SWF

USER'S MANUAL

MAS-12 Automatic Embroidery Machine

SunStar CO., LTD.

MME-210625

1. This manual explains and describes the operation methods and related issues of SWF "Automatic Embroidery Machine" to ensure the proper use. Please have a thorough understanding of the manual before operating the machine.

2. The manual is subject to change without prior notice to enhance the quality of the embroidery machine and may be different a bit from the purchased product. If you have any inquiry on the product and manual, please contact a sales agency.

3. The manual must be passed on to next users.

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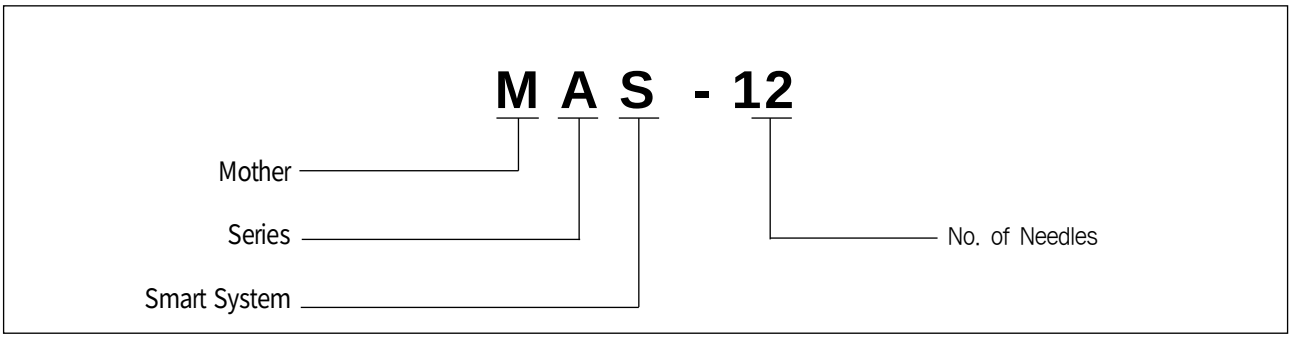
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01 MACHINE TYPES AND SPECIFICATIONS

1.1) MACHINE TYPES



1.2) MODELS

Machine	Color	Head	Emb. space (X,Y)		
			Tubular	Wide Cap Frame	Semi-Wide Cap Frame
MAS - 12	12	1	360×230	360×75	180×83

1.3) SPECIFICATIONS

Stitch Length	0.1～12.7mm
Speed	Max. 1000 rpm
Motor	BLDC Motor×1 (Main Shaft Motor)
	Pulse Motor×2 (Frame Driving Motor)
Electricity	1-Phase : 100V, 110V, 120V, 200V, 220V, 240V (50～60 Hz)
Power Consumption	700W

1.4) PERIPHERALS

Bobbin Winder	Standard
Memory Capacity	Max. 10,000,000
Memory Medium	USB Memory Stick
Device (Option)	Boring Device, Stand, Cap Frame, Laser Point, Bobbin Winder

02 SAFETY RULES

2.1) SAFETY INDICATIONS

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

No.	Names	Content
	**CAUTION**	Users may be subject to physical or property damages if not fully observe the CAUTION.
	**WARNING**	Users may be subject to death or severe damages if not fully observe the WARNING.
	**DANGER**	Users may be subject to death or severe damages and emergency if not fully observe the DANGER.

2.2) MACHINE DELIVERY

Warning mark	Description
DANGER **Make sure all persons and obstacles are out of the way of the moving machine.**	ONLY TRAINED AND EXPERIENCED PERSONS, FAMILIAR WITH THE RELEVANT SAFETY INSTRUCTIONS, SHOULD HANDLE THE MACHINE. MAKE SURE TO FULLY OBSERVE THE FOLLOWING INSTRUCTIONS. **2.2.1) Delivery by hand** Make sure to wear safety boots. Hold the machine tightly at both left and right. **2.2.2) Delivery using a forklift** 1) Make sure that size and weight of the forklift is sufficient to support the machine. 2) Place the machine so that its center is on the fork arm. Lift the machine carefully from behind so that the machine does not tilt to either side. WARNING **When unloading the machine from forklift or crane, make sure to maintain the weight balance in order to prevent injury or machine damages.**

2.3) MACHINE INSTALLATION

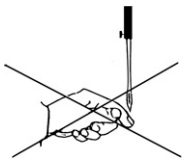
CAUTION

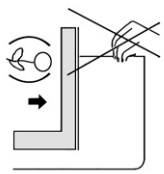
2.3.1) Machine malfunctions or physical damages may occur due to condition of the installation environment. Make sure to meet the following conditions.

1) The foundation (floor) under the machine must be strong enough to support the weight of the machine (approximately 3.5 tons).
2) Air conditioning can eliminate dust and humidity, which may cause pollution and corrosion of the machine. Make sure your machine is regularly maintained.
3) Do not expose the machine to direct sunlight. (Long exposure to direct sunlight can fade the machine paint or deform the machine shape.)
4) Allow at least 50cm space on each side of the machine (right, left, rear) from the wall for convenient maintenance.

2.4) MACHINE OPERATION

WARNING







2.4.1) The machine has CAUTION and WARNING labels on each risky parts. Pay careful attention to the labels and make sure to observe them during operation.

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 to prevent slip-off accidents.
3) Check the scope of machine operation to see if there is no problem.
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 covers on the pulley or shaft when the machine is in operation for your safety.
6) Be sure the main power is turned off and the power switch is OFF before opening the cover of any electrical components such as control box.
7) Be sure the main switch is OFF before manually turning the main shaft.
8) Turn OFF the machine when you thread needles or inspect the finished embroidery.
9) Do not lean against the cradle or place your fingers near the pantograph guide grooves. You may hurt your fingers when the frame moves.
10) The machine noise may exceed 85db when it runs at the maximum speed.

2.5) REPAIR



DANGER

2.5.1) Only SWF-trained and designated engineers should perform repair work.

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



CAUTION

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

2) Do not change the settings or any parts on the machine without consulting with SWF.



DANGER

Machine changes without consultation with SWF may cause risks to your safety when you operate the machine.

3) Use only **official SWF parts** when repairing your machine or replacing parts.
4) Re-install all safety covers when you are finished with the repair.

03 PRODUCT FEATURES

3.1) EXPANDED MEMORY

- It enables saving up to 200 designs in a memory; the maximum capacity of memory is 10 million needles.

3.2) MIRROR IMAGE CONVERSION

- You can turn the design from 0˚ to 359˚ by 1˚ and also mirror the design (reverse in the X direction).

3.3) ENLARGING AND REDUCING DESIGN

- You can reduce or enlarge the design from 50% to 200% by 1% along the X, Y axis.

3.4) AUTOMATIC SELECTION OF NEEDLE BAR

- You can select the order of the needle bars up to the 300th bar.

3.5) GENERAL REPETITION WORK

- The same design can be repeated up to 99 times along the X, Y axis.

3.6) SPECIAL REPETITION WORK

- It functions to continuously work by changing mirror and angle over a variety of designs.

3.7) AUTOMATIC OFFSET

- The frame automatically returns to the offset point when the embroidery is finished, making 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 appliqués and to switch the frames.

3.8) RETURN TO START

- The frame can be moved back to the start point of the design during the embroidery.

3.9) NON-STITCHING

- The frame and the needle bar can move backward and forward by the units of 1, 100, 1000, and 10000 stitches and by color without stitching.

3.10) FRAME BACKWARD

- When the thread breaks or runs out of track, you can move the frame back to the starting point of the design in the units of one to ten stitches.

3.11) AUTOMATIC TRIMMING DEVICE

- The automatic trimming device is performed according to the design and the machine set-up in order to enhance work productivity and quality of the finished product.

3.12) THREAD TENSION CONTROL SYSTEM

3.13) FUNCTION THAT HAS AN AUTOMATIC SENSOR OF CUTTING THREAD

- The machine detects when the upper thread breaks or the lower thread is out of the needle and automatically stops the machine.

3.14) FRAME CENTER

3.15) 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.

3.16) USB INPUT/OUTPUT

- It realizes an easy and simple way of input-output of DATA through the port for USB which is newly applied. Input-output of DATA is possible while being connected with PC.

3.17) EDITING

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

3.18) MULTI-LINGUISTIC SUPPORT

3.19) THE SCREEN WILL INDICATE THE CAUSE OF ANY MACHINE STOPS.

3.20) THE SCREEN INDICATES RPM DATA.

3.21) FRAME MOVEMENT SPEED

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

3.22) THE SCREEN INDICATES THE MEMORY AVAILABLE FOR USE.

3.23) OTHER BRAND CODES

- The machine can automatically read designs of various formats stored in the floppy disk.

[Readable Format]

1. SST **2. DST**

04 MACHINE INSTALLATION AND PRECAUTIONS

CAUTION	**Meet the conditions described in the manual when installing the machine. Failure to follow the directions may result in unexpected machine malfunctions.**

4.1) INSTALLATION CONDITION

4.1.1) Temperatures

1) When machine in operation: 15 ~ 40℃ (59 ~ 104℉)
2) When machine is idle: − 25 ~ 55℃ (− 13 ~ 131℉)

4.1.2) Humidity

1) relative humidity : 45~85%

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

4.1.3) Grounding

Ensure the electricity is properly grounded.

CAUTION	**Ensure properly grounding of the machine to avoid the possibility of electric shock. Use three-wire grounding (grounding resistance below 100 ohms).**

4.1.4) Surrounding environment

Close any doors or windows near the machine to prevent direct sunlight, dust, and humidity.

4.1.5) Place of installation

Foundation (floor) under the machine must be sufficiently strong and flat concrete to support the weight of the machine.

4.1.6) Industrial environment classification

Installation and use of the machine must be performed in an industrial area.
(SWF machines should be used in Class A environment)

4.2) ELECTRICITY INSTALLATION ENVIRONMENT

WARNING

Check if the input voltage of the machine corresponds with the voltage supply before installing or operating the machine.

4.2.1) Input voltage (to be adjusted at installation)

100V, 110V, 120V, 200V, 220V, 240V, 100V~240V free voltage

4.2.2) Allowed voltage range

Within 10% of the voltage set

4.2.3) Electric capacity and power consumption

3KVA 1.4~1.6KW

4.2.4) Insulation resistance

Over 10M ohms (measured with 500V insulation tester)

WARNING

1) Make sure to 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.

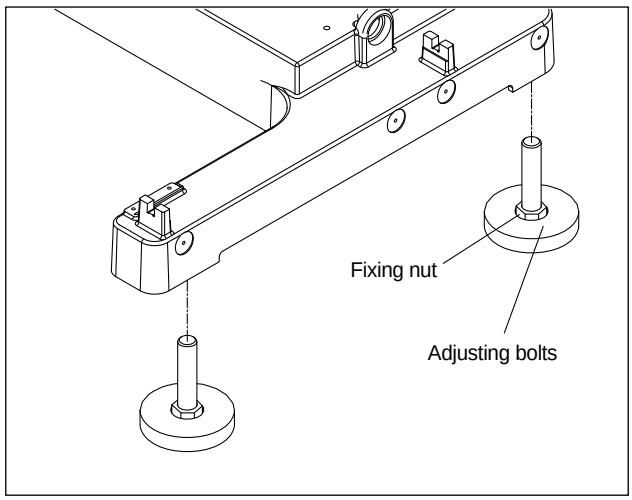
4.3) LEVELING THE MACHINE

CAUTION

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

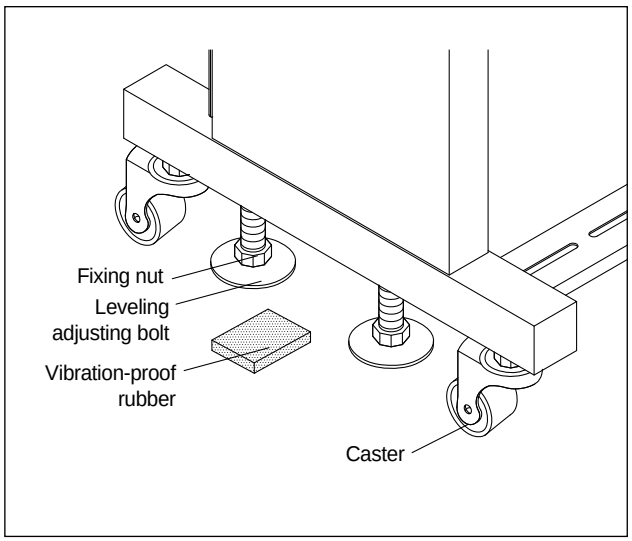
4.3.1) Leveling the equipment

1) Stand
   – If the stand is not installed
   If the dedicated stand (optional) is not attached, use the adjusting bolt to adjust the back & front and left & right balance of the machine.



– If the stand is installed
  If the dedicated stand (optional) is attached, reach it duly on the stand table.

2) Vibration-proof rubber
  Place the vibration-proof rubbers (four) under each leveling adjusting bolts. Adjust the bolts until the caster rises from the floor. Use the level gauge to check the leveling.



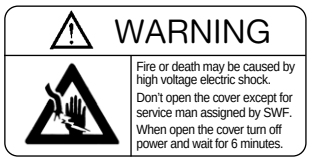
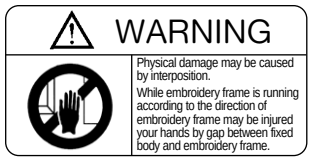
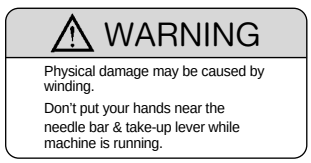
CAUTION

1) Check the voltage supply where the machine will be installed.
2) If the difference in heights of the four bolts is over 10mm, place spacers beneath the lower level base to make the heights even.

05 MACHINE USE AND PRECAUTIONS

5.1) TYPES OF SAFETY LABELS

CAUTION	**Observe the directions on the safety labels for your safety.**

	※ **NEEDLE** **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.**
	※ **HIGH VOLTAGE** **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.**
	※ **CRACK** **Physical injury may be caused by crevice.** **Don' t put your finger in a groove on the table.**
	※ **HAND** **Physical damage may be caused by interposition.** **While embroidery frame is running according to the direction of embroidery frame may be injured your hands by gap between fixed body and embroidery frame.**
	※ **MACHINE MOVE** **Physical damage may be caused by winding.** **Don't put your hands near the arrow while the main shaft is rotating**
	※ **MACHINE MOVE** **Injury may be caused by winding.** **Be sure to turn off the power before cleaning, lubricating, adjusting or repairing.**

5.2) LOCATIONS OF SAFETY LABELS



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.

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



Physical damage may be caused by interposition.

While embroidery frame is running according to the direction of embroidery frame may be injured your hands by gap between fixed body and embroidery frame.

WARNING



Physical injury may be caused by crevice.

Don` t put your finger in a groove on the table.

WARNING

Physical damage may be caused by winding.

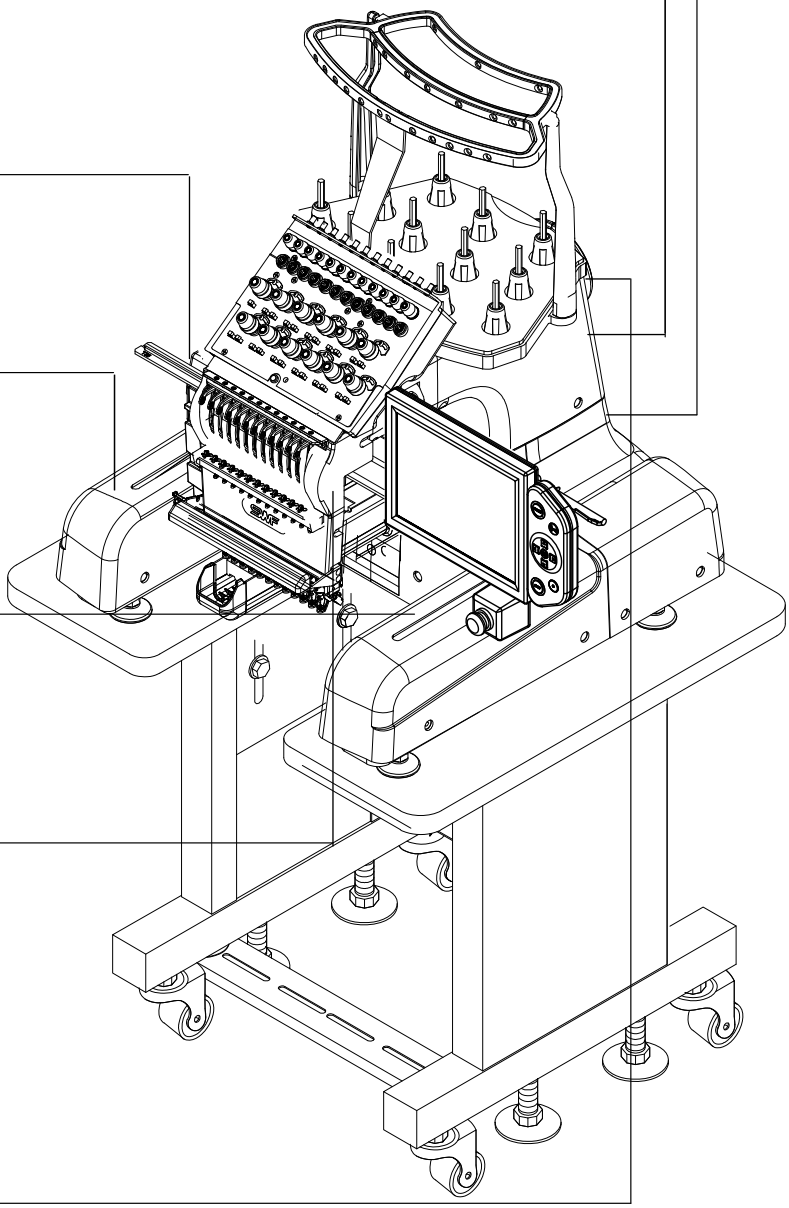
Don't put your hands near the needle bar & take-up lever while machine is running.

