SWF

# USER'S MANUAL

TWO-HEAD AUTOMATIC EMBROIDERY MACHINE

FOUR-HEAD AUTOMATIC EMBROIDERY MACHINE

SIX-HEAD AUTOMATIC EMBROIDERY MACHINE

EIGHT-HEAD AUTOMATIC EMBROIDERY MACHINE

SIX-HEAD AUTOMATIC EMBROIDERY MACHINE (Compact Type)

SWF/KS-Series

SunStar CO., LTD.

MME-190624

1. THIS IS AN INSTRUCTION FOR SAFE USE OF SWF AUTOMATIC EMBROIDERY MACHINES. READ THOROUGHLY BEFORE USE.

2. CONTENTS IN THIS INSTRUCTION MAY CHANGE, WITHOUT PRIOR NOTICE, FOR IMPROVEMENT OF MACHINE QUALITY AND THUS MAY NOT CORRESPOND TO THE MACHINE YOU PURCHASED. CONTACT YOUR SALES AGENT FOR INQUIRIES.

3. THIS IS DESIGNED AND MANUFACTURED AS AN INDUSTRIAL MACHINE. IT SHOULD NOT BE USED FOR OTHER THAN INDUSTRIAL PURPOSE.

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# CHAPTER 1

# SAFETY RULES

The following set of safety rules categorized as DANGER, WARNING, and CAUTION indicates possibilities of physical or property damages if not fully observed.

DANGER : These safety instructions MUST be observed to be safe from danger when installing, delivering, or repairing the machine.

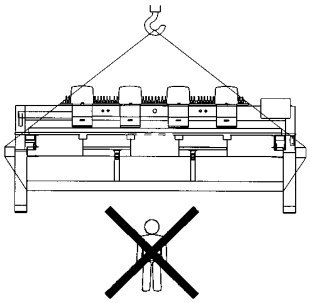
WARNING : These safety instructions MUST be observed to be safe from machine injuries.

CAUTION : These safety instructions MUST be observed to prevent predictable machine errors.

## 1-1) DELIVERY OF YOUR MACHINE



DANGER

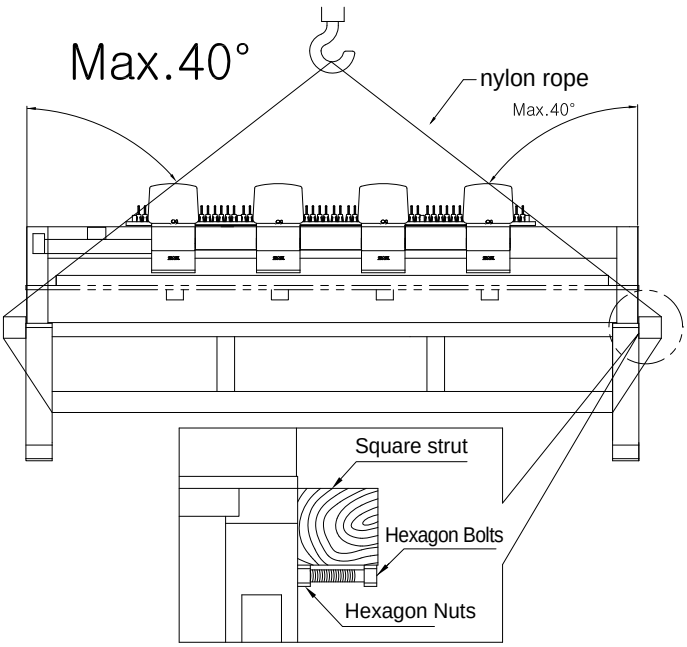


※ Make sure all persons and obstacles are out of the way of the moving equipment.

ONLY TRAINED AND EXPERIENCED PERSONS, FAMILIAR WITH THE RELEVANT SAFETY INSTRUCTIONS, SHOULD HANDLE THE MACHINE. MAKE SURE TO FULLY OBSERVE THE FOLLOWING INSTRUCTIONS.

1) **Using a crane**

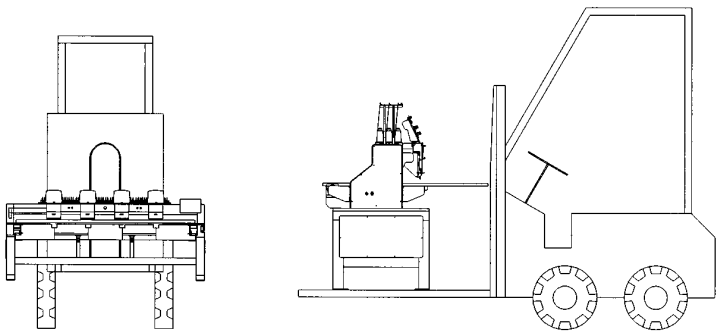
Make sure that the crane is large enough to hold the machine. Use a nylon rope of sufficient strength. Place a wooden block at either side of the machine before tying the rope. The angle should be 40°Δ or less. Make sure that the rope does not touch the table.




[Fig.1-1]

2) **Using a Forklift**

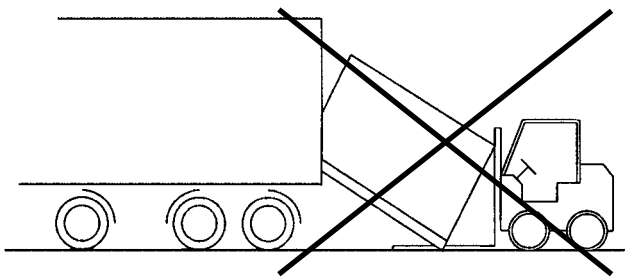
Make sure that size and weight of the forklift is sufficient to support the machine. Use the pallet to place the machine so that its center is on the forklift arm (see [Fig.1-2]). Lift the machine carefully so that the machine does not tilt to either side.



[Fig.1-2]

**[WARNING]**

Make sure to maintain the weight balance in machine deliveries, especially when unloading the machine from a forklift or crane, in order to prevent injury or machine damages.



## 1-2) INSTALLATION

CAUTION

Installation environment may incur machine malfunction or breakdown. Make sure to meet the following conditions.

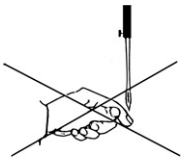
1) The foundation under the machine, i.e. table or desk, must be strong enough to support the weight of the machine (approximately 1 ton).
2) Air conditioning can eliminate dust and humidity that can cause pollution and corrosion of the machine. Make sure your machine is regularly cleaned.
3) Long exposure to direct sunlight can cause the paint of the machine to fade or change of the machine shape.
4) Allow at least 50cm (20 inches) of space on each side of the machine for convenient maintenance.

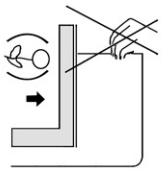
※ Please refer to 2. Machine Installation and Assembly for installation details.

## 1-3) MACHINE OPERATION



WARNING





The SWF Automatic Embroidery Machine is designed for applying embroidery to fabric and other similar materials.

Pay careful attention to the WARNING and CAUTION stickers on certain parts of the machine. Make sure to observe the following when operating the machine:

1) Read thoroughly and fully understand the manual before operating the machine.
2) Dress for safety. Long and unbound hair, jewelry such as necklaces, bracelets, and wide sleeves can get caught in the machine. Wear shoes with non-slip soles.
3) Clear all persons from the machine before turning on the power.
4) Keep your hands or head away from the moving parts of the machine such as needle, hook, take-up lever, and pulley when the machine is in operation.
5) Do not remove the safety cover on the pulley or shaft when the machine is in operation.
6) Be sure the main power is turned off and the power switch is set to OFF before opening the cover of any electrical component or control box.
7) Be sure the main switch is OFF before manually turning the main shaft.
8) Turn the machine off when threading needles or inspecting the finished embroidery.
9) Do not lean against the cradle or place your fingers near the guide grooves of the frame.
10) The machine noise may exceed 85db when it is run at a maximum speed. It is not higher than the standard level, but you may need earplugs or sound-proof facilities for the operator and other workers.

## 1-4) REPAIR



DANGER

Only SWF-trained and selected repair engineers should do repair work.

1) Turn OFF the power before cleaning or repairing the machine. Wait for 4 minutes so the machine electricity is completely discharged.

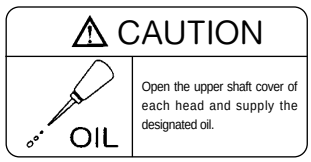
**[CAUTION]**
It takes about 10 minutes after turning off the main switch before the electricity is fully discharged from X/Y main shafts and the drive box.

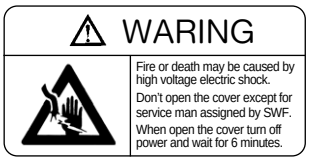
2) Do not change the settings or any parts on the machine without confirmation from SWF. Such change may cause safety accidents.
3) Use only SWF parts when repairing your machine.
4) Replace all safety covers when you are finished with your repair.

## 1-5) Placement of Warning Stickers

Observe the directions on ALL warning stickers placed on the machine as reminders for your safety.

1) Location of Warning Stickers







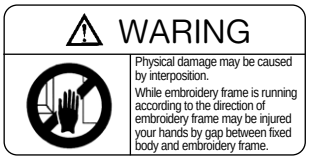


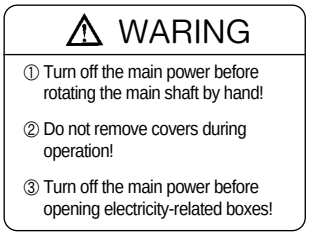


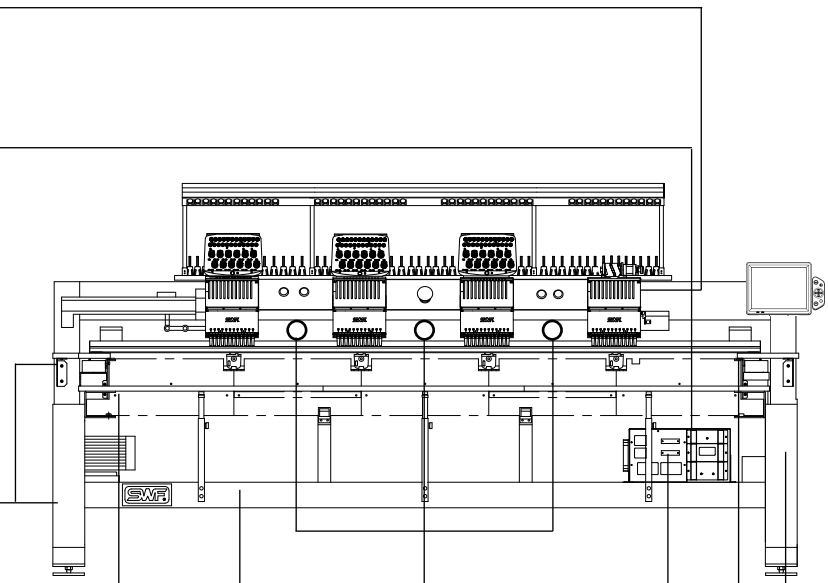




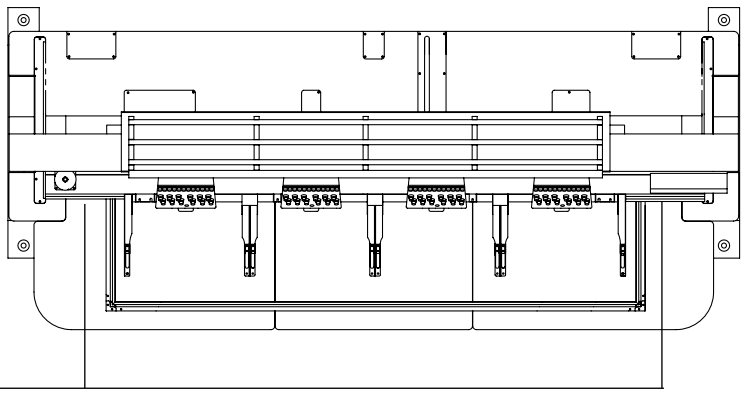


[Fig.1-3 Front]



[Fig.1-4 From top]

## 1-6) Contents of Warning Stickers

1) Warning

ⓐ

**⚠ WARNING**



Injury may be caused by winding.

Be sure to turn off the power before cleaning, lubricating, adjusting or repairing.

**[ Notice ]**
"Safety cover" in the 'WARNING' refers to all covers near the operating parts of the machine.

ⓑ

**⚠ WARNING**



Injury may be caused by moving needle.

Ensure that the machine is in a stop condition before changing, threading or rethreading of needies or changing of needles.

ⓒ

**⚠ WARNING**



Fire or death may be caused by high voltage electric shock.

Don't open the cover except for service man assigned by SWF.

When open the cover turn off power and wait for 6 minutes.

# CHAPTER 2

# INSTALLATION AND MACHINE ASSEMBLY

Install your machine in an appropriate environment and with adequate electrical supply. Failure to follow the directions may result in machine malfunction.

## 2-1) ENVIRONMENT

1) Temperature: ① 15～40°C (59～104°F) when the machine is in operation
② －25～55°C (－13～131°F) when the machine is not in operation
2) Humidity: 45～90% (relative)

**[CAUTION]**
① Do not let moisture drops on the machine.
② Provide air conditioning to control humidity and to prevent dust and corrosion.

3) Grounding: Ensure the electricity is properly grounded.




Properly ground the machine to avoid the possibility of electric shock. Use three-wire grounding (grounding resistance below 100 ohms).

4) Close any doors and windows near the machine to prevent direct light, dust, and humidity.
5) Foundation under the machine must be a sufficiently strong and flat concrete to support the weight of the machine.

## 2-2) ELECTRICITY INSTALLATION

Check if the input voltage of the machine is in the right range of the voltage supply before installing or operating the machine. The voltage required is as follows:

1) Input voltage (to be adjusted when installing): 110V, 220V
2) Allowed range of voltage: within ±10% of the voltage set
3) Electric capacity and voltage consumption: 640VA 440W
4) Insulation resistance: over 10M ohms (measured with 500V insulation tester)

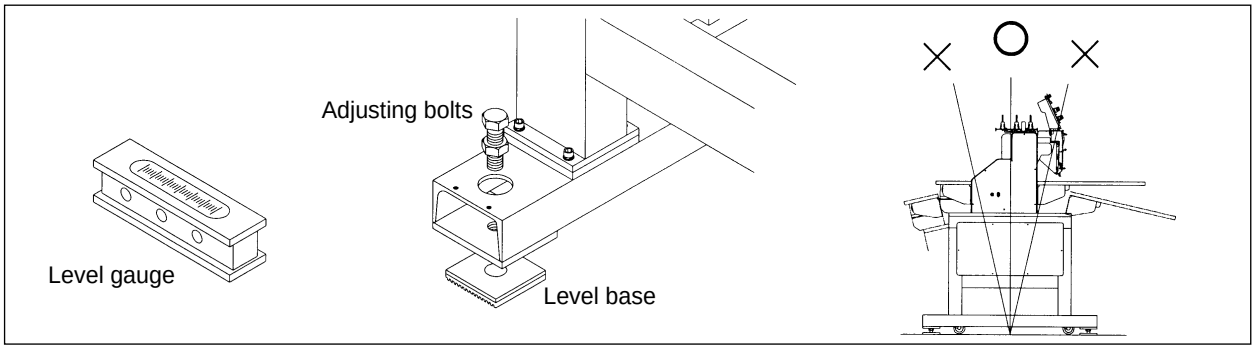



① Check the voltage supply where the machine will be installed.
② Install the cable away from the operator's work space to prevent accident or injury.

## 2-3) LEVELING THE MACHINE

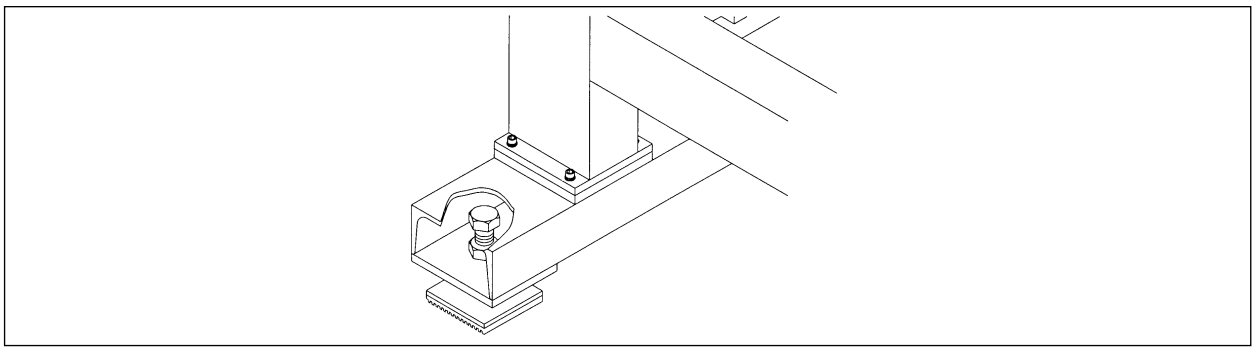
The machine must be accurately leveled (especially front and back) to prevent the needle from moving out of position.

1) Use the adjusting bolts installed at the four stands to level the machine (front, rear, left, and right). Use a level gauge.
   ① Check the voltage supply where the machine will be installed.
   ② Install the cable away from the operator's work space to prevent accident or injury.
   ③ If the difference in heights of the four bolts is over 10mm, place spacers beneath the lower adjusting bolts to make the heights even.



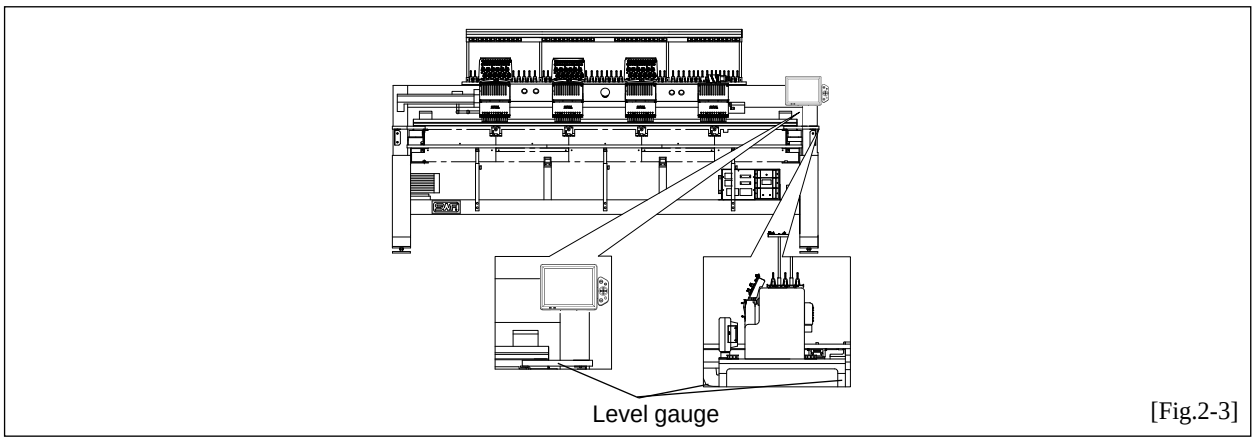

[Fig.2-1]

2) The machine must be horizontally balanced on all four sides - front, rear, right, and left.



[Fig.2-2]

3) Using the level gauge
   Use a nut to fully fasten the adjusting bolts when the machine is leveled.

