



TECHNICAL MANUAL SEWING MACHINE HEAD

Electronic Pattern Sewing Machine

Model PLK-G2008H

FOR SAFE USE

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

SAFETY INDICATIONS

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

CAUTION INDICATIONS

No.	Caution indication	Description
1		<u>Precaution for sewing machine operation:</u> Indicates that removing the safety and operating the sewing machine for some other purposes with power-on are prohibited. ● Please do not operate the sewing machine without protective equipment such as an eye guard, a belt cover or the others. ● Please turn off the power switch when threading, changing a needle and a bobbin, cleaning, and lubricating.
2		<u>Caution for fingers injury:</u> Indicates a possibility of fingers (hands) injury in a certain condition.
3		<u>Caution for squeezing fingers:</u> Indicates a possibility of squeezing fingers in a certain condition.
4		<u>Indication of pulley rotation direction:</u> Indicates a normal pulley rotation direction of sewing machine.

SAFETY PRECAUTIONS



DANGER

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.



CAUTION

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) 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, 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.

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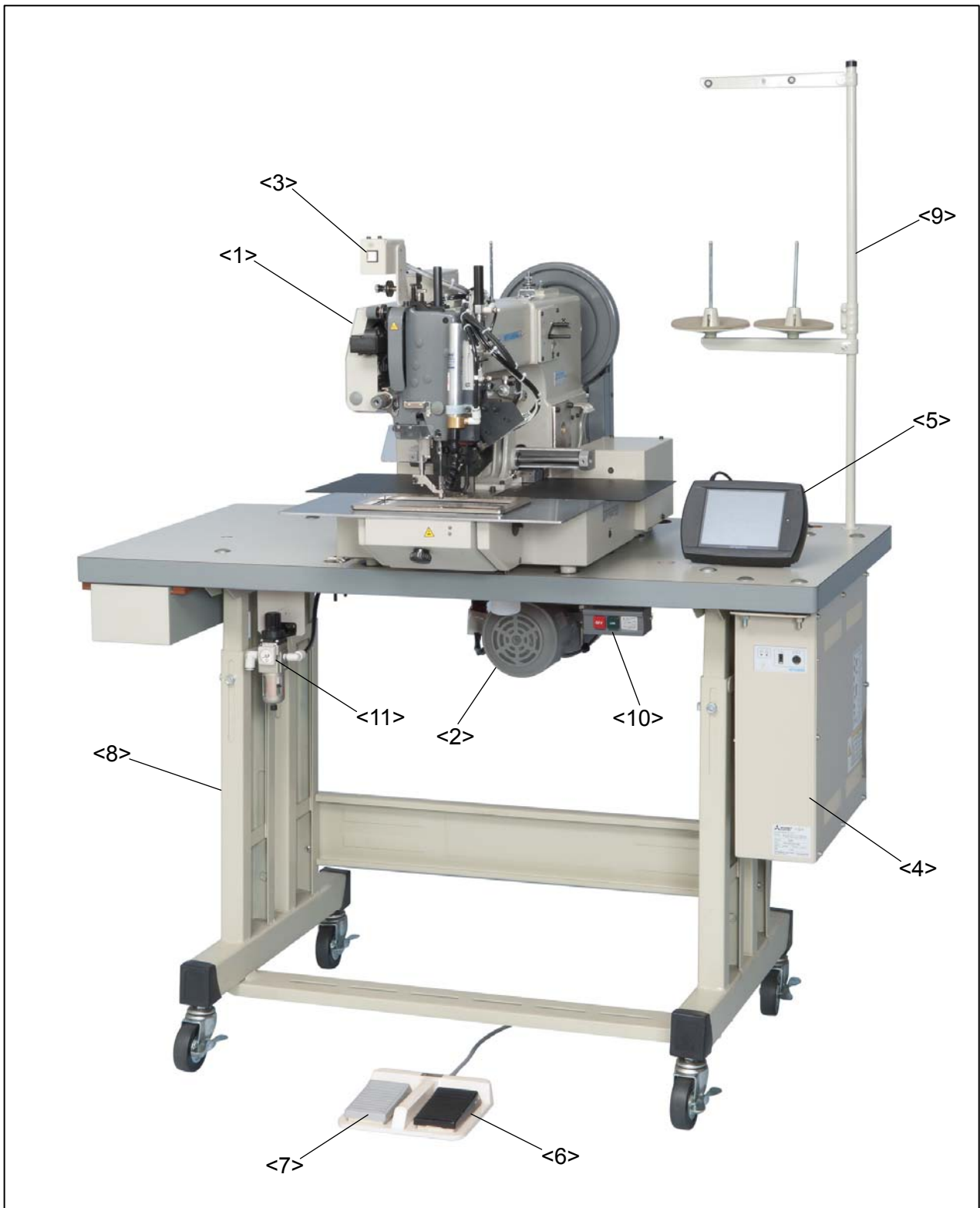
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1. STRUCTURE OF THE SEWING MACHINE

PLK-G2008H electronic pattern sewing machine consists of the following main parts.



<1>: Sewing machine head <2>: Main motor <3>: Halt switch <4>: Control box
<5>: Operation panel <6>: Work holder foot switch <7>: Start foot switch <8>: Steel stand
<9>: Thread stand <10>: Power switch <11>: Air regulator

2. SPECIFICATIONS

Model	: PLK-G2008H
Sewing area	: X-direction (left/right) 200 mm, Y-direction (front / back) 80 mm
Maximum sewing speed	: 700 rpm
Setting speed	: 10 speed levels in 200 rpm to 700 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	: 520 patterns (internal memory)
Data memory	: Internal memory, USB memory
Needle bar stroke	: 56.3 mm
Thread take up lever stroke	: 94 mm
Class of needle	: Schmitz 794 #230
Presser foot lift ^{*1}	: 25 mm
Work holder lift	: 20 mm (25 mm max)
Hook	: Barrel shuttle hook
Bobbin	: Large size bobbin
Thread trimmer system	: Thermal trimming system Voltage IN : AC 210/230 V OUT : AC 1V
Pre heating	: Available by using Function Code 4
Thread	: #8 to #00 (Synthetic)
Lubrication system	: Manual oiling
Lubrication oil	: Pulley SF oil
X-Y drive system	: Stepping motor feedback control Timing belt drive system Intermittent or continuous feeding ^{*2}
Machine dimensions	: 1,200 mm (W) ×780 mm (L) ×1,320 mm (H)
Total mass	: 172 Kg
Type of motor	: XL-G554-20
Type of controller	: PLK-G-CU-20M
Type of operation panel	: PLK-G-PAL
Power	: In 200V to 240V single-phase or three-phase The power in 110V to 120V or in 380V to 415V is compatible with power unit (option).

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

*2 : Recommend intermittent feeding.

3. INSTALLATION



CAUTION

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

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 6 drawing.

3-2. Preparation of 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 APPENDIX 6 drawing.

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

3-3. Installation of the motor

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

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

3-4. Installation of the control box

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

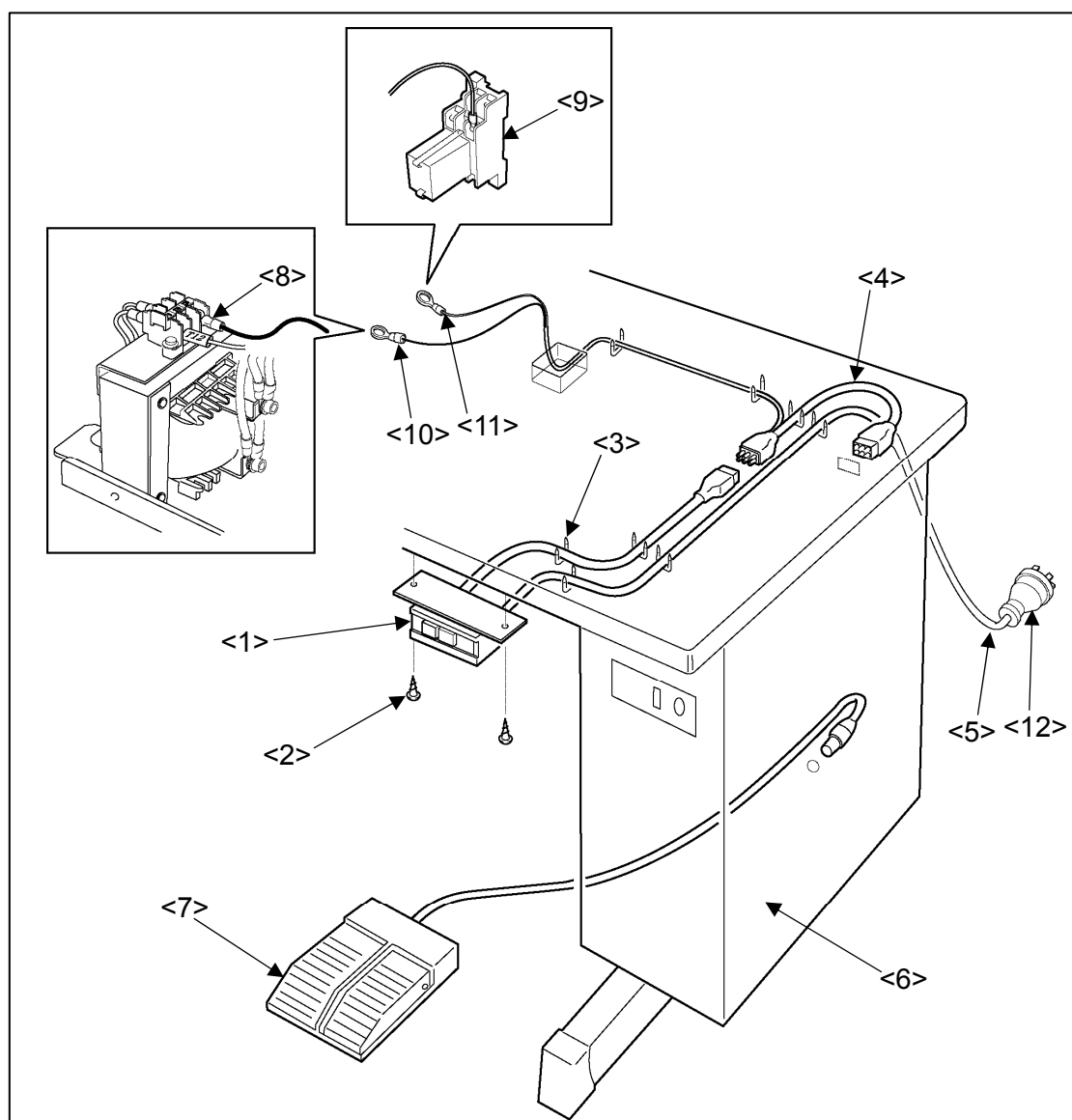
Please install the control box with the instruction in the paragraph [installation of the control box] on the another [CONTROL UNIT] technical manual.

3-5. Connection of the operation panel

Please install the operation panel referring following figure of control box backside view.

3-6. Installation of the power switch

- (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 of the power switch (No.1) to the connector of the cable (No.4).
 - (4) Hook up the connector of the cable (No.4) to the CON B connector of the control box (No.6).
 - (5) Connect the terminal (No.10) of the cable in black (No.4) to the terminal adapter on the transformer (No.8). Two terminal has been prepared on this transformer (for 210V and for 230V). Detail of wiring are informed in APPENDIX 1 on this manual.
 - (6) Connect the other terminal (No.11) of the cable in white to the terminal adapter PORT No.5 of the relay socket (No.9). Detail of wiring are informed in APPENDIX 1 on this manual.
These terminal adapter are located inside of the motor cover of machine head.
 - (7) Attach the power plug (No.12) to the another end of the power switch cord (No.5).
- For detail description, please refer to APPENDIX 1 and 2 Wiring diagram.
- [Notice] Power plug (No.12) is not included in accessory box.

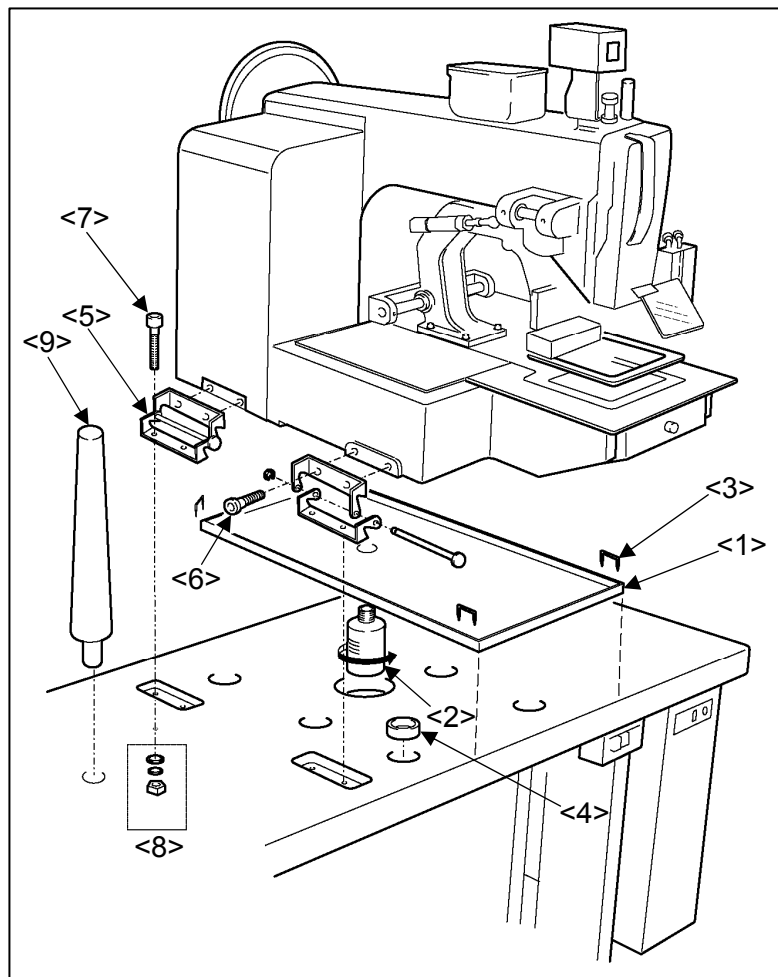


3-7. Connection of the foot switch

Connect the foot switch (No.7) to CON H connector of the control box (No.6).
Details are informed in [3-11. Connection of the electric cables] on this manual.

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 table top cut-out hole.
- (3) Install the oil pan (No.1) fit with the table front edge.
- (4) Fix the oil pan (No.1) at its four corners on the table top with four staples (No.3) en-closed in the accessory box.



3-9. Installation of the sewing 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.
- (1) Make sure to hold the machine table with the caster stopper.
 - (2) Fit the rubber cushion pads (No.4) into the each hole on the table top. The rubber cushion pads (No.4) are enclosed in the accessory box.
 - (3) Put the sewing machine head on the table top and set the each leg to the each rubber cushion pad (No.4).

- (4) Attach two hinges (No.5) temporarily, with the hexagonal socket head set screws (No.6) fastening with the thread holes light, on the left side surface of the machine bed. At this time, take notice of the E-shaped snap ring must be come to the behind.
- (5) These parts are all enclosed in the accessory box.
- (6) Fit the screw holes of the hinges (No.5) to the bolt setting holes on the table top then, pass the bolt (No.7) through these holes and fasten the bolt (No.7) to fix the hinges (No.5) with the flat washers, the spring washers and the nuts (No.8).
- (7) Fasten firmly hexagonal socket head set screws (No.6) which set the hinges (No.5) temporarily at above procedure (4) then, fix the hinges (No.5) perfectly.
- (8) Insert the head support stand (No.9) into the hole on the table top.

3-10. Installation of the V-belt

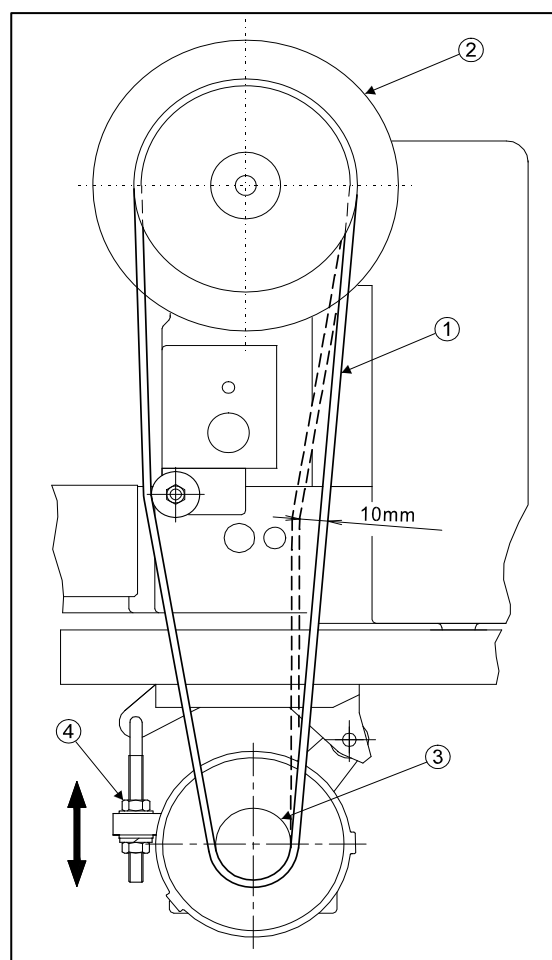
- (1) Put the V-belt (No.1) across the sewing machine pulley (No.2) and the motor pulley (No.3) with passing it through the slit on the table top.
- (2) The V-belt (No.1) is enclosed in the accessory box.
- (3) Push the center portion of V-belt by the finger with the pressure of about 0.1 N (1 kgf). If the V-belt tension is proper, it should be yielded about 10mm. If the V-belt tension is not proper, please adjust it with changing the motor setting position with loosening the nuts (No.4).

[Notice] About the motor pulley (No.3) it is necessary to use only PLK-G2008H accessory. Other motor pulley for the PLK-E1008H/2008H and PLK-B1008H are different in size. Please do not use that kind of motor pulleys.

Suitable motor pulley

PLK-G2008H : T85 / PLK-E1008H/2008H : T100
/ PLK-B1008H : T100

NOTE The V-belt becomes loose after a long period machine running. If the looseness is recognized definitely, firstly turn the power OFF then adjust the V-belt tension again as the above procedure.



3-11. Connection of the electric cables (Refer to the figure on the following page)

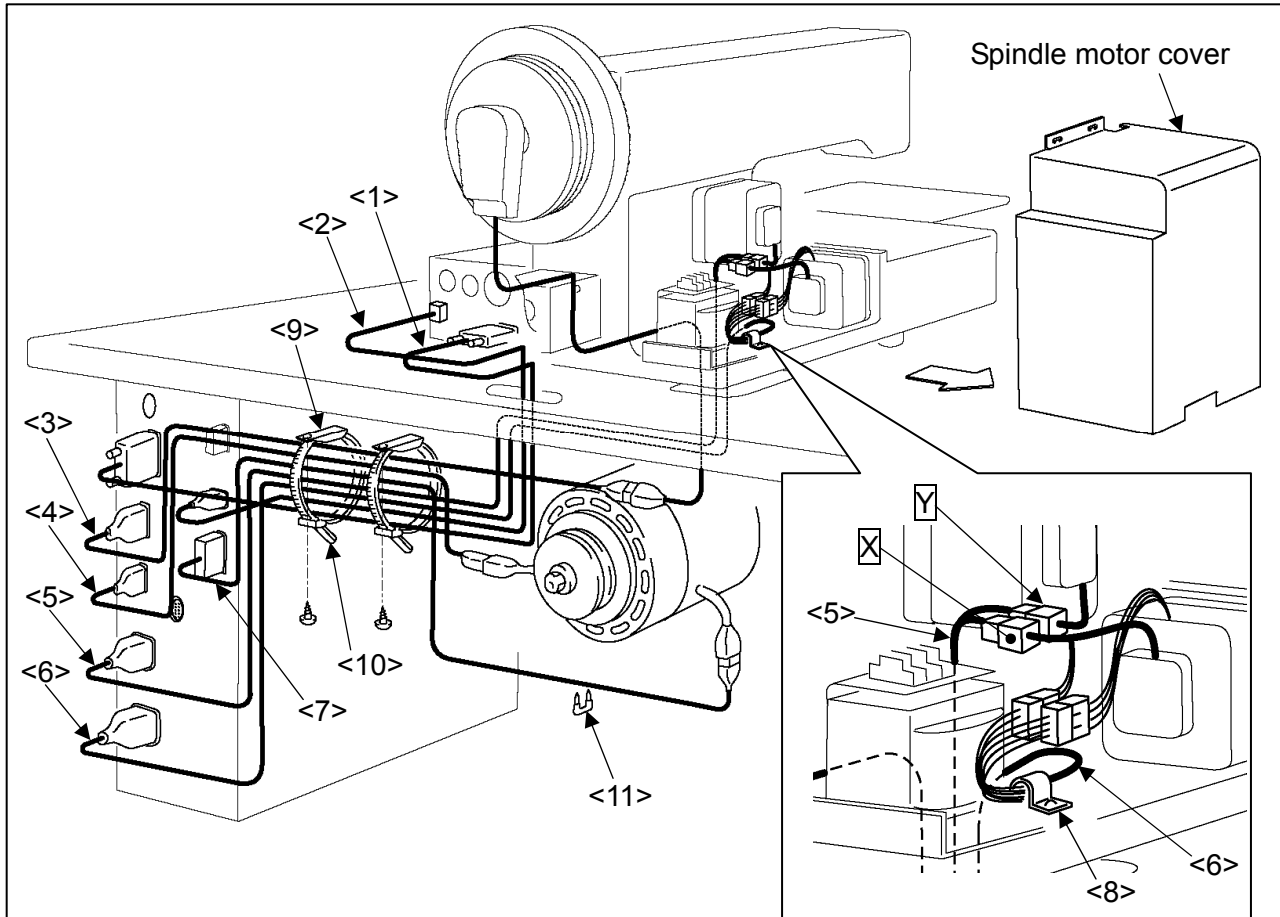


CAUTION

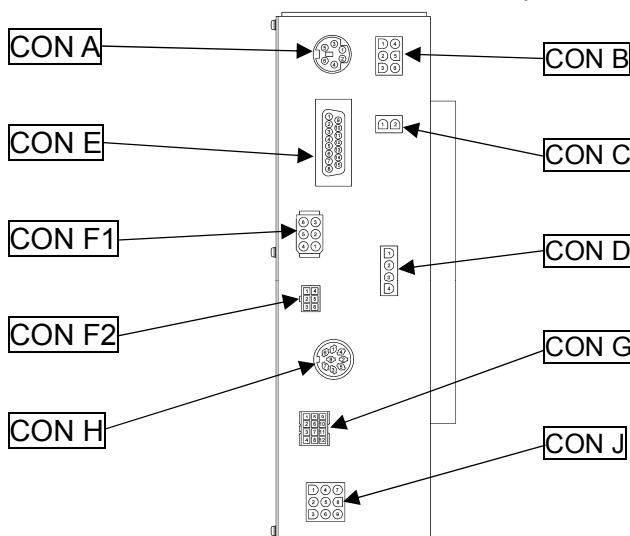
(1) Please make sure to ground the place where there is a  mark. Failure to do so may cause electric shock and or malfunction.

- (1) Remove the stepping motor cover from sewing machine head.
- (2) Connect the machine head, motor and the control box with cables as shown on the figure.

