



INDUSTRIAL SEWING MACHINE

MODEL

**PLK-G1306**

TECHNICAL MANUAL

SEWING MACHINE HEAD

# FOR SAFE USE

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

## SAFETY INDICATIONS

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

## CAUTION INDICATIONS

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

## SAFETY PRECAUTIONS



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



### USAGE ENVIRONMENT

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

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

### INSTALLATION

- (1) Please have some specialists, who have enough experience for the sewing machine installations, install the sewing machine.
- (2) Please have a qualified electrician perform necessary electric wiring.
- (3) Please do not operate until the sewing machine is repaired when any damage or fault is found on the sewing machine at the installation.
- (4) Please do not refurbish the sewing machine.
- (5) The sewing machine is heavy. For the safety, please make sure to install the sewing machine head by more than one person.
- (6) When tilting the sewing machine, please stand at the hinge side and hold the sewing machine with both hands. Also, please lock the caster on the steel stand
- (7) When tilting the sewing machine, the work clamp slides toward the hinges. Remember to move the work clamps Fully to the right side of the casting before placing the sewing head in the sewing position.
- (8) Please lock the caster on the steel stand to prevent the machine from moving before tilting the sewing machine.

- (9) Please make sure to fit the safety protective equipment (the motor cover or the others) and the accessory protective equipment (the eye guard) that removed temporarily for installation.
- (10) If the table and the steel stand are not MITSUBISHI original, the table and the steel stand have to be strong enough to withstand the weight and Vibration of the sewing machine.
- (11) When fitting the caster to the steel stand that are not MITSUBISHI original, the caster with locking function has to be strong enough to withstand the weight and Vibration of the sewing machine.

### SEWING

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

### ADJUSTMENT

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

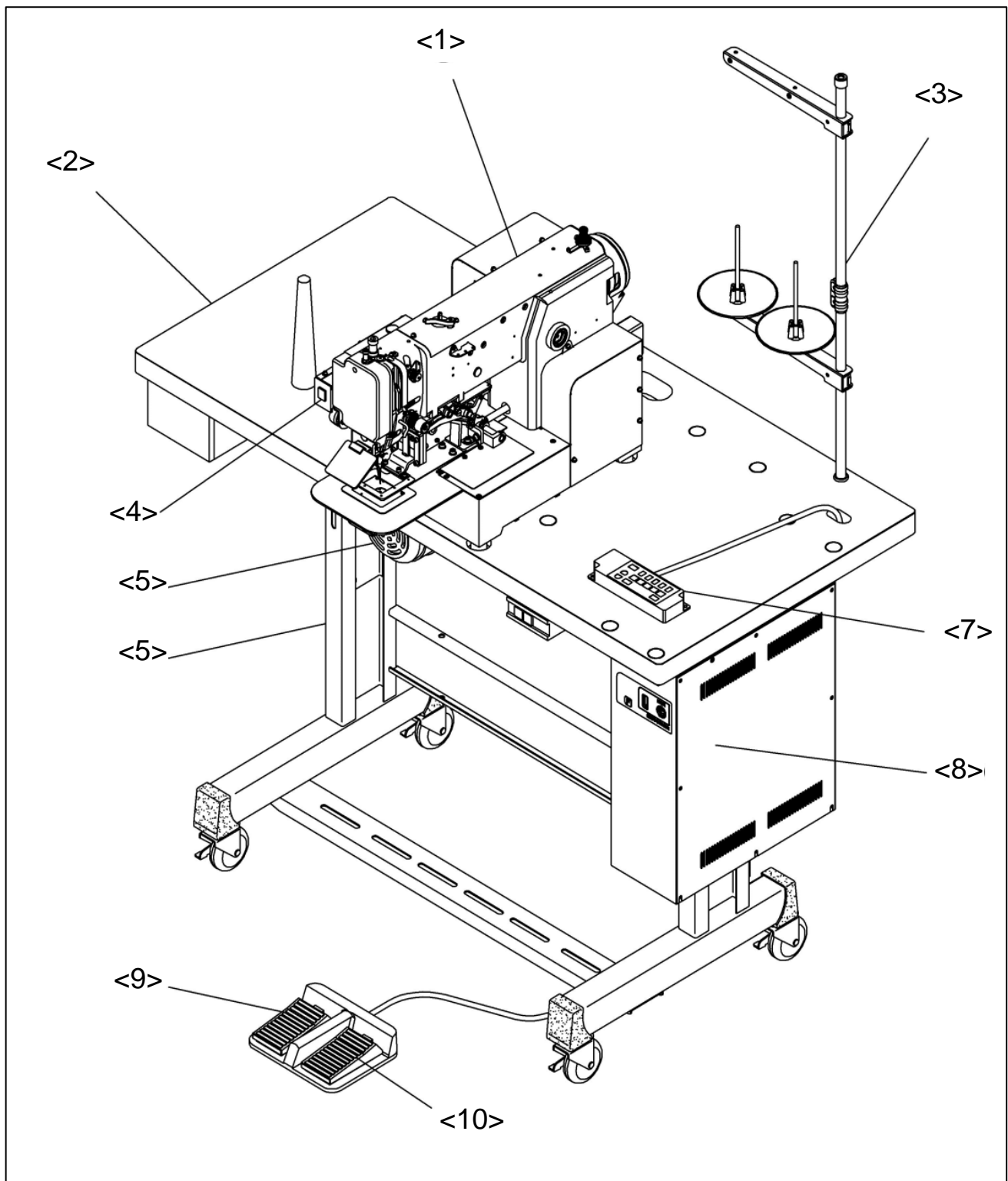
# Index

<b>1. STRUCTURE OF THE SEWING MACHINE</b>	1
<b>2. SPECIFICATIONS</b>	2
<b>3. INSTALLATION</b>	3
3-1. Preparation of the table	3
3-2. Preparation of the steel stand	4
3-3. Installation of the motor	4
3-4. Installation of the control box	4
3-5. Installation of the operation panel	4
3-6. Installation of the power switch and foot switch	4
3-7. Installation of the oil pan	5
3-8. Installation of the machine head	5
3-9. Installation of the V-belt	6
3-10. Installation of the belt cover	7
3-11. Installation of the thread stand	7
3-12. Connection of the electric cables	8
<b>4. LUBRICATION</b>	9
<b>5. PROPER OPERATION</b>	9
5-1. Initial setting of the control box	9
5-2. Installation of the needle	9
5-3. Threading the upper thread	10
5-4. Winding the bobbin thread	11
5-5. Setting the bobbin	11
5-6. Setting the bobbin case	12
<b>6. SEWING</b>	12
6-1. The sewing operation	12
6-2. Operation of the halt switch	13
6-3. Adjustment of the thread tension	13
<b>7. STANDARD ADJUSTMENT</b>	14
7-1. Adjustment of the needle bar position	14
7-2. Adjustment of the position between the needle and the shuttle hook	14
7-3. Adjustment of the clearance between the shuttle hook and the needle	15
7-4. Adjustment of the clearance between the driver and the needle	16

7-5. Adjustment of the shuttle race thread guide.....	17
7-6. Adjustment of the presser foot.....	17
7-6-1. Adjustment of the presser foot position.....	18
7-6-2. Adjustment of the presser foot lift during the sewing.....	19
7-6-3. Adjustment of the presser foot timing.....	20
7-7. Adjustment of the wiper.....	21
7-8. Adjustment of the bobbin winder.....	22
7-9. Adjustment of the work holder presser.....	22
7-10. Adjustment of the trimmer cam follower.....	23
7-11. Adjustment of the position for movable knife.....	23
7-12. Adjustment of the fixed knife position.....	24
7-13. Adjustment of the thread take up spring.....	24
7-14. Adjustment of the thread tail after the trimming.....	25
7-15. Adjustment of the upper thread tension release.....	25
7-16. Adjustment of the synchronizer.....	25
7-17. Adjustment of the X-Y mechanical home position.....	26
7-17-1. Adjustment of the X direction.....	26
7-17-2. Adjustment of the Y direction.....	27
7-18. Positional correction of X-Y retainer.....	27
<b>8. MAINTENANCE.....</b>	<b>28</b>
8-1. Cleaning.....	28
8-2. Lubrication(grease).....	28
8-3. Disposing of oil waste.....	28
<b>9. TROUBLESHOOTING.....</b>	<b>29</b>
<b>APPENDIX.....</b>	<b>31</b>

# 1. STRUCTURE OF THE SEWING MACHINE

PLK-G1306 electronic pattern sewing machine consists of the following main parts.



- <1> : Sewing machine head   <2> : Tabletop   <3> : Thread stand   <4> : Halt Switch  
<5> : Main shaft motor   <6> : Steel stand   <7> : Operation panel   <8> : Control box  
<9> : Start foot switch   <10> : Work holder switch

## 2. SPECIFICATIONS

Sewing area	: X-direction (left/right) 130mm Y-direction (front / back) 60mm
Maximum sewing speed	: 2,000 rpm *1
Setting speed	: 10 speed levels in 200 rpm to 2,000 rpm
Stitch length	: 0.1 to 20.0 mm
Stitch type	: Single needle lock stitch
Maximum number of needles	: 20,000 per pattern
Storable sewing data item	: 900 patterns (internal memory)
Data memory	: Internal memory, USB memory
Needle bar stroke	: 41.2 mm
Thread take up lever stroke	: 68 mm
Class of needle	: DPX17#18 (at standard installation)
Wiper system	: Back to front wiping system
Presser foot lift *2	: 15 mm
Presser foot stroke*3	: In 2 mm to 10 mm (4 mm as factory default setting)
Work holder lift	: 25 mm
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	: Replenishment with the oil braids from the oil tanks
Lubrication oil	: Pulley SF oil
X-Y drive system	: Stepping motor feedback control Rack and pinion drive system
Machine dimensions	: 1,200mm(W) X 795mm(D) X 1,230mm(H)
Weight	: 126kg
Type of motor	: XL-G554-20Y
Type of controller	: PLK-G-CU-20M
Type of operation panel	: PLK-G10
Power	: In 200V to 240V single-phrase or three-phrase The power in 110V to 120V or in 380V to 415V is compatible with power unit (option).

\*1 : Sewing speed may be limited by the operation or sewing condition.

When sewing at speeds of over 2,500rpm, use an anti-noise protective equipment as needed.

\*2 : Presser foot lift is the height of the presser foot after the sewing has stopped.

\*3 : Presser foot stroke is the up and down movement of the presser foot while sewing.



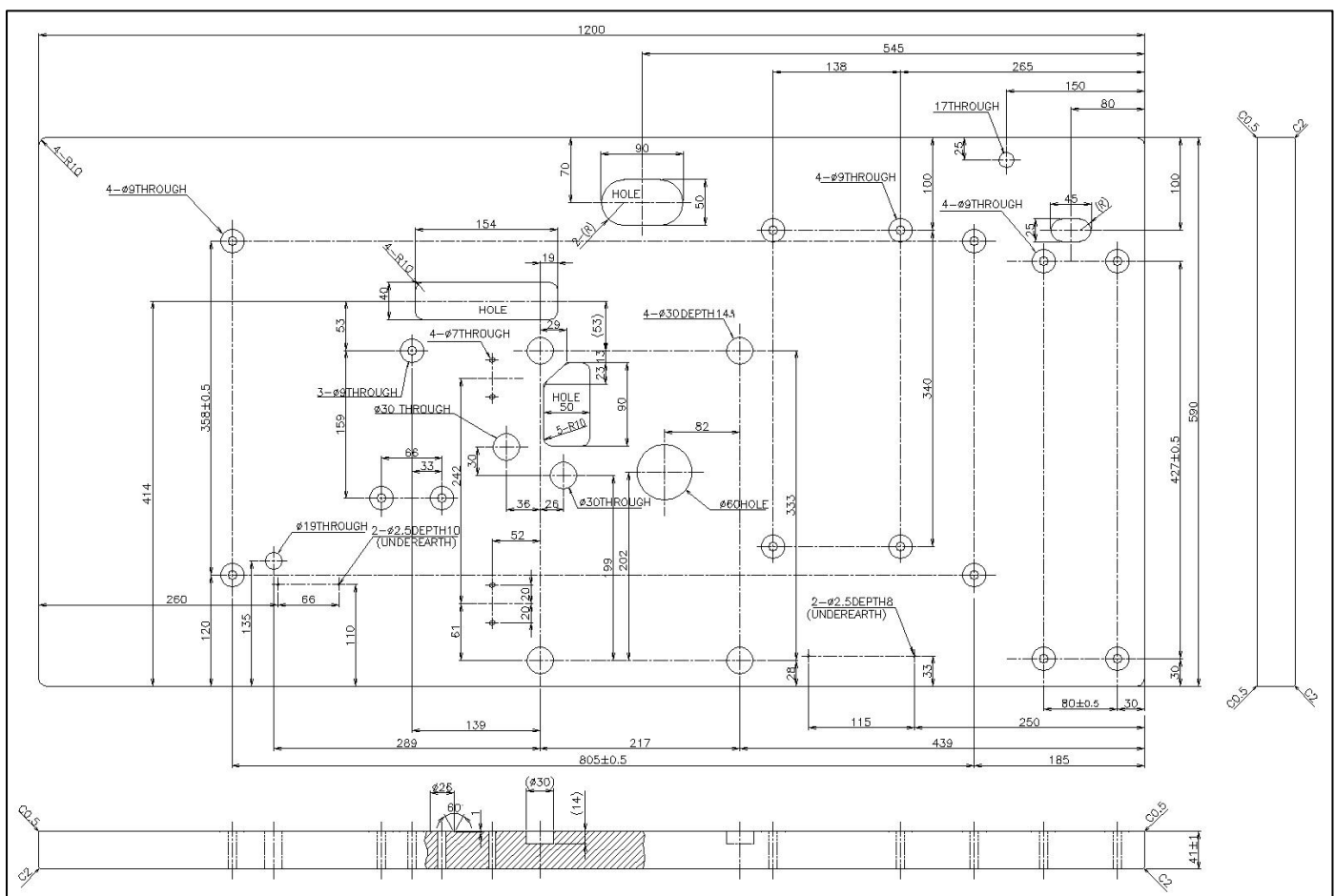
### 3. INSTALLATION

## ⚠ CAUTION

- (1) Please have some specialists, who have enough experience for the sewing machine installations, install the sewing machine.
- (2) Please have a Qualified Electrician perform necessary electric wiring.
- (3) Please do not operate until the sewing machine is repaired when any damage or fault is found on the sewing machine at the installation.
- (4) Please do not refurbish the sewing machine.
- (5) If the table and the steel stand are not MITSUBISHI original, the table and the steel stand have to be strong enough to withstand the weight and Vibration of the sewing machine.
- (6) When fitting the caster to the steel stand that are not MITSUBISHI original, the caster with locking function has to be strong enough to withstand the weight and Vibration of the sewing machine.