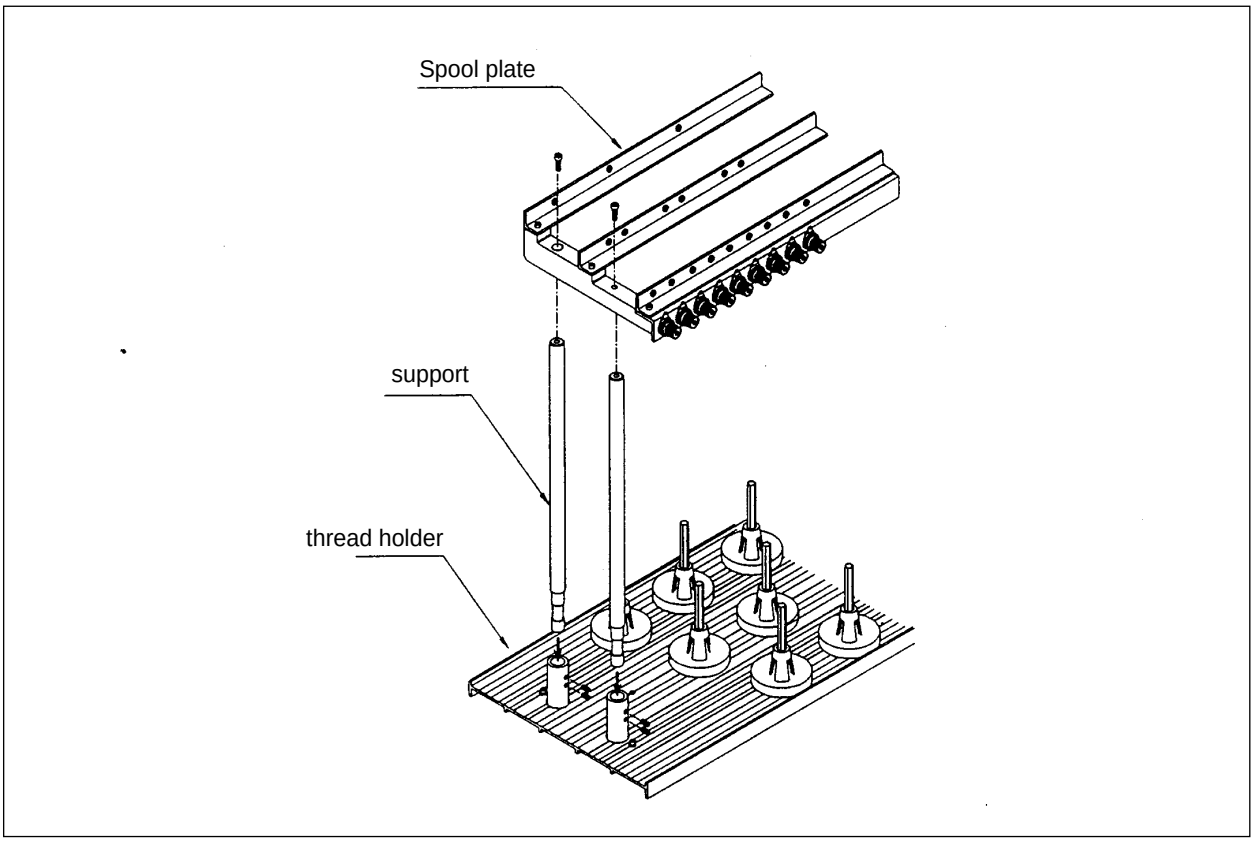



[Fig.2-3]

**[CAUTION]**
The level gauge does not measure accurately on a square pipe or a table.

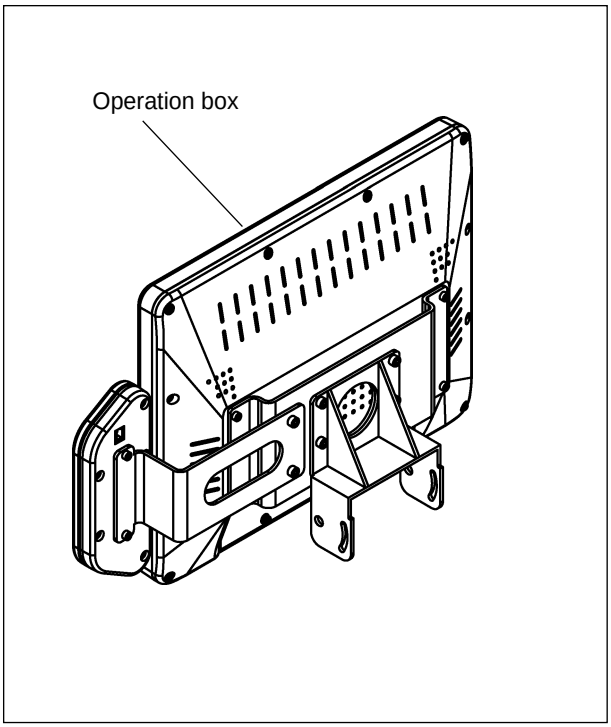
## 2-4) ASSEMBLY OF PERIPHERAL DEVICES

1) Assembling Upper Thread Stand

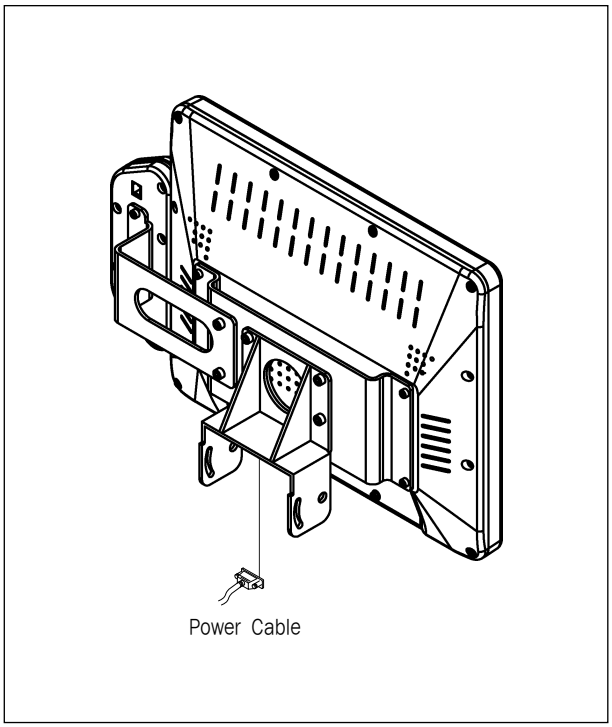



[Fig.2-4]

2) Assembling Operation Box



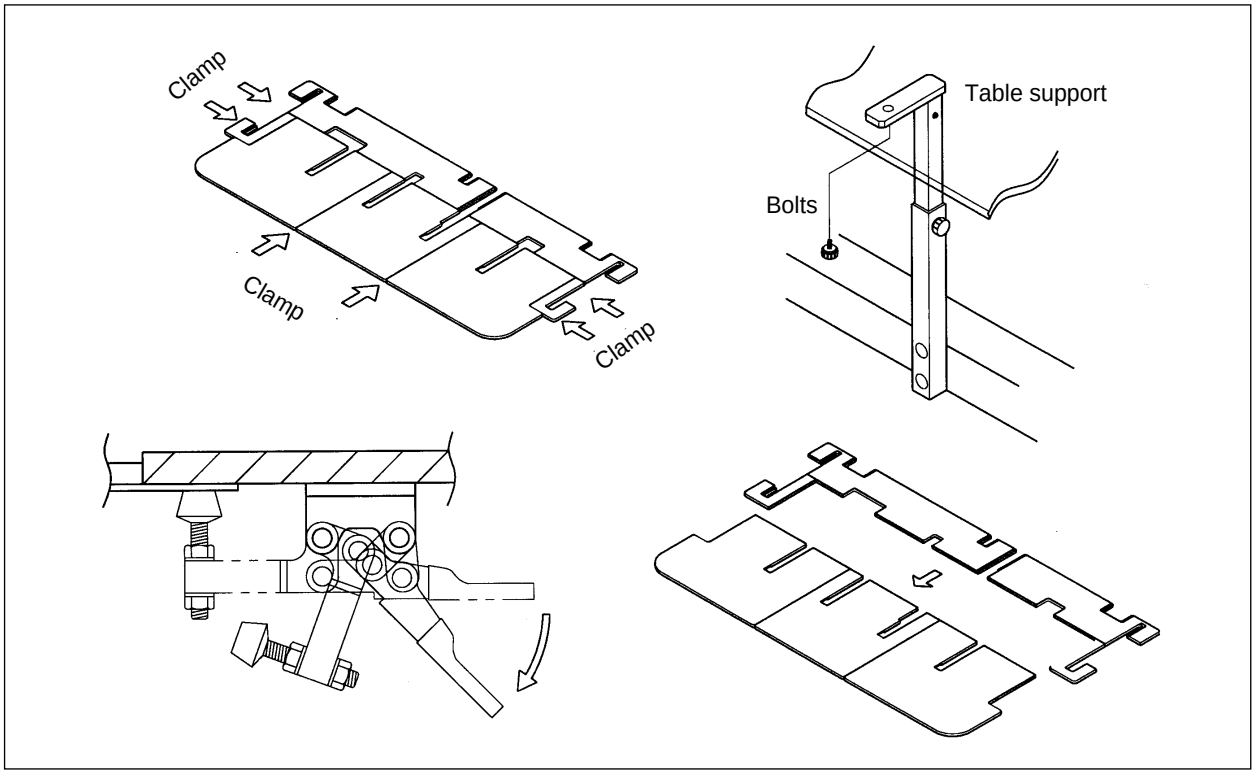

[Fig.2-5]




[Fig.2-6]

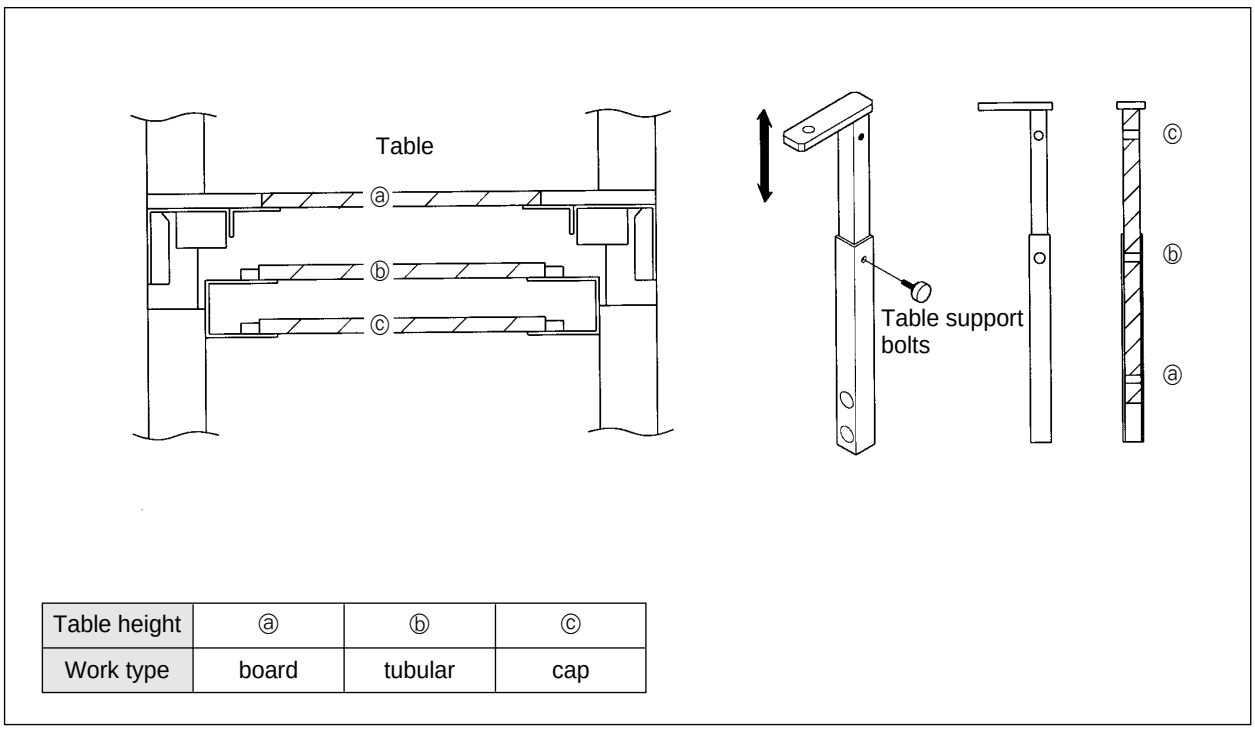
## 2-5) TABLE ASSEMBLY

1) Unscrew the eight clamps underneath the table and the bolts to disassemble the table.




[Fig.2-7]

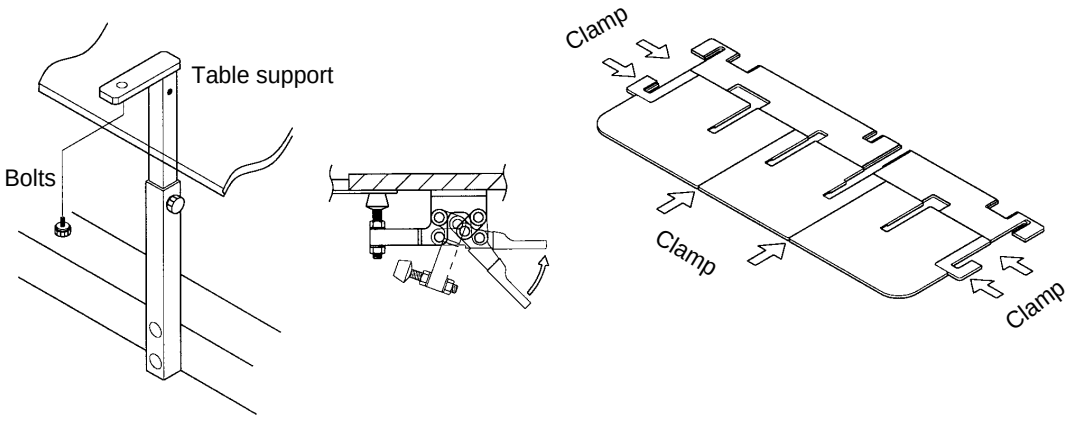
2) Adjust the table support at an appropriate height and fasten the bolts.




| Table height | ⓐ | ⓑ | ⓒ |
|---|---|---|---|
| Work type | board | tubular | cap |

[Fig.2-8]

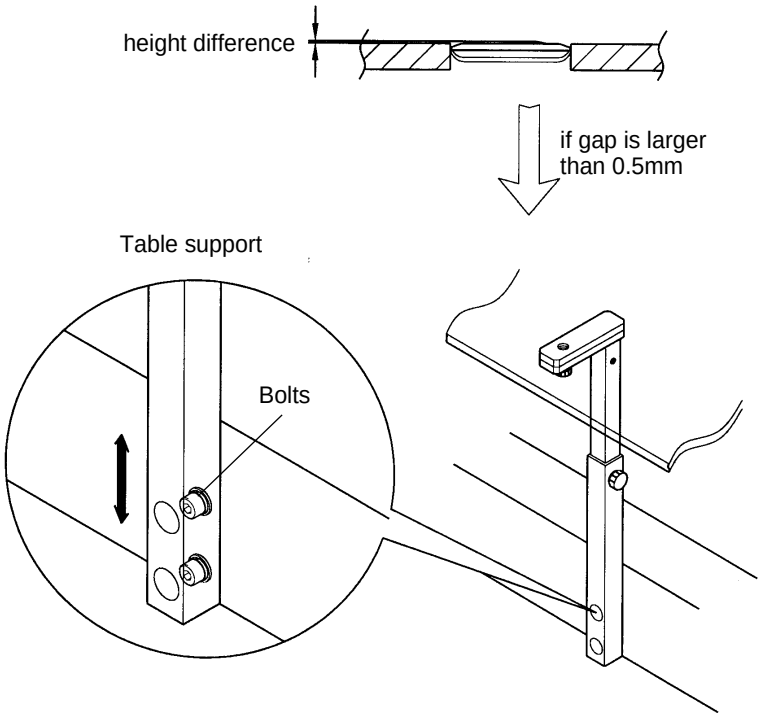
3) Insert the table and fasten the bolts and the clamps.




[Fig.2-9]

**[CAUTION]**

The table should not be higher than the upper side of the needle plate by 0.5mm for board frame work. If the height difference is over 0.5mm, unfasten the table support bolts, adjust the height, and fasten the bolts back.



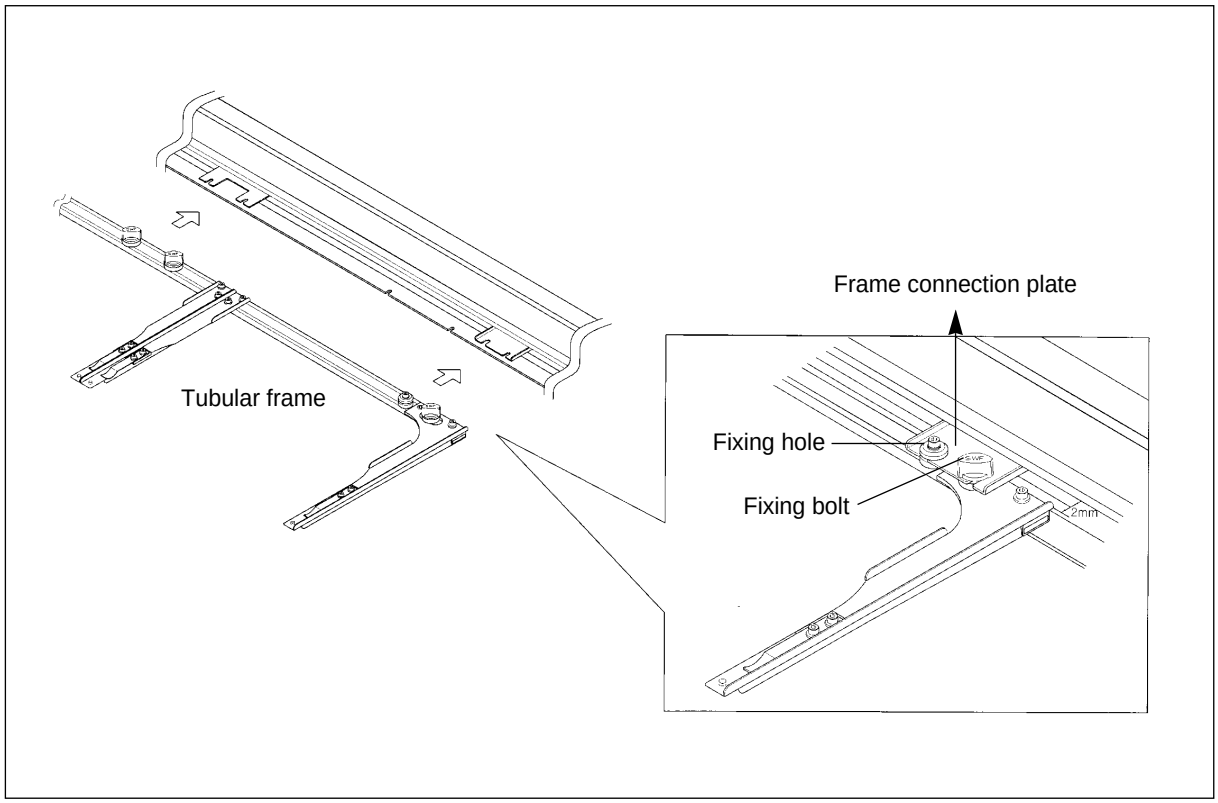

[Fig.2-10]

## 2-6) FRAME ASSEMBLY

### 2-6-1) Tubular Frame

1) Unfasten screws on the tubular frame 2/3, install the tubular frame in the groove of the frame connection plate, and fasten the bolt.

> **[CAUTION]**
> Do not install the tubular frame too close from the X frame. Keep the space at around 2mm.

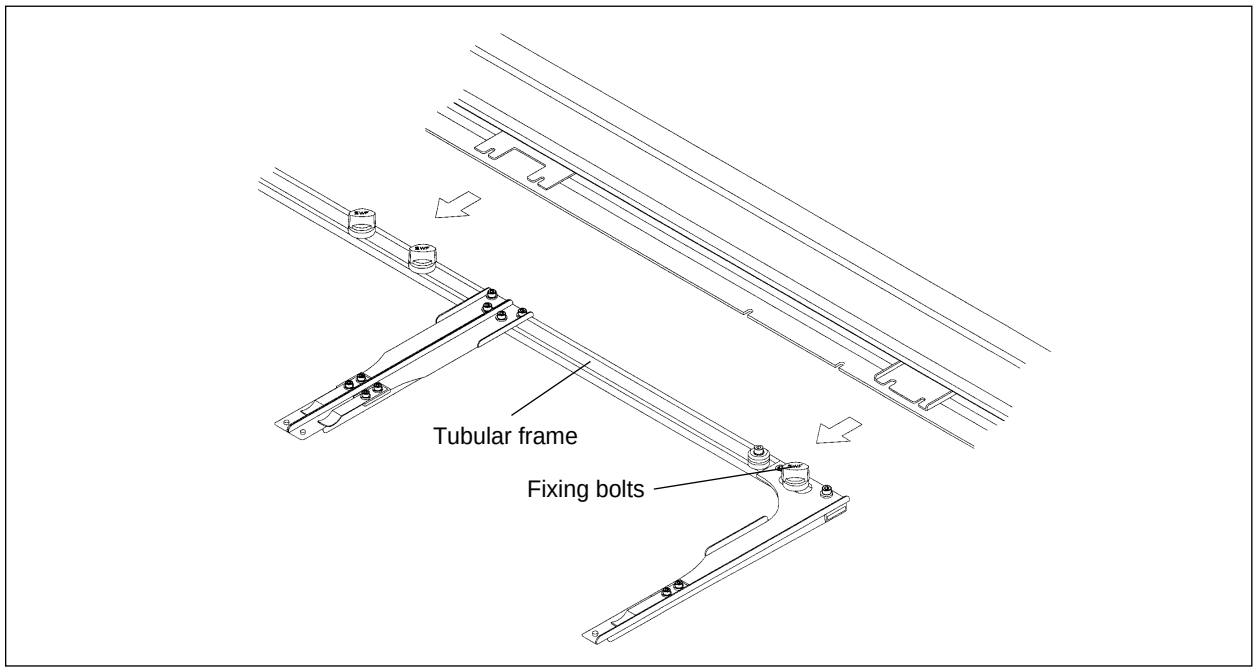



[Fig.2-11]

2) Insert the frame into the tubular frame. Use the screws to adjust the space.

## 2-6-2) Border Frame

1) Unfasten screws on the tubular frame 2/3 and remove the frame.

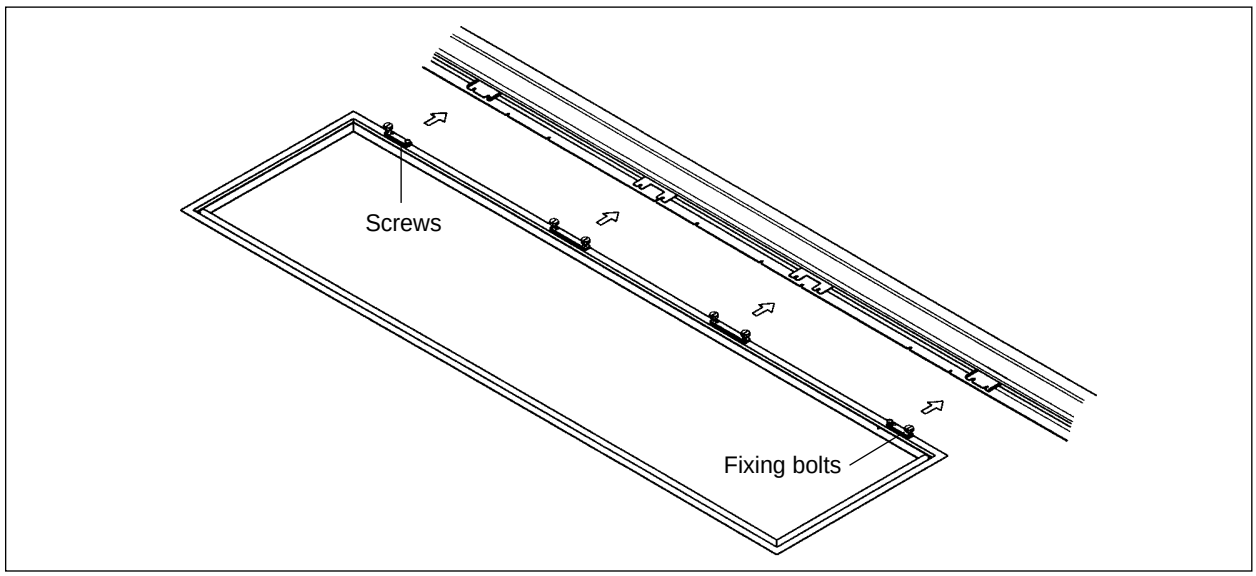



[Fig.2-12]

2) Adjust the table height at an appropriate level for border frame work. (See 2.5) TABLE ASSEMBLY)

3) Unfasten screws on the border frame 2/3 and install the border frame in the groove of the X frame connection plate. Fasten the bolt.

> **[CAUTION]**
> At this time, don't keep a border frame close to the X-frame by force and tighten the bolt while maintaining the gap of about 2mm between the two frames.