WARNING

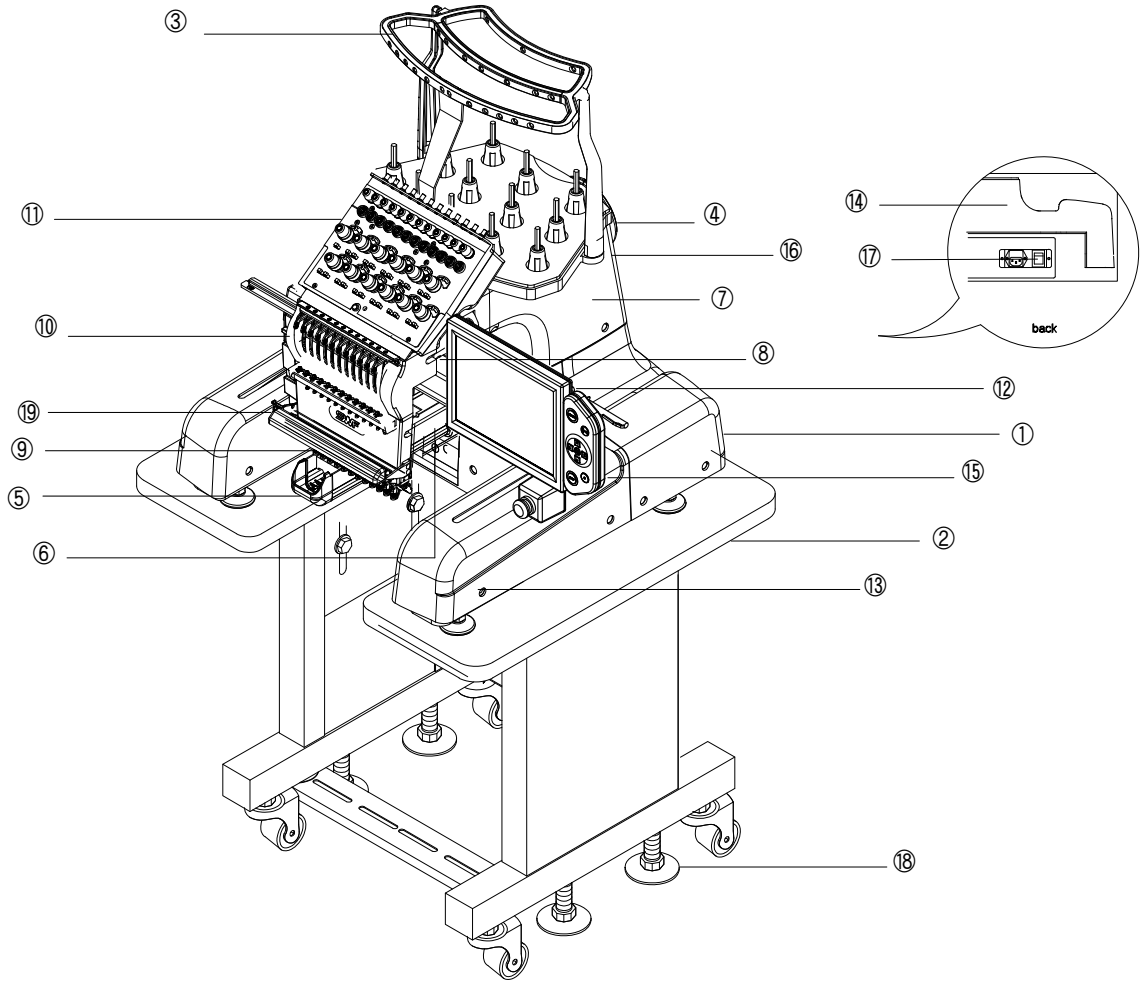


Injury may be caused by winding.

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



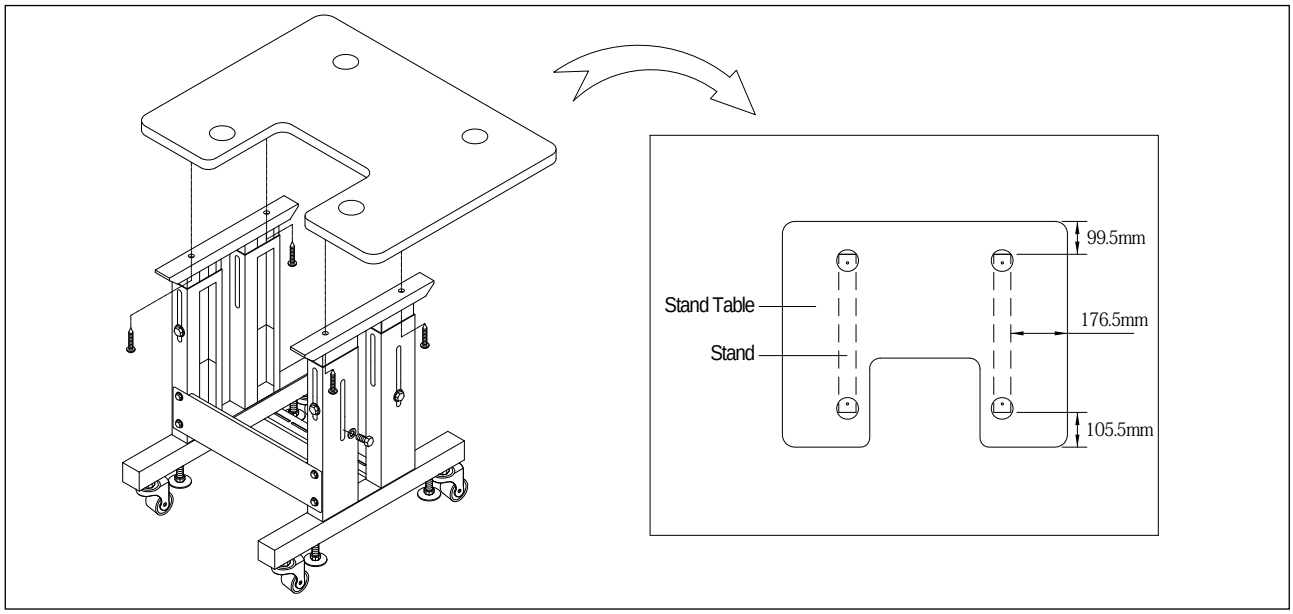
06 NAMES OF MACHINE PARTS



① Machine Body	⑧ Color change box	⑮ Operation box
② Table	⑨ Upper thread holder	⑯ Encoder
③ Thread stand	⑩ Head	⑰ Main power switch
④ Main shaft drive motor	⑪ Thread tension adjustment board	⑱ Leveling adjusting bolt
⑤ Bed	⑫ X-axis driving system	⑲ Lamp
⑥ Trimming drive box	⑬ Y-axis driving system	
⑦ Arm	⑭ Controller box	

07 PERIPHERALS ASSEMBLY

7.1) STAND ASSEMBLY (Optional)

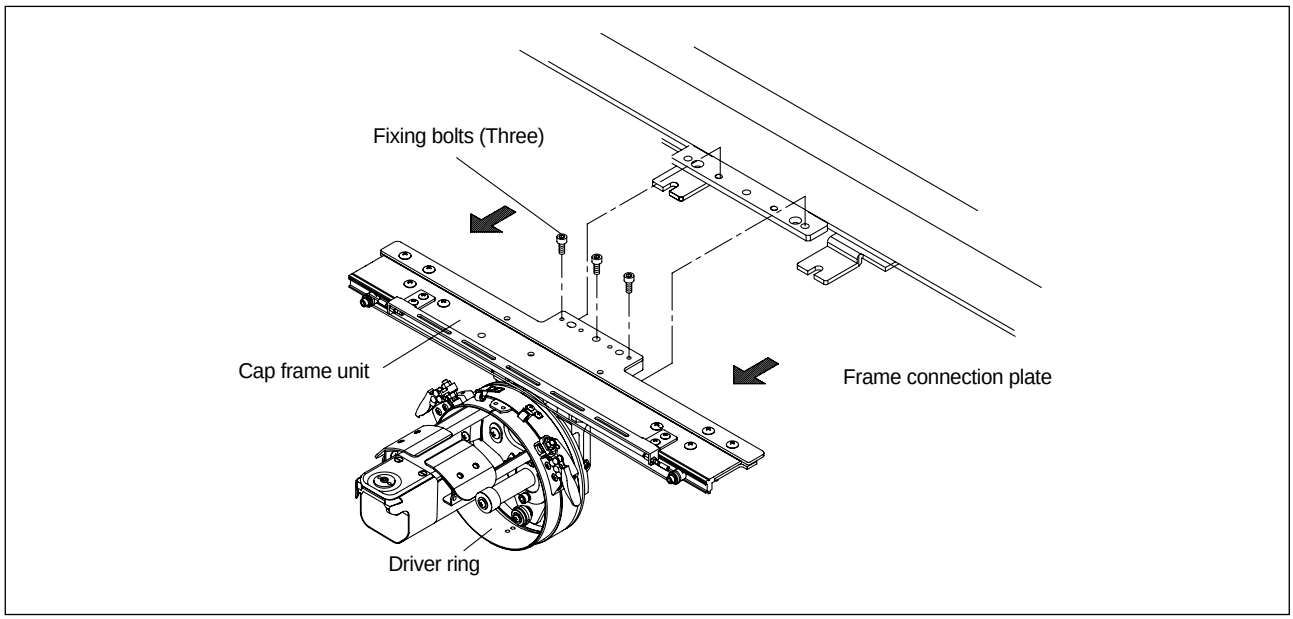


▷Place the table on the stable in the stable manner and fasten tightening screws.

7.2) CHANGE CAP TO TUBULAR

7.2.1) Disassembling the cap frame driving set

Unscrew the fixing bolts to disassemble the cap frame driving set from the frame connection plate.

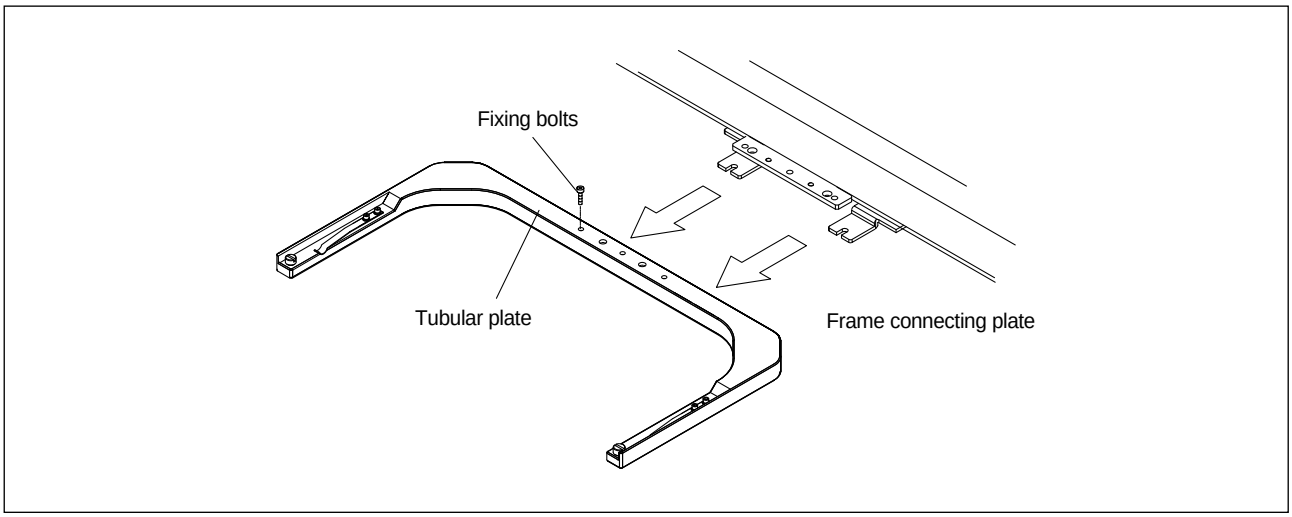


CAUTION

You will need the fixing bolts when installing the tubular plate. Keep them safe.

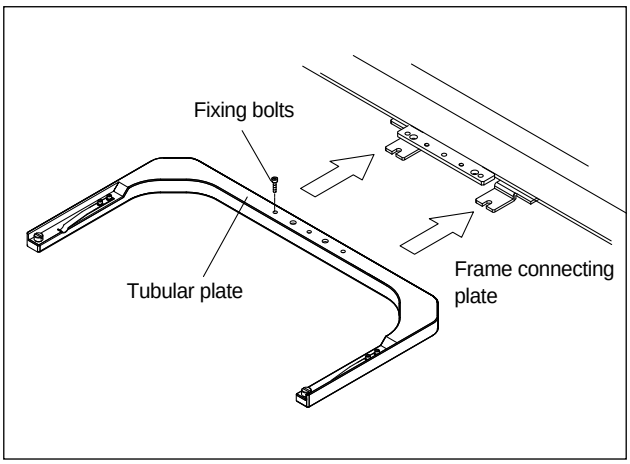
7.2.2) Assembling tubular frame plate

Use the fixing bolts to fix the tubular frame tightly to the frame connecting plate.



7.2.3) Changing tubular to cap

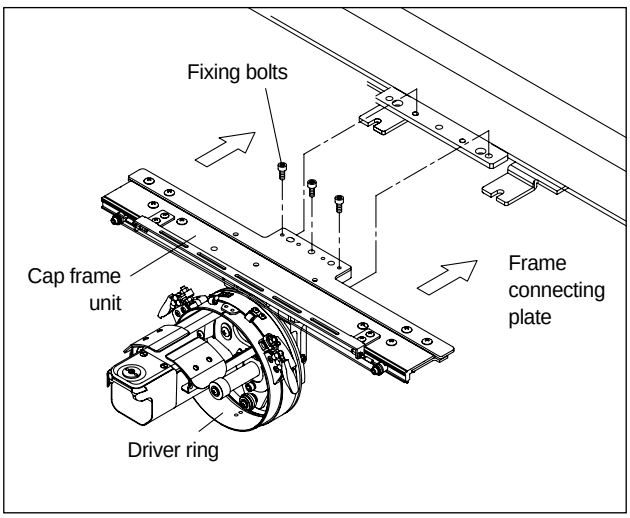
1) Disassembling the tubular plate
   Unscrew the fixing bolts to separate the tubular plate from the frame connecting plate.



CAUTION

You will need the fixing bolts when installing the cap driving set. Keep them safe.

2) Assembling the cap driving set
   Use the fixing bolts to fix the cap driving set tightly to the frame connecting plate.

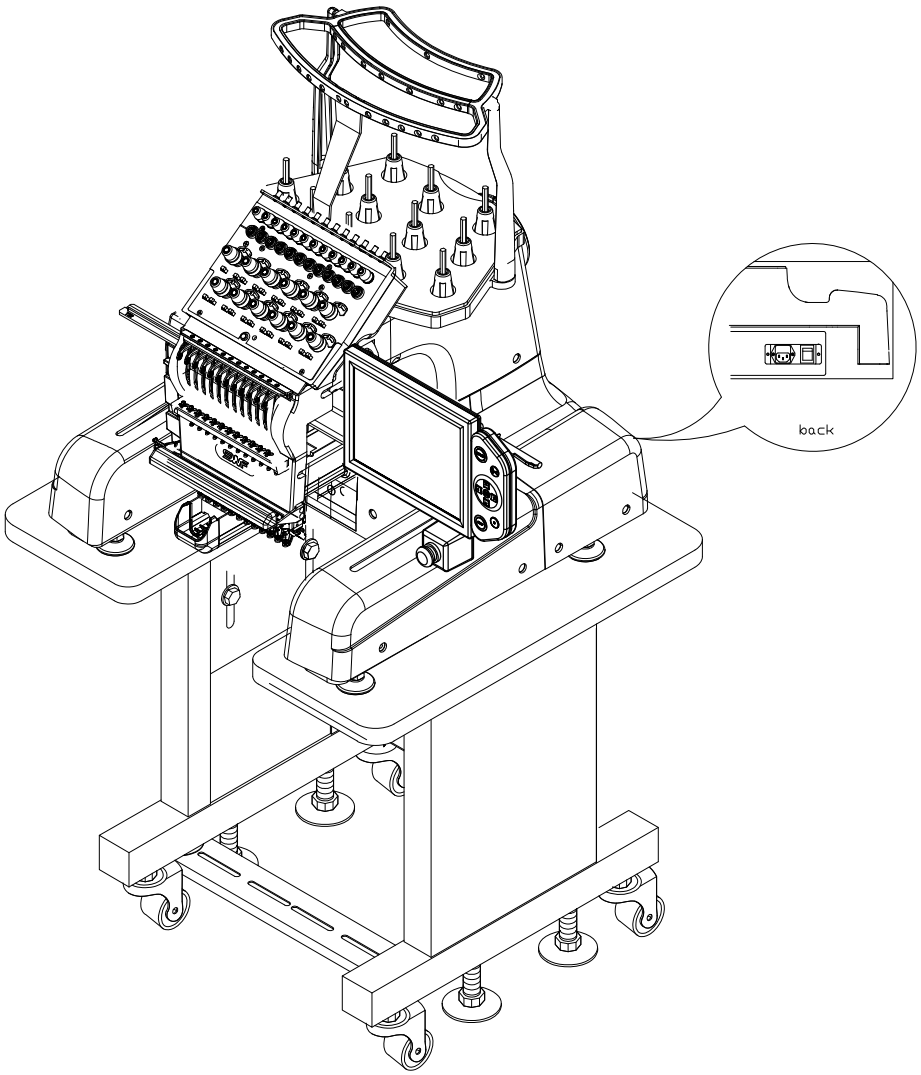


08 BASIC FUNCTIONS FOR MACHINE OPERATION

8.1) BASIC OPERATION

8.1.1) Power

1) Plug in the power of the embroidery machine.
2) Turn on the power switch.
3) OP Box's LCD screen is turned on, and the operating program starts running.



CAUTION	**Make sure to plug OFF the power when inspecting the machine.**

8.1.2) For starting embroidery and stopping the machine

You can use START and STOP switches during machine operation in the following cases.

1) For starting or stopping the embroidery work

Switch	Machine Operation
Press START	Machine starts and embroidery work begins.
Hold START	Machine "inching (see Note1)" until you release the START switch.
Press STOP	Machine stops.



1) Non-stitching (floating) function is not available in the initial menu.
2) To perform floating at the start of embroidery, press STOP switch. The machine will then go into STOP MODE. Select FLOAT and set the number of non-stitching desired in the sub menu.

2) For moving the frame backward during embroidery work stop

Switch	Machine Operation
Press STOP	Frame moves backward in selected frame movement units (see Note 2)
Hold STOP	Frame starts to move backward. If you release STOP before the machine goes 10 of the selected stitches, the machine will stop immediately (the machine moves in the selected frame movement units). If you release the switch after the machine traveled 10 of the selected stitches, the machine will continue to move back.
Press STOP	Press STOP again and the machine will stop moving backward.