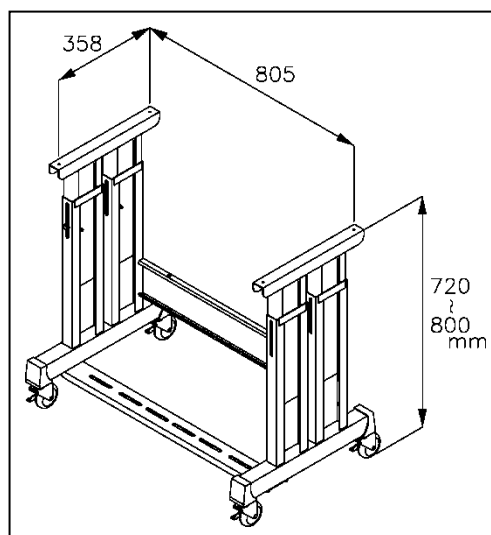
#### 3-1. Preparation of the table

- (1) If the table is not MITSUBISHI original, the thickness of the table is required to have 40mm and that is strong enough to withstand the weight and Vibration of the sewing machine.
- (2) Manufacture the table as shown on the figure below.



### 3-2. Preparation of the steel stand

- (1) If the steel stand is not MITSUBISHI original, please refer to the dimensions shown on the figure at the right.
- (2) When fitting the caster to the steel stand, the steel stand has to be strong enough to withstand the weight and Vibration of the sewing machine.
- (3) If the steel stand is MITSUBISHI PLK-G1010 original, assemble the steel stand with the assembling instructions enclosed in the packing.



### 3-3. Installation of the motor

In the case of purchasing sewing machine 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

Install the control box with the instructions in the paragraph "[3] Installation" in the CONTROL UNIT technical manual.

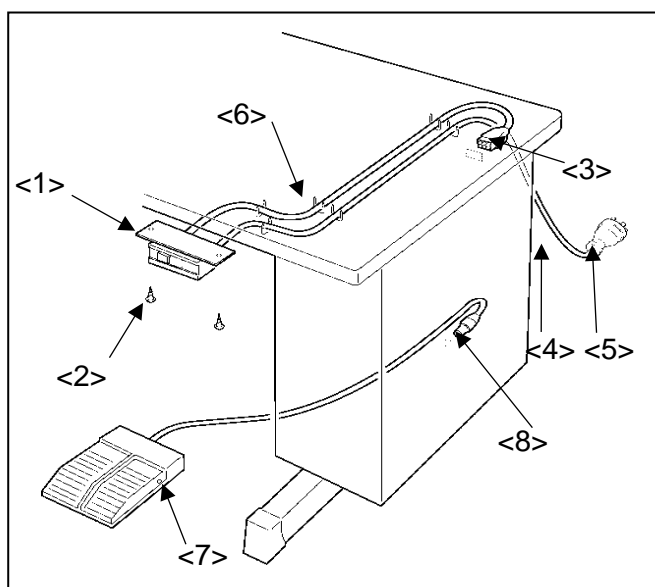
### 3-5. Installation of the operation panel

Connect the operation panel PLK-G10 with the CON A on the rear of the control box.

As for the control box connector, refer to the instructions in the paragraph "3-11.Connection of the electric cables" in this manual.

### 3-6. Installation of the power switch and foot switch

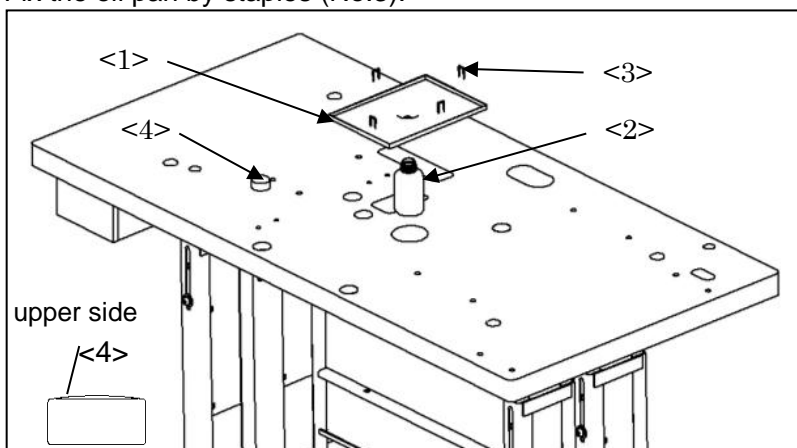
- (1) Mount the power switch (No.1) with the wood screw (No.2) at the position as shown on the figure.
- (2) Hook up the connector (No.3) of the power switch to the control box CON B.
- (3) Attach the power plug (No.5) to the incoming electrical cable (No.4).
- (4) Fix the electric cables with the staples (No.6) to prevent the cables from hanging down.
- (5) Hook up the connector (No.8) of the foot switch (No.7) to the control box CON H.
- (6) As for the control box connector, refer to the instructions in the paragraph "3-12.Connection of the electric cables" in this manual.



- <1>: Power switch
- <2>: Wood screw
- <3>: Power switch connector
- <4>: Electrical cable
- <5>: Power plug
- <6>: Staple (6)
- <7>: Foot switch
- <8>: Foot switch connector

### 3-7. Installation of the oil pan

- (1) Put the oil pan (No.1) on the table where oil drops from machine head.
- (2) Fix the oil pan by staples (No.3).



- <1> : Oil pan
- <2> : Oil bottle
- <3> : Staples
- <4> : Rubber cushion

### 3-8. Installation of the machine head

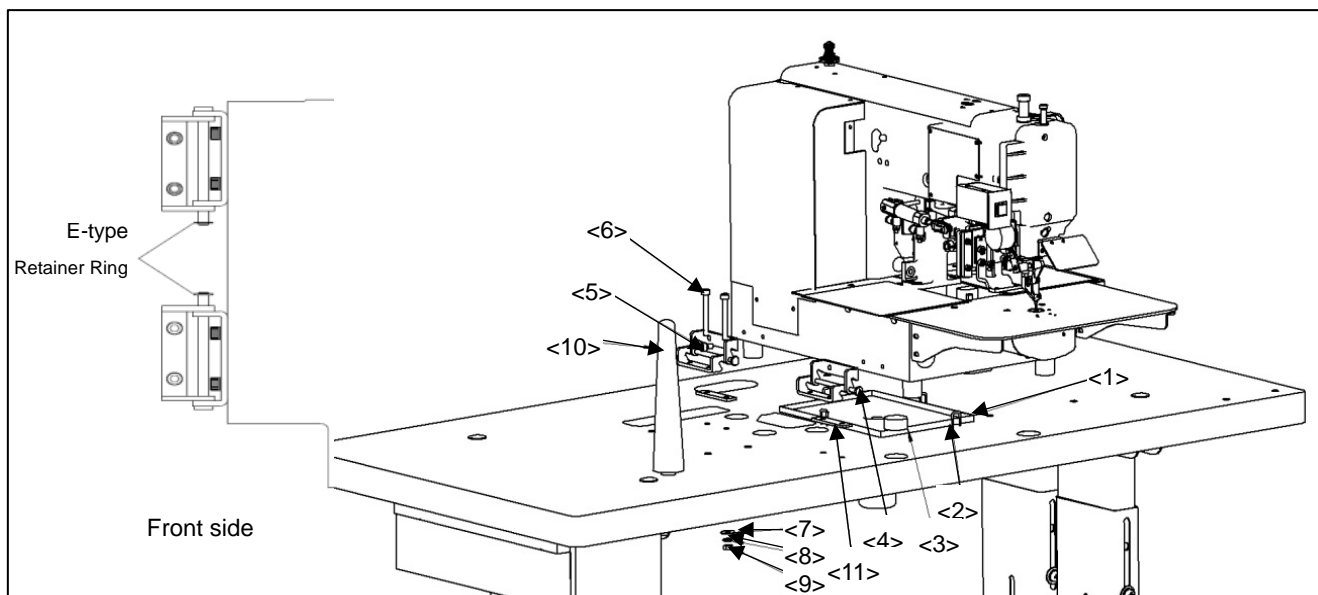
## ⚠ CAUTION

(1) The sewing machine is heavy. For the safety, please make sure to install the sewing machine head by more than one person.

(2) When tilting the sewing machine, please stand at the hinge side and hold the sewing machine with both hands. Also, please lock the caster on the steel stand.

(3) When tilting the sewing machine, the work clamp slides toward the hinges. Remember to move the work clamps Fully to the right side of the casting before placing the sewing head in the sewing position.

- (1) Insert the rubber cushions (No.3) into the table.
- (2) Put the machine head carefully on the rubber cushions.
- (3) Fix the hinges (No.4) by short bolts (No.5) to the machine head ,refer to the figure.
- (4) Fix the hinges by long bolts (No.6),washer(No.7),spring washer(No.8) and nuts(No.9) to the table.  
The sewing machine might fall when hinges attached in mistake direction.
- (5) Insert the head rest (No.10) into the table..



- |                     |                    |                      |                        |
|---------------------|--------------------|----------------------|------------------------|
| <1> : Oil pan       | <2> : Staples      | <3> : Rubber cushion | <4> : Hinge(2)         |
| <5> : Short bolt(4) | <6> : Long bolt(4) | <7> : Washer(4)      | <8> : Spring washer(4) |
| <9> : Nut(4)        | <10> : Head rest   | <11> : Spacer        |                        |

### 3-9. Installation of the V-belt

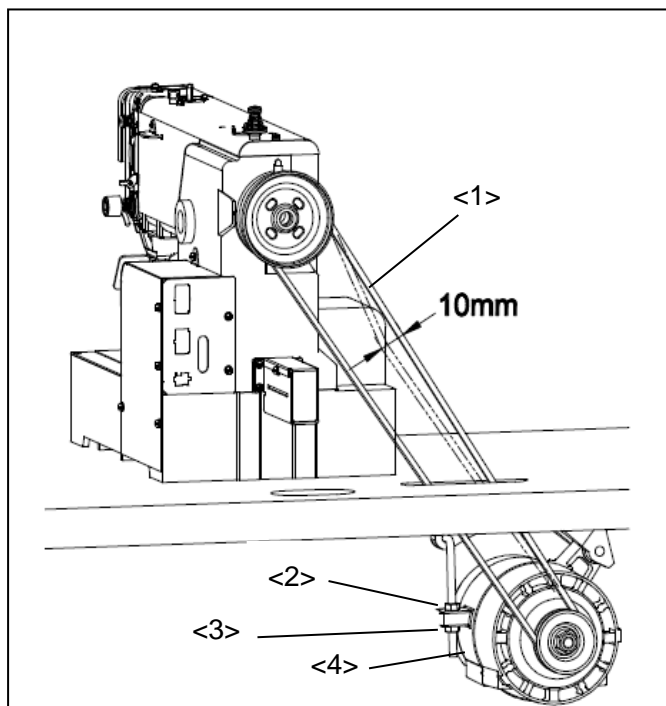
## ⚠ CAUTION

- (1) For safety purposes, tilting or raising of the sewing must always be carried out by two or more workers. Apply a stopper on the leg casters to prevent the table from moving, and then securely support the bed base and the sewing machine head.
- (2) Hold the work holder frame to prevent it from dropping down when tilting the sewing machine.

- (1) Lay the machine head, and hold it with the head rest.
- (2) Set the V- belt (No.1) to each belt pulley of the sewing machine and the motor ,refer to the figure.
- (3) Push the V-belt center by the power of 0.1N.

If the V-belt tension is proper, it should be bent about 10mm.

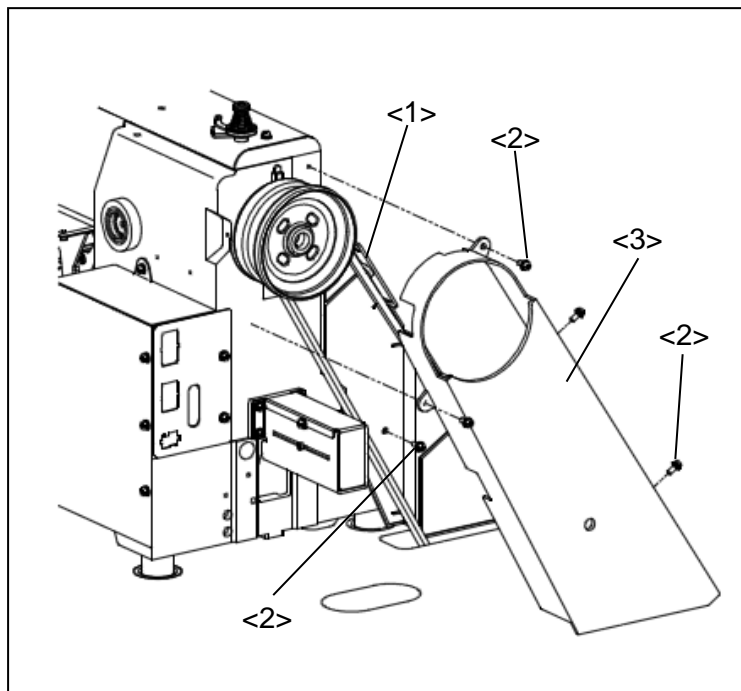
- (4) The tension adjustment is done by loosening the upper nut (No.2) and lower nut (No.3) and moving up and down the motor (No.4). Tighten the nut firmly after it adjusts it.
- (5) Install the pulley cover of the motor at the end.



- <1>: V-belt
- <2>: Upper nut
- <3>: Lower nut
- <4>: Motor

### 3-10. Installation of the belt cover

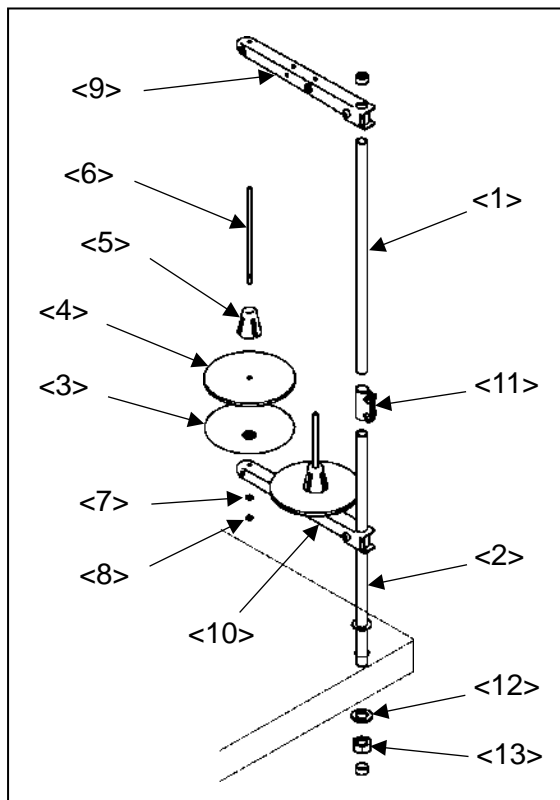
- (1) Attach the small cover (No.1) by screw (No.2) to the machine head loosely.
- (2) Fix the large cover (No.3) by screws (No.2) to the machine head.
- (3) Fix the small cover at the end. Put the driver in the large cover hole and turn the screw.



