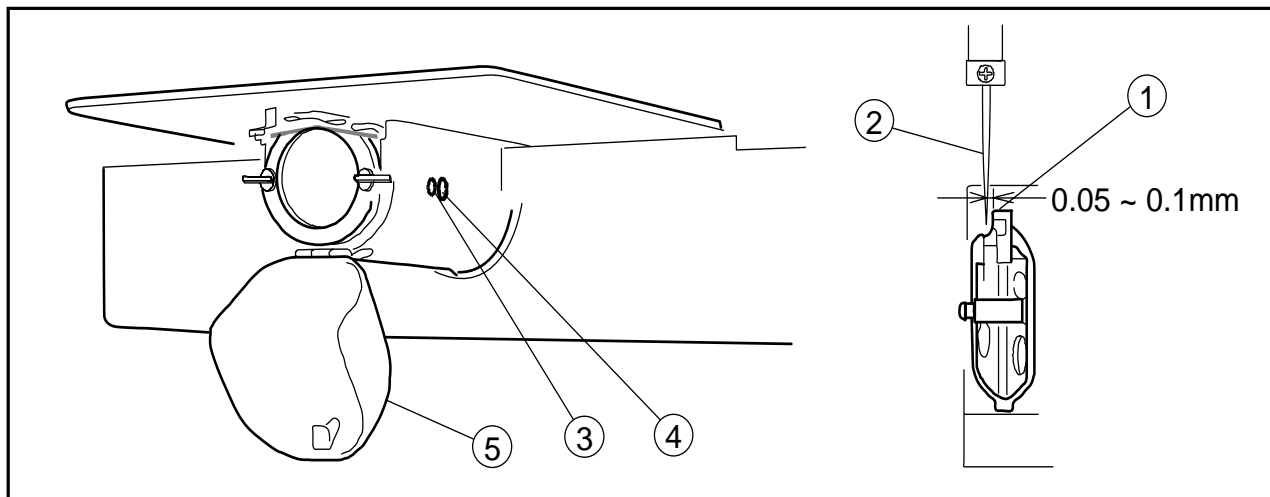
(6) Loosen the driver setscrew (No.9) then, move the driver (No.10) and adjust the shuttle hook point (No.7) to be matched with the center line (No.8) of the needle.

(7) After the adjustment, tighten the driver setscrew (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).



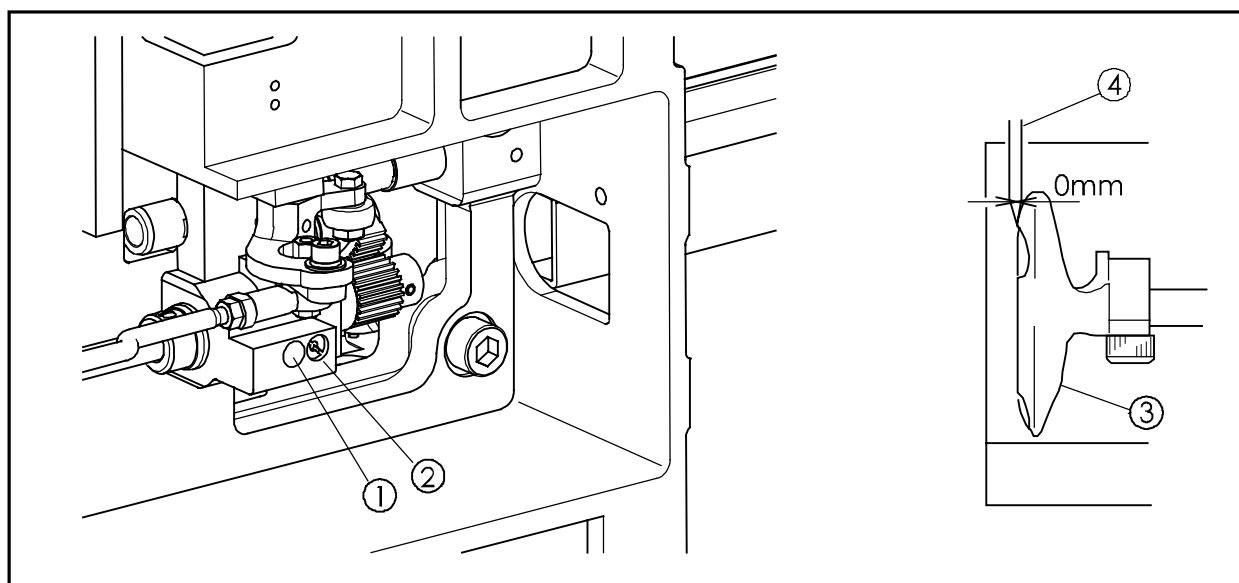
7-3. Adjustment of the clearance between the shuttle hook and the needle

- (1) Please take the same procedures as above paragraph 7-2. from (1) to (5).
- (2) Loosen the outer hook setscrew (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 setscrew (No.3) and put the hook retainer and the bobbin case back to the original location then, close the cylinder cover (No.5).



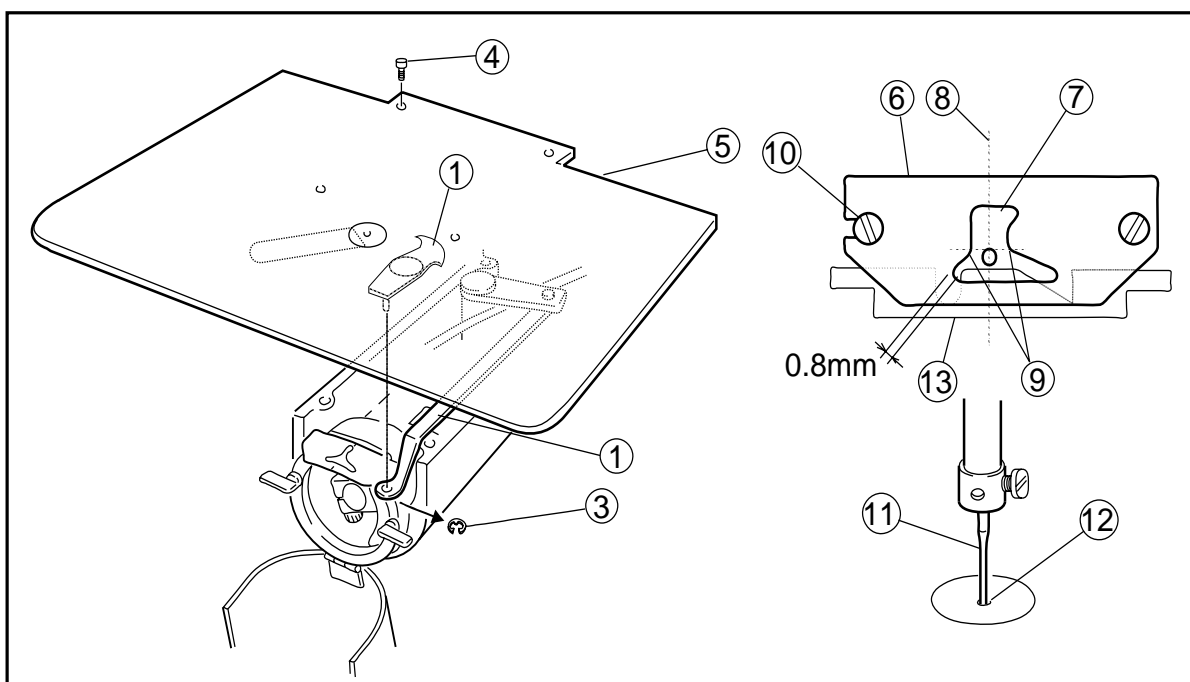
7-4. Adjustment of the clearance between the driver and the needle

- (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) Loosen the driver setscrew (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.
- (4) After the adjustment, securely tighten the driver setscrew (No.1) and put the hook retainer and the bobbin case back to the original location then, close the cylinder cover(No.5).



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 setscrews (No.4) and remove the sliding plate (S)(No.5).
- (2) Loosen the setscrews (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 (S)(No.5) back on the original location then, tighten the setscrews (No.4).At this time, set the sliding plate(S)(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 presser foot

[NOTE] The presser foot is a very important part to form the fine stitches.

It moves simultaneously with the needle and stabilize the needle penetrating area of the sewing material with pressing down it, when the needle sticks into or pulls out the sewing material and prevent the skip stitch or the over penetration happening. Please adjust the presser foot properly to the sewing materials with the following instructions.

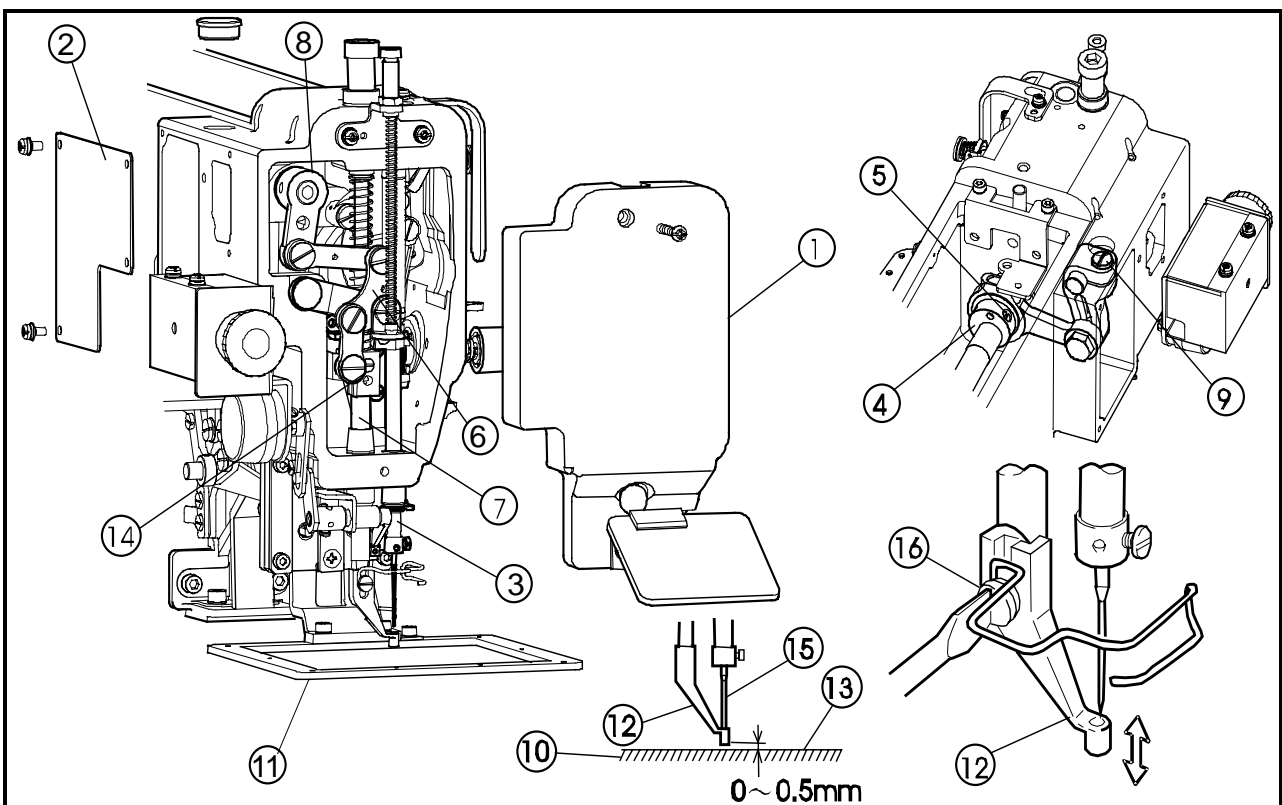
7-6-1. Adjustment of the presser foot position

[NOTE] Please always adjust the presser foot position when the thickness of the sewing material is changed.

- (1) Turn the power switch OFF.
- (2) Remove the face plate (No.1) and the link cover (No.2).
- (3) Turn the sewing machine pulley by hand and stop the needle bar (No.3) at the lowest position. At this time, make sure the setscrew (No.5) of the eccentric cam (No.4) is positioned right beside the center line of the upper shaft. This is the standard position of the eccentric cam (No.4). If the eccentric cam (No.4) is off from this position, set it back to the standard position with the instructions on the paragraph [7-6-3. Adjustment of the presser foot timing] in the following page.
- (4) Turn the sewing machine pulley by hand and stop the needle at the highest position (this is also the thread take up lever's highest position). At this time, loosen the setscrew (No.9) of the upper feed lock crank shaft (No.8) and adjust the center line of the bell crank (No.6) to be parallel with the presser foot bar (No.7).
- (5) Insert the sewing material (No.10) under the work holder (No.11) and turn the sewing machine pulley by hand then, stop the presser foot (No.12) at the lowest position.
- (6) Loosen the presser foot bar setscrew (No.14) and move the presser foot bar (No.7) then, adjust the presser foot (No.12) position to become the clearance between the bottom surface of the presser foot (No.12) and the surface of the sewing material 0~0.5mm. At the same time, rotate the presser foot bar (No.7) for the needle (No.15) to come down to the center of the needle hole of the presser foot (No.12).
- (7) After the adjustment, put the face plate (No.1) and the link cover (No.2) back on the original location.

[NOTE] The lower position of the presser foot, the more effective for the skip stitches.

However, if the presser foot becomes to press the sewing material, the movement of the presser foot mechanism generates a slight noise. And also, the presser foot stays longer to hold the sewing material, so the upper thread tension becomes loose or the sewing pattern forming gets out of shape because the presser foot catches the surface of the sewing material. For avoiding these troubles, please lower the presser foot as small as possible.