- (3) Fix the X-Y spindle motor cable (No.6) with the nylon clip (No.8) on the sewing machine head which enclosed in the X-Y spindle motor cable set.
- (4) Hold the dangling cables under the table with accessory tie holders (No.9) and cord ties (No.10). At this time, please check whether the cables are not pulled when tilting the sewing machine.
- (5) Fix the cables with staples (No.11) as needed.



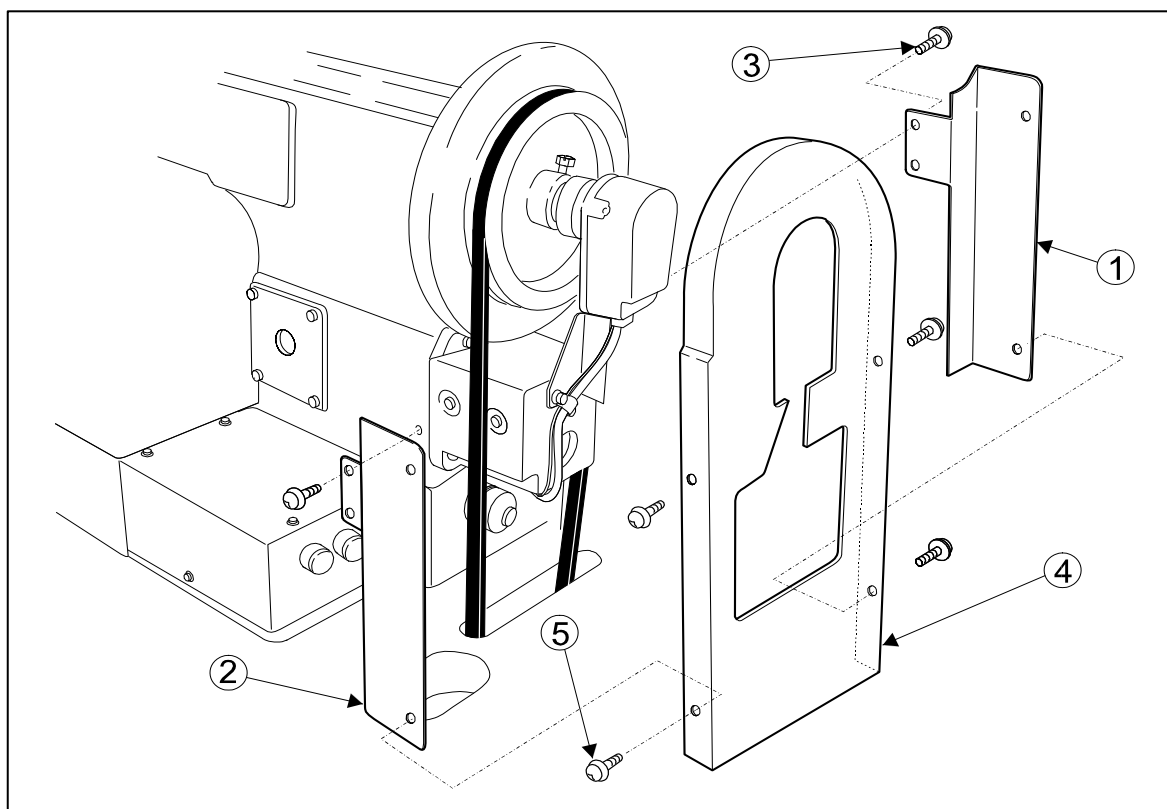
- <1>: Solenoid cable <2>: Solenoid power cable <3>: Detector junction cable
 <4>: Spindle motor encoder junction cable
 <5>: X-Y spindle encoder cable (X and Y different has exist)
 <6>: X-Y spindle motor cable <7>: Spindle motor junction cable <8>: Nylon clip
 <9>: Tie holder <10>: Cord tie <11>: Staple



- CON A: Operation panel
 CON B: Power supply
 CON C: Various solenoid DC power
 CON D: Spindle motor
 CON E: Various solenoid
 CON F1: Detector
 CON F2: Spindle encoder
 CON G: X-Y spindle encoder
 CON H: Foot switch
 CON J: X-Y spindle stepping motor

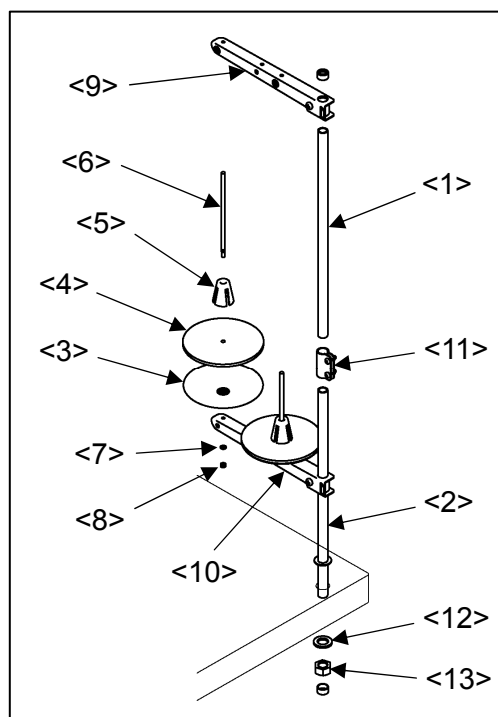
3-12. Installation of the belt cover

- (1) Attach the belt cover mounting plate (No.1, 2) to the sewing machine head with the set screws (No.3).
- (2) Put the belt cover (NO.4) on to the mounting plate with set screws (No.5).



3-13. Installation of the thread stand

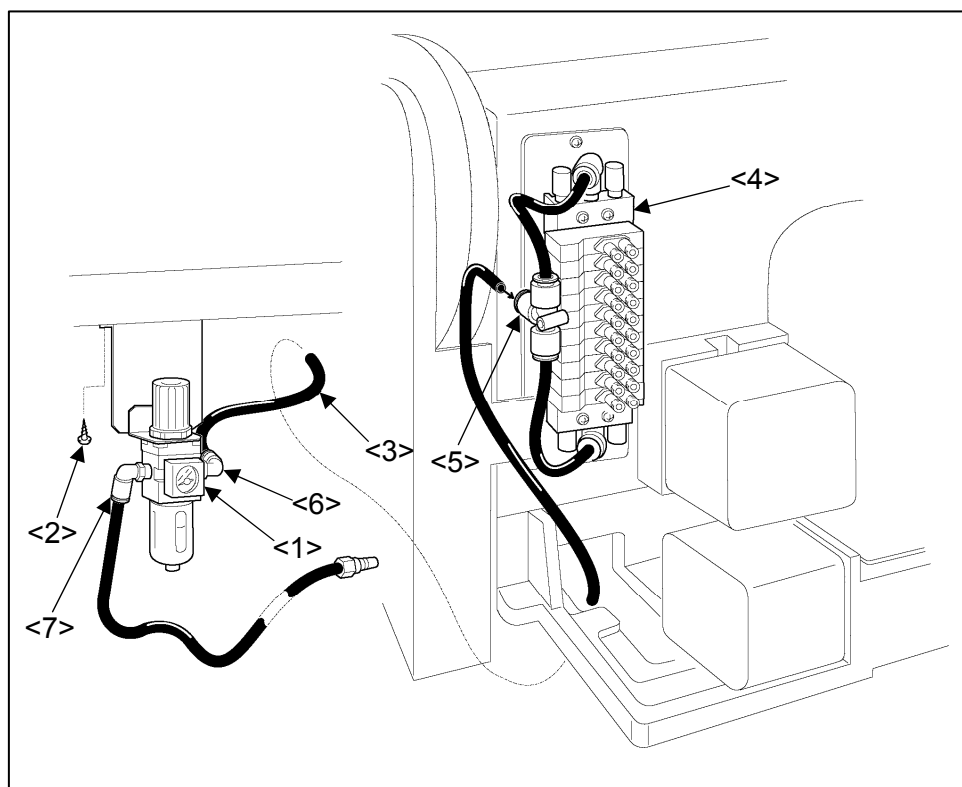
- (1) Assemble the parts (No.1 to No.11) of the thread stand as shown on the figure.
- (2) Fit the thread stand into the hole at the far right on the table stand with the nut (No.13) and the washers (No.12).



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

3-14. Connection of the air tube

- (1) Remove the spindle motor cover.
- (2) Attach the air pressure regulator assembly (No.1) underneath the table with the wood screws (No.2). These are enclosed in the accessory box. There are pilot holes for the wood screw on the undersurface of the table..
- (3) Cut the part of size $\varnothing 8$ air tube (No.3) enclosed in the accessory box into about 1.5 meter length then, insert one end of this air tube into the air fitting (No.5) of the manifold (No.4). The manifold is jointed with the magnet valves and located at the left side surface of the sewing machine head. Beside, pass the other end of the air tube (No.3) through the cut out hole of the table top then, insert it into the air outlet fitting (No.6) of the air pressure regulator (No.1).
- (4) Join the other end of the resting tube with the suitable air coupling to be adopted with the air supply source provided in your factory. One of the air couplings is enclosed in the accessory box.



4. LUBRICATION



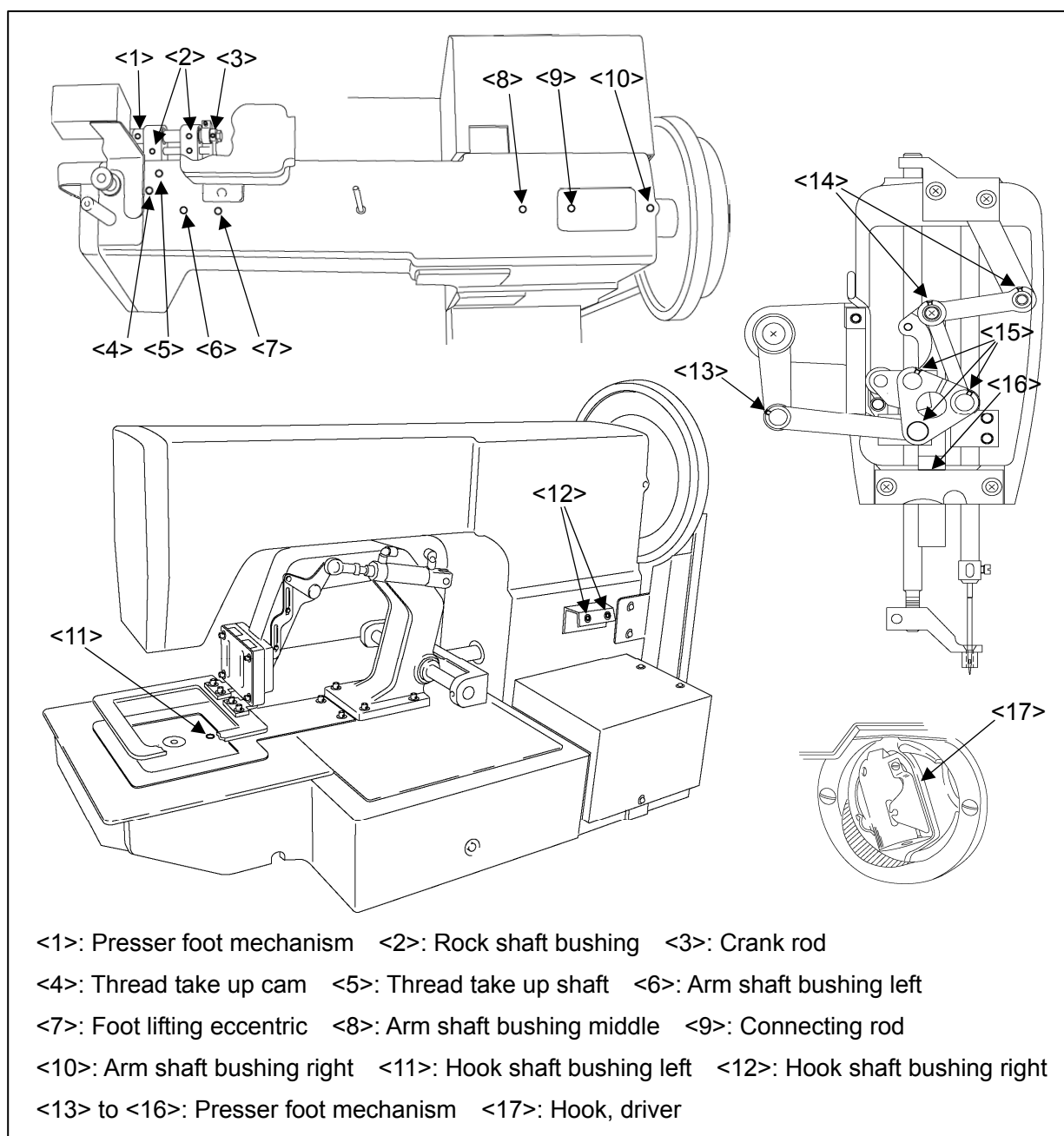
CAUTION

- (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.

NOTE Please use high quality white machining oil.

Put some oil to red marked oil holes and other part as described below arrow sign.



5. PROPER OPERATION

5-1. Initial setting of the control box

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

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

5-2. Initial setting of the setting table

For the thermal trimming system function it is necessary to initial setting of setting table. Please perform the procedures below.

[Notice] If this setting not performed the thermal trimming system does not function.

5-2-1. Setting table save to USB memory (using copy tool)

Coping setting table of the CD-ROM (PLK-G Document CD) to the USB memory by using copy tool.

PLK-G Document CD is enclosed in packing box of the operation panel (PLK-G-PAL).

[Note] If "USER_system" is already exist in the USB memory, they are over-written.

(Please move other important data to other folder or memory before using copy tool.)

- (1) Inset the CD-ROM (PLK-G Document CD) to your PC.

Insert USB memory to the USB connector on your PC.

Check the CD-ROM drive and USB memory drive.

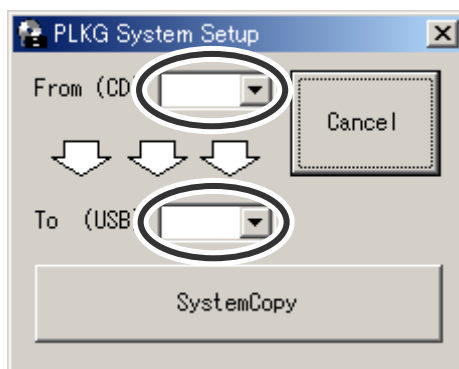
(ex. CD-ROM drive= "D:" , USB memory drive = "E:")

- (2) Open the CD-ROM root directory by using explorer etc.

Double click "PLKG System Setup.exe"

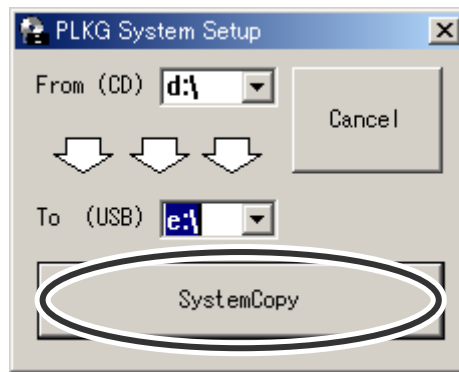


- (3) After open the PLKG System Setup window, select CD-ROM drive and USB memory drive respectively.



- (4) Click the "System Copy" button.

Data copy will be executed.



(5) When copying is complete, the message will be appeared, then click OK button.

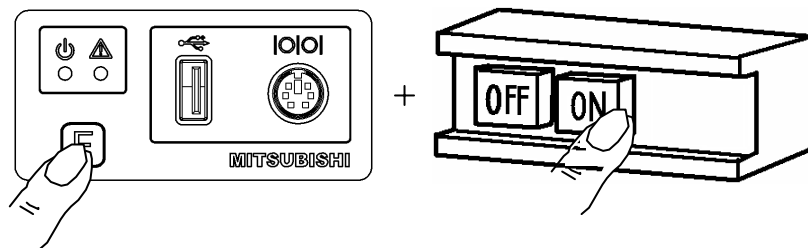
Press button to close the window.

(6) The setting table copy to USB memory is completed. Please confirm the content of USB memory.

5-2-2. Reading of the setting table

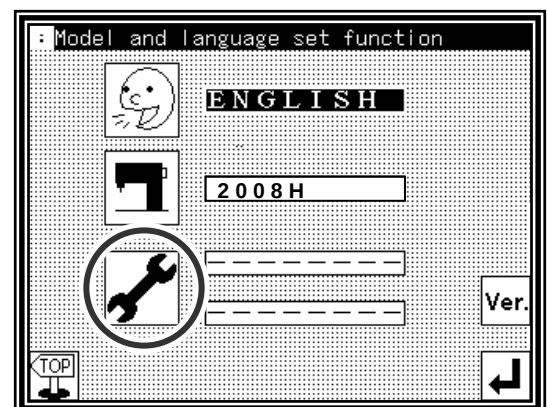
(1) Turning on the power supply

While holding down the [F] key on the front panel of the control box, turn the machine power ON.
(Keep pushing [F] key until red LED on the front panel is turned on.)



(2) Setting of the setting table

Press .



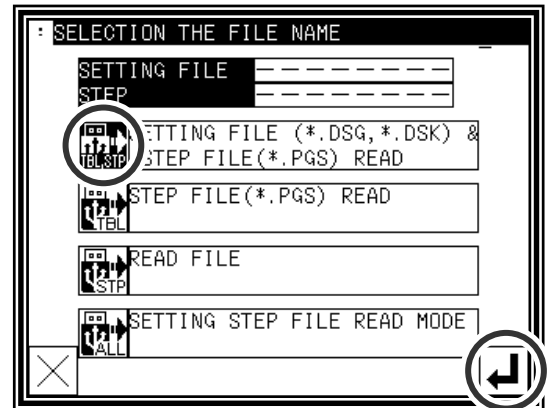
(3) Setting table reading mode

Press 

Connect USB memory [*1] to the connector on the

front panel of the control box, then, press .

[*1] Using a USB memory which explained in foregoing paragraph.

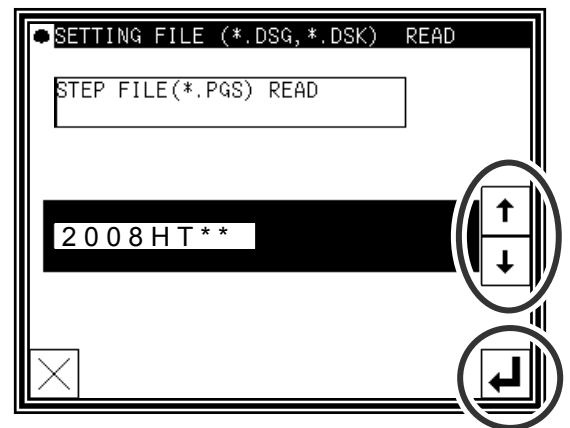


(4) After file name selection screen is displayed, choose

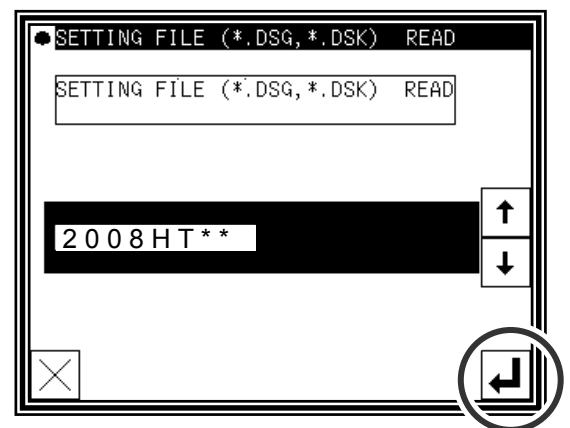
[2008HT **] by using up and down arrow button, then

press .

(The ** mark displays file version)



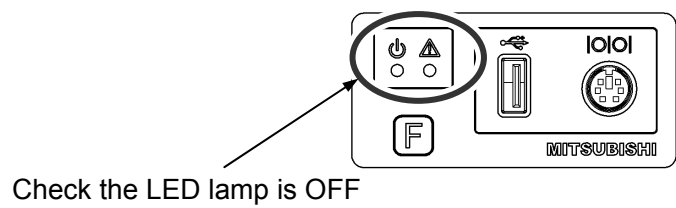
Press  again.



(5) Re-turning on the power supply

Please turn the power off according to the display of the message.

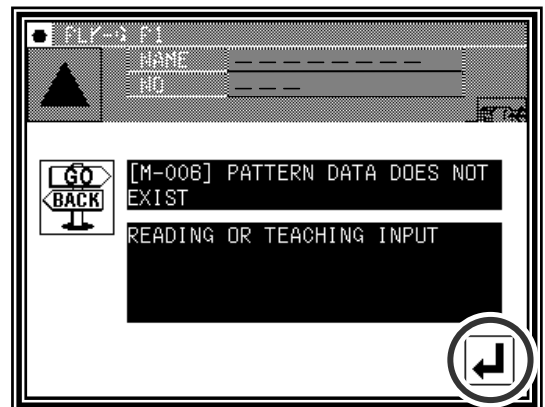
- (6) After check the LED lamp has completely off on the front panel of the control box,
turn the power on.



- (7) Initial condition

At initial condition, the message like a right picture is displayed.

Press  to switch to the Standard screen.



5-3. Installation of the needle



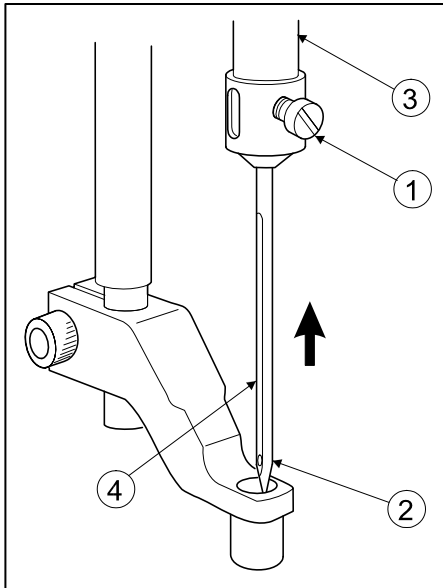
CAUTION

(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.