- <1>: Small cover
- <2>: Screw (5)
- <3>: Large cover

### 3-11. Installation of the thread stand


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



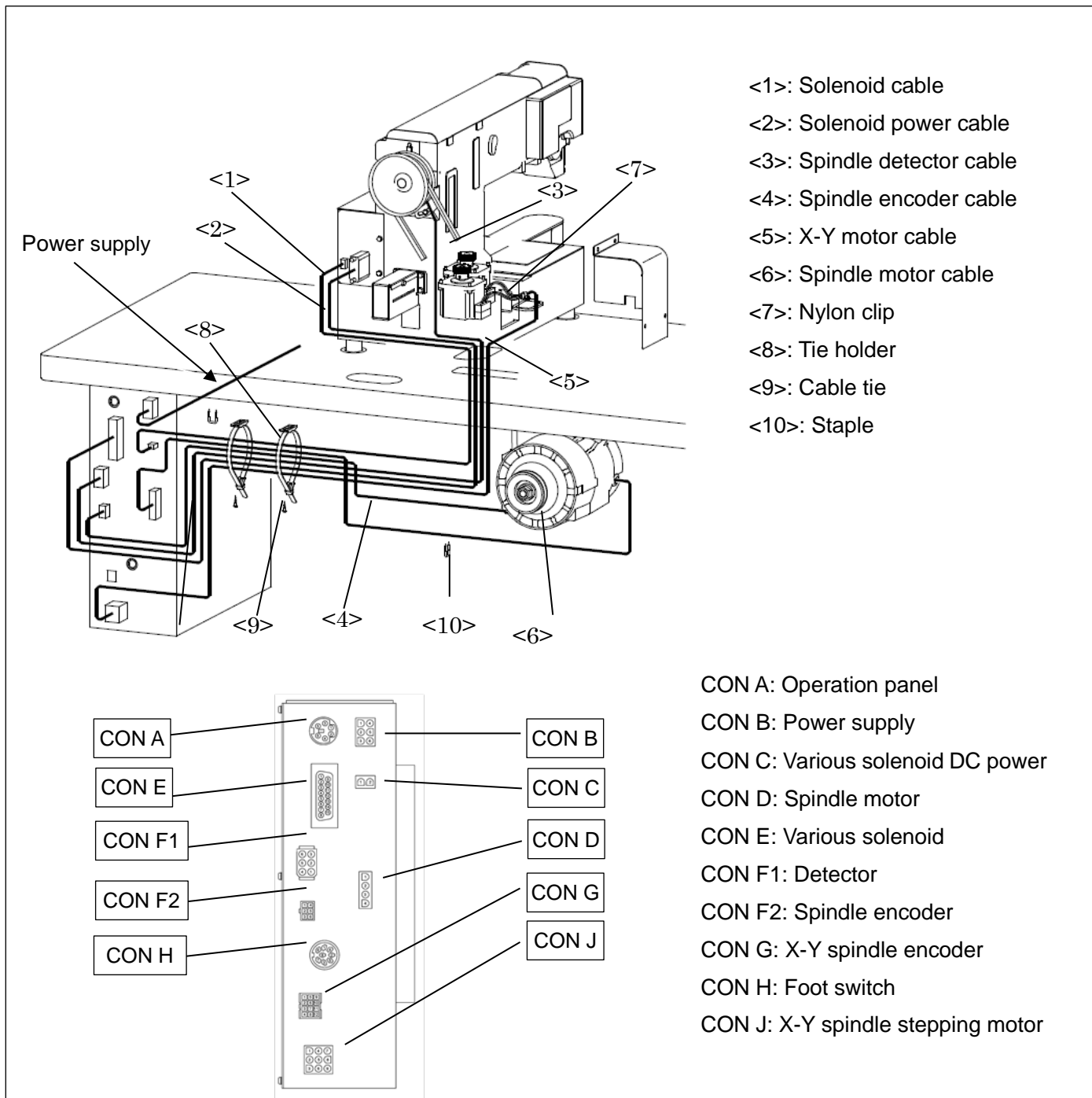
- <1>: Upper column pipe
- <2>: Lower column pipe
- <3>: Spool stand base (2)
- <4>: Spool mat (2)
- <5>: Spool holder (2)
- <6>: Spool shaft (2)
- <7>: Spring washer (2)
- <8>: Nut (4)
- <9>: Thread hunger
- <10>: Spool holder
- <11>: Column joint
- <12>: Washer
- <13>: Nut

### 3-12. Connection of the electric cables

## ⚠ CAUTION

Please make sure to ground the place where there is a  mark. Failure to do so may cause electric shock and/or malfunction.

- (1) Connect the machine head and the control box with cables as shown on the figure.
- (2) Hold the dangling cables under the table with accessory tie holders <8> and cord ties <9>. At this time, please check whether the cables are not pulled when tilting the sewing machine.



## 4. LUBRICATION

### CAUTION

- (1) Please make sure to turn power switch off before lubricating.
- (2) Please pay attention that oil does not get on your skin or in your eyes as it may cause an inflammation.
- (3) Please make sure to keep oil out of the reach of children who may drink oil by mistake.

[Notice] Please make sure to lubricate when operating for the first time after the installation.

Also, please make sure to check the amount of oil when the machine has not been used for a long time.

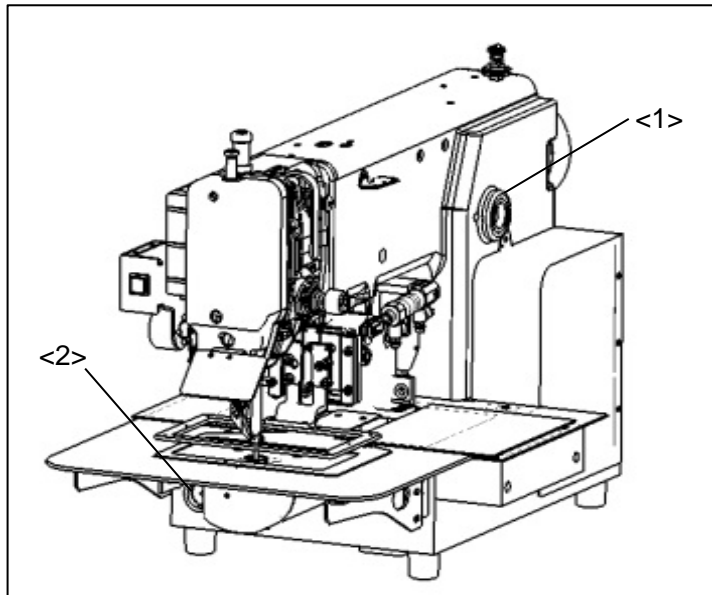
For oil, use "Pulley SF oil" specified by Mitsubishi.

• Refer

Pulley SF oil : Specific gravity(15°C) = 0.86(g/cm<sup>3</sup>)

: Viscosity(40°C) = 18.0(mm<sup>2</sup>/s)

- (1) The oil tanks are set at two places of the machine. Pour oil through the oil holes of (No.1 & No.2) to the oil tanks.
- (2) The oil tanks have level marks (at the center of the tank). Running out the oil may cause the machine to make abnormal noise and seize up. When the amount of oil decreases to one-third or less than one-third, make sure to fill the tank with oil.



## 5. PROPER OPERATION

### 5-1. Initial setting of the control box

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

Refer to the instructions in the paragraph "[3] Initial settings (Language/Model settings)" in the **PLK-G10** technical manual.

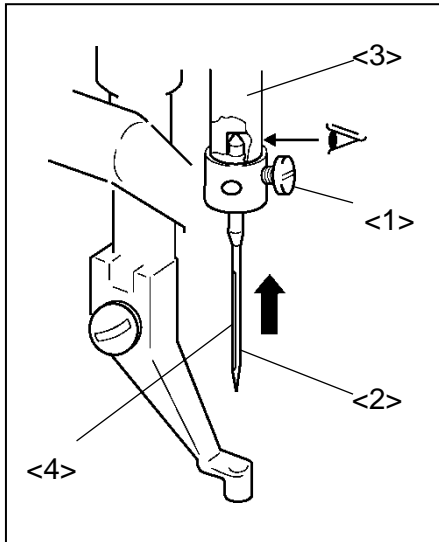
### 5-2. Installation of the needle

### CAUTION

- (1) Please make sure to turn the power switch off before installing or replacing needles.
- (2) Please pay attention for the fingers not to be injured by the needle point.



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



- <1>: Set screw
- <2>: Needle
- <3>: Needle bar
- <4>: Needle groove

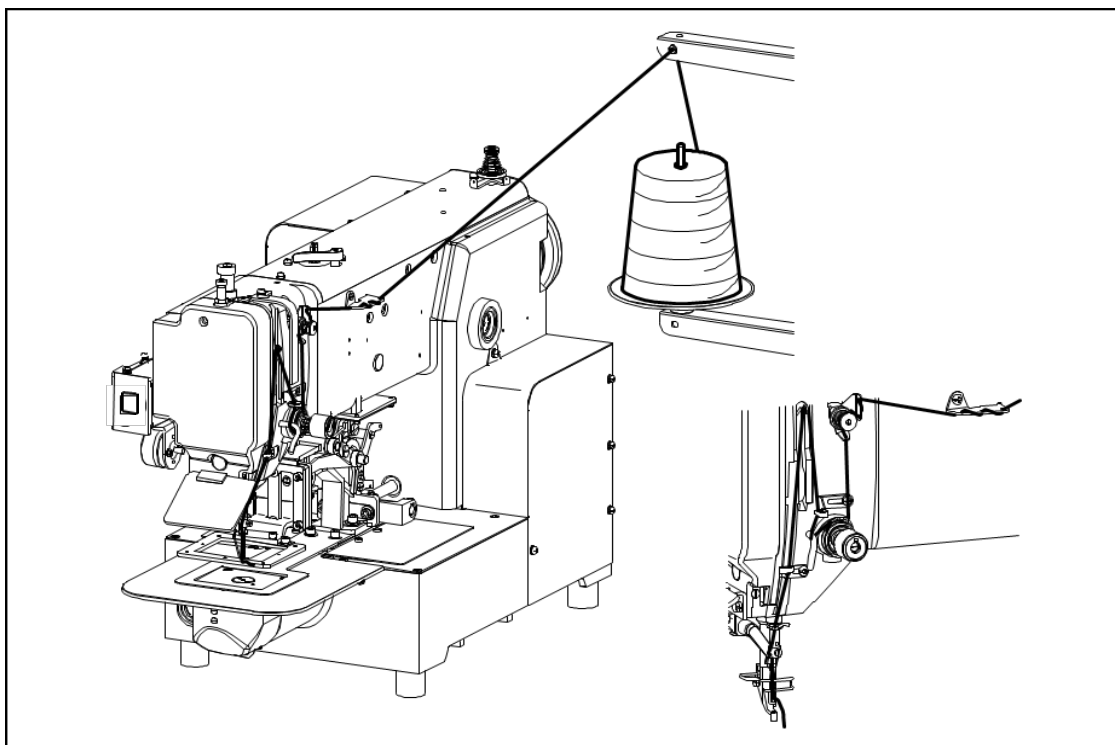
### 5-3. Threading the upper thread



## CAUTION

Please turn the power switch off when threading a needle.

Thread the upper thread as shown on the figure.





## 5-4. Winding the bobbin thread

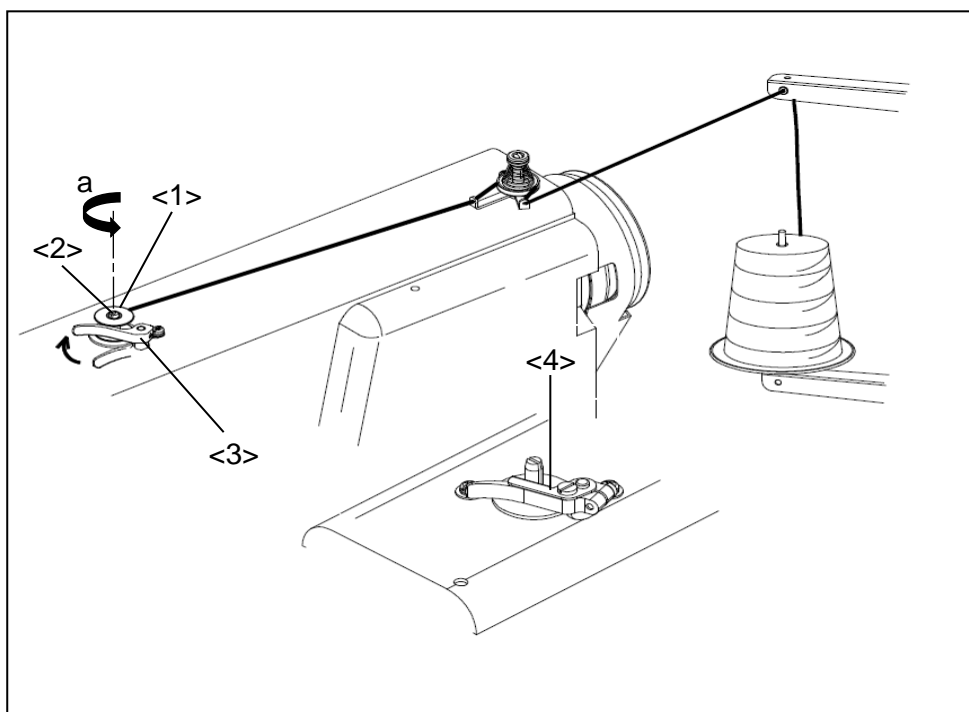
### ⚠ CAUTION

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

[Notice] Please make sure to pull the upper thread out of the needle before winding the bobbin thread.

- (1) Route the thread as shown in the below figure then, wind the thread to the bobbin (No.1) in the direction of "a" arrow several times. Then fit the bobbin to the bobbin winder (No.2) and push in the bobbin presser arm (No.3).
- (2) With the machine in the Bobbin Wind Mode, step on the work holder foot switch first and then the start switch second so that the thread continues winding to the bobbin while the start switch is stepped on.
- (3) When the bobbin finishes winding a certain amount (80 to 90 % of the outside diameter of bobbin) of thread, the bobbin presser arm is returned to the initial position. Adjust the amount of the winding thread with the subsidiary arm (No.4).
- (4) To wind the bobbin thread during the sewing operation, carry out the procedure (1) above then, the bobbin winding is performed automatically.

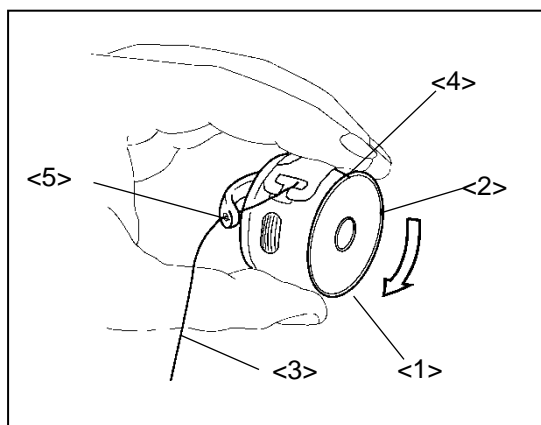
For the bobbin winding mode, refer to the instructions in the paragraph "[4-5] Bobbin winding mode" in the **PLK-G10** technical manual.