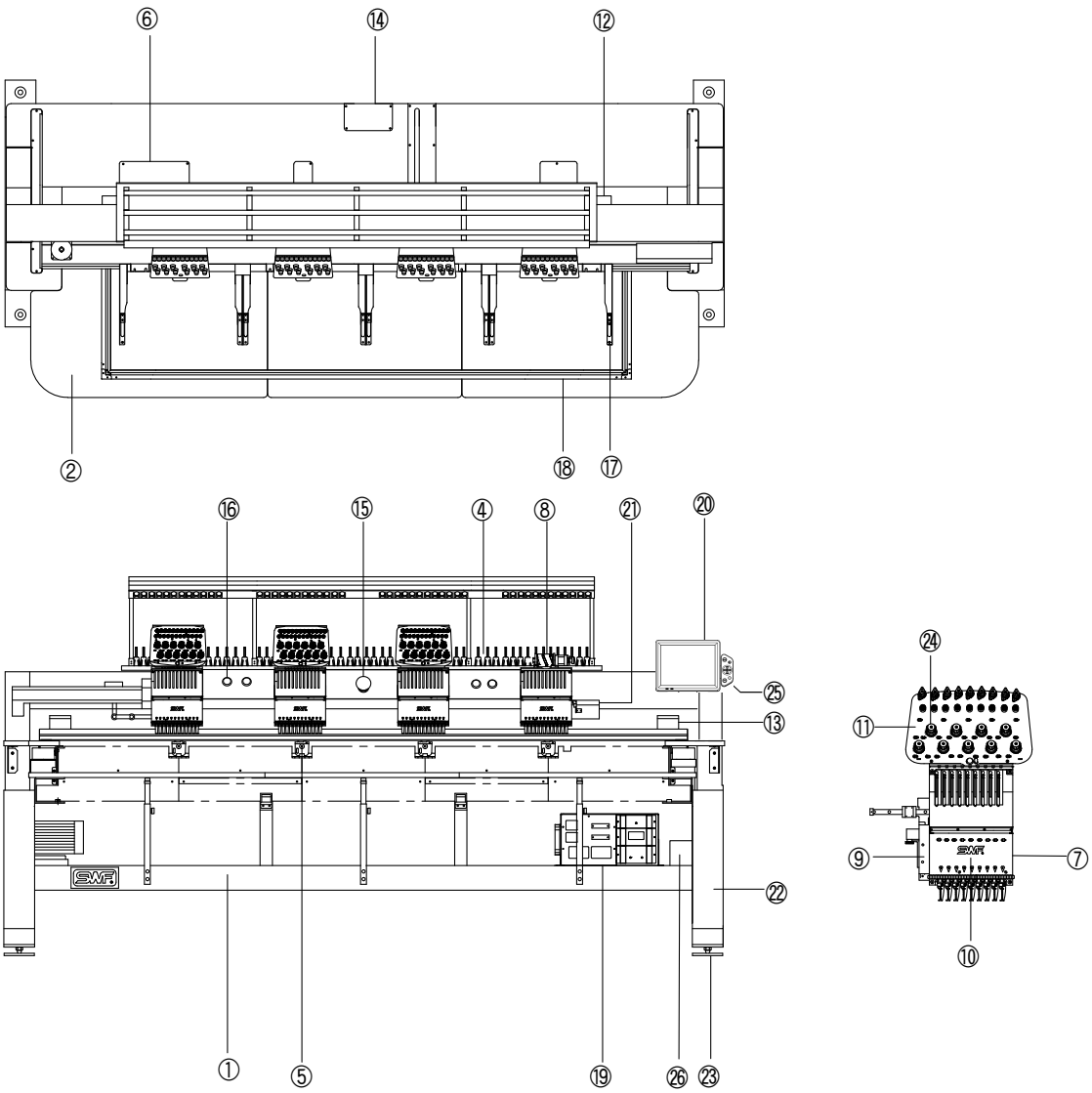



[Fig.2-13]

# CHAPTER 3

# PARTS OF THE MACHINE

## 3-1) SWF/KS-U SERIES




[Fig.3-1]

| | | | |
|---|---|---|---|
| ① Machine Body | ⑧ Color Change | ⑭ Y-axis driving system | ㉑ Encoder |
| ② Table | ⑨ Upper thread holder | ⑮ Emergency stop | ㉒ Main power switch |
| ③ Upper thread stand | ⑩ Head | ⑯ S/B button | ㉓ Leveling base |
| ④ Main shaft drive motor | ⑪ Thread tension adjustment board | ⑰ Tubular frame | ㉔ Thread detector |
| ⑤ Rotary hook base | | ⑱ Border frame | ㉕ Emergency power |
| ⑥ Trimming cam box | ⑫ Sub-controller | ⑲ Controller box | ㉖ Transformer box |
| ⑦ Arm | ⑬ X-axis driving system | ⑳ Operation box | |

# CHAPTER 4

# FUNCTIONS AND FEATURES

1) EXPANDED MEMORY SIZE
The machine can store a maximum of 100 designs. The basic memory size is 2 million stitches.

2) MIRROR IMAGE CONVERSION AND DESIGN DIRECTION
You can turn the design from 0˚ to 359˚ in the increments of 1˚ and also reverse the design in the X direction (mirror image).

3) ENLARGING AND REDUCING DESIGN
You can reduce or enlarge the embroidery design in size from 50% to 200% by 1% along the X and Y axis.

4) AUTOMATIC SELECTION OF NEEDLE BAR
You can select the order of the needle bars up to the 300th bar.

5) GENERAL REPETITION WORK
The same design can be repeated up to 99 times along the X and Y axis.

6) AUTOMATIC OFFSET
The frame automatically returns to the offset point when the embroidery is finished to make it easier for you to switch the frames. You can select AUTOMATIC OFFSET at PARAMETER SELECT MODE to move the frame automatically to the desired point, making it easier to do appliques and to switch the frames.

7) MANUAL OFFSET
You can manually move the frame to the pre-selected point to do appliques or change the frames during embroidery work. The frame can be moved back to its original place by simply pressing the right buttons.

8) RETURN TO START
The frame can be moved back to the start point of the design during the embroidery work.

9) NON-STITCHING
The frame and the needle bar can move back and forth by the units of 1, 100, 1000, and 10000 stitches and by color without stitching.

10) FRAME REVERSAL
When the thread breaks or runs out of track, you can move the needle bar back to the starting point of the design in the units of one to ten stitches.

11) AUTOMATIC TRIMMING
The automatic trimming function, determined by the design and the machine set-up, enhances work productivity and quality of the finished product.

12) AUTOMATIC DETECTION OF UPPER AND LOWER THREAD BREAKS

① Spring Type

The upper and the lower threads are detected by two separate devices. The machine stops automatically when the upper thread breaks or the lower thread is out of the needle (lower thread detector is optional for all machines except for single-head).

② Wheel Type

Wheel and wheel sensor board are installed in the tension adjustment board to detect both the upper and the lower threads. The machine stops automatically when the upper thread breaks or the lower thread is out of the needle.

13) AUTOMATIC RETURN TO STOP POINT IN UNEXPECTED BLACKOUT

When the power fails unexpectedly, the frame moves back to the exact point where the stitching stopped. This helps reduce the number of defects.

14) EDITING

You can delete, change, or insert stitch data and function codes (jump, finish, trimming).

15) AUTOMATIC STORAGE OF DESIGN SET-UP

The machine automatically stores "basic set-up" for each design and calls the set-ups when a specific design is called. This reduces your preparation time.

16) INDIVIDUAL HEAD OPERATION

You can work on the specific head with a broken thread.

17) MACHINE STOPPAGE

The screen will indicate why the machine has stopped.

18) RPM

The screen indicates rpm.

19) FRAME SPEED SET-UP

You can adjust the frame speed to high, medium, or low.

20) UNUSED MEMORY

The screen indicates the memory available for use.

21) TAPE CODE COMPATIBILITY

2-binary and 3-binary tape codes can be edited.

22) CODES FROM OTHER BRANDS

The machine can automatically read designs of various formats stored in the floppy disk. These formats include SST/ DST, DSB, DSZ/ TAP/ FMC, FDR/ ZSK/ 10O/ EXP.

# CHAPTER 5

# FUNCTIONS FOR BASIC MACHINE OPERATION

## 5-1) HOW TO OPERATE START/ STOP SWITCH

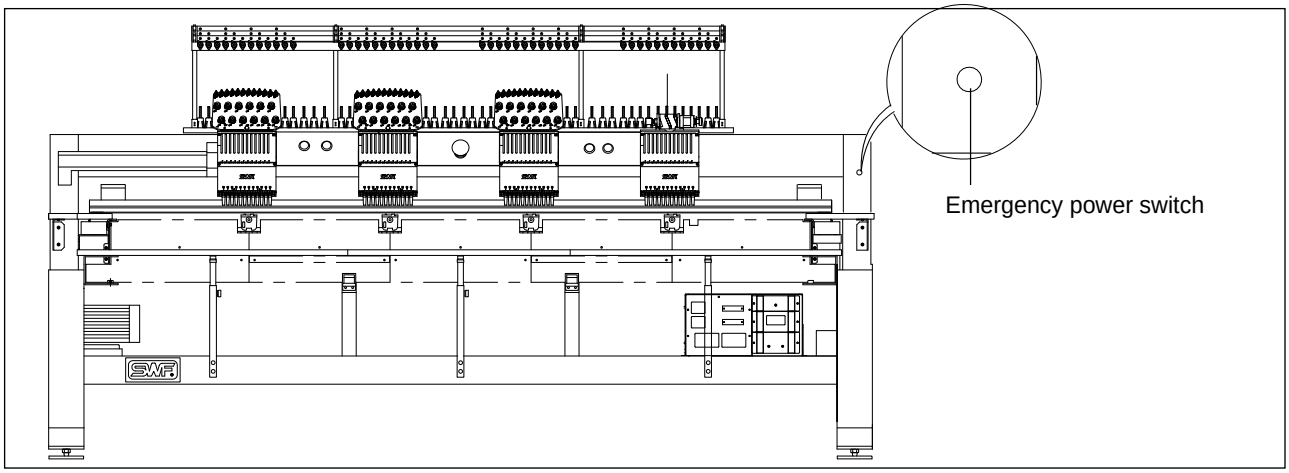
### 5-1-1) Emergency Power Switch

Starting the machine in the initial stage

① Turn on the main power ([Fig.5-1]).

② Press the emergency power switch about 1 second (green color).

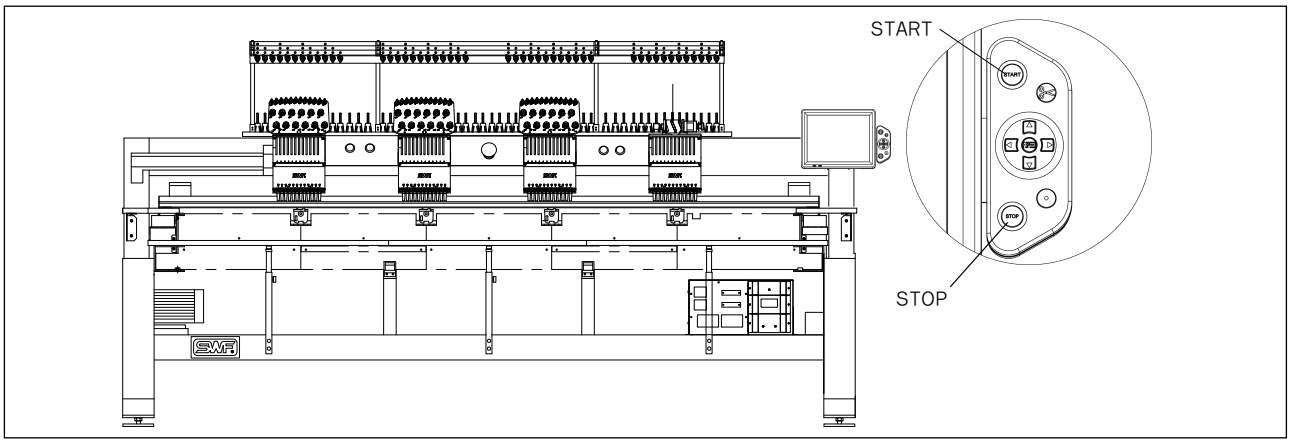
③ Emergency power switch will not turn on if the main power is off.




[Fig.5-1]

**[NOTE]**
Emergency power switch detects emergency stop failures and prevents accidents.
Emergency power function detects the failure of the emergency stop function and prevents the machine from being switched on.

### 5-1-2) Please operate start/stop switches as shown in the followin gfigure.




[Fig.5-2]

The cases for start/ stop switches operations are as follows:

① Start the embroidery work or stop the machine during operation.
② Move the frame back during machine stop.
③ Move forward in design during machine stop (non-stitching)
④ Move backward in design during machine stop (non-stitching)
⑤ Do work other than embroidery

① START/STOP for starting embroidery and stopping the machine

| BUTTON OPERATION | MACHINE OPERATION |
|---|---|
| Press START | Machine starts and embroidery work begins. |
| Hold START | Machine "inches (see Note1)" until you release the button. |
| Press STOP | Machine stops. |

**[NOTE 1]**

You cannot perform non-stitching (floating) at the start of the embroidery because the function is not in the start menu. To perform floating at the start, press STOP to put the machine in STOP MODE. Then press  button to select the non-stitching function.

② START/STOP during machine stop

| BUTTON OPERATION | MACHINE OPERATION |
|---|---|
| Press STOP | Frame moves backward in selected movement units (see Note 2). |
| Hold STOP | Frame starts to move backward.<br>If you press STOP before the machine goes 10 of the selected stitches, the machine will stop immediately (the machine moves back in the selected movement units). If you press STOP after the machine traveled 10 of the selected stitches, the machine will continue to move back. |
| Press STOP again | Press STOP one more time and the machine will stop moving backward. |

③ START/STOP during forward non-stitching (during machine stop)

| BUTTON OPERATION | MACHINE OPERATION |
|---|---|
| Press START | Frame moves forward in selected movement units (see Note 2) |
| Hold START | Frame starts to move forward.<br>If you press START before the machine goes 10 of the selected stitches, the machine will stop immediately (the machine moves back in the selected movement units). If you press START after the machine traveled 10 of the selected stitches, the machine will continue to move forward. |
| Press START again | Press START one more time and the machine will stop moving forward. |

④ START /STOP during backward non-stitching (during machine stop)

See (2) START/STOP during machine stop.

⑤ Performing Work Other Than Embroidery

If you want to perform a solenoid test, a thread break sensor test, or manual trimming, select the function and press START.

Select function → Press START

**[NOTE 1]**

"Inching" refers to low-speed embroidery at a 100 rpm range, performed for stable stitching when the machine is re-started after stop.

**[NOTE 2]**

"Frame movement unit" refers to the "BK STITCH UNIT" in "EMB FUNCTION." You can select from 1 to 10 stitches (by 1 stitch).

## 5-2) LAMP ON THREAD TENSION ADJUSTMENT BOARD

### 1) Switch

① For normal operation, turn the toggle switch on to turn on the indicator lamp.

② If the machine stopped after detecting a thread break, move the frame back to the location of the thread break using STOP button and restart the machine to pick up stitching (design edit).

> **[NOTE]**
> If you want to move the frame back for any reason when a thread break has NOT occurred, press the toggle twice (OFF and ON again).

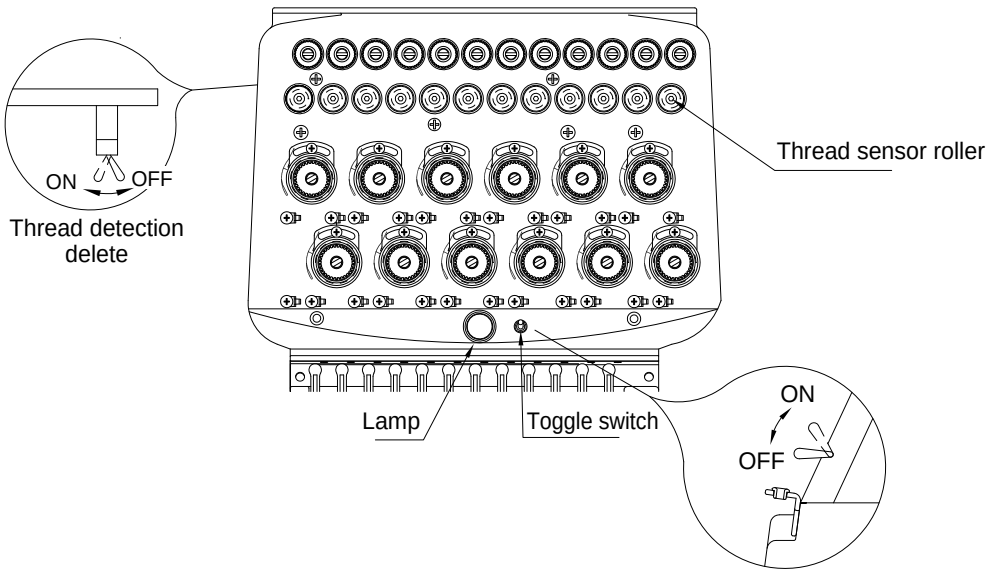
③ To set the needle bar so a specific head does not work, turn the toggle switch off.

> **[CAUTION 1]**
> The take-up lever continues to operate even when the head is turned off. This movement can cause the upper thread to come out of the holder. Use a rubber magnet to fix the unused upper thread.

### 2) Thread Break Detector Lamp

Lamp on a specific head will blink when thread break is detected at the head, while lamps on other heads will be turned off. You cannot turn the lamp on or off on the other heads using the toggle switch.

> **[CAUTION 2]**
> Foreign substances around the thread detector roller may block smooth rotation of the roller and cause wrong detection of thread break.



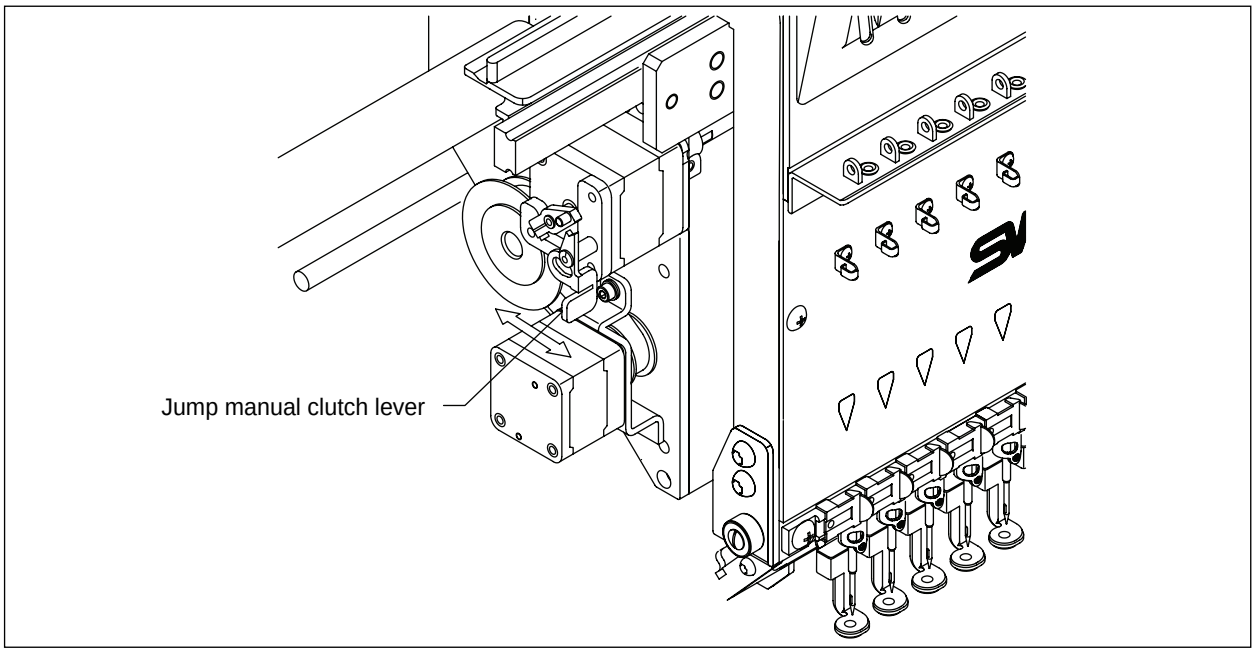

[Fig.5-3]

### 3) Deletion of Thread-Break Detection Function

Poor function of the thread detecting roller due to foreign substances around it may result in wrong and frequent detections, causing inefficiency of work. In this case, you can turn off the detecting function by turning off the toggle switch at the end of the thread tension adjustment board. This will turn off the detecting function on the head you are working with.

## 5-3) NEEDLE STOP CLUTCH

As illustrated in [Fig.5-4], the needle bar will not move when you pull the jump clutch lever. Push the level to the opposite direction of the operator to do move needle bar up and down.



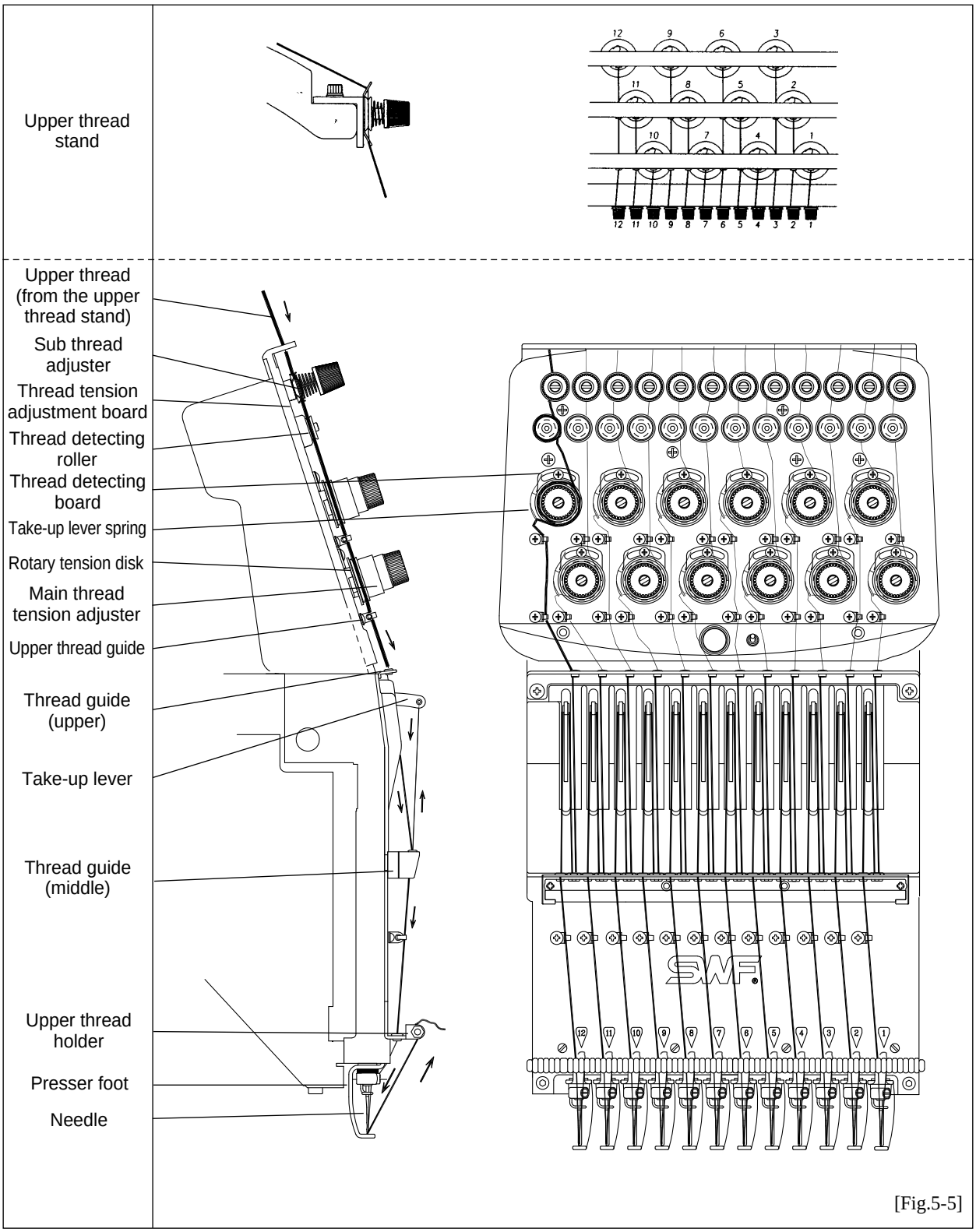

[Fig.5-4]

CAUTION

① The trimmer and the take-up lever continue to move even when the needle bar is stopped by the clutch. Avoid any operations, i.e. threading the needle or changing thread.
② Long-time operation of the needle bar with the clutch may damage the bar controller.

