Procedure of Reading This Manual

Explanation of models

This manual explains two models:
- BES-960BC (9 needles)
- BES-1260BC (12 needles)

Explanation for individual model is provided by identifying the model name. Check the model before using the machine. The software display is BES-1260BC.

Configuration of this manual

This manual consists of the following chapters:

Chapter 1 An Introduction of Embroidery Machine

Provides information on the specifications of the embroidery machine, software installation environment, and basic software operations.

Chapter 2 Preparation of Embroidery Machine

Describes machine installation and preparation to be conducted before starting embroidering operation.

Chapter 3 Embroidering Procedures

Provides explanations on the operation panel and briefly reviews the flow of embroidering processes.

Chapter 4 Selecting and Transferring Embroidery Data

Explains how to use the Embroidery Data Explorer.

Chapter 5 Editing Embroidery Data

Explains how to use the Embroidery Data Editor.

Chapter 6 Embroidering

Explains how to use the Machine Controller.

Chapter 7 Operation of Machine

Provides information on machine operation during embroidering.

Chapter 8 Creating Production Report

Explains how to use the production report program.

Chapter 9 Maintenance

Describes appropriate maintenance of the machine.

Chapter 10 Standard Adjustment

Explains how to adjust the needles.

Chapter 11 List of Error Codes

Provides information on error codes and action to be taken.

Chapter 12 Troubleshooting

Provides troubleshooting for the machine.

Connection and Installation of Optional Equipment

Describes connections between the machine/computer and optional equipment available.

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Chapter 1
An Introduction of Embroidery Machine

1. Specifications

Embroidery machine used	9 needle embroidery machine head (six-head type)	12 needle embroidery machine head (six-head type)
Application	Pattern embroidery	
Sewing speed	Maximum 1000 spm	
Sewing area	450 (V) x 400 (H) mm (border frame area) 430 (V) x 300 (H) mm (tubular square hoop area) 85 (V) x 360 (H) mm (cap frame area) 450 (V) x 600 (H) mm (with bed retracted or with head control)	
Feed system	By timing belt and stepping motor drive	
Stitch length	0.1 ~ 12.7 mm (minimum pitch: 0.1 mm)	
Storage medium	3.5 2DD floppy disk (Tajima format) Paper tape with 25.4 mm width/8 holes (Tajima, Barudan, Zanks) 3.5 2HD floppy disk (the equivalent to Tajima format) **3.5 2DD floppy disk (Barudan FDR/FMC format)**	
Thread trimming	Automatic thread trimmer	
Needle thread breakage	Needle thread breakage detector	
Power supply	Single phase 200 V, 50/60 Hz, 1.7kVA	
Weight	720 kg	720 kg
Dimensions	(Before assembly) 3650 (W) x 810 (L) x 1650 (H) mm (After setup) 3650 (W) x 1400 (L) x 1650 (H) mm (Distance between machine heads) 400 mm	
Options	Paper tape reader, Embroidery hoops in different sizes, Bobbin winder, Parts for boring	

2. Software

2-1 Necessary Systems

The following systems are needed for installing the software.

- Personal computer with a CPU of Intel Pentium 133 MHz or above (150 MHz or above is recommended.)
- Memory of 16 MB or above (32 MB or above is recommended.)
- Free space of 100 MB or above in the hard disk
- 3.5 floppy disk drive
- CD-ROM drive
- Video card of 1024 x 768 resolution in 256 colors (1280 x 1024 in 65000 colors is recommended.)
- Windows 95

2-2 Configuration of Software

This software is mainly composed of the following four programs. The software is provided on CD-R.

(1) Embroidery Machine Controller
(2) Embroidery Data Explorer
(3) Embroidery Data Editor
(4) Production Report

Program Functions

(1) Machine Controller
This program controls embroidering operation of the machine.
A embroidering status can be displayed on the screen in real time, and data for operating the machine can be set.

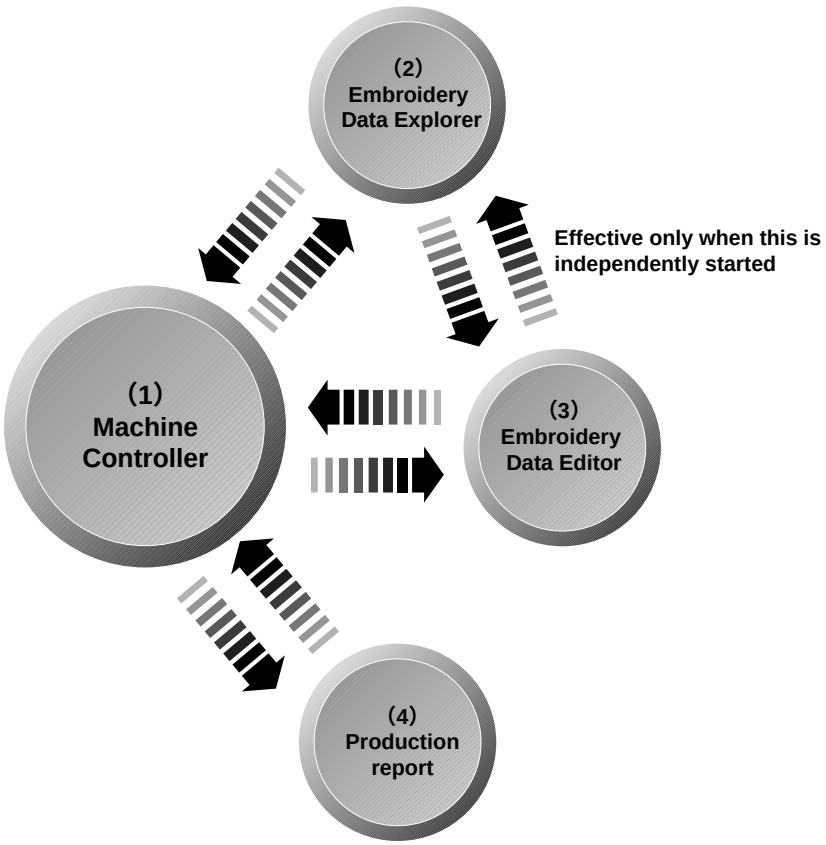
(2) Embroidery Data Explorer
This program handles files of embroidery data on patterns.
Transmission of embroidery data to the machine, as well as copy, move and retrieval of a file are available by means of this program. Embroidery data can be converted from the paper tape or floppy disk.

(3) Embroidery Data Editor
This program allows editing of data on embroidering operation including scaling, rotation, color change, etc.

(4) Production Report
This program is for collecting data on actual embroidering operation and calculating output, etc.

Relationship among Programs

When the software is started, the program (1) for actuating the machine starts first. Next, embroidery data is called by the program (2). Use the program (3), when required, for editing and embroidering. The embroidery data is totaled by the program (4).
The programs (2), (3), and (4) can be started from the menu of the program (1). Each program can also be started independently.