- <1>: Bobbin
- <2>: Bobbin winder
- <3>: Bobbin presser arm
- <4>: Subsidiary arm

## 5-5. Setting the bobbin

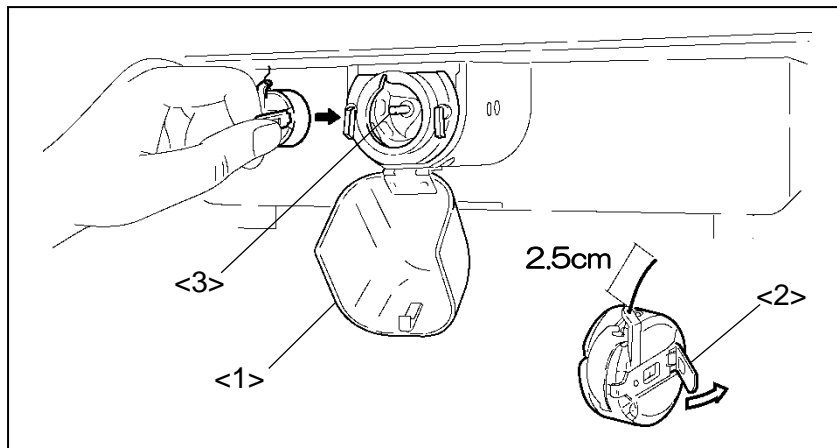
- (1) Insert a full Bobbin (No.2) into the bobbin case (No.1).
- (2) Pull out the bobbin thread (No.3) from the slit (No.4) and pass the thread through the thread hole (No.5). When the bobbin thread is pulled, the pin rotates in the arrow direction shown on the figure. If the pin starts rotating to the opposite direction, turn the bobbin over and reset the bobbin.



- <1>: Bobbin case
- <2>: Bobbin
- <3>: Thread
- <4>: Bobbin case slit
- <5>: Hole of Bobbin case

## 5-6. Setting the bobbin case

- (1) Pull the bobbin thread about 2.5cm out of the thread hole of the bobbin case.
- (2) Open the cylinder cover (No.1).
- (3) Open the bobbin case latch (No.2) and hold it then, fit it securely in the shuttle hook (No.3).



- <1>: Cylinder cover  
<2>: Bobbin case latch  
<3>: Shuttle hook

## 6. SEWING

### CAUTION

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

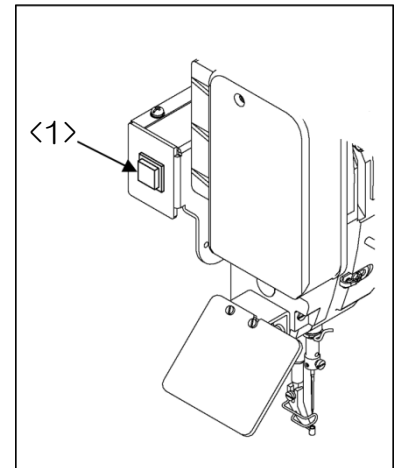
### 6-1. The sewing operation

First read the technical manual "PLK-G10" firmly.  
Prepare "Reading the sewing data" and "Setting of speed", etc.  
Sewing becomes possible according to the following procedures.

- (1) Set the sewing material under the work holder.
- (2) When the black foot switch is stepped on, the work holder goes down.  
(When the sewing material has to be reset, step the black color foot switch again to make the work holder go up.)
- (3) Step on the gray color start switch so that the sewing machine starts sewing,
- (4) After the sewing finishes, the work holder is lifted automatically then, the sewing material is released.

## 6-2. Operation of the halt switch

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

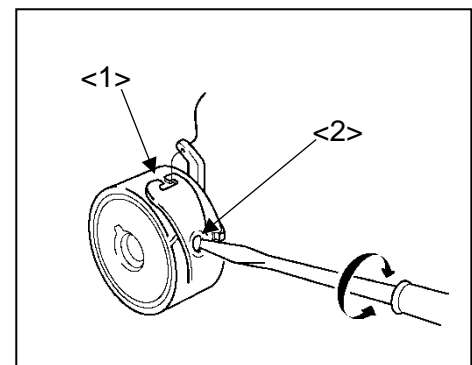


<1> : Halt Switch

## 6-3. Adjustment of the thread tension

### (1) Adjustment of 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 when loosening the thread tension adjusting screw (No.2) counterclockwise, and the thread tension becomes tight when tightening the thread tension adjusting screw clockwise.

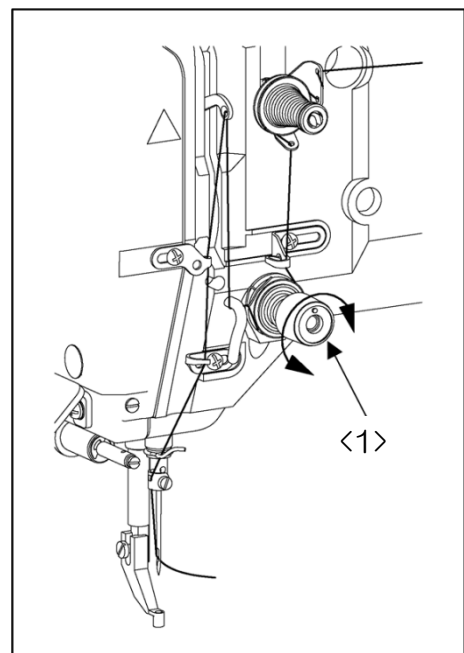


<1>: Bobbin case

<2>: Thread tension adjusting screw

### (2) Adjustment of upper thread tension

Adjust the upper thread tension corresponding to the bobbin Thread tension. The upper thread tension becomes tight when tightening the thread tension adjusting nut (No.1) clockwise, and the upper thread tension becomes loose when loosening the thread tension adjusting nut counterclockwise.



<1>: Thread tension adjusting nut

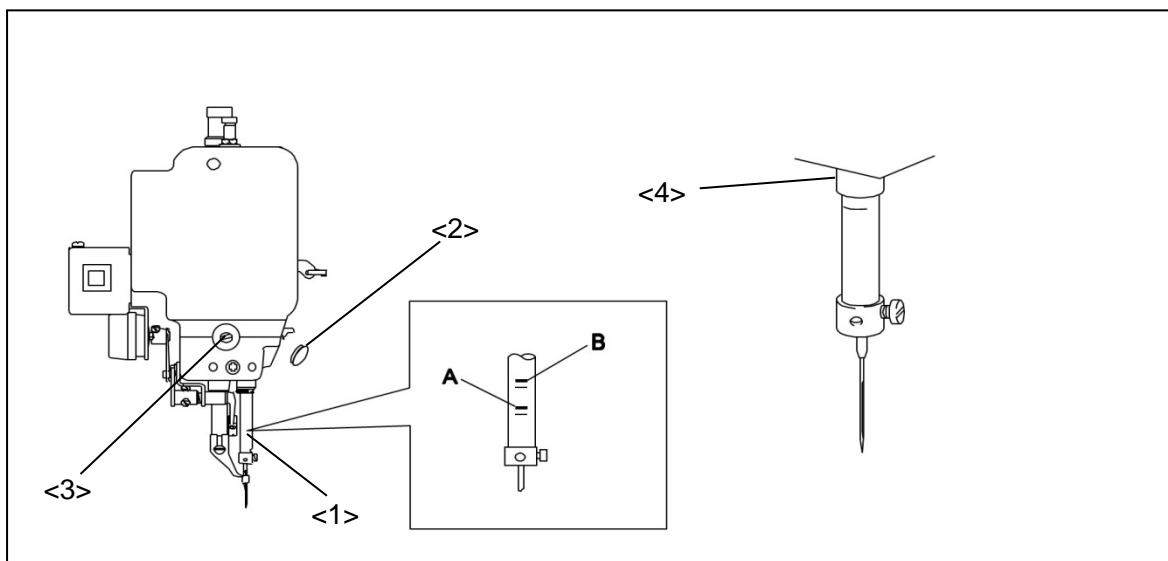
## 7. STANDARD ADJUSTMENT

### ⚠ CAUTION

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

#### 7-1. Adjustment of the needle bar position

- (1) Turn the power switch off then, stop the needle bar (No.1) at the lowest position.
- (2) Move the needle bar to the position where the needle bar timing mark "B" is matched to the needle bar bushing (No.2) bottom line. (For the needle class DP×5)
- (3) If the position of the needle bar timing mark "B" is not matched to the needle bar bushing bottom line, remove the rubber plug (No.3) from the face cover then, loosen the needle bar holder set screw (No.4).
- (4) For the needle class DP×17, move the needle bar to the position where the needle bar timing mark "A" is matched to the needle bar bushing bottom line.



<1>: Needle bar

<2>: Needle bar bushing

<3>: Rubber plug

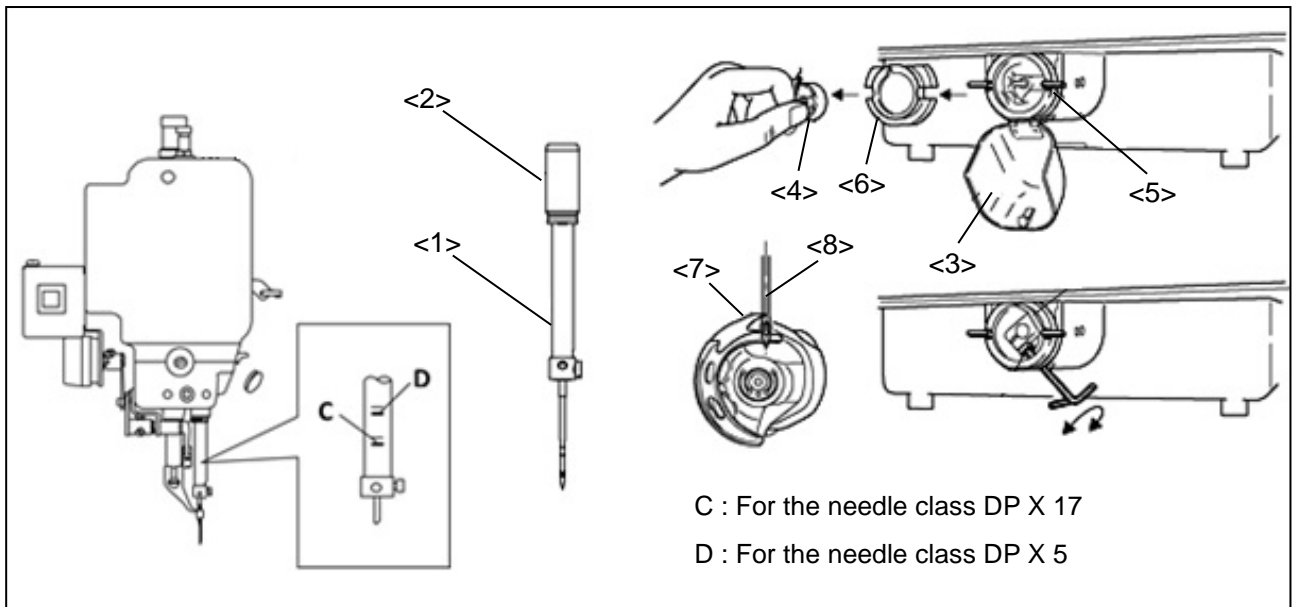
<4>: Needle bar holder set screw

Timing mark A: For the needle class DP×17

Timing mark B: For the needle class DP×5

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

- (1) Turn the power switch off. Move up the needle bar (No.1) from the lowest position then, stop the needle bar at the position where the needle bar timing mark C is matched to the needle bar bushing (No.2) bottom line. (For the needle class DP×17)
- (2) Open the cylinder cover (No.3).
- (3) Remove the bobbin case (No.4).
- (4) Turn the hook retainer arm (No.5) then, remove the hook retainer (No.6).
- (5) Adjust the shuttle hook (No.7) point to match with the center line of the needle (No.8). The matched position is standard.

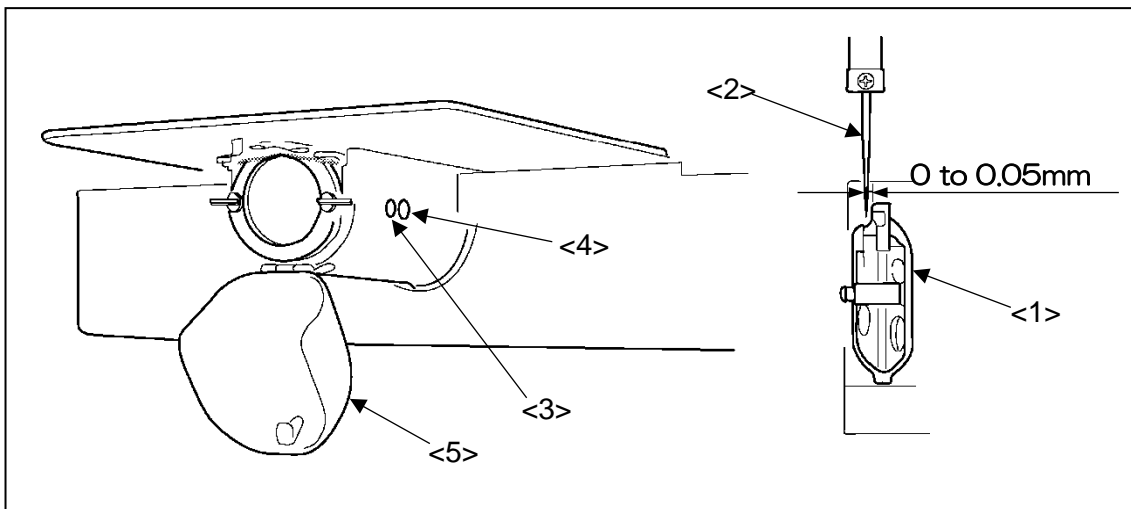


<1>: Needle bar    <2>: Needle bar bushing    <3>: Cylinder cover    <4>: Bobbin case    <5>: hook retainer arm  
<6>: Hook retainer    <7>: Shuttle hook    <8>: Needle

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

- (1) Take the same procedure described in (1) to (4) of above paragraph 7-2.
- (2) Set the clearance between the shuttle hook (No.1) point and the needle (No.2) in 0 to 0.05mm, standard position.
- (3) Loosen the shuttle race set screw (No.3) and turn the eccentric pin (No.4) to move the hook entirely back and forth for adjustment. Adjust the clearance to be standard, and tighten set screw (No.3). (\*1)
- (4) After adjusting, check that the pulley can be turned lightly by hand.

\*1: Be careful not to tighten the shuttle race set screw (No.3) excessively because a load is applied to the rotating shaft and it causes trouble.