3) For backward non-stitching during embroidery work stop
Same as START/STOP during embroidery work stop

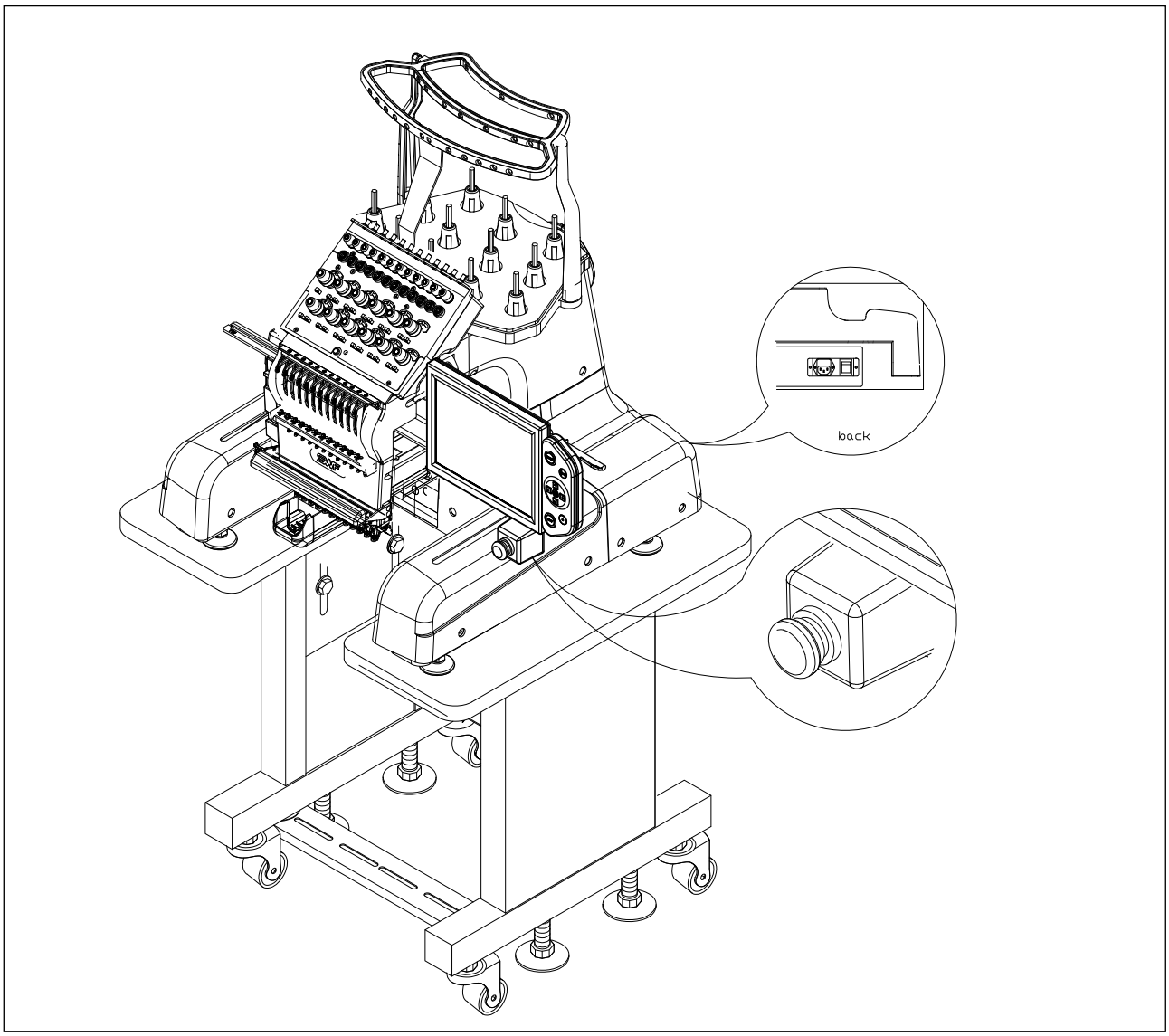


1) "Inching" refers to low-speed embroidery at 100 rpm range, performed for stable stitching when the machine is re-started after stop.
2) "Frame movement unit" refers to the "13. BK STITCH UNIT" in "Parameter Set-Up". You can select from 1 to 10 stitches (by 1 stitch).

8.1.3) EMERGENCY STOP

Press EMERGENCY STOP if you have to stop the machine urgently due to unstable machine operation.

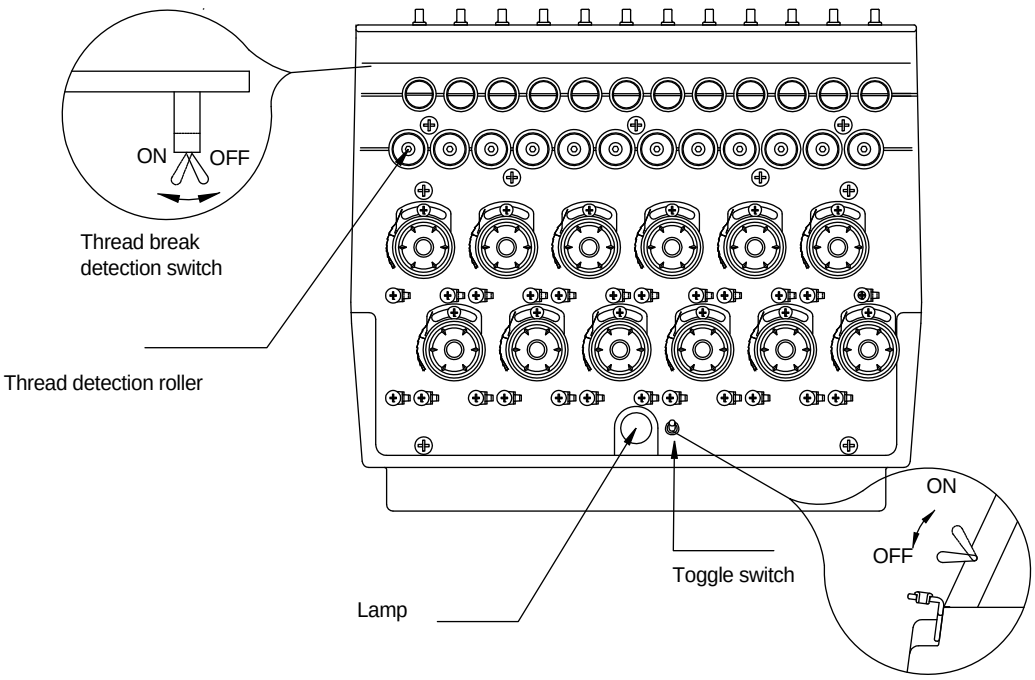
1) Press EMERGENCY STOP and the machine will stop immediately.
2) Turn OFF the EMERGENCY STOP after addressing the risk factors or problems.



8.1.4) LAMP SWITCH ON THREAD TENSION ADJUSTMENT BOARD

1) Switch
   - For normal operation, turn the toggle switch on to turn on the indicator lamp.
   - If the machine stopped after detecting a thread break, move the frame back to the location of the thread break and restart the machine to pick up stitching (design edit).
   - To set the needle bar so a specific head does not work, turn the toggle switch off.

2) Thread break detector lamp
   Lamp on the thread tension adjustment board will blink if upper and lower thread break is detected, regardless of the toggle switch status.

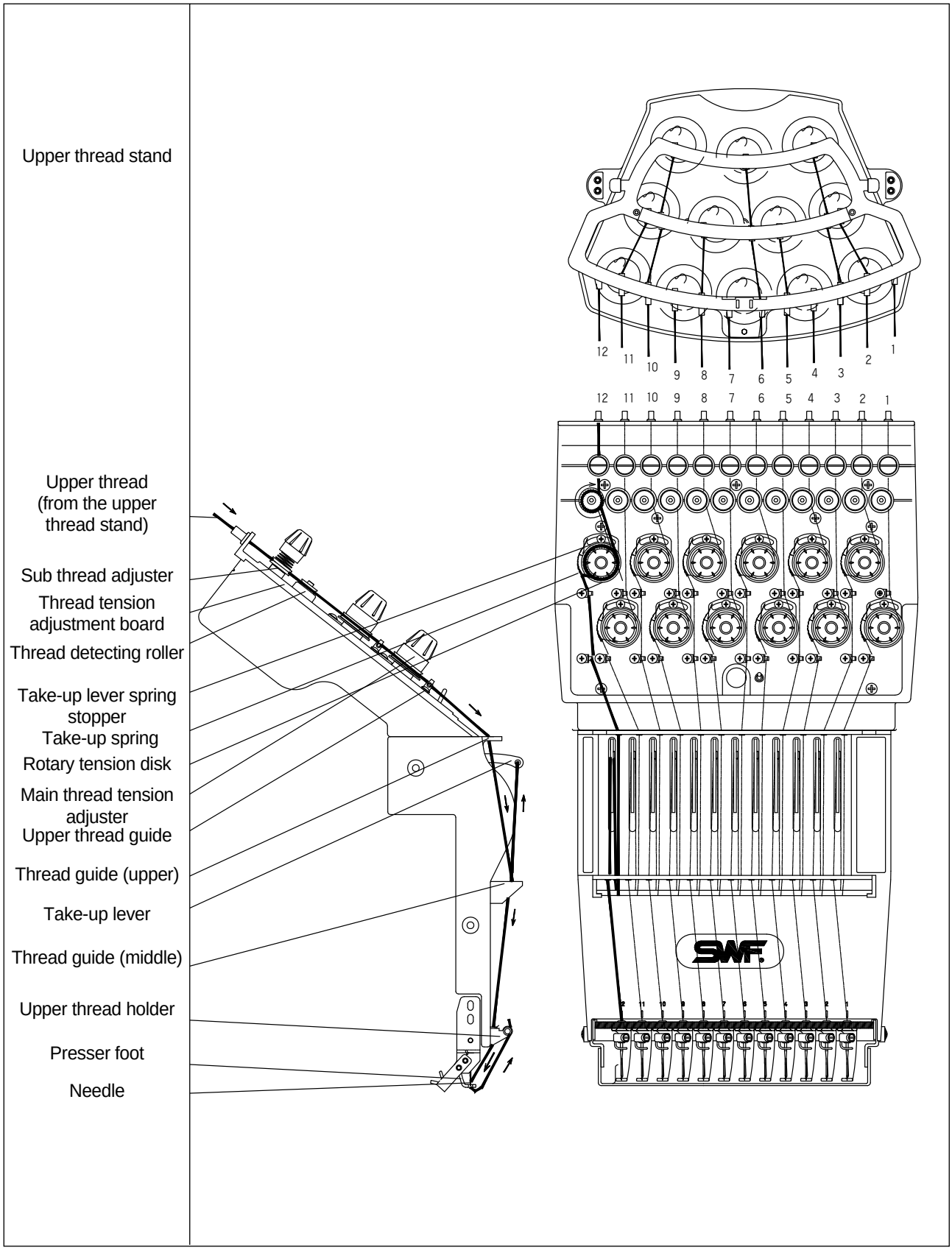


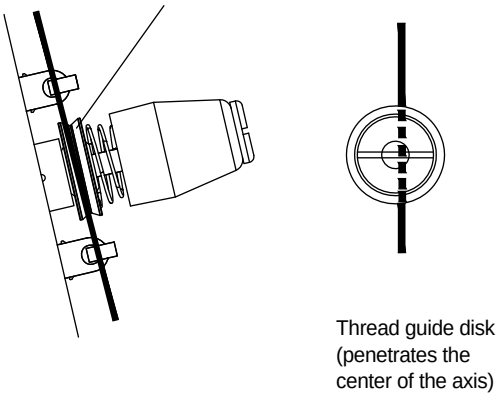
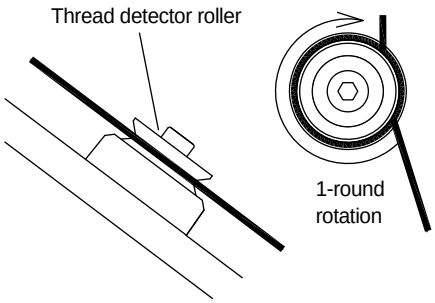
CAUTION

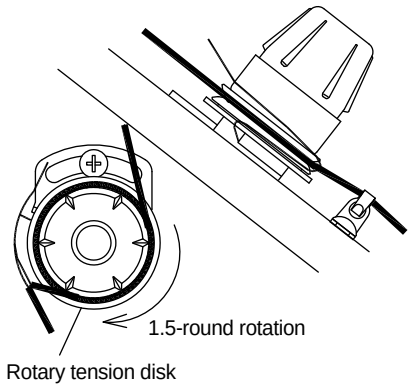
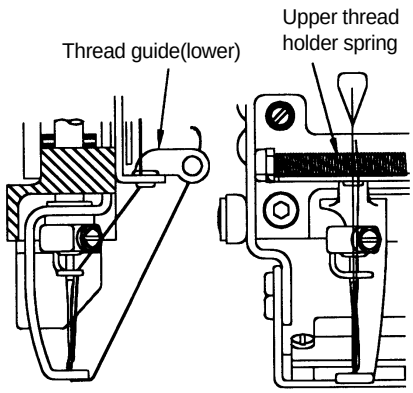
Interference to the thread detector roller (due to foreign substances around the thread detector roller, etc.) can cause the thread break lamp to blink.

8.1.5) Upper threading and tension adjustment

1) Upper threading



Threading the sub thread adjuster	Threading the thread detector roller
	
Thread between the thread guide disk and through the hole on the axis of the thread adjuster.	Wrap the thread around the V-shaped groove around the detector roller (1 time).

Threading the main thread tension adjuster	Threading around the needle
	
Wrap the thread 1.5 times around the rotary tension disk (V-shaped groove.)	Let the thread pass the islet hole of the thread guide (lower). Thread the needle holder thread guide and the needle. Fix the upper thread in the upper thread holder spring of the thread guide (lower).

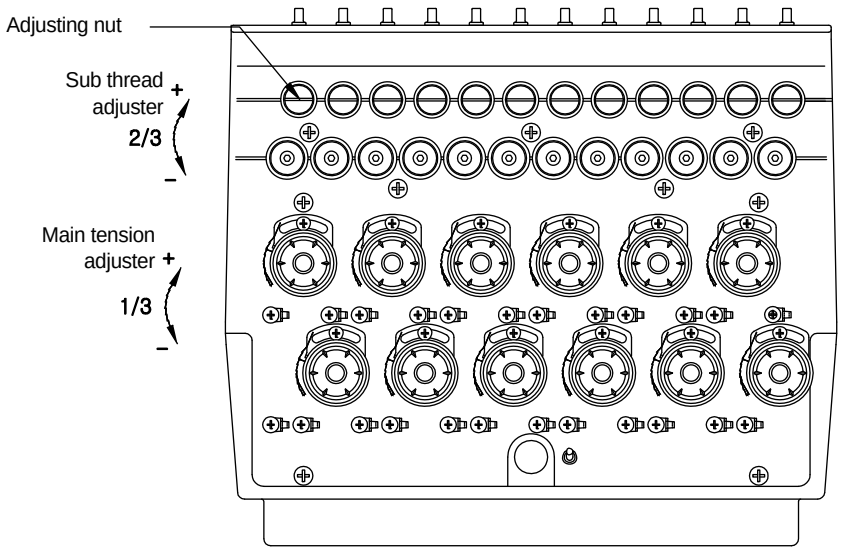
2) Upper Thread Tension Adjustment

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.

CAUTION

1) If tension is too weak
The upper thread will loop, causing thread tangles or breaks.
2) If tension is too strong
Puckering may occur as well as thread and needle breaks.

- The upper thread tension is controlled by sub and main thread tension adjusters. Turn adjusting nut clockwise to increase the tension and counterclockwise to decrease the tension.
- The sub thread adjuster should control about 2/3 of the upper thread tension.
- The main tension adjuster should handle the other 1/3.
- Set the tension of the sub thread adjuster so the upper thread flows smoothly through the rotary tension disks and into the rollers of the main tension adjuster.



CAUTION

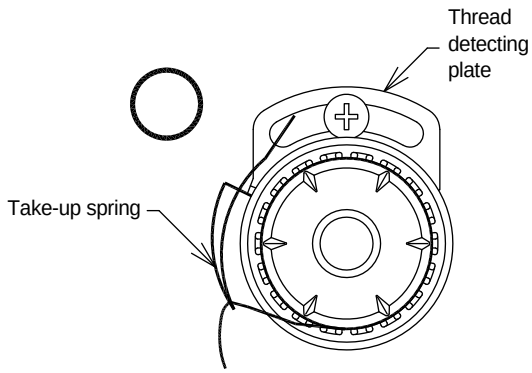
1) If tension at the sub thread tension adjuster is too loose, the detector roller may not rotate well and make wrong detections.
2) After adjusting the tension, check if the upper thread tension is what can be pulled with little force of around 100-120g.
3) After adjusting the tension, pull the upper thread to see if the detector roller rotates well.
4) Adjust the tension constantly according to the type of thread and fabric used.

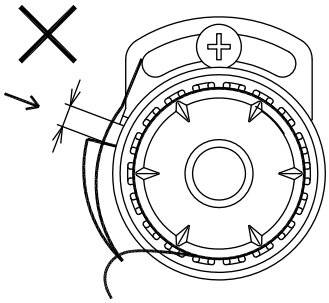
3) Take-up spring adjustment

– Functions

Difference in the length of the upper thread pulled by the take-up lever and by the hook creates tension or looping. The take-up spring absorbs the leftover of the upper thread. Increase the tension or the stroke of the spring to form tight stitches on the embroidery.

○ Correct position of the take-up spring	✕ Incorrect position of the take-up spring
The take-up spring stopper touches the spring	Gap between the take-up spring stopper and the spring (due to dust or foreign substances in the stopper)



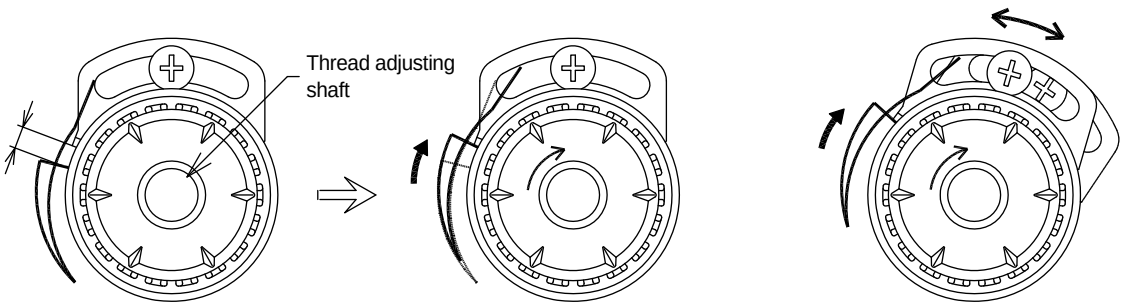


– Adjusting tension of the take-up spring

You can adjust the tension of the take-up spring with its shaft. You can increase the spring tension by turning it clockwise, and decrease the tension by turning it counterclockwise.

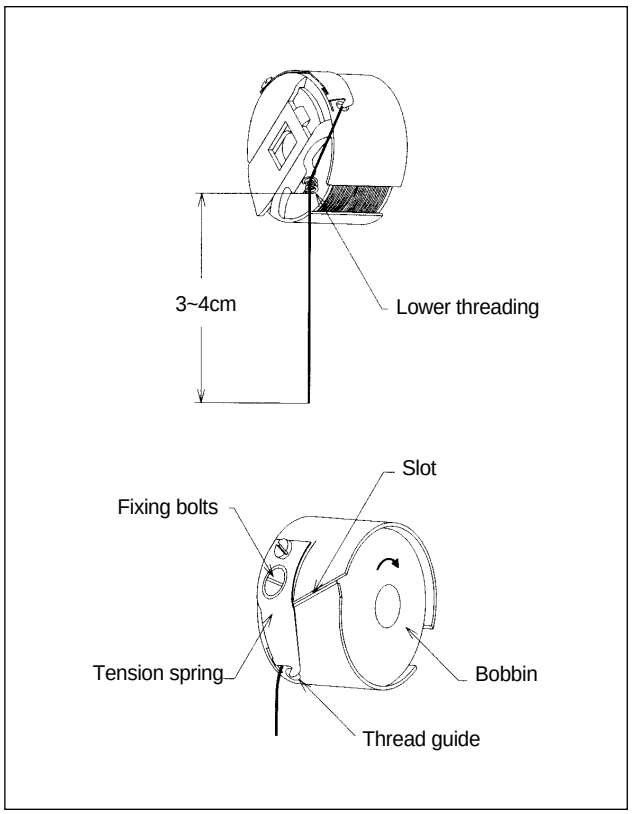
– To adjust the stroke of the take-up spring

You can adjust the stroke of the spring by moving the take-up stopper to right or left.