2-3 Notes on use

- Do not start other application software while the machine controller is used.
- Do not set the screen saver.
  To cancel setting, select the "Screen saver" on the "Control panel" screen and set "Not used".
- Set the computer not to use the system agent included in the Windows 95 PLUS.

2-4 Help

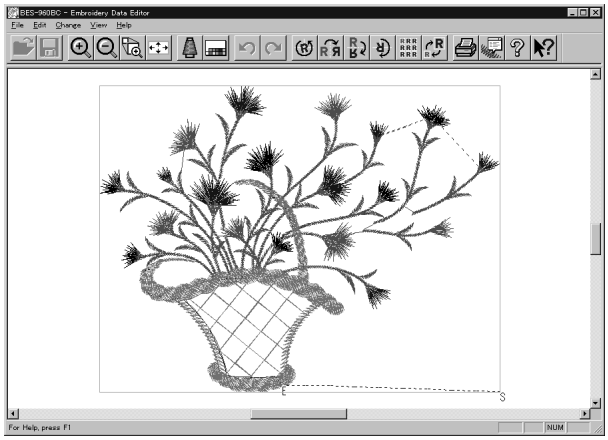
The software is equipped with an on-line help function as an accessory.
Click , then the icon of the desired item. A message is displayed to explain the meaning and usage of the item. Pressing the [F1] key brings up the help screen of the application for your reference.

2-5 Basic Operation of Software

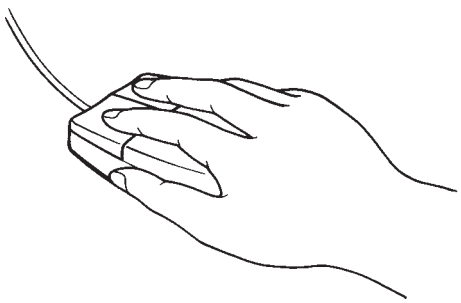
This section explains the basics of using the software. It covers only the operating procedures that are commonly used for the software. If there are any special operating procedures inherent to a program, they are explained in each section.

How to Use the Mouse

When selecting an icon or a menu displayed on the screen, move the white arrow pointer on the screen to the required position, then press the button on the mouse.



Place the mouse on a flat, smooth surface and move it by sliding on it. The white arrow pointer moves along the mouse motion.

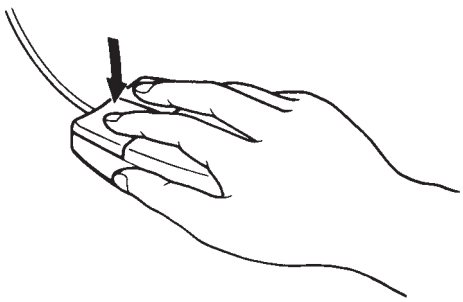


The mouse has two buttons. The left one is used in general. There are three ways of operating the mouse button as described below:

■ Click

Press the left button of the mouse once.

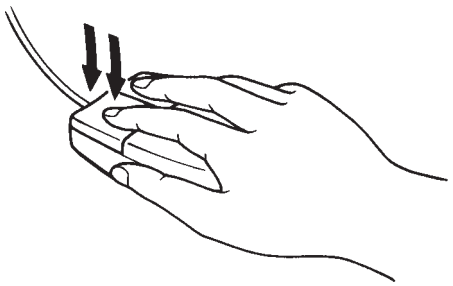
"Click [xx]" means moving the white arrow pointer to "xx" and pressing the left button once.



■ Double-click

Press the left mouse button twice continuously. Do not leave a long pause in between.

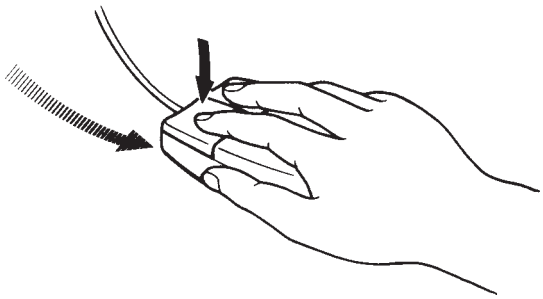
"Double-click [xx]" means moving the white arrow pointer to "xx" and pressing the left button twice continuously.



■ Drag

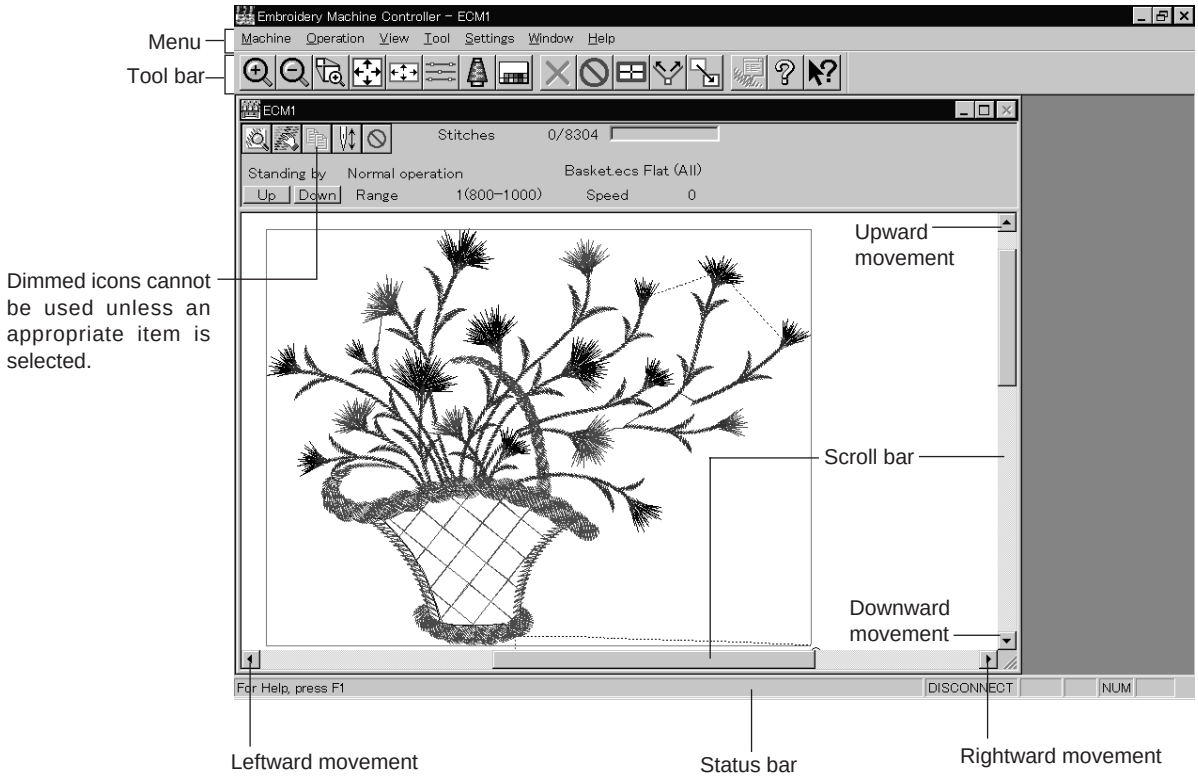
Move the mouse while holding down the left button.