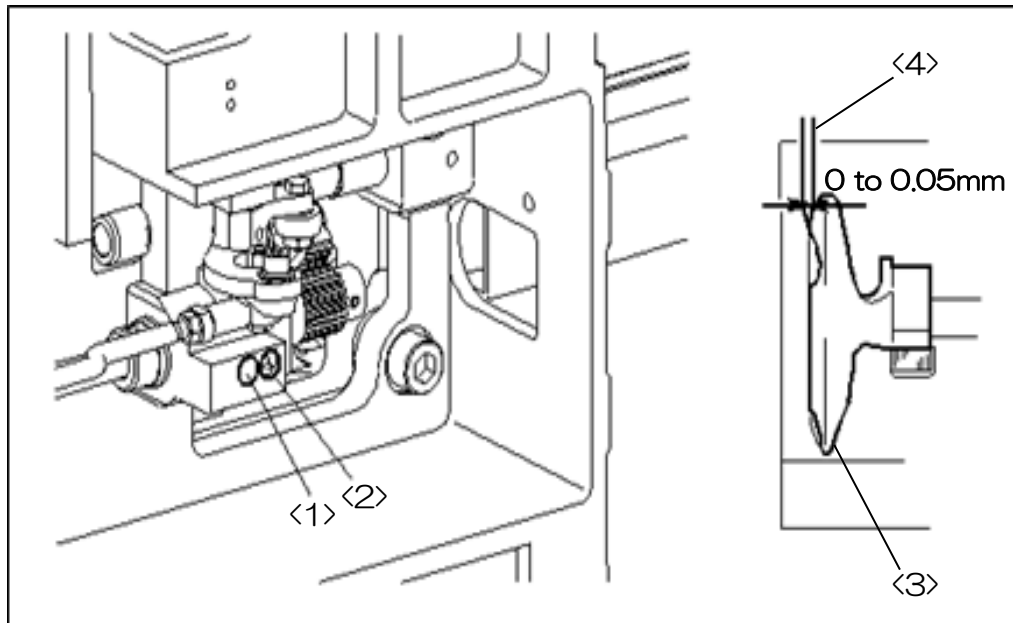


<1>: Shuttle hook    <2>: Needle    <3>: Shuttle race set screw  
<4>: Eccentric pin    <5>: Cylinder cover

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

- (1) Take the same procedure as above paragraph 7-2. from (1) to (4).
- (2) Check the clearance between the shuttle hook point and the needle has been adjusted in 0 to 0.05 mm.
- (3) Loosen the lower shaft bushing screw (No.1) and turn the eccentric pin (No.2) so that the driver (No.3) moves back and forth. Adjust the clearance between the needle (No.4) and the driver (No.3) in 0 to 0.05mm, and tighten set screw (No.1). (\*1)
- (4) After adjusting, check that the pulley can be turned lightly by hand.

\*1: Be careful not to tighten the lower shaft bushing screw (No.1) excessively because a load is applied to the rotating shaft and it causes trouble.



<1>: Lower shaft bushing screw

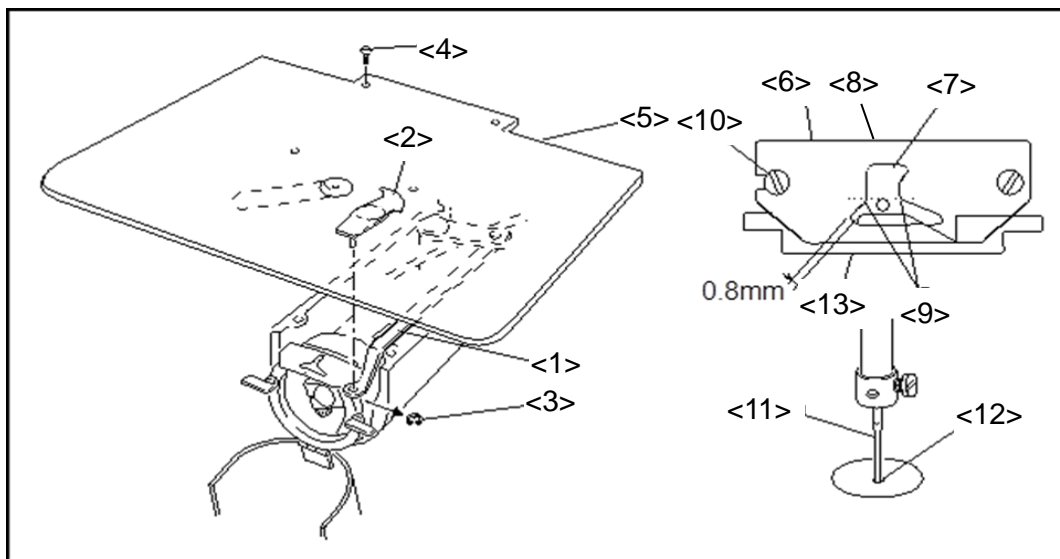
<2>: Eccentric pin

<3>: Driver

<4>: Needle

## 7-5. Adjustment of the shuttle race thread guide

- (1) Remove the ring-E type (No.3) which is engaging the movable knife (No.2) and the trimmer link (No.1).
- (2) Loosen the set screw (No.4) and remove the sliding plate (No.5) so that the shuttle race thread guide (No.6) shown on the figure appears.
- (3) Loosen the set screws (No.10) to match the hole in the shuttle race thread guide (No.6) with the needle bar center line so that the shoulder (No.9) of the shuttle race thread guide matches with the rear side line (No.8) of the needle. At this time, make sure that there is a clearance between the hook retainer and the shuttle race thread guide (No.6) at least the thread can be passed through. (The standard clearance is 0.8mm.) The wide clearance causes the trimming failure.
- (4) After the adjustment, assemble the place with the reverse procedure. Make sure to set the sliding plate (No.5) at this time so that the needle (No.11) comes down to the center of the needle hole (No.12) of the needle plate.



- <1>: Trimmer link    <2>: Movable knife    <3>: Ring-E type  
<4>: Set screw    <5>: Sliding plate    <6>: Shuttle race thread guide  
<7>: Hole of shuttle race thread guide    <8>: Needle bar center line  
<9>: Shoulder    <10>: Set screw    <11>: Needle

## 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.



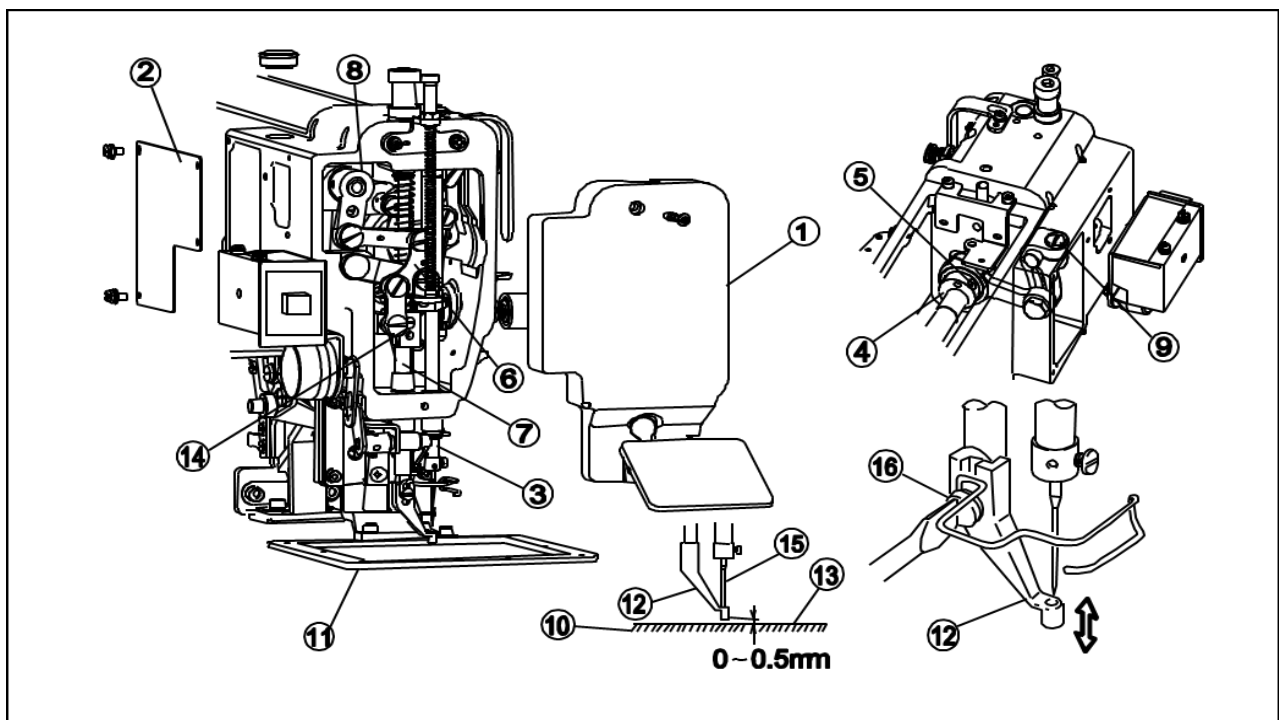
## 7-6-1. Adjustment of the presser foot position

**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 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 in 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 (No.13) 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 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

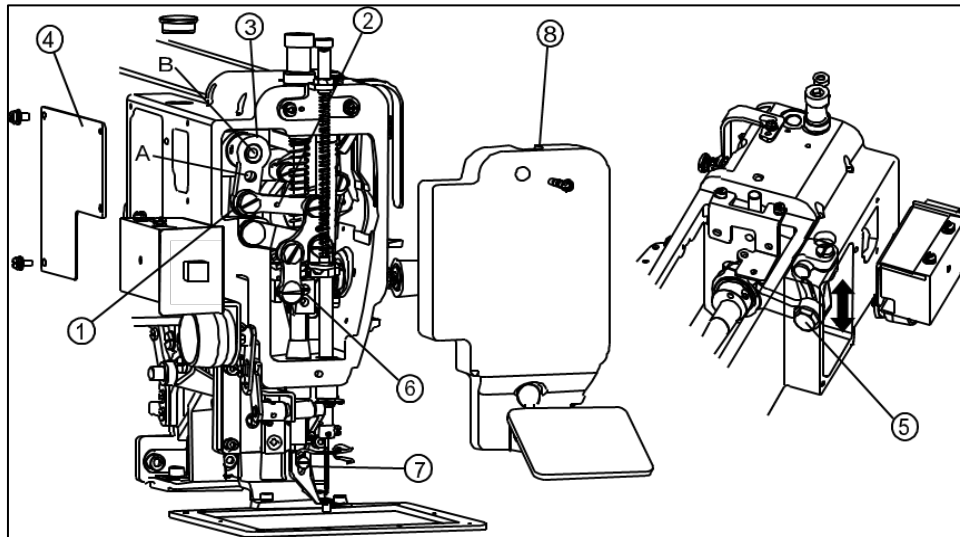
**NOTE** The presser foot lift during the sewing can be adjusted 0 and 2~10mm.

- (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 2~4mm if the connection is made with A hole, and it becomes 0mm if the connection is made with B hole.

The walk at zero requires the exclusive parts (Option).

Please feel free to contact the sewing machine stores.

- (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 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 loosening 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 cover (No.4) and the face plate (No.8) back on the original location.

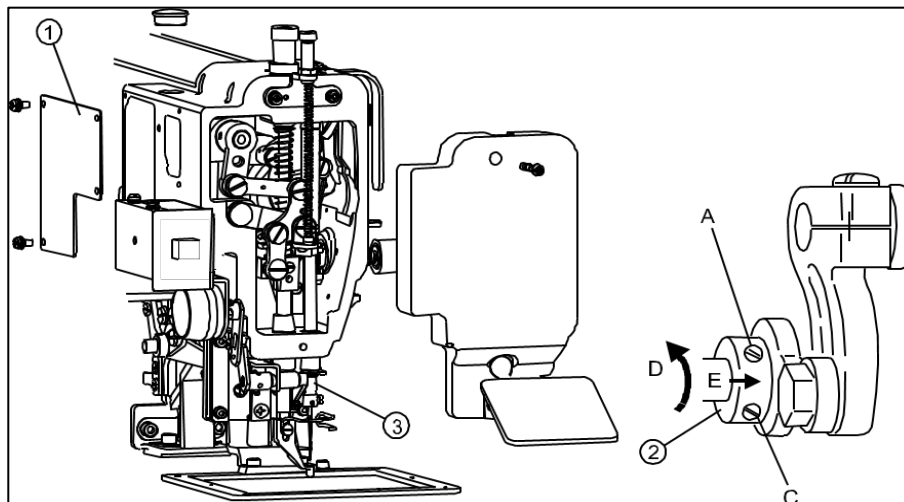


### 7-6-3. Adjustment of the presser foot timing

**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.

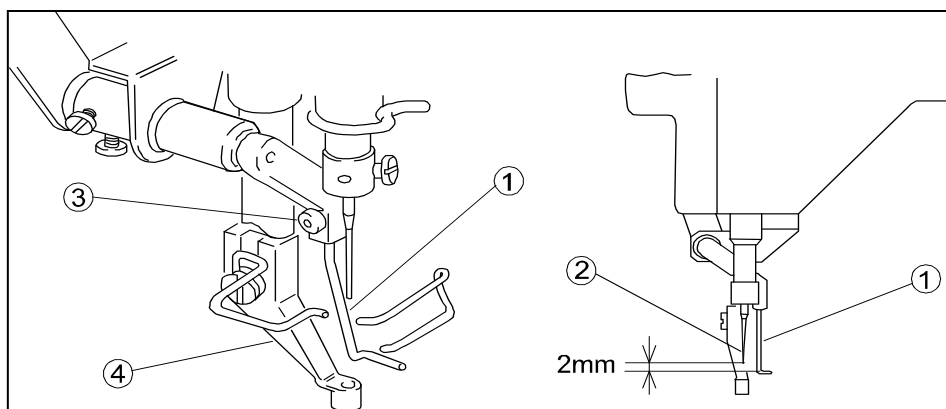
For example, the delay of the presser foot timing against the needle movement prevents the skip stitches especially to the thin materials, and the advance of the presser foot timing can improve the seam tightness especially to the thick materials.

- (1) Remove the 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 cover (No.1) back on the original location.



## 7-7. Adjustment of the wiper

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 2mm 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).

## 7-8. Adjustment of the bobbin winder

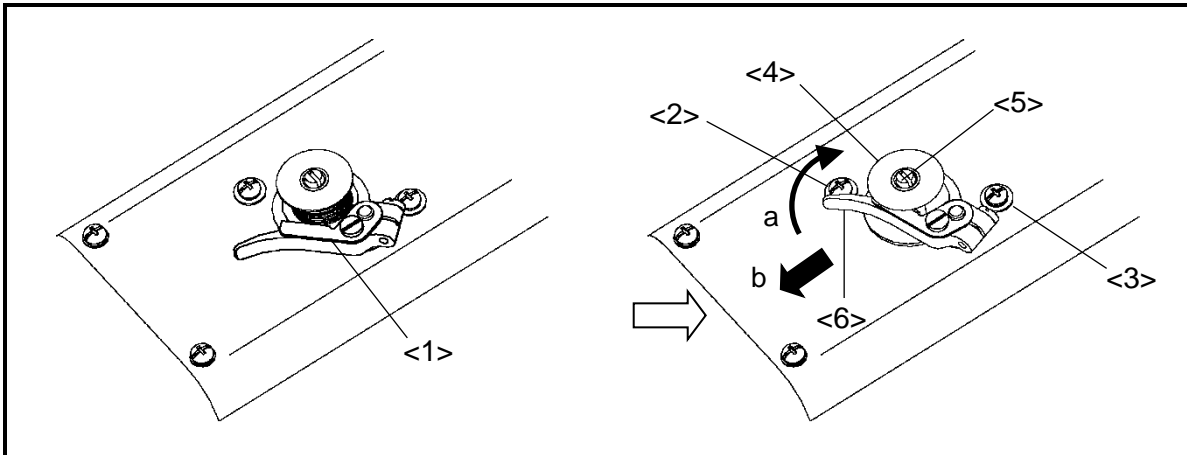
### (1) Adjustment of the winding volume

Adjust the amount of the winding thread with the subsidiary arm (No.1).