8.1.6) LOWER THREADING AND TENSION ADJUSTMENT

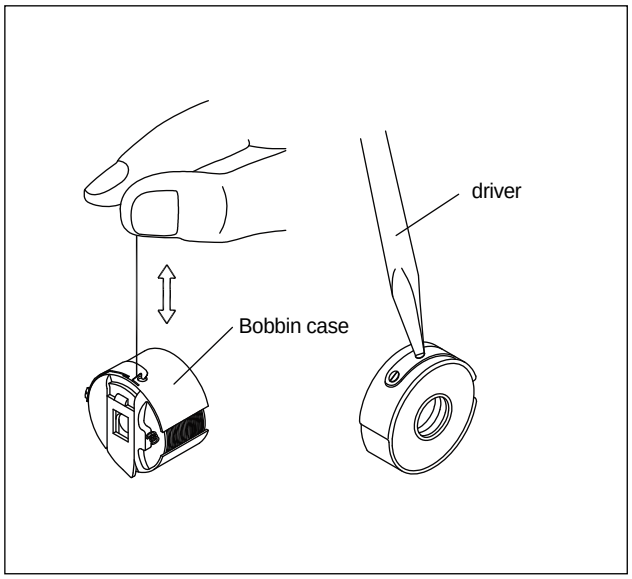
1) Lower threading
   - Use cotton yarn (#80-#120) for your lower thread.
   - Lower threading into the bobbin case
     Insert the bobbin into the bobbin case with the thread coming out from the case slot.
     Pull the thread through the thread guide.
   - To prevent lower thread tangles, trim the thread, leaving the length at 3-4cm, before inserting the bobbin into the hook.



CAUTION

Make sure the bobbin rotates clockwise when you pull the thread holding the bobbin case in your left hand.

2) Lower thread tension adjustment
   Adjust the tension of the lower thread using the bolt on the tension spring of the bobbin case.
   Turn the bolt clockwise to increase the tension and counterclockwise to decrease the tension.

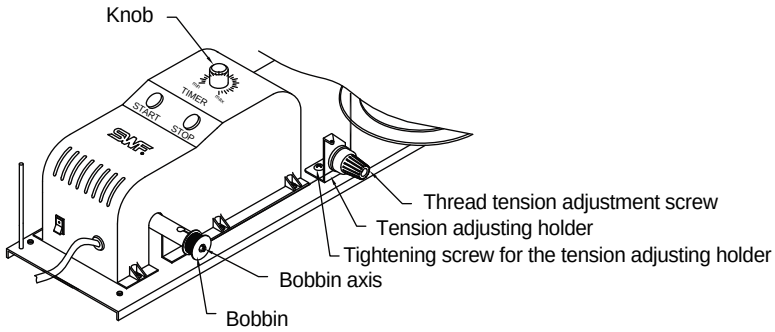


CAUTION

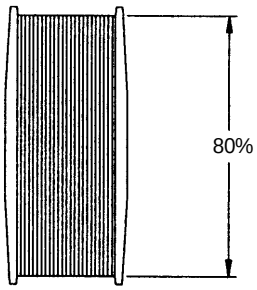
To check if the lower thread tension is adequate, hold the thread from the bobbin and jiggle the bobbin case lightly up and down. The thread should come out from its own weight and the tension should be 25-35g.

8.1.7) BOBBIN WINDER

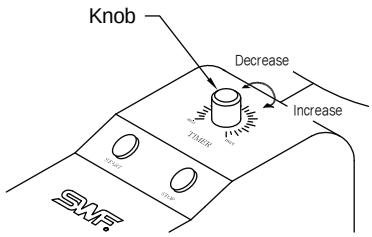
1) Bobbin winding
   - Insert the bobbin into the thread winder shaft as in the figure below and manually wind the thread 5 to 6 times on the bobbin in the direction of winding the thread. Then press the start button.
   - When the thread winding condition is poor, press the stop button. It will immediately stop the winding shaft.



2) Adjusting thread volume on the bobbin
   - Fill the bobbin 80% and make sure the thread is parallel to the bobbin as shown in the figure.



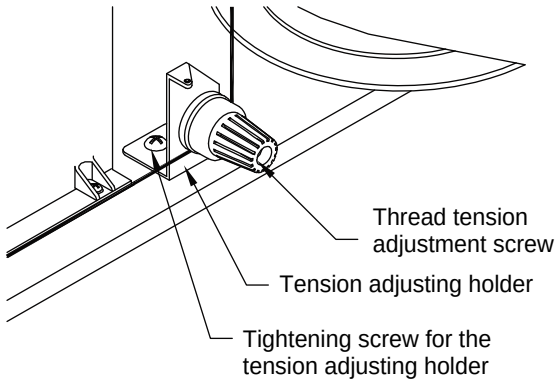
   - The thread volume on the bobbin can be adjusted by using the thread winding knob. When the knob is turned clockwise, the thread volume increases. When the knob is turned counterclockwise, the thread volume decreases.



CAUTION

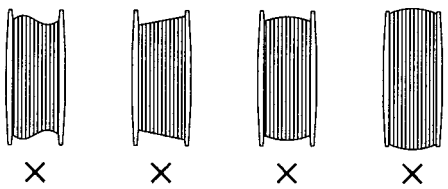
1) Overfilling the bobbin may interfere with the smooth pull of the lower thread.
2) For normal bobbin, 80% fill will render around 80m of lower thread.

3) Adjusting the bobbin winding condition
   - 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.
   - Adjust the tension of the bobbin winding using the tension adjusting nut.



CAUTION

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



CAUTION

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

8.1.8) Notes when using USB memory sticks.

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

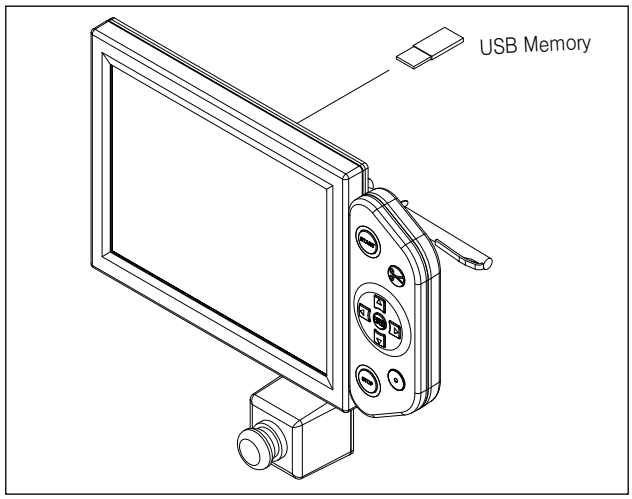
CAUTION	**You can use USB memory sticks of FAT 16 (file system). The machine does not accommodate FAT 32.**

▶ When using USB memory sticks

– Do not delete USB memory from the USB port when reading and writing with USB.

8.1.9) How to insert USB memory sticks

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



8.1.10) How to take out USB memory sticks

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

8.1.11) Reading and writing of embroidery designs

Serial USB memory communication is adopted in order to input the embroidery design in an op box through an external device.

8.1.12) Return to stop position in unexpected blackouts

Your SWF embroidery machine automatically returns to the previous position when the power comes back on after an unexpected blackout, thereby not affecting the quality of the embroidery.
(See LCD Monitor User Manual)

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

8.2) NEEDLE-HOOK TIMING AND RELATED TIPS

8.2.1) Needle

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

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

8.2.2) Relationship between needle and thread

- Inadequate selection of threads and needles can result in thread breaks, skipped stitches, as well as in bad-quality embroidery.
- Refer to the following table for threads and needles used in 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	36~40	60~70	80~100	130~150
0.36	14	90				

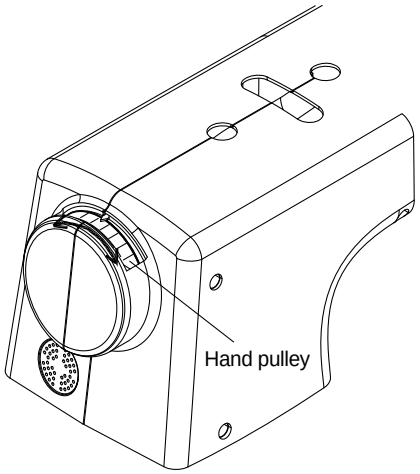
NOTE	**Needle and thread most commonly used in embroidery** **Thread : rayon yarn 120d/2.** **Needle : DB × K5 #11**

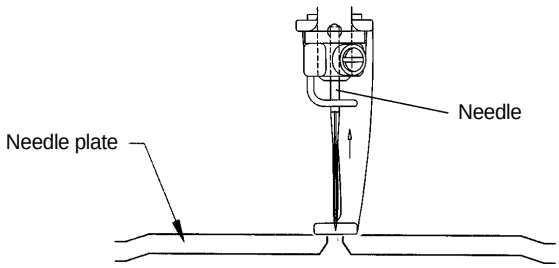
8.2.3) Changing the needle

– Make sure the needle is completely clear of the needle plate before changing it. If the needle is not clear of the plate, use the main shaft handle, manually turn the main shaft to put the needle in the right location for change.

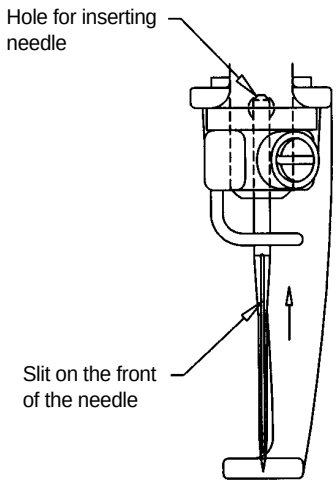
CAUTION

1) Turn OFF the machine according to the safety rules before turning the main shaft manually.
2) Immediately remove the main shaft handle afterward: it is dangerous to operate the machine with the handle inserted.

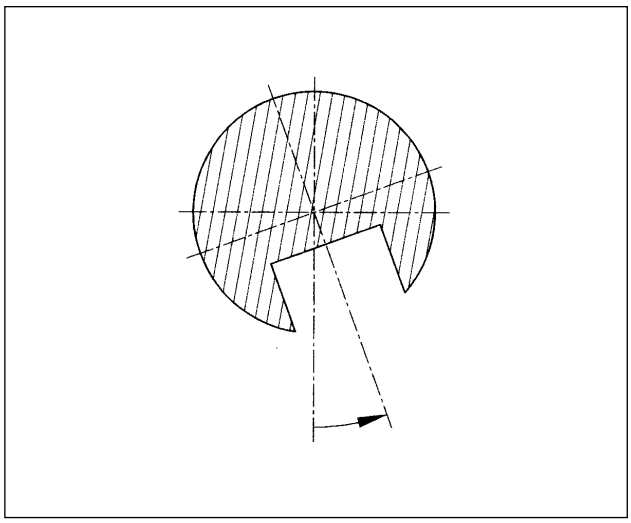




– When inserting the needle, make sure that the groove of the needle is facing front.
– End tip of the needle should be inserted completely into the needle bar.



– When using special threads, such as artificial silk, you might want to turn the groove of the needle to the right in order to minimize the thread breaks.

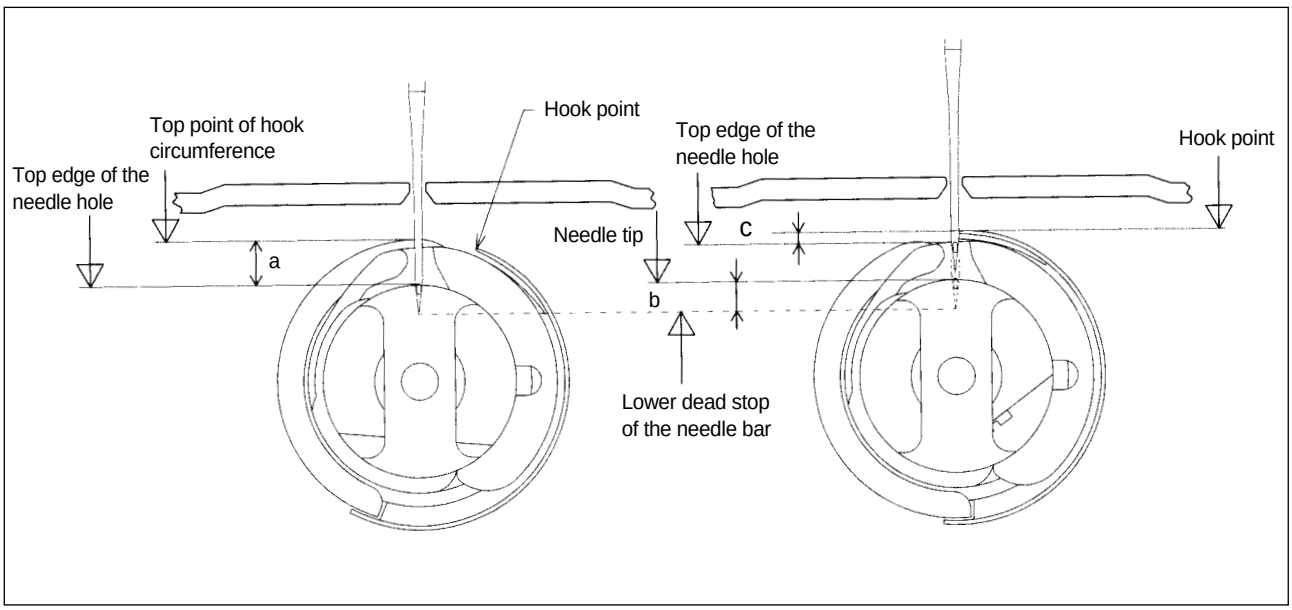


CAUTION

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.

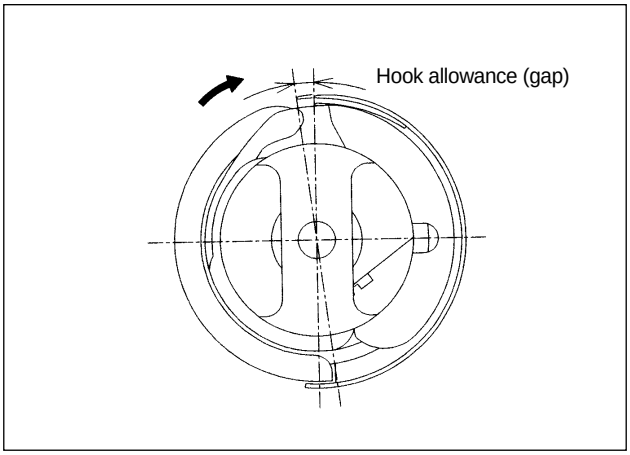
8.2.4) Relationship between needle and hook

– Adjusting timing between needle and hook
Default timing of the needle and the hook is set by the main shaft angle of 201°. Relationship between the needle and the hook varies as below.



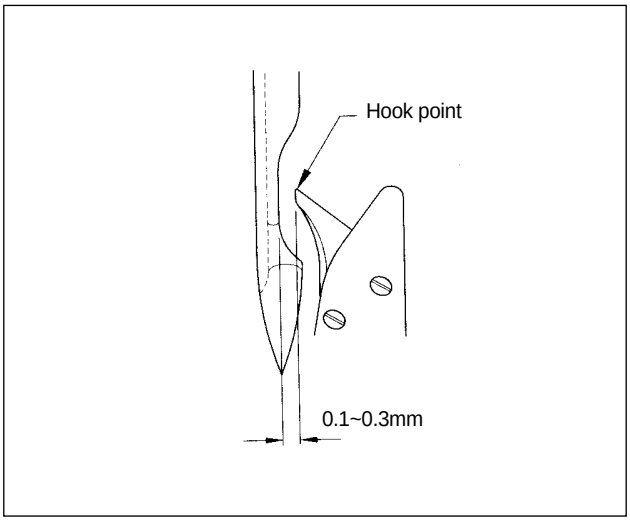
a. At lower dead stop of the needle bar	2.3~3.7 mm
b. At needle-hook timing	1.8~2.2 mm
c. At needle-hook timing	0.5~1.5 mm

– Adjusting allowance in the hook
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.



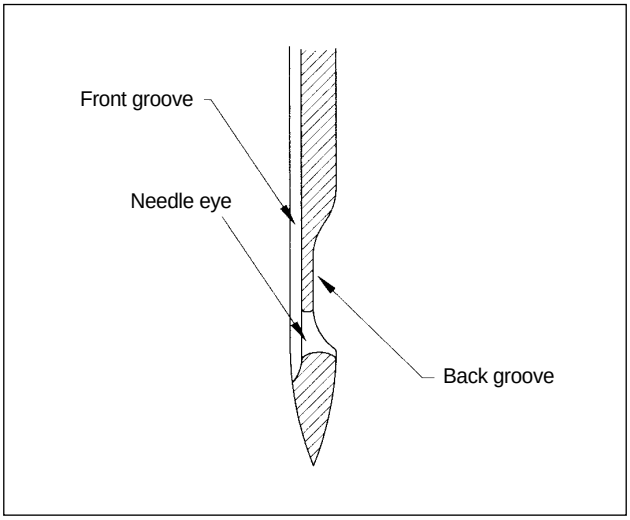
8.2.5) Adjusting gap between needle and hook point

– Gap between the hook point and the needle
The distance between the needle and the hook should be 0.1-0.3mm at their closest interface.
– Thread skip
Thread skip occurs due to thread looping or inadequate balance or gap between the needle and the hook.
– Adjustment
The closer the hook point is to the needle, the hook point will be inside the loop and threading will be more stable.



8.2.6) Functions by needle shape

Hole and groove of the needle vary by the size and type of the needle.
– Front groove
It protects the thread from the friction heat of the sewing (which can cause thread breaks).
– Back groove
It adjusts the hook timing according to the needle movement, thus preventing thread skips.

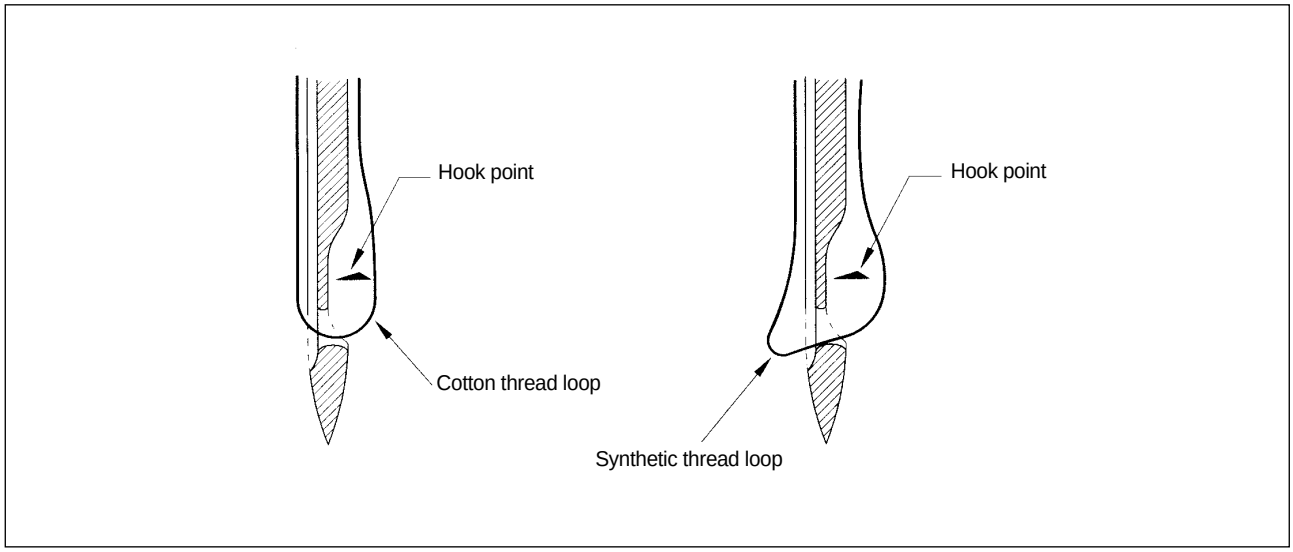


CAUTION

1) 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 embroidery state is not good, move the needle slightly to the right.