Dragging is used for defining an area.



Names of Screen Components

Names of major components on the screen of the machine controller are described below:



■ Menu

Processing of software is carried out by giving relative commands.
Commands are divided in groups and stored in each menu. The menu displayed on the screen changes depending on the program which is currently active.

■ Tool bar

A command is executed by clicking a relative icon (illustrated button) on the screen. If it is hard to recognize icons from illustrations, move the white arrow pointer to the icon. The name of the icon is displayed.

■ Scroll bar, scroll box, and scroll arrow

Some patterns may not be displayed entirely on the screen. Use the scroll bar to see hidden parts of the pattern into view.
When displaying the right part, for example, click the scroll arrow at the right end. The box in the scroll bar moves to the right. By dragging the scroll box to the right, the screen can scroll quickly.
The vertical scroll bar can be used in the same way.

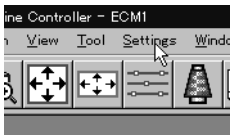
■ Status bar

This bar is for displaying a brief description of the selected command.

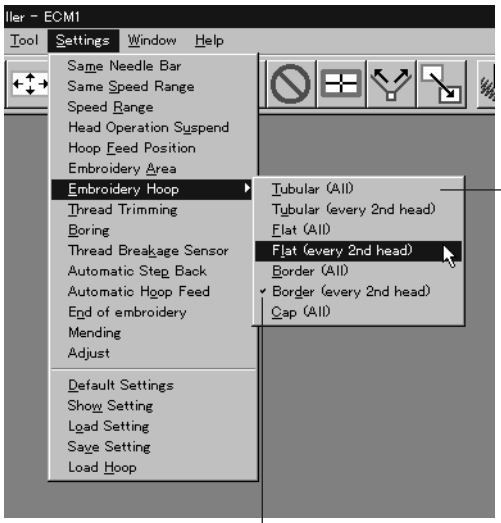
Selection of Menu

Processing of software is carried out by giving a command. A command can be given by the mouse as described below:

1. Move the arrow pointer to a menu name and click there.



2. A list of commands is displayed. Click the required command.



Dimmed commands cannot be used unless an appropriate item is selected.

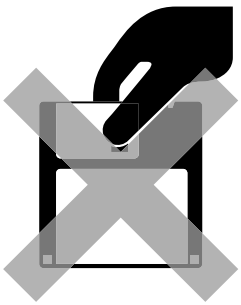
Commands with a s mark have sub menus.

The check mark (√) indicates that the command is selected.

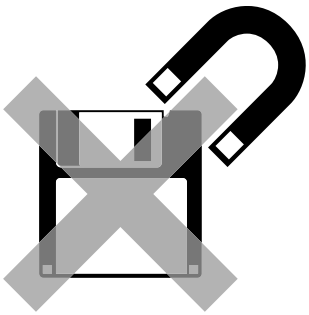
When the arrow pointer is moved to another menu while a list of commands is displayed, those of the latter menu are displayed.

2-6. Handling of floppy disk

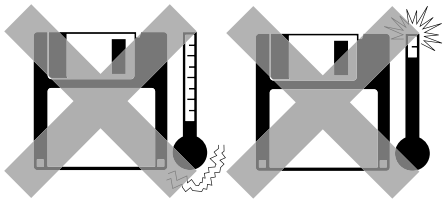
Do not force open the shutter for direct contact with the magnetic area.



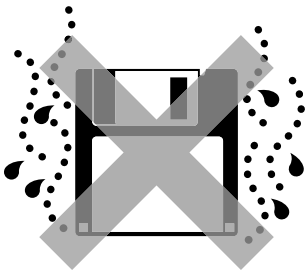
Do not bring disks near magnetic matters such as magnetic screwdriver or the back side of the programmer.



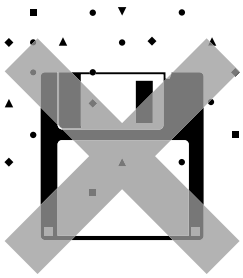
Do not store floppy disks in an extremely high or low ambient temperature.



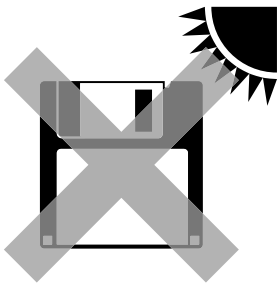
Do not use floppy disks under high humidity.



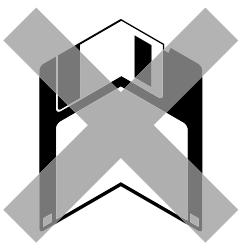
Do not use or store floppy disks in a dusty place.



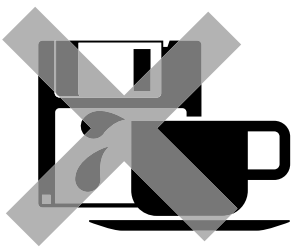
Do not store floppy disks under direct sunlight.



Do not bend the disk. Do not put things on the disk.



Avoid contact with solvent or drink.

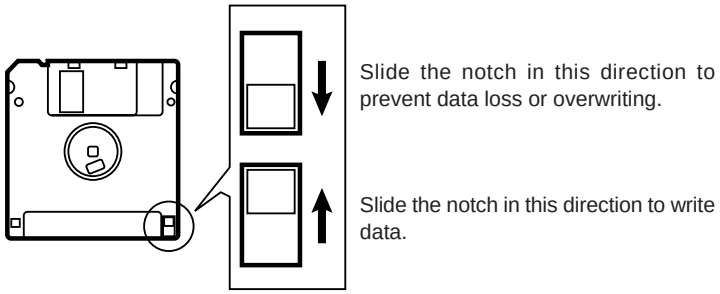


Do not remove the disk out of the drive during the access lamp is lit.

Protecting data in floppy disks

Write-protection is available for a floppy disk to prevent undesired data deletion. A write-protected disk is read-only. It is recommended to provide write-protection for disks which contain important data.