The winding volume is adjusted 80 to 90% 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.2) and (No.3) of the bobbin winder and put the empty bobbin (No.4) on the rotating shaft (No.5) then, push the adjusting lever (No.6) to the arrow direction "a". Secondary, move the whole bobbin winder to the arrow direction "b" and stop it at the position where the empty bobbin is rotated then, tighten the setscrews (No.2) and (No.3) of the bobbin winder. This is the proper position of the bobbin winder.

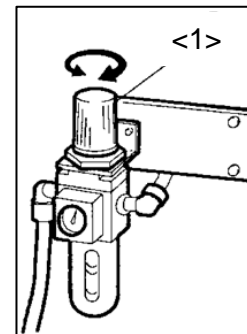


## 7-9. Adjustment of the work holder presser

The work holder presser is generated by air pressure.

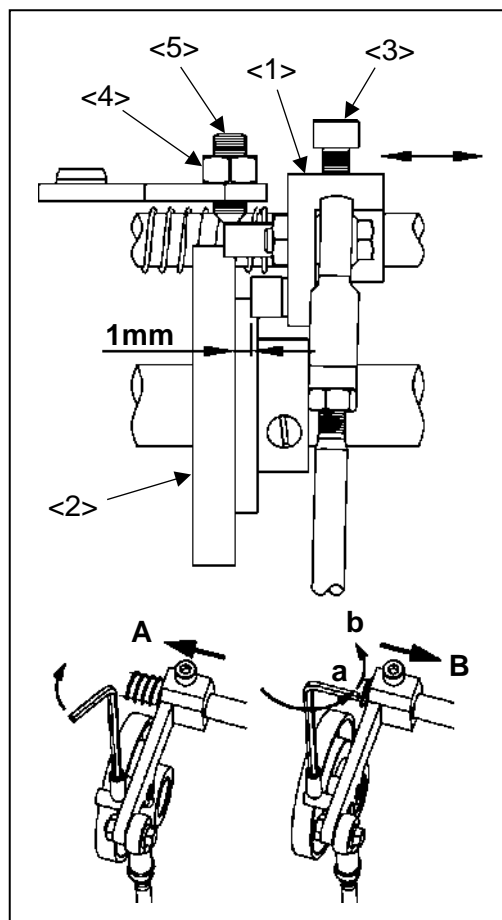
Control the air pressure with the adjusting knob (No.1) of the air regulator located underneath the table.

If turn the adjusting knob (No.1) to the clockwise, the air pressure is increased and the work holder pressure is also increased simultaneously. If turn the adjusting knob (No.1) to the counterclockwise, the air pressure is decreased and the work holder pressure also decreased simultaneously. 390kPa (4kgf/cm<sup>2</sup>) is the standard air pressure as a normal sewing operation.



## 7-10. Adjustment of the trimmer cam follower

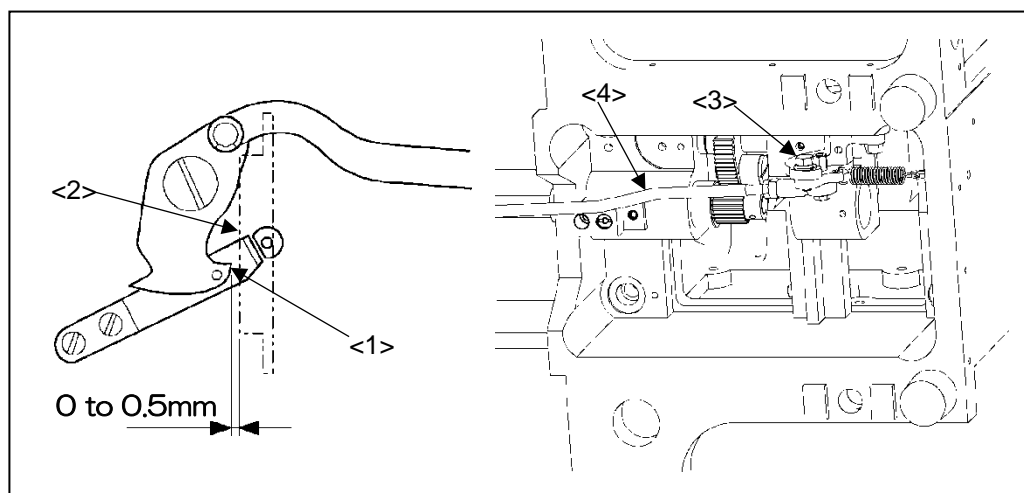
- (1) Turn the power switch off and remove the top cover.
- (2) Loosen the arm set screw (No.3) to adjust the cam follower (No.1) with a cam groove clearance of about 1mm between the cam follower and the trimmer cam (No.2).
- (3) Loosen the nut (No.4) for turning the adjust screw (No.5).
- (4) Turn the pulley so that the needle bar moves to the lowest position.
- (5) Push the cam follower arm (No.1) to the arrow direction "A" and put the cam into the cam groove of the trimmer cam (No.2).
- (6) When tightening the adjust screw (No.5) in the condition described above, the cam follower is pushed into the cam groove then, the cam follower arm (No.1) is not returned even when releasing the cam follower arm .
- (7) When loosening the adjust screw (No.5) to the point "a" shown on the figure, the cam follower arm (No.1) goes back to the position in the direction "B"  
Loosen the nut (No.4) from the point "a" to "b", 90-degree turns, and then fix the adjust screw (No.5).



<1>: Cam follower arm   <2>: Trimmer cam  
<3>: Arm set screw   <4>: Nut   <5>: Adjust screw

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

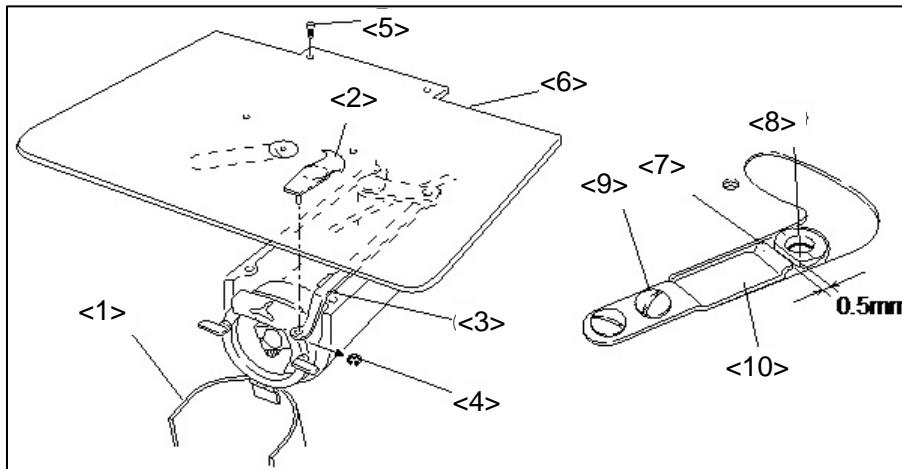
- (1) Tilt the sewing machine head and open the cylinder cover.
- (2) Check the movable knife (No.1) whether the movable knife is at the standard home position 0 to 0.5mm far from the front face of the shuttle hook retainer (No.2).
- (3) For the adjustment of the movable knife point, loosen the hexagon head bolt (No.3) and move the horizontal thread trimmer rod (No.4) then, adjust the position of the movable knife point.



<1>: Movable knife   <2>: Shuttle hook retainer  
<3>: Hexagon head bolt   <4>: Horizontal thread trimmer rod

### 7-12. Adjustment of the fixed knife position

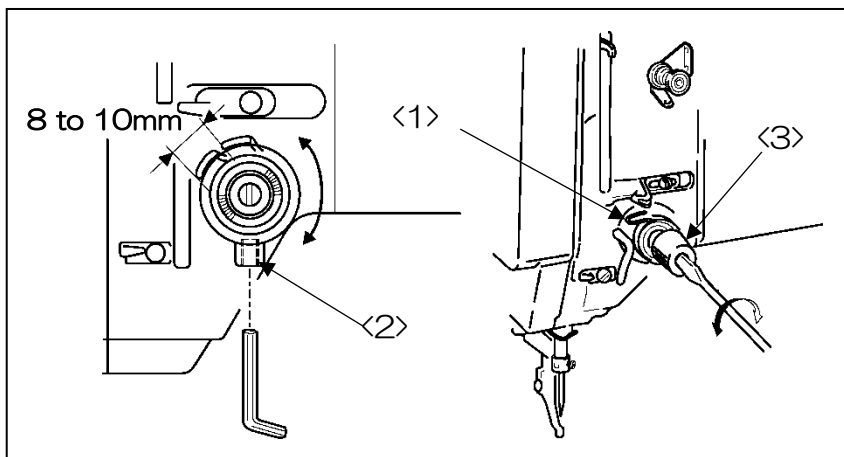
- (1) Open the cylinder cover (No.1) and remove the ring-E type (No.4), which engages the movable knife (No.2) and the thread trimmer link (No.3).
- (2) Loosen the screw (No.5) then, remove the slide plate (No.6).
- (3) Adjust the fixed knife (No.7) position to be positioned for the blade edge to have the clearance 0.5mm from the edge of the needle plate (No.8), which is standard position.
- (4) For the adjustment of the fixed knife (No.7) position, loosen the screw (No.9) and move the knife.



- <1>: Cylinder cover
- <2>: Movable knife
- <3>: Thread trimmer link
- <4>: Ring-E type
- <5>: Screw
- <6>: Slide plate
- <7>: Fixed knife
- <8>: Needle plate
- <9>: Screw

### 7-13. Adjustment of the thread take up spring

- (1) Loosen the set screw (No.2) and turn the whole thread tension regulator (No.3) then, adjust the thread take up spring (No.1) stroke to be in 8 to 10mm, which is standard stroke.
- (2) Insert the screw driver into the slit of the thread tension regulator and adjust the thread take up spring tension. When tightening the screw driver clockwise, the thread take up spring tension becomes tight, and when loosening the screw driver counterclockwise, the thread take up spring tension becomes loose. For the adjustment of the thread take up spring tension, tighten the set screw (No.2) so that the whole thread tension regulator does not turn.

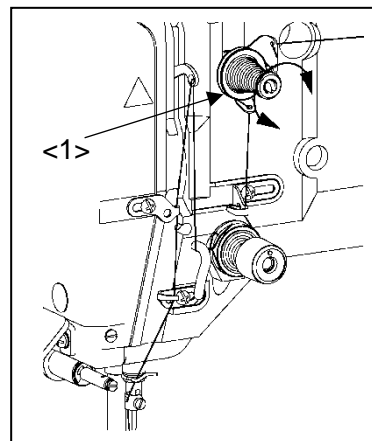


- <1>: Thread take up spring
- <2>: Set screw
- <3>: Thread tension regulator

#### 7-14. Adjustment of the thread tail after the trimming

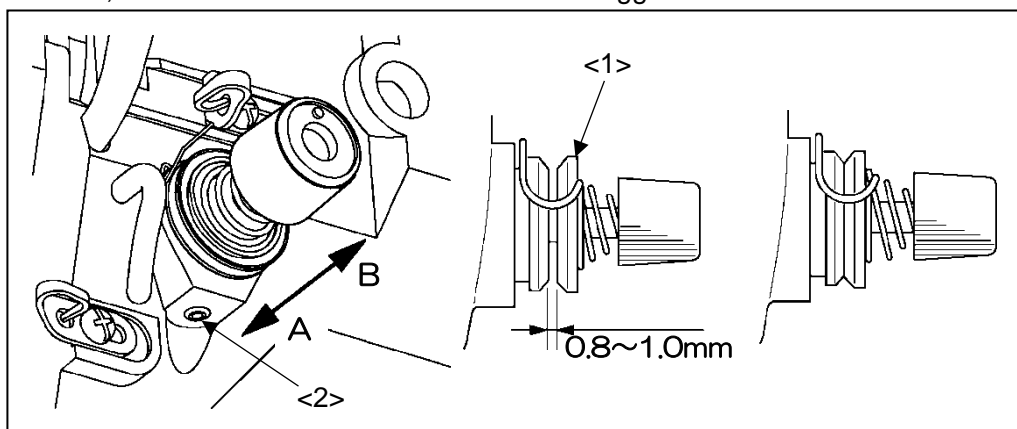
- (1) Adjust the thread tail with the pre-tension (No.1).
- (2) When turning the nut clockwise, the thread tail becomes shorter. When turning the nut counterclockwise, the thread tail becomes longer.

<1>: Pre-tension



#### 7-15. Adjustment of the upper thread tension release (the width between thread tension discs)

- (1) When the upper thread tension is released, the thread tension discs (No.1) open in 0.8mm to 1.0mm, which is standard width.
- (2) For the adjustment of the upper thread release, loosen the set screw (No.2) and move the whole upper thread tension release to the arrow direction as shown on the figure. When moving the upper thread tension release to the direction "A", the width between the discs becomes bigger.

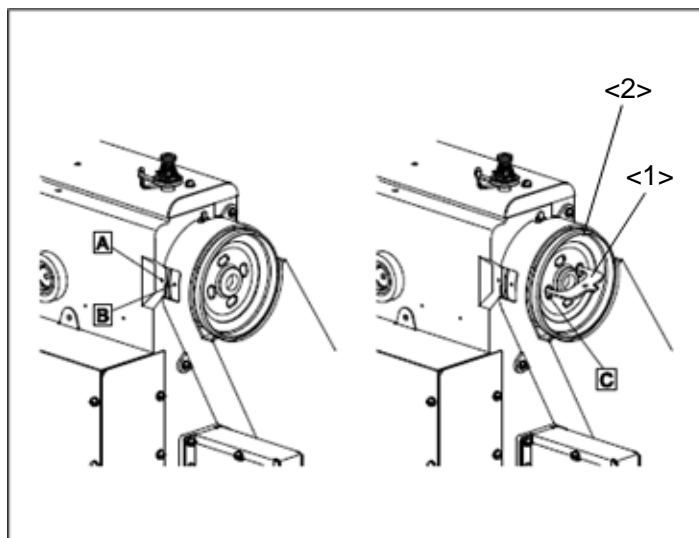


<1>: Thread tension disc <2>: Set screw

#### 7-16. Adjustment of the synchronizer

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 right position. If these timing mark "A" and "B" get out of the matching more than 3mm, adjust the timing mark matching.