## 5-4) UPPER THREADING AND TENSION ADJUSTMENT

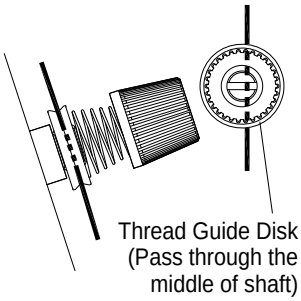
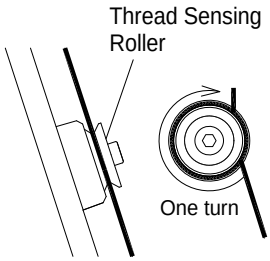
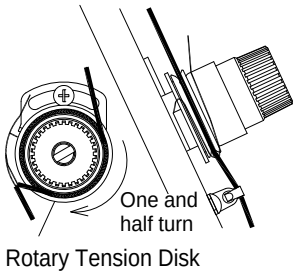
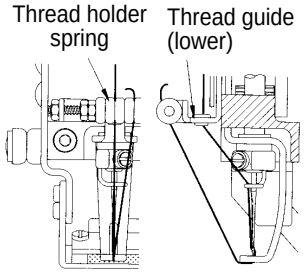
### 1) Upper Threading




[Fig.5-5]

**[NOTE]**

Do not stand on the table when threading the upper thread stand. The table may be damaged.

| Threading the sub tension adjuster | Threading the thread detector roller | Threading the main tension adjuster | Threading around the needle |
|---|---|---|---|
|  |  |  |  |
| Wrap the thread clockwise around the thread guide disk. | Wrap the thread around the detector roller one time. | Wrap the thread 1.5 times around the rotary tension disk (V-shaped groove.) | Fix the upper thread between the thread holder spring of the lower thread guide. |

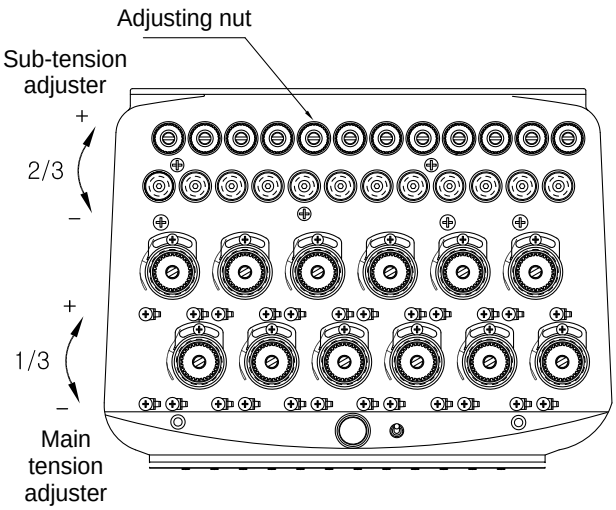
[Fig.5-6]

## 2) Upper Thread Tension Adjustment

Thread tension adjustment is critical for producing high quality of the embroidery. A balance of 2/3 upper thread and 1/3 lower thread generally indicates good tension. If the tension is too loose, the upper thread will loop, causing thread tangles or breaks. If the tension is too tight, puckering may occur as well as thread and needle breaks.

① The upper thread tension is controlled by the sub and main thread tension adjusters. Turn clockwise to increase the tension and counter-clockwise to decrease the tension.

② The sub-tension adjusters should control about 2/3 of the thread tension while the main adjuster should handle the other 1/3. Set the sub-tension adjuster so the upper thread flows smoothly through the rotary tension disks and into the rollers of the main tension adjuster.




[Fig.5-7]

**[CAUTION]**

① If tension at the sub adjuster is too loose, the detector roller may not rotate well and make wrong detections.

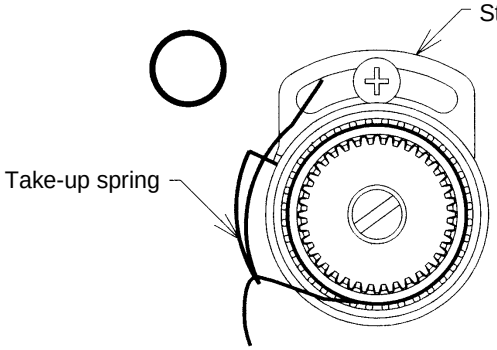
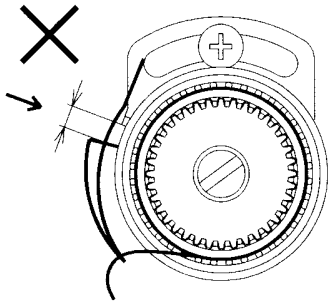
② After adjusting the tension, check if the upper thread tension is what can be pulled with little force of around 100-120g.

**[CAUTION]**

① After adjusting the tension, pull the upper thread to see if the detector roller rotates well.

② Adjust the tension according to the type of thread and fabric used.

### 3) Take-Up Spring

| ○ CORRECT | × WRONG |
|---|---|
| Connect between the take-up spring and the stopper.<br><br> | Take-up spring unable to connect with the stopper (due to dust or foreign substances in the stopper.)<br> |

[Fig.5-8]

① Take-up Spring Functions

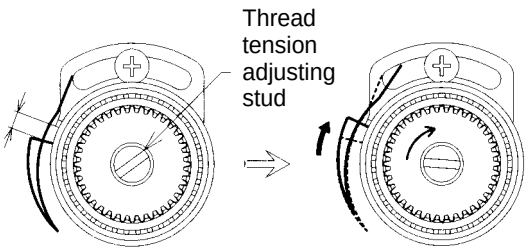
Difference in the length of the upper thread pulled by the take-up lever and pulled by the hook creates tension or looping. When the tension is too weak, the take-up spring handles the leftover length of the upper thread. Increase the tension or the stroke of the spring to form tight stitches on the embroidery.

② Take-up Spring Adjustment

ⓐ If the spring tension is too weak:
Turn the tension adjusting stud clockwise to increase the tension.

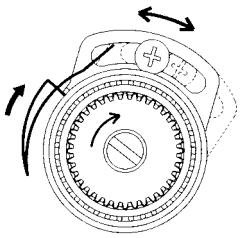
ⓑ If the spring tension is too tight:
Turn the tension adjusting stud counter-clockwise to decrease the tension.

**[CAUTION 1]**
Keep the area clean for connection between the spring and the stopper.




③ Adjusting stroke of the take-up spring:
To adjust the stroke of the spring during embroidery work, move the take-up spring stopper to right or left as shown in [Fig.5-9].

**[CAUTION 2]**
After adjusting the operating capacity of the take-up spring, check if the spring connects with the stopper.



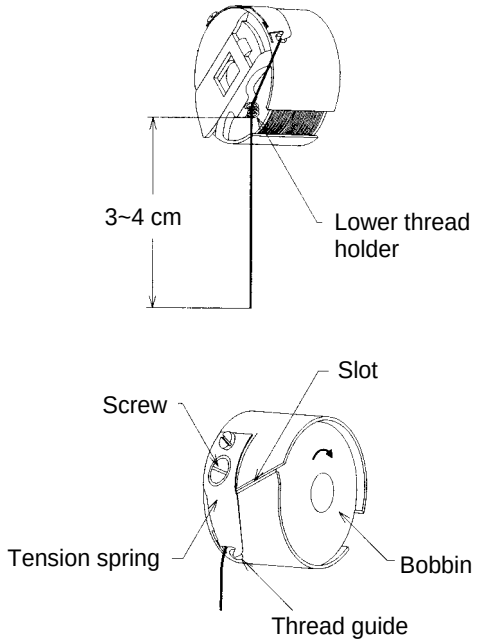
[Fig.5-9]

## 5-5) LOWER (BOBBIN) THREADING AND TENSION ADJUSTMENT

### 1) Lower Threading

① Use cotton yarn (#80 – #120) for your lower thread.
② Threading the bobbin:
ⓐ Insert the threaded bobbin into the bobbin case with the thread coming out from the case slot. Pull the thread through the thread guide. Check if the bobbin is rotating ([Fig.5-10]).
ⓑ Thread the lower thread holder and trim the thread to 3-4cm before inserting the bobbin and the case into the hook assembly. Long tail can cause the thread to tangle during stitching.

**[CAUTION 1]**
Direction of the Bobbin Rotation
Make sure that the bobbin rotates clockwise when you pull the thread holding the bobbin case in your left hand([Fig 5-10]).

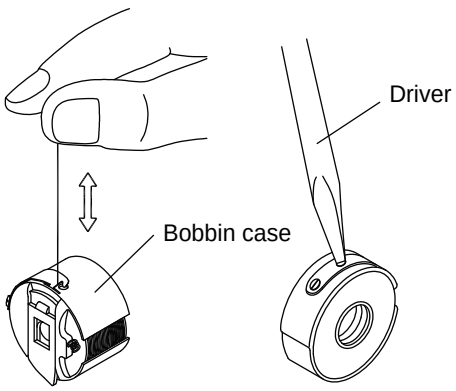



[Fig.5-10]

### 2) Lower Thread Tension Adjustment

Adjust the tension of the lower thread using the nut on the tension spring on the bobbin case. Turn the nut clockwise to increase the tension and counterclockwise to decrease the tension.

**[CAUTION 2]**
For adequate bobbin thread tension, hold a thread from the bobbin and jiggle the bobbin case lightly up and down([Fig 5-11]). The case should drop and the tension should be 25-35g.

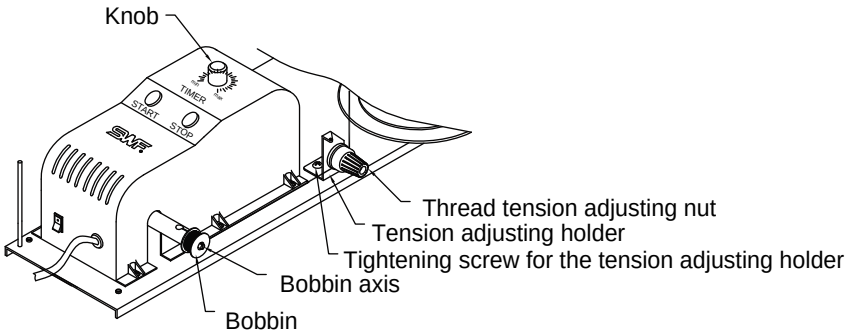



[Fig.5-11]

## 5-6) THREAD WINDER

### 1) Lower thread winding

① Insert the bobbin into the thread winder shaft as in [Fig. 5-12]. Wind the bobbin 5-6 times by hand in the thread winding direction. Then press the start button, and the thread winding begins.




[Fig.5-12]

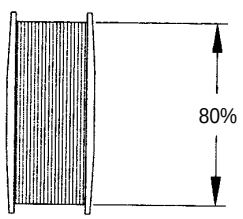
② If the thread winding status is poor, press the stop button. Then the winding stops immediately.

2) Adjustment of bobbin thread volume

① When winding thread around the bobbin, the thread volume should be some 80% of the bobbin size in terms of diameter as in [Fig. 5-13].

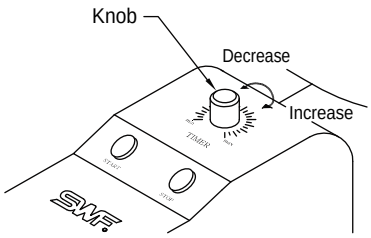
**[CAUTION]**

1. If the bobbin thread volume is too high, the lower thread is not properly released.
2. When the lower thread is wound by 80% of the standard bobbin size, it means some 80m.




[Fig.5-13]

② Bobbin thread volume is adjusted by the thread winder knob. When the knob is turned clockwise, the bobbin thread gets thicker. When the knob is turned counter-clockwise, the bobbin thread gets thinner.

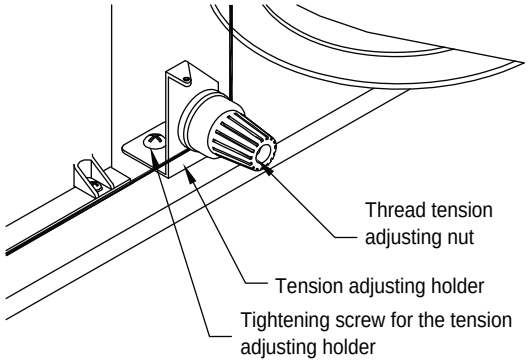



[Fig.5-14]

3) Adjustment of bobbin thread status

① The thread should be wound around the bobbin in parallel. Otherwise, loosen the tightening screw for the thread winder's tension adjusting holder and move the thread guide body left or right for adjustment.

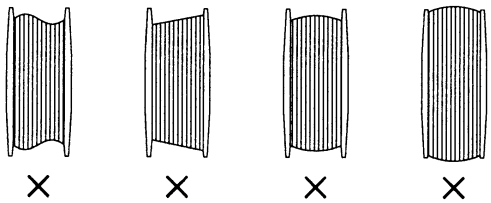
② The tightening level of the bobbin thread can be adjusted with the tension adjusting nut.




[Fig.5-15]

**[CAUTION 1]**

Winding the bobbin off-center or uneven as shown below can cause thread breaks, skipped stitches, or thread tangles.



[Fig.5-16]

**[CAUTION 2]**

Too tight tension of the bobbin thread may block smooth pulling of the thread and cause thread breaks or short tails.

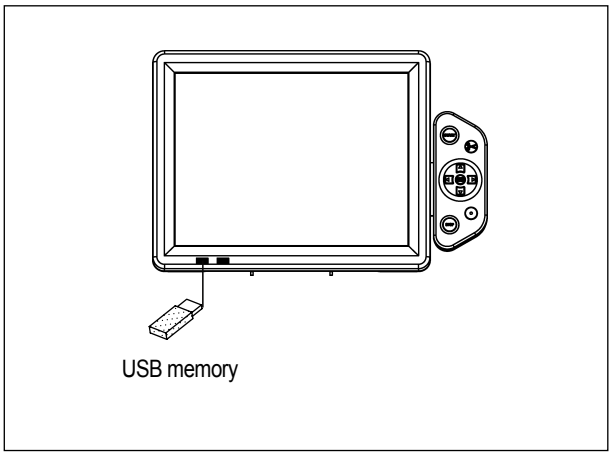
## 5-7) Precautions in using USB memory sticks

Make sure to meet the following conditions when using the above devices.

▶ When using USB memory sticks
- Do not delete USB memory from the USB port when reading and writing with USB.

## 5-8) Inserting USB memory sticks

- Inserting USB memory sticks
  Insert the USB memory into the USB port.




[Fig.5-17]

## 5-9) Deleting USB memory stick

- For USB, close the input/output window and delete the USB memory.

| | |
|---|---|
| CAUTION | Be careful not to remove the disk from the drive when formatting, reading, or writing in order to prevent loss of data. |

## 5-10) Reading and writing of embroidery designs

You can use external devices, such as USB memory, CF cards, and serial port to read designs into the operation box. For writing the designs onto floppy disks and USB memory sticks are available.

## 5-11) RETURN TO PREVIOUS LOCATION IN UNEXPECTED BLACKOUTS

Your SWF machine goes back to the location of stop to pick up stitching when the power comes back on after unexpected blackouts.

**[CAUTION]**
Make sure to turn OFF the power in unexpected blackouts until the power comes back on.

## 5-12) NEEDLE-HOOK TIMING CONTROL

### 1) Needle

① It is very important to select the right needle for the type of thread and fabric used.
② Inappropriate needle may cause bad embroidery, thread breaks, skipped stitches, etc.
③ For normal embroidery, use a DB × K5 needle.

**[CAUTION]**
DB × K5 needle has an eye twice larger than that of DB1 (used for normal sewing). Use DB X K5 for normal embroidery.

### 2) Relationship between Needle and Thread

① Inadequate selection of thread and needle may result in thread breaks, skipped stitches, as well as in bad-quality embroidery.
② Refer to the following table of threads and needles used for normal embroidery.

| NEEDLE SIZE | | | THREAD SIZE | | | |
|---|---|---|---|---|---|---|
| US | Japan | Germany | Cotton | Silk | Nylon | Rayon |
| 0.25 | 9 | 65 | 70~80 | 100~120 | 130~150 | 70~100 |
| 0.27 | 10 | 70 | | | | |
| 0.29 | 11 | 75 | 50~60 | 80~100 | 100~130 | 100~130 |
| 0.32 | 12 | 80 | | | | |
| 0.34 | 13 | 85 | 50~60 | 60~70 | 80~100 | 130~150 |
| 0.36 | 14 | 90 | | | | |

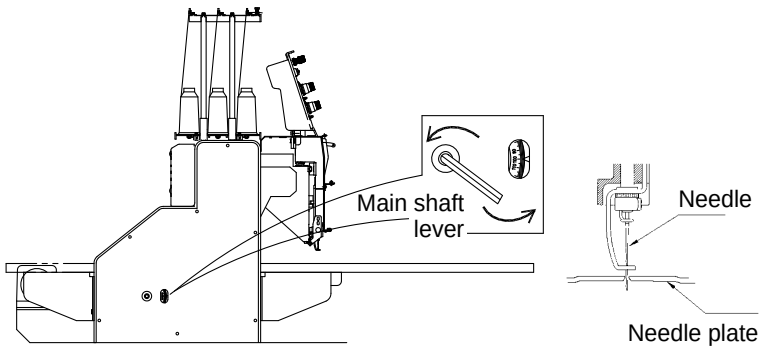
**[CAUTION]**
Needle and thread most commonly used in embroidery are DB × K5 #11 and rayon yarn 120d/2.

### 3) Changing the Needle

① Make sure the needle is completely clear of the needle plate before attempting to change it. If the needle is not clear of the plate, manually turn the main shaft with a hand lever to put the needle in the right location for change.

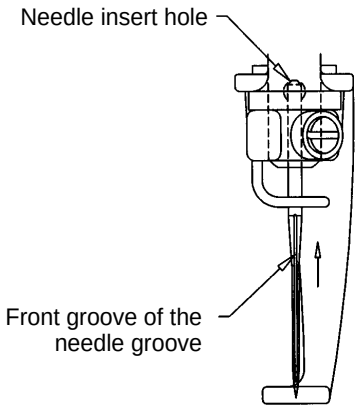
**CAUTION**

STOP the machine before turning the shaft manually. Immediately remove the lever afterward: it is dangerous to operate the machine with the lever inserted.



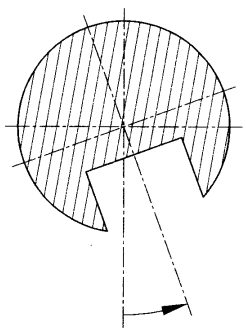

[Fig.5-18]

② When inserting the needle, make sure that the groove of the needle is facing front. Shaft of the needle should be inserted completely into the needle bar.




[Fig.5-19]

**[CAUTION 1]**
For special threads such as artificial silk, turn the needle slightly to the right to prevent thread breaks (see [Fig.5-20]).



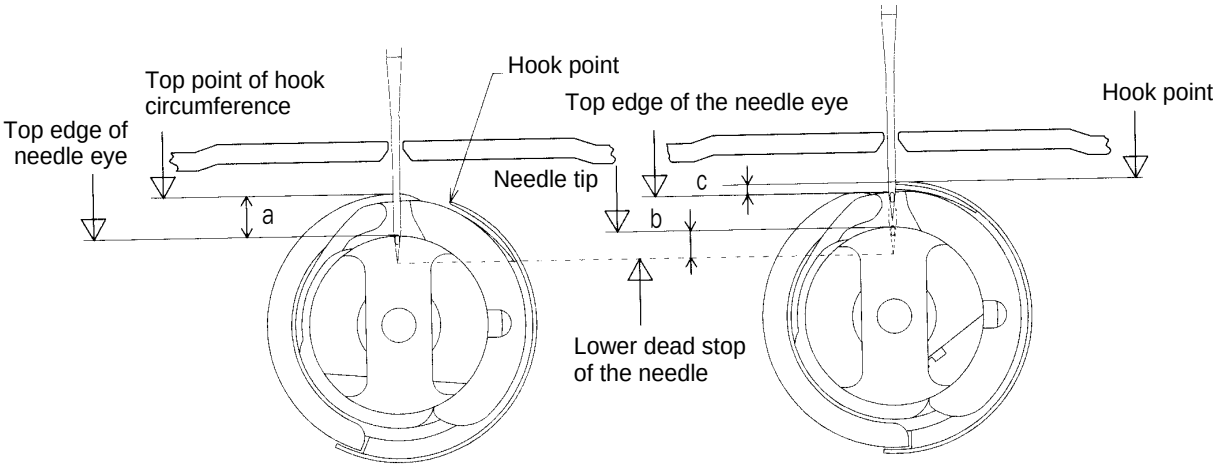
[Fig.5-20]

**[CAUTION 2]**
If the needle is not inserted all the way to the top of the needle bar hole, timing of the machine will go off, causing broken needles and thread breaks.