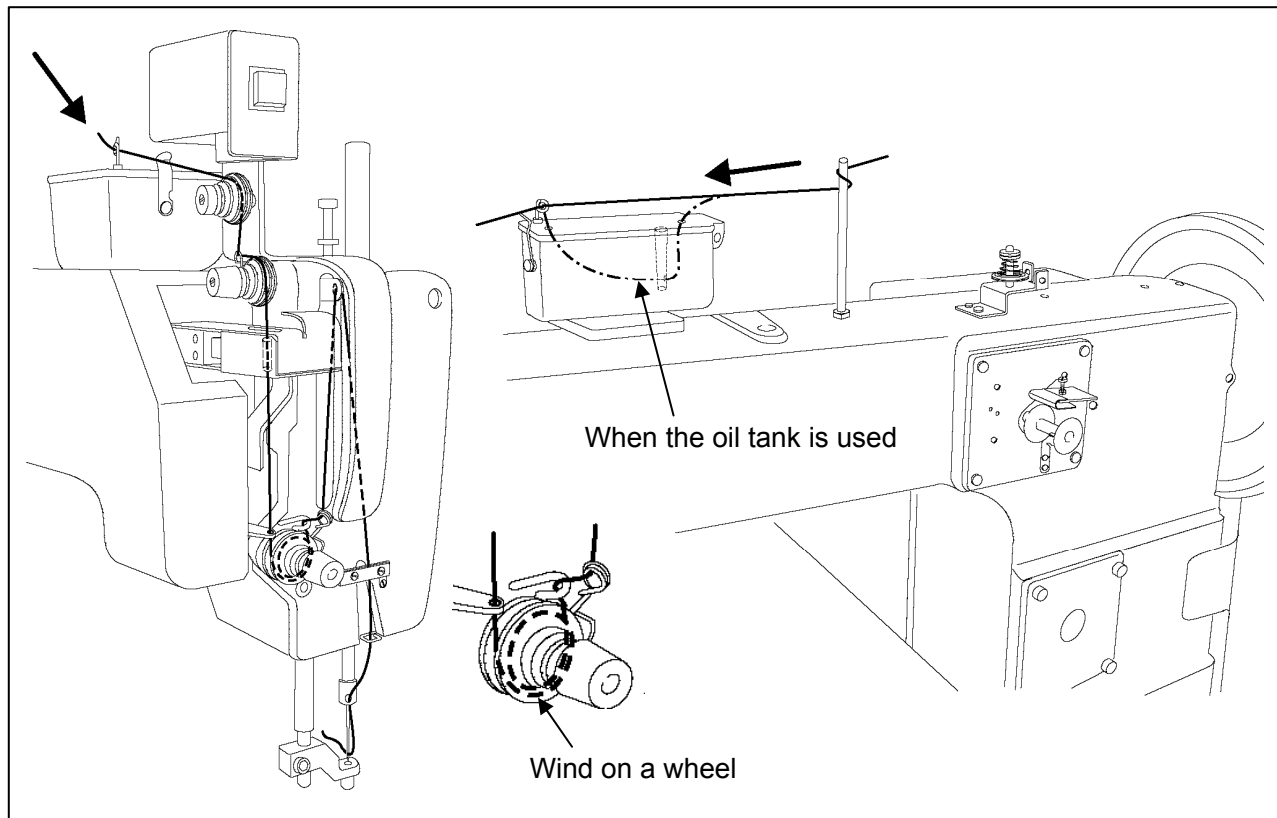


5-4. Threading the upper thread



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

Thread the upper thread as shown on the figure.



5-5. Winding the bobbin thread



CAUTION

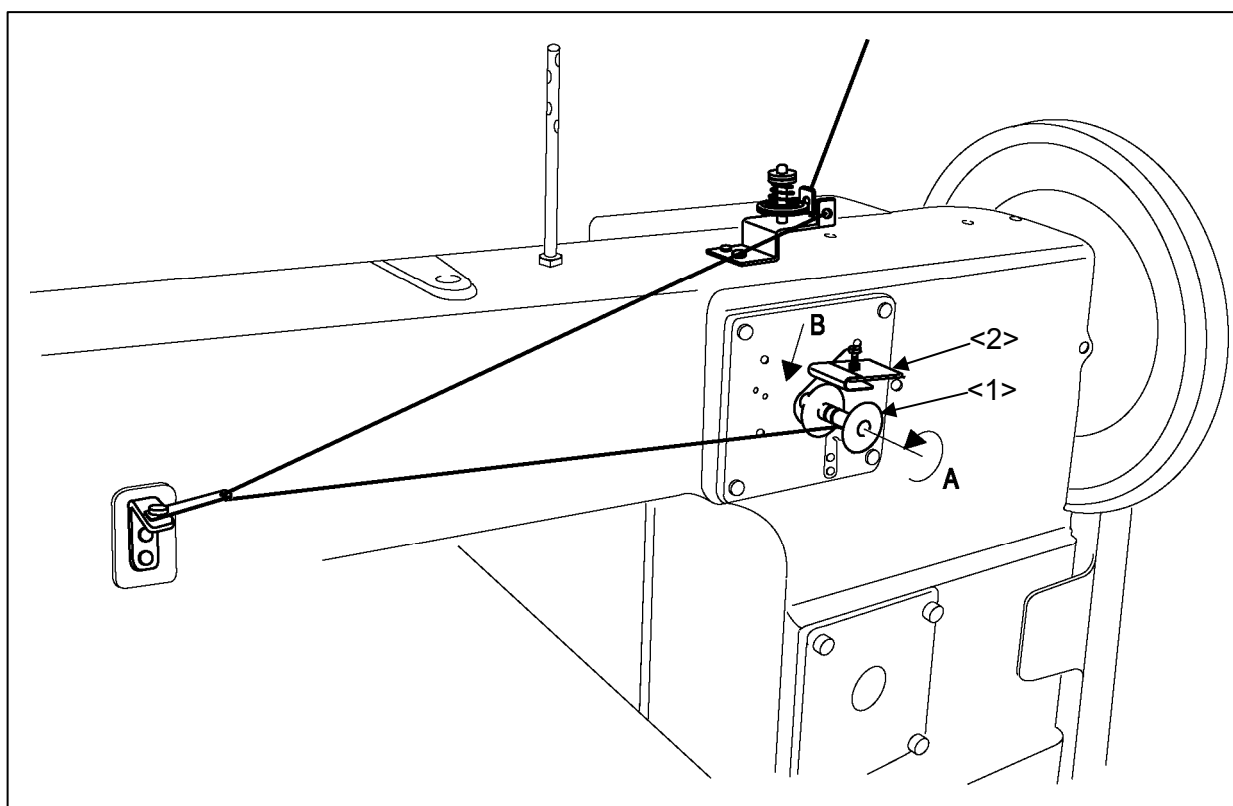
Please do not touch the rotating part during winding thread. Doing so may cause injury and/or the machine failure.

[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 and push the bobbin presser arm (No.2) in the direction of “B” arrow.
- (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. Adjustment of the winding thread amount informed in [7-11. Adjustment of the bobbin winder] on this manual.
- (4) To wind the bobbin thread during the sewing operation, carry out the procedure (1) above then, the bobbin winding is performed automatically.

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

OPERATION PANEL technical manual.



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

5-6. Setting the bobbin

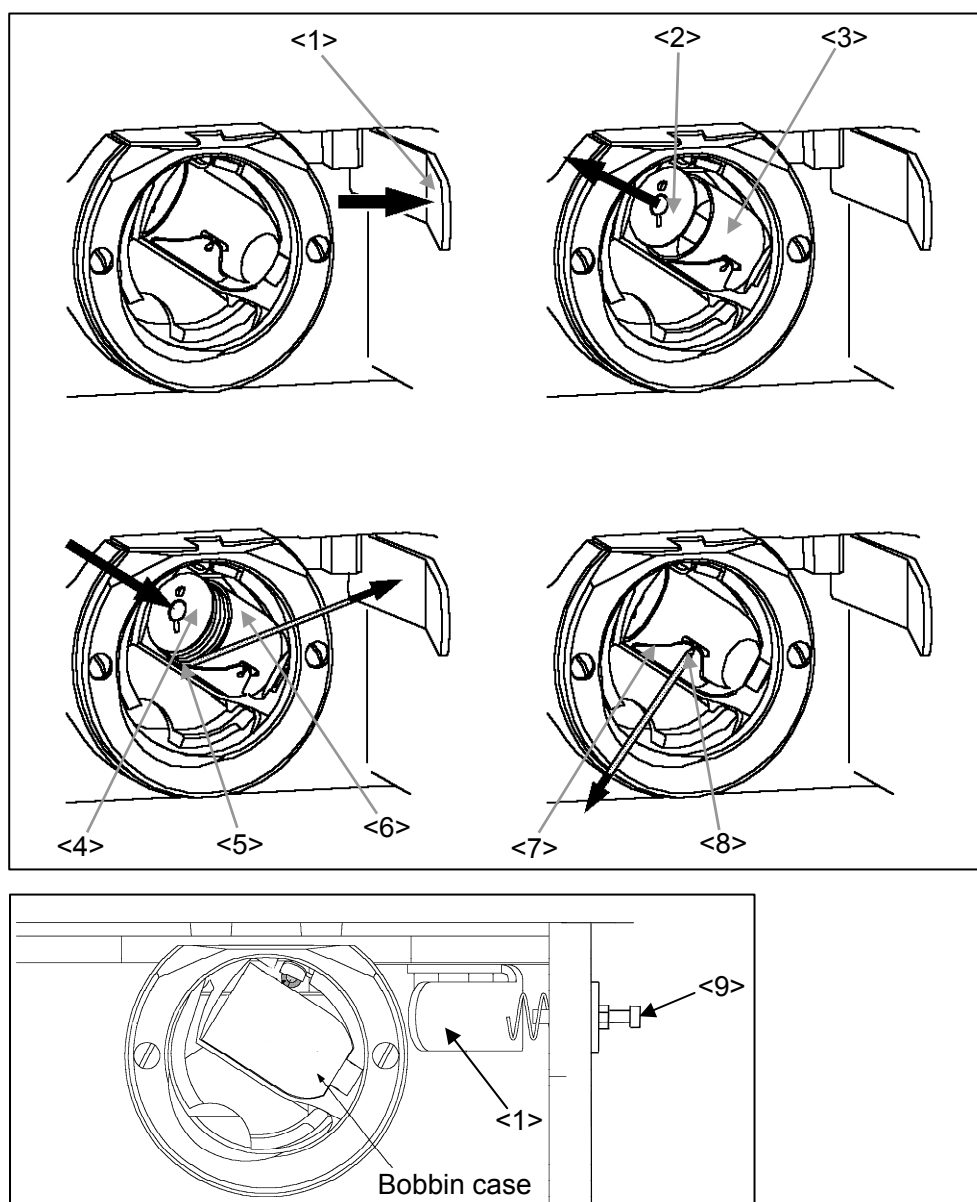
5-6-1. Taking out the bobbin

- (1) As shown below, press the bobbin removal lever (No.1) found at the right side of the hook to the right. The bobbin case (No.3) will open, and the bobbin (No.2) can be removed from the case.

NOTE If the bobbin case does not open even when the lever is pressed to the right, adjust the lever stroke by adjusting screw (No.9) or the bobbin's position must be rotated. Turn the pulley by hand and set the thread take up lever to the uppermost position. Then, press the bobbin removal lever to the right. (Refer to section 7-14. [Adjustment of the position detecting disc].)

5-6-2. Setting the bobbin

- (1) After pulling out thread about 10 cm from bobbin (No.4), put the bobbin into bobbin case (No.6).
- (2) Pass the thread through the threading groove (No.5) in the bobbin case. At this time, with pulling the thread, check that the rotation of the bobbin (No.4) is same as arrow of below figure. Pass the thread through thread slit (No.8) and pull it then, the thread can be passed under the thread tension spring (No.7) and pulled out.
- (3) Push the bobbin case into the original position.



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, or the others). Please make sure to operate the sewing machine with safety guards.
- (4) Please make sure to turn the power switch off when stopping the sewing machine temporarily.

6-1. The sewing operation

- (1) Turn the power switch on.

- (2) Press the home position return icon .

- (3) Select a sewing data.

Press the  on the standard screen then, press the .

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

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

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

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

(Pressing the  also can switch the target.)

Press the   to switch the page with full of data.

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

Press the target data number then, press the .

- (6) Set the sewing speed.

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

- (7) Set the sewing material under the work holder (No.1).

- (8) 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.)

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

- (10) After the sewing finishes, the work holder (No.1) is lifted automatically then, the sewing material is released.

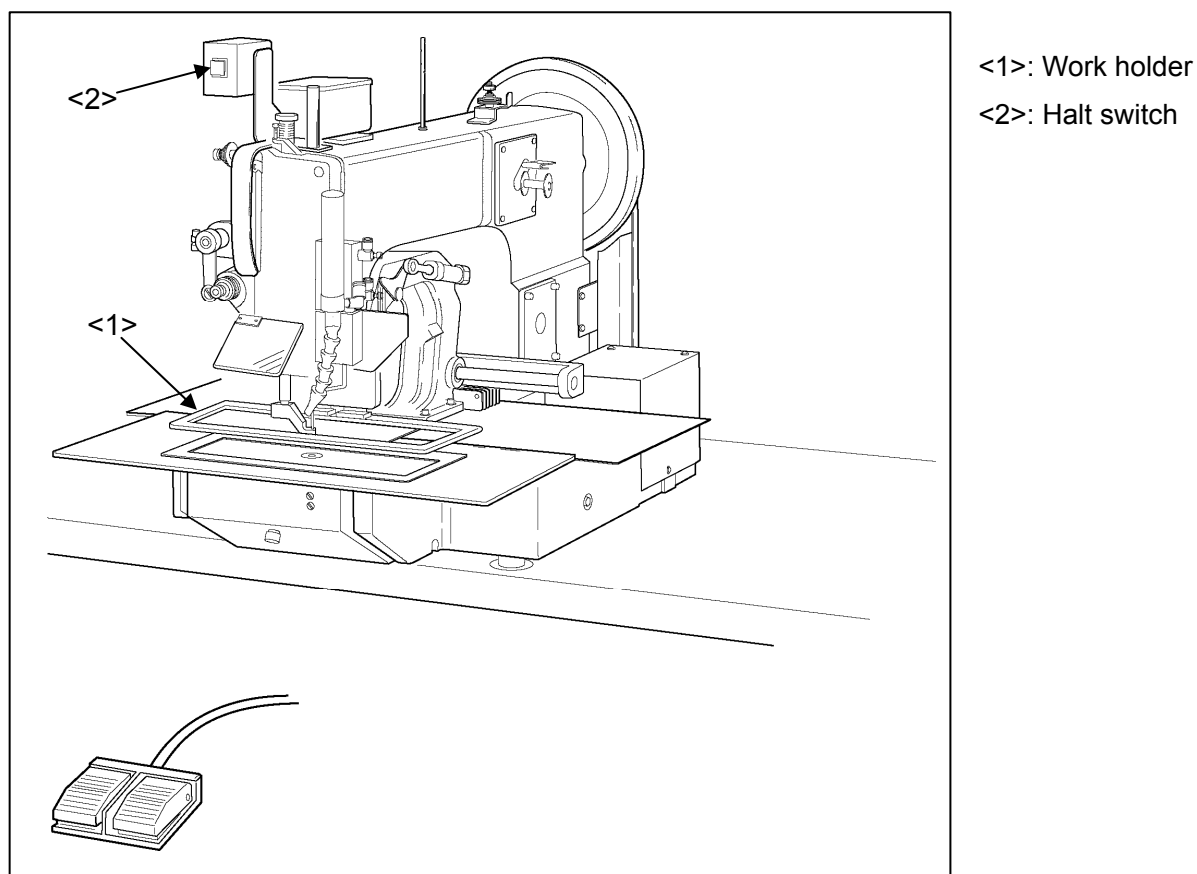
6-2. Operation of the halt switch

- (1) If accidents such as a thread breakage, needle breakage and others happened during the sewing, press the halt switch (No.2) immediately.

The sewing machine stops instantly.

- (2) To cancel the halt state, press the halt switch (No.2) again.

- (3) When continuing sewing, step on the grey foot switch to restart at the halted position. (Press the jogging in forward/reverse direction icon so that the sewing start position will move.)
- (4) To cancel sewing, press the home position return icon .



6-3. The teaching operation

Detail descriptions for pattern input are mentioned in TECHNICAL MANUAL <Operation Panel Section>. As for the input method of PLK-G2008H, it is necessary to operate the peculiarity compared with other PLK machines. Peculiar point is

STOP code [USTP] just after TRIM code is required for thermal trimming sequence.

There are two ways to put codes in the pattern data (Using Code Data Input method in the Input Mode or Modifying code data method in the Modification mode).

Please refer to the [Code data input] or [Modifying code data] in the technical manual [Operation Panel] for detail operation method.

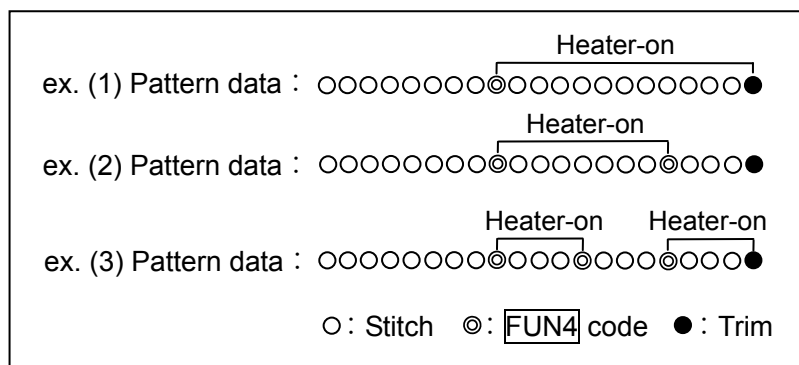


CAUTION

If STOP code is not put just after TRIM code, the X-Y table and needle will move during thermal trimming procedure and cause to damage the machine.

6-4. Pre-heating control

To secure the trimming, it is available to use pre-heating by input Function Code No.4 **FUN4** in the pattern data. Relationship between **FUN4** and pre-heating behavior is described as below.



When **FUN4** code is input once, pre-heater is continue to on until trim code is appeared.(ex.1)

When **FUN4** code is input twice, pre-heater is on at first code and off at second code.(ex.2)

When **FUN4** code is input thrice, pre-heater is on again at third.(ex.3)

Usually **FUN4** is better to put only 1 time.

NOTE Pre-heating function also, available **FN4_H** and **FN4_L** code.

Refer to the instructions in the paragraph “[7] Methods of creating sewing data “7. Code data input” ” in the **OPERATION PANEL** technical manual.

[Notice] If the residual heat time is short, sufficient heating to trim the thread may not be attained. When sewing a pattern with few stitches, the heating time must be increased by slowing the stitching speed, etc.

6-5. Setting of the Left / right alternating clamp specification

If modified the work clamp for the left / right alternating clamp specification as customer usage.

It is necessary to change the setting according to below procedures.

NOTE Left / right alternating clamp is suitable for stitching two parts together. Usage methods can be changed to suit the purpose and make setup of the stitching material more efficient.

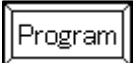


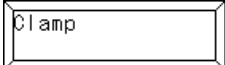
CAUTION

Please do not refurbish the sewing machine by customer-self. Doing so may cause injury and/or the machine failure.

6-5-1. Setting of the clamp priority order

(1) Press the  on the standard screen to open the MENU mode.

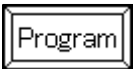
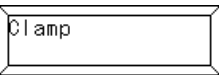
(2) Press the  in the menu icon. The Program Mode [Mode Selection] screen is displayed.

(3) Press the  .

(4) The program Mode [Set Selection] is displayed.

- (5) Set the clamp priority order. Press the  [Priority of clamp mode].
 - (6) Change the priority order invalid display  on the screen to valid , and press the .
 - (7) Press the  on the screen.
 - (8) Then screen return to the [Mode Selection]. Press the .
- Clamp priority order setting has completed.

6-5-2. Setting of the method of the clamp up for the step clamp movement

- (1) Press the  on the standard screen to open the MENU mode.
 - (2) Press the  in the menu icon. The Program Mode [Mode Selection] screen is displayed.
 - (3) Press the .
 - (4) The program Mode [Set Selection] is displayed.
 - (5) Set the method of the clamp up for the step clamp movement. Press the  [All cancel at over-step movement].
 - (6) Change the All cancel at over-step movement display  on the screen to valid , and press the .
 - (7) Press the  on the screen.
 - (8) Then screen return to the [Mode Selection]. Press the .
- Method of the clamp up for the step clamp movement has completed.

6-5-3. Setting of the input signal for the input / output setting mode

- (1) Press the  on the standard screen to open the MENU mode.
- (2) Press the  in the menu icon. (Password function)

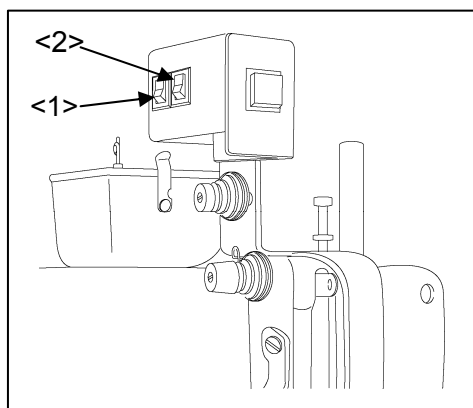
The Input setting [Input customizing setting] screen is displayed. Press the  in the input customizing setting screen. The function section screen will open. Box which setting is changed from initial setting is displayed.

- (3) Function selection screen

Press the   icons and select the signal  [Clamp all step ON signal].
(Default value is )

6-6. The thermal trimming operation

There are 2 operation switches for thermal trimming operation.

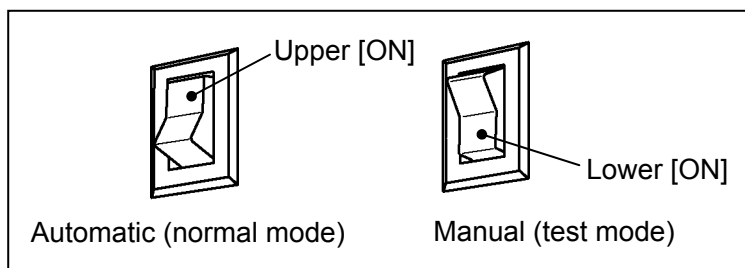


<1>: Automatic (normal mode) and Manual (test mode) conversion switch.

<2>: Thermal thread trimming device (needle and bobbin thread / invalid / bobbin thread) conversion switch.

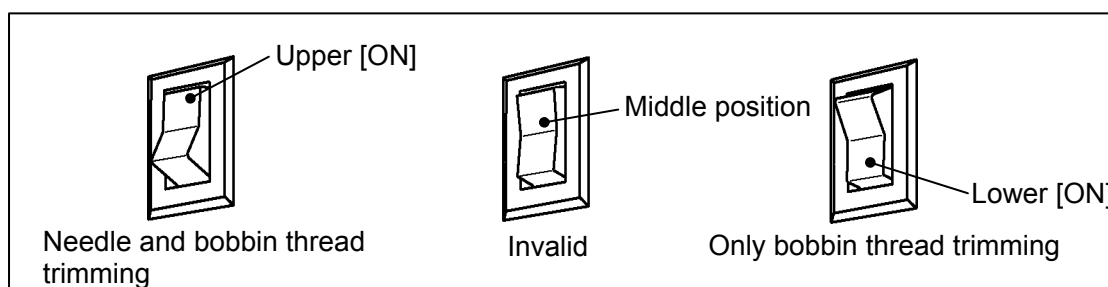
6-6-1. Manual / Test mode conversion switch (No.1)

When this switch is ON, operation mode is changed to test mode. In this mode, each cylinder can be operated separately by the operation panel. Please refer to [7-6 Test mode operation] the following page.



6-6-2. Thermal thread trimming device switch (No.2)

Thermal thread trimming device switch work as like below.



Thermal thread trimming device switch needs to operate according to below procedures.

(1) Set the changeover switch (No.1) to Manual (test mode). And then confirm the presser foot has down.

[Notice] Thermal thread trimming device switch selection is not valid when changeover switch (No.1) does not set to Manual (test mode).

(2) Select the thermal thread trimming device switch (No.2) in any position.

(3) Confirm the trimming mode on the manual (test mode) screen. Please refer to [7-6-2 Key function in the test mode] the following page.

(4) Select the switch (No.1) to automatic (normal mode).