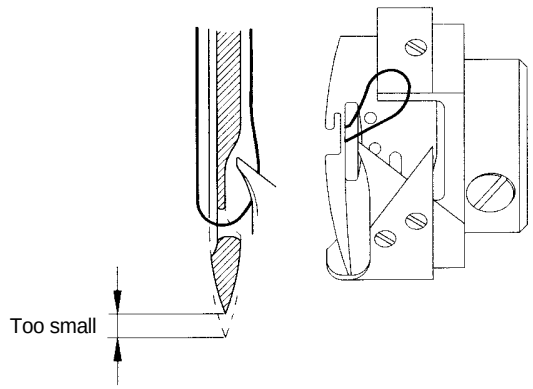
8.2.7) Different loop shapes

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.



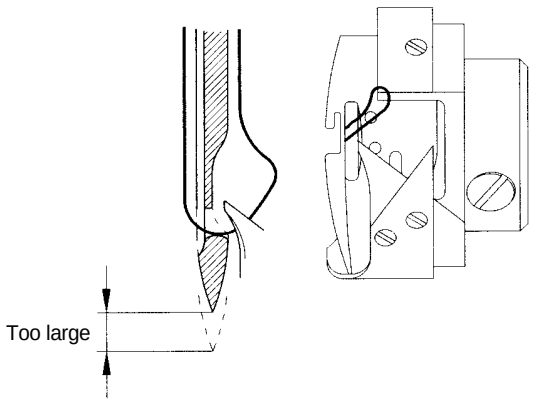
8.2.8) Relationship between the take-up lever and the hook

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: 291˚).



1) Hook timing is fast (in the A range)

The hook starts to take the thread from the take-up lever. Loop is small because the upper thread is pulled. Stitches are made but stitch tension is bad. Thread skips occur, where hook fails to go through the loop.

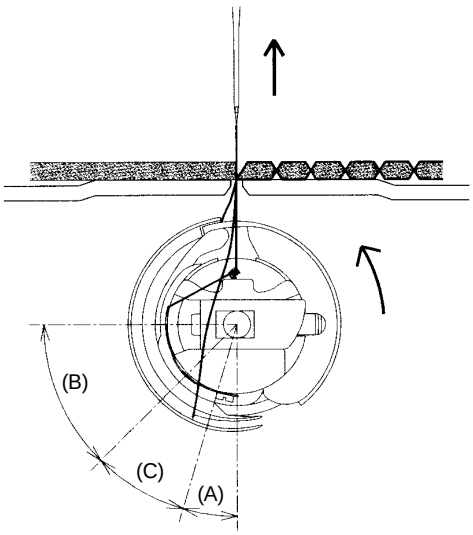


2) Hook timing is slow (in the B range)

The hook starts to take the loop before the take-up lever goes up. Thread skips don't occur, but thread breaks occur, because the take-up lever moves faster than the thread coming off the hook.

NOTE

In normal hook timing, the hook should be in the (C) range.



8.3) THREAD DETECTOR ASSEMBLY AND FUNCTIONS

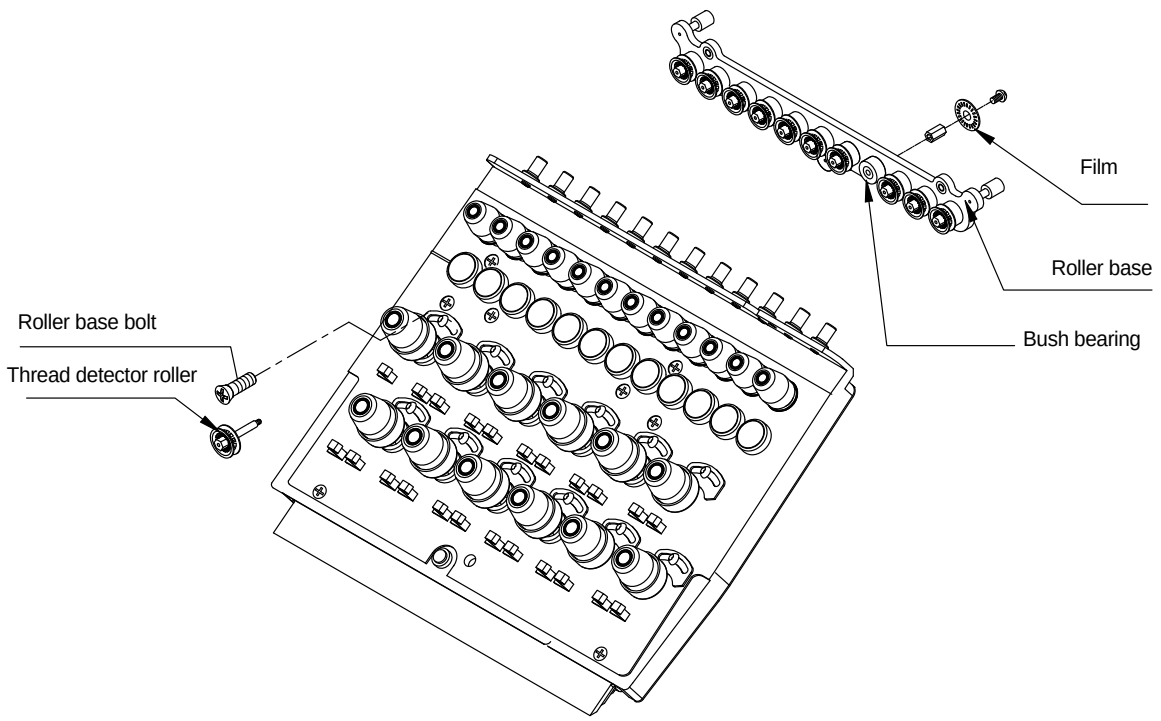
8.3.1) Functions of the thread detector

The thread detector prevents bad embroidery by detecting breaks of the upper or the lower threads. The thread detection roller performs the detection.

CAUTION	**Wrong detection can occur if the thread detection roller does not rotate smoothly.**

8.3.2) Disassembling the thread detector

You will need to disassemble the thread-break detector unit when you to have to clean it for more smooth rotation. Remove the cover of the thread tension adjusting plate, separate the cables of the thread detection board, and unfasten the roller base bolts. The entire unit will be disassembled including the rollers and bush bearing.



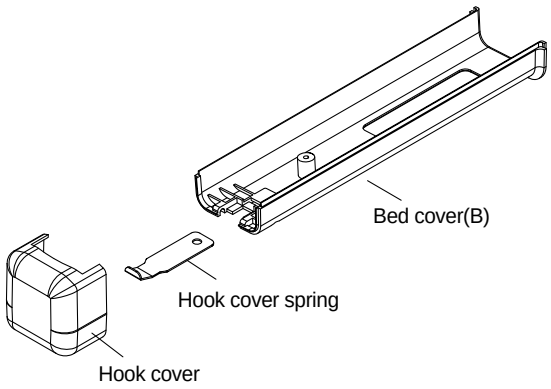
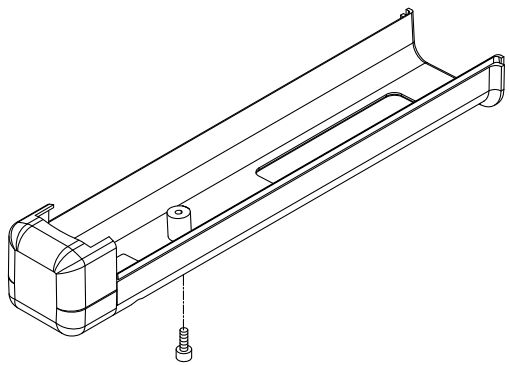
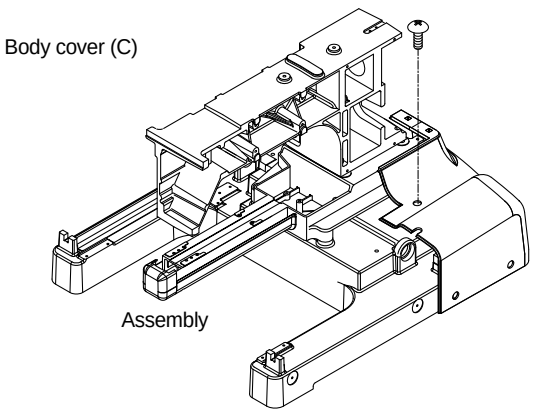
CAUTION	**1) When assembling the thread detection roller, check between the sensor groove and the film on the thread detection board.** **2) Thread detection may not work according to the location of the thread detection board.** **3) You can adjust the location of the board using the board base bolts.**

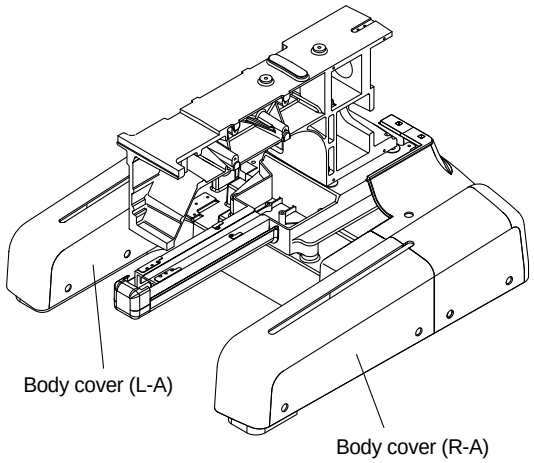
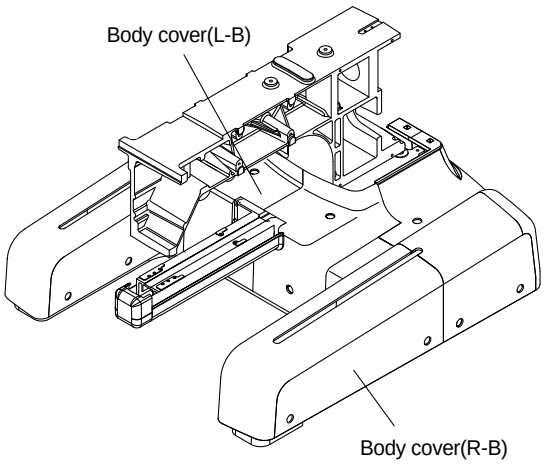
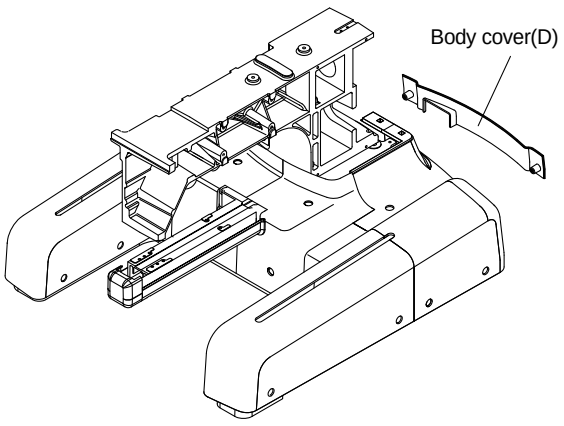
8.4) COVER ASSEMBLY

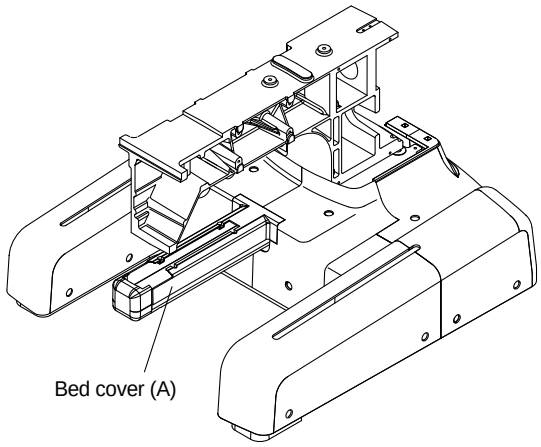
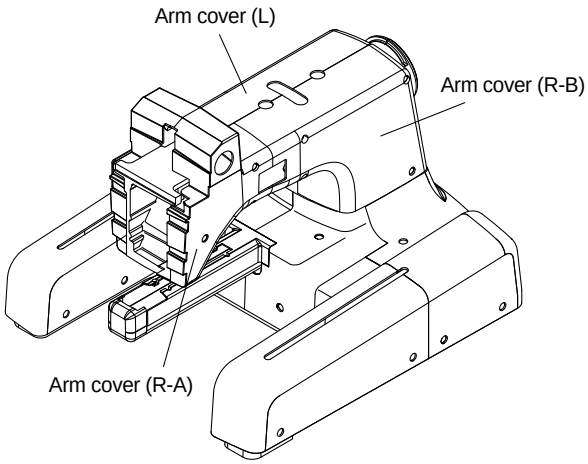
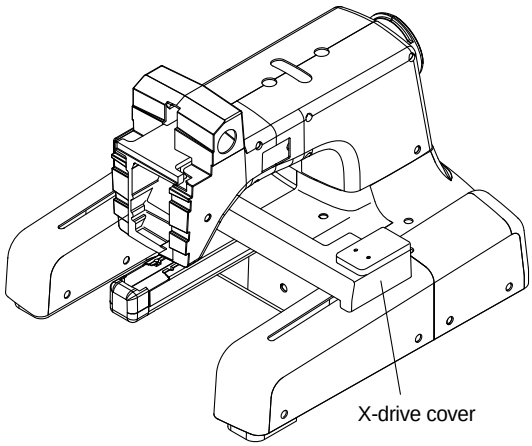
8.4.1) Assembling the cover

CAUTION

1) Follow the order of assembly.
2) Do not put excessive pressure or force on the plastic cover.
3) Use appropriate tools to prevent breaking or damage of the cover.

No	Picture	Instructions
①		– Assemble the hook cover and bed cover (B) using the hook cover spring.
②		– Assemble after completing "①" using the M3 × L8 wrench bolt. – Tools to use : 2.5mm T-wrench
③		– Assemble the body cover (C) on the rear side of the body. – Tools to use : (+) screwdriver – Joining bolts : M4 × L10 trust bolt

No	Picture	Instructions
④		– Assemble the body cover (L-A)(R-A). – Tools to use : (+) screwdriver – Joining bolts : M4 × L10 trust bolt
⑤		– Assemble the body cover (L-B)(R-B). – Tools to use : (+) screwdriver – Joining bolts : M4 × L10 trust bolt
⑥		– Assemble the body cover (D). – Tools to use : (+) screwdriver – Joining bolts : M4 × L10 trust bolt

No	Picture	Instructions
⑦		– Assemble the bed cover (A). – Tools to use: (+) screwdriver – Joining bolts: M4×L10 trust bolt
⑧		– Assemble the arm cover (L)(R-A)(R-B). – Tools to use: (+) screwdriver – Joining bolts: M4×L10 trust bolt
⑨		– Assemble the X-drive cover to the machine. – Tools to use: (+) screwdriver – Joining bolts: M4×L10 trust bolt

09 MAINTENANCE AND INSPECTION

Consumable parts shall not be guaranteed even in warranty period.

9.1) CHECK POINTS FOR REGULAR INSPECTION

CAUTION

1) Machine and electricity safety rules must be observed during the inspection.
2) Make sure to turn OFF and STOP the machine when performing inspection.

9.1.1) Clean, oil, and grease the set parts of the machine on a regular basis.

9.1.2) Inspect tension of each driver belt.

9.1.3) Failure to perform regular inspections can 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-outs of machine parts due to insufficient oiling and greasing

9.2) CLEANING

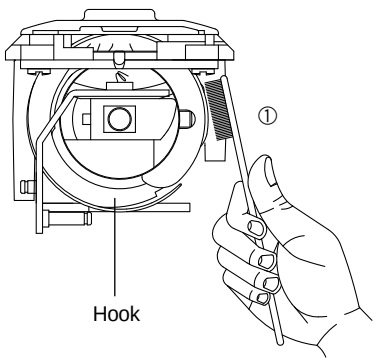
Use the air compressor to clean each part of the machine.

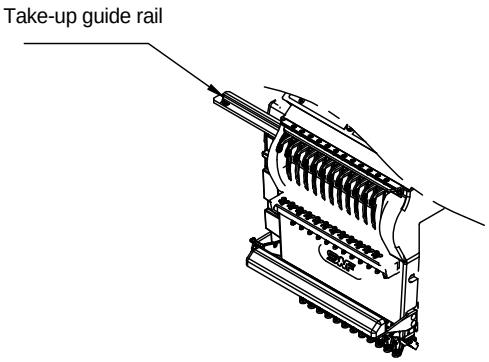
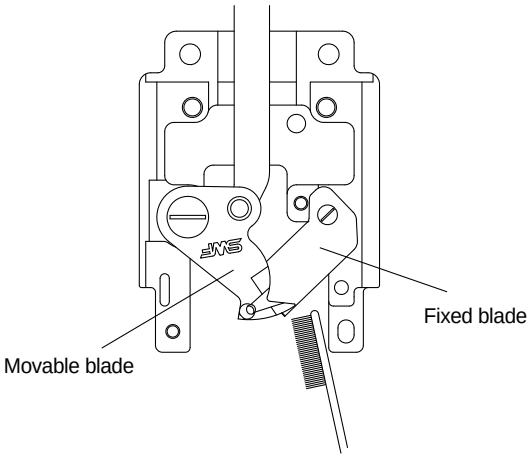
CAUTION

1) Turn OFF the main power before inspecting or cleaning of the machine.
2) Adjust the cleaning cycle according to the conditions of use and to the environment.

CAUTION

SWF is not responsible for machine damages or malfunction caused by insufficient regular inspection.

No.	Major parts for cleaning		Cleaning cycle	Fig.
1	Around the hook		Every day	①

No.	Major parts for cleaning		Cleaning cycle	Fig.
2	Guide rail to the take-up lever of the head		Once a week	②
3	Around the movable blade and the fixed blade		Once in 3 days	③

CAUTION

To clean, remove the needle plate and pull the movable blade to the front (see picture). After the cleaning, assemble back in the reverse order.

9.3) OIL SUPPLY

CAUTION

1) Make sure to turn the power OFF during oil supply.
2) SWF is not responsible for machine damages or wear-outs caused by insufficient oiling.