## 4) Relationship between Needle and Hook

① Adjusting Timing between Needle and Hook

Default timing of the needle and the hook is set by the main shaft angle of 200° and varies as below.

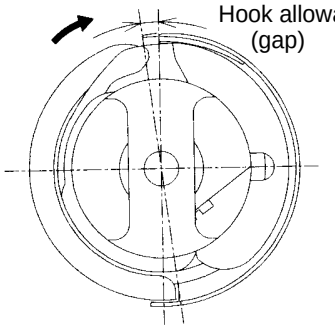



[Fig.5-21]

| | | |
|---|---|---|
| a. At lower dead stop of the needle bar | 2.3～3.7 mm | The figures may change according to needle specification/number. |
| b. At needle-hook timing | 1.8～2.2 mm | |
| c. At needle-hook timing | 0.5～1.5 mm | |

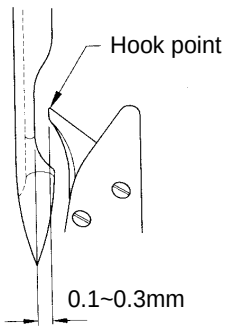
**[CAUTION]**

The hook can move right and left if there is an allowance in the lower shaft gear. Eliminate the allowance (gap) by turning the hook clockwise. Then adjust the timing.




[Fig.5-22]

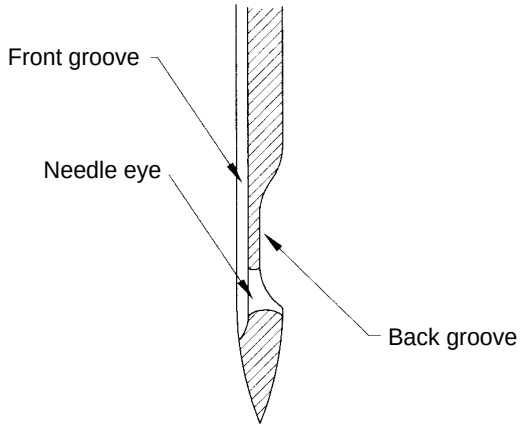
② Adjusting Gap between Needle and Hook Point




[Fig.5-23]

- Gap between the hook point and the scarf of the needle should be 0.1～0.3 mm minimum.
- Thread skip occurs due to thread looping or inadequate balance/gap between the needle and the hook. The closer the hook point is to the needle, the hook point will be inside the loop and threading will be more stable.

**[CAUTION]** Functions by Needle Shape



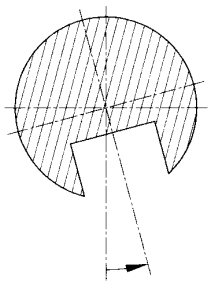

[Fig.5-24]

① Size of the hole and groove differs by needle.

- Front groove: protects the thread from the heat of the sewing friction (which may cause thread breaks).
- Back groove: helps regulate the hook timing and prevents looping.

Prevention of looping is important for stitching. Adjust the hook point as close to the needle as possible to achieve the perfect thread position.

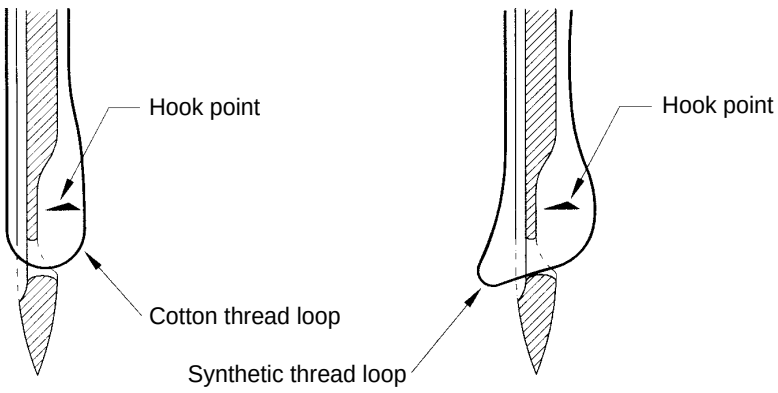
② If thread breaks or stitches are unstable, turn the needle slightly to the right.



[Fig.5-25]

**[NOTE]**

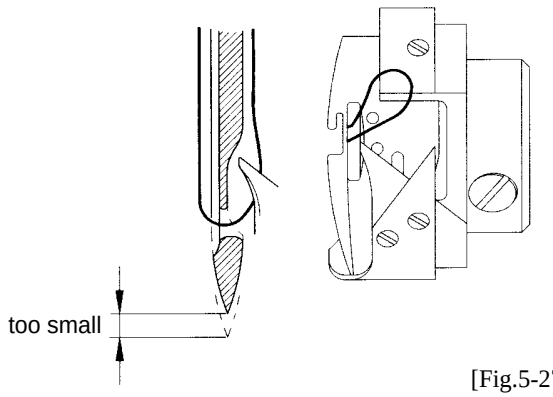
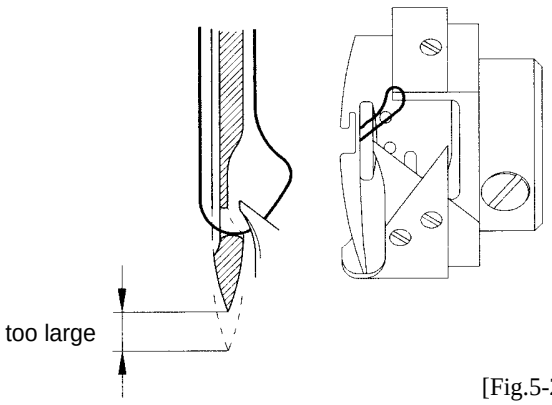
Shape of the loop varies by the type of thread or fabric. Unstable shape of the loop may result in skipped stitches. The following pictures show different shapes of loop formed by different types of thread.



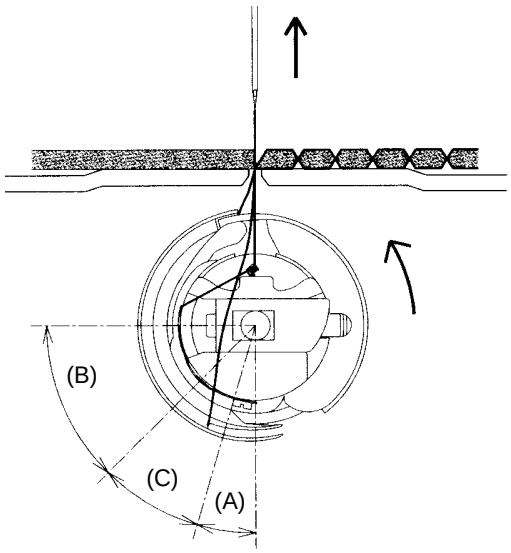

[Fig.5-26]

## 5) Relationship between the Take-up Lever and the Hook

Hook point timing is directly related to thread tension and thread breaks. The following pictures show the location of hook when the take-up lever starts to move up from the lower dead stop (main shaft rotation angle: 292°).

| FAST HOOK TIMING | |
|---|---|
|  [Fig.5-27] | Groove of the hook is in the (A) range. The hook point will take up the thread when the loop is too small. Stitching will be faster than the take-up movement. As a result, the thread tension will be too loose, upper thread loop will be too small, and skipped stitches will occur. |
| **SLOW HOOK TIMING** | |
|  [Fig.5-28] | Groove of the hook is in the (B) range. The hook point will take up the thread when the loop is too large, so there may not be skipped stitches. However, the take-up movement will be faster than the stitching and thread breaks may occur. |

**[CAUTION]** In normal hook timing, the hook should be in the (C) range in the picture below.




[Fig.5-29]

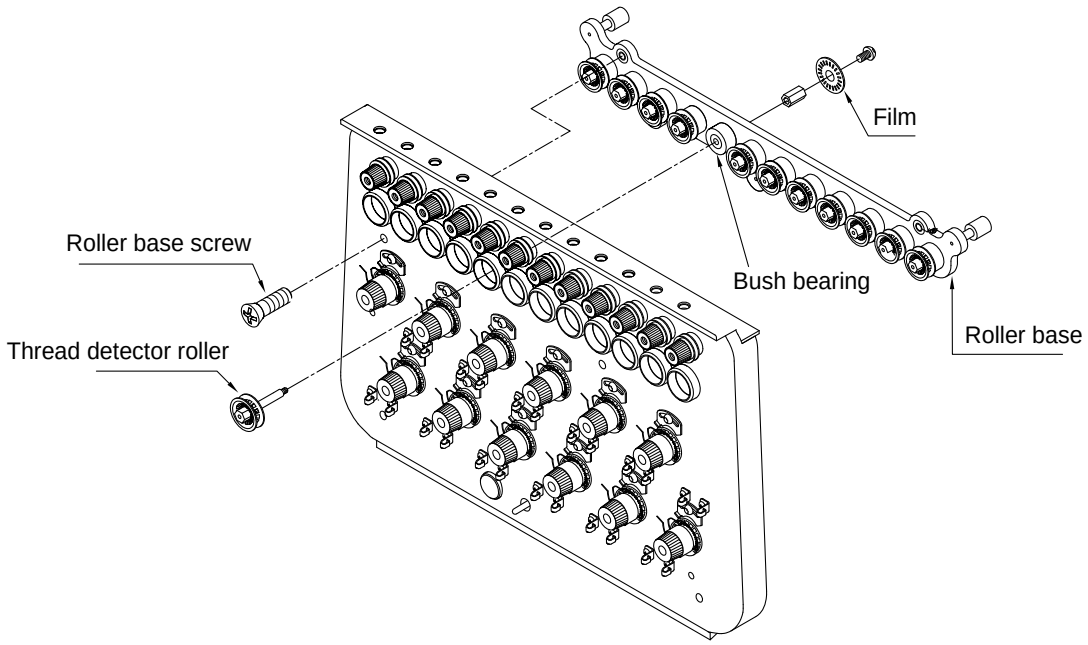
## 5-13) ASSEMBLY AND FUNCTIONS OF THREAD DETECTOR

### 5-13-1) Functions of Thread Detector

Detection of the breaks of upper or lower threads prevents ill quality embroidery. The thread- break detector unit contains rollers that sense the smooth feeding of the thread. Any dust, thread remnants, etc. will interfere the rollers' rotation and may cause wrong detection.

### 5-13-2) Disassembling Thread Detector

You will need to disassemble the thread-break detector unit to clean. Remove the cover of the thread tension adjusting plate, separate the cables and unfasten the roller base joint screw. The entire unit will be disassembled including the rollers and bush bearing.




[Fig.5-30]

**[CAUTION]**

Make sure to correctly place the thread detecting roller to have the unit properly function. Check between the sensor groove and the film. If needed, unfasten the board base screw to adjust the board.

# CHAPTER 6

# MAINTENANCE AND INSPECTION

Consumable parts shall not be guaranteed even in warranty period.

## 6-1) CHECK POINTS FOR REGULAR INSPECTION

CAUTION

Safety rules must be observed during the inspection.

① Clean, oil, and grease the set parts of the machine on a regular basis.
② Inspect tension of each driver belt.
③ Failure to perform regular inspections may cause the following:

- Corrosion of P/C circuit board
- Damage to the semi-conductor on P/C circuit board
- Malfunction of the floppy disk drive
- Ill connection of the connector
- Abnormal wear-out of machine parts due to insufficient oiling and greasing

## 6-2) CLEANING

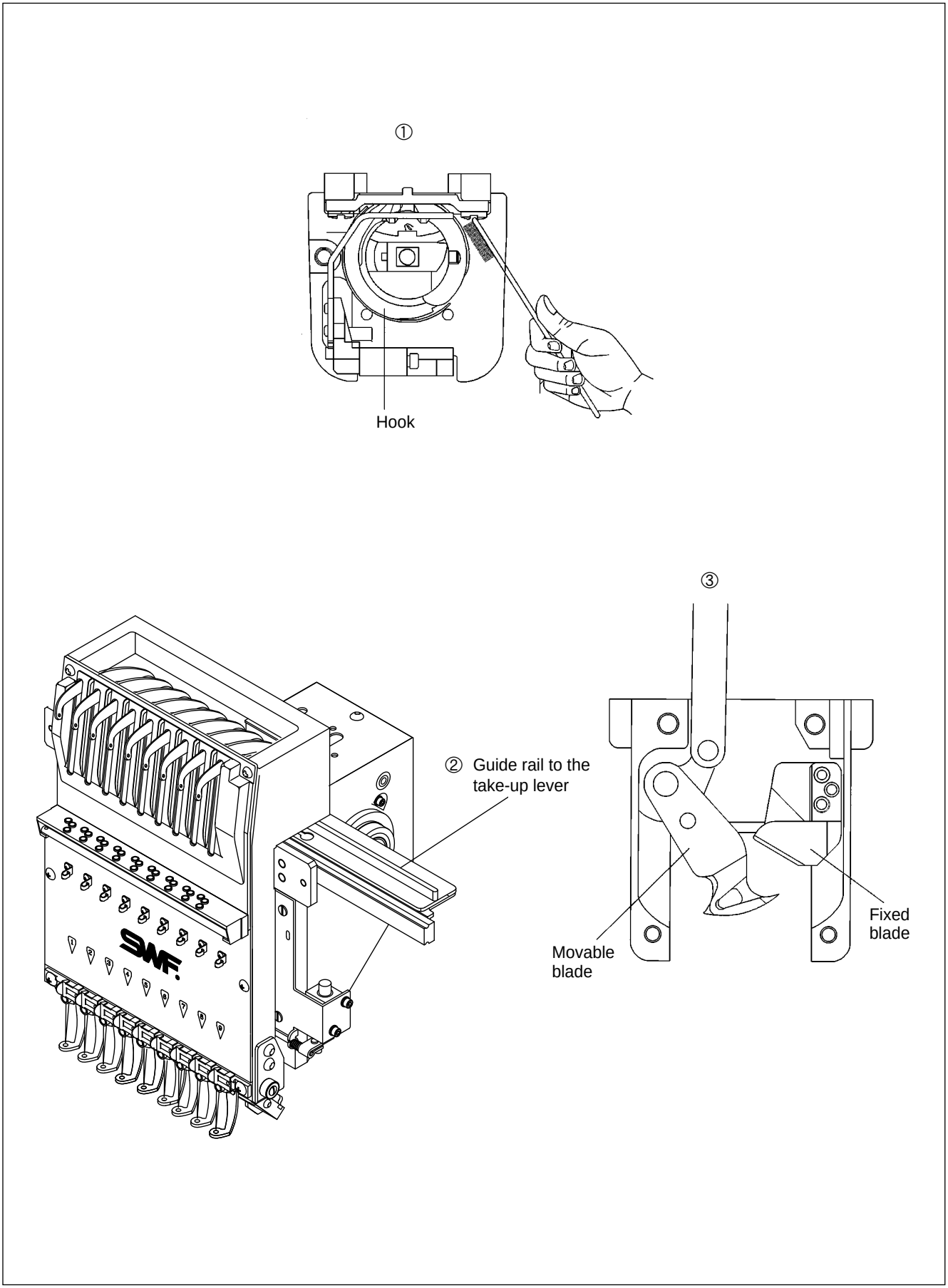
CAUTION

Sun Star is not responsible for machine damages or malfunctions caused by insufficient cleaning or oiling.

CAUTION

Turn OFF the main power before inspecting or cleaning of the following parts.
Clean your machine according to the usage condition and surounding environment

| NO | Important Parts for Cleaning | Cleaning cycle | Reference Fig. |
|---|---|---|---|
| 1 | Around the hook | Every day | ① |
| 2 | Guide rail to the take-up lever | Once a week | ② |
| 3 | Around the movable blade and the fixed blade<br>[How to Clean]<br>☐ Remove the needle plate and pull the movable blade forward (see picture).<br>☐ Use the SWF brush to remove dirt and dust. | Once in 3-7 days | ③ |


①
Hook
③
② Guide rail to the take-up lever
Movable blade
Fixed blade

[Fig.6-1]

## 6-3) OIL SUPPLY

| | |
|---|---|
| CAUTION | Make sure to turn the power OFF during oil supply. |

| | |
|---|---|
| CAUTION | Sun Star is not responsible for machine damages or wear-outs caused by insufficient oiling. |

**1) Oil supply**

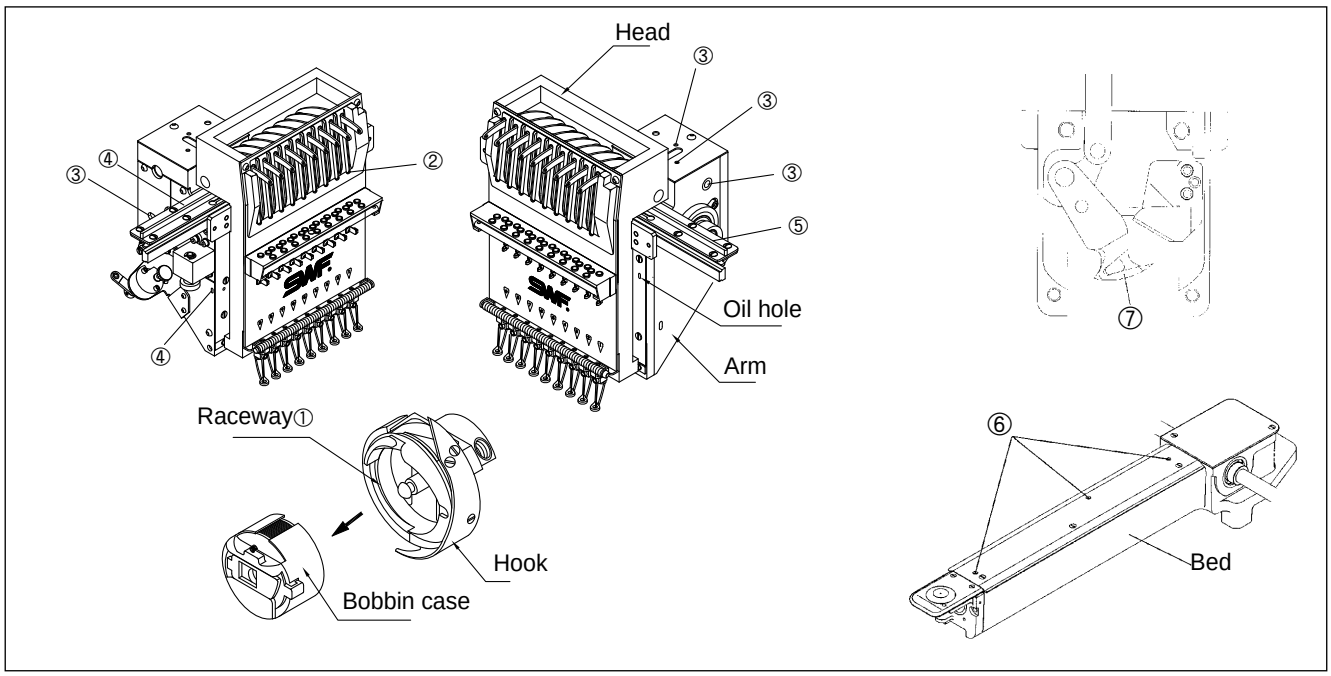
Use the SWF sewing machine oil (Spindle Oil) or ISO-standard VG18.

**2) Manual oil supply**

| No. | Where to Oil | Oiling cycle | Ref. Fig. |
|---|---|---|---|
| 1 | Take the bobbin case out of the hook. Feed small amount of oil on the raceway. | 3-4 times a day<br>Over twice a day for the first month | ① |
| 2 | Needle bar and needle bar shaft | Once a week | ② |
| 3 | Inside the arm | Once a week | ③, ④ |
| 4 | Guide rail to the take-up lever | Once a week | ⑤ |
| 5 | 3 oil holes on the bed cover | Once in 3 days | ⑥ |
| 6 | Juncture of the movable blade and the fixed blade in the trimming unit | Once in 2-3 weeks | ⑦ |

**[CAUTION]**

1. Excess oil may stain the thread and the fabric.
2. Run the machine without stitching for 2-3 minutes after oiling.
3. Excessive oiling in the hook may cause trimming problems and thread breaks.



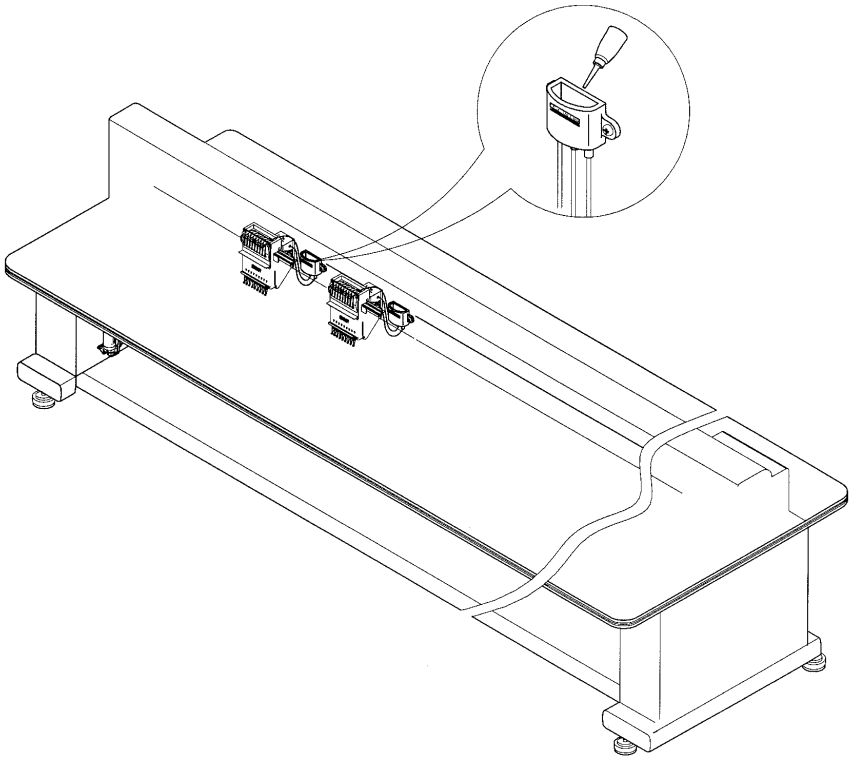

[Fig.6-2]

### 3) Oiling

① Cored drip-feed lubrication [Standard Type]

㉠ Location and Cycle of Oiling

| No. | Where to oil | Oiling cycle |
|---|---|---|
| 1 | Inside arm<br>a. driver pin of take-up lever<br>b. driver pin of presser foot<br>c. driver shaft of needle bar | Once in 2 days |



[Fig.6-3]

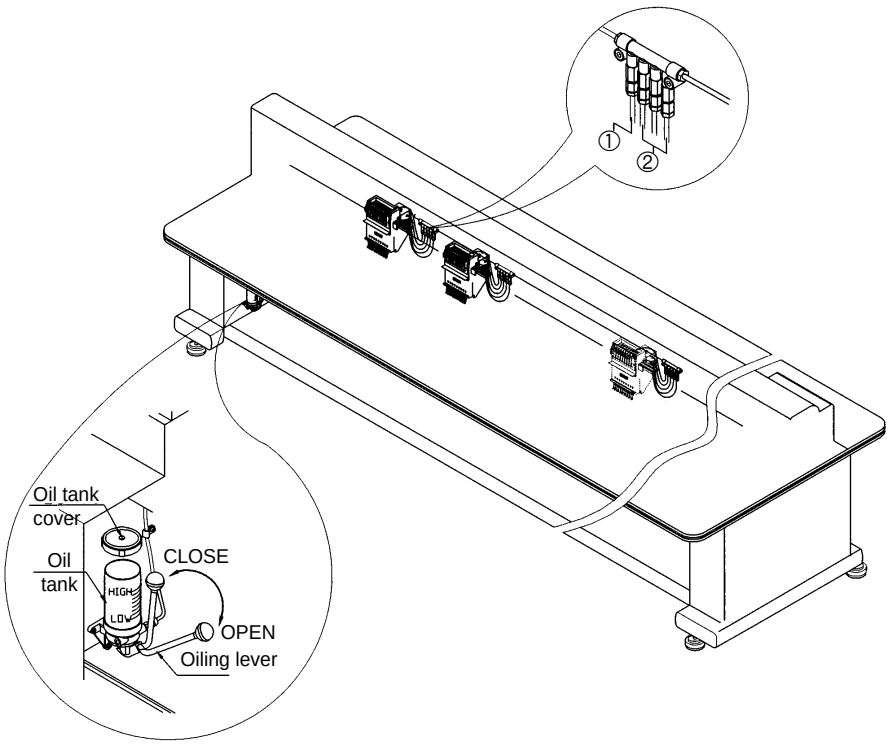
**[CAUTION]**

- Use the SWF sewing machine oil (Spindle Oil) or ISO-standard VG18.
- Oil just enough to damp the tape in the oil tank.