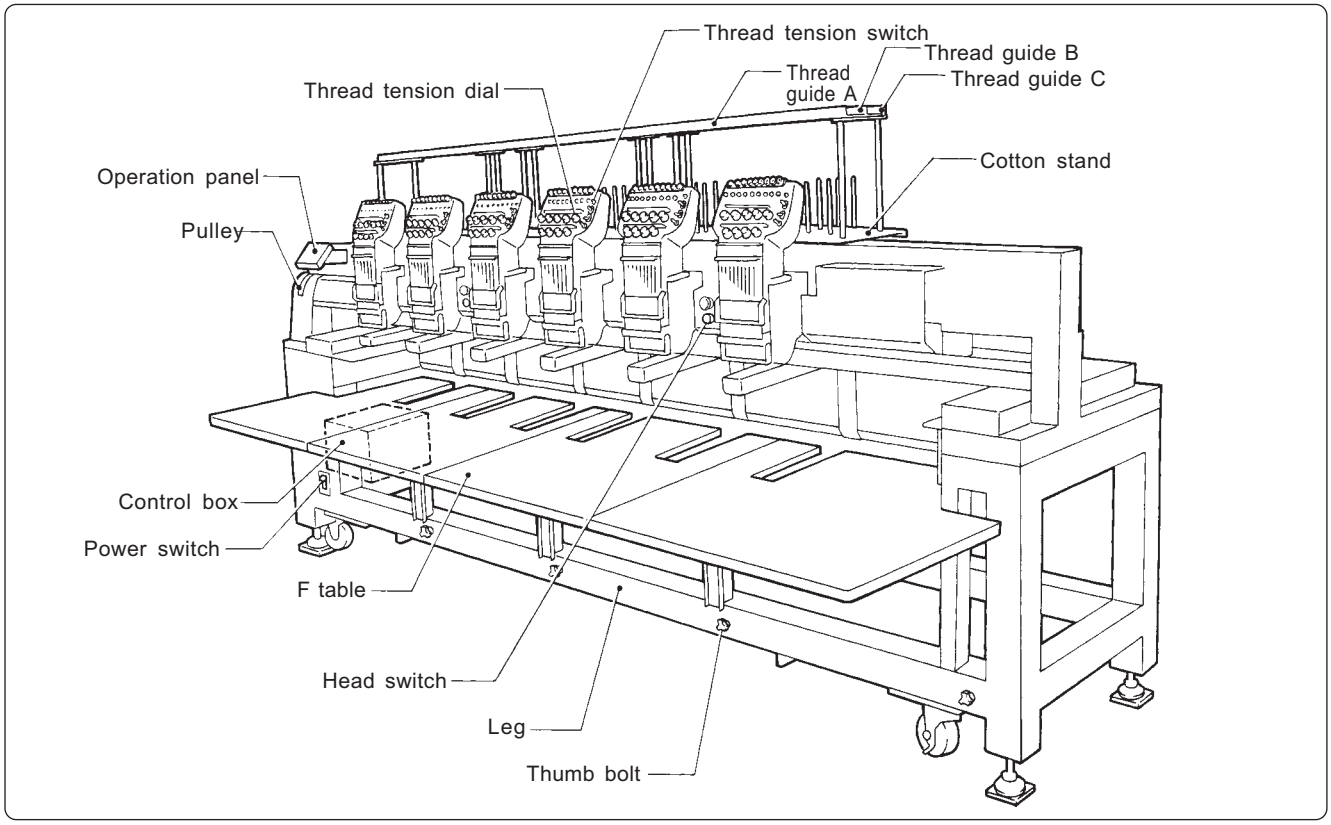
To do so, slide the write-protect notch to open the slot as shown below.



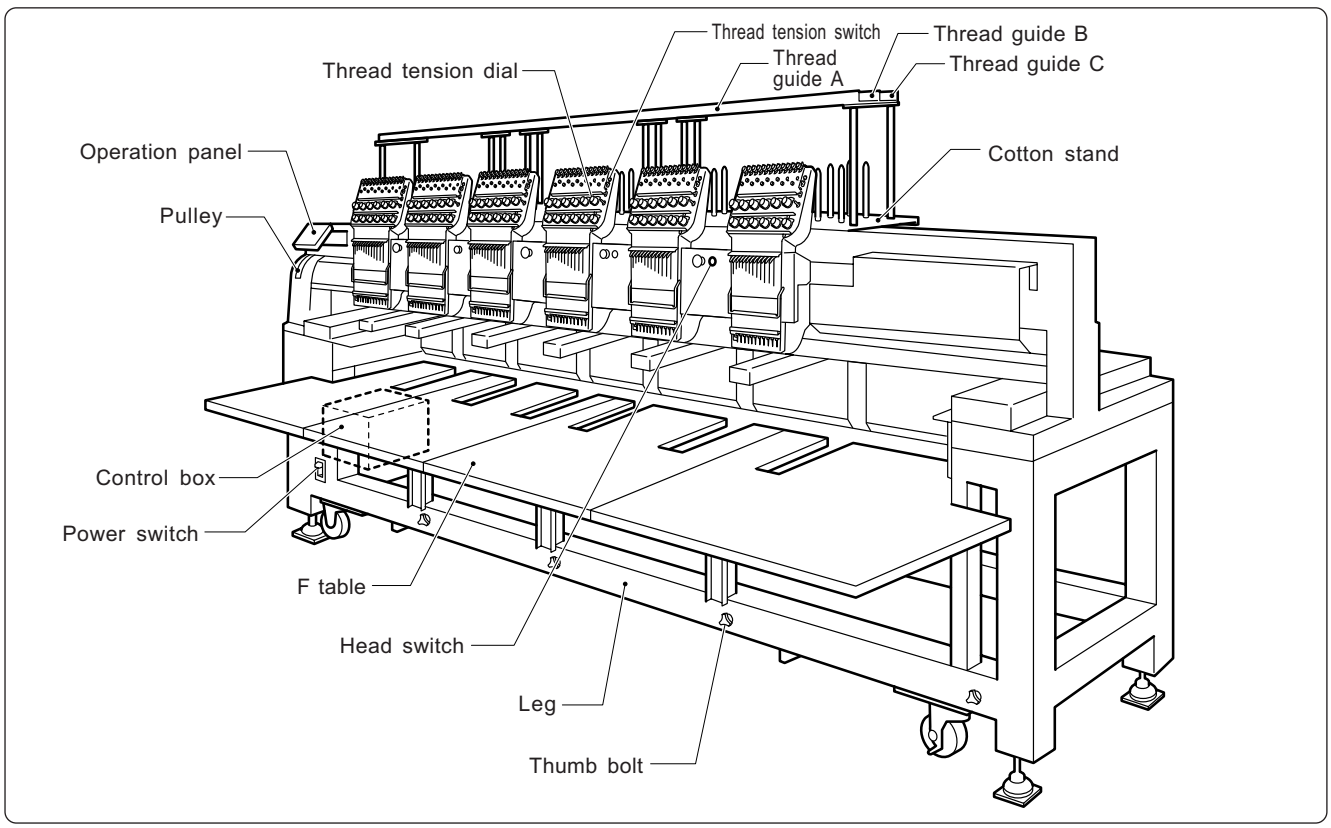
Chapter 2
Preparation of Embroidery Machine

1. Names of Machine Components

■ BES-960BC



■ BES-1260BC



The machine heads are numbered 1 to 6 from the right front.