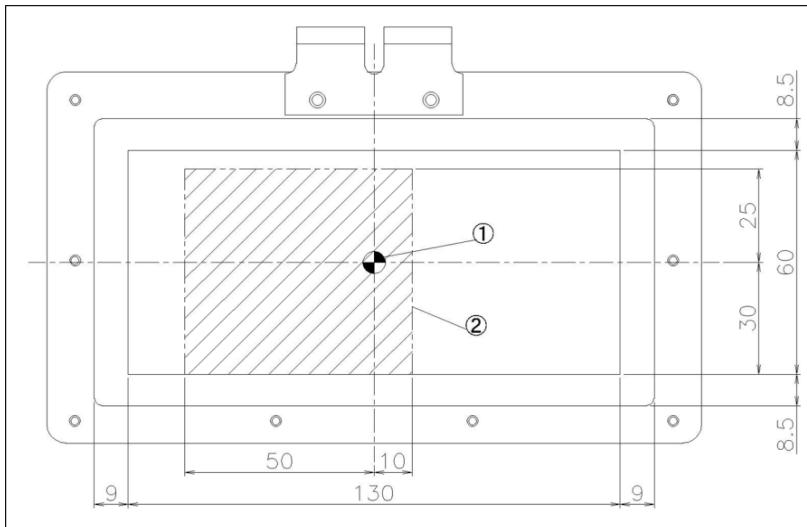
Hold the sewing machine pulley (No.2) by hand and insert the angle adjuster (No.1) into the hole "C" then, turn the angle adjuster. If turn the angle adjuster to the clockwise, the pulley timing mark "B" comes down and if turn it to the counter clockwise, the pulley timing mark "B" goes up. The



<1>: Angle adjuster  
<2>: Pulley

## 7-17. Adjustment of the X-Y mechanical home position

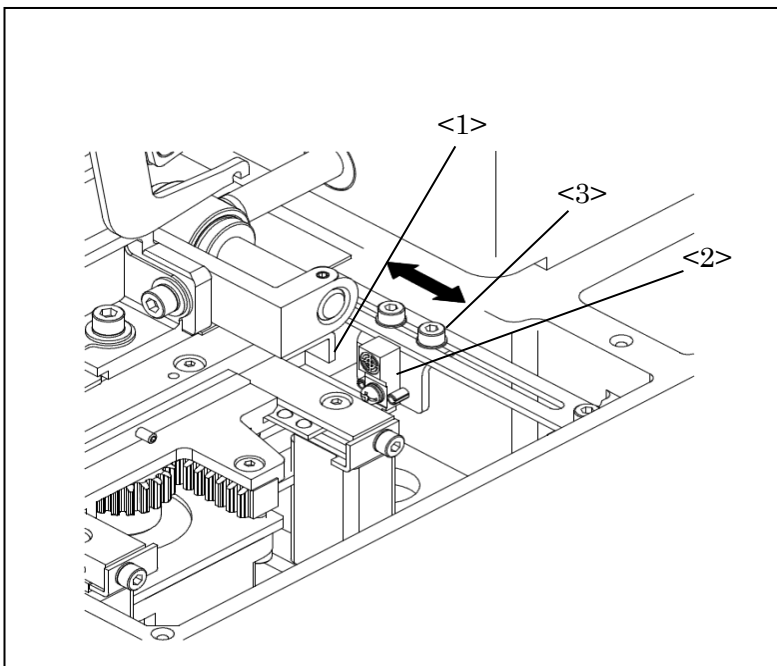
The mechanical home position is fixed as the factory default setting.



<1>: Home position as factory default  
<2>: Adjustable area

### 7-17-1. Adjustment of the X direction

- (1) Turn the power switch off.
- (2) Remove the upper right covers.
- (3) The mechanical home position of the X direction is the position where the detector (No.2) can detect the edge of the detector plate X (No.1).
- (4) For the adjustment of the X direction mechanical home position, loosen the detector plate set screws (No.3) at the left and right side then, move the detector plate X in the arrow direction as shown on the figure. Set the clearance between the detector plate X and the detector within the range of 1.0 to 1.5mm.
- (5) Turn the power switch on. Press the home position return key "H", and check the mechanical home position.
- (6) If the mechanical home position is not the desired position, turn the power switch off again, and carry out the same procedure (4) and (5).

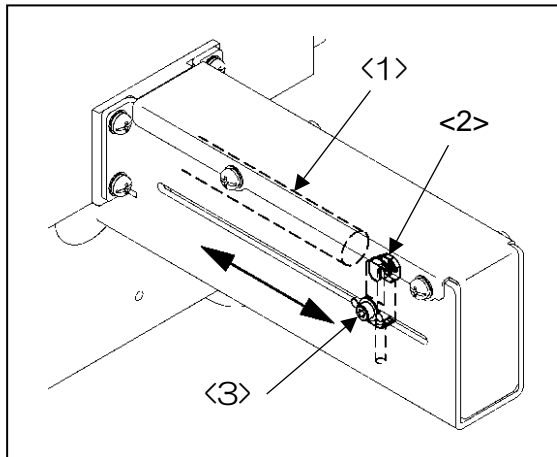


<1>: Detector plate X  
<2>: Detector  
<3>: Detector plate set screw



## 7-17-2. Adjustment of the Y direction

- (1) Turn the power switch off.
- (2) The mechanical home position of the Y direction is the position where the detector (No.2) can detect the edge of the Y drive shaft (No.1).
- (3) For the adjustment of the Y direction mechanical home position, loosen the detector set screw (No.3) then, move the detector to the arrow direction as shown on the figure. Set the clearance between the detector plate X and the detector within the range of 1.0 to 1.5mm.
- (4) Turn the power switch on. Press the home position return key "H", and check the mechanical home position.
- (5) If the mechanical home position is not the desired position, turn the power switch off again, and carry out the same procedure (3) and (4).



- <1>: Y drive shaft  
<2>: Detector  
<3>: Detector set screw

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

To use the sensor from the send returning,

- (1) Press **Program** → **↑** **↓** to display "HP", and press **↵**.
- (2) Press **↑** **↓** to display "SHP", and press **↵**.
- (3) Press **D**, set "ON", and press **↵**.
- (4) Press **H** twice to return standard screen.

## 7-18. Positional correction of X-Y retainer

Retainer shifts from the correct position when same pattern sewing is repeated. It is correct to locate retainer at the center of fixed race. (X&Y) Execute the following operation regularly before sewing.

- (1) Turn the power switch off.
- (2) Please move the work holder to the front, back, left and right until the stroke end by hand. Movable race hits stopper when moving it about five times. Movable race hits stopper when moving work holder about five times.

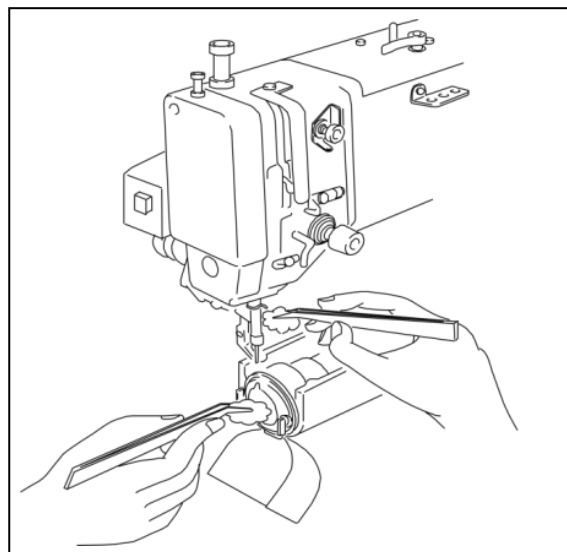
## 8. MAINTENANCE

### CAUTION

- (1) Please make sure to turn the power switch off before cleaning the sewing machine.
- (2) Please pay attention to that staining your skin or eyes with oil may cause an inflammation.

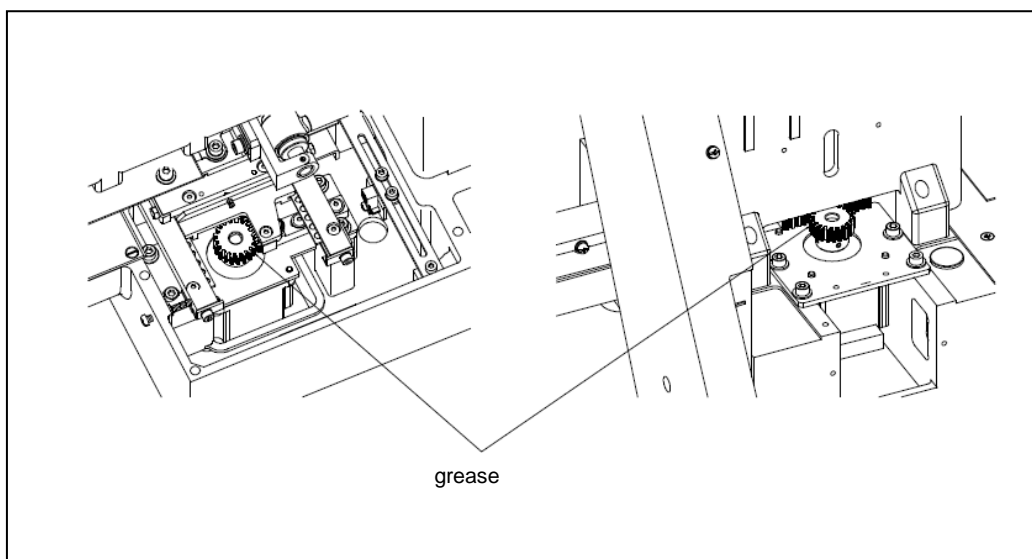
#### 8-1. Cleaning

Remove the dust and the thread waste sticking the threading parts or the hooks area regularly.



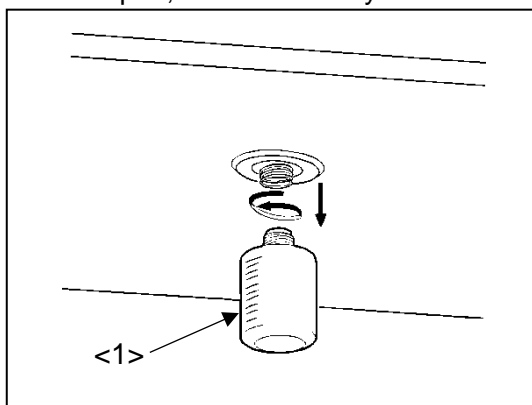
#### 8-2. Lubrication(grease)

Please grease X-Y gear periodically for reduction of noise or abrasion.  
Recommended grease: Lithium grease 2



#### 8-3. Disposing of oil waste

Lay the sewing machine, take out the oil pan, and throw away oil when oil pan is full.



## 9. TROUBLESHOOTING

### CAUTION

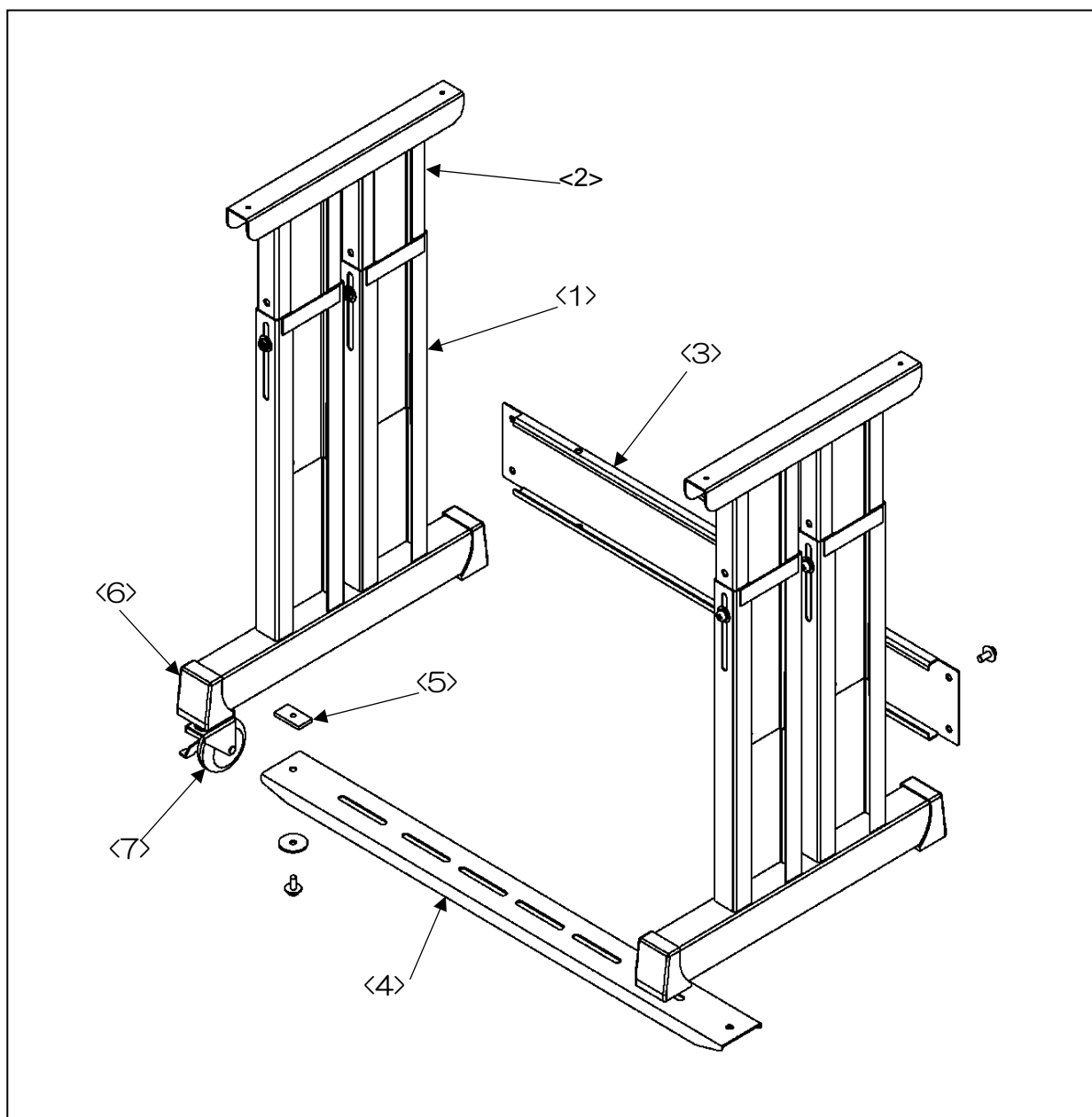
- (1) Please make sure to turn the power switch off before adjusting the sewing machine.  
 (2) If the adjustment is required while the power switch on, do not step on the foot switch by mistake.