② Oiling via Pump [Option Type]

㉠ Location and Cycle of Oiling

| No. | Where to oil | Oiling cycle | Reference Fig. |
|---|---|---|---|
| 1 | Needle bar | Twice a day | ① |
| 2 | Inside arm<br>a. driver pin of take-up lever<br>b. driver pin of presser foot<br>c. driver shaft of needle bar | | ② |




[Fig.6-4]

**[CAUTION]**

- Use the SWF sewing machine oil (Spindle Oil) or ISO-standard VG18.
- Make sure to fill the oil tank to the middle point between HIGH and LOW.
- Do not oil with both of the ① and ② levers open.

③ Grease supply

| | |
|---|---|
| CAUTION | Make sure to turn OFF the main power during the grease supply. |

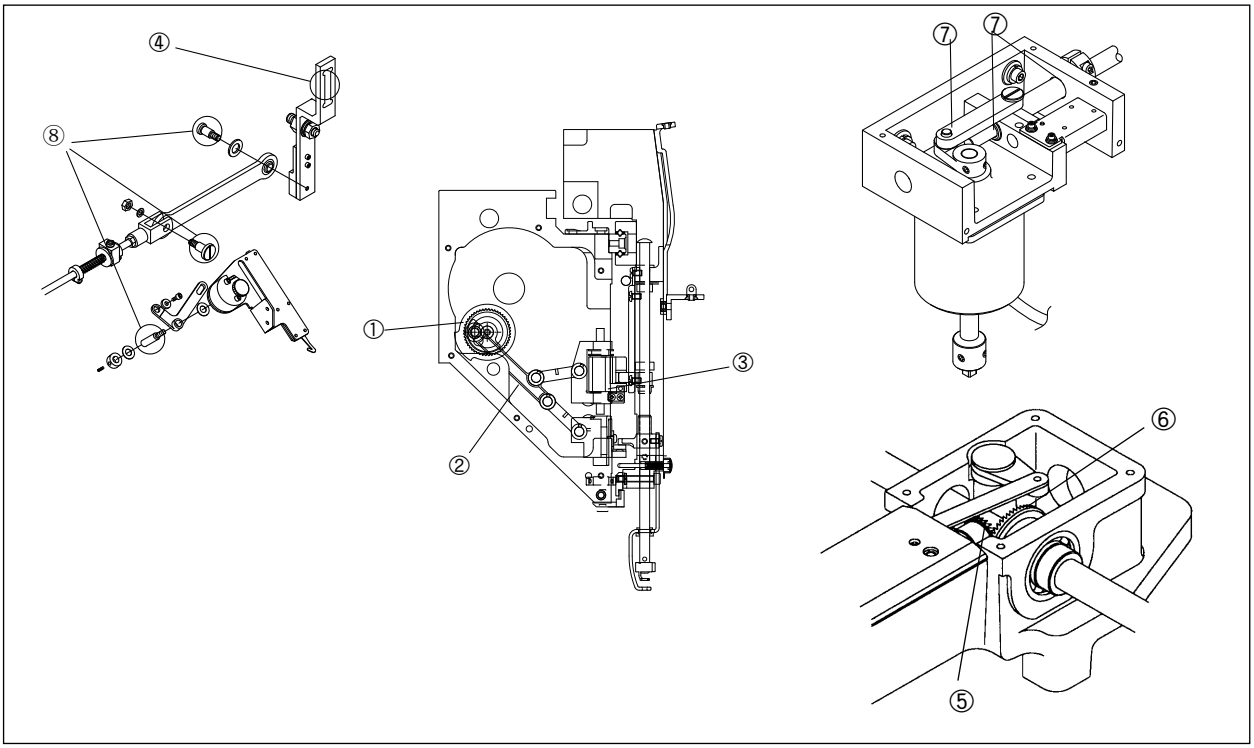
Use high-quality mineral-based lithium grease.

| NO | Where to Grease | Greasing cycle | Reference Fig. |
|---|---|---|---|
| 1 | Inside the arm<br>Take-up lever drive cam<br>Needle bar drive cam<br>Needle bar controller | Once in 3 months | ①<br>②<br>③ |
| 2 | Driving plate for the upper thread holder | Once in 3 months | ④ |
| 3 | Hook gear and lower gear in the rotary hook base<br>Once in 3 months | Once in 3 months | ⑤<br>⑥ |
| 4 | Trimmer driving link and trimmer driving shaft bushing | Once in 3 months | ⑦ |

Places for supplying synthetic TM grease

| NO | Where to Grease | Greasing cycle | Reference Fig. |
|---|---|---|---|
| 1 | Hinge screw | Once in 1 months | ⑧ |

**[CAUTION]**
Regular greasing prevents machine noise and abnormal wear-out.




[Fig.6-5]

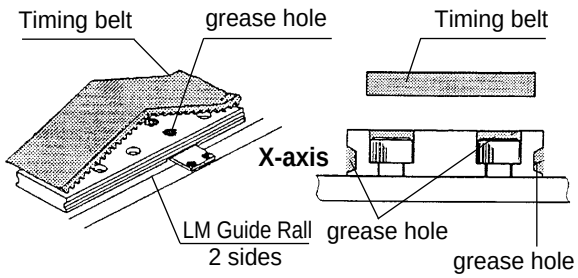
| | |
|---|---|
| CAUTION | Turn OFF the main power during the grease supply. |

Use lithium-type grease (JIS No.2) - Albania No.2.

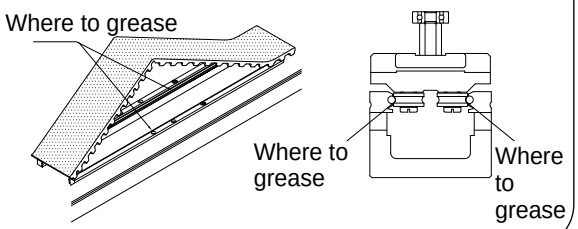
| NO | Where to Grease | Greasing cycle | Reference Fig. |
|---|---|---|---|
| 1 | X-axis LM guide (2 on each side) | Once in 2 months | ① |
| 2 | Y-axis LM guide (2 on each side) | Once in 2 months | ② |
| 3 | Sub Y drive LM guide (1 on one side) | Once in 2 months | ③ |
| 4 | Head drive LM guide | Once in 2 months | ④ |

**[CATUION]**
Do NOT grease the parts not indicated (needle bar, hook, etc.)

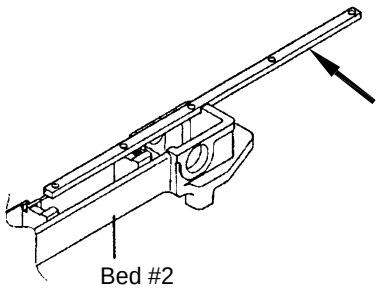
① X-axis LM guide (4 spots)



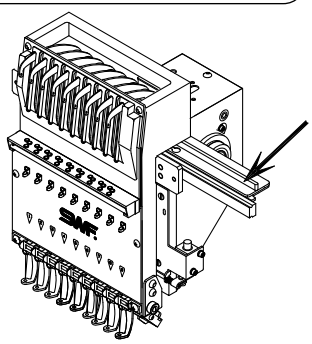

② Y-axis LM guide (4 spots)




③ Sub Y drive LM guide (1 spots)




④ Head drive LM guide (upper cover opened)



[Fig.6-6]

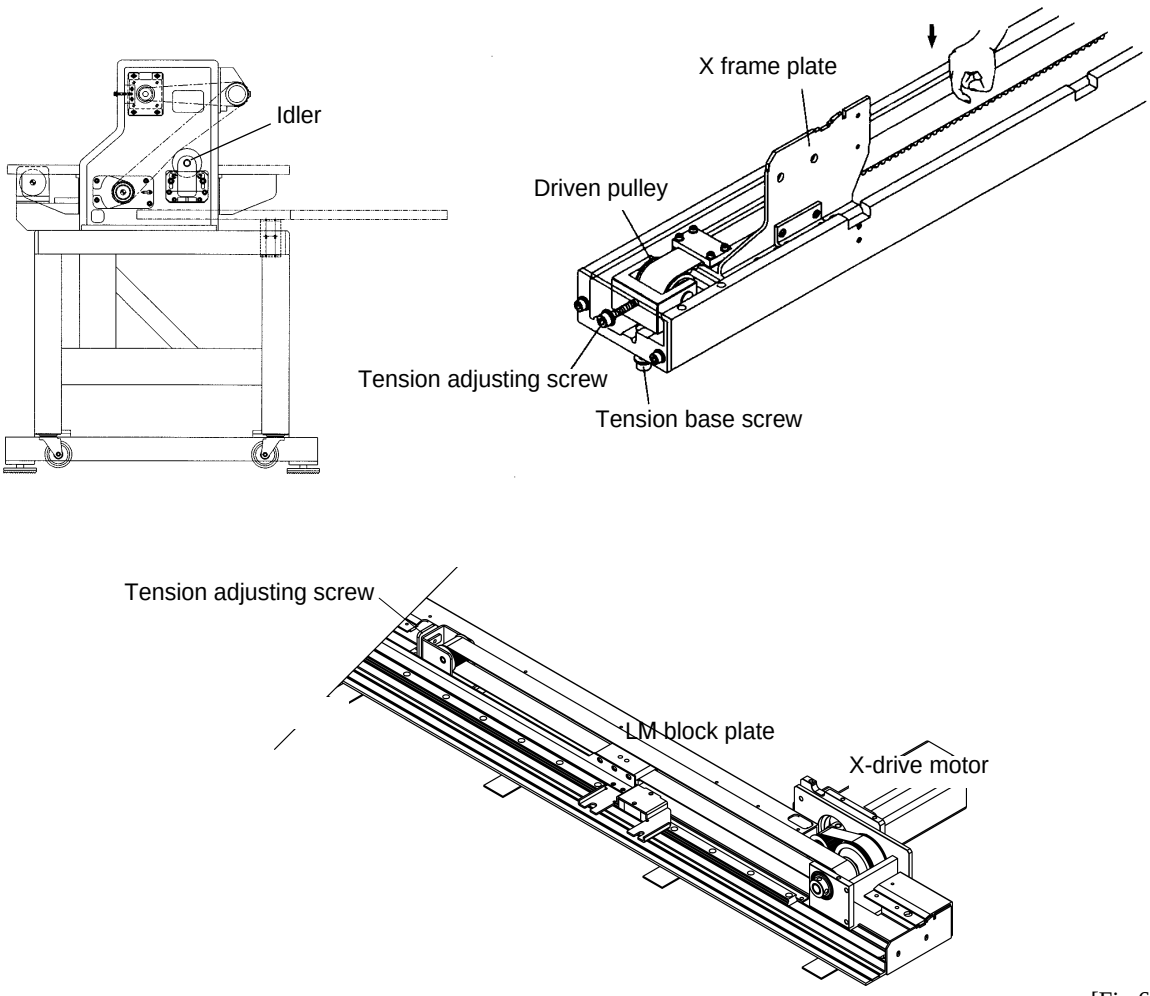
## 6-4) DRIVE BELT TENSION

| | |
|---|---|
| CAUTION | Turn OFF the main power when inspecting drive belt tension. |

Too weak or too tight tension on the drive belt may cause machine malfunction or damages (abnormal wear-out of drive unit). Inspect the driver belt on a regular basis.

| NO | Location for inspection | Inspection cycle | Reference |
|---|---|---|---|
| 1 | Belt on main shaft motor | Once in 3 months | ① check belt tension<br>② check for belt crack<br>③ check for belt wear-out<br>④ check for bearing damage<br>⑤ check for wear-outs of rotating & sliding parts |
| 2 | Belt on main shaft motor | Once in 3 months | |
| 3 | Others | Once in 3 months | |

**[CAUTION]**
Inspect the tension in the direction of the arrows in the picture below.




[Fig.6-7]

# CHAPTER 7

# MACHINE ADJUSTMENTS

WARNING

Turn OFF the main power when adjusting the machine.

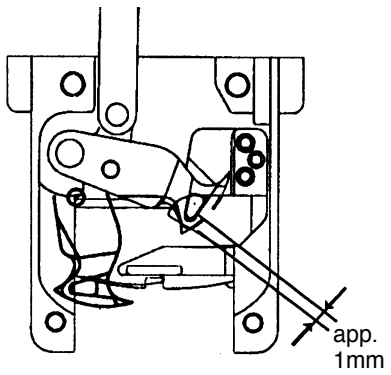
## 7-1) ADJUSTING THE TRIMMERS

### 7-1-1) Adjusting the Position of the Trimming Cam (Insert Angle of Movable Blade)

The movable blade is started by the trimmer cam in the angle it is inserted. As one of the basic trimming functions, it arranges the upper thread tails in the needle after trimming.

**1) Adjusting the position of the movable blade**

① Check if the movable blade is in the correct position.
② Cutting point of the movable blade should be inserted 1mm at the end of the fixed blade. Incorrect position of the movable blade can cause trimming errors or deviation of the upper thread.
③ Unfasten the crank screw to adjust the location of the movable blade (see [Fig.7-1]).



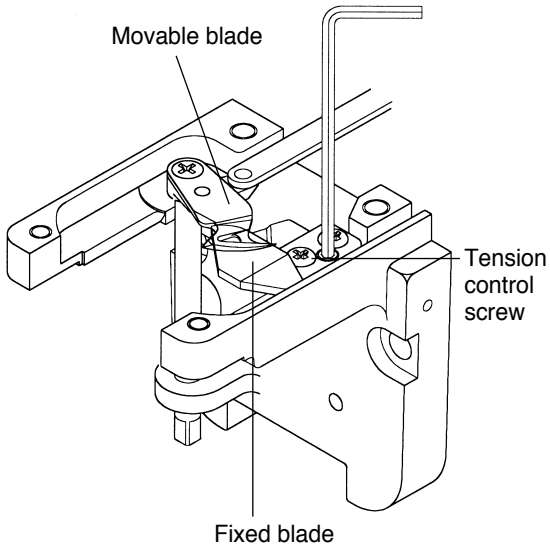

[Fig.7-1]

### 7-1-2) Adjusting Blade Tension

Make sure to check and adjust the cross-tension of the movable and the fixed blades after replacement or repair.

① Checking the cross tension
Manually move the movable blade and cut the upper and the lower threads. Check the cross-section of the thread cut.

② Adjusting the cross tension
Adjust the cross tension using fixed blade tension control screws (see [Fig.7-2]). Manually move the movable blade and adjust that it crosses in parallel with the cutting line of the fixed blade from its entry point to its return point.




[Fig.7-2]

**[NOTE]**
Avoid excess cross-tension. It may cause the movable blade to wear out from overload at its entry or return point.

## 7-2) ADJUSTING THE TRIMMER RETURN SPRI

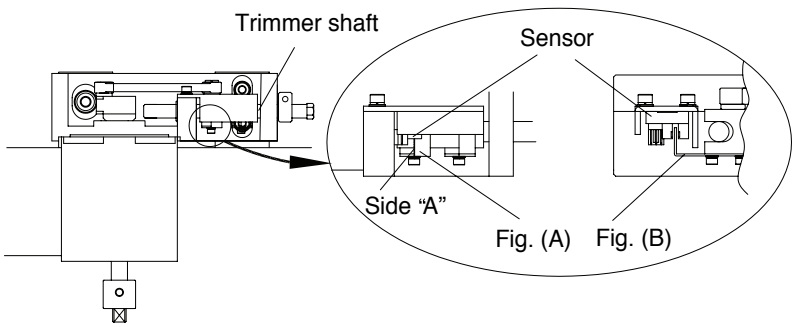
**1) Function**

The trimmer return spring detects if the movable blade returns to the correct position after trimming. If the machine operates without the blade returned to its correct position, the needle and the blade may be damaged. The trimmer return spring detects and stops the machine if the blade has not returned.

**2) Adjustment**

① Unfasten the spring shaft screw so that the center of the spring hole is around 2mm away from the surface to which the screw is attached (see [Fig.7-3]). Save the location of the spring. Turn the spring holder #1 to adjust the tension of the return spring and refasten the screw.

② Adjust the return spring so that the surface and the spring are around 1mm apart.

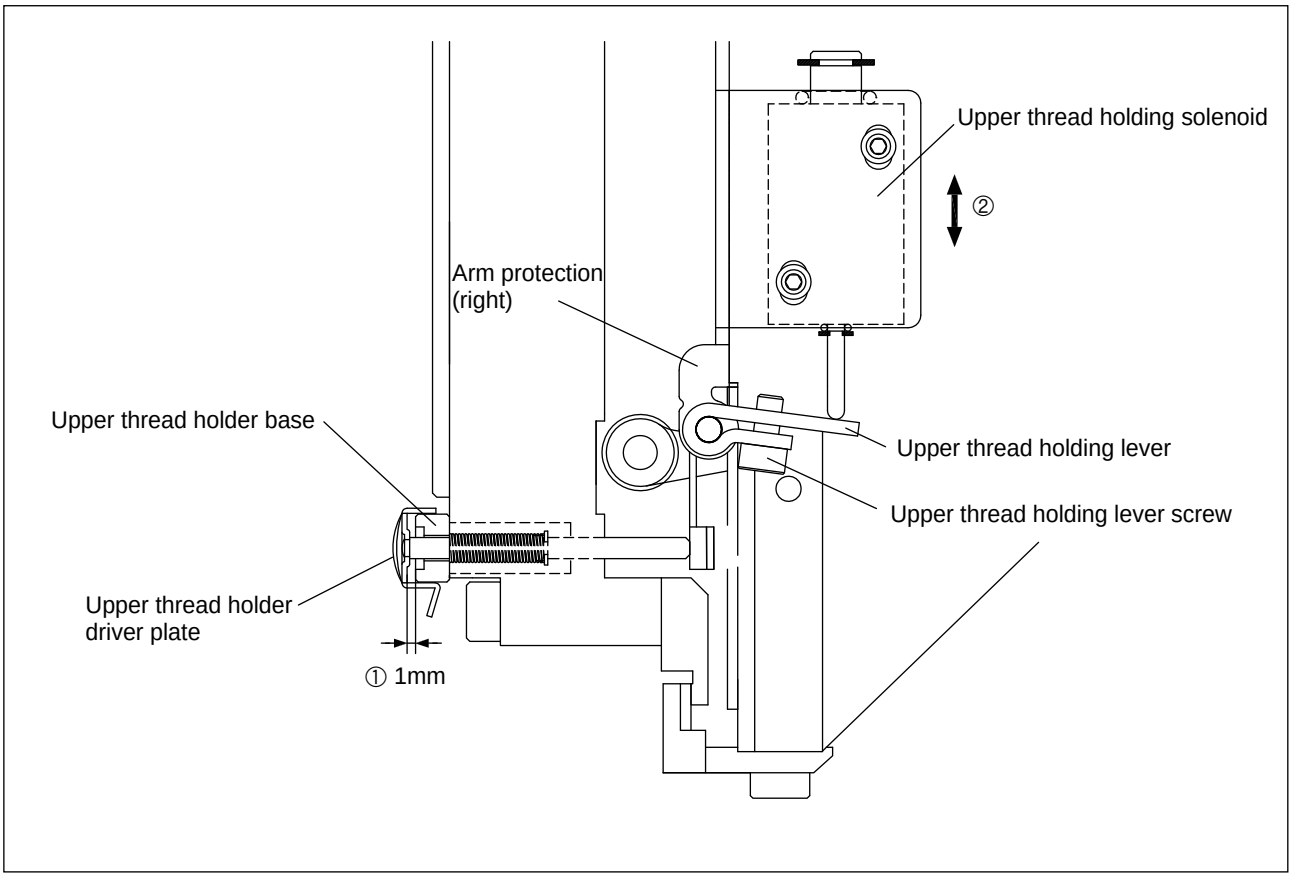



[Fig.7-3]

## 7-3) ADJUSTING UPPER THREAD HOLDING UNIT

1) Checking the assembly of upper thread holding lever and upper thread holder plate
   ① Stroke of the upper thread holder driver plate in the upper thread holder base should be 1mm from the base when the upper thread holding solenoid is on.
   ② If the space is shorter than 1mm, adjust the position of the upper thread holding solenoid up and down so that the stroke of the plate is 1mm.
   ③ If the solenoid is not adjusted with the above measure, you must adjust the position of the upper thread holding lever.
   ④ To adjust the upper thread holding lever, remove the arm protection plate from the arm. Adjust the upper thread holding solenoid over the center, and unscrew the lever. Support the arm protection plate with a flat plate so the lever touches the flat plate. Fasten the screw of the upper thread holding lever. Make sure that the upper thread holding lever is touching the axis of the upper thread holding solenoid.
   ⑤ Check if the lever moves smoothly left and right when you manually operate it.
   ⑥ Install the arm protection plate and go through ① and ② to complete.