■ Accessories

	Standard Accessories	Optional Accessories
Embroidery hoop	• Tubular square hoop 30 x 43 (6) • Tubular round arm set R (6) • Tubular round arm set L (6)	• Holder base 30 x 43 (6) Other embroidery hoops in different sizes • Sash frame assembly * Other Tajima embroidery hoops that can be used with BAS-412A and 416A • Cap frame (6) Cap frame drive assembly (6) Base frame set (12) Set frame base set (1)
Others	F table assembly	• Paper tape reader • Bobbin winder • Parts for boring

2. Installation

⚠ DANGER

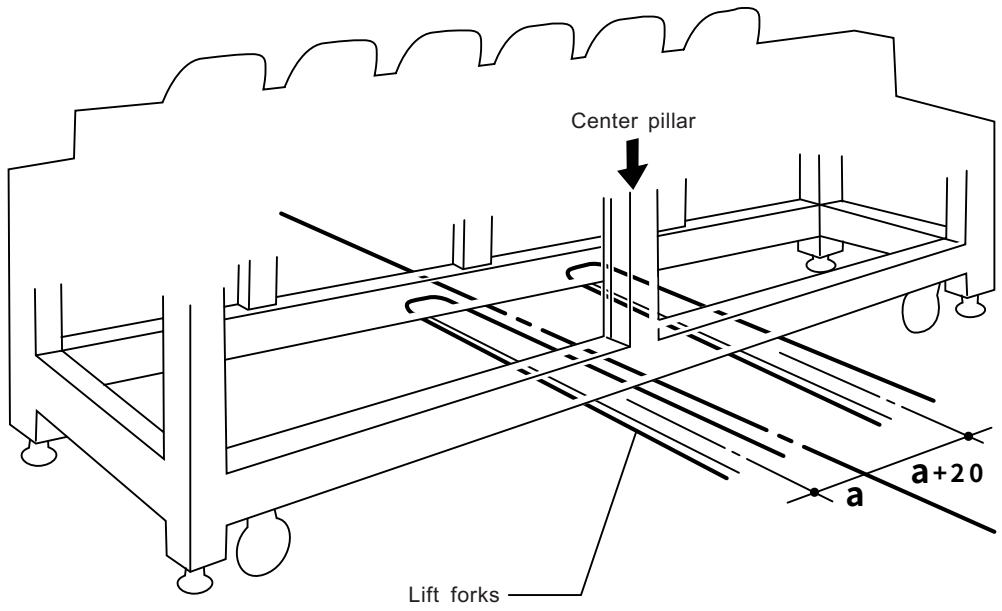
- Embroidery machines should be installed only by trained engineers.
- Electric wiring should be laid by your distributor or electric experts.
- A machine weighs more than 720 kg. Installation should be carried out by 4 or more workers.
- Do not connect the power source until installation is completed. Doing so may start the machine unintentionally through an accidental activation of the START switch, resulting in bodily injuries.
- Install a machine in a place away from a high-frequency welding machine or other machines that may generate a strong electric noise. Failure to do so may cause the embroidery machine to malfunction.
- Establish grounding as designated. Improper grounding may result in an electric shock.

* After installation is completed, get the power supply from a dedicated outlet.
* When connecting multiple machines, exercise care not to exceed the capacity of the outlet.

2-1 Transportation of Machine

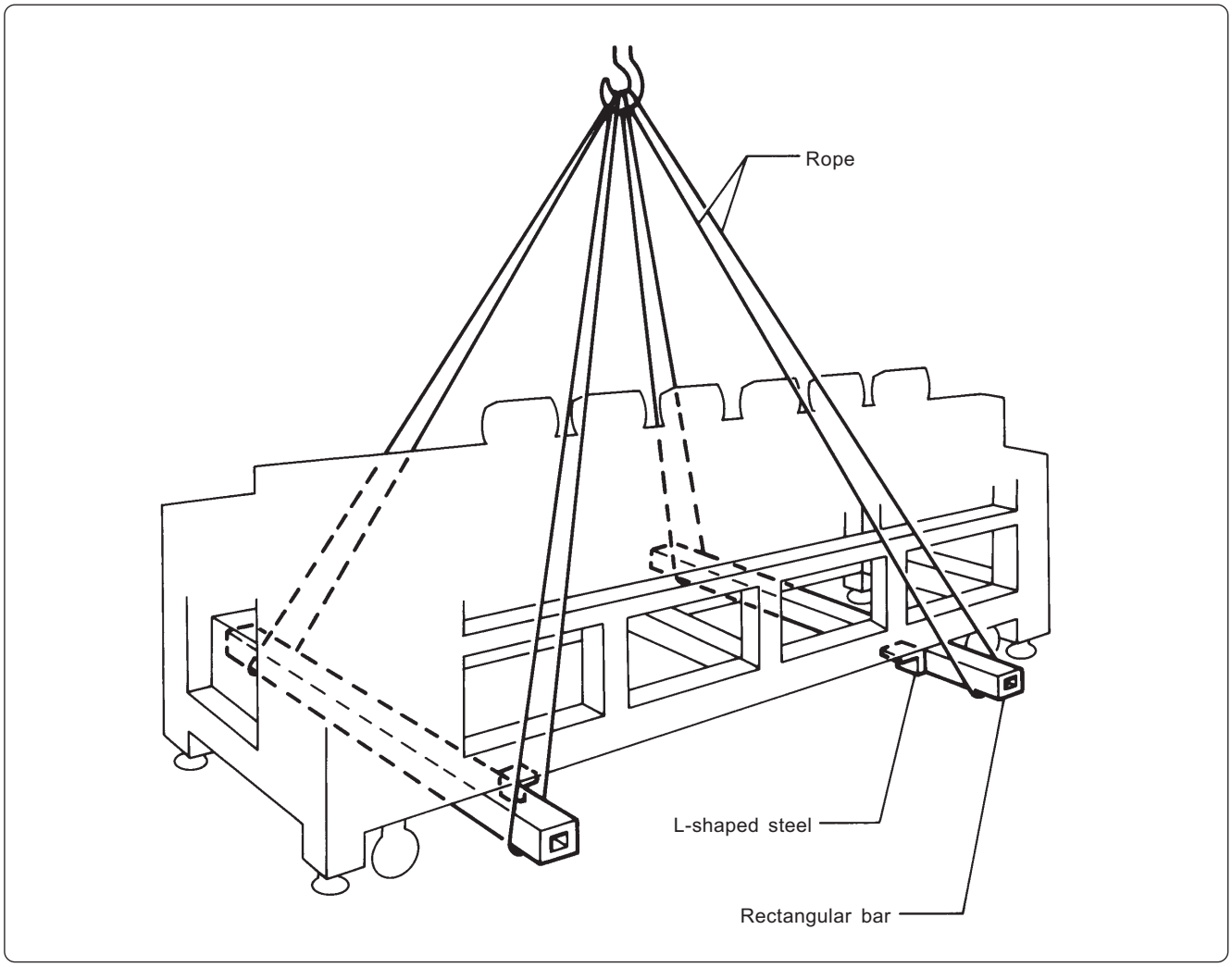
When relocating the machine, push the steel frame.
Note) Never push the cover or carriage.