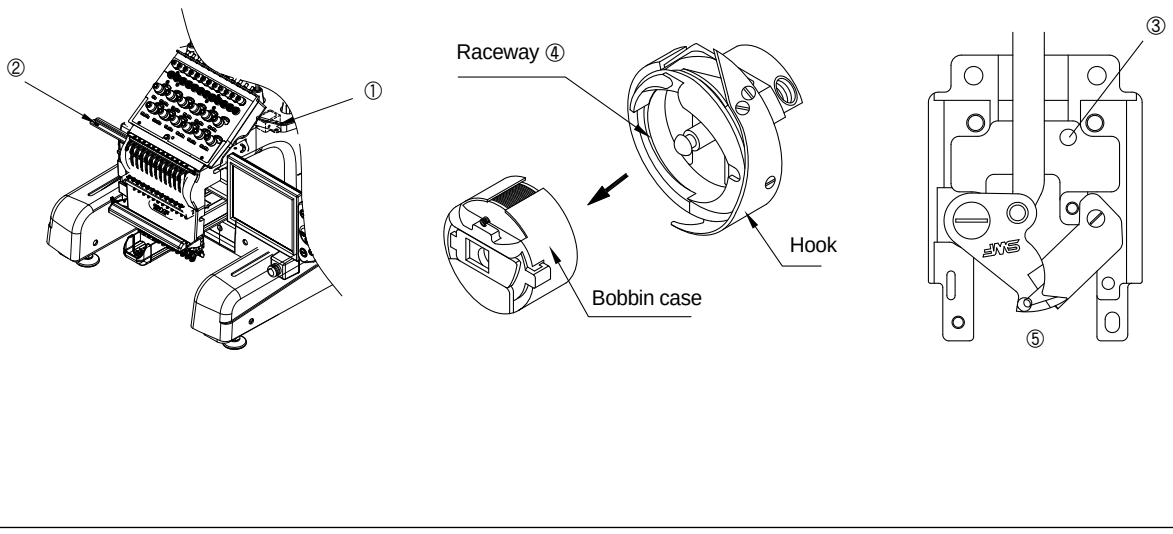
9.3.1) Oil supply

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

No.	Where to oil	Oiling cycle	Fig.
1	Oil tank	Once in 2 weeks [Fill the tank when the oil level is below the red line]	①
2	Guide rail to the take-up lever	Once a week	②
3	Needle plate lubrication hole	Once every three days	③
4	Take the bobbin case out of the hook. Feed small amount of oil on the raceway.	Once in 3-4 hours	④
5	Juncture of the movable blade and the fixed blade in the trimming unit	Once in 2-3 weeks	⑤

CAUTION

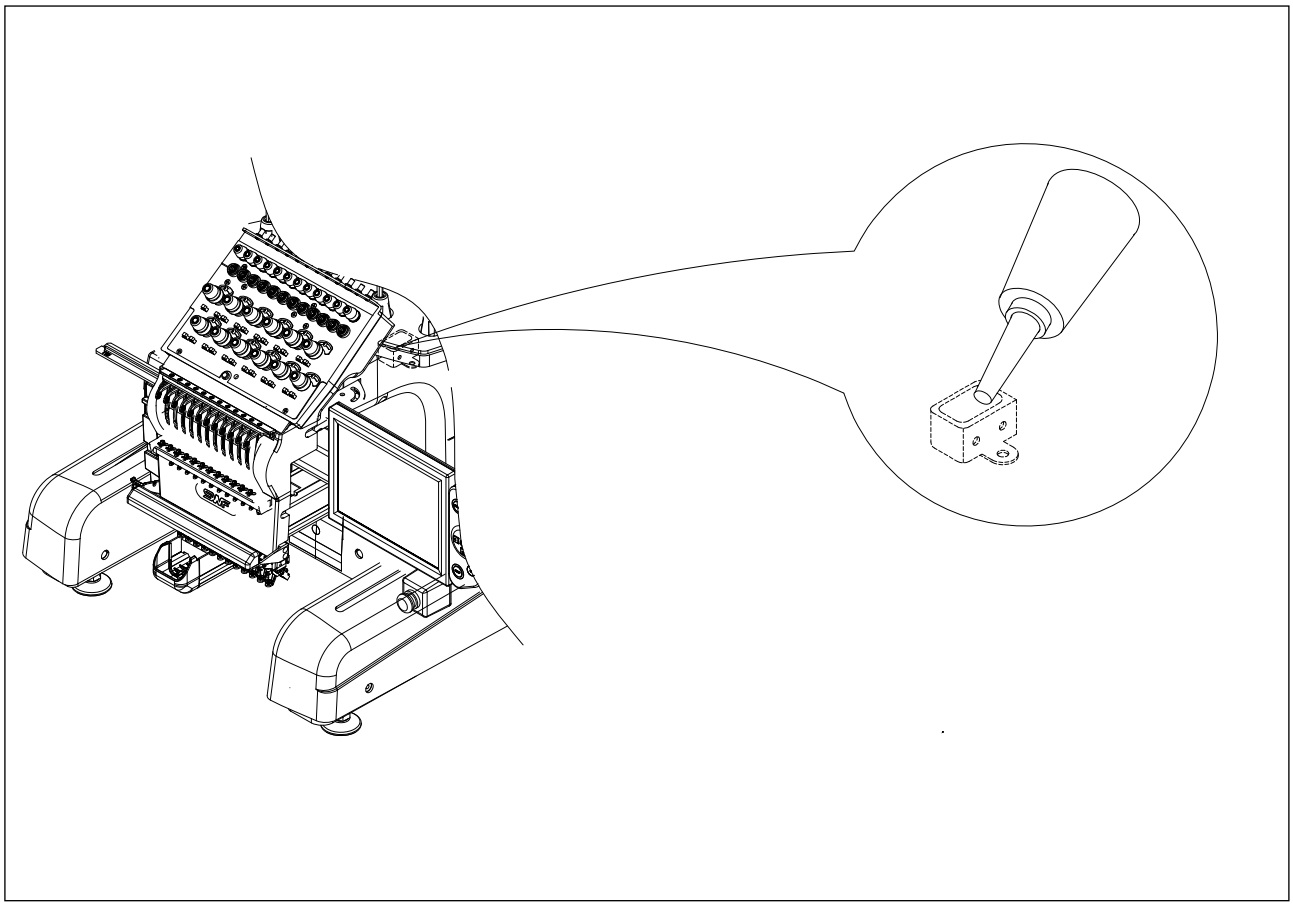
1) Excess oil may stain the thread and the fabric.
2) Run the machine without stitching for 2-3 minutes after oiling.
3) Excessive oiling in the hook may cause trimming problems and thread breaks.



9.3.2) Oiling each part of the arm

Filling the oil tank will automatically oil each part of the arm.
Be careful not to overfill the tank.

- All bushings in the upper shaft
- Crank road of the needle bar
- Controller and the needle bar
- Shaft of the take-up lever driver lever
- Shaft of the presser foot driver lever
- Shaft of the needle bar driver
- Shaft of the presser foot driver
- Bushing in the lower shaft



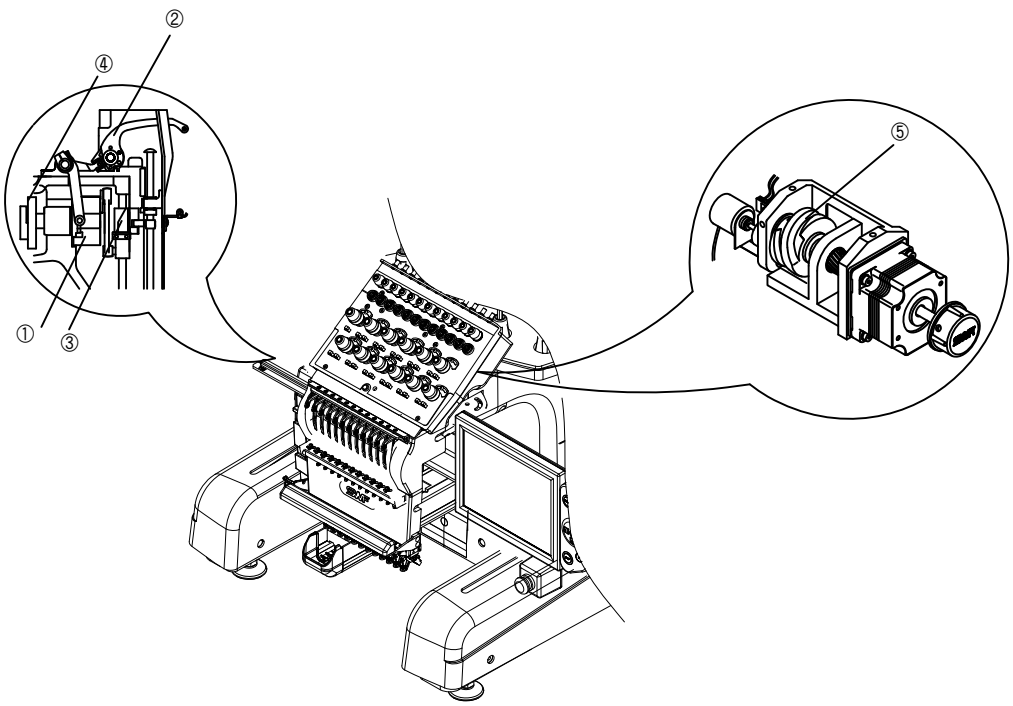
9.3.3) Greasing

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

1) Greasing the inside of the arm
Use high-quality mineral-based lithium grease.

No.	Where to grease	Greasing cycle	Fig.
1	Inside the arm – Take-up lever drive cam – Boss of the take-up lever – Needle bar controller – Presser foot driver cam	Once in 3 months	① ② ③ ④
2	Color change cam	Once in 3 months	⑤

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



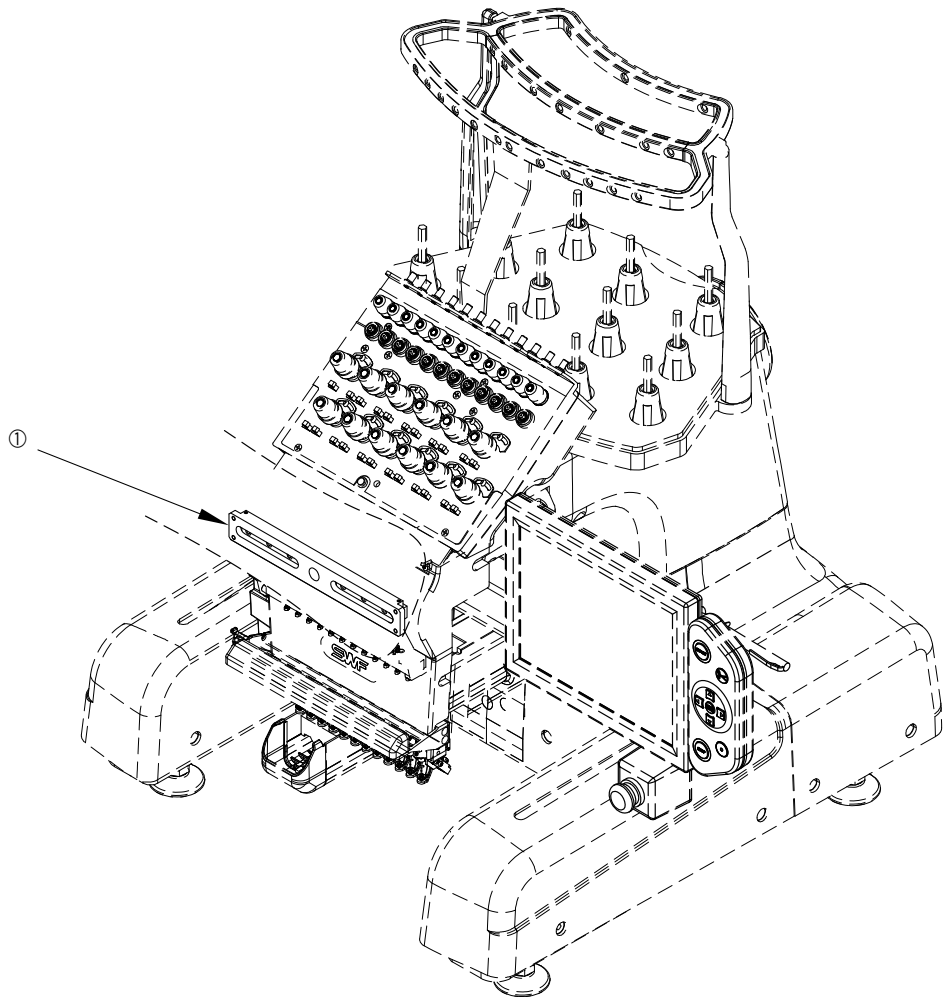
2) Greasing the head
Use lithium-type grease (JIS No.2) – Albania No.2.

No.	Where to grease	Greasing cycle	Fig.
1	Head drive LM guide	Once in a month	①
2	X, Y drive guide rail	Once in a month	②

CAUTION

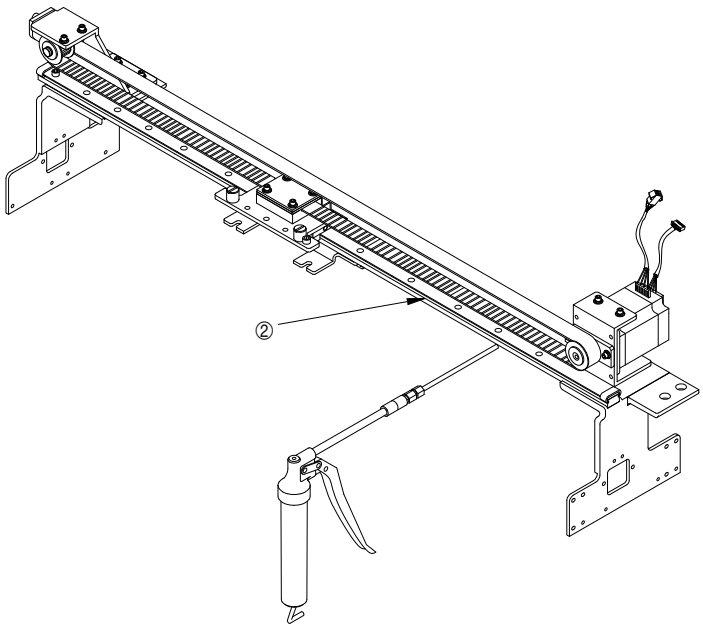
Regular greasing prevents machine noise and abnormal wear-out.

■ Greasing the head drive LM guide

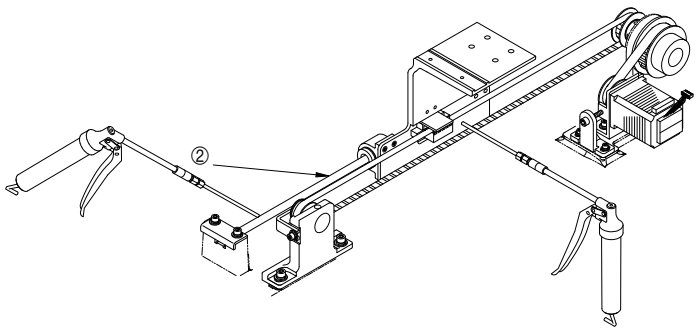


3) Greasing the X, Y drive guide rail
   - Disassemble the X-drive frame cover and body covers L-A, R-A.
   - Push the guide block farthest to one side.
   - Lift the timing belt with one hand and grease the entire part of the drive guide rail
   - After greasing, assemble the cover back in the reverse order.

■ Layout of X, Y drive guide rail



■ Zoom-in the guide rail layout



Y-drive

10 ADJUSTING MAJOR PARTS OF THE MACHINE

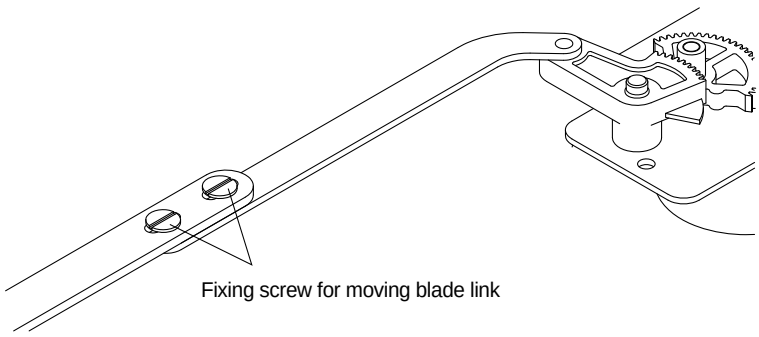
CAUTION

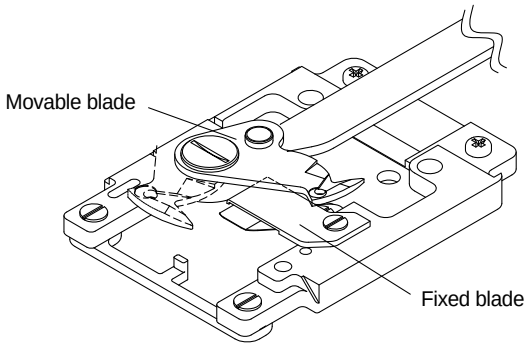
Turn OFF the main power when adjusting the machine.

10.1) TRIMMER ADJUSTMENT

10.1.1) Moving Place Position Adjustment

– The proper position of the moving blade is that the cutting point of the fixed blade should be at the end of the fixed blade. If the moving blade is not properly positioned, such problems as upper thread separation and cut skipping could occur.
– If the moving blade is not properly positioned, loosen the fixing screws for the moving blade links (A), (B) and turn on the power. Then the trimming motor moves to the default point. Place the moving blade at the end of the fixed blade, and then tightly fasten the fixing screw.





CAUTION

Clean the machine regularly to prevent thread tails clouding around the lower thread holder. Such may undermine the function of the lower thread holder.

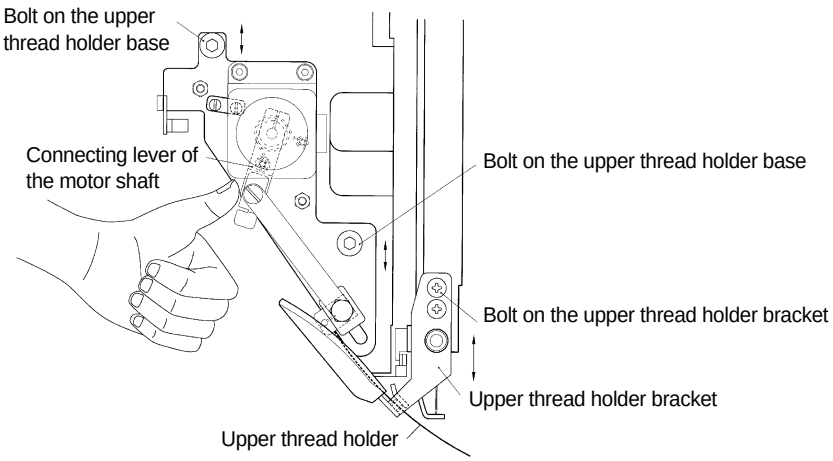
10.2) ADJUSTING UPPER THREAD HOLDER

10.2.1) Adjusting

Unfasten the base bolts of the upper thread holder base. Press with your hand the connecting lever of the motor shaft and fix the base at a position where hook of the upper thread holder completely passes through the center of the needle. Unscrew the bracket bolt so the bracket does not load the upper thread holder. Fasten the bracket bolt where the upper thread holder operates smoothly.

10.2.2) Checking

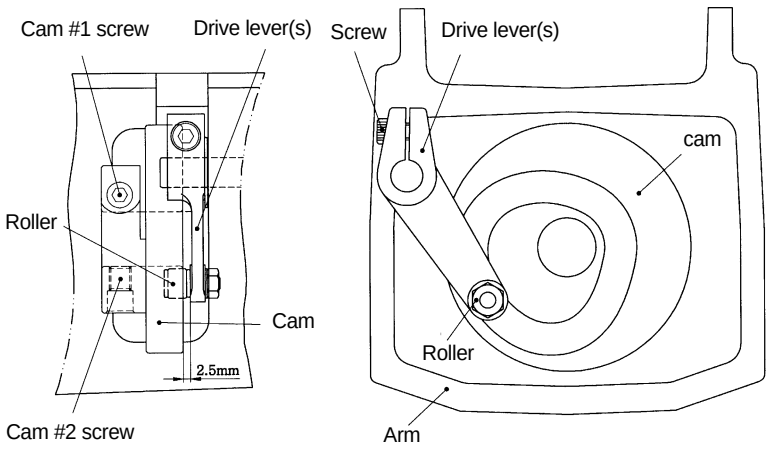
After adjustment, check if the upper thread holder operates smoothly when the needle is changed, by changing the color.