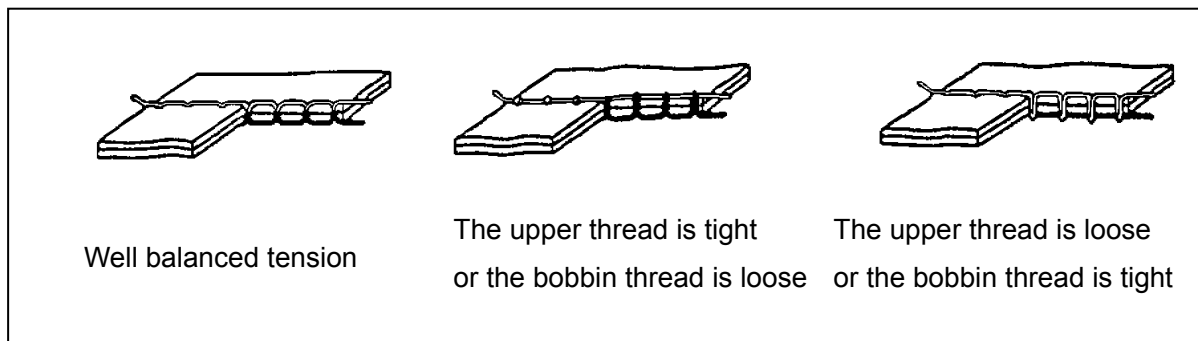
NOTE Thermal thread trimming device switch can be select in the machine power switch turned off. In this case it become validly when the machine power switch turned on again.

6-7. Adjustment of the thread tension

The thread tension between the upper and bobbin thread should be balanced in the best condition. When the upper thread tension is well balanced with the bobbin thread tension, the both threads are interlocked along the center line of fabric layers as shown on the below figures.

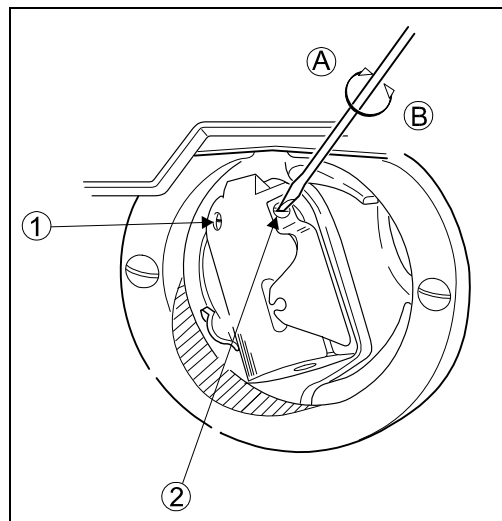
NOTE Normally weaker bobbin thread tension bring better sewing quality.

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



6-7-1. Bobbin thread tension

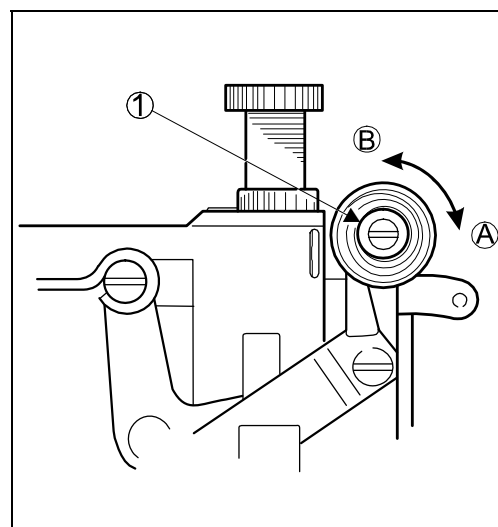
- (1) Loosen the screw (No.1). Adjust the bobbin thread tension with the thread tension adjusting screw (No.2).
To increase the bobbin thread tension, Turn the screw to the clock-wise (A).
To decrease the bobbin thread tension, turn the screw to the counterclockwise (B).
- (2) After adjustment, fasten the screw (No.1).



6-7-2. Upper thread tension

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

For this adjustment, turn the thread tension adjusting nut (No.1). The upper thread tension becomes tight if turn the thread tension adjusting nut (No.1) to the clockwise (A), and the upper thread tension becomes loose if turn it to the counter-clockwise (B).



7. STANDARD ADJUSTMENT

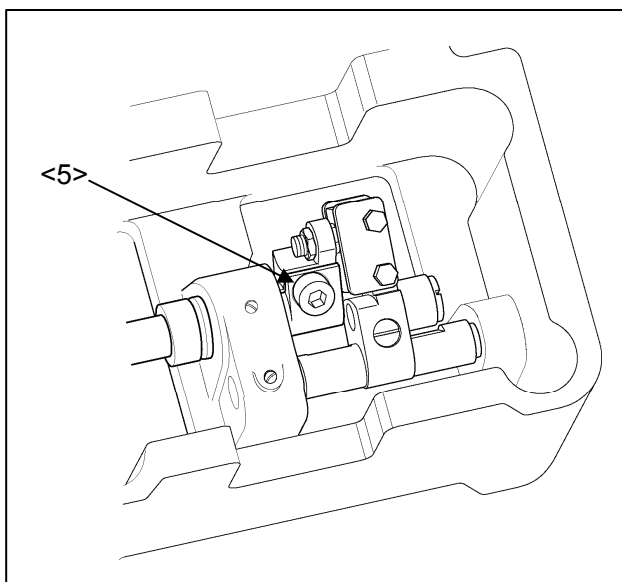
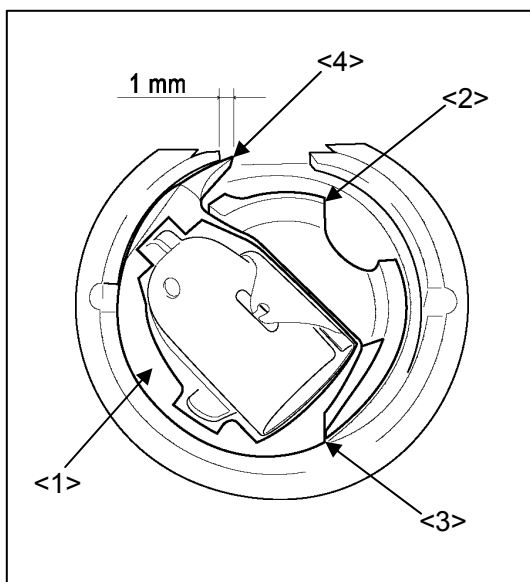


CAUTION

- (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, or the others) back on the initial position after the sewing machine adjustment.

7-1. Adjustment of the shuttle

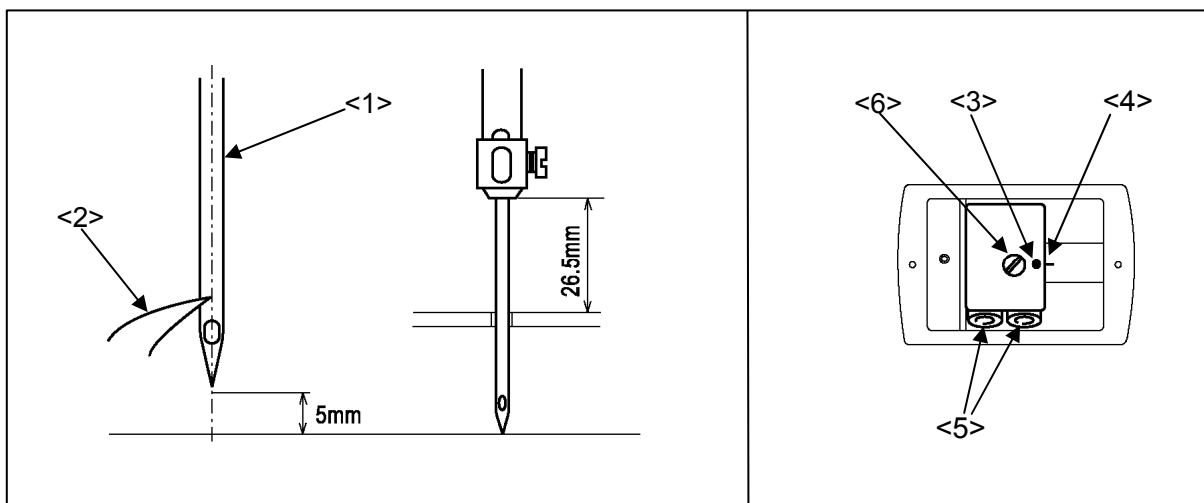
- (1) Turn the power switch OFF.
- (2) Turn the driver race (No.2) counterclockwise until it will go no further.
Put shuttle (No.1) to come contact with the driver race (No.2) by (No.3) point.
- (3) Check a distance between the blade point (No.4) of the shuttle (No.1) and the end face of the shuttle race. Proper distance is 1mm. If distance is not proper, refer to following adjustment.
- (4) Turn the shuttle (No.1) until at the point described in (3).
- (5) Remove the V-belt from sewing machine.
- (6) Tilting the sewing machine, and loosen the bolt (No.5).
- (7) Align the blade point of the shuttle (No.1) by turning the shuttle by hand.
- (8) After adjustment has been completed, tighten screw (No.5) firmly.



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

- (1) Turn the hand wheel to make the needle bar ascend 5 mm from its lowest position.
At this time, blade point (No.2) should be aligned with the center of the needle (No.1).
- (2) And the distance from the upper surface of the throat plate to the lower end of the needle bar should be 26.5 mm. To adjust the position of the needle and shuttle, referring following procedure.
- (3) Remove the cover of the arm top.

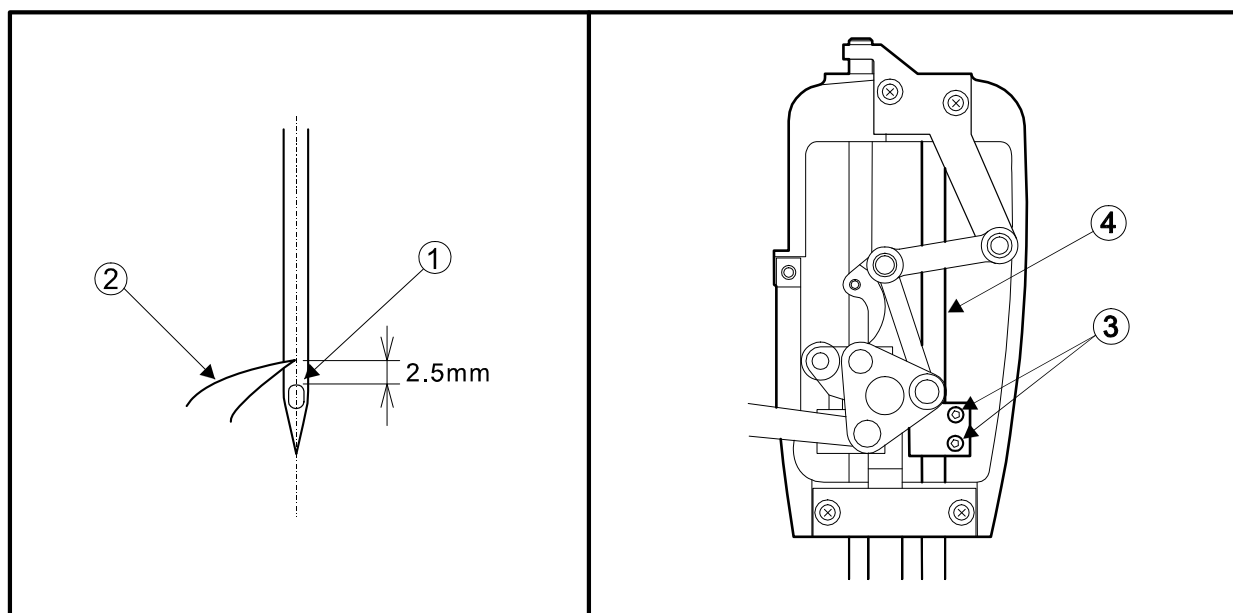
- (4) Loosen screw (No.5).
- (5) Loosen screw (No.6), and adjust so that marker dot (No.3) engraved on the eccentric cam of the vertical rod is aligned with marker line (No.4) engraved on the main shaft.
- (6) After the adjustment, securely tighten screws (No.5 and 6).



7-3. Adjustment of the needle bar height

The correct height is that the distance from the blade point of the shuttle (No.2) to the upper end of the needle eyelet (No.1) is 2.5 mm when the blade point of the shuttle is aligned with the center of the needle. To adjust the height of the needle bar,

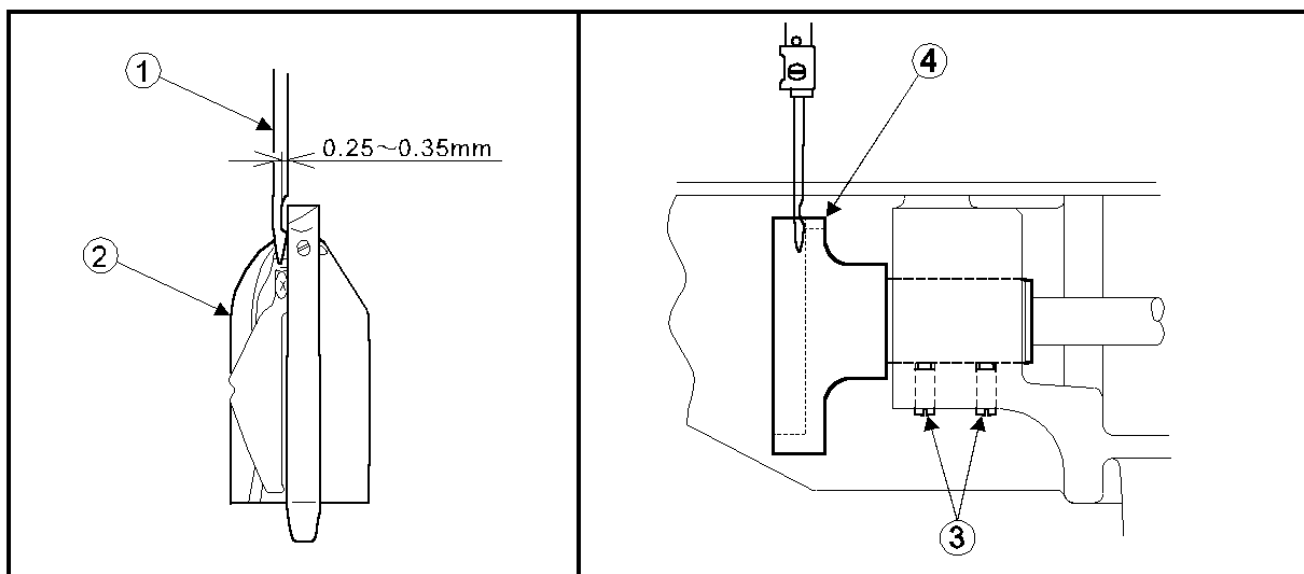
- (1) Loosen screws (No.3).
- (2) Adjust the height by moving needle bar (No.4) up and down.
- (3) After adjustment has been completed, tighten screws (No.3) firmly.



7-4. Adjustment of the needle-to shuttle clearance

Correct clearance between the recess in the needle (No.1) and the blade point of the shuttle (No.2) is 0.25 ~ 0.35 mm. To adjust the needle-to-shuttle clearance,

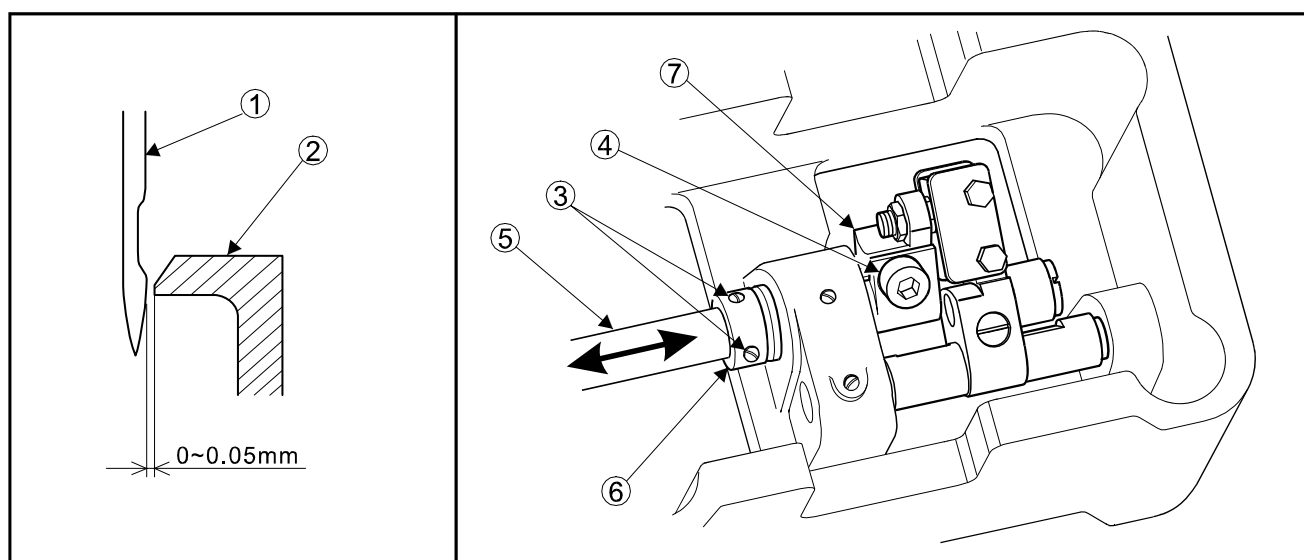
- (1) Loosen screw (No.3).
- (2) Adjust the clearance by moving shuttle driving shaft bushing (No.4) to the left and right.
- (3) After adjustment has been completed, tighten screw (No.3) firmly.



7-5. Adjustment of the needle-to-driver clearance

Correct clearance between the needle (No.1) and the needle guard of the driver (No.2) has the range of 0 ~ 0.05 mm. To adjust the needle-to-driver clearance,

- (1) Turn the hand wheel to make the needle bar lowest position.
- (2) Remove the V-belt and tilting the sewing machine.
- (3) Loosen two screws (No.3) and Bolt (No.4).
- (4) Adjust clearance between the convex section of needle (No.1) and the needle guard of the driver (No.2) to range of 0 ~ 0.05 mm by moving the shuttle driving shaft (No.5) to the left and right.
- (5) After adjustment has been completed, secure the shuttle driving shaft thrust collar (No.6) and the small pendulum (No.7), making sure there is no axial play of the shuttle driving shaft.



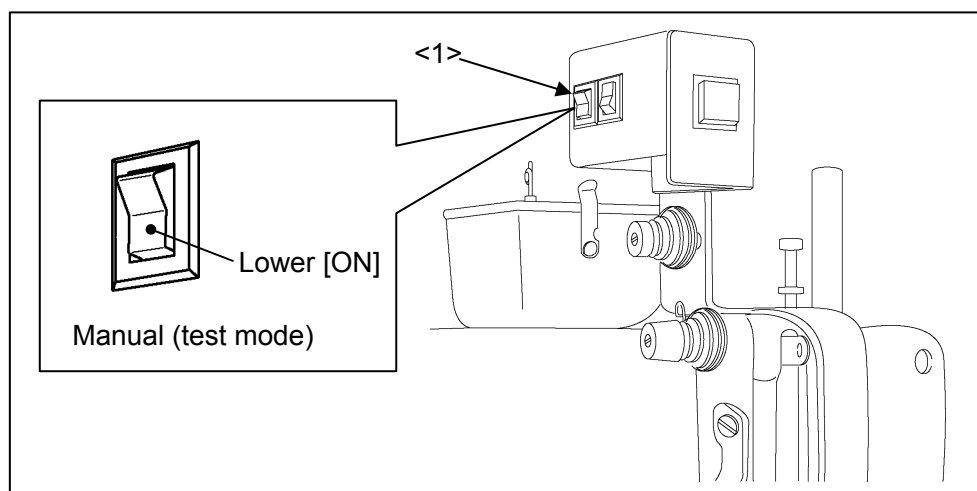
7-6. Test mode operation

7-6-1. Entrance for the test mode operation

The test mode operation is used for adjustment of mechanical position (height or stroke) for the thermal thread trimmer equipment and also for check the position of the sensors of the cylinders.

For entrance this mode,

- (1) Turn the power switch ON.
- (2) Set the changeover switch (No.1) to manual (test mode).
- (3) The operation panel screen will change to the manual (test mode) screen. The manual (test mode) screen opens at the standard screen 1 and 2. The explanation of standard screen refer to the instructions in the paragraph "[3] Explanations of basic screen, icons and operation" in the Operation Panel technical manual.



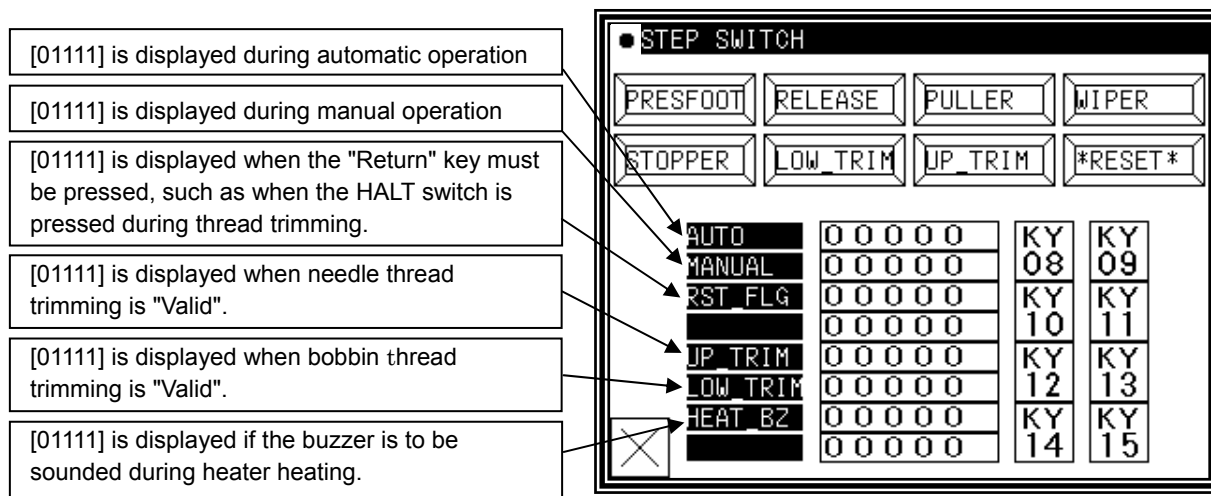
[Notice] Even when the changeover switch (No.1) is already set to manual (test mode) when the power switch is turned ON, the manual (test mode) screen will open.

NOTE Out / In signal can be checked by checking mode in the operation panel. Please refer to [7-6-3. Checking method of the input signal in the sewing state] in this technical manual

STEP SWITCH			
PRESFOOT	RELEASE	PULLER	WIPER
STOPPER	LOW_TRIM	UP_TRIM	*RESET*
AUTO	0 0 0 0 0	KY	KY
MANUAL	0 0 0 0 0	08	09
RST_FLG	0 0 0 0 0	KY	KY
	0 0 0 0 0	10	11
UP_TRIM	0 0 0 0 0	KY	KY
LOW_TRIM	0 0 0 0 0	12	13
HEAT_B2	0 0 0 0 0	KY	KY
	0 0 0 0 0	14	15

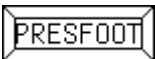
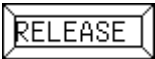
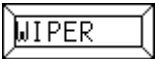
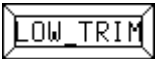
7-6-2. Key function in the test mode

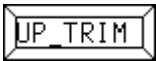
In the test mode, each key on the operation panel works to operate the thermal thread trimmer equipment (cylinders or relay) independently. Relationship between the key and the equipment is as below. In the Test mode, Start switch is disabled.