■ When using a fork lift



Open the forks of the lift approximately 10 cm to the right from the even position to the center pillar viewed from the rear of the machine, and pass them under the legs to lift the machine.

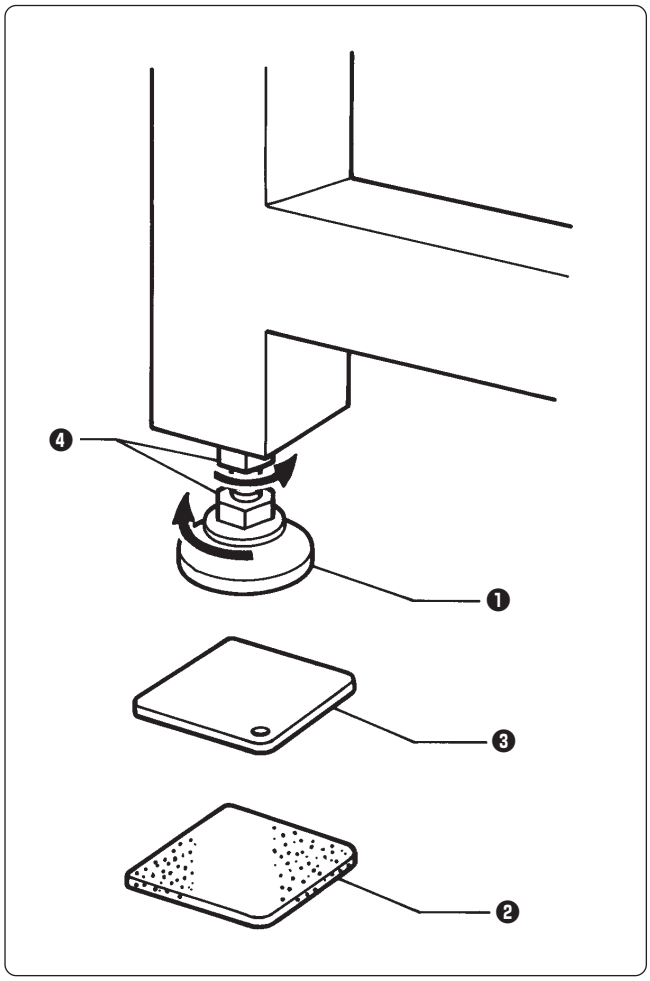
■ When using a crane



Place two rectangular bars on the four L-shaped steels on the bottom of the machine steel frame. Loop four ropes around the bars and lift the machine.

Note) When lifting the machine, make sure that the ropes do not contact the machine table or the tension plate.

2-2 Installation of Machine



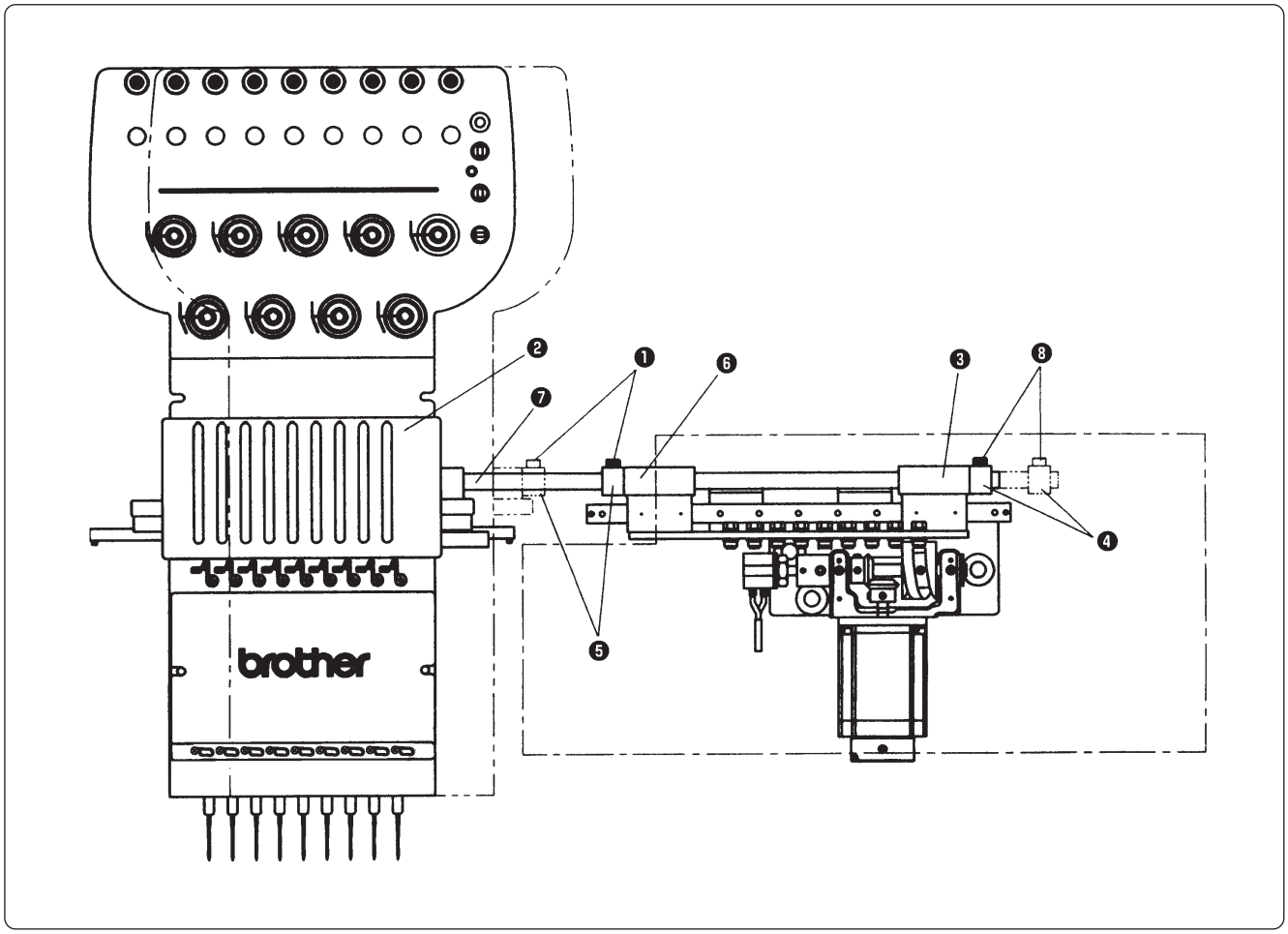
1. Place the attached cushion sheets ❷ and leveling plates ❸ under the four level adjusters ❶. The leveling plates ❸ should be placed above the cushion sheets respectively.