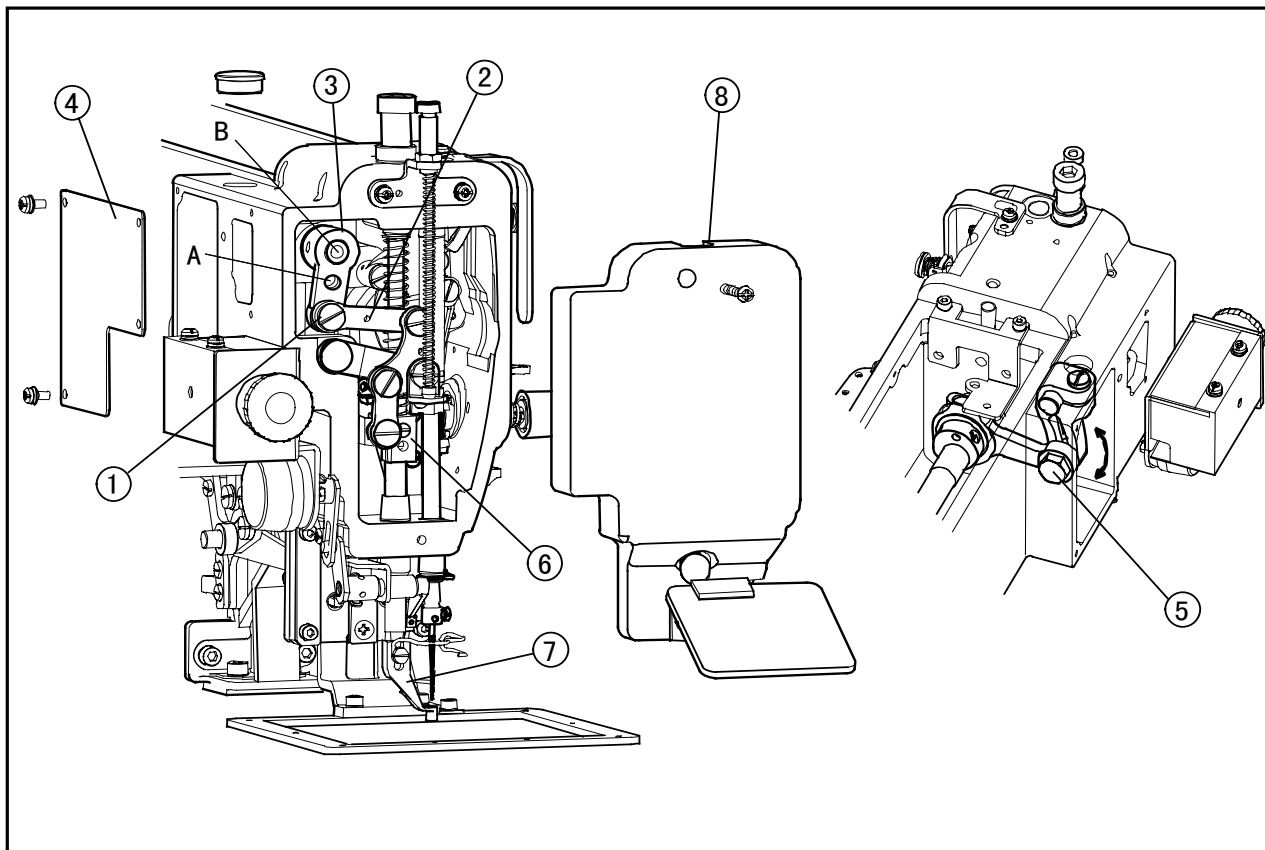
[NOTE] If the thickness of the sewing material changes very often, it is recommended to take the easy way for the adjustment of the presser foot position with the method that change only the fixed position of the presser foot after fixed the presser foot bar at higher position.

For this adjustment, loosen the setscrew (NO.16) then, move the presser foot (NO.12) up and down.

7-6-2. Adjustment of the presser foot lift during the sewing

[NOTE] The presser foot lift during the sewing can be adjusted 0 and 2~10mm.

- (1) The presser foot lift during the sewing becomes 4~10mm at the condition which the connection of the link (No.2) and the lever (No.3) with the shoulder screw(No.1) is as shown on the figure and it becomes 2 to 4 mm if the connection is made with A hole, and it becomes 0 mm if the connection is made with B hole..
- (2) The stepping lift is adjusted 4mm when the sewing machine is shipped from the factory.
- (3) For the adjustment at the each range of the presser foot lift, remove the link cover (No.4) then, loosen and move the adjust bolt(No.5).
- (4) If the link (No.2) connection is changed to A or B hole, the presser foot position is also changed. So reset the presser foot position with adjusting the position of the presser foot bar or the presser foot itself with losing their setscrews (No.6) or (No.7).
- (5) Regarding the running noise and the vibration, the higher lift effects worse. So adjust the presser foot lift during the sewing as small as possible.
- (6) After the adjustment, put the link cover (No.4) and the face plate (No.8) back on the original location.



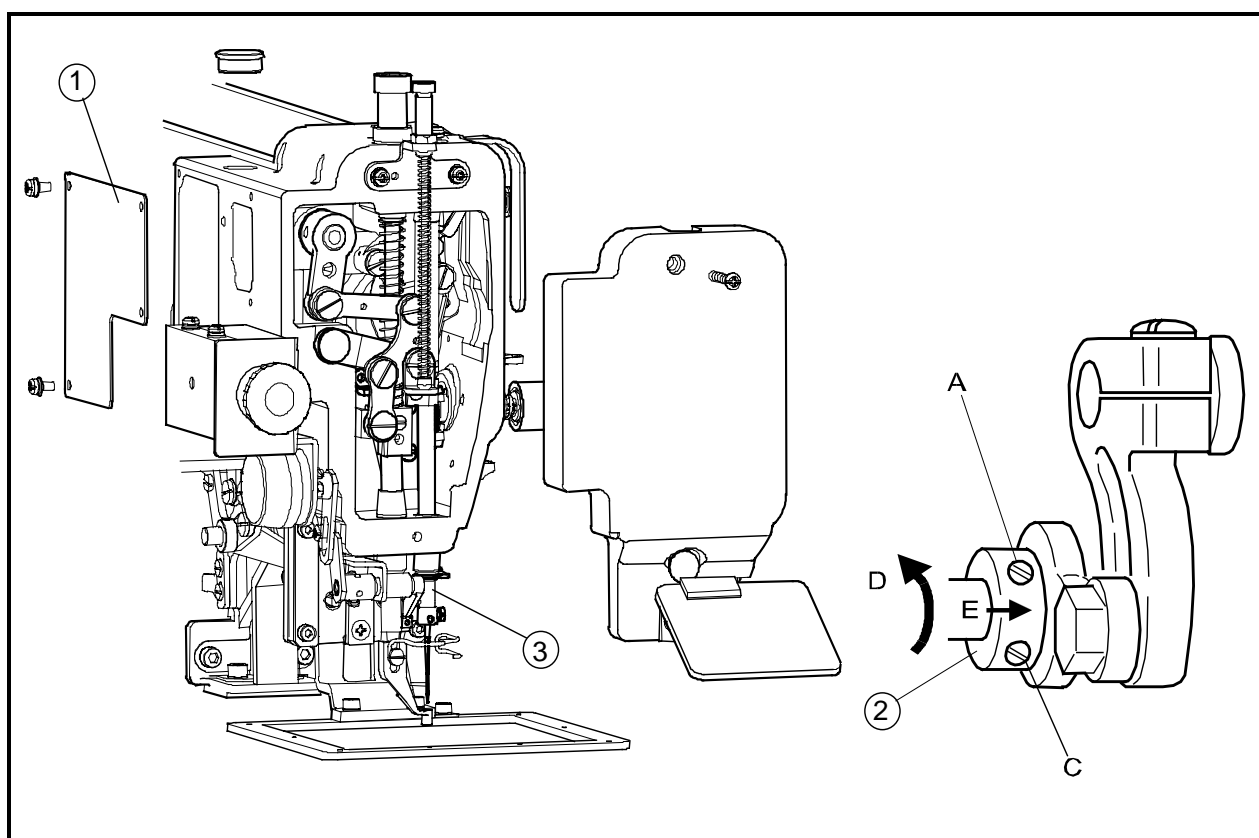
7-6-3. Adjustment of the presser foot timing

[NOTE] The presser foot up and down movement during the sewing synchronizes with the needle up and down movement.

With changing this synchronized timing to the sewing materials, the skip stitches can be prevented or the seam tightness can be improved.

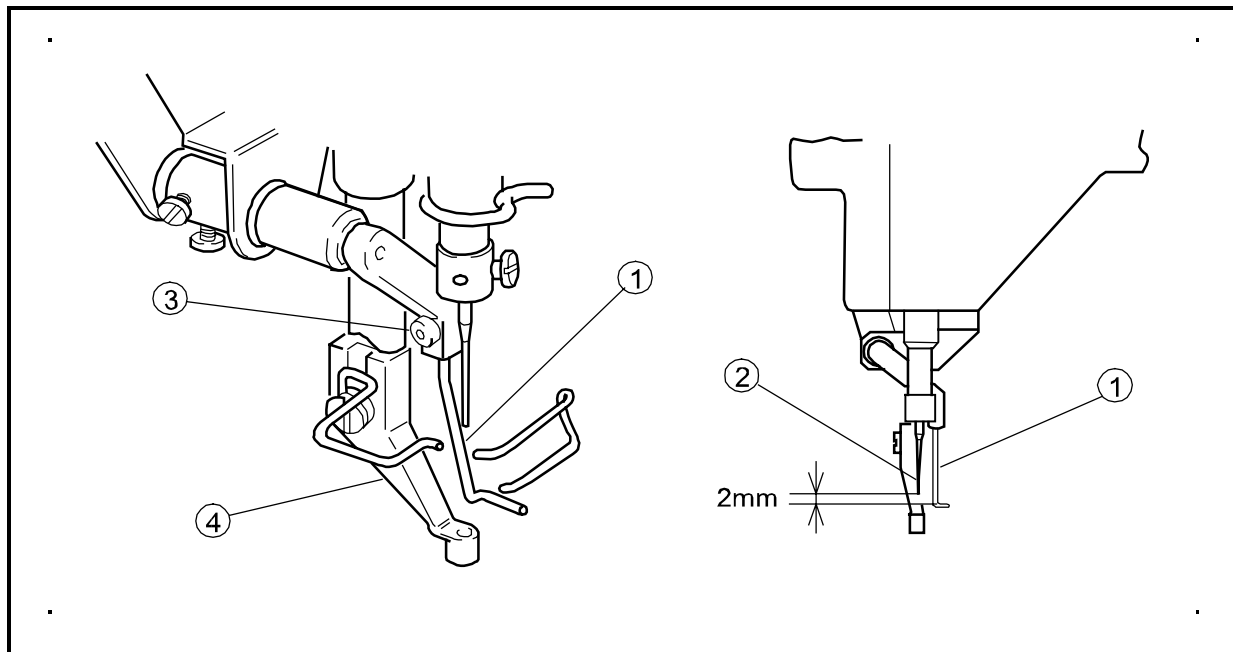
For example, the delay of the presser foot timing against the needle movement prevents the skip stitches especially to the thin materials, and the advance of the presser foot timing can improve the seam tightness especially to the thick materials.

- (1) Remove the link cover(No.1).
- (2) Loosen the setscrew "C" of the eccentric cam (No.2).
- (3) Turn the sewing machine pulley by hand and stop the needle bar (No.3) at the lowest position. At this stage, the setscrew "A" of the eccentric cam (No.2) is positioned right beside the center line of the upper shaft. This is the standard position for the eccentric cam (No.2).
- (4) Loosen the setscrew "A" of the eccentric cam (No.2).
- (5) Hold the eccentric cam (No.2) and turn the sewing machine pulley slowly by hand.
If turn the sewing machine pulley to the arrow direction "D", the presser foot timing against the needle movement is delayed, and if turn the pulley to the opposite direction, the timing of the presser foot is advanced.
- (6) After the adjustment, tighten the setscrew "A" and "C" in turn with slightly pushing the eccentric cam (No.2) to the arrow direction "E".
- (7) Put the link cover (No.1) back on the original location.



7-7. Adjustment of the wiper


- (1) Loosen the wiper setscrew (No.3) and adjust the wiper (No.1) to be positioned where the wiper (No.1) passes under the needle point (No.2) 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).

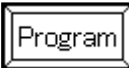


[NOTE] When the presser foot position or the presser foot lift is changed, the wiper (No.1) may collide with the presser foot (No.4).

In that case, please do not use the wiper (No.1).

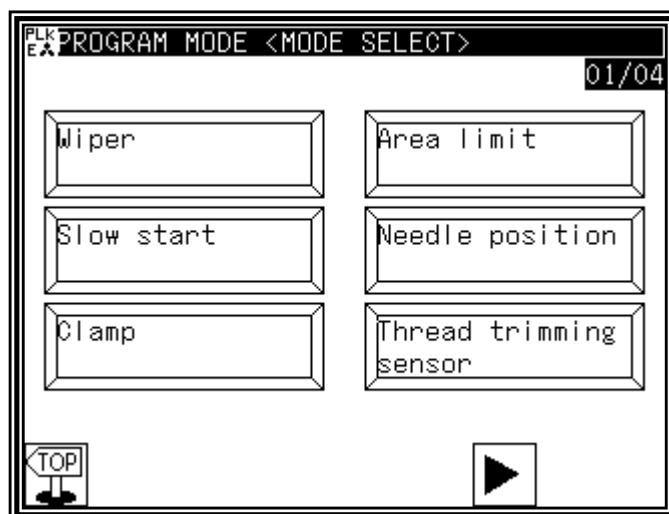
- (2) If do not use the wiper (No.1), cancel the wiper function with operation panel as follows.

>> Press  button at the normal mode condition, then MENU MODE is appeared.

>> Press  button. Then below screen will be appeared.

>> Press [Wiper] button.

>> And then press [WIP] and select [OFF] button.



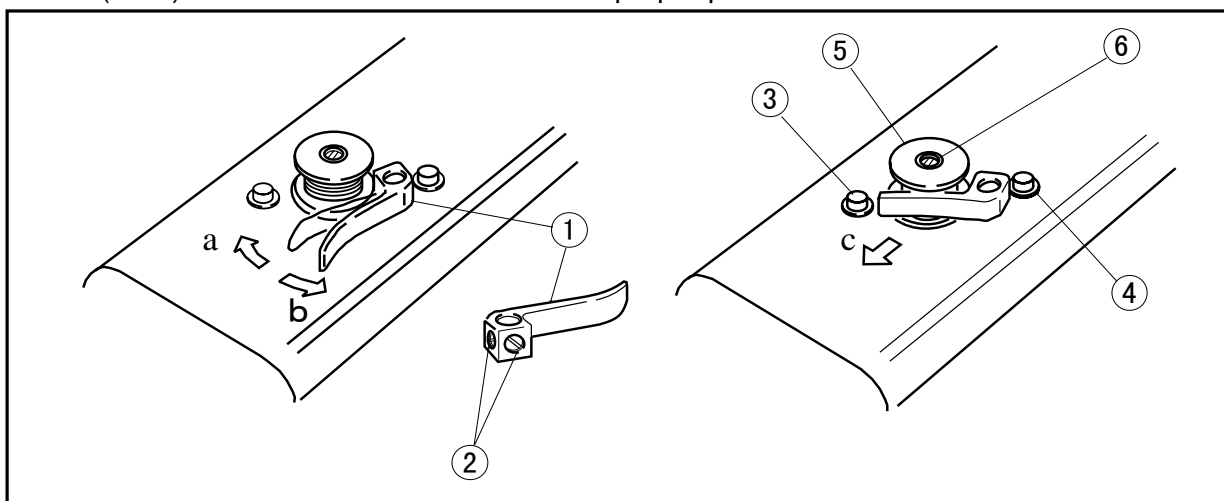
7-8. Adjustment of the bobbin winder

(1) Adjustment of the winding volume

Loosen the setscrew (No.2) of the adjusting lever (No.1) and adjust the position of the adjusting lever (No.1). If move the adjusting lever (No.1) to the arrow direction "a", the winding volume is reduced, and if move the adjusting lever (No.1) to the arrow direction "b", the winding volume is increased. The winding volume is adjusted 80 % of the full volume when the sewing machine is shipped from the factory.