* The state with each key pressed and highlighted is the [ON] state.

* Each cylinder will not move unless the work holder is lowered.

KEY	[ON]	[OFF]
 (*1)	Rise	Lower
	Refers to when the needle is at the thread take up lever uppermost position.	
	Thread release "Open"	Thread release "Close"
	Can be operated when needle thread trimming is valid.	
	Thread manual feed	Thread manual feed return
	Can be operated when needle thread trimming is valid.	
 (*1)	Tense thread	Loosen thread tension
	Can be operated when needle thread trimming is valid.	
	Operable when "Presser foot" is raised	
 (*1)	Stopper "Lower"	Stopper "Rise"
	Can be operated when needle thread trimming is valid.	
	Operable when thread is tensed by "Thread tensioner"	
	Bobbin thread trimmer function	Bobbin thread trimmer return
	Can be operated when bobbin thread trimming is valid.	

 (*1)	Needle tread trimmer function (heater lower)	Needle thread trimmer return (heater rise)
	Can be operated when needle thread trimming is valid.	
	Return all above cylinders to default state in appropriate order	No function
	Turns [ON] when pressed, and turns [OFF] when returned	

(*1) In some cases, the keys cannot be operated depending on the condition. The conditions are shown below.

To turn the key [ON], the keys must be turned ON in the order of "Presser foot" > "Thread tensioner" > "Fabric thickness detection" > "Needle thread trimmer".

To turn [OFF], the keys must be turned OFF in the order of "Needle thread trimmer" > "Fabric thickness detection" > "Thread tensioner" > "Presser foot".

 The heater will heat while pressed.
(Max. 2.5 seconds)

 The needle cooler will
output while pressed.

 Not used

 Not used

 Not used

 Not used

 The heater buzzer is turned ON or OFF.
Condition can be confirmed visually

 One cycle operation

One cycle operation

One cycle of operation refers to the following series of operations.

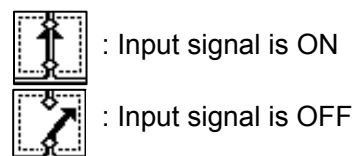
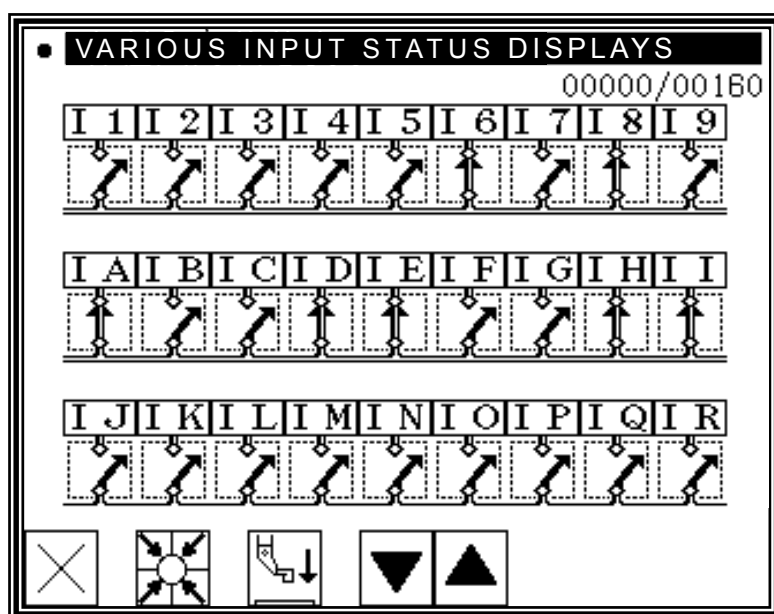
1. The thread release is opened.
2. The required amount of thread is pulled out with the thread manual feed.
3. The thread release is closed.
4. The thread manual feed is returned to the original position.
5. The presser foot rises.
6. The thread tensioner pulls up the remaining number of stitches to the position where the thread can be trimmed.
7. The fabric thickness detector lowers to above the work holder.
8. The needle thread trimming heater (and bobbin thread trimming heater) moves to the thread path.
(The thread is heated and cut.)
9. The needle thread trimming heater (and bobbin thread trimming heater) returns to the original position.
10. The fabric thickness detector rises.
11. The thread tensioner returns to the original position.
12. The presser foot lowers.

7-6-3. Checking method of the input signal in the sewing state

If the thread trimming mechanism (heater cutter) stops for any reason or the sewing machine does not work even start switch is turned on, confirm the input signal by the below procedures. The detail is explained in the paragraph "[14] Input/output setting mode" in the Operation Panel technical manual.

- (1) Press the  on the standard screen to open the MENU mode.
- (2) Press the   in the menu icon.
- (3) Press the  ON/OFF status of the input signal can be confirmed.

Please confirm if the ON/OFF status of the input signal same as below figure.



Signal	Function	Status
I1	Start input	OFF
I2	Work holder 1	OFF
I3	No operation	OFF
I4	Halt switch	OFF
I5	Presser foot lower	OFF
I6	Bobbin thread trimmer return	ON
I7	Bobbin thread trimmer function	OFF
I8	Fabric thickness detection "rise"	ON
I9	Needle thread trimmer function	OFF

Signal	Function	Status
IA	Needle thread trimmer return	ON
IB	Thread manual feed function	OFF
IC	Thread tensioner function	OFF
ID	Thread tensioner return	ON
IE	Thread release function	ON
IF	Thread release return	OFF
IG	Bobbin thread trimming device SW	—
IH	Needle thread trimming device SW	—
II	Automatic/manual conversion SW	ON

(IG, IH indicates that the input signal is ON or OFF)

7-6-4. Countermeasure for troubles

Each unit can be returned to the home position with the following methods. (This method returns each cylinder to the home position in an appropriate order. Do not use this method if a problem could arise when each cylinder moves.)

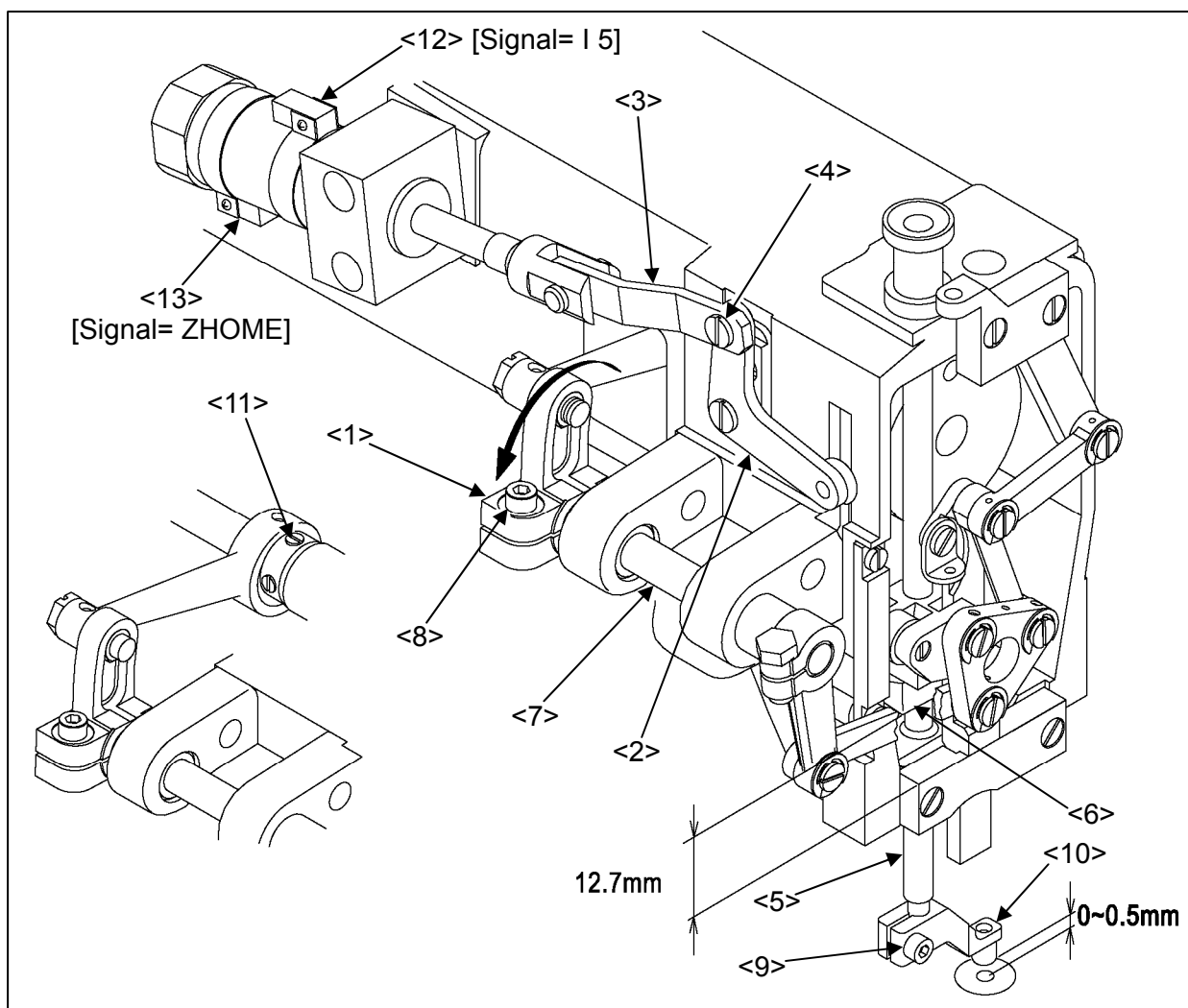
- (1) Put the HALT switch ON and turning back the HALT switch to OFF.
- (2) Change mode switch to Test mode.
- (3) Put the Reset key ON.

When the thread trimmer device is stop by mechanical problem (for example jam with thread), it is necessary to power switch OFF. In this case the presser foot keep up to avoid interference with thread trimmer device.

7-7. Adjustment of the presser foot

7-7-1. Adjustment of the driving shaft arm(front) and the presser foot

- (1) Turn the power switch OFF.
- (2) Remove the side cover and the face cover.
- (3) Turn the sewing machine pulley by hand and stop the driving shaft arm-rear(No.1) at its maximum swing position in arrow direction.
- (4) Disconnect the presser bar lifting link (No.2) from the presser lift plate (No.3) by removing the hinge screw (No.4).
- (5) Lift up the presser bar (No.5) and the hand lift link (No.6).
- (6) Insert the 12.7mm block.
- (7) Tighten the screw (No.8) of the driving shaft arm-front (No.7) without the axial clearance of the driving shaft.
- (8) After the adjustment, connect the presser bar lifting link (No.2) with the presser lift plate (No.3) by setting the hinge screw (No.4) and put the face cover and the side cover back on the original location.
- (9) Loosen the screw (No.9) of the presser foot (No.10) and then, adjust the presser foot position to be become the clearance between the bottom surface of the presser foot and the surface of the sewing material 0~0.5 mm.
- (10) Tighten the screw (No.9) of the presser foot with to come down to the center of the needle hole of the presser foot.



7-7-2. Adjustment of the sensor of the presser foot cylinder

At normal position, the sensor Z HOME (No.13) is ON and the sensor I 5 (No.12) is OFF.

At activate position, these sensor will be reversed.

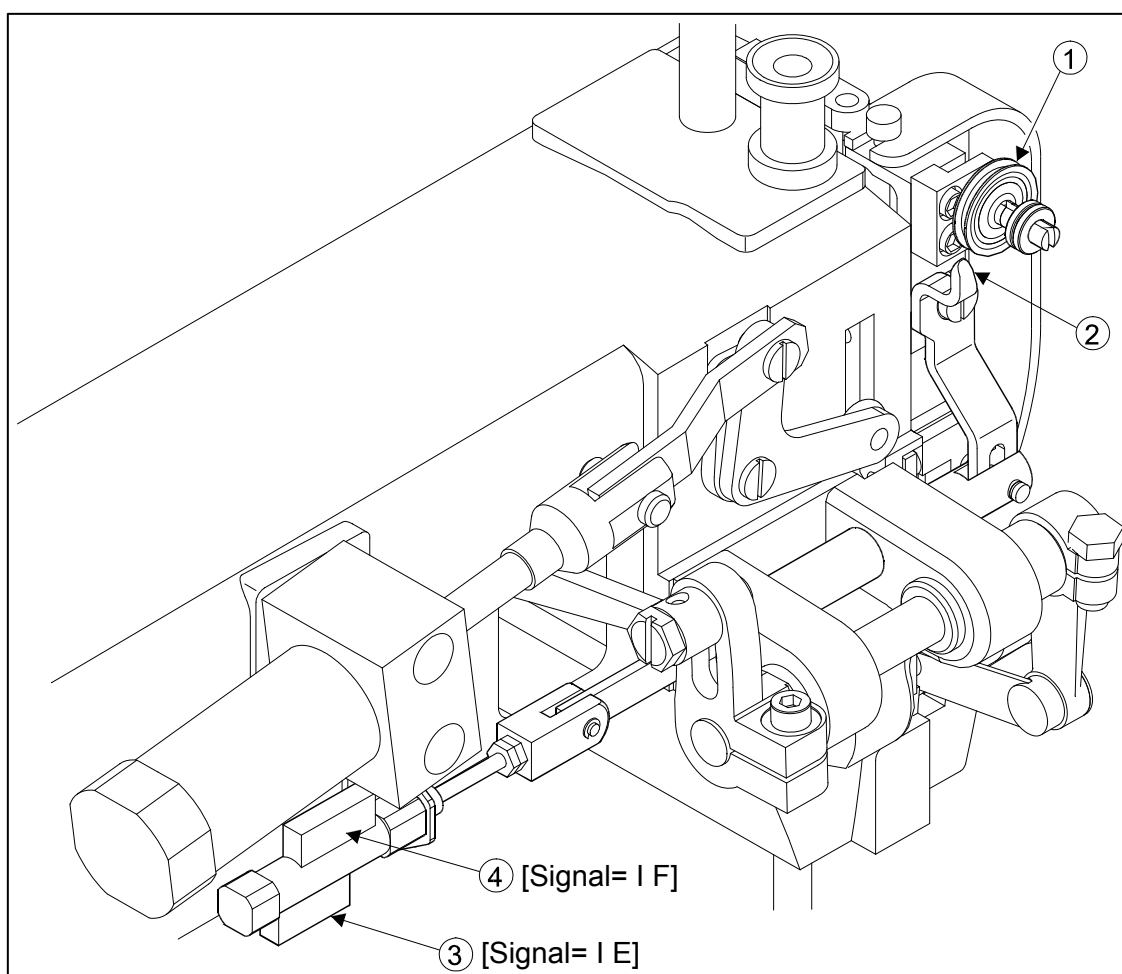
Check the sensors according to the previous section [7-6-2. Key function in the test mode] and [7-6-3.

Checking method of the input signal in the sewing state]

7-8. Adjustment of the tension release

When tension close (the tension release plate (No.2) leaves from the tension disc (No.1)), the sensor I F (No.4) on the cylinder is ON and the sensor I E (No.3) is OFF.

When tension open, (tension release plate approach to the tension disc), these sensors will be reversed.



7-9. Upper thread thermal trimming device

For a secure sewing at the seam beginning, a certain quantity of drawn-forward needle thread is required. The drawn-forward occurs after completion of seam with the clamps still lowered.

Function sequence of upper thread thermal trimming procedure

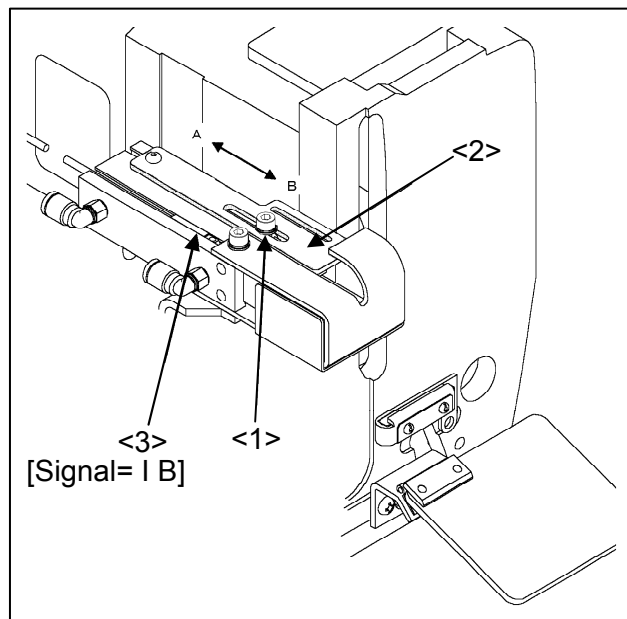
- ✧ The sewing pattern is finished.
- ✧ The needle stops in the high-position of thread lever.
- ✧ The needle thread tension open.
- ✧ The thread puller pulls the required thread quantity forward.
- ✧ The needle thread tension close again.
- ✧ The thread puller moves back into its base position.
- ✧ The presser foot lifted in it's up-position.
- ✧ The thread wiper pulls the drawn-forward needle thread into the heating position.
- ✧ The thickness detector lowers on the clamps.
- ✧ The upper heater lowers.
- ✧ The thread is heated off.
- ✧ The clamp move up.
- ✧ A new sewing sequence can be started.

7-9-1. Setting thread puller

The thread puller must be set so that, depending on the material to be worked, a secure seam beginning is assured. If the drawn-forward thread quantity is too small, the thread is too taut during heating, and The thread end doesn't melt together.

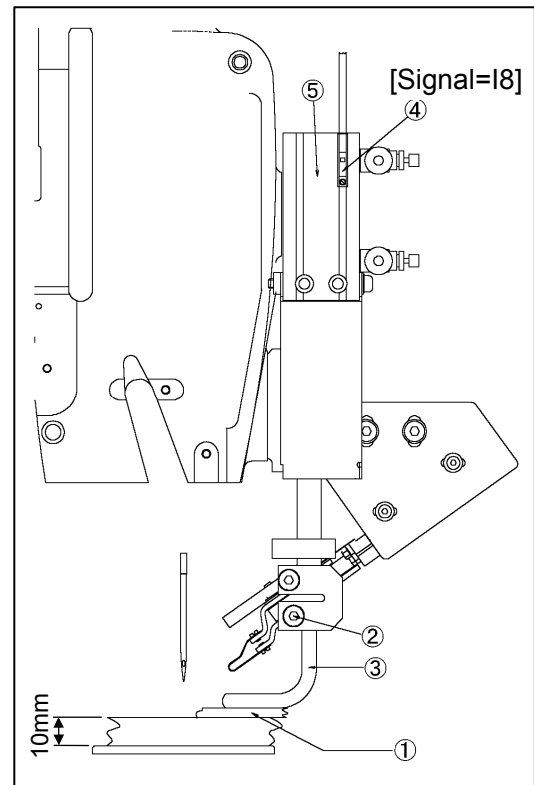
To adjust the drawn-forward thread quantity

- (1) Loosen screw (No.1).
- (2) Move and adjust the thread adjustment plate (No.2) in the direction of the arrow (A or B).
(When moved in the direction of A, the thread manual feed amount will increase, and when moved in the direction of B, the thread manual feed amount will decrease.)
- (3) Securely tighten screw (No.1).
- (4) Check the sensor if the thread puller pull (activate position) the thread, the sensor I B (No.3) is ON.



7-9-2. Setting of the thickness detector

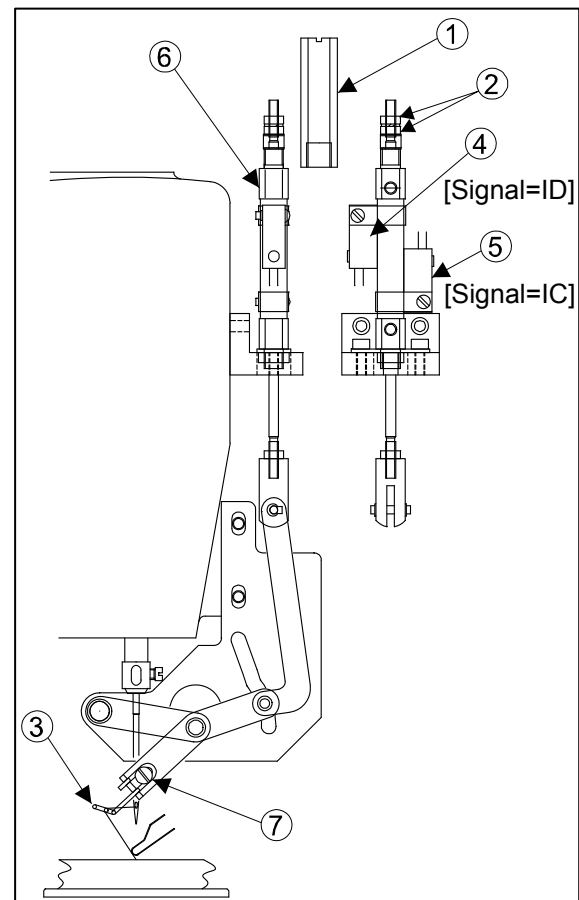
- (1) Place material of the maximum allowable thickness(10mm) or spacer between the upper and lower clamp (No.1).
- (2) Pull down the air cylinder (No.5).
- (3) Loosen the setting screw (No.2).
- (4) Pull the thickness detector (No.3) downward until it touches the lower clamp (No.1).
- (5) Tighten the setting screw (No.2).
- (6) At this time, make sure the sensor I 8 (No.4) of the thickness detector cylinder (No.5) functions. At upper (normal) position the sensor I 8 should be ON.



7-9-3. Setting of the thread wiper

The thread wiper pulls the thread at a proper angle for the heater and the thread on to come in contact correctly as for the thread. It is proper that the thread angle almost has the relation of the 90 degree with the heater. Moreover, a suitable tension should be added for avoid the thread should not escape from the heater at this time. Please adjust the thread wiper device as follows.

- (1) Remove the rod cover (No.1).
- (2) Loosen the nuts (No.2).
- (3) Set the swing movement of the thread wiper (No.3) by rotating the nuts (No.2) up or down.
- (4) Tighten the nuts (No.2) .
- (5) Replace the rod cover again.
- (6) After adjustment, check the position of the sensors I D (No.4) and I C (No.5) of the wiper cylinder (No.6). At the initial position of the thread wiper, the sensor I C must be OFF and the sensor I D must be ON.



The thread wiper should move freely past under the needle. To correct the height of the thread wiper

- (1) Place material of the maximum allowance thickness (10mm) or spacer between upper and lower clamp.

- (2) Swing the thread wiper manually past under the needle and check the thread wiper should not thereby strike against the needle. If the wiper interfere, adjust by following procedure.
- (3) Loosen clamping screw (No.7).
- (4) Adjust the height of the thread wiper (No.3).
- (5) Tighten clamping screw (No.7).