**[CAUTION]**
If the upper thread holding unit does not function well, check if the upper thread holder driver plate of the unit moves smoothly when you manually move it. If not, adjust the position of the upper thread holding base.



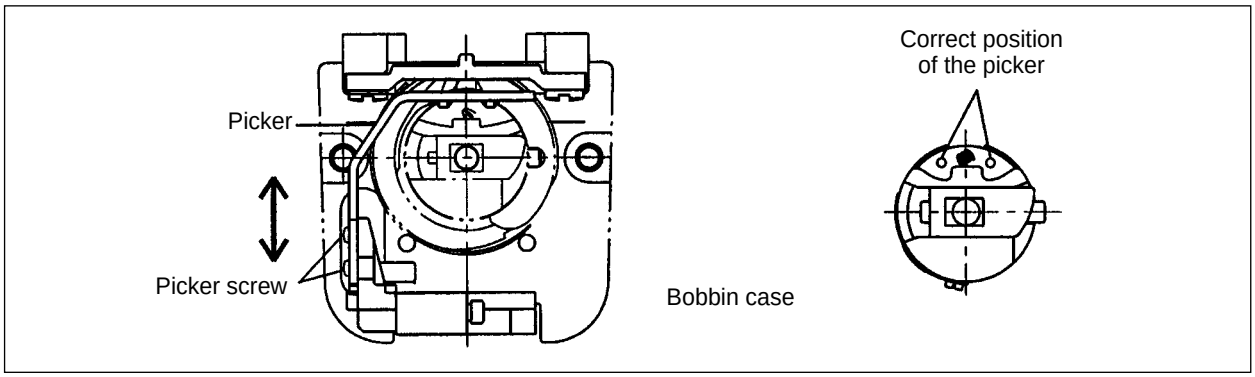

[Fig.7-5]

## 7-4) PICKER ADJUSTMENT

If the position or the starting height of the picker is incorrect, the machine may not be able to separate the upper and the lower thread and cut them both, resulting in short upper thread.

① Adjusting the picker position

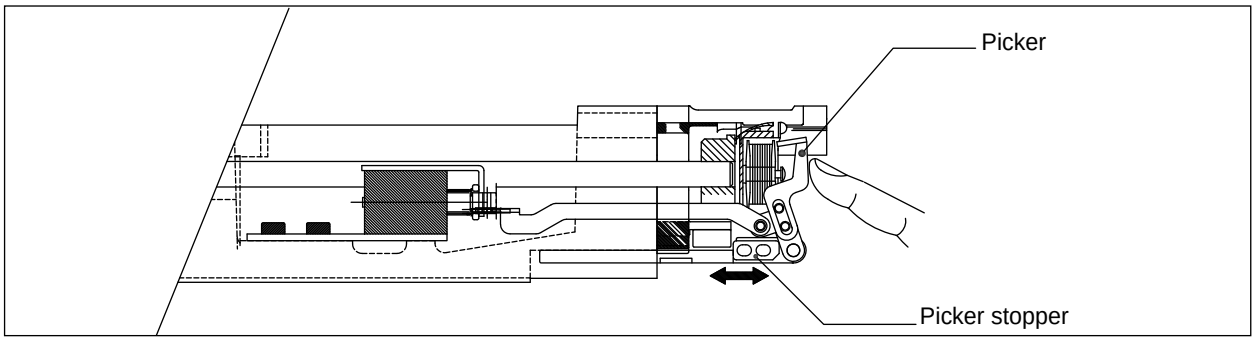
Manually move the picker so it touches the bobbin. Using the picker screws, adjust so the tip of the picker is in the correct position as in [Fig.7-5].




[Fig.7-6]

② Adjusting the starting height

Loosen the screw for the picker stopper and adjust the picker to be 0.2~0.5mm apart from the bobbin when the picker is pressed. Make left and right adjustments for the picker stopper. When all the adjustments are done, tighten the screw for the picker stopper.



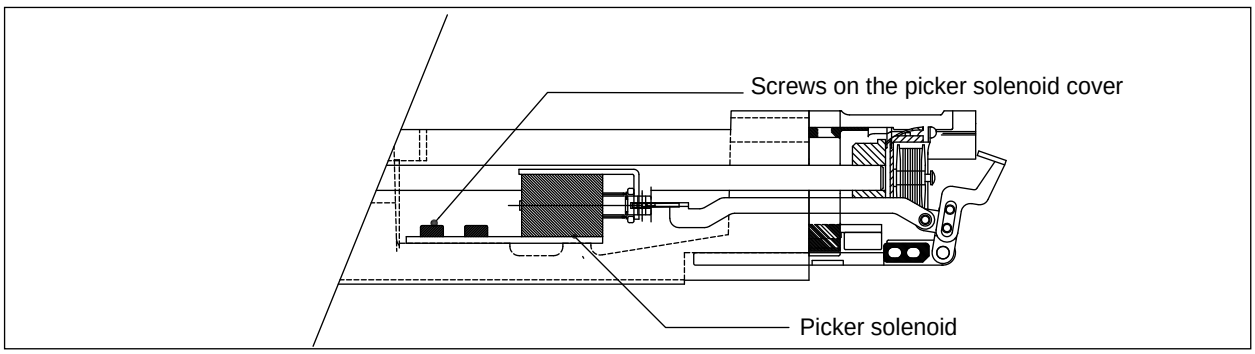

[Fig.7-7]

③ Adjusting picker standby position

Unfasten the screws on the picker solenoid cover. Adjust the position of the solenoid cover so that the tip of the picker is around 20mm away from the bobbin.

**[CAUTION]**

After adjusting the picker standby position, check if the bobbin case moves smoothly.



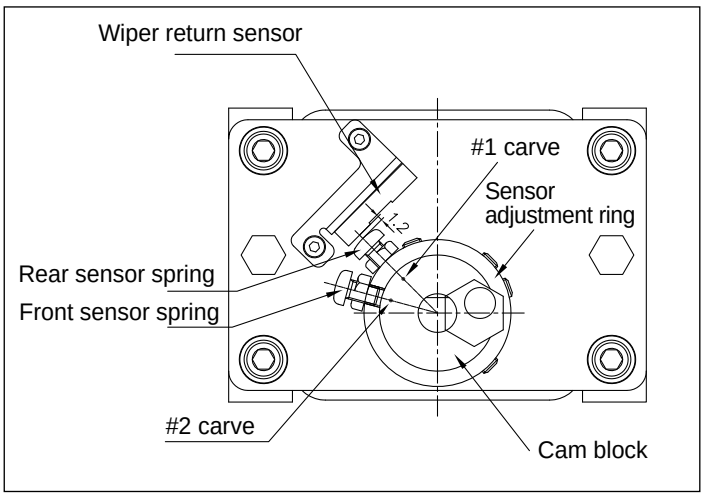

[Fig.7-8]

## 7-5) ADJUSTING UPPER THREAD HOLDER

① Adjusting the sensor springs (when wiper does not return)

Ⓐ Open the wiper motor cover. Of the two sensor rings, align the center of the rear sensor spring with #1 carve on the block on the shaft. Align the center of the front sensor spring with #2 carve on the block.

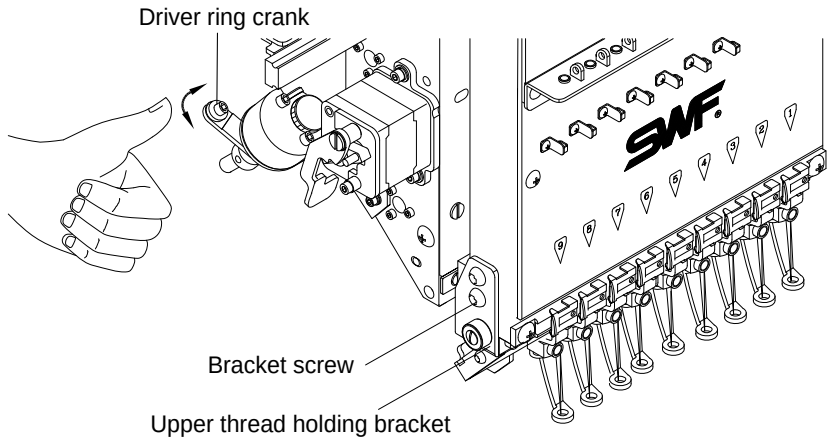
Ⓑ Adjust so that the head of the sensor spring is 1-1.2 mm apart from the wiper return sensor. Make sure to check if the wiper return sensor blinks.




[Fig.7-9]

② If the wiper does not operate smoothly, unfasten the screws on the drive link. Move the wiper lever up and down and unfasten the bracket screws so the wiper is not loaded by the upper thread holder bracket. Fasten the screws back when the wiper moves smoothly.

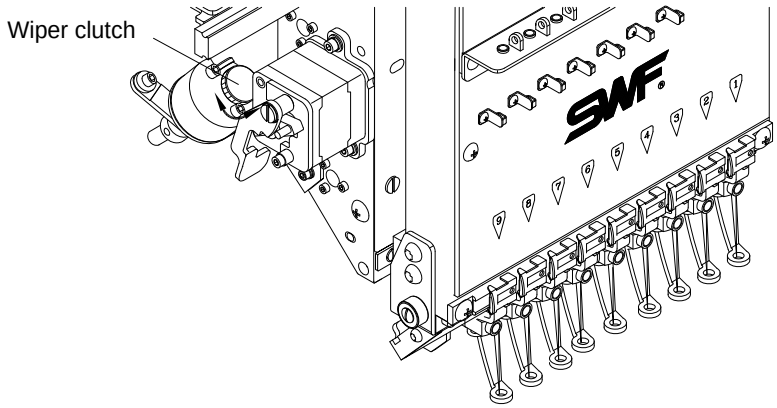
③ After the adjustment, run the color change function to check if the wiper operates well at each needle bar.




[Fig.7-10]

④ If trimming error or jump error occurs on a certain head during the embroidery, run the wiper clutch to protect the embroidery and the wiper.

- Press and turn the wiper clutch counterclockwise to run it. Turn it clockwise to stop.

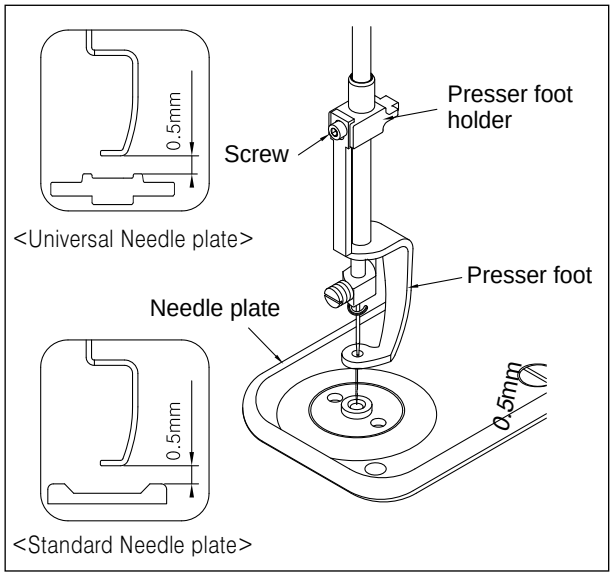



[Fig.7-11]

## 7-6) ADJUSTING HEIGHT OF THE PRESSER FOOT

1) Adjusting the Height of the Presser Foot

①Check the relationship between the presser foot and the needle/embroidery material. Turn the main shaft lever to position the needle at the lowest point (178°). Remove the head cover and unfasten the screws on the presser foot so it moves up and down. Place a 0.5mm-thick gauge on the needle plat and lightly press the presser foot. Fasten the screws snugly when the presser foot touches the gauge.

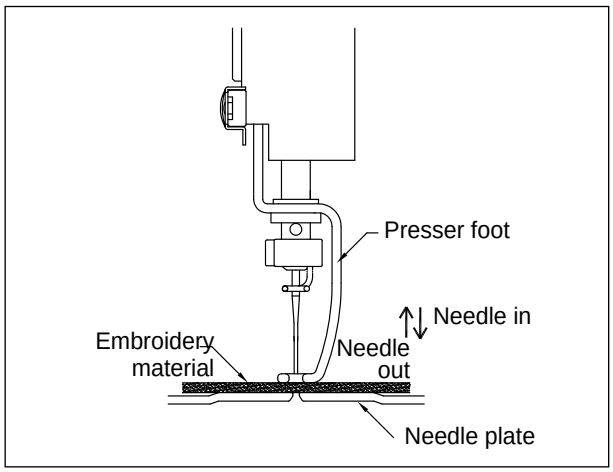



[Fig.7-13]

## 7-7) Relationship between Presser Foot and Needle

1) Relationship between Presser Foot, Needle, and Embroidery Material

For stable stitching, the presser foot must be pressing the embroidery material before the needle pierces into the material. The same is true for when the needle comes out of the material.




[Fig.7-14]

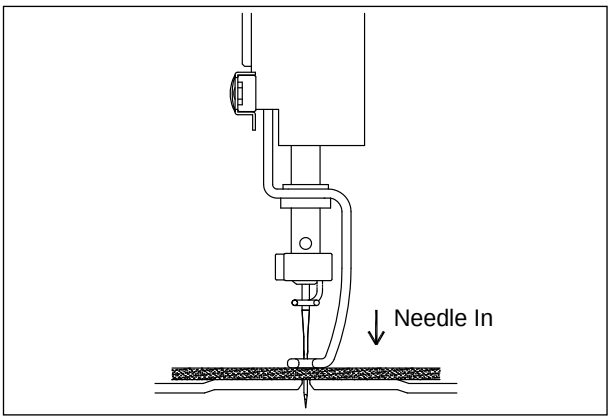
2) When the Presser Foot is Too High

① Needle In

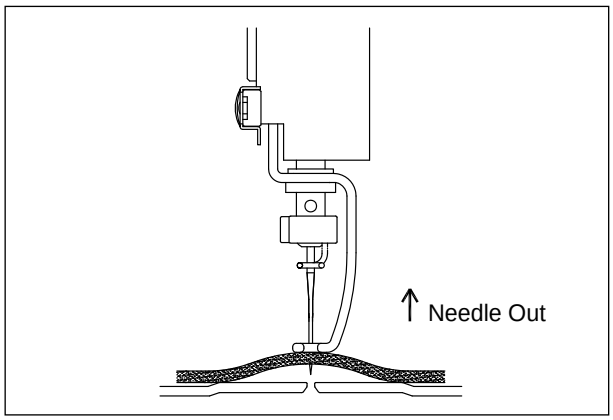
[Fig.7-15] shows the presser foot fails to press the work material when the needle pierces into the fabric, causing an unstable needlework.

② Needle Out

[Fig.7-16] shows the presser foot fails to press the work material when the needle comes out of the fabric. The embroidery material is lifted up along with the needle, making a gap between the fabric and the needle plate. This may cause thread breaks, skipped stitches, or unstable stitching.




[Fig.7-15]



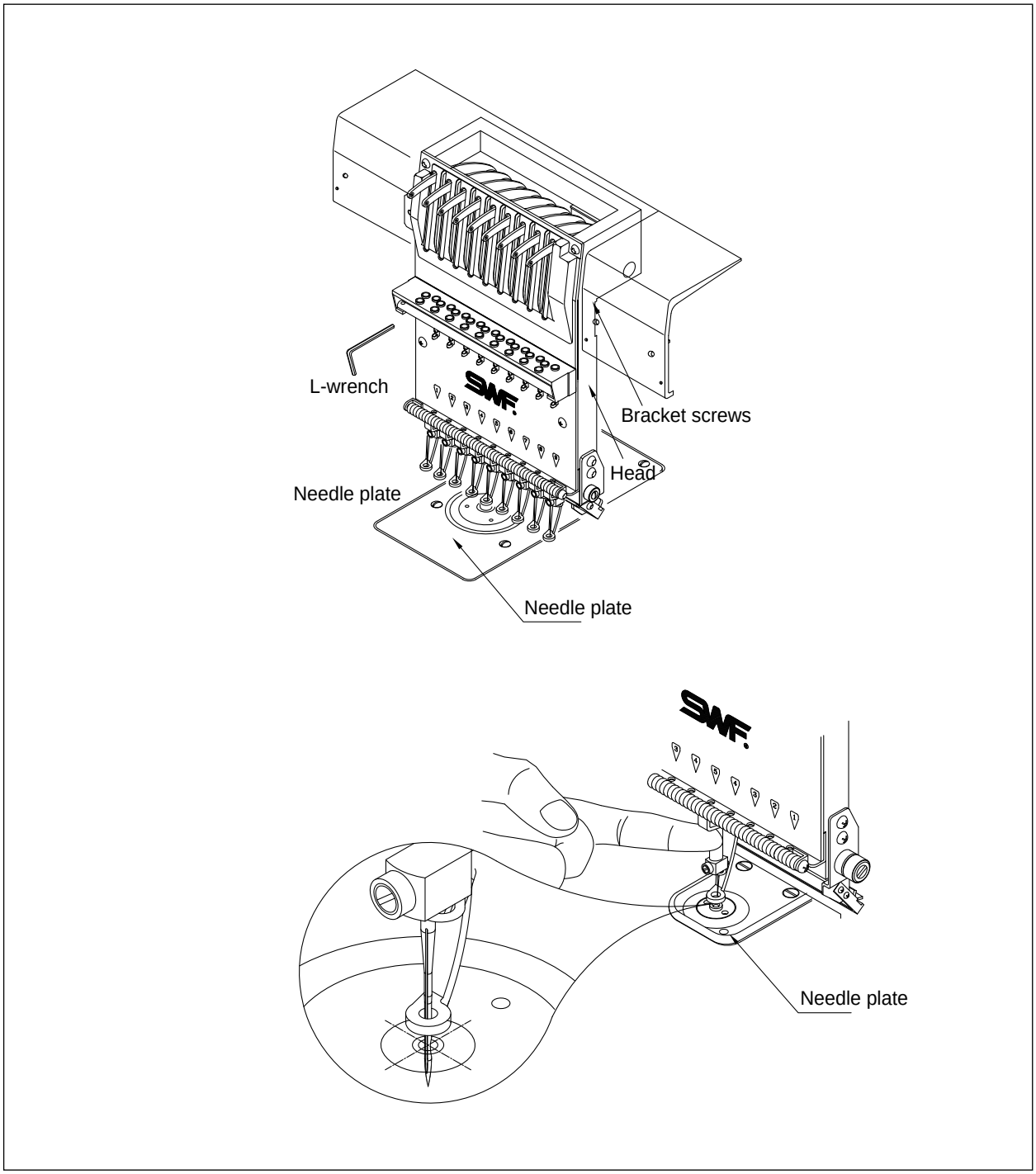

[Fig.7-16]

## 7-8) CORRECT POSITION OF NEEDLE

① Make sure to check the position of the needle - it may change during machine delivery or leveling. First check if the needle is bent. Then turn the main shaft lever to set the shaft at around 130°. Position the needle at the lower dead stop and check if the needle is at the center of the needle hole on the plate.

**[CAUTION]**
Check the needle position on all heads.

② If the needle is not in the correct position, unscrew the brackets (two screws) to adjust the head and the needle (see [Fig.7-17]).

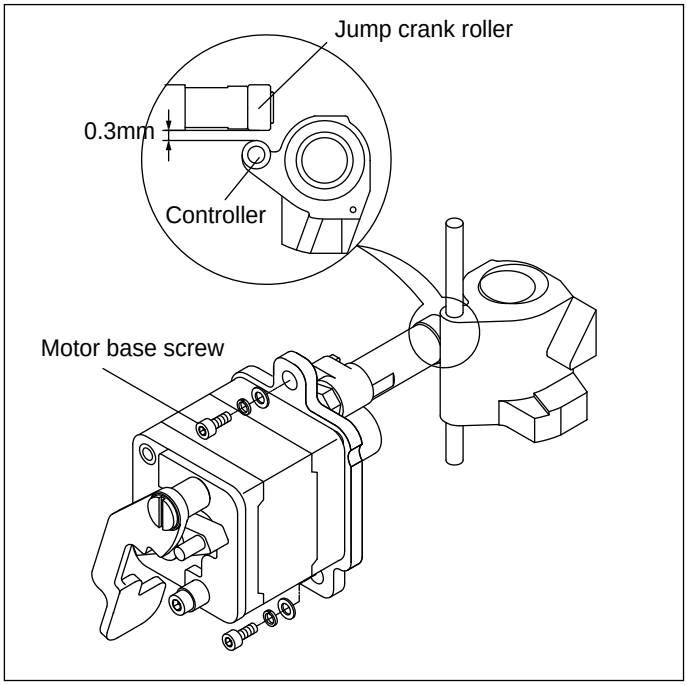



[Fig.7-17]

## 7-9) JUMP MOTOR ADJUSTMENT

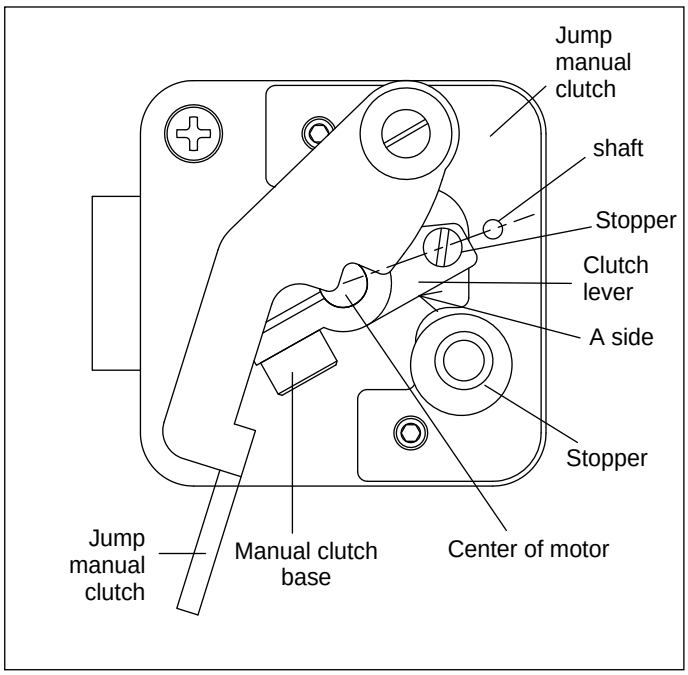
Adjustment is required for new or malfunctioning jump motor.

1) Adjusting the Standby Position (adjusting motor base)
   ① Unscrew motor base ([Fig.7-19]) and adjust so that the jump crank roller is 0.3mm away from the controller. Fasten the screw.
   ② If the gap is wider than 0.3mm, the needle may not jump well. If the gap is narrower than 0.3mm, the jump will cause noise.