(2) Adjustment of the proper position of the bobbin winder

Firstly, loosen the setscrews (No.3) and (No.4) of the bobbin winder and put the empty bobbin (No.5) on the rotating shaft (No.6) then, push the adjusting lever (No.1) to the arrow direction "a". Secondary, move the whole bobbin winder to the arrow direction "c" and stop it at the position where the empty bobbin is rotated then, tighten the setscrews (No.3) and (No.4) of the bobbin winder. This is the proper position of the bobbin winder.



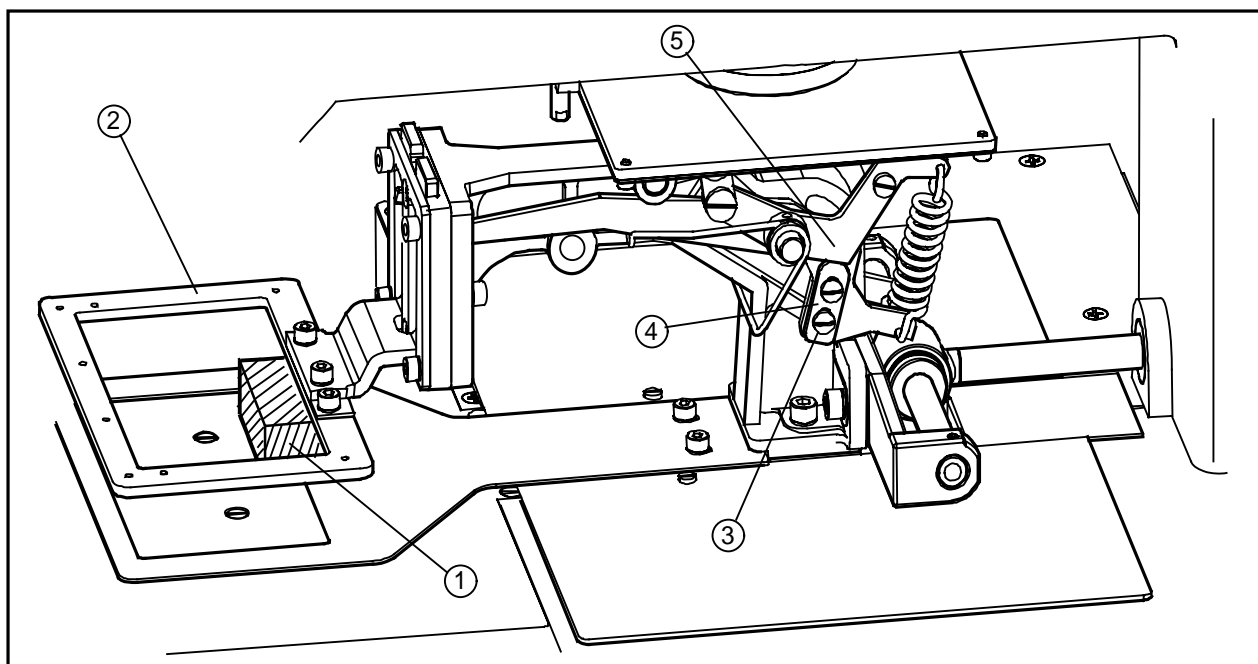
7-9. Adjustment of the work holder

If the sewing material is thick and the work holder does not press it strong enough, adjust the work holder presser as follow.

(1) Insert the sewing material (NO.1) under the work holder (NO.2).

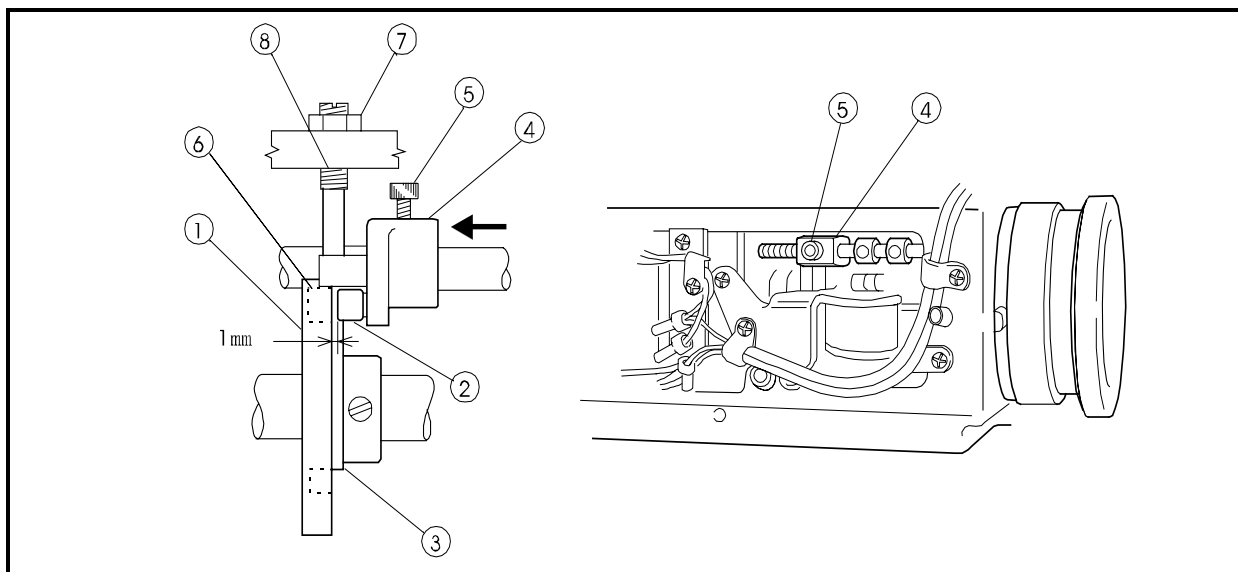
(2) Turn the power switch ON and lower the work holder (NO.2) with the work holder foot switch (black color foot switch).

(3) Loosen the 2 of the setscrews (NO.3) and move adjusting plate (NO.4) until it touches with the link (NO.5) then, tighten the 2 of the setscrews (NO.3).



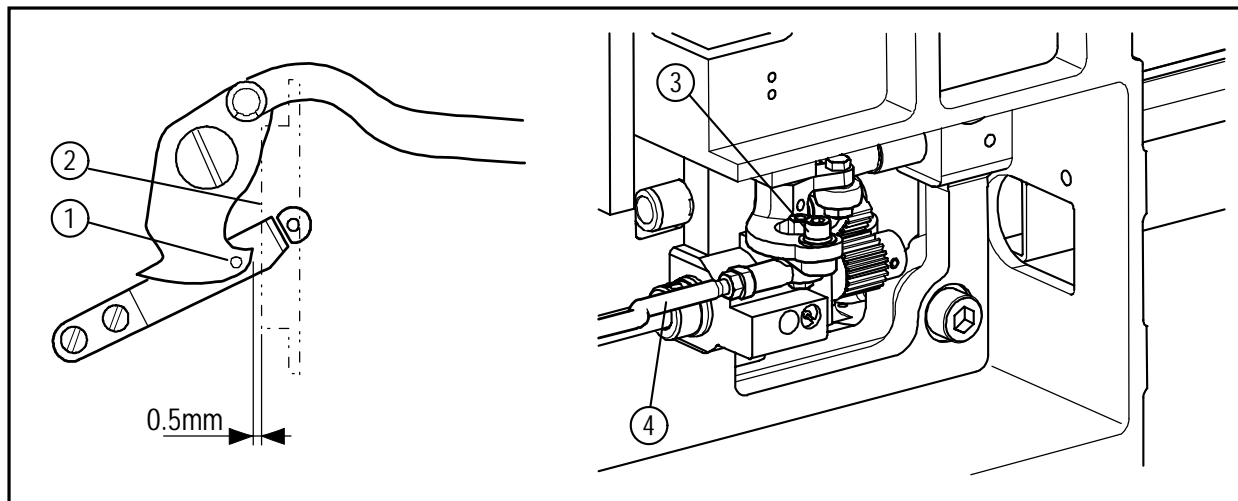
7-10. Adjustment of the trimmer cam follower

- (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 setscrew (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 setscrew (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.3) 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.



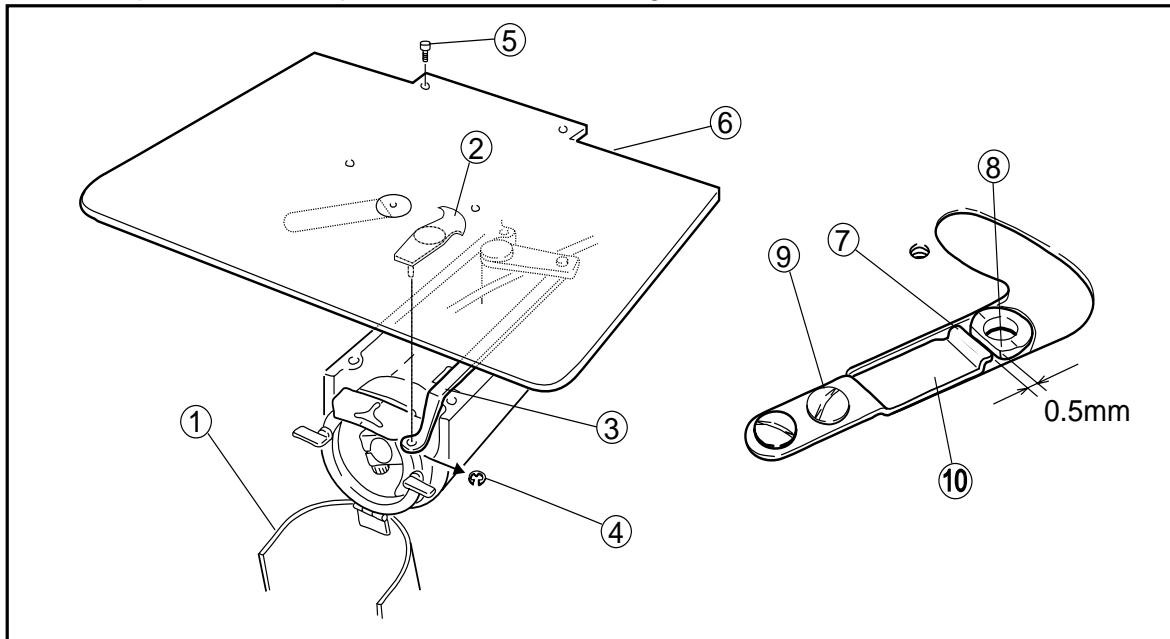
7-11. Adjustment of the position for the movable knife point

- (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 of the hook retainer (No.2).
- (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 nut (No.3) securely.



7-12. 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 setscrews (No.5) then, remove the sliding plate (NO.6).
- (4) Turn the sliding plate (No.6) upside down and loosen two setscrews (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 setscrews (No.9) securely.
- (6) Put all the parts for this adjustment back to the original locations.



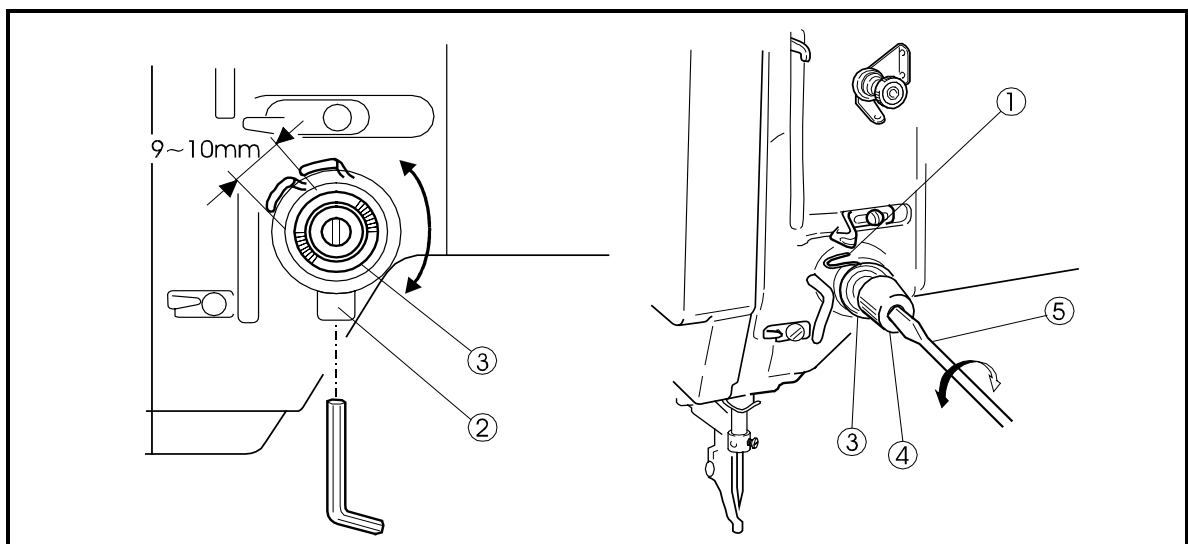
7-13. Adjustment of the thread take up spring swing stroke

Loosen the setscrew (No.2) and turn the whole thread tension regulator (No.3) then, adjust the thread take up spring swing stroke to be become 9 to 10mm.

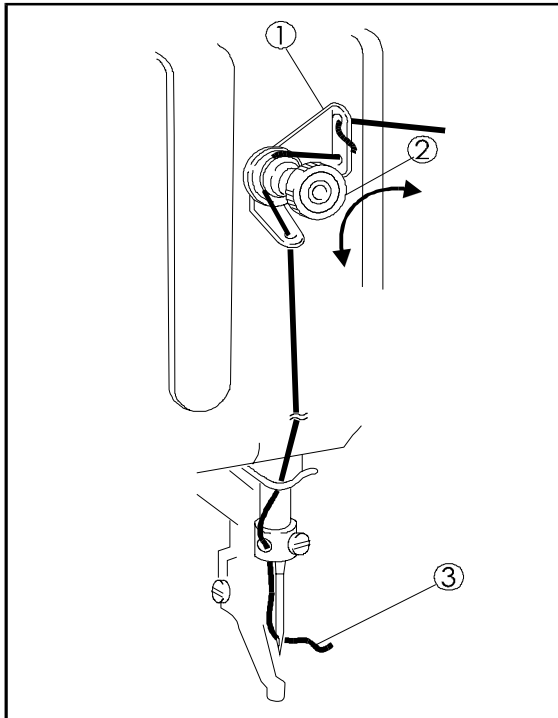
After the adjustment, tighten the setscrew (No.2) securely.

7-14. 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.



7-15. Adjustment of the thread tail 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.