7-9-4. Adjustment of the upper thread heater

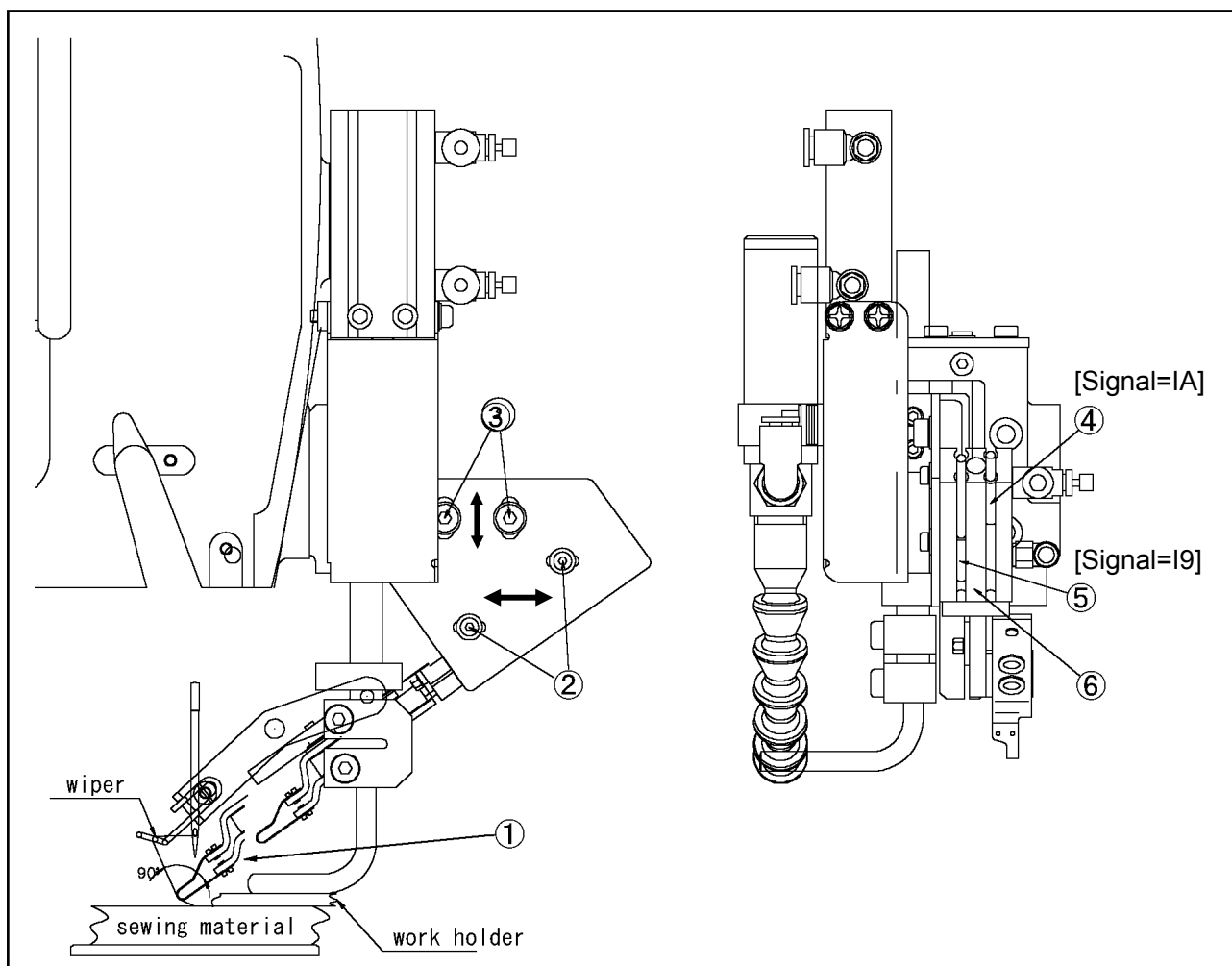
The upper heater must be an angle of approx. 90° to the thread positioned by the thread wiper.

The fully extended heater must have a clearance of approx. 1 mm to the clamped material.

The fully extended heater must touch on the thread positioned by the thread wiper with a slight pressure.

To adjust the position of the upper thread heater

- (1) Extend the heater (No.1) manually.
- (2) Loosen the screws (No.2) and the screws (No.3).
- (3) Adjust the heater vertically and horizontally.
- (4) Tighten the screws (No.2 and 3) and the screws.
- (5) After this adjustment, check the sensor I A (No.4) of the heater cylinder (No.6) should be ON and the sensor I 9 (No.5) should be OFF at the normal position.

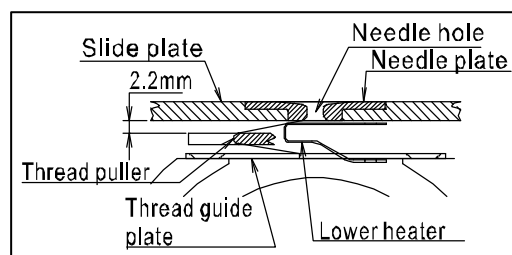


7-10. Adjustment of lower thread trimmer heater

The lower heater is in its initial position, when the thread puller (No.2) is outside the area of needle hole (NO.4).

- (1) Distance between thread puller (No.2) and lower heater (No.1) should be about 6mm.

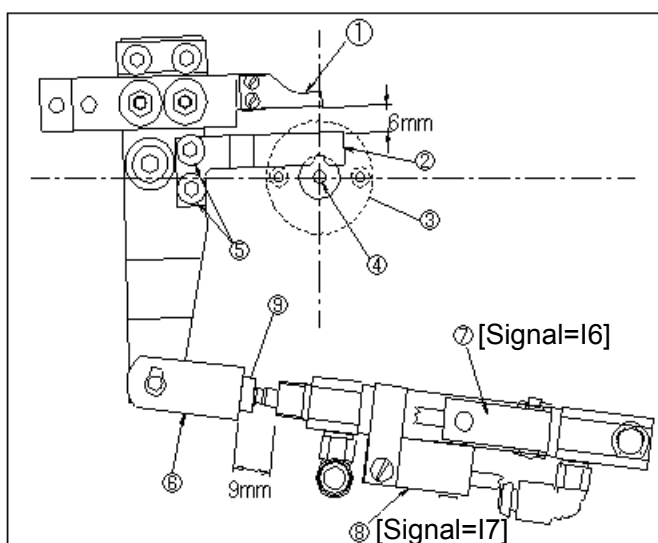
For correction of the lower heater (No.1), loosen the screw (No.5) and change the position of the thread puller (No.2).



- (2) The proper position of the lower thread trimmer device is obtained when the distance of the cylinder and Y-shape knuckle joint (No.6) is 9mm on the withdrawing side of the cylinder and is 34mm on the extrusion side. For correction of the distance, loosen the nut (No.9).

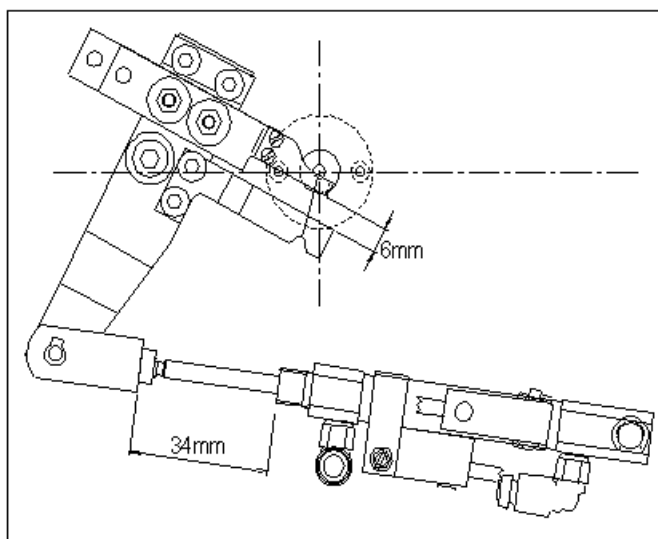
Proper height of the heater (No.1) is where the heater is very adjacent to the needle plate (No.3) and also it does not come in contact with any other part.

For correction, bend the lower heater.



- (3) Height of the thread puller (No.2) in the normal position should be positioned 2.2mm lower than the needle plate (No.3).

For correction, bend the thread puller (No.2).



- (4) After this adjustment, check the sensor I6 (No.7) of the heater cylinder should be ON and the sensor I7 (No.8) should be OFF at the normal position.

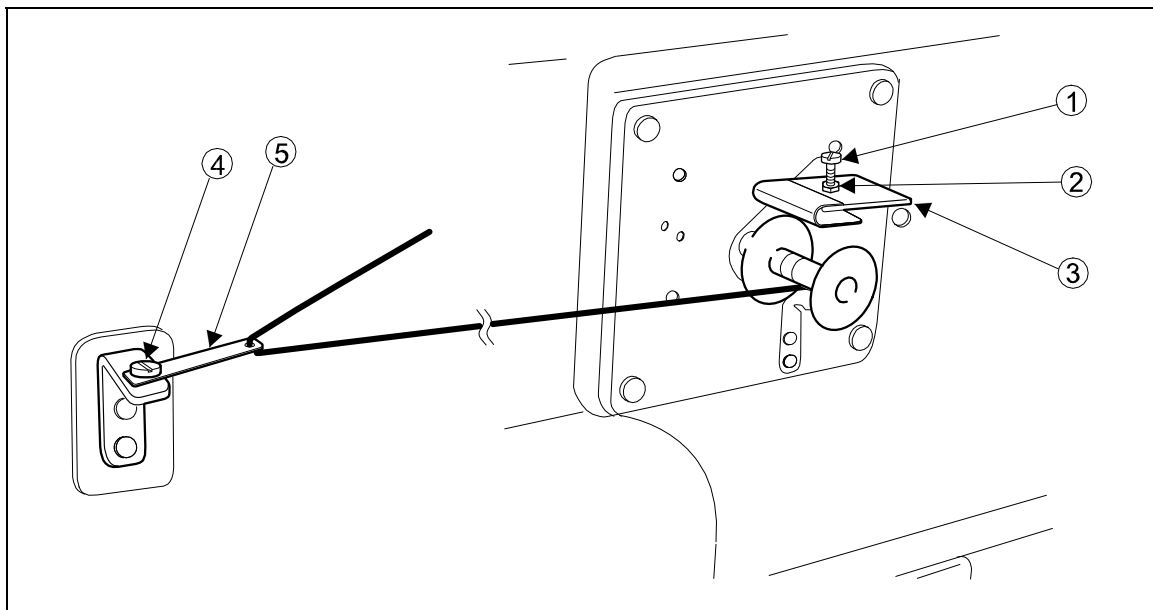
7-11. Adjustment of the bobbin winder

The amount of thread has already been adjusted so that thread can be wound round approximately nine-tenths of the bobbin. If the amount is excessive or insufficient, adjust by following method.

- (1) Loosen the adjusting screw (No.1) and nut (No.2).
- (2) Turn the adjusting screw (No.1). To decrease the amount, turn clockwise. To increase the amount, turn counterclockwise.
- (3) After adjusting the amount of thread has been completed, tighten the nut to secure firmly.

If bobbin thread is wound unevenly,

- (4) Loosen the screw (No.4).
- (5) Move the bobbin winder thread guide (No.5) forward and backward so that thread can be wound evenly.

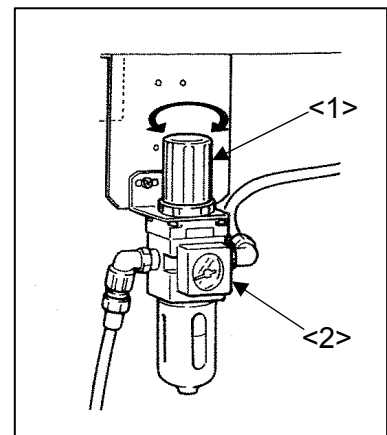


7-12. Adjustment of the work holder pressure



★If the secondary side air pressure is set too high, trouble such as operation faults may occur. Always set the pressure to within 0.4Mpa.

- (1) The work holder pressure is provided from an air source.
Lift and turn the air regulator's adjustment knob (No.1) located under the table to adjust the air pressure.
- (2) If turn the adjusting knob (No.1) to the clockwise, the air pressure is increased and the work holder pressure is also increased simultaneously.
- (3) If turn the adjusting knob (No.1) to counter clockwise, the air pressure is decreased and the work holder pressure is also decreased simultaneously.
- (4) 0.4Mpa (4kgf/cm²) is the standard air pressure as a normal sewing operation.

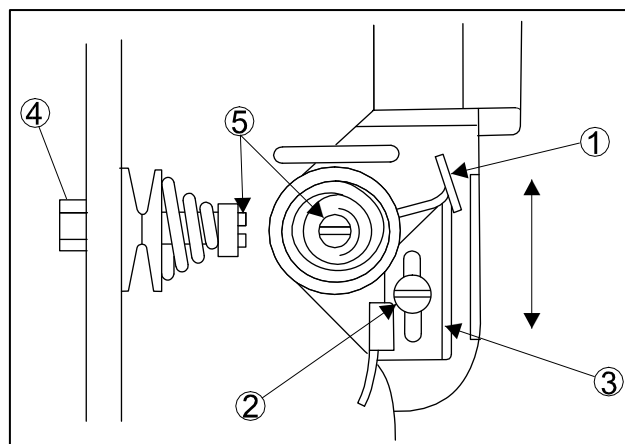


7-13. Adjustment of the Thread take up spring tension

The standard stroke of thread take-up spring (No.1) is 8 to 15 mm.

To adjust operating range,

- (1) Loosen screw (No.2).
- (2) Adjust the operating range by moving thread the take-up spring adjusting plate (No.3) up and down.
- (3) After adjustment, tighten screw (No.2) firmly.



7-14. Adjustment of the position detecting disc

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

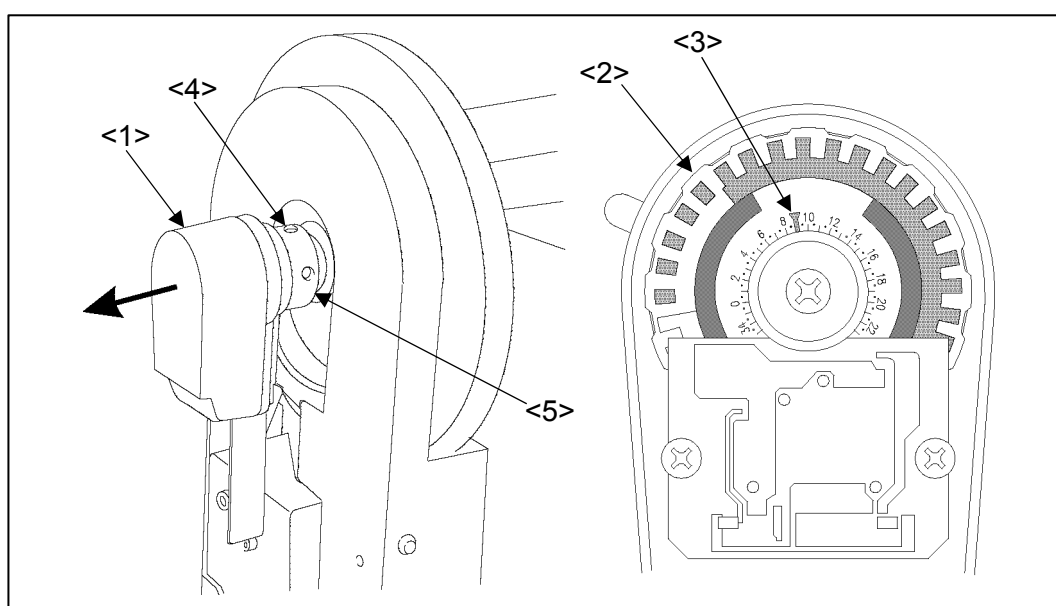
- (1) Draw out the synchronizer cover (No.1) cable and remove it.
- (2) The synchronizer comes with 2 position detecting discs. The front disc (red) is used to detect the down position, and the rear disc (black) (No.2) to detect the up position.
- (3) The rear disk (black) has a scale. Align the triangular mark (No.3) of the front disc (red) at the 90 degree position on this scale. This setting is used for determine the start timing of X-Y table.



CAUTION

★If the setting of discs is changed, accurate movement of X-Y table can not be performed.

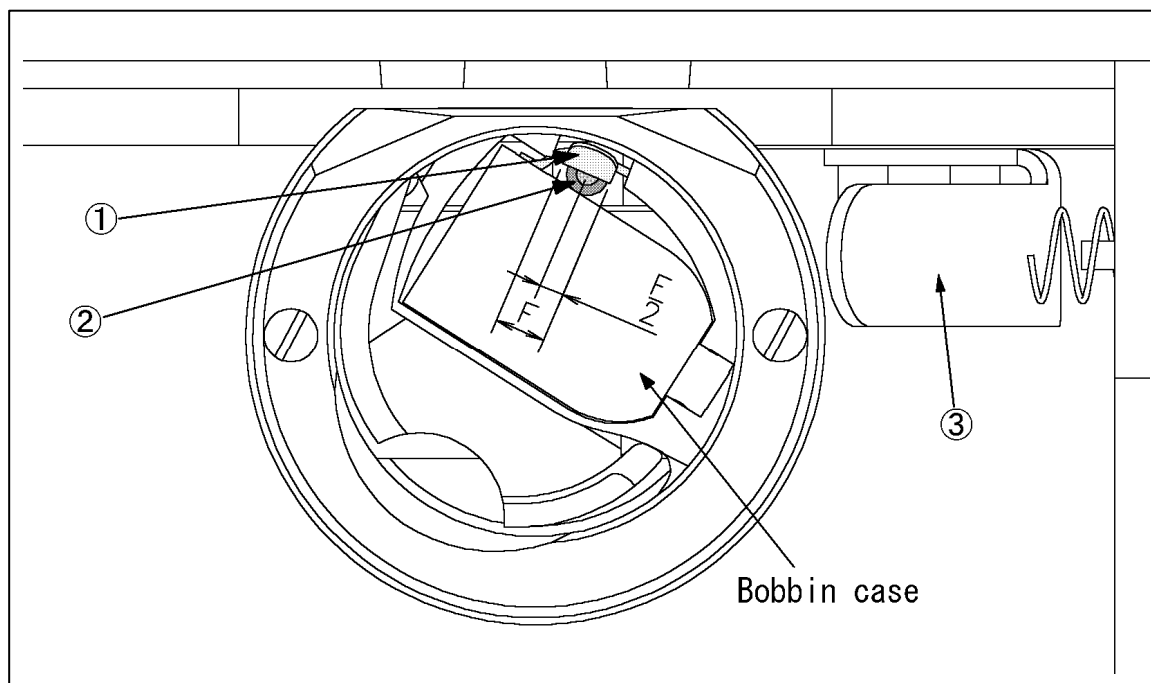
- (4) Adjusting for up position thread take up lever is in high end), loosen screw (No.4).
- (5) Turn the synchronizer bush (No.5) with holding pulley.
- (6) After adjustment tighten screw (No.4).



7-15. The relation of the hook position and upper stop position

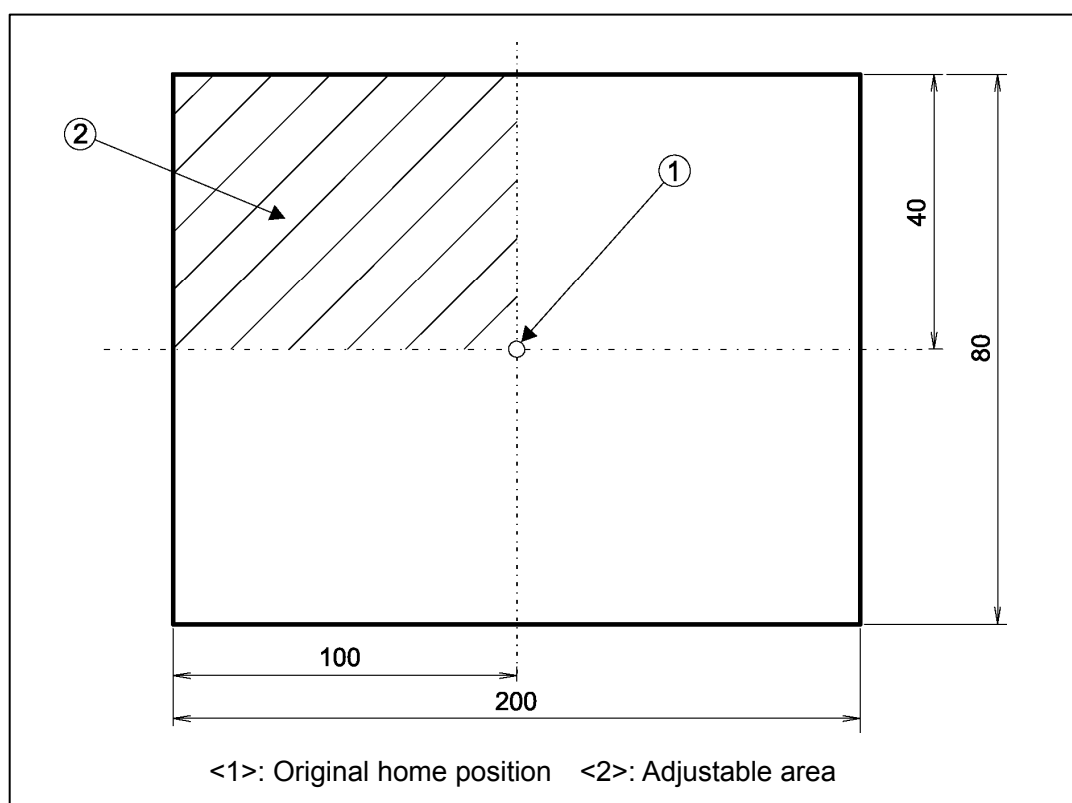
The relation of the hook (bobbin case) position and upper stop plate (thread take up lever uppermost position) is shown below.

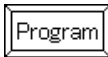
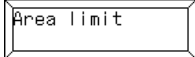
The upper stop position (thread take up lever uppermost position) is the position where the bobbin case holding spring knob (No.1) and holding spring release pin (No.2) are aligned as shown in the figure. (If the bobbin removal lever (No.3) is pressed to the right in this state, the bobbin case will open.)



7-16. Adjustment of the mechanical home position

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.

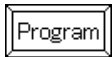
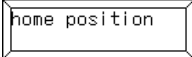


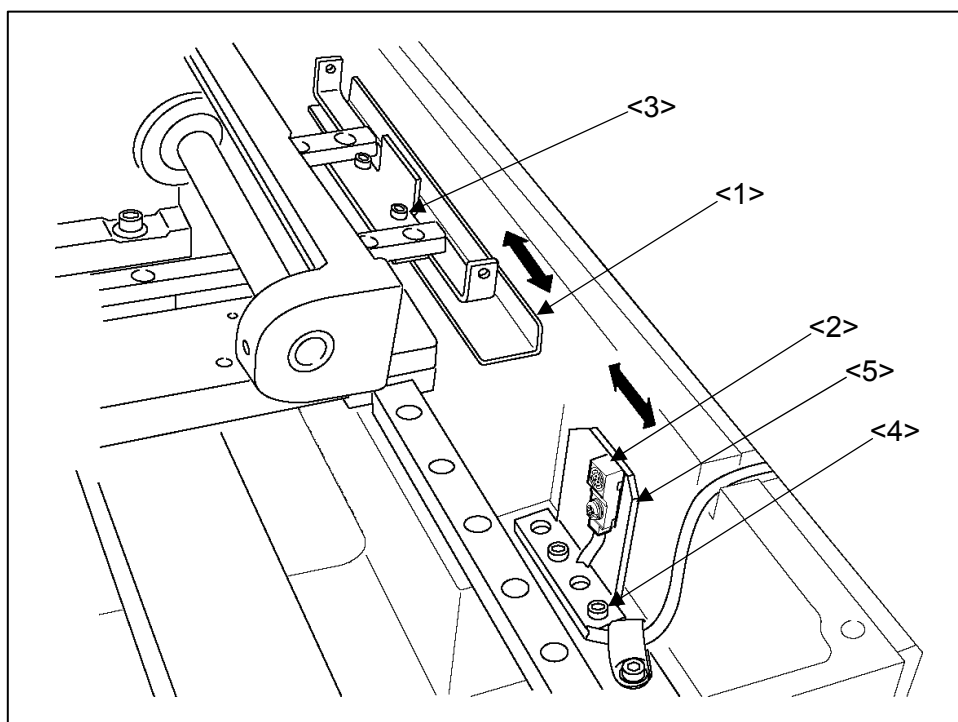
- (1) After canceling the sewing area limit, change the mechanical home position.
- (2) Press the  on the standard screen to open the MENU mode.
- (3) Press the  ->  ->  [Cancellation of sewing area limit] in order.
- (4) Select the  on the [Cancellation of sewing area limit] screen, and press the .
- (5) When turning the power off then, the setting of the sewing area limit is cancelled.