[Fig.7-19]

2) Adjusting Jump Manual Clutch
   ① Jump manual clutch is used to turn the head off mechanically. If the clutch lever doesn't function properly, check the clutch assembly.
   ② First, pull the clutch lever forward and check if the carve on the clutch base is in line with the center of the clutch pin and the center of the motor shaft when in standby (see [Fig.7-20]). If not, unscrew and adjust the clutch body with the jump crank roller attached to the stopper. Fasten the screw back.
   ③ Pull the clutch lever forward and check if the clutch body and the stopper are completely attached. If not, adjust the stopper to be completely attached to the body.




[Fig.7-20]

CAUTION

1. If you will not be using the head with the head ON/OFF switch, make sure to use the jump manual clutch lever.
2. If the A side of the jump manual clutch does not touch the stopper, when you run the electric jump you will hear a noise.

## 7-10) ADJUSTING DRIVE BELT TENSION

### 7-10-1) Y-Axis Timing Belt

**[CAUTION]**

Specification of Drive Belt Tension Adjuster

- Model: U-305 Series Sound Wave Belt Tension Gauge - Standard
- Manufacturer: UNITTA

**[CAUTION]**

- Drive belt tension can be adjusted only by trained SWF engineers.
- Make sure to turn OFF the machine during the adjustment.

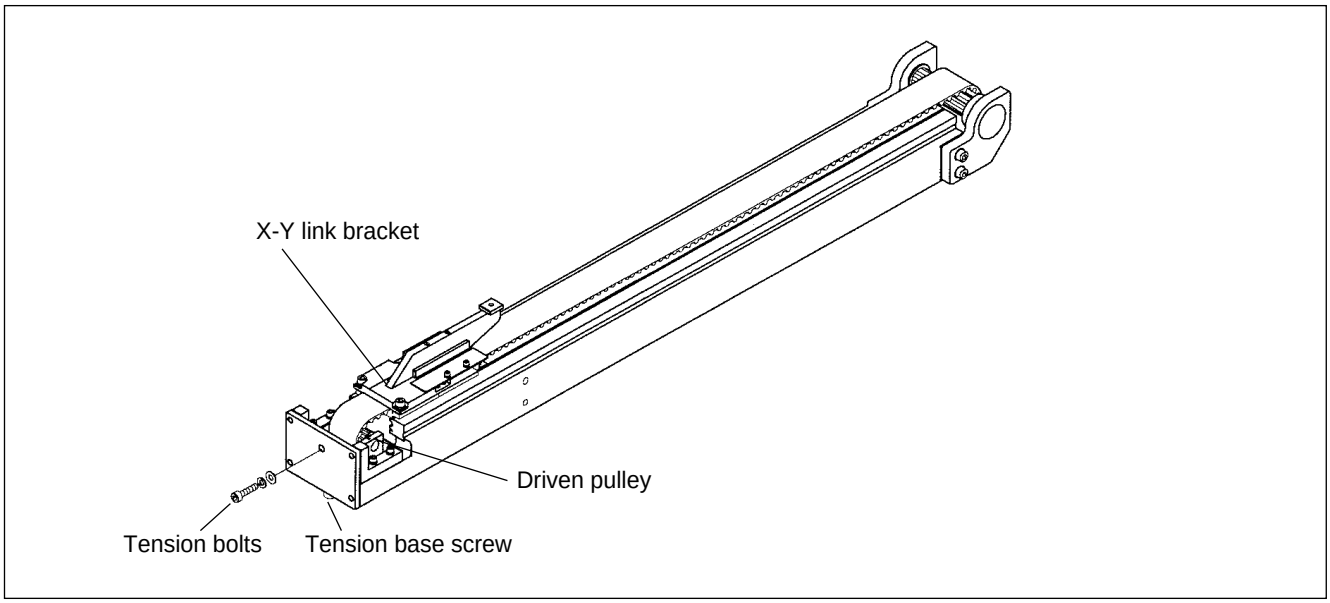
① Push the X frame plate to the driven pulley ([Fig.7-21]) and check the drive belt tension on the Y-axis. Use the sound wave tension gauge.

② Tension on the Y-axis belt should measure as below on the sound wave measurer when you pluck the middle of the belt between the X-Y link bracket and the drive pulley with your finger.

③ Input data for the sound wave tension measurer:

| Type | 2-head | 4-head | 6-head | | 6-head compact | 8-head | |
|---|---|---|---|---|---|---|---|
| | | | 2 at both ends, narrow | 2 in the middle, wide | | 2 at both ends, narrow | 2 in the middle, wide |
| Weight | 4.0gf/m | 3.8gf/m | 4.0gf/m | 3.8gf/m | 3.8gf/m | 3.8gf/m | 3.8gf/m |
| Wide | 25.0mm/#R | 35.0mm/#R | 25.0mm/#R | 35.0mm/#R | 35.0mm/#R | 35.0mm/#R | 35.0mm/#R |
| Span | 480mm | 510mm | 900mm | 535mm | 510mm | 924mm | 512mm |
| Tension measurement | 18kgf | 18kgf | 18kgf | 25kgf | 18kgf | 21kgf | 21kgf |

④ Unfasten the tension base screws. Turn the bolts to adjust the tension. Turn clockwise to increase and counterclockwise to decrease the tension.



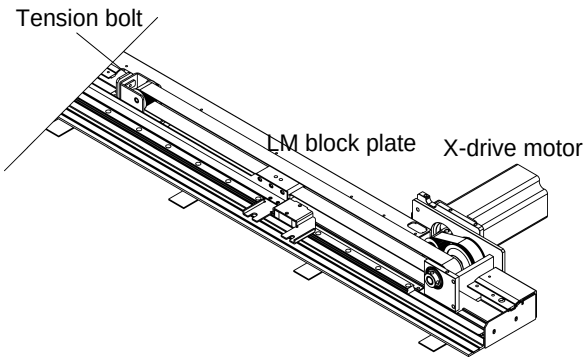

[Fig.7-21]

## 7-10-2) X-Axis Timing Belt

① Push the frame plate fully to the right ([Fig.7-22]). Check the drive belt tension on X-axis using the sound wave tension gauge.
② Tension on the X-axis timing belt should measure as below on the sound wave measurer when you pluck the middle of the belt with your finger.
③ Input data for the sound wave tension measurer:

| Type | 4-head | 6-head & 8-head |
|---|---|---|
| Weight | 004.0 gf/m | 004.0 gf/m |
| Wide | 015.0 mm/#R | 015.0 mm/#R |
| Span | 0590 mm | 0590 mm |
| Tension measurement | 18 Kgf | 19 Kgf |

④ Unscrew LM block plate. Turn the tension bolts to adjust the tension. Turn clockwise to increase and counterclockwise to decrease the tension.



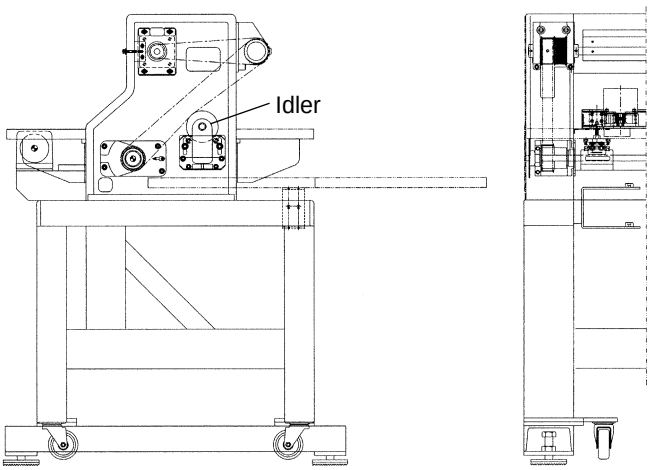

[Fig.7-22]

## 7-10-3) Timing Belt on Main Shaft Motor

① Tension on the timing belt of the main shaft motor should measure as below on the sound wave measurer when you pluck the middle of the belt with your finger.
② Input data for the sound wave tension measurer:

| Type | 4-head | 6-head & 8-head |
|---|---|---|
| Weight | 004.0 gf/m | 004.0 gf/m |
| Wide | 020.0 mm/#R | 030.0 mm/#R |
| Span | 0405 mm | 0405 mm |
| tension measurement | 18 Kgf | 18 Kgf |

③ Unscrew the idler and adjust it right and left to get the right tension. Turn the idler left to increase the tension and right to decrease the tension.




[Fig.7-23]

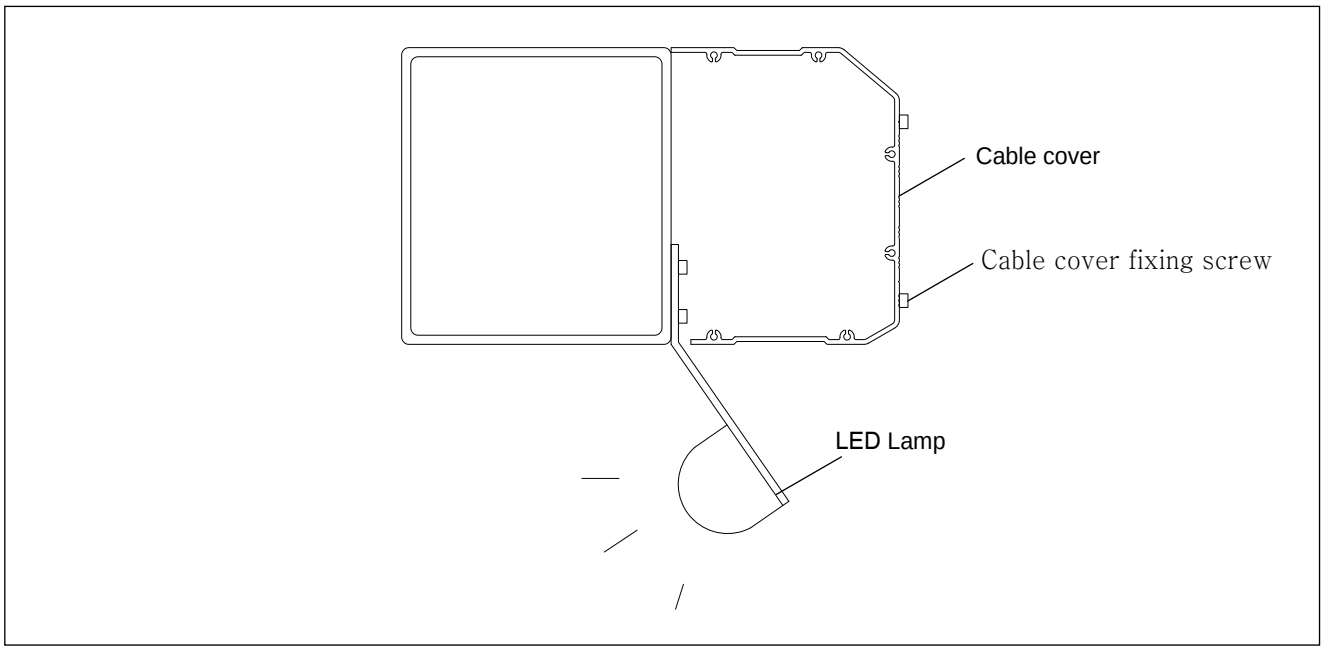
## 7-11) LED LAMP

### 7-11-1) Disassembling Cable Cover (4-head)

If you have to open the cable cover for machine repair, etc., follow the procedures below.

① Unscrew the cable cover fixing screw to loosen the cover.

② When finished, re-assemble the cover, fasten the bracket screws.



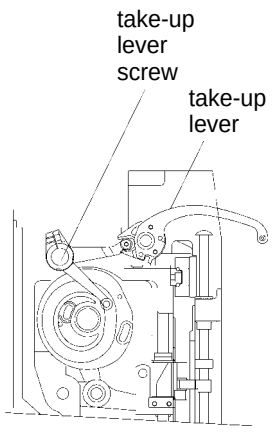

[Fig.7-25]

# CHAPTER 8

# TROUBLESHOOTING

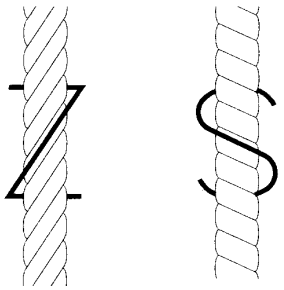
| | |
|---|---|
| ⚠ DANGER CAUTION | Inspect/repair the machine by the guideline when in machine failures. |

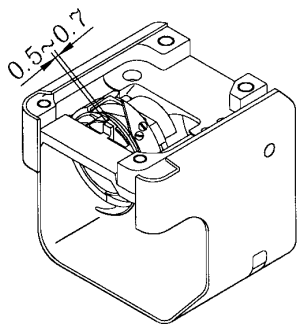
| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Operation failure | ① Loose belt tension / belt damage | Adjust belt tension / change belt | |
| | ② Power failure or short-circuit of fuse | Check fuse in main shaft motor and change fuse | |
| | ③ Failure to sense signals for needle position or 1 rotation | Run manual color change and check if signal lamps (needle set lamp & needle position lamp) blinks at correct needle position. Adjust the half-turn film. | |
| | ④ Red light on X/Y drive box | Address the cause and press RESET. Check if the lamp turns green. | |
| | ⑤ Machine does not start at START | Check connection of START switch | |
| Incorrect Stop Position | ① Loose tension on main driver belt | Adjust belt tension | |
| | ② Incorrect position of encoder or bad encoder | Adjust encoder position or change encoder | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Bad Color Change | ① Incorrect position of needle stop | Refer to user's manual | Set main shaft angle back at 100°, if you manually moved it for cleaning, inspection or repair. |
| | ② Failure to sense signals for needle position or 1 rotation | Run manual color change and check if signal lamps (needle set lamp & needle position lamp) blinks at correct needle position. Adjust the half-turn film. | |
| | ③ Incorrect position of needle bar | Set it to the correct position | |
| | ④ Incorrect position of take-up lever | Adjust so take-up lever is in line with other levers in stop position (upper shaft angle:100°) | ※ Adjusting position of take-up lever<br>Unscrew the lever and adjust so it is in line with other take-up levers on the guide rail.<br><br> |
| | ⑤ Bad connection | Change fuse F3 in joint board or check connection | ※ Check fuse spec. |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Poor detection of upper thread | ① Poor connection of take-up spring and thread detector plate | Clean the spring and the plate, or adjust the spring tension. | |
| | ② Poor connection & quality of tension adjusting plate | Check the plate connection and change the circuit board | |
| Bad jump | ① Bad Motor and bad motor wiring | Check wiring and change motor | |
| | ② Bad connection | Check connection | |
| | ③ Switch failure on tension adjusting board and bad circuit board | Change switch and circuit board | |
| Bad stitch quality | ① Bad tape | Correct tape | |
| | ② Inadequate tension on X-Y belt | Adjust tension | |
| | ③ Foreign substance in X-Y rail | Clean the rail | |
| | ④ Failure of X/Y driver board | Change circuit board | |
| | ⑤ Heavy load on frame | Reduce speed of main shaft | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Thread breaks | ① Stitch is too small/dense for thread | Re-punch design tape | Check design |
| | ② Frequent thread break in the same spot | • Re-punch after checking design<br>• Correct the stitches on operation box | |
| | ③ Inadequate needle size for thread | Change needle | |
| | ④ Needle damage (bent, dent, worn) | Change needle | |
| | ⑤ Incorrect needle installation (height, direction, etc.) | Re-install needle | |
| | ⑥ Dirty needle (adhesive, etc.) | Clean or change needle and hook | Use minimum adhesive for applique |

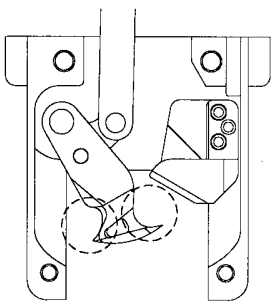
| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| | ⑦ Bad thread (weak, uneven thickness, poorly twisted, old) | Change thread | ※ Check the thread used. How to select thread.<br>• Select soft thread with ever thickness and stable tension.<br>• Choose left-twisted thread. |
| | ⑧ Right-twisted thread | Change to left-twisted thread | <br>• Z-direction: left twist<br>• S-direction: right twist<br>※ left-twist prevents unraveling of the upper thread in the counterclockwise rotation of the hook |
| | ⑨ Excessive thread tension | Adjust tension | |
| | ⑩ Tension imbalance between upper and lower threads | | |
| | ⑪ Excessive tension & stroke on take-up spring | Adjust tension and stroke | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| | ⑫ Dent on thread path on hook and bobbin case | Remove dent or change the case | |
| | ⑬ Narrow space between hook holder and groove for hook holder (on hook) | Adjust space | ※ Set it at 0.5-0.7mm for smooth feeding of upper thread   |
| | ⑭ Insufficient oil in hook | Oil the raceway of hook | |
| | ⑮ Poor timing of needle and hook | Adjust timing | |
| | ⑯ Incorrect lower dead stop | Adjust the lower dead stop | |
| | ⑰ Dent on thread path | ※ Check:<br>• Thread path in presser foot<br>• Around needle hole on needle plate<br>• Thread guide on the head<br>• Thread path in tension adjuster | |
| | ⑱ Fabric moves on the frame | Fix the material firmly | |
| | ⑲ Inadequate height of presser foot (does not press the work material) | Adjust height | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Skipped Stitches | ① Bent needle | | |
| | ② Inadequate needle size for thread | Change needle | |
| | ③ Incorrect installation of needle | Adjust installation | |
| | ④ Poor timing of needle and hook | Adjust timing | |
| | ⑤ Large gap between needle groove and hook point | | |
| | ⑥ Incorrect lower dead stop | Adjust the lower dead stop | |
| | ⑦ Damaged hook point | Use whetstone to adjust hook point or change hook | |
| | ⑧ Thread feeding is interfered | • Adjust thread tension<br>• For upper thread, change bobbin or bobbin case | |
| | ⑨ Inadequate thread (twist, elasticity, and flexibility) | Select right thread for embroidery | |
| | ⑩ Excessive tension or stroke on the take-up lever spring | Adjust stroke or tension | |
| | ⑪ Fabric moves with needle - weak or damaged presser foot (spring) | Change presser foot spring | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Poor stitch tension | ① Weak upper thread tension | Adjust tension | |
| | ② Uneven upper thread tension due to foreign substances | Clean main and sub tension adjusters in the thread tension adjusting plate | |
| | ③ Weak lower thread tension | Adjust tension | |
| | ④ Uneven lower thread tension | Clean bobbin case and check tension on bobbin spring | |
| | ⑤ Thread thickness | Change to quality thread | |
| | ⑥ Poor timing of needle and hook | Adjust timing | |
| | ⑦ Insufficient oil in hook | Oil the raceway of hook | |
| Needle breaks | ① Bent needle | | |
| | ② Bad quality needle | Change needle | |
| | ③ Tip of the needle is worn or bent | | |
| | ④ Needle touches the hook point | | |
| | ⑤ Needle touches the hook point | Space the needle and the hook point | |
| | ⑥ Incorrect installation of needle | Correct the installation | |
| | ⑦ Needle touches the needle hole on the plate | • Check if needle plate is unscrewed<br>• Adjust the position of the needle bar | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Puckering | ① Excessive thread tension | Adjust tension | |
| | ② Excessive pressure of presser foot | Change presser foot spring | |
| | ③ Needle failure - worn out/damaged needle tip needle is too large for thread | Change needle | |
| | ④ Needle hole is too large for needle | Use adequate size of needle | ※ SWF/□ needle holes are 2.0mm |
| Trimming failure | ① Poor connection/quality of trimming solenoid | Check and change solenoid and solenoid connection | |
| | ② Bad connection | Check connection | |
| | ③ Trimming driver TR damaged | Change joint board | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Trimmer return failure | ① Poor connection of sensor | Check connection | |
| | ② Bad circuit board | Change circuit board | |
| | ③ Bad sensor or sensor position.<br>Dirty area around the sensor. | • change sensor<br>• clean around the sensor<br>• adjust location of the sensor unit | |
| Short upper thread after trimming due to separation failure | ① Movable blade is too fast or too slow to separate the upper thread | Adjust insert angle of movable blade (295˚) | |
| | ② Incorrect position of picker | Adjust picker position | |
| | ③ Picker failure | • Check and change fuse F1, F3<br>• Check/change solenoid and solenoid connection<br>• Check connection and change joint board | Check fuse spec. |
| Thread break before trimming | ① Upper thread is too short<br>• check main and sub tension adjuster | Adjust upper thread tension | |
| | • dent or damage to movable blade | remove dent using whetstone or sandpaper or change movable blade | <br>Check for dent |
| | ② Lower thread is too short | • adjust or change bobbin case spring | |
| | • doesn't unwind smoothly | • clean/check for dent in thread guide on the bobbin case | • Too short lower thread cannot make stitches right after trimming |
| | • too weak or too elastic | • Change lower thread | |

| Error Type | Cause | Inspection & Repair | Reference |
|---|---|---|---|
| Short upper thread after trimming | ① Upper thread is trimmed too short and comes unthreaded | • check upper thread tension<br>• set [Long] or [Medium] length of trimmed thread in data set-up | The default is [Medium]. |
| | ② Upper thread is trimmed too long and thread tail remains on the embroidery | • set [Medium] or [Short] length of trimmed thread in data set-up<br>• if upper thread is held due to narrow velcro space in upper thread holder, clean the velcro | |
| Thread is not cut (at specific head) | ① Failure of movable and fixed blades | Check screws and crank driver clamp screws of the movable blade | |
| | ② Loose cross tension of the blades | Check tension of fixed blade | |
| | ③ Movable blade damaged | Change movable blade | |
| | ④ Incorrect return position of movable blade | Adjust the position of movable blade | |
| Failure of upper thread holder solenoid | ① Poor connection/quality of solenoid | Check/change solenoid & connection | |
| | ② Bad connection | Check connection | |
| | ③ Poor quality circuit board | Change thread detecting plate in sub controller | |
| Failure to hold upper thread | ① Short strokes of upper thread holder | Adjust stroke | |
| | ② Upper thread holder overloaded | Adjust the workload | |
| When the fluorescent lamp is not properly operating, one of the following might be the reason: | ① Cable fuse short-circuit | Replace the cable fuse | ※ Change fuse spec |
| | ② Circuit fuse short-circuit | Replace the con. box lamp ass'y fuse | ※ Change fuse spec |
| | ③ Expired lifespan of the lamp | Replace the fluorescent lamp | ※ Change fuse spec |

# CHAPTER 9

# BLOCK DIAGRAM

1) Block Diagram of SWF/KS Series