2. Secure the four level adjusters ❶ on the ground using the nuts ❹ so that the machine will be stable.

   Note) If the floor is not strong enough, the embroidery machine may be rocked during operation. In such a case, it is recommended that a secure base of concrete be placed below the embroidery machine.

2-3 Preparation of needle bar case

■ BES-960BC

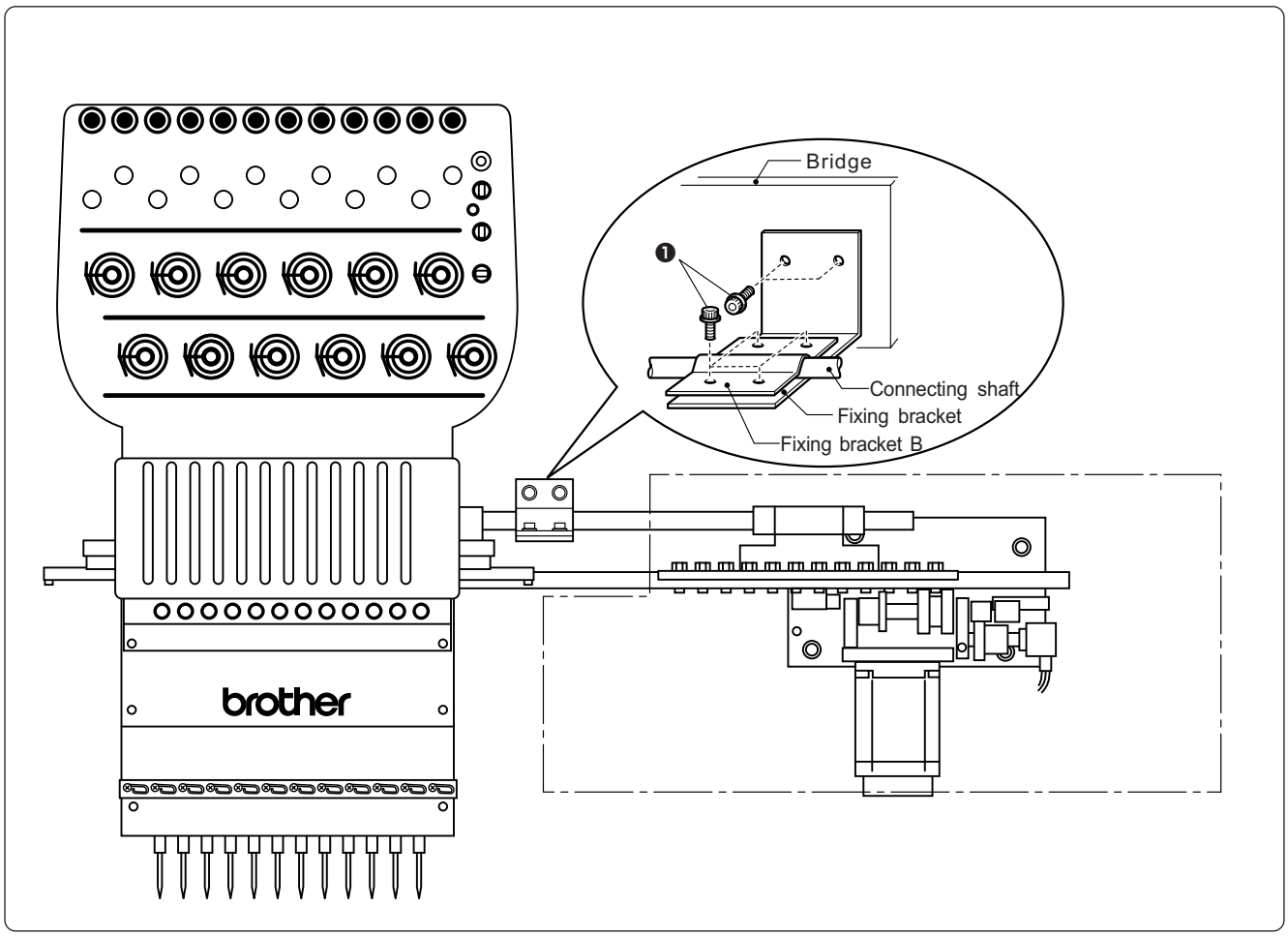


1. Loosen the bolt ❶, and move the needle case ❷ to the left.

2. Press the change bracket collar ❹ against the change case base ❸ on the light, while pressing the change bracket collar ❺ against the change case base ❻ on the left, and tighten the bolt ❶. Check that needles at needle bar No.1 and 9 are inserted into the needle plate holes smoothly.

   Notes) • Check that the connecting shaft ❼ does not have backlash in the horizontal direction.
   • If the bolt ❽ of the change bracket collar on the right is loosened, it may be dislocated during adjustment of the needle bar case ❷. Do not loosen this bolt.