7-16-1. Adjustment of the X direction

- (1) Turn the power switch off.
- (2) Remove the covers on the top of the sewing machine bed.
- (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 icon , and check the mechanical home position.
- (6) If the mechanical home position is not the desired position, carry out the same procedure (4) and (5) again. In that case, turn the power switch off each time.

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

To use the sensor from the send returning, press  →  →  [Home returning method since the second time returning] on the standard screen and set it ON.



(a) In the case described above, available amount of adjustment of the home position is 0 to 25mm.

For further adjustment, Loosen set screw (No.4) and move position of the detector adapter (No.5).

(b) If move the detector adapter (No.5) to the right, the mechanical home position is shifted to the left.

(c) After adjustment, tighten the set screw (No.4)

7-16-2. Adjustment of the Y direction

(1) Turn the power switch off.

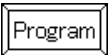
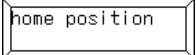
(2) The mechanical home position of the Y direction is the position where the detector (No.2) can detect the edge of the Y drive (No.1).

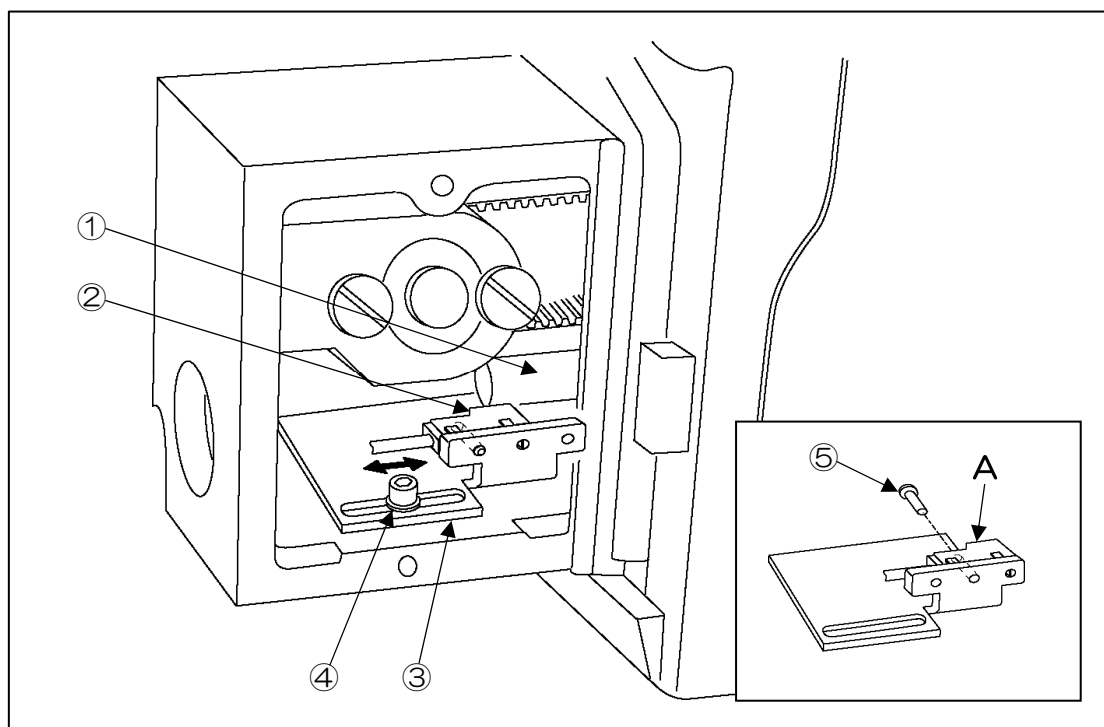
(3) For the adjustment of the Y direction mechanical home position, loosen the detector set screw (No.4) then, move the detector to the arrow direction as shown on the figure.

(4) Turn the power switch on. Press the home position return icon , and check the mechanical home position.

(5) If the mechanical home position is not the desired position, carry out the same procedure (3) and (4) again. In that case, turn the power switch off each time.

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

To use the sensor from the send returning, press  →  →  [Home returning method since the second time returning] on the standard screen and set it ON.



(a) In the case described above, available amount of adjustment of the home position is 0 to 25mm.

For further adjustment, move position of the detector (No.2) in (A).

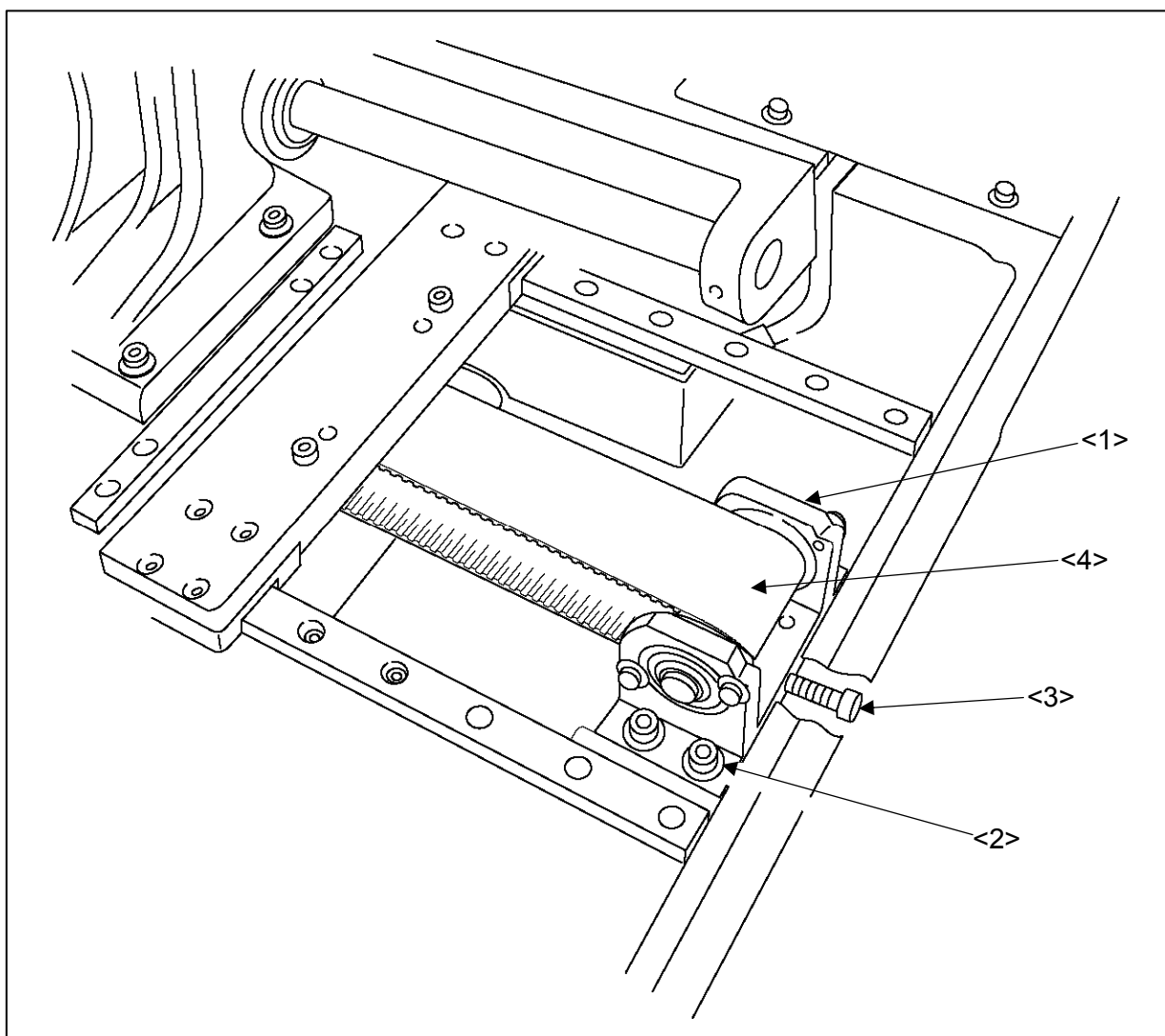
(b) After adjustment, tighten the set screw (No.5) by tightening torque 0.6 to 0.7 (Nm). Detector may deform or damaged if it tightened beyond the recommended value.

7-17. 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.

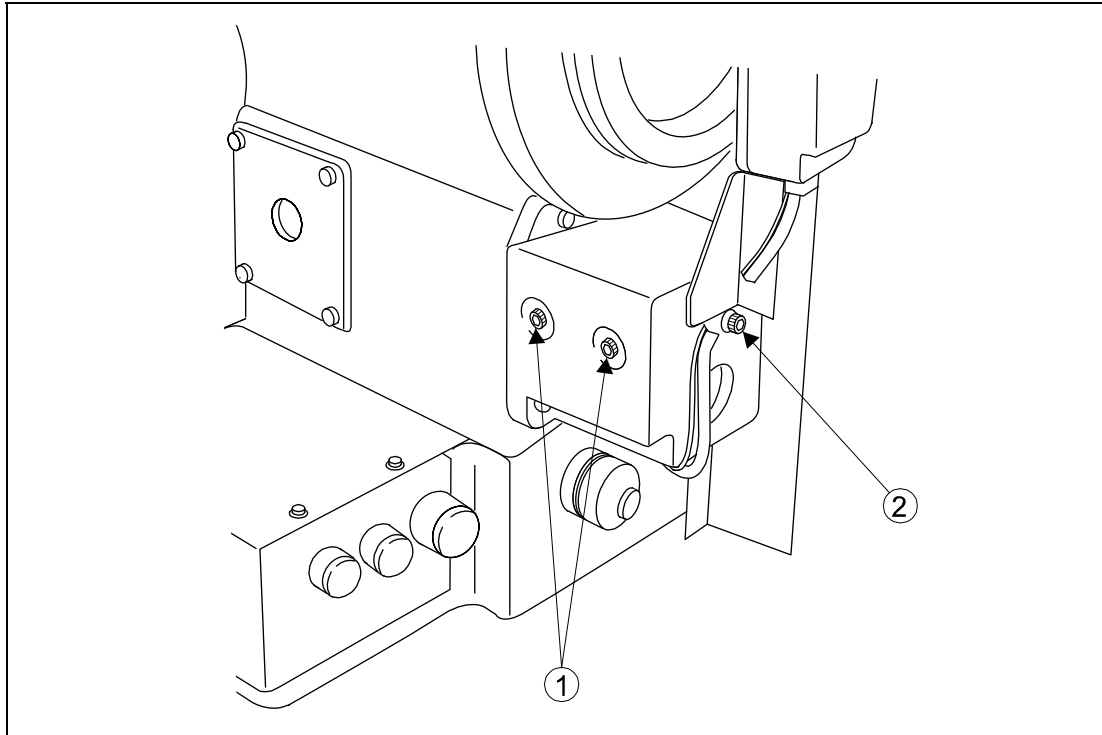
7-17-1. Adjustment of the X timing belt tension

- (1) Remove the X-bellow (left) and X-Y cover.
- (2) Loosen the set screws (No.2) (4 pieces) of the bracket (No.1)
- (3) If tighten the tension adjust screw (No.3) the X timing belt (No.4) tension will be increased.
- (4) After the adjustment, securely tighten the set screw (No.2) of the bracket (No.1) and put the X-Y cover and X-bellows on the original locations.



7-17-2. Adjustment of the Y timing belt tension

- (1) Loosen set screws (No.1) of the brackets. (It's located machine arm tail)
- (2) If tighten the tension adjust screw (No.2), the Y timing belt tension will be increased.
- (3) After the adjustment, tighten the set screws (No.1) securely.



8. MAINTENANCE

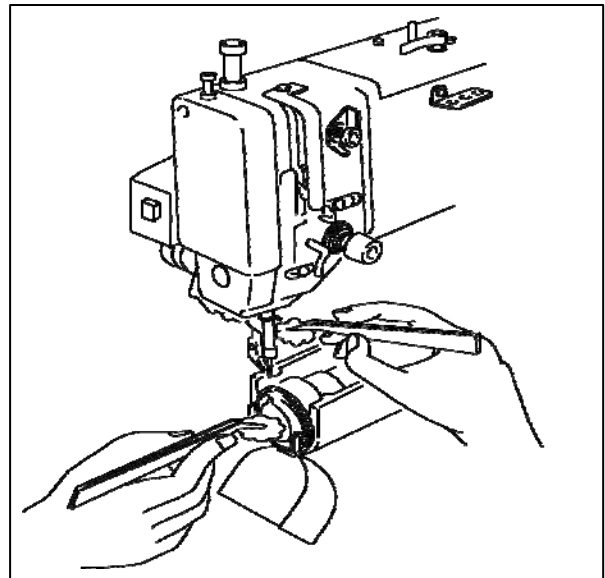


CAUTION

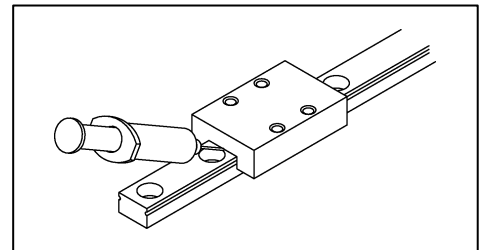
- (1) Please make sure to turn the power switch off before cleaning the sewing machine.
- (2) Please pay attention to that staining your skin or eyes with oil may cause an inflammation.

8-1. Cleaning

- (1) Remove the dust and the thread waste sticking the threading parts or the hooks area regularly.



- (2) The dust or the like sticking the X-Y slide guide absorbs lubrication oil on the rails and significantly lowers the slide guide running life.



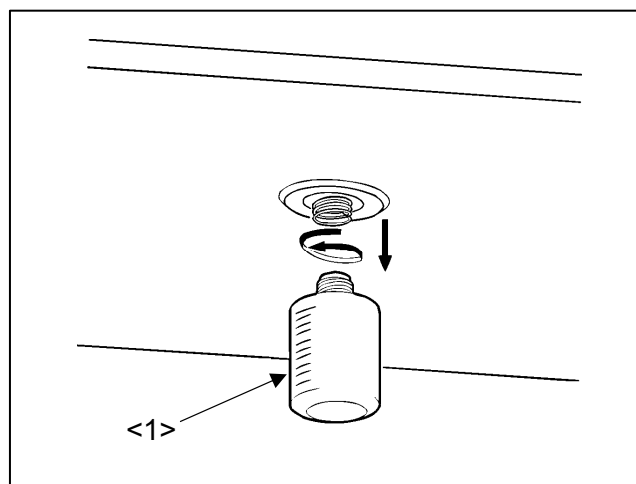
Clean the slide guide regularly and also pour some grease.

Recommended grease: Multemp PS2 (Produced by *Kyodo Yushi Co. Ltd*)

(Lithium grease 2)

8-2. Disposing of oil waste

If the waste oil pan is full filled in the oil bottle (No.1), remove the oil bottle then dispose of the waste oil.



9. TROUBLESHOOTING



CAUTION

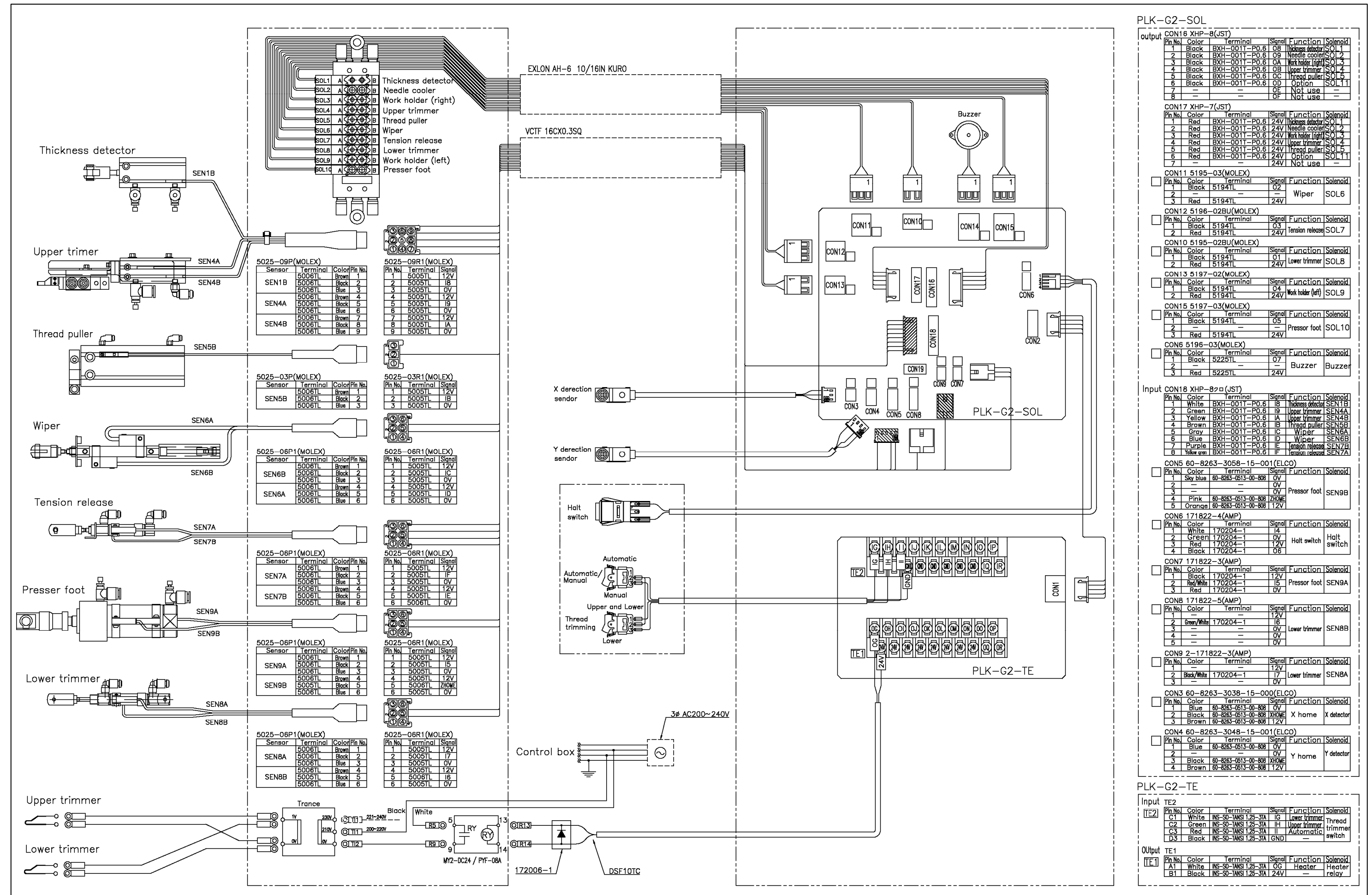
- (1) Please make sure to turn the power switch off before adjusting the sewing machine.
 (2) If the adjustment is required while the power switch on, do not step on the foot switch by mistake.

Condition	Cause	Corrective action	Reference
breakage often happens	Poor thread quality	Use better quality thread	----
	Tight upper thread tension	Adjust thread tension	6-7-2
	Strong thread take up spring Upper thread is thicker than needle size	Adjust thread take up spring properly	7-13
		Change needle to suitable size	----
	Damages on shuttle hook or driver Damages inside presser foot needle hole	Change them new ones or grind them with buffing wheel or grind stone	----
		Change it new one or grind it with buffing wheel	----
	Needle touches with presser foot needle hole	Move presser foot position	7-7
	Needle and shuttle hook are not in proper timing	Adjust the timing	7-2
	Thread melts with needle heat	Slow down sewing speed	6-1
		Use silicon oil	----
Upper thread is pulled out from needle	Thread tension discs are not opened at trimming	Adjust thread tension release	7-8
	Thread take up spring swing is too much	Adjust thread take up spring's swing stroke	7-13
	Needle size is bigger than thread size	Change needle to suitable size	----
	Needle and shuttle hook are in bad timing	Adjust the timing properly	7-2
	Thread tail from needle is very short after trimming	Adjust wiper cylinder position	7-9-3
		Adjust thread puller stroke	7-9-1
		Adjust upper heater position	7-9-4
		Adjust adjusting plate position	7-13

	Bobbin thread tension is too tight	Loosen bobbin thread tension spring	6-7-1
Thread tail from needle is too long after trimming	Thread take up spring swing is too small	Adjust thread take up spring's swing stroke	7-13
	Trimmer equipment position is not correct	Adjust wiper cylinder position	7-9-3
		Adjust thread puller stroke	7-9-1
		Adjust upper heater position	7-9-4
	Bobbin thread tension is too loose	Loosen bobbin thread tension spring	6-7-1
Trimming is not functioned	Trimmer function is canceled	Resume trimmer function	6-6
	Trimmer switch is off	Put on the trimmer switch	6-6
	Heater knife is aging	Change the heater knife	7-9,10
	Skip stitching happens at trimming	Adjust synchronizer position	7-14
	Preheating time is short	Adjust the preheating time	6-4
	Initial setting of the setting table is not set up.	Set up the initial setting of the setting table.	5-2
The bobbin cannot be removed	The hook position is deviated	Set the needle stop position to the thread take up lever uppermost position	7-15
	Bobbin removal lever stroke is short	Adjust the bobbin removal lever stroke	5-6-1
Skip stitching often happens	Needle and shuttle hook clearance is too big	Adjust needle and shuttle hook clearance properly	7-2
	Needle and shuttle hook timing is not correct	Adjust needle and shuttle hook timing properly	7-4
	Needle is bent	Change it new needle	----
	Needle is bent by driver	Adjust needle and diver clearance properly	7-5
	Presser foot position is not correct	Adjust presser foot position properly	7-7
Stitch forming is loose	Upper thread tension is not tight enough	Adjust upper thread tension	6-7-2

	Thread tension regulator's discs are opened during sewing	Adjust upper tension release position properly	7-8
	Presser foot position is not correct	Adjust presser foot position properly	7-7
	Driver and shuttle hook clearance is very small	Adjust needle and diver clearance properly	7-5
	Presser foot up and down timing is not proper	Adjust presser foot timing properly	7-7
Sewing machine does not work even start switch is turned ON	Cables wiring is disconnected	Connect all cables precisely	3-6,3-11
	Halt switch is kept ON	Cancel the halt switch	6-2
	Start switch breaks down	Change it new start switch	----
	The test mode is valid	Change to the operation mode	6-4
	Input signal is not in the sewing state	Checking the input signal in the sewing state	7-6-3
Returned home position is changed.	Ambient temperature is out of use range.	Use sewing machine in ambient temperature in 5 degrees to 35 degrees.	----
	Clearance between detector and detecting subject is too wide.	Adjust clearance in 1 to 1.5mm.	7-16
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	7-12
	Work holder switch breaks down	Change it new work holder switch	----
Sewing pattern is distorted	Sewing material weight is heavy	Slow down sewing speed	6-1
		Select sewing material weight level at feeding	Control unit
	X-Y timing belts are loose	Slow down feeding speed	6-1
		Adjust X-Y timing belt tension properly	7-17
	X-Y detector cabled are disconnected	Connect X-Y cables correctly	----