10.3) ADJUSTING LOW-NOISE PRESSER FOOT

10.3.1) Setting the low-noise presser foot

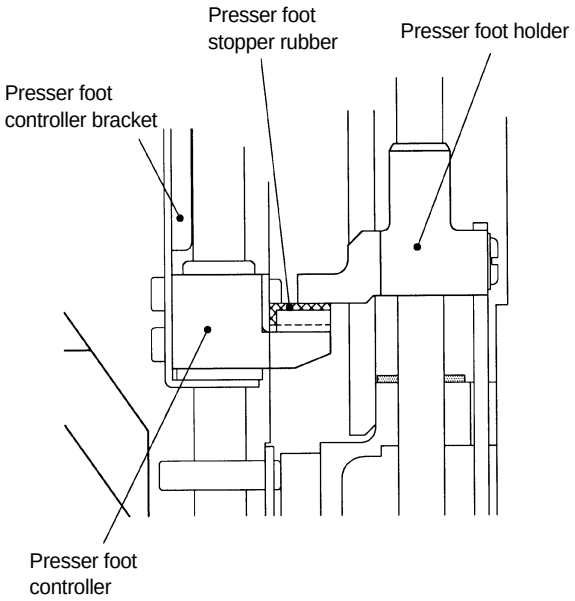
Unfasten all screws of the presser foot cam and drive lever (s). Turn the hand pulley to the maximum lower position of the needle bar (180˚). Turn the cam with the roller inserted to it. When the roller reaches a position, where it aligns with the maximum eccentricity of the cam (roller is farthest from the arm in the picture), fasten the screws tightly.



CAUTION

When fastening the drive lever(s), pull the shaft and make sure there is no gap between the lever and the arm.

– Turn the hand pulley and set it at 100˚. Fix the hand pulley and turn the cam. Fix the cam when it reaches a position where the presser foot holder sits on the rubber of the presser foot stopper. Fasten the cam#1 screw. Turn the hand pulley and fasten the cam#2 screw.



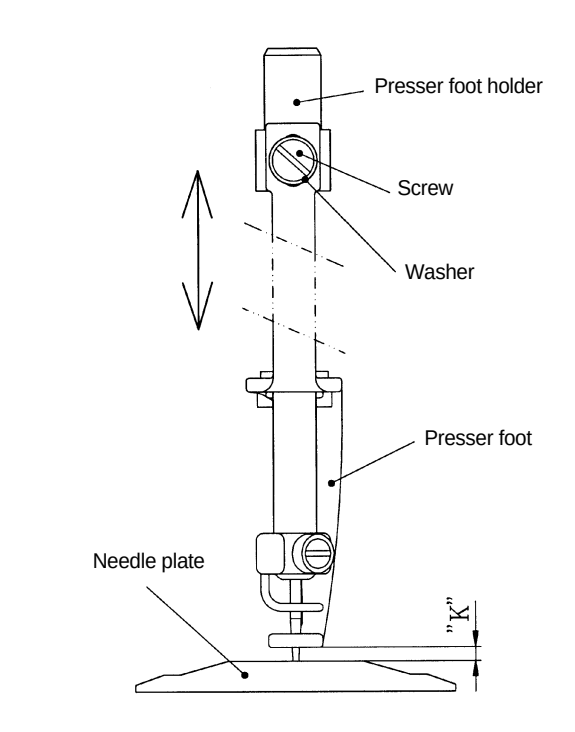
CAUTION

Roller should not be inserted too deep into the cam.

10.3.2) Adjusting the height of the presser foot

Turn the hand pulley and set to the lowest point of the needle bar (180˚). Uncover the head plate and unfasten the presser foot screw. Adjust the space, using the gauge, between the lower part of the presser foot and the upper part of the needle plate to the appropriate height (K). Make the adjustment for each presser foot.

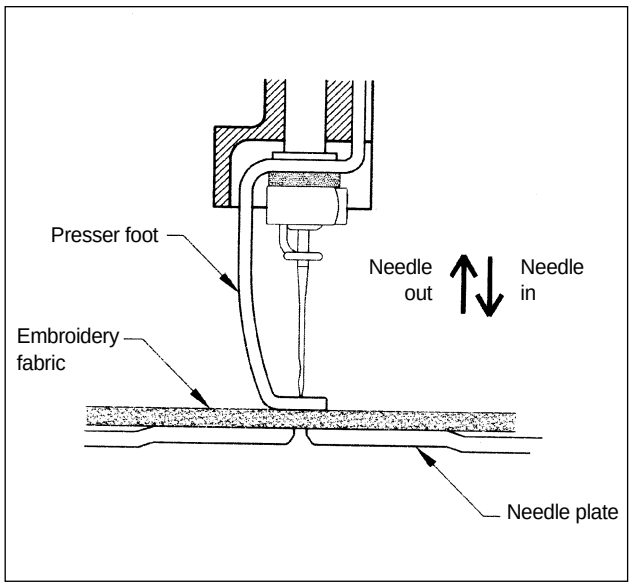
[Standard set-up]
"K" : Needle plate for cap → 1.5mm
Needle plate for flat → 1mm (tubular)



10.4) RELATIONSHIP BETWEEN PRESSER FOOT AND NEEDLE

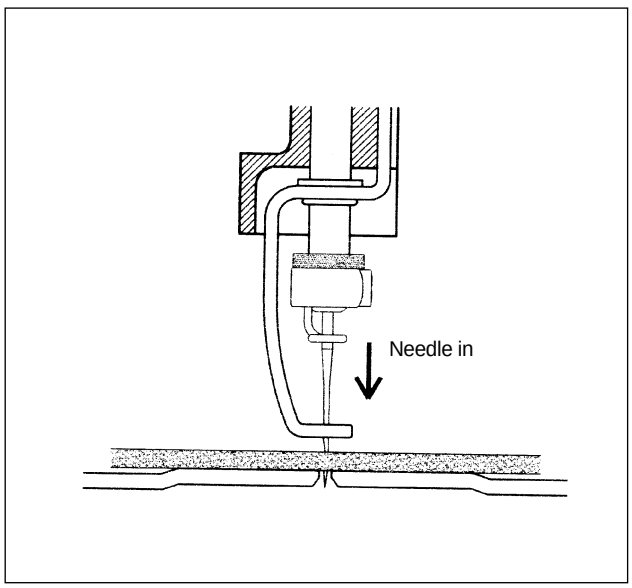
10.4.1) Relationship between presser foot, needle, and embroidery fabric

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.

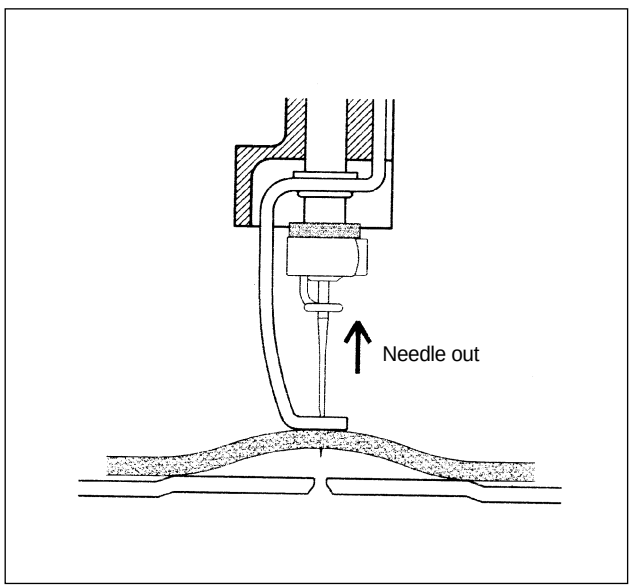


10.4.2) When the presser foot is too high

– Needle in
The picture shows the presser foot fails to press the work material when the needle pierces into the fabric, causing an unstable needlework.



– Needle out
The picture 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.

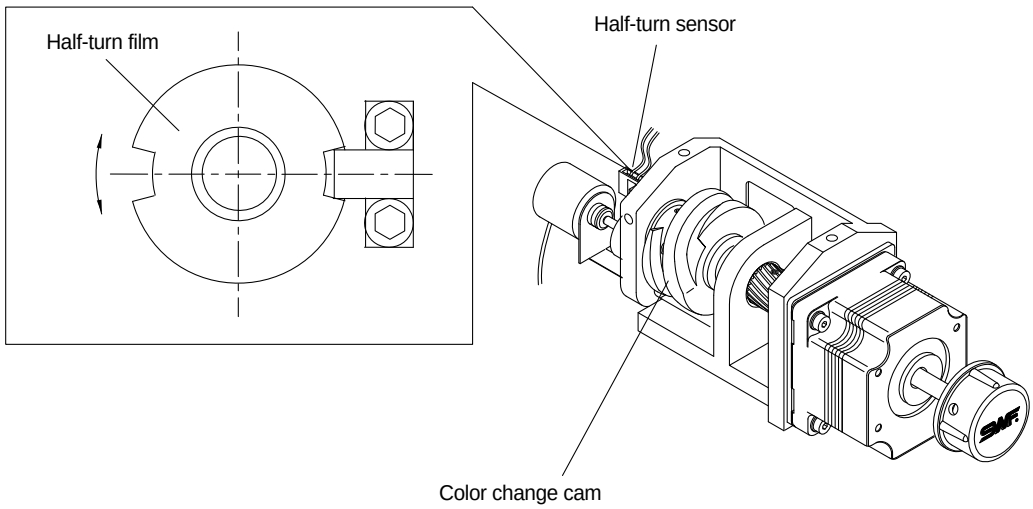


10.5) ADJUSTING HALF-TURN FILM

For automatic color change, if the needle is not at the center of the needle hole on the plate, adjust the half-turn film as below.

– Adjusting the half-turn film

  Adjust the cam position using a manual knob so the roller is on the center of the color change cam on the straight line when the needle aligns with the center of the needle hole on the needle plate. Make an adjustment so the center of the half-turn film aligns with the center of the half-turn sensor.



CAUTION

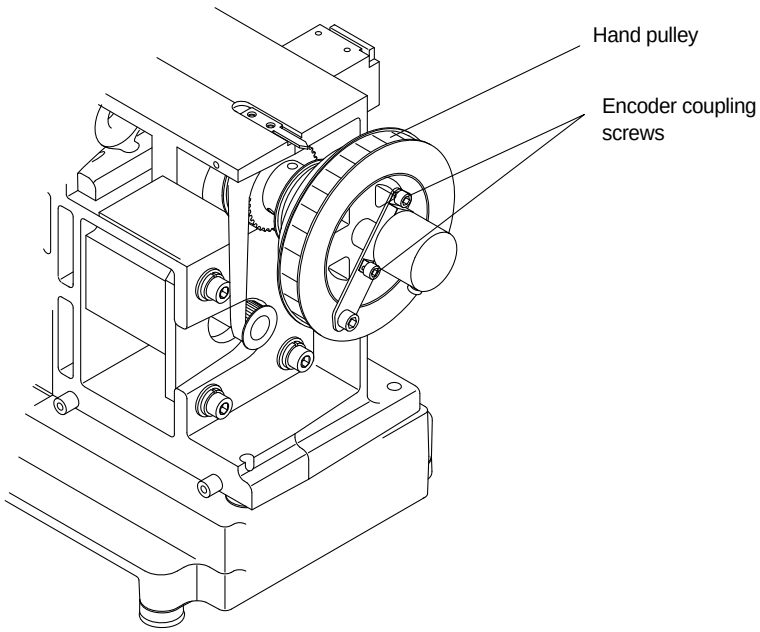
1) Manual color change must be performed at the main shaft angle of 100°. Manual color change at the main shaft angles other than 100° can cause damage on the controller and the take-up unit.

2) If you cannot align the needle to the center of the needle hole by adjusting the half-turn film, call your SWF dealership or a skilled engineer for help.

10.6) ADJUSTING ENCODER

Adjust the encoder as below if the needle bar stops at an incorrect position.

- First, unfasten the two encoder coupling screws (2EA).
- Turn the hand pulley, fix the main shaft angle at around 98˚, and adjust the encoder. Tighten the screws when FIX POS light is turned on.
- If you cannot make the adjustment through the encoder coupling, unfasten the two encoder screws, move the hand pulley, fix the upper shaft angle at around 98˚, and adjust the encoder. When the upper shaft stop position light blinks red, fasten the screws tightly.

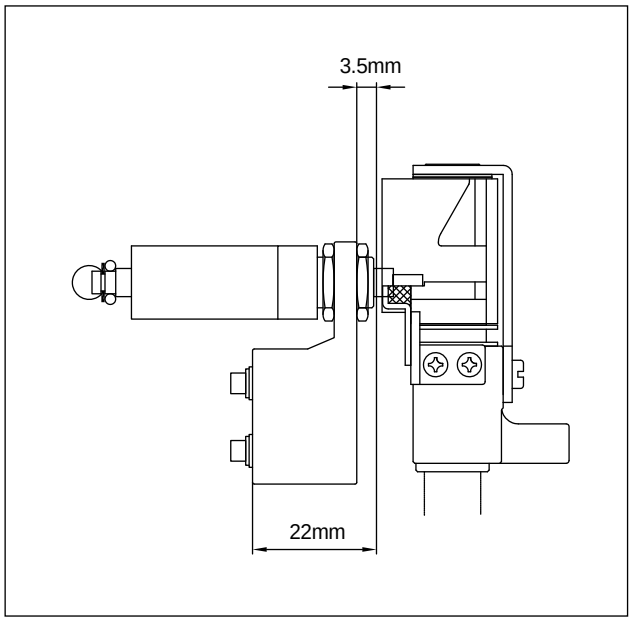


10.7) ADJUSTING JUMP SOLENOID

Solenoid adjustment is required for new or malfunctioning jump solenoids.

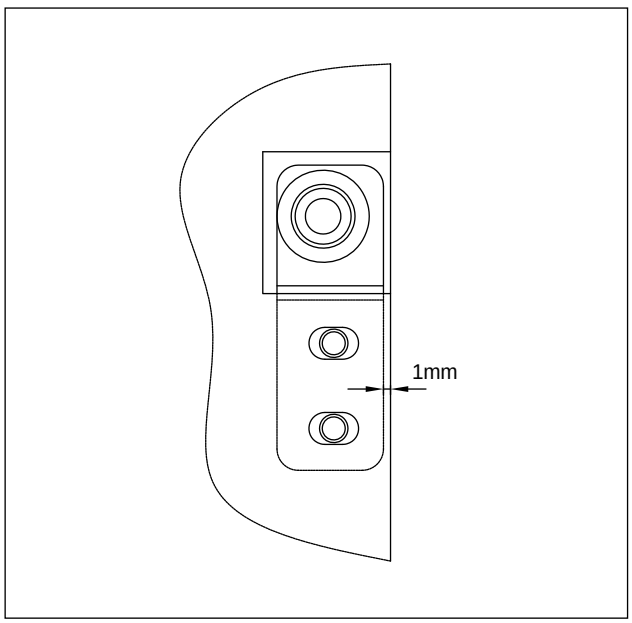
10.7.1) Adjusting the standby position (assembling solenoid and bracket)

- Unscrew solenoid nut using the jump solenoid adjusting spanner and adjust so that the bracket and the solenoid operation surface are 3.5mm away. Fasten the nut.
- If the gap is too big, the needle bar controller can interfere with the solenoid screw and therefore the needle bar can stop. If the gap is too small, the needle bar controller can hold the needle bar even during the jump, causing bad jumps.



10.7.2) Adjusting the assembly location (assembling solenoid-attached bracket to the arm)

- Adjust so that the processed surface of the arm is 1mm from the bracket surface. Fix with the bracket screw.
- If the location is not good, the needle bar controller can touch the needle bar during the jumps, making the needle bar work during the jumps.



10.8) ADJUSTING TENSION OF EACH DRIVE BELT

CAUTION

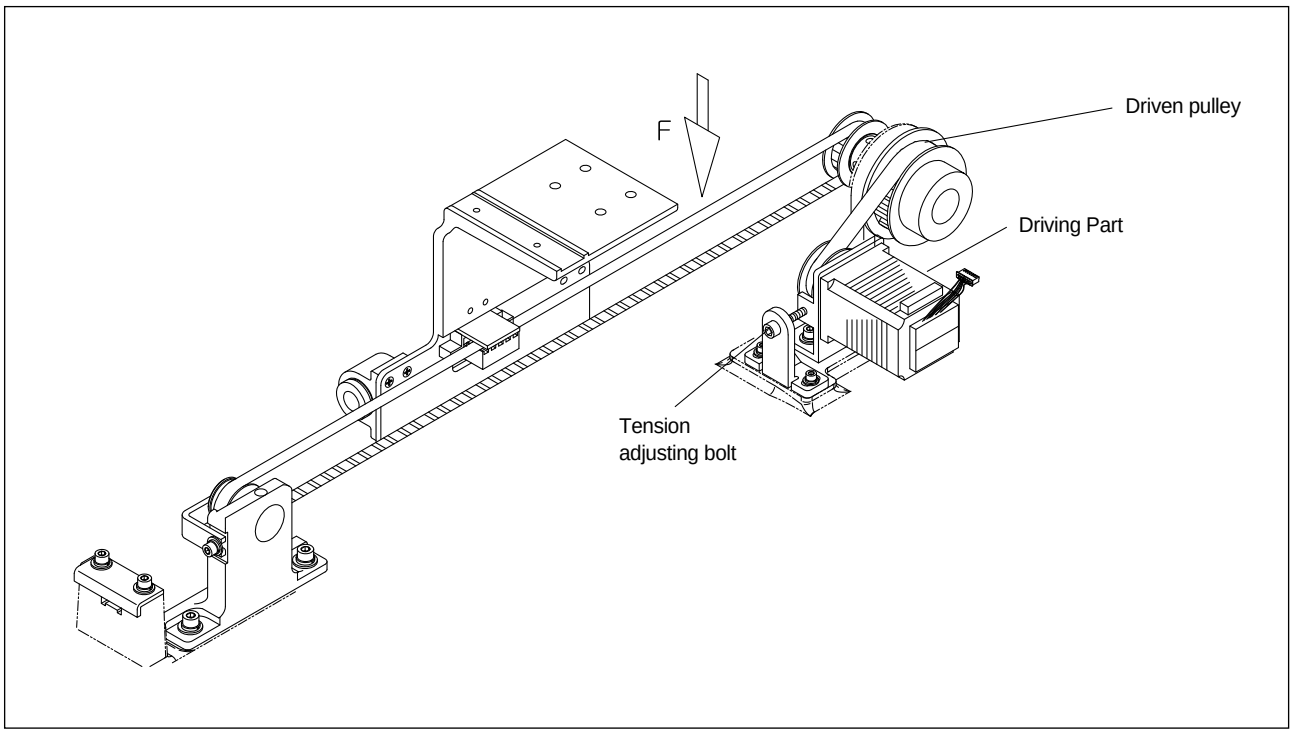
1) Drive belt tension, as it affects the embroidery quality and machine operation, should be adjusted only by trained SWF engineers or skilled experts.
2) Make sure to turn OFF the machine during the adjustment.

10.8.1) Specification of drive belt tension adjusters (sound wave belt tension)

1) Model : U-305 Series Sound Wave Belt Tension Gauge – Standard
2) Manufacturer : UNITTA

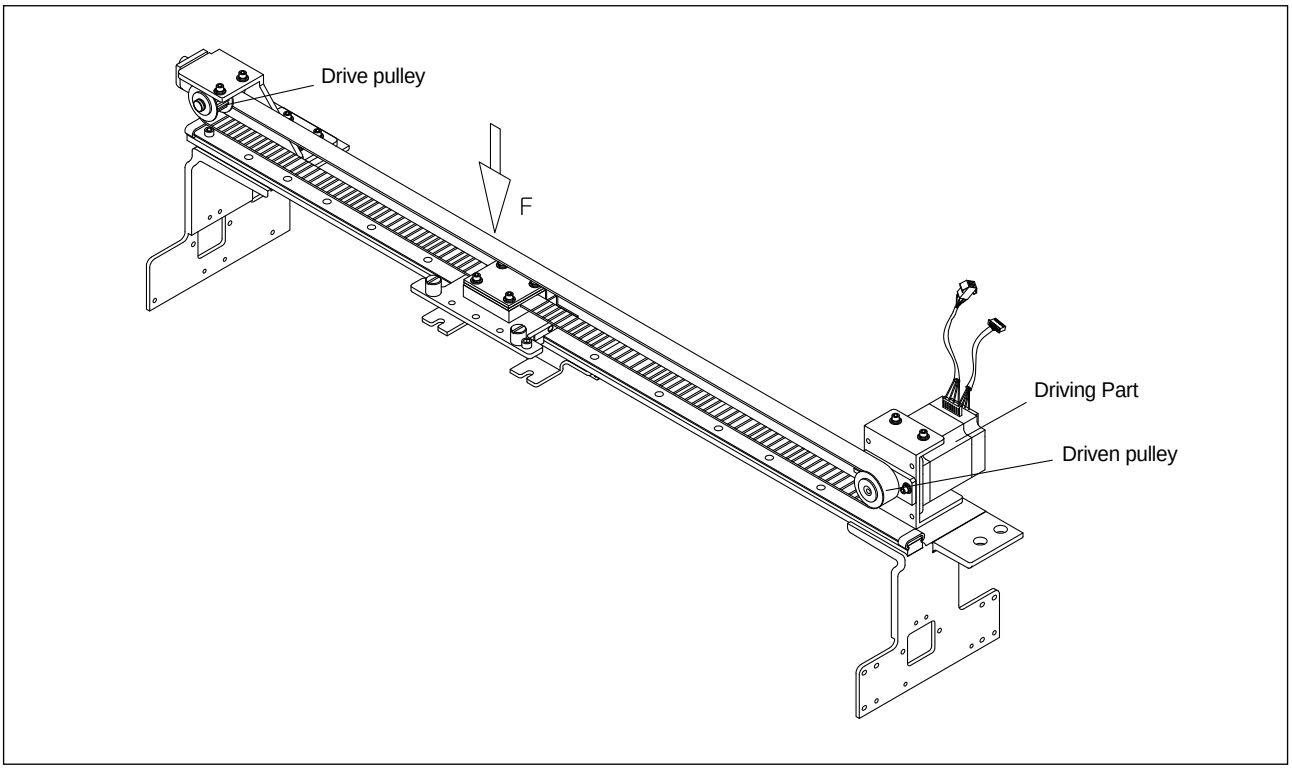
10.8.2) Y-axis timing belt

– Push the X driver to the driven pulley and check the timing belt on the Y-axis. Use the sound wave tension gauge.
– Tension on the Y-axis timing belt should measure 14-15kgf on the sound wave gauge when you pluck the middle of the belt between the end of the X driver and the drive pulley with your finger or with a similar tool.
– Input data for the sound wave tension measurer:
  • Weight : 003.8gf/m
  • Width : 015.0mm/#R
  • Span: 488mm
– To adjust the Y-axis timing belt tension, unfasten the tension base screw and turn the bolt. Turn clockwise to increase and counterclockwise to decrease the tension.



10.8.3) X-axis timing belt

- Push the frame plate fully to the right. Check the timing belt tension on X-axis using the sound wave tension gauge.
- Tension on the X-axis timing belt should measure 14-15kgf on the sound wave gauge when you pluck the middle of the belt with your finger or with a similar tool.
- Input data for the sound wave tension measurer
  - Weight : 003.8gf/m
  - Width : 015.0mm/#R
  - Span : 583mm
- To adjust tension on the X-axis timing belt, unfasten the adjusting shaft nut of tension and adjusting nut. And turn the tension adjusting bolt. Turn the bolt clockwise to increase the tension and counterclockwise to decrease the tension.

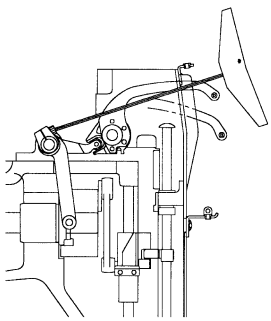


11 TROUBLESHOOTING

11.1) CAUSES AND TROUBLESHOOTING

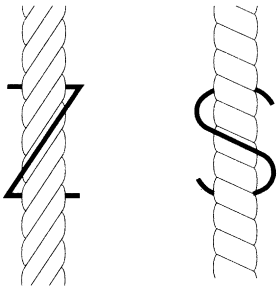
CAUTION / DANGER	
⚠ ⚠	**Inspect/repair the machine by the guideline in machine failures.**

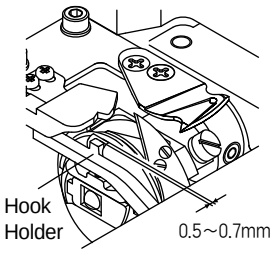
Error Type	Cause	Inspection & Repair	Reference
Operation failure	① Loose belt tension or belt damage	■ Adjust belt tension/ change belt	Check ① main driver belt ② X-Y timing belt
	② Power failure or short-circuit of fuse	■ Change fuse in the power socket	
	③ Failure to detect signals for needle position or for 1 rotation	■ Manually move color change. Check if the signal blinks at the correct needle position in the operation box	
	④ Frame out of X or Y limit	■ Adjust design start point (Move the frame manually so the design comes into the scope)	
Incorrect Stop Position	① Loose tension on main driver belt	■ Change belt	
	② Incorrect position of encoder or bad encoder	■ Adjust position or change encoder	

Error Type	Cause	Inspection & Repair	Reference
Bad Color Change	① Incorrect position of needle stop	■ Refer to the related part	■ Always set the main shaft angle back at 100°, after moving it manually for cleaning, inspection or repair.
	② Failure to sense signals for needle position or 1 rotation	■ Manually move color change. Check if the signal blinks at the correct needle position in the operation box	
	③ Incorrect position of needle bar	■ Set it to the correct position	
	④ Incorrect position of take-up lever	■ Adjust so the take-up lever is aligned with other levers in the stop position (main shaft angle 100°)	■ How to adjust take-up lever: Unscrew the lever and adjust it so it is aligned with others on the guide rail. 

Error Type	Cause	Inspection & Repair	Reference
Poor detection of upper thread	① Failure of thread detecting roller	■ Disassemble the roller and clean the roller and bush bearing.	
	② Poor connection and bad quality of tension adjusting plate	■ Check the plate connection and change the circuit board	
Bad jump	① Bad solenoid and solenoid wiring	■ Check wiring and change solenoid	
	② Bad connection	■ Check connector	
	③ Switch failure on tension adjusting board and bad circuit board	■ Change switch and circuit board	
Bad stitch quality	① Bad tape data	■ Correct tape data	
	② Inadequate tension on X-Y belt	■ Adjust tension	
	③ Foreign substances in X-Y rail	■ Clean	
	④ Failure of X/Y drivers	■ Change X/Y drivers	
	⑤ Heavy load on the frame	■ Reduce speed of main shaft rotation	

Error Type	Cause	Inspection & Repair	Reference
Thread breaks	① Stitch is too small/dense for thread	■ Re-punch design	■ Check design
	② Frequent thread break in the same spot	■ Re-punch after checking design ■ Correct the stitches on operation box	
	③ Inadequate needle size for thread	■ Change needle for the thread type	
	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 appliqué

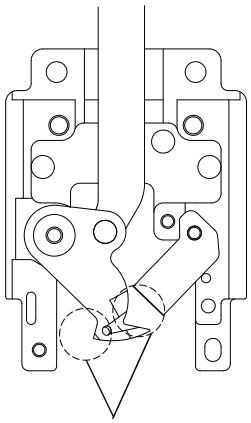
Error Type	Cause	Inspection & Repair	Reference
Thread breaks	⑦ Bad quality thread (weak, uneven thickness, poorly twisted, old)	■ Change thread	**Selecting thread** ■ soft, even thickness tight, left-twisted
	⑧ Right-twisted thread	■ Change to left-twisted thread	 ■ Z-direction : left ■ S-direction : right ※ left-twist prevents unraveling in the counterclockwise rotation of the hook
	⑨ Excessive tension on upper/lower thread	■ Adjust tension	
	⑩ Tension imbalance between upper and lower threads	■ Adjust tension	
	⑪ Excessive tension & stroke on the take-up spring	■ Adjust tension and stroke	

Error Type	Cause	Inspection & Repair	Reference
Thread breaks	⑫ Dent on thread path on hook and bobbin case	■ Remove dent or change the case	■ Check rotary hook
	⑬ Narrow space between hook holder and groove for hook holder	■ 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 needle-hook timing	
	⑯ Incorrect lower dead stop	■ Adjust the lower dead stop	
	⑰ Dent on thread path	■ Check: ① Thread path in presser foot ② Around needle hole on needle plate ③ Thread guide on the head ④ Thread path in tension adjuster ⑤ Thread path in upper thread holding device	
	⑱ Fabric moves on the frame/plate	■ Fix the material firmly	
	⑲ Inadequate height of presser foot (does not press the work material)	■ Adjust height of the presser foot	

Error Type	Cause	Inspection & Repair	Reference
Skipped Stitches	① Bent needle	■ Change needle	
	② Inadequate needle size for thread	■ Change needle to appropriate size	
	③ Incorrect installation of needle	■ Adjust installation	
	④ Poor timing of needle and hook	■ Adjust needle-hook timing	
	⑤ Large gap between needle groove and hook point	■ Adjust the gap	
	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 For lower 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 of the spring	
	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 lower thread 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	■ Change needle	
	② Bad quality needle		
	③ Tip of the needle is worn or bent		
	④ Inadequate needle size		
	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 needle plate	■ Check if needle plate is unscrewed ■ 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 large. SWF specification for needle & thread are: Cotton : #50~70 Rayon : #75~120 Needle : DB × K5 #9~#14
Trimming failure	① Poor connection, bad quality of trimming Motor or solenoid	■ Check and change Motor or solenoid and Motor or solenoid connection	
	② Bad connection	■ Check connector	
	③ driver damaged	■ Driver-related board changes	
Picker failure	① Poor connection, bad quality of trimming Motor or solenoid	■ Check and change Motor or solenoid and Motor or solenoid connection	

Error Type	Cause	Inspection & Repair	Reference
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	■ Checking the Picker Solenoid and Terminal Connection	
Thread break before trimming	① Upper thread is too short • check main and sub tension adjuster	■ Adjust upper thread tension	 Check for dent
	• dent or damage of movable blade	■ remove dent using whetstone or sandpaper or change movable blade	
	② Lower thread is too short • doesn't unwind smoothly	■ adjust or change bobbin case spring	■ 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 in the next embroidery	■ Check upper thread tension	
	② Upper thread is trimmed too long and thread tail remains on the embroidery	■ If upper thread is held due to narrow velcro space in upper thread holder, clean the velcro	
Thread is not cut when trimming	① Failure of movable and fixed blades	■ Check screws of the related parts	■ Check fuse spec.
	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	
	⑤ Poor picker operation	■ Adjust picker bracket ■ Replace the picker solenoid	■ Adjust entry amount

11.2) ERROR DISPLAY AND TROUBLESHOOTING

11.2.1) Main shaft motor and others

No.	Error	Description	Troubleshooting
100	Main shaft stop	Main shaft doesn't stop at 100°	Adjust the main shaft at 100° using lever.
101	Main shaft motor drive	Error in main shaft motor driver	Turn the main switch off and on again.
102	Main shaft motor overload	Thread tangles in the hook Error in needle bar controller Thread tangle in trimming	Check hooks of all heads. Turn the switch off and on again.
103	Trimming return	Trimming sensor doesn't return when trimming	Check for errors in the trimming system
104	START switch	START is pressed when turning power on	Check START – connector connection
105	STOP switch	STOP is pressed when turning power on	Check STOP – connector connection
107	Valve	Valve is opened	
108	Air pressure	Air pressure is below standard (Sequin)	
109	AC line	Power supply error or power measurement circuit error	Check power or replace circuit

11.2.2) X, Y-axis motors

No.	Error	Description	Troubleshooting
200	(+X) frame limit	Frame reaches +X limit	Move the frame −X
201	(−X) frame limit	Frame reaches −X limit	Move the frame +X
202	(+Y) frame limit	Frame reaches +Y limit	Move the frame −Y
203	(−Y) frame limit	Frame reaches −Y limit	Move the frame +Y
204	X-axis driver	Error in X-axis driver	Turn the main switch off and on again
205	Y-axis driver	Error in Y-axis driver	Turn the main switch off and on again
206	Wiper return	Wiper motor doesn't return	Repair the wiper mechanism
207	Trimmer return	Trimmer solenoid doesn't return	Repair the trimmer mechanism

11.2.3) Color change

No.	Error	Description	Troubleshooting
300	Needle bar position	Needle bar doesn't come to correct position when changed	Move the needle bar manually. Check the load. Position it at the correct location.

11.2.4) Encoder

No.	Error	Description	Troubleshooting
400	Main shaft encoder A	Error in signal in main shaft encoder A	Check encoder connection. Turn the main switch off and on again.
401	Main shaft encoder Z	Error in signal in main shaft encoder Z	Check encoder connection. Turn the main switch off and on again

11.2.5) Repetition work

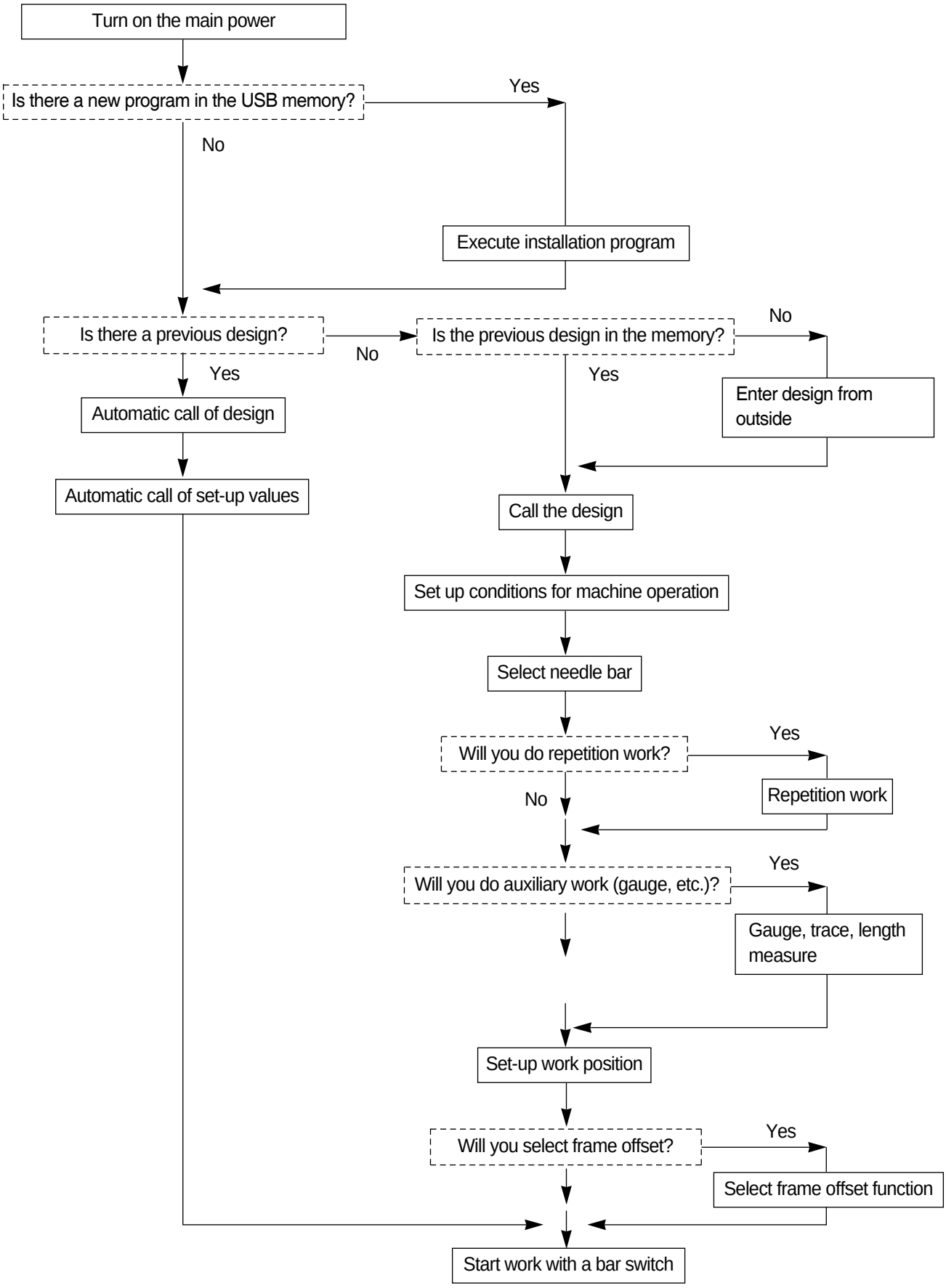
No.	Error	Description	Troubleshooting
501	Repetition set-up	Off the repetition limit (X set-up) × (Y set-up) 〉99	Change the set-up to: (X set-up) × (Y set-up) 〈 99

11.2.6) Memory

No.	Error	Description	Troubleshooting
700	No embroidery data in the memory	No embroidery data in the memory	Store data in memory via disk
701	Insufficient memory	Unable to copy data to memory due to insufficient memory	Delete unnecessary data
702	Memory full	memory rooms are full	Delete unnecessary data
703	Design memory system	Error in copy/delete between memories	RESET or turn the main power off and on again.

11.2.9) Communication

No.	Error	Description	Troubleshooting
900	Comm. Error 0	CAN communication error	Turn the power off and on again
901	Comm. Error 1	CAN communication error	Turn the power off and on again
902	Comm. Error 2	CAN communication error	Turn the power off and on again
903	Comm. Error 3	CAN communication error	Turn the power off and on again
904	Comm. Error 4	CAN communication error	Turn the power off and on again
905	Comm. Error 5	CAN communication error	Turn the power off and on again
906	Comm. Error 6	CAN communication error	Turn the power off and on again
907	Comm. Error 7	CAN communication error	Turn the power off and on again
908	Comm. Error 8	CAN communication error	Turn the power off and on again
909	Comm. Error 9	CAN communication error	Turn the power off and on again
910	Comm. Error 10	CAN communication error	Turn the power off and on again
911	Comm. Error 11	CAN communication error	Turn the power off and on again
912	Comm. Error 12	CAN communication error	Turn the power off and on again
913	Comm. Error 13	CAN communication error	Turn the power off and on again
914	Comm. Error 14	CAN communication error	Turn the power off and on again
915	Comm. Error 15	CAN communication error	Turn the power off and on again


Turn on the main power
Is there a new program in the USB memory?
Yes
No
Execute installation program
Is there a previous design?
No
Is the previous design in the memory?
No
Yes
Yes
Automatic call of design
Enter design from outside
Automatic call of set-up values
Call the design
Set up conditions for machine operation
Select needle bar
Will you do repetition work?
Yes
No
Repetition work
Will you do auxiliary work (gauge, etc.)?
Yes
Gauge, trace, length measure
Set-up work position
Will you select frame offset?
Yes
Select frame offset function
Start work with a bar switch

13 BLOCK DIAGRAM