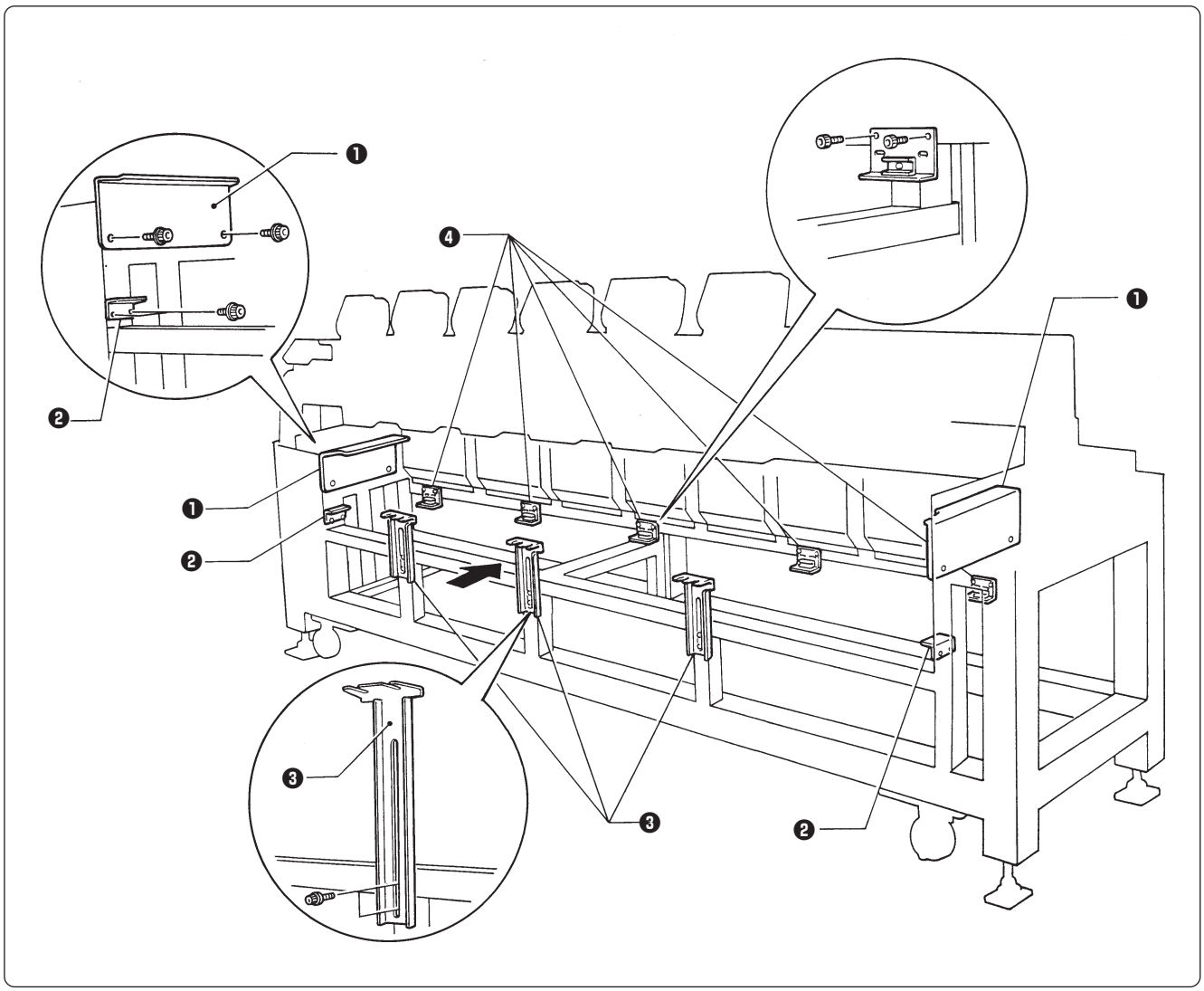
■ BES-1260BC



Remove the bolts ❶ ,and then detach the fixing bracket B for transportation from the bridge and the connecting shaft.

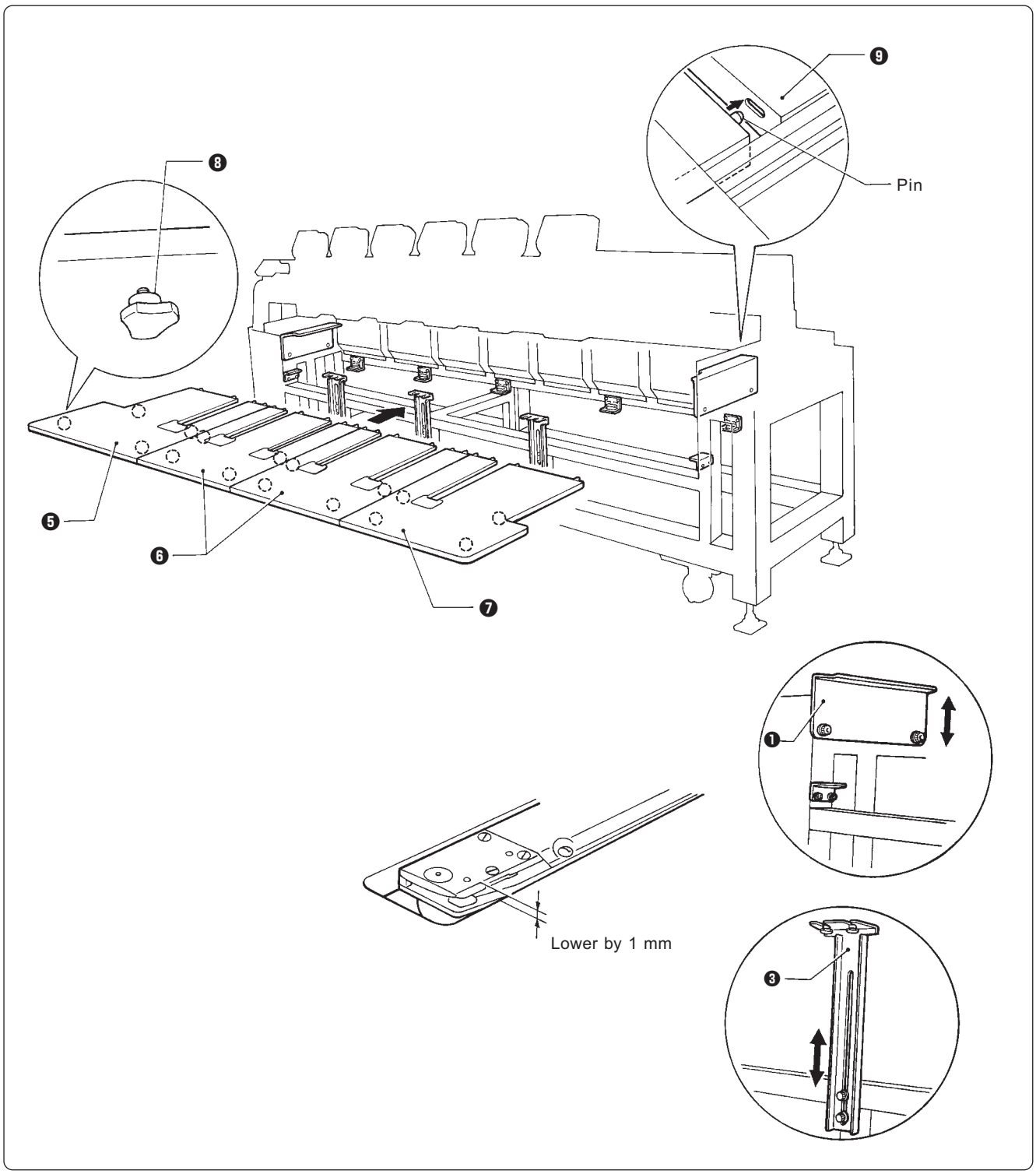
2-4 Mounting of Table

■ Mounting