7-16 Cancellation of the trimming function

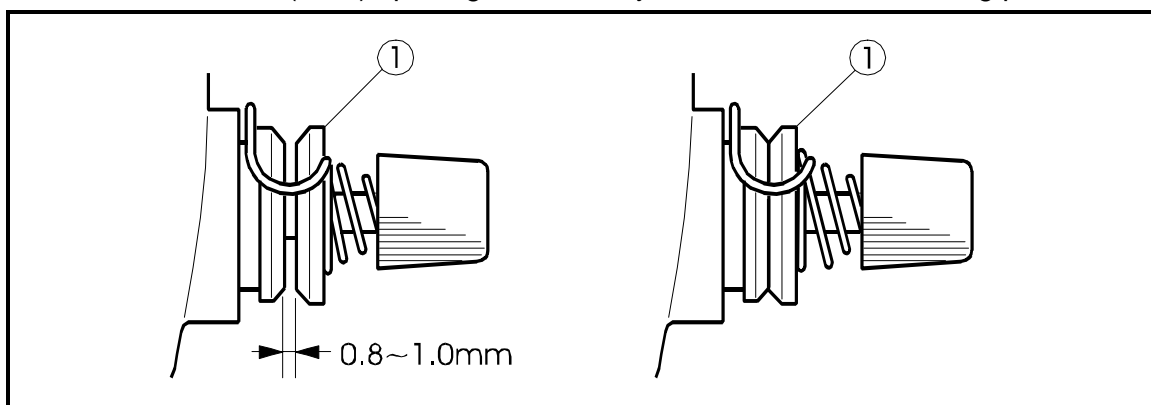
If the automatic trimming is not required during the sewing operation, cancel the trimming function with the setting panel of the control box. For the detail of this instructions, please refer to the paragraph [4.Program 4 mode display] on [9] Basic mode operation of the technical manual **CONTROL UNIT**.

7-17. Adjustment of the upper thread tension release

- [NOTE]
- (a) The upper thread tension release works when the upper thread is trimmed automatically or the presser foot is lifted during the work holder feeding.
 - (b) If the upper thread tension release does not work properly when the upper thread is trimmed automatically, the thread tail from the needle becomes shorter then, it induces the skip stitch happening or pulling the thread tail out of the needle at the start of the sewing.
 - (c) During the sewing operation, the discs (No.1) of the thread tension regulator is closed while the presser foot is moving up and down.

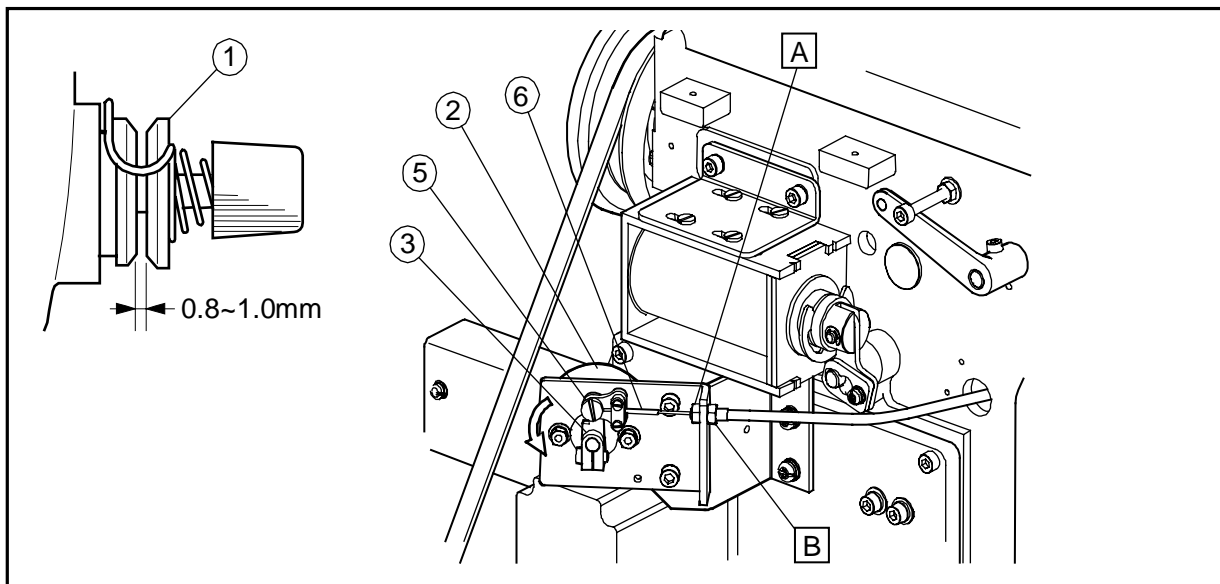
If the discs (No.1) of the thread tension regulator is not closed, the upper thread tension becomes loose and the proper stitch condition can not be obtained.

- (d) When the upper thread tension release is activated, the discs (No.1) the upper thread tension regulator opens 0.8~1.0mm. This is the normal condition of the discs (No.1) opening. For this adjustment, take the following procedure.



- (1) Remove the top motor cover.

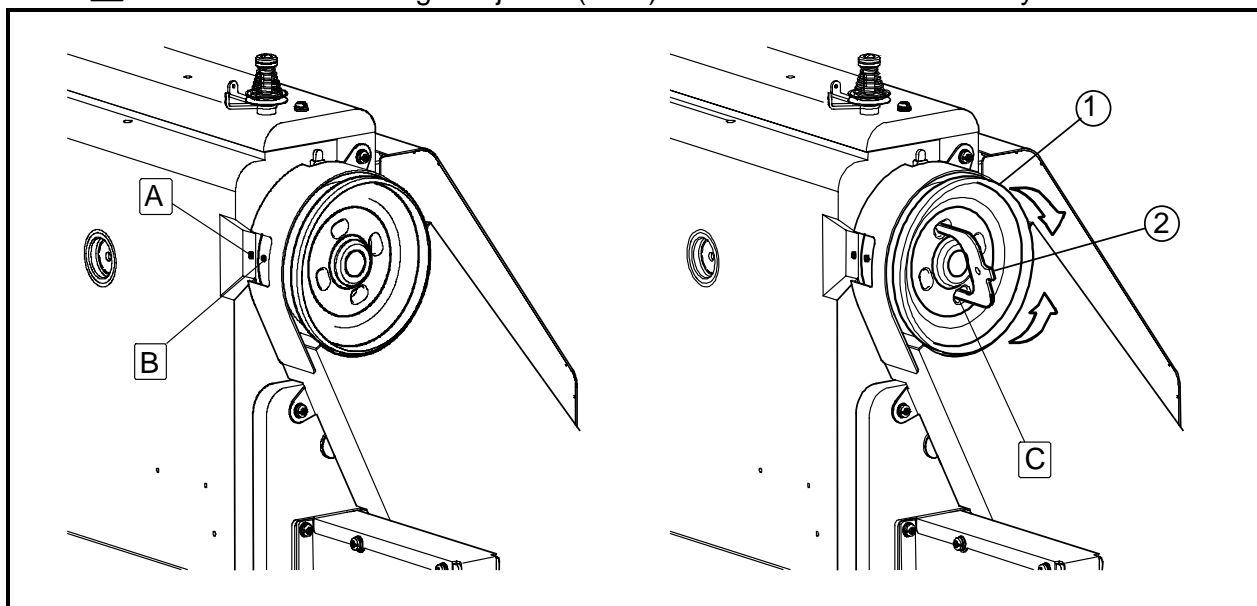
- (2) Fully turn the crank (No.3) of the rotary solenoid (No.2) in the arrow direction. At this time, adjust the upper thread tension release for the discs to be opened 0.8 to 1.0mm.
- (3) For this adjustment, loosen the nut [A] then, if tighten the nut [B], the discs opening becomes wider and if loosen the nut [B], it becomes narrower.
- (4) If the normal opening of the discs can not be obtained with the nut adjustment, loosen the wire fix screws (No.5) and adjust the tension of the wire (No.6).
- (5) The wire (No.6) may be got longer over a long period machine operation. At that time, adjust the upper thread tension release again.



7-18. Adjustment of the synchronizer

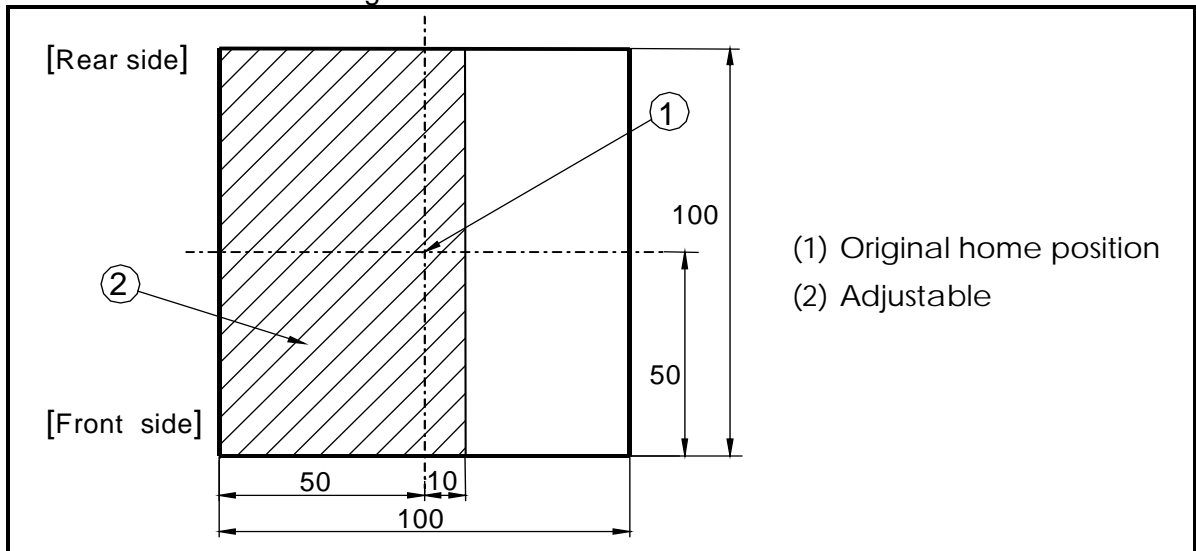
- [NOTE] (a) When the sewing is finished, the arm timing mark [A] and the pulley timing mark [B] are matched with each other then, the sewing machine is stopped the running. This is the normal condition.
- (b) If theses timing mark [A] and [B] get out of the matching more than 3mm, adjust the timing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




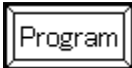
7-19. Adjustment of the mechanical home position

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



(1) Original home position
(2) Adjustable

- (1) Turn the power switch ON and cancel the sewing area limit with the operation panel.

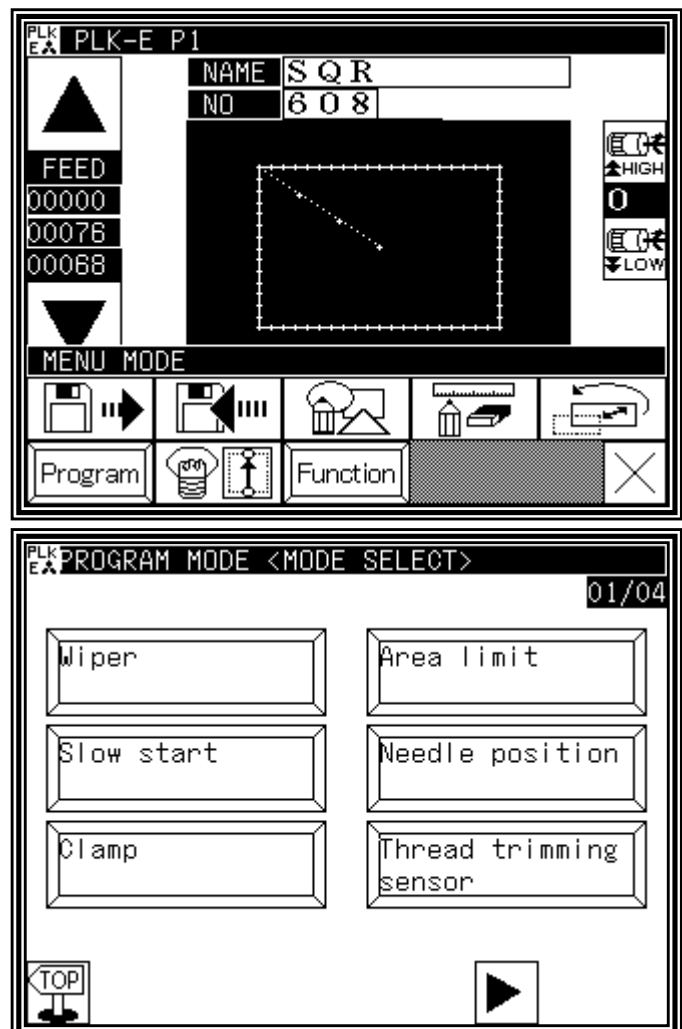
For this cancellation, press  key at the normal mode condition, then MENU MODE is appeared. Press  key. And press [Area limit] button.

Please select [Area limit control (ALC)].

If you select ALC=ON, area limit control 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.

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

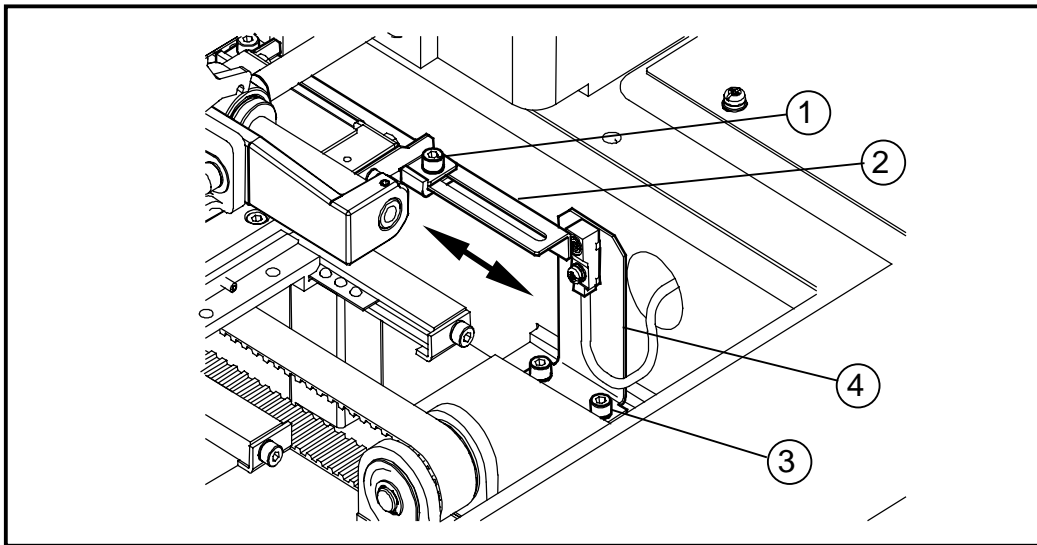


7-19-1. Shifting the mechanical home position to the X direction

- (1) Remove the X-Y cover (right), (left) and X cover.
- (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.

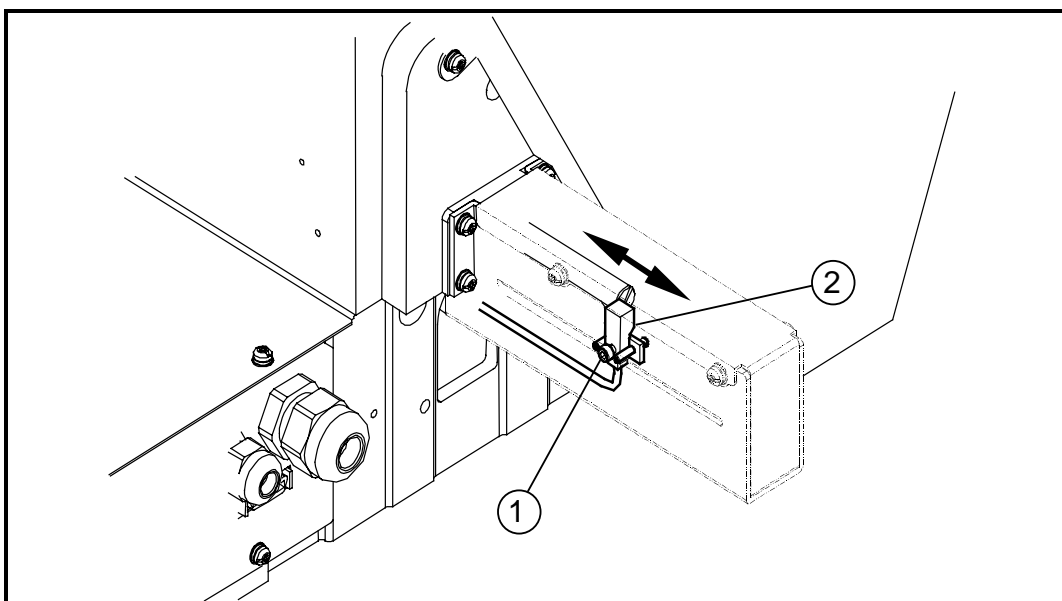
- (3) After the mechanical home position setting, tighten the detector plate fix screws (No.1) securely.
- (4) If the shift amount of home position by using this method enough. Please adjust by following procedure.
- (5) Remove the detector adaptor fix screws (No.3).
- (6) Replace the detector adaptor (No.4) to other position. In this case if move the detector adaptor (No.4) to the right, the mechanical home position is moved to the right and if it is moved to the left, the mechanical home position is moved to the left.
- (7) After setting, tighten the detector adaptor fix screws (No.3) securely.

[NOTE] When the original mechanical home position is shifted. Please check the clearance between the X detector plate and the X detector.
This clearance should be set within the range of 1.0 ~ 1.5 mm.



7-19-2. Shifting the mechanical home position to the Y direction

- (1) Loosen the Y-detector setscrew (No.1).
- (2) If move the Y-detector (No.2) to the front , the mechanical home position is shifted to the backward. If it is moved to the backward , the mechanical home position is shifted to the front.
- (3) After the mechanical home position setting, tighten the screw (No.1) securely.



7-20 Adjustment of the X-Y contact pressure

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

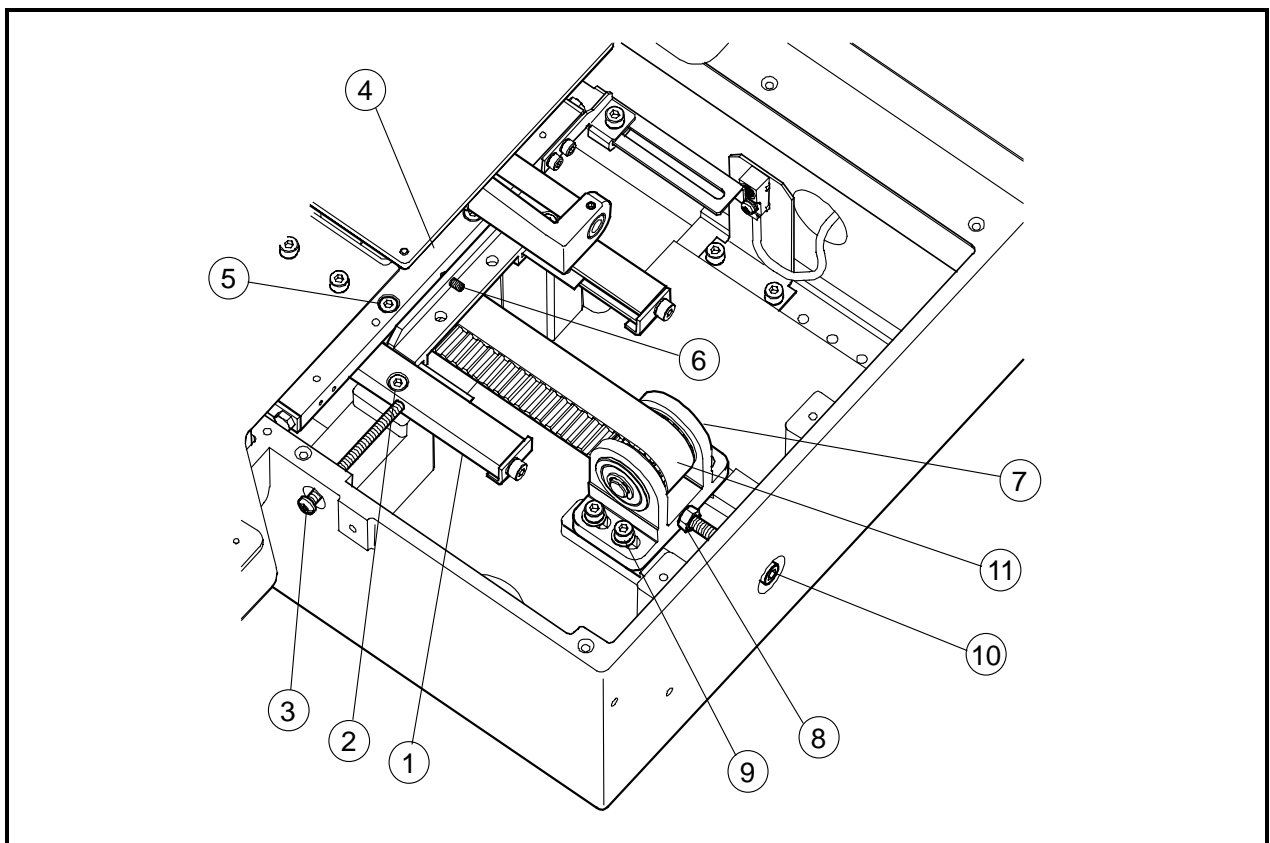
- (1) Remove the right and left X-Y covers and the right X cover plate.
- (2) Loosen the setscrew (2 pieces) (No.2) so that the X fixed race (No.1) can be moved slightly.
- (3) If tighten the both right and left contact presser adjusting screws (No.3), the X table contact pressure is increased.
- (4)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

7-21 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.

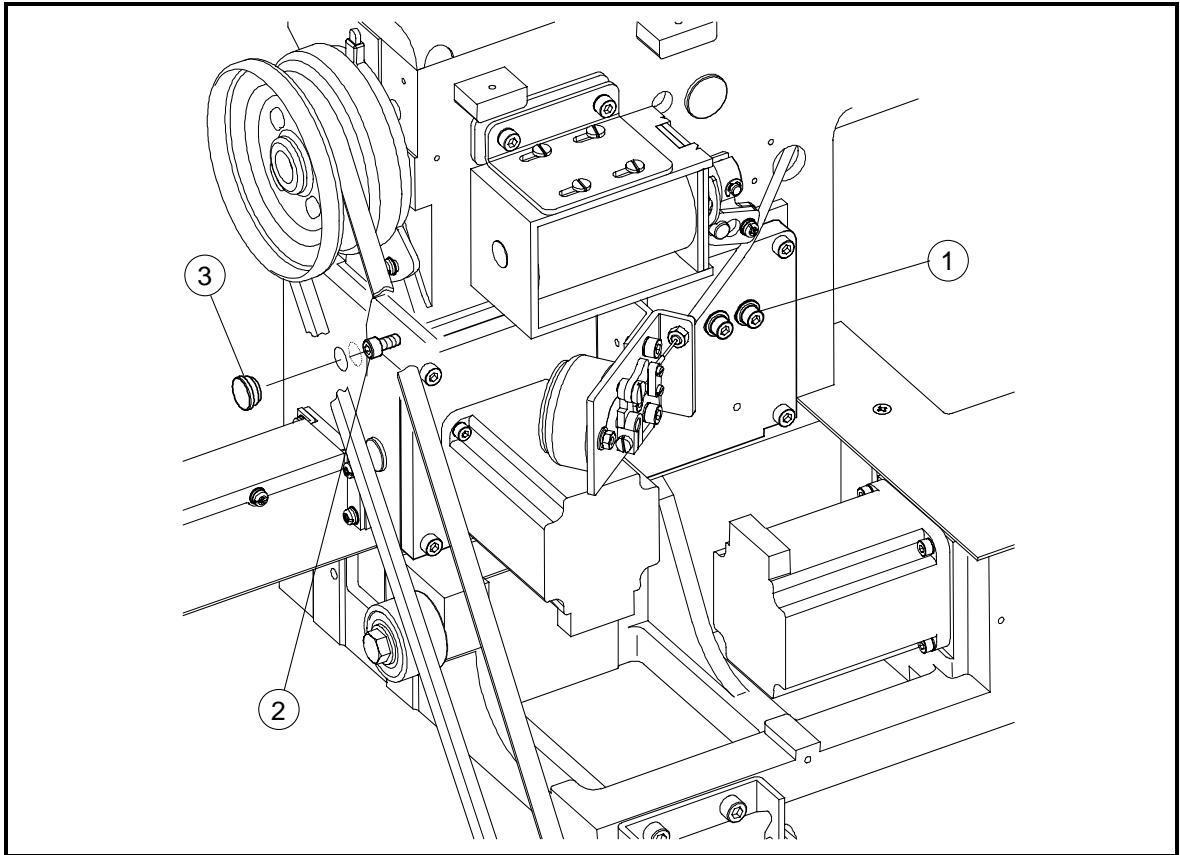
7-21-1 Adjustment of the X timing belt tension

- (1) Remove the right X cover and the right X cover plate.
- (2) Loosen the nut (No.8) and the setscrew (No.9) of the bracket (No.7).
- (3) If the tighten the tension adjust screw (No.10), the X timing belt (No.11) tension will be increased.
- (4) After adjustment, tighten the nut (No.8) and the setscrew (No.9).



7-21-2. Adjustment of the Y timing belt tension

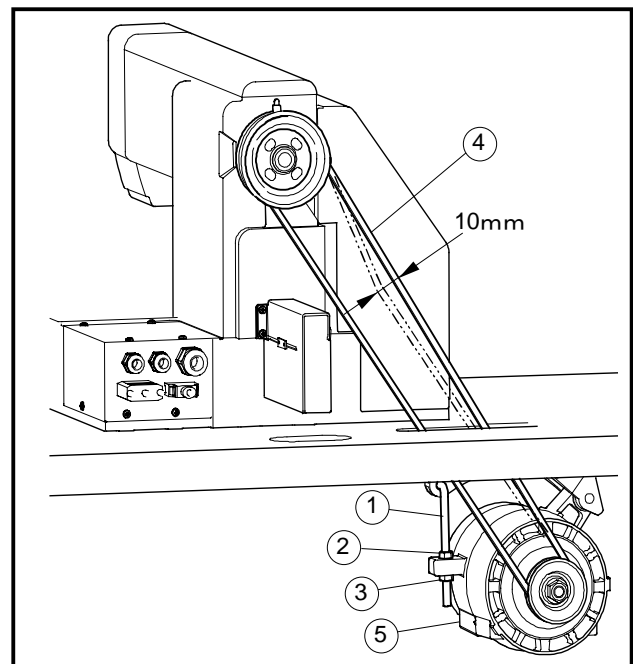
- (1) Remove stepping motor cover and V belt cover.
- (2) Loosen the bracket setscrews (No.1).
- (3) Remove the rubber plug (No.3) and tighten the tension adjust screw (No.2). The Y timing belt tension will be increased.
- (4) After adjustment, tighten the bracket set screws (No.1) securely and put the rubber plug (No.3), the stepping motor cover and the V belt cover to the original position.



7-22. 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 10 mm with the hand pressure 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 weight and firstly, tighten the upper nut (No.2) then secondly, tighten the lower nut (No.2).



8. MAINTENANCE

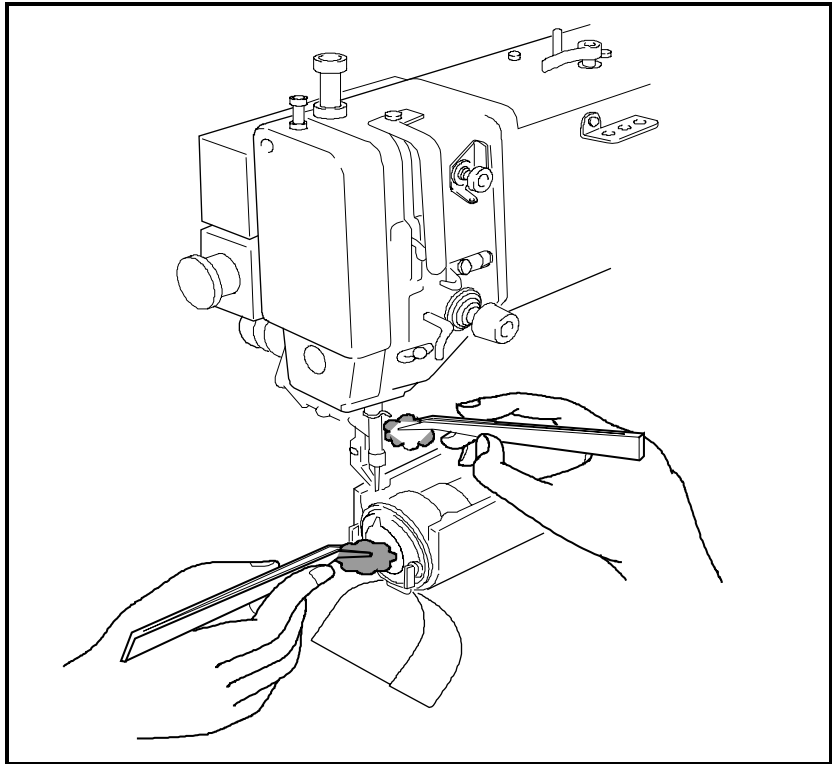


Caution

- ★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.

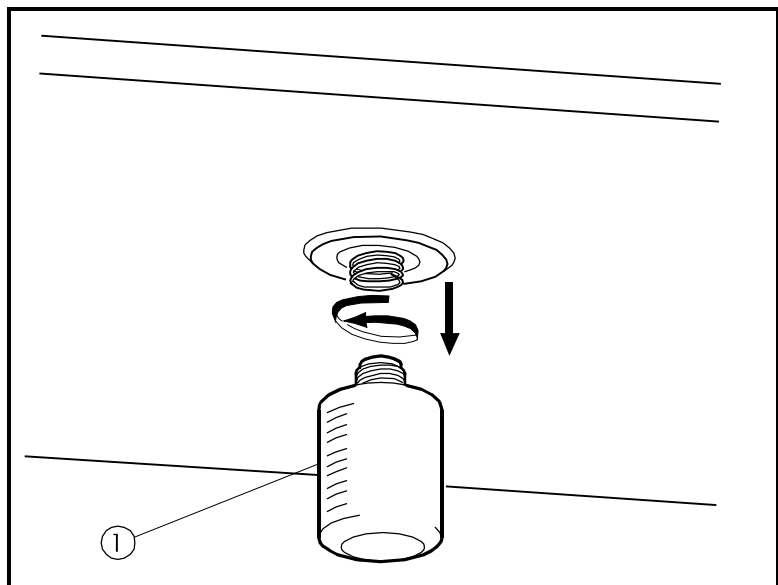
8-1. Cleaning

- (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 level supply the oil to be over the red mark level.



8-2. Disposing of oil waste

- (1) If the waste oil is full filled in the oil bottle (No.1), remove the oil bottle (No.1) then, dispose of the waste oil.
- (2) For cleaning the oil pan, remove the screw (No.2) and take off the oil bottle adapter (No.3). Next remove the screw (No.4) and pull out the oil pan (No.5).



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	6-3
	Strong thread take up spring	Adjust thread take up spring properly	7-14
	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 presser foot needle hole	Change it new one or grind it with buffing wheel	----
	Needle touches with presser foot needle hole	Move presser foot position	7-6-1(6)
	Needle and shuttle hook are not in proper timing	Adjust the timing	7-2
	Thread melts with needle heat	Slow down sewing speed	6-2(4)
Use silicon oil		----	
Use needle cooler		----	
2. Upper thread is pulled out from needle	Thread tension discs are not opened at trimming	Adjust thread tension release	7-17
	Thread take up spring swings too much	Adjust thread take up spring's swing stroke	7-14
	Upper thread is broken before regular trimming	Adjust fixed knife and needle plate position	7-12
	Needle size is bigger than thread size	Change needle to suitable size	----
	Pre-tension is too tight	Adjust pre-tension	7-16
	Thread guide is in wrong position	Adjust thread guide position properly	7-5
	Needle and shuttle hook are in bad timing	Adjust the position properly	7-2
	Trimmer timing is not correct	Adjust trimmer cam position	7-10
Adjust movable knife position		7-11	
Adjust synchronizer position		7-18	
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	6-3(1)
		Decrease pre-tension	7-16
		Adjust trimmer cam position	7-10
		Adjust synchronizer position	7-18
		Make thread take up swing stroke smaller	7-13
		Advance thread tension release timing	Control unit
Thread tail from needle is very short after trimming	Adjust thread guide position properly	7-5	

Bad condition	Cause	Remedy	Ref. page & Item
4. Thread tail from needle is too long after trimming	Pre-tension is too loose	Make pre-tension tighter	7-14
	Trimmer timing is delayed	Adjust trimmer cam position	7-10
		Adjust synchronizer position	7-18
	Upper thread tension release timing is too fast	Delay tension release timing	Control unit
	Tread guide is in wrong position	Adjust thread guide position properly	7-5
5. Trimming is not functioned	Trimmer function is canceled	Resume trimmer function	Control unit
	Fixed knife is dull	Change it new knife	7-11
	Movable Knife is in wrong position	Adjust movable knife position properly	7-11
	Skip stitching happens at trimming	Fix skip stitching	7-6
	Trimmer timing is wrong	Adjust trimmer cam position	7-10
Adjust synchronizer position		7-18	
6. Skip stitching often happens	Needle and shuttle hook clearance is too big	Adjust needle and shuttle hook timing properly	7-2
	Needle and shuttle hook timing is not correct	Adjust needle and shuttle hook timing properly	7-2
	Needle is bent	Change it new needle	----
	Needle is bent by driver	Adjust needle and diver clearance properly	7-4
	Needle is in wrong position	Amend needle position	7-2
	Presser foot position is not correct	Adjust presser foot position properly	7-6
7. Stitch forming is loose	Upper thread tension is not tight enough	Increase upper thread tension	6-3(2)
	Thread tension regulator's discs are opened during sewing	Adjust tension regulator position properly	7-17
		Adjust upper tension release position properly	7-17
	Presser foot position is not correct	Adjust presser foot position properly	7-6-1
	Driver and shuttle hook clearance is very small	Change shuttle hook	----
Presser foot up and down timing is not proper	Adjust presser foot timing properly	7-6-3	
8. Sewing machine does not work even start switch is turned ON	Cables wiring is disconnected	Connect all cables precisely	3
	System software is not loaded	Load system software to control box	5-1
	Emergency stop switch is kept ON	Release emergency stop switch lock	6-1(3)
	Start switch is out of order	Change it new start switch	----
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	----

Bad condition	Cause	Remedy	Ref. Page & Item
10. Work holder does not work	Work holder activate cable is disconnected	Connect the cable precisely	Control unit
	Work holder pressure is not strong enough	Increase work holder pressure	7-9-1
	Work holder switch is out of order	Change it new work holder switch	----
11. Sewing pattern is distorted	Work holder pressure is not strong enough	Increase work holder pressure	7-9-1
	Sewing material weight is very heavy	Slow down sewing speed	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	7-21	
12. Work holder does not stop at home position	X-Y detector cabled are disconnected	Connect X-Y cables precisely	----
	X-Y detectors are out o 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)	----
	Detector and detector plate clearance is too big	Adjust the clearance properly	7-19
13. Work holder stops at not original home position	Detector or detector plate mounting is loose	Check setscrews and tighten them securely	7-19
	Detector and detector plate clearance is bigger than standard	Adjust detector and detector plate clearance properly	7-19
	Home position correction function is in working	Cancel home position correction function	Control unit

APPENDIX

Tabletop and stand drawings.

Ref.1Table cut-out for PLK-E1010 machine

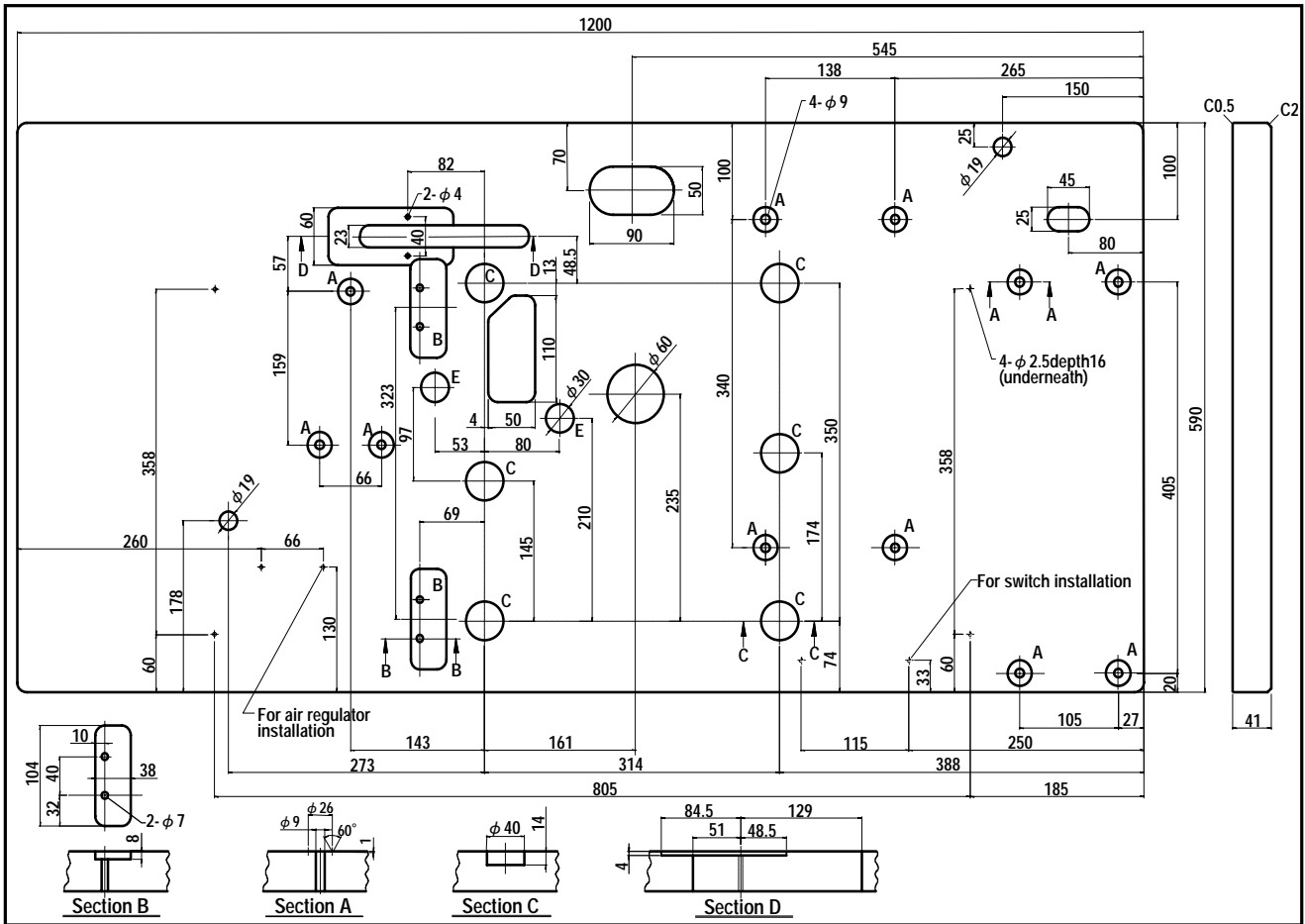
Ref.2Table and stand

Ref.3Stand components

NOTE Tabletop and stand must be produced refer to below drawings.

Recommendable measurements for original MITSUBISHI tabletop and stand are shown in the figures.

Ref.1 <Table cut-out for PLK-E1010 machine>



Ref.2 <Table and stand>

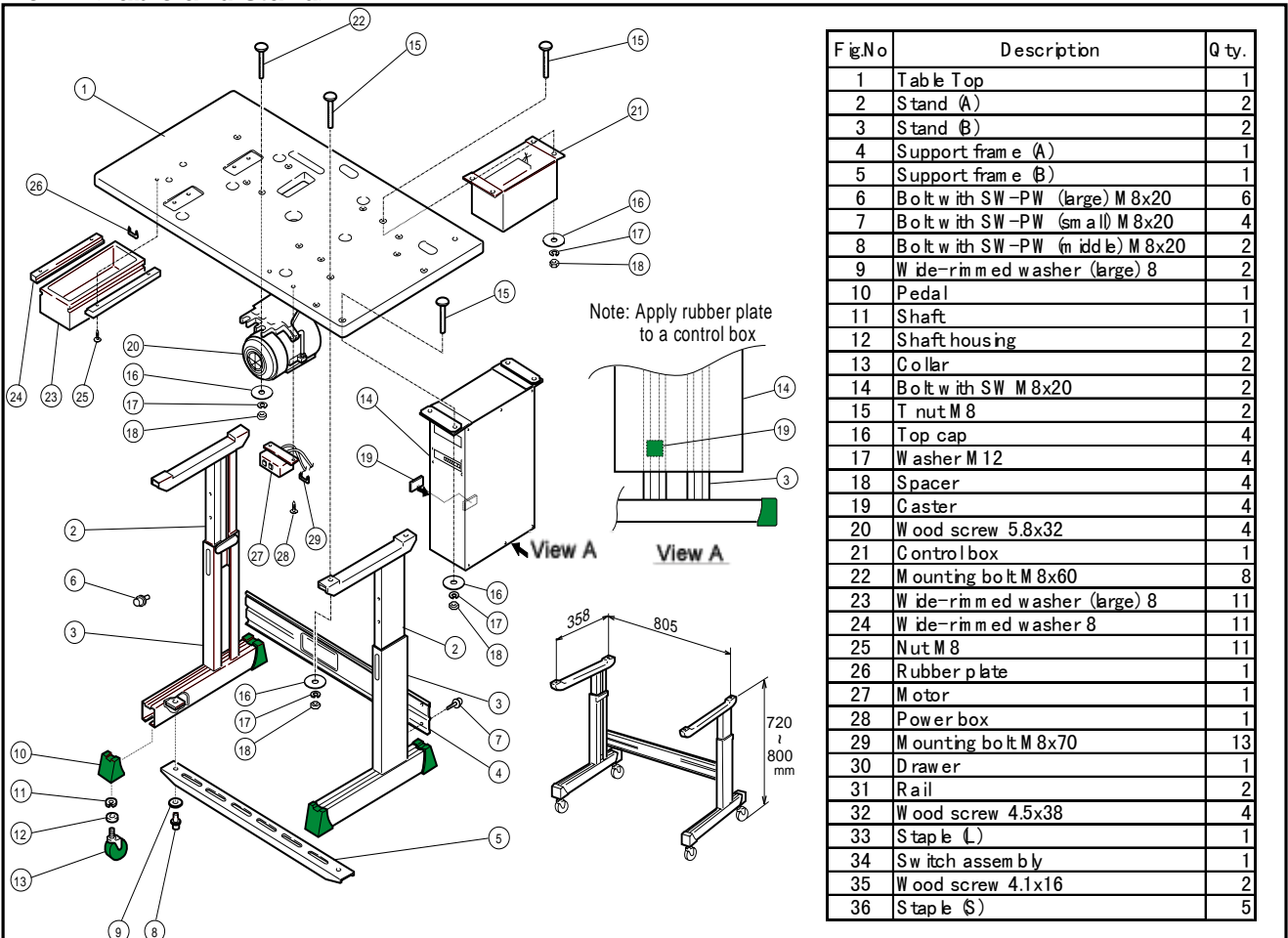
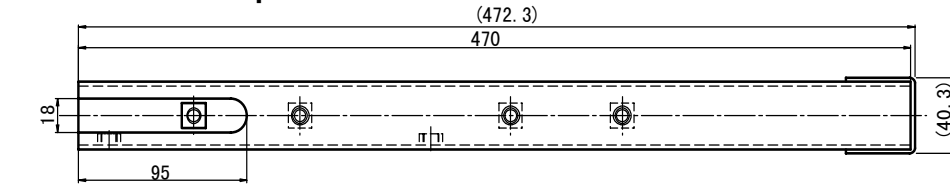
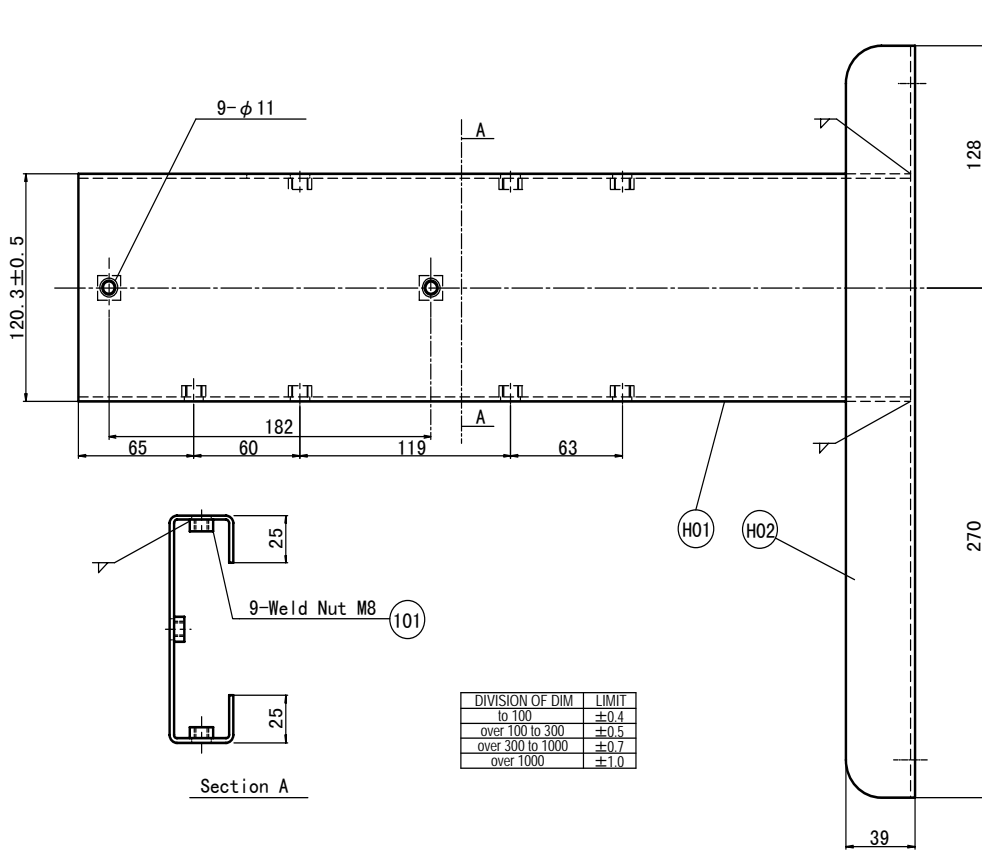


Fig.No	Description	Qty.
1	Table Top	1
2	Stand (A)	2
3	Stand (B)	2
4	Support frame (A)	1
5	Support frame (B)	1
6	Bolt with SW-PW (large) M 8x20	6
7	Bolt with SW-PW (small) M 8x20	4
8	Bolt with SW-PW (middle) M 8x20	2
9	Wide-rimmed washer (large) 8	2
10	Pedal	1
11	Shaft	1
12	Shaft housing	2
13	Collar	2
14	Bolt with SW M 8x20	2
15	Nut M 8	2
16	Top cap	4
17	Washer M 12	4
18	Spacer	4
19	Caster	4
20	Wood screw 5.8x32	4
21	Control box	1
22	Mounting bolt M 8x60	8
23	Wide-rimmed washer (large) 8	11
24	Wide-rimmed washer 8	11
25	Nut M 8	11
26	Rubber plate	1
27	Motor	1
28	Power box	1
29	Mounting bolt M 8x70	13
30	Drawer	1
31	Rail	2
32	Wood screw 4.5x38	4
33	Staple (L)	1
34	Switch assembly	1
35	Wood screw 4.1x16	2
36	Staple (S)	5

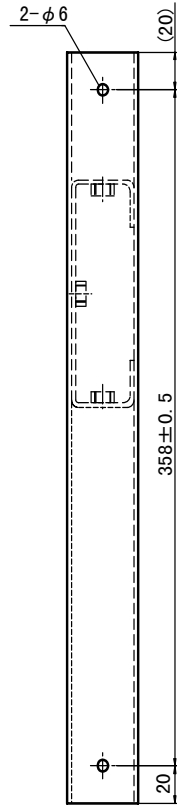
Ref.3 <Stand components>



No. 1
 Description Stand (A)
 Material H01: SPCC 2.3T
 H02: SPCC 2.3T
 Surface Treatment Paint(anti-corrosion)
 Caution 101: WELD NUT M8
 String chamfer, except as noted
 (chamfer slightly)
 Trigonometry

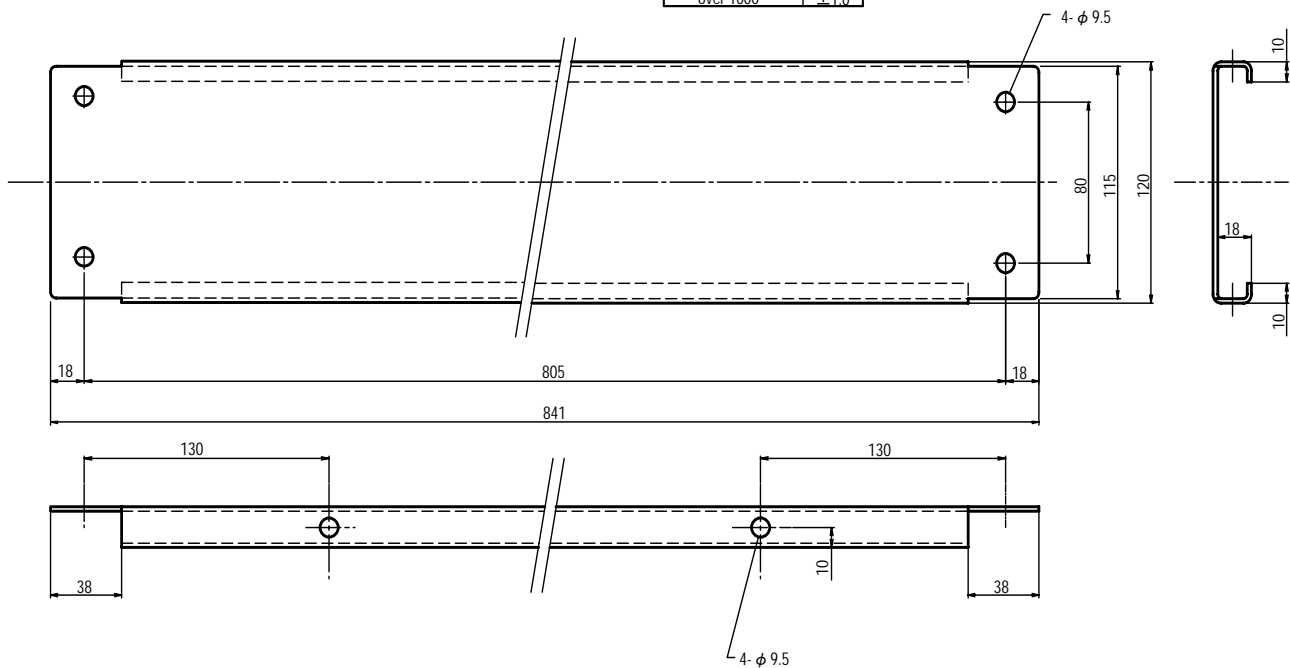


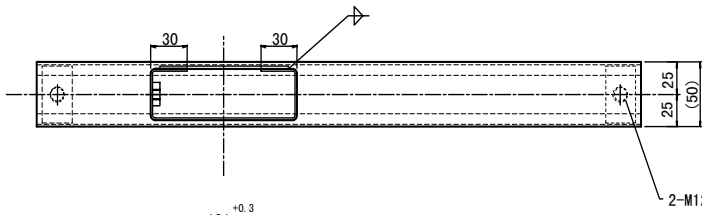
DIVISION OF DIM	LIMIT
to 100	±0.4
over 100 to 300	±0.5
over 300 to 1000	±0.7
over 1000	±1.0



No. 2
 Description Support frame (A)
 Material SPCC 2.3T
 Surface Treatment Paint(anti-corrosion)
 Caution String chamfer, except as noted
 (chamfer slightly)
 Trigonometry

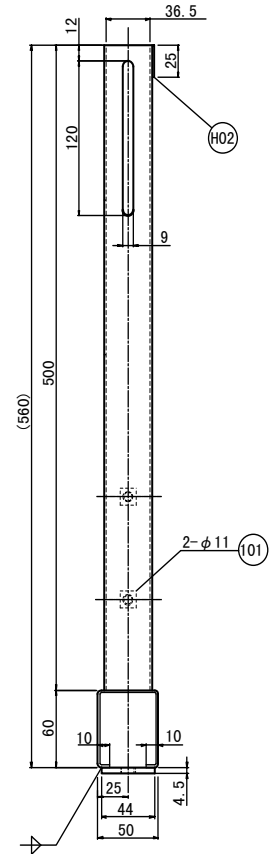
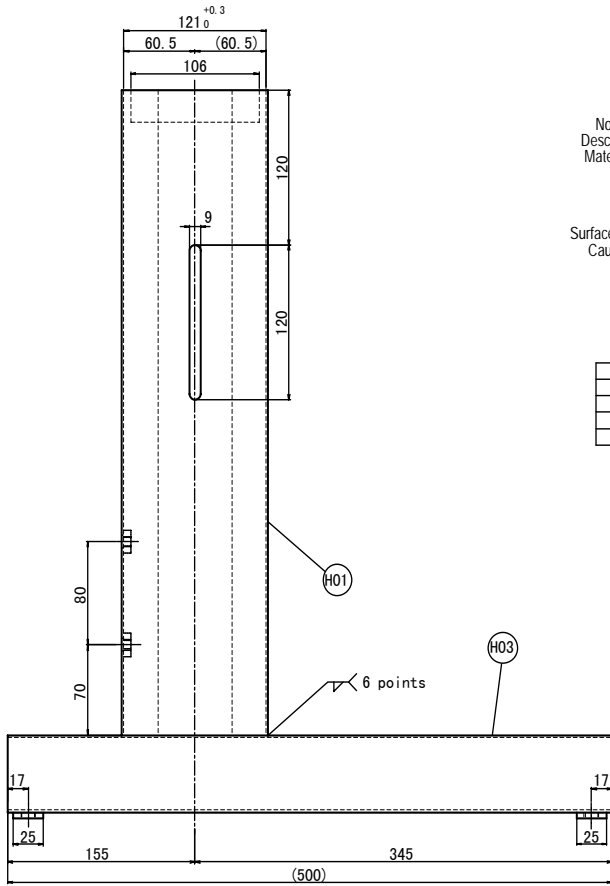
DIVISION OF DIM	LIMIT
to 100	±0.4
over 100 to 300	±0.5
over 300 to 1000	±0.7
over 1000	±1.0





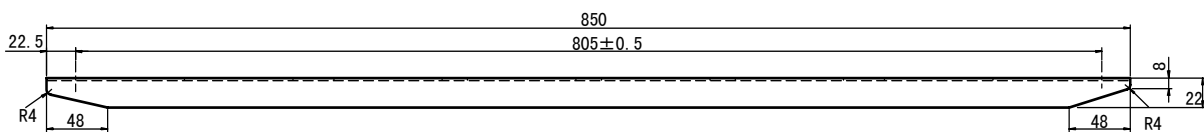
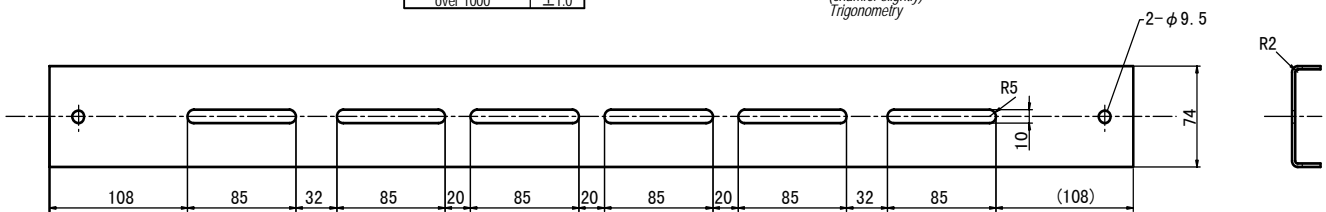
No. 3
 Description Stand (B)
 Material H01: SPCC 2.3T
 H02: SPCC 2.3T
 H03: SPCC 2.3T
 H04: SPHC 4.5T
 101: WELD NUT M8
 Surface Treatment Paint(anti-corrosion)
 Caution String chamfer, except as noted
 (chamfer slightly)
 Trigonometry

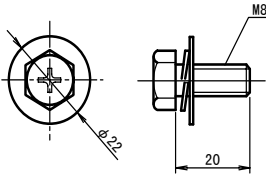
DIVISION OF DIM	LIMIT
to 100	±0.4
over 100 to 300	±0.5
over 300 to 1000	±0.7
over 1000	±1.0



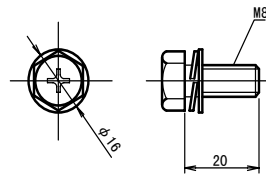
DIVISION OF DIM	LIMIT
to 100	±0.4
over 100 to 300	±0.5
over 300 to 1000	±0.7
over 1000	±1.0

No. 5
 Description Support frame (B)
 Material SPCC 2.3T
 Surface Treatment Paint(anti-corrosion)
 Caution String chamfer, except as noted
 (chamfer slightly)
 Trigonometry

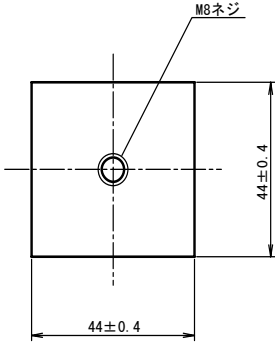




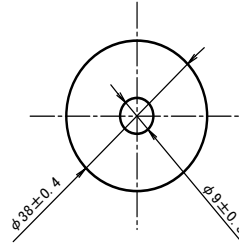
No. 6
Description Bolt with SW-PW (large)
M8 X 20
Material SS100
Surface Treatment Electroplated Coating
Trigonometry



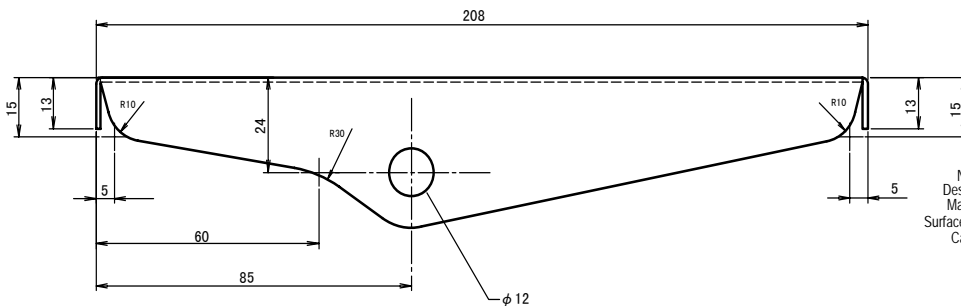
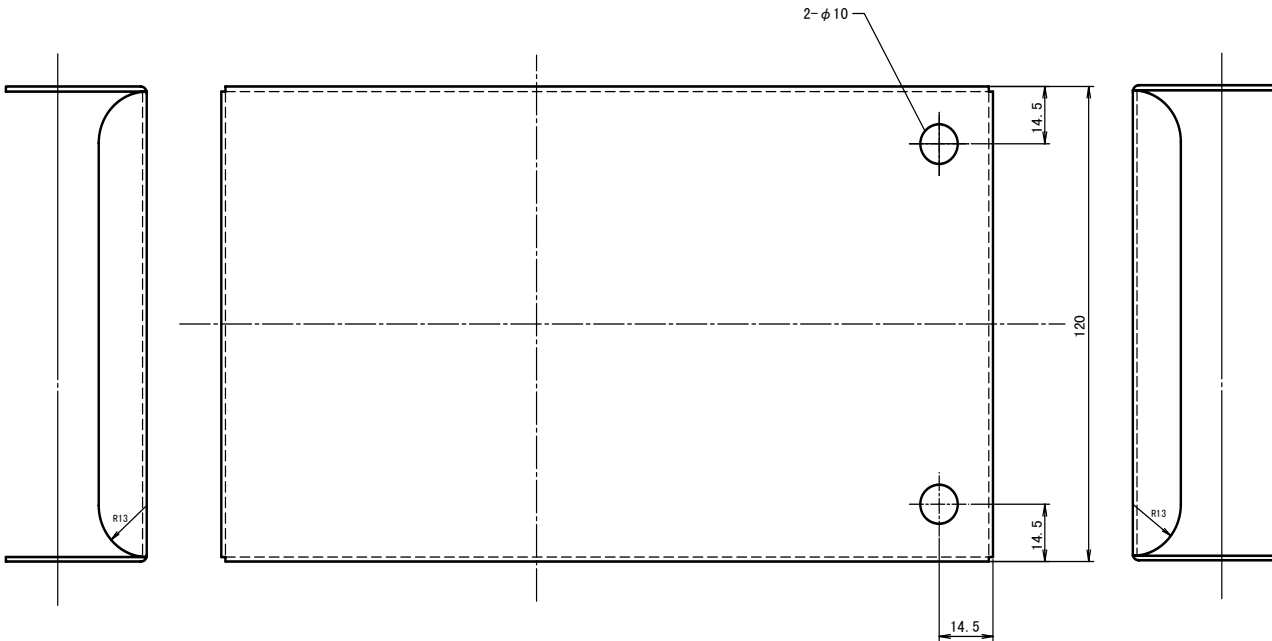
No. 7
Description Bolt with SW-PW (small)
M8 X 20
Material SS100
Surface Treatment Electroplated Coating
Trigonometry



No. 8
Description Screw plate (A)
Material SPHC 4.5T
Surface Treatment Electroplated Coating
Caution String chamfer, except as noted
(chamfer slightly)
Trigonometry

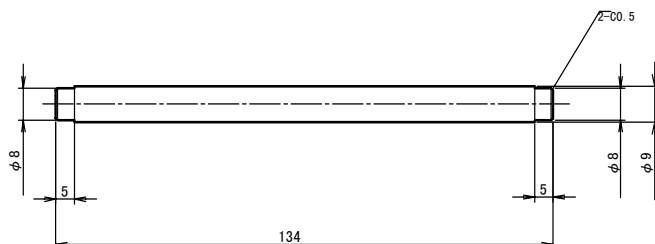


No. 9
Description Wide-rimmed washer (large)
Material SPCC 2.6T
Surface Treatment Electroplated Coating
Caution String chamfer, except as noted
(chamfer slightly)
Trigonometry



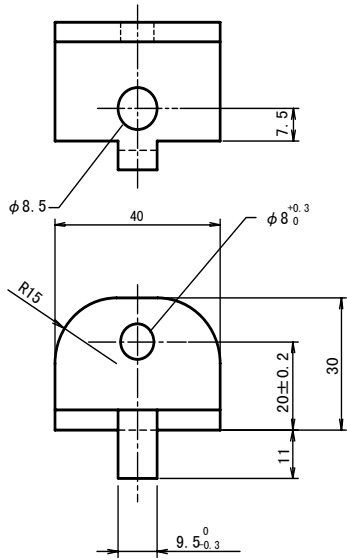
DIVISION OF DIM	LIMIT
to 100	± 0.4
over 100 to 300	± 0.5
over 300 to 1000	± 0.7
over 1000	± 1.0

No. 10
Description Pedal
Material SPCC 1.2T
Surface Treatment Paint (anti-corrosion)
Caution String chamfer, except as noted
(chamfer slightly)
Trigonometry

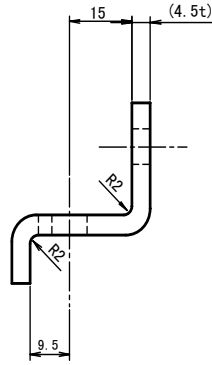


DIVISION OF DIM	LIMIT
0.5 to 3	± 0.1
over 3 to 6	± 0.1
over 6 to 30	± 0.2
over 30 to 120	± 0.3
over 120 to 315	± 0.5
over 315 to 1000	± 0.8

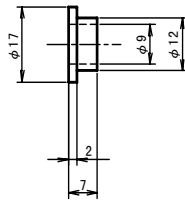
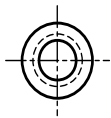
No. 11
Description Shaft
Material S15C
Surface Treatment Electroplated Coating
Caution String chamfer, except as noted
(chamfer slightly)
Trigonometry



No. 12
 Description Shaft housing
 Material SPHC 4.5T
 Surface Treatment Electroplated Coating
 Caution String chamfer, except as noted (chamfer slightly)
 Trigonometry

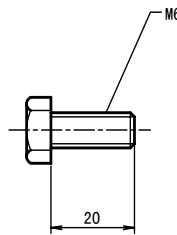


DIVISION OF DIM	LIMIT
to 100	±0.4
over 100 to 300	±0.5
over 300 to 1000	±0.7
over 1000	±1.0

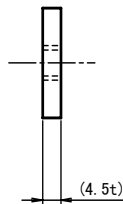
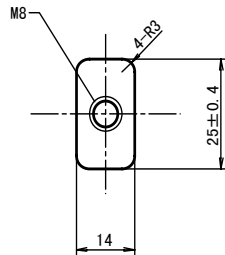


No. 13
 Description Collar
 Material NYLON 66
 Trigonometry

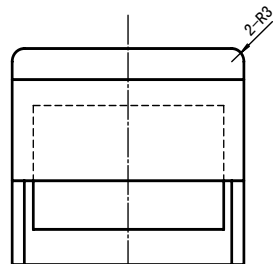
DIVISION OF DIM	LIMIT
0.5 to 3	±0.1
over 3 to 6	±0.1
over 6 to 30	±0.2
over 30 to 120	±0.3
over 120 to 315	±0.5
over 315 to 1000	±0.8



No. 14
 Description Bolt with SW M8X20
 Material SS100
 Surface Treatment Electroplated Coating
 Trigonometry

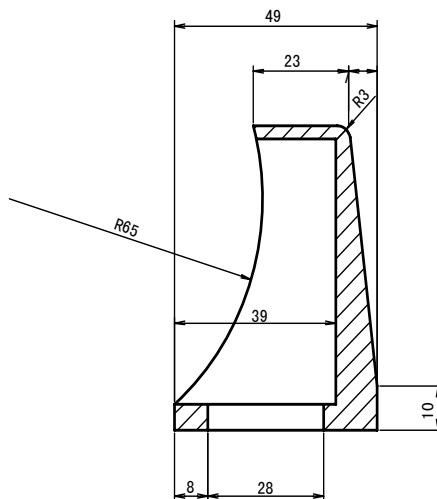
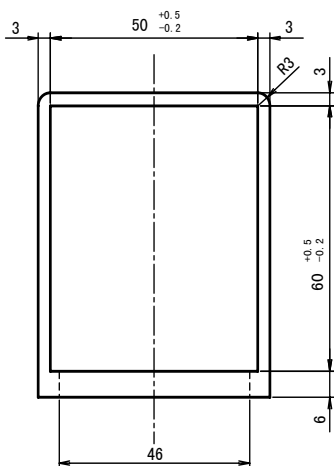


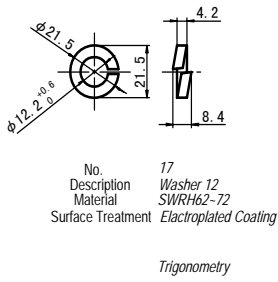
No. 15
 Description Screw plate (B)
 Material SPHC 4.5T
 Surface Treatment Electroplated Coating
 Caution String chamfer, except as noted (chamfer slightly)
 Trigonometry



No. 16
 Description Top cap
 Material RUBBER(NBR)
 Trigonometry

DIVISION OF DIM	LIMIT
to 3	±0.3
over 3 to 6	±0.4
over 6 to 10	±0.5
over 10 to 18	±0.6
over 18 to 30	±0.8
over 30 to 50	±1.0
over 50 to 80	±1.2
over 80 to 120	±1.4
over 120 to 180	±1.6

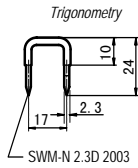




No. 17
Description Washer 12
Material SWRH62-72
Surface Treatment Electroplated Coating

Trigonometry

No. 18
Description Staple (L)
Material SWM-N 2.3D 2003
PVC coating



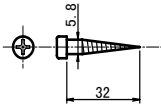
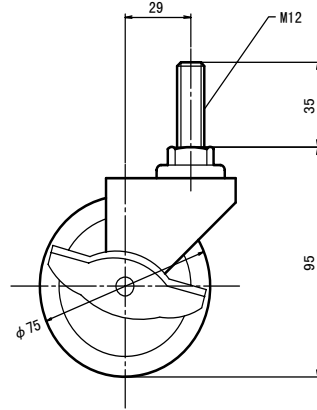
Trigonometry

SWM-N 2.3D 2003

No. 19
Description Caster
Material RUBBER WHEEL
Permitted load: 40Kg (per each)
Lock mechanism is required

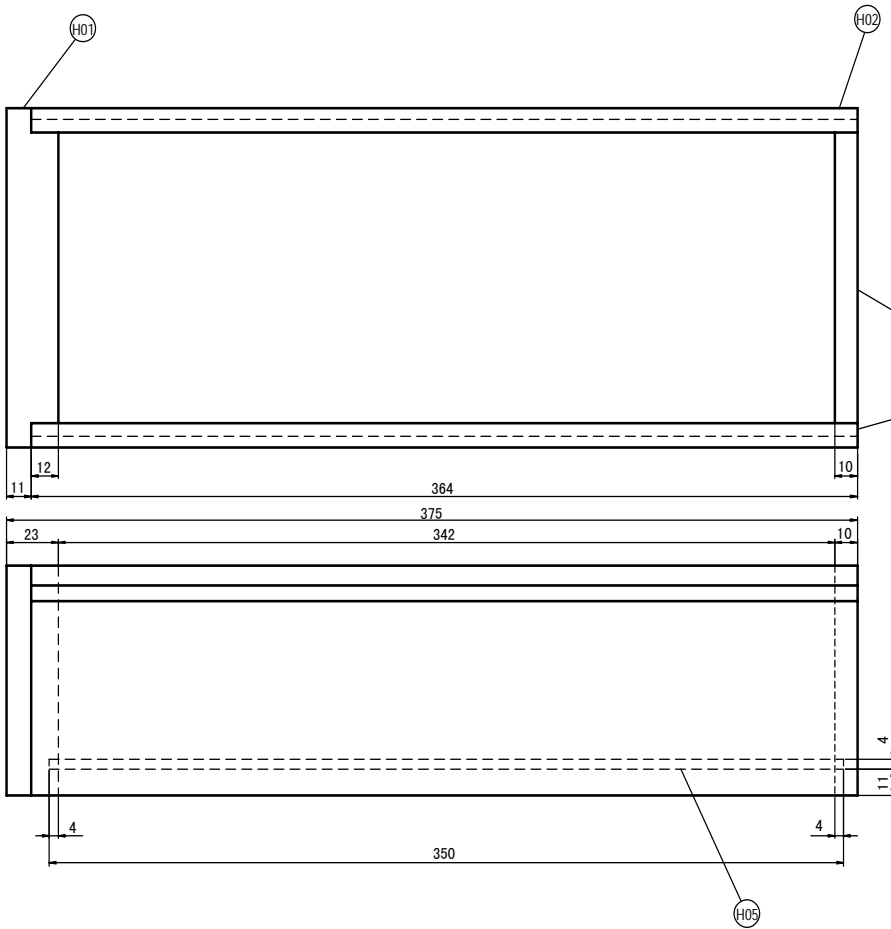
Trigonometry

CASTER
415EA-R φ 75 (HAMMER)



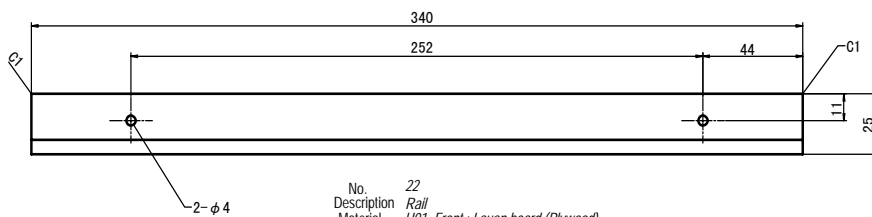
No. 20
Description Wood screw 5.8X32
Material SWRM3
Surface Treatment Electroplated Coating

Trigonometry



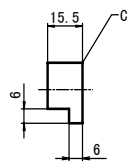
No. 21
Description Drawer
Material H01. Front : Lauan board (Plywood) B-Z melamin coated
H02. Side : Lauan board (Plywood)
H03. Side : Lauan board (Plywood)
H04. Back : Lauan board (Plywood)
H05. Bottom : Lauan board (Plywood)

Trigonometry



No. 22
Description Rail
Material H01. Front : Lauan board (Plywood)

Trigonometry



No. 23
Description Wood screw 4.5 X 38
Material SWRM3
Surface Treatment Electroplated Coating

Trigonometry



FACTORY AUTOMATION SYSTEM

OFFICE TOWER "Z" 14F 8-12 1chome, Harumi CHUO-KU, TOKYO 104-6212, JAPAN

Phone : +81-3-6221-6060

Fax : +81-3-6221-6076

New publication, effective SEP.2001.

Contents subject to change without notice

e

From the library of Superior Sewing Machine & Supply LLC • www.supsew.com