APPENDIX 1. Chart of connecting wires



2. WIRING BETWEEN THE POWER SWITCH TO RELAY

COUNTRY	PHASE VOLTAGE	WIRING DIAGRAM
EXCEPT CE	1 ϕ 110V 3 ϕ 380V	
	1 ϕ , 3 ϕ 200~240V	
CE	1 ϕ 220V	
	3 ϕ 380V	

A134C215X01



CONVENTIONAL CABLES OR UNITS



SPECIAL CABLES FOR PLK-G2008H

3. PLK-G2008H I/O Table

INPUT		
Terminal	Signal	Function
CONH-2	I1	Start
CONH-3	I2	Work holder 1
CONH-7	I3	Not use
CON6-1	I4	Halt switch
CON7-2	I5	Presser foot down
CON8-2	I6	Lower trimmer back
CON9-2	I7	Lower trimmer act
CON18-1	I8	Thickness detector up
CON18-2	I9	Upper trimmer act
CON18-3	IA	Upper trimmer back
CON18-4	IB	Thread puller act
CON18-5	IC	Wiper act
CON18-6	ID	Wiper back
CON18-7	IE	Tension release act
CON18-8	IF	Tension release back
TE2-C1	IG	Lower trimmer switch
TE2-C2	IH	Upper trimmer switch
TE2-C3	II	Automatic/Manual switch

OUTPUT			
Terminal	Signal	Function	SOL No.
CON10-1	O1	Lower trimmer	8
CON11-1	O2	Wiper	6
CON12-1	O3	Tension release	7
CON13-1	O4	Work holder (left)	9
CON15-1	O5	Presser foot	10
CON6-4	O6	Halt switch (Lamp)	-
CON6-1	O7	Buzzer	-
CON16-1	O8	Thickness detector	1
CON16-2	O9	Needle cooler	2
CON16-3	OA	Work holder (right)	3
CON16-4	OB	Upper trimmer	4
CON16-5	OC	Thread puller	5
CON16-6	OD	Not use	-
CON16-7	OE	Not use	-
CON16-8	OF	Not use	-
TE1-A1	OG	Heater	-

4. Expanded I/O port PLK-G2-TE

4-1. Abstract

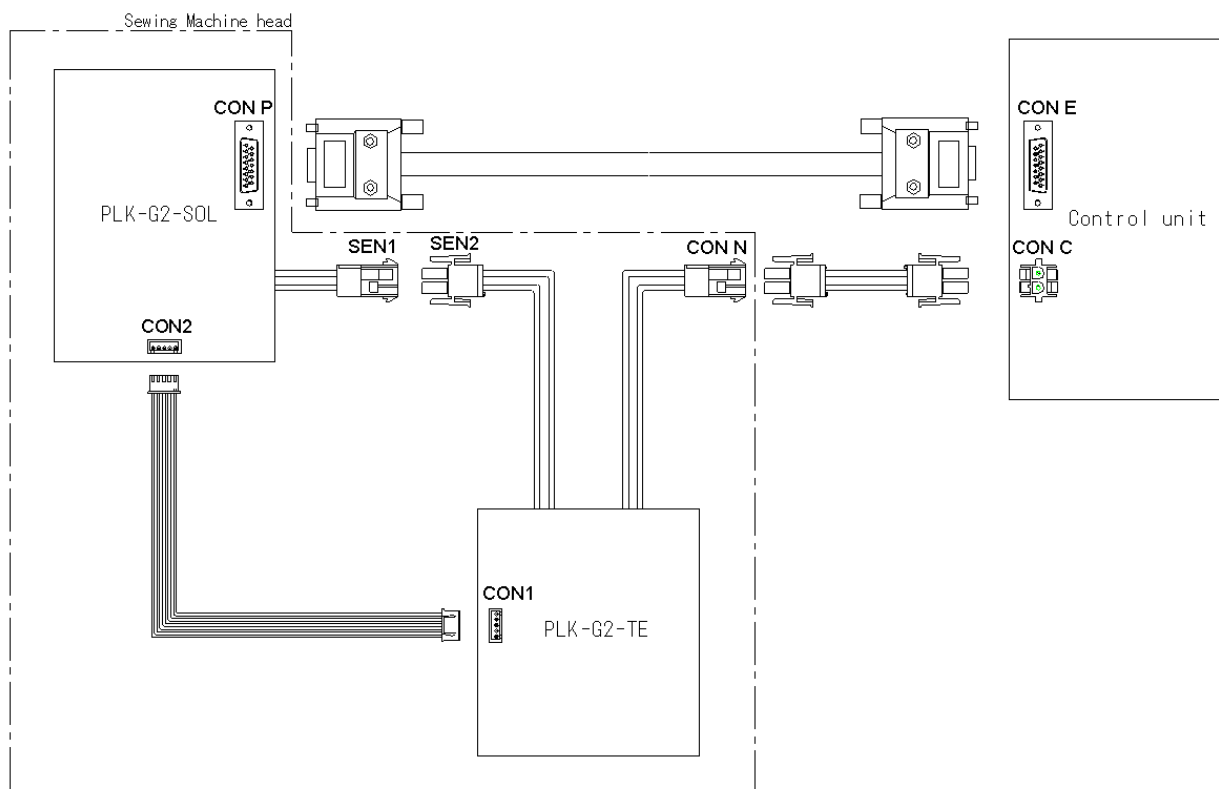
PLK-G2008H equipped expanded I/O Port PLK-G2-TE. 12 input and 12 output ports in addition to the number of ports of Standard I/O can be expanded.*¹ *²

The setting of these expanded ports can be changed from the input/output setting mode.

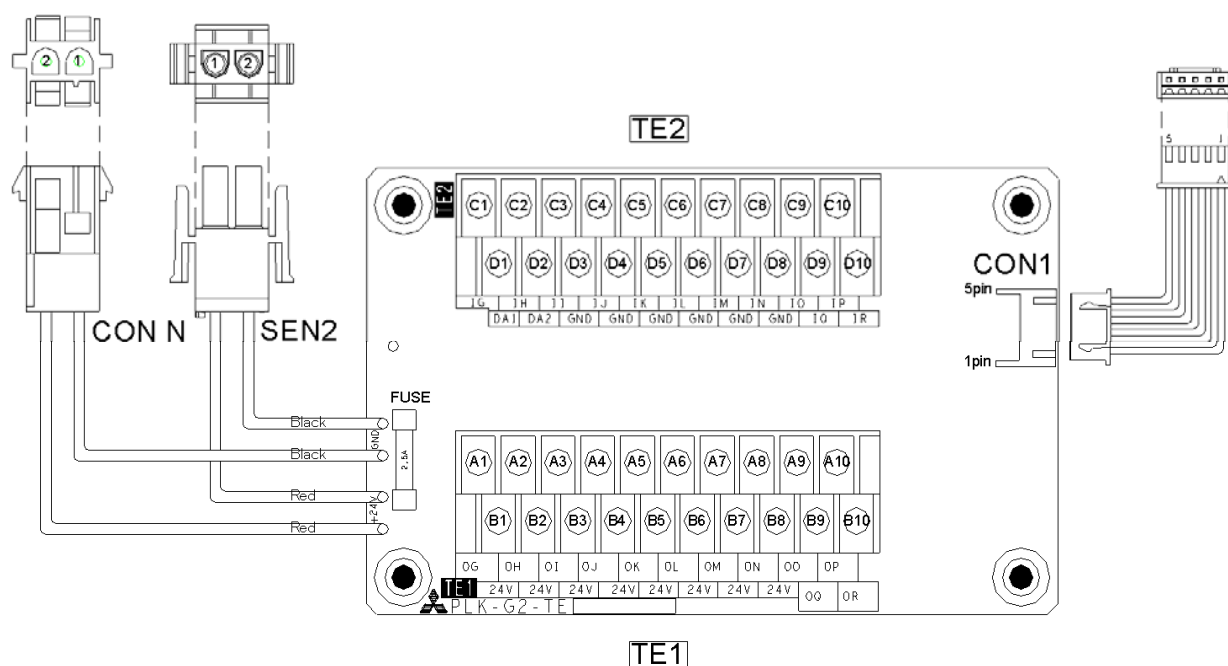
*1 Some of the I/O ports are already connected for standard function.

*2 These outputs are for air valve only. The solenoid can not be driven

4-2. Wiring diagram



4-3 Connectors layout



4-4. Pin number of connectors

CON1 (PLK-G2-SOL board connection cable)

Signal	Pin No.
+12V	1
SCL	2
SDA	3
OE	4
GND	5

*Please do not connect anything with OE.

SEN1 (PLK-G2-TE board connection cable)

Signal	Pin No.
GND	1
+24V	2

SEN2 (PLK-G2-SOL board connection cable)

Signal	Pin No.
+24V	1
GND	2

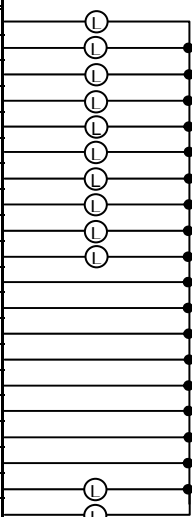
CON N (Control box connection cable)

Signal	Pin No.
GND	1
+24V	2

TE1 (General purpose output)

(These outputs are for air valve only. The solenoid can not be driven.)

Signal	Initial setting	Pin No.
OG	Heater	A1
OH	[NO] No operation	A2
OI	[NO] No operation	A3
OJ	[NO] No operation	A4
OK	[NO] No operation	A5
OL	[NO] No operation	A6
OM	[NO] No operation	A7
ON	[NO] No operation	A8
OO	[NO] No operation	A9
OP	[NO] No operation	A10
+24V	+24V (Heater)	B1
+24V	+24V	B2
+24V	+24V	B3
+24V	+24V	B4
+24V	+24V	B5
+24V	+24V	B6
+24V	+24V	B7
+24V	+24V	B8
OQ	[NO] No operation	B9
OR	[NO] No operation	B10



*Refer [4-5.Specifications], for ratings of air valve.

TE2 (General purpose input)

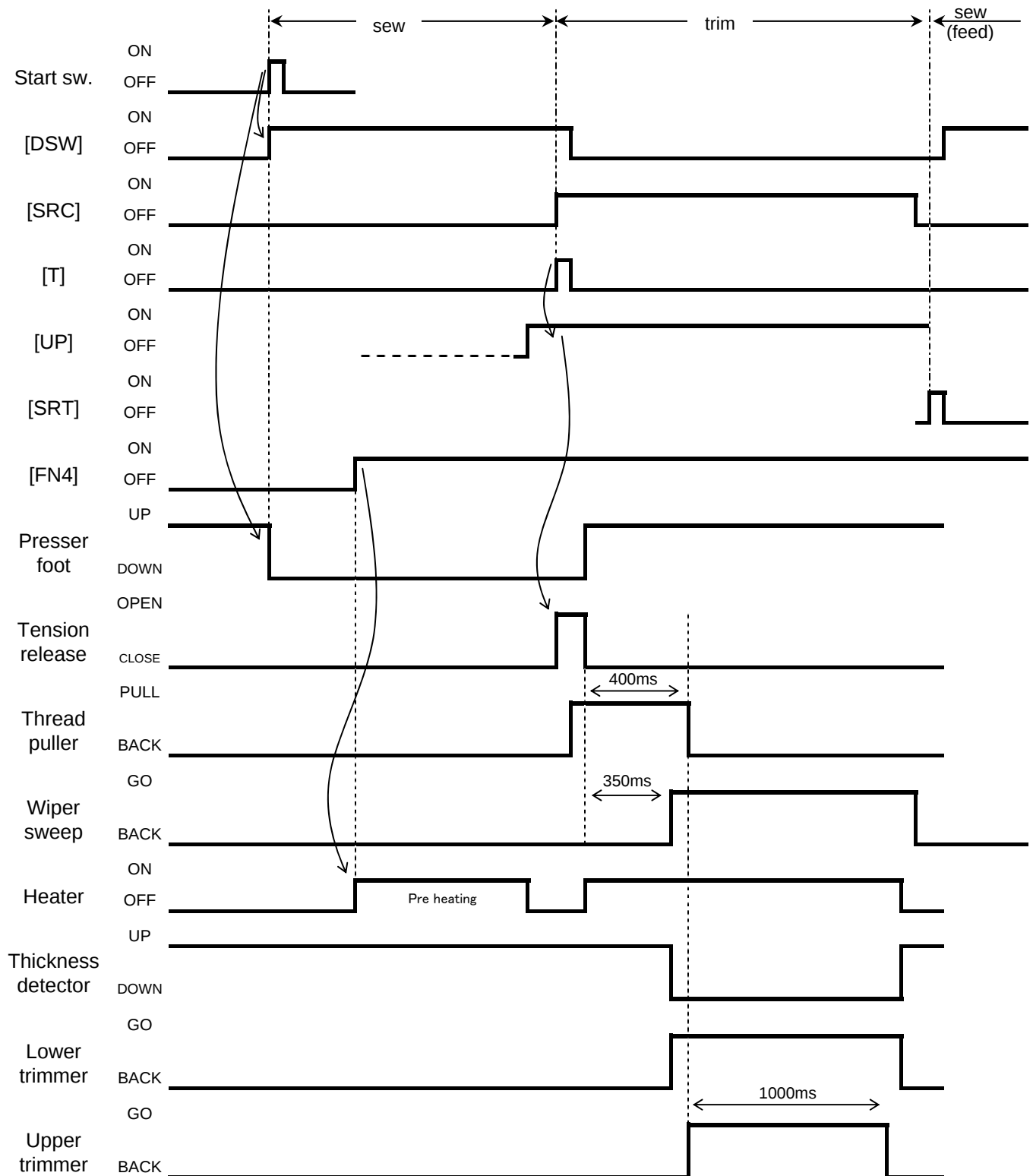
Signal	Initial setting	Pin No.	
IG	Lower trimmer switch	C1	
IH	Upper trimmer switch	C2	
II	Automatic trim switch	C3	
IJ	[NO] No operation	C4	
IK	[NO] No operation	C5	
IL	[NO] No operation	C6	
IM	[NO] No operation	C7	
IN	[NO] No operation	C8	
IO	[NO] No operation	C9	
IP	[NO] No operation	C10	
DA1	Reserved	D1	
DA2	Reserved	D2	
GND	GND (Switch)	D3	
GND	GND	D4	
GND	GND	D5	
GND	GND	D6	
GND	GND	D7	
GND	GND	D8	
IQ	[NO] No operation	D9	
IR	[NO] No operation	D10	

*Please do not connect anything with DA1 and DA2.

4-5. Specifications

Model		PLK-G2-TE
Specifications		
Output	Output voltage	DC 24V
	Number of output	12(OG~OR)
	Ratings value for solenoid value	Output total 0.5A or less
Input	Input voltage	DC 5V
	Number of Input	12(IG~IR)
Condition	Power source	DC 12V
	Range of rating voltage	±10%
	Ambient temperature	5°C ~ 35°C
	Ambient humidity	45% ~ 85%

5. TRIMMING TIME CHART



[DSW] : Sewing in progress output signal (by system)

[SRC] : Start prohibit unput signal (by step sequence)

[T] : Thread trimming output signal (output by teaching data)

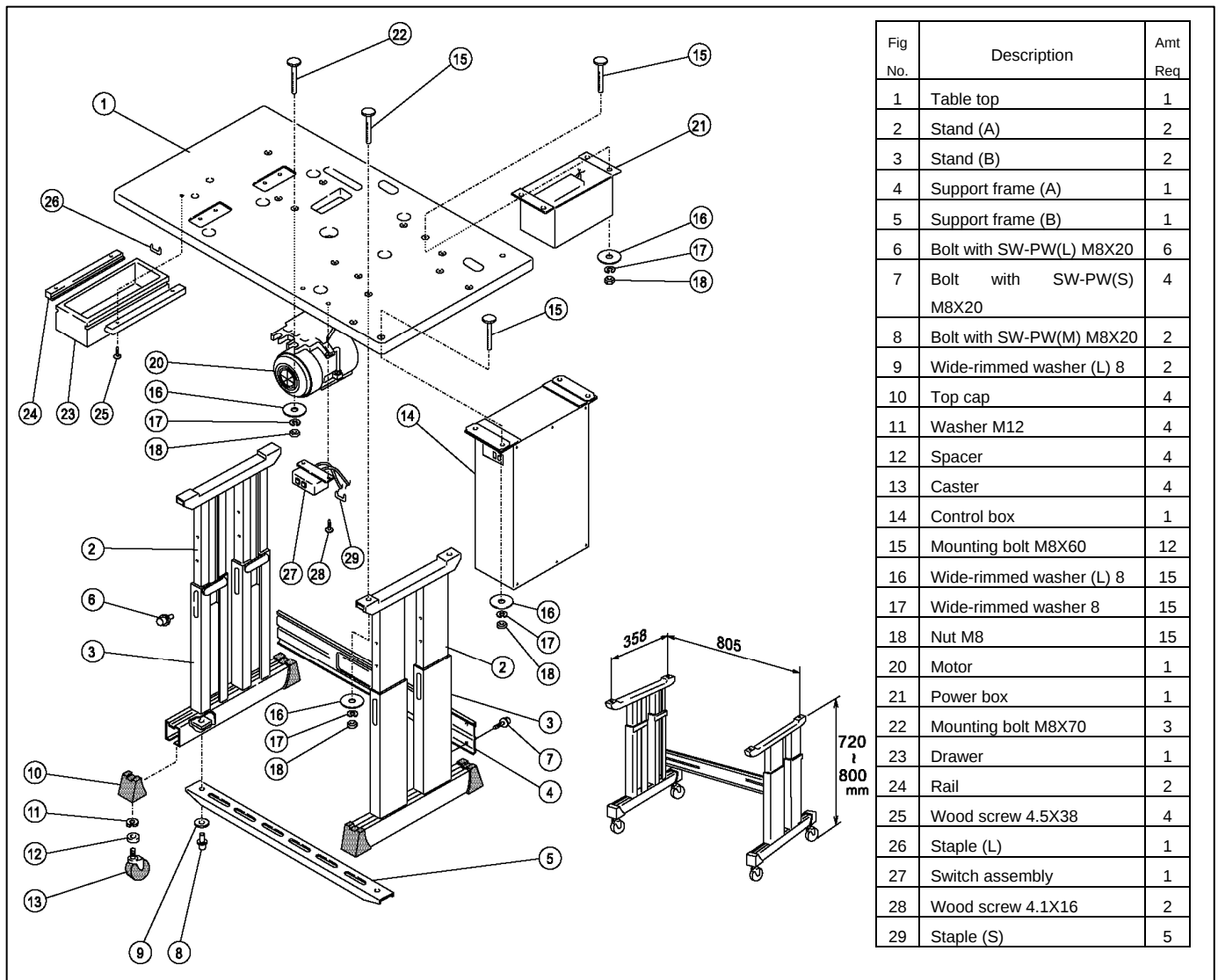
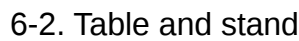
[UP] : Up position output signal (by system)

[SRT] : Start input signal (output by teaching data)

[FN4] : Function No.4 output signal (output by teaching data)

Heater protection : In the trimming process, heater is automatically off after 2.5 sec in spite of trimming process is end or not. In any time, heater can be off by pressing the halt switch.

6-1. Table cut-out

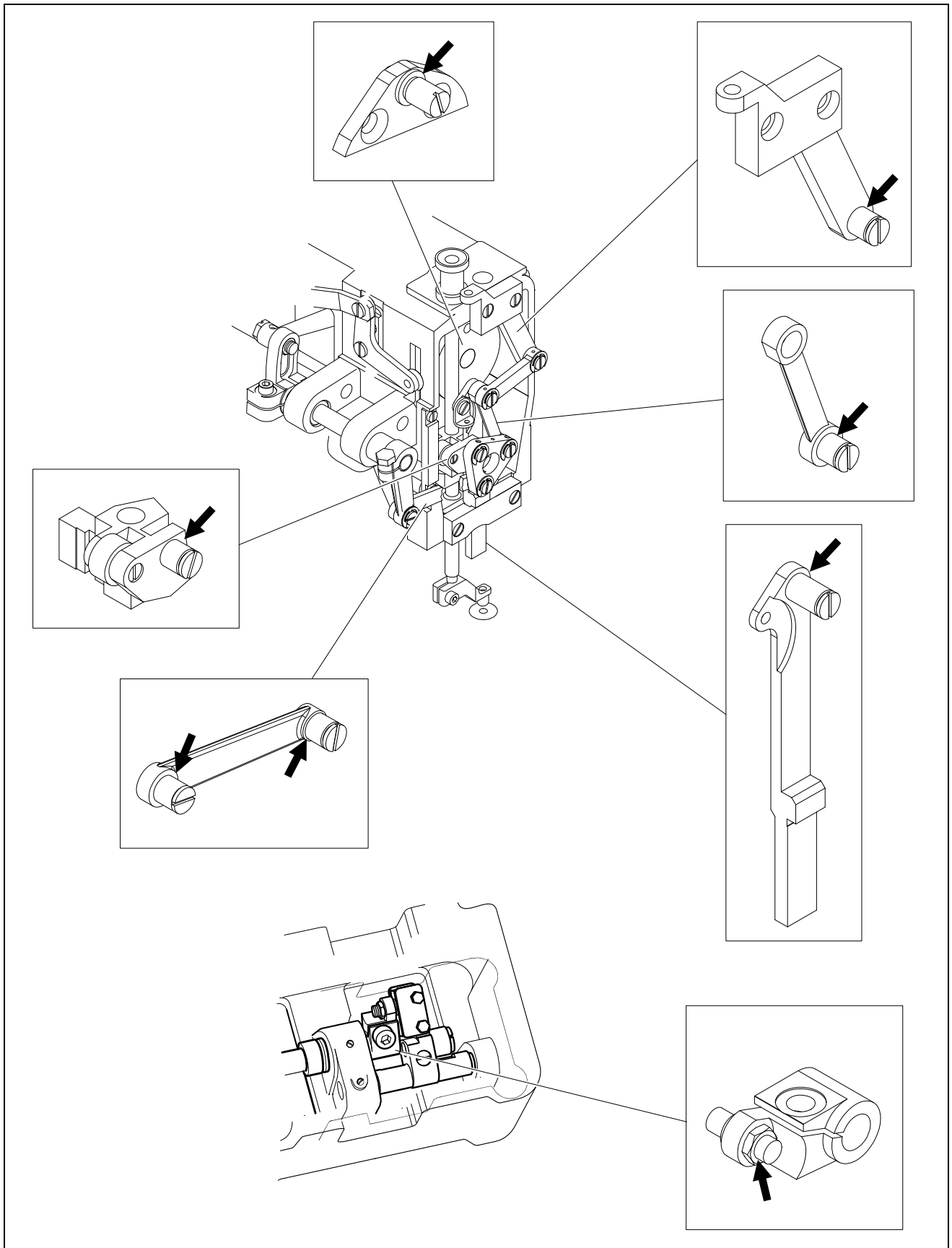


7. ANAEROBIC ADHESIVE USED LOCATION

Below parts are fixed by anaerobic adhesive.

If these parts are disassembled, make sure to clean their bonding part with thinner.

And please put anaerobic adhesive before reassembling.





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