Condition	Cause	Corrective action	Reference
Upper thread is broken.	Upper thread tension is too tight.	Adjust thread tension.	6-3
	Strength of thread take up spring is inappropriate.	Adjust thread take up spring.	7-13
	Parts on needle plate, hook, and presser foot touching thread are damaged.	Grind parts or change parts.	-
	The needle size is bigger than the thread size.	Change the needle size to suitable size.	-
	Thread melts with heat.	Slow down the sewing speed	6-1
		Use needle cooler.	-
Bobbin thread is broken.	Bobbin thread tension is too tight.	Adjust thread tension.	6-3
	Parts on needle plate and presser foot touching thread are damaged.	Buff parts or change parts.	-
Upper thread is pulled from needle hole when starting sewing.	Thread tail is short.	Adjust thread tail with pre-tension.	7-14
	Thread take up spring tension is too much.	Adjust thread take up spring tension.	7-13
Frequent skip stitching happens.	Clearance between needle and shuttle hook is too big.	Adjust clearance between needle and shuttle hook properly.	7-3
	Timing of needle and shuttle hook is not proper.	Adjust position of needle and shuttle properly.	7-2
	Contact between needle and driver is too tight.	Adjust clearance between needle and driver properly.	7-4
	Presser foot doesn't work proper.	Adjust presser foot position and timing.	7-6-1 7-6-3
	Needle is bent.	Change needle.	-
	Needle is at wrong position.	Fix position properly.	5-2
Trimming is not functioned.	Fixed knife is dull.	Sharpen fixed knife or change fixed knife.	7-12
	Movable knife is dull.	Change movable knife.	7-11

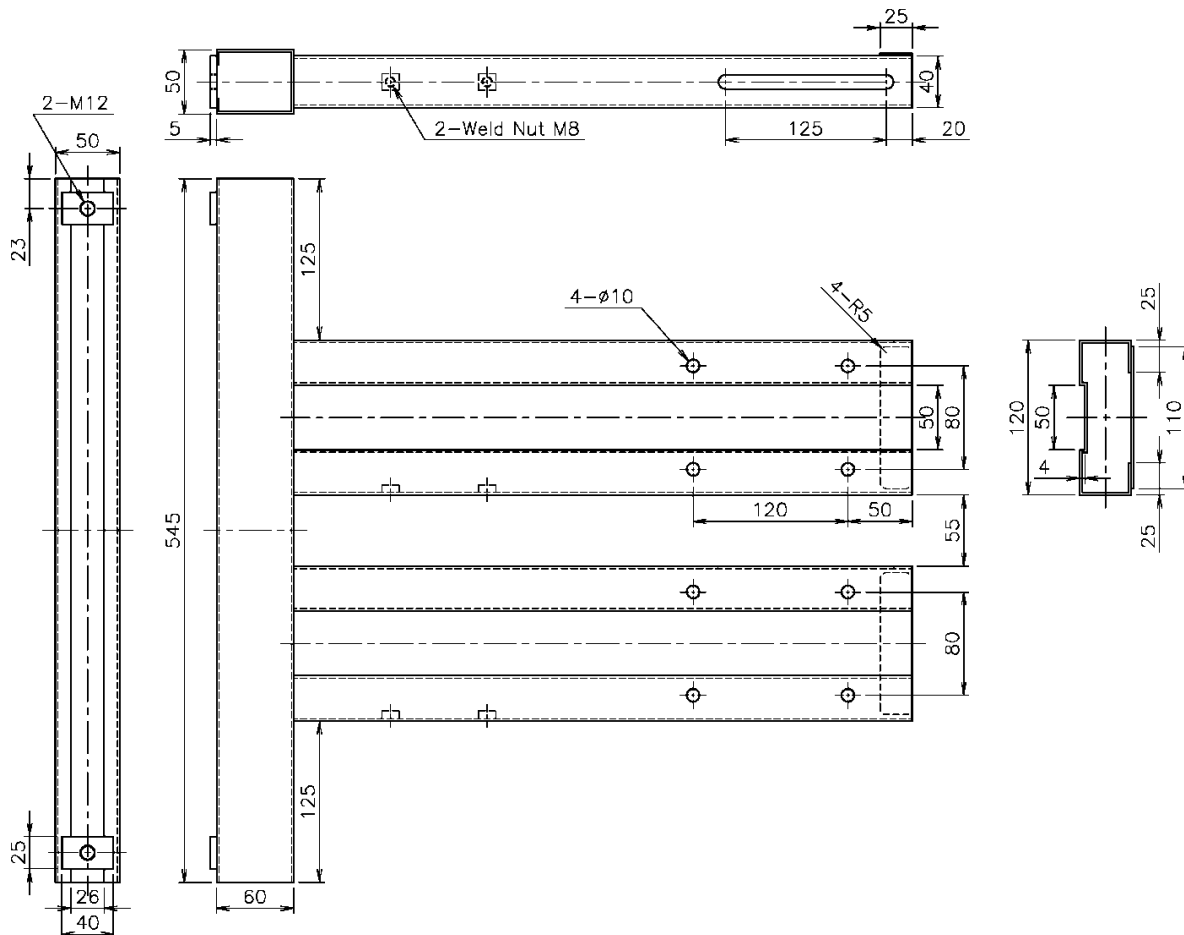
Trimming is not functioned.	Movable knife is at wrong position.	Adjust position of movable knife properly.	7-11
	Skip stitching happens in trimming.	Refer to the condition "Frequent skip stitching happens".	-
	Trimming setting is off.	Turn trimming setting on.	Technical manual PLK-G10
Stitch forming is loose.	Upper thread tension is too loose.	Adjust upper thread tension.	6-3
	Bobbin thread tension is too loose.	Adjust bobbin thread tension.	6-3
	Strength of thread take up spring is inadequate.	Adjust strength of thread take up spring.	7-13
Stitch on back comes apart.	Thread is not divided with thread guide properly.	Adjust thread guide position.	7-5
	Needle thread is too long.	Adjust needle thread with pre-tension.	7-14
Work holder does not fall.	Foot switch is broken.	Change foot switch.	-
Wiper system does not work.	Wiper hits needle .	Adjust wiper position.	7-7
	Wiper setting is turned off.	Turn wiper setting on.	Technical manual PLK-G10
Sewing pattern is changed.	Sewing material in work clamp slips.	Put slip stopper on presser plate.	-
	Sewing material is too heavy.	Slow down sewing speed.	6-1
	X-Y timing belt tension is loose.	Adjust X-Y belt tension properly.	-
Returned home position is changed.	Ambient temperature is out of use range.	Use sewing machine in ambient temperature in 5 to 35 degrees.	-
	Clearance between detector and detecting subject is too wide.	Adjust clearance in 1 to 1.5mm.	7-17

## APPENDIX

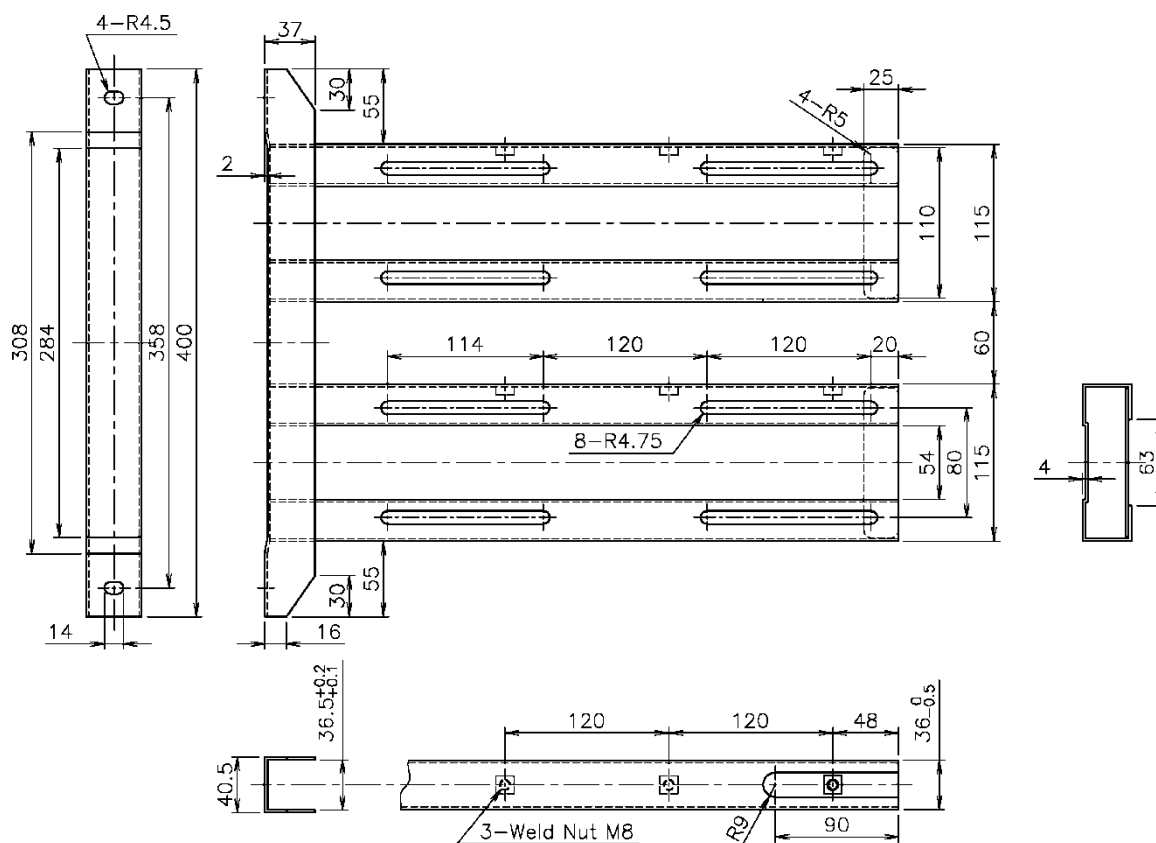
**MEMO** If the steel stand is not MITSUBISHI original, produce the parts with reference to the following drawings. The drawings show the measurements of original MITSUBISHI stand parts.



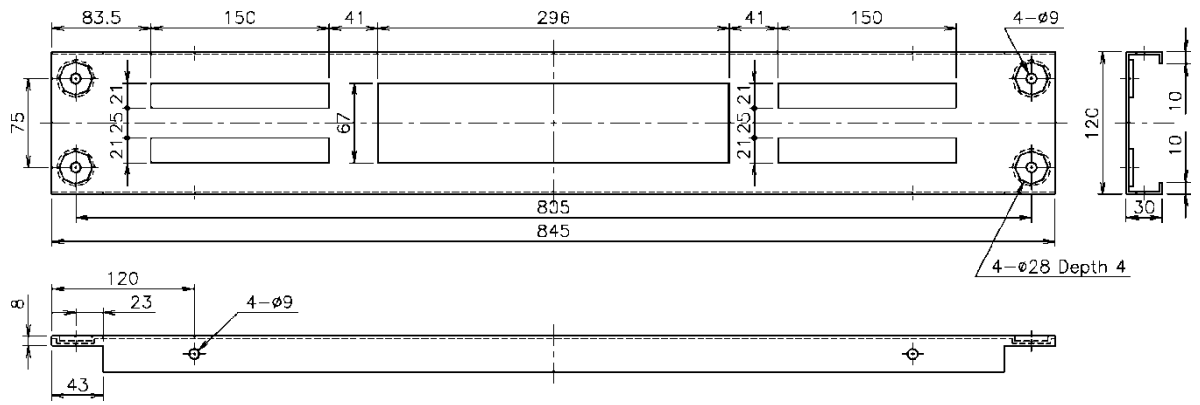
Stand part <1>...thickness 2mm



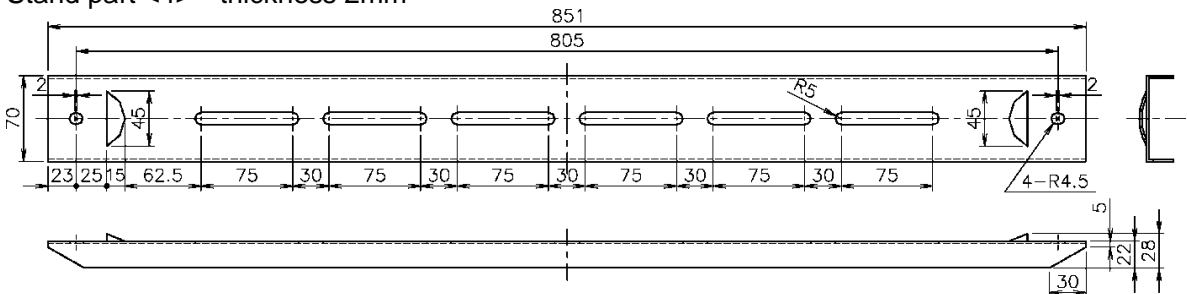
Stand part <2>...thickness 2mm



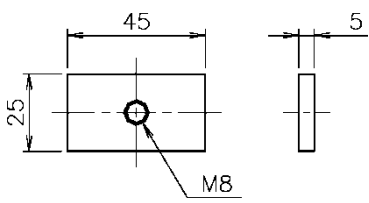
Stand part <3>...thickness 2mm



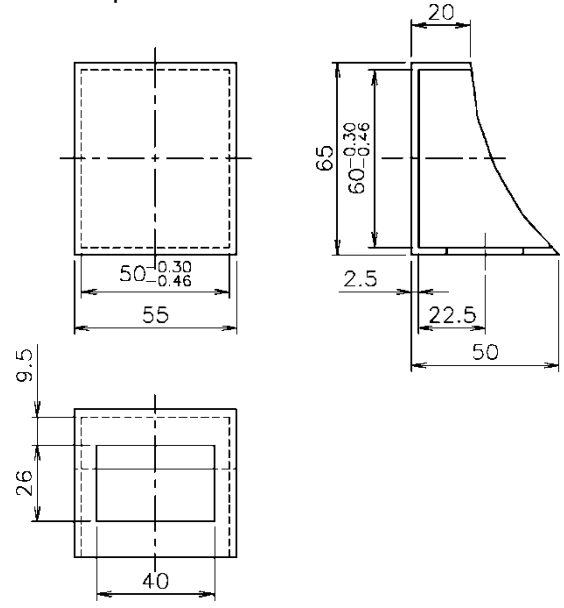
Stand part <4>...thickness 2mm



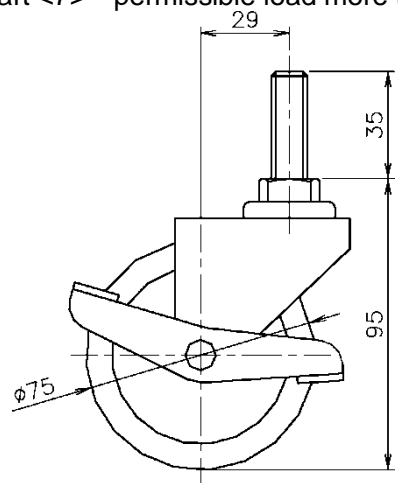
Stand part <5>...thickness 2mm



Stand part <6>...rubber thickness 2.5mm



Stand part <7>...permissible load more than 40kg(per wheel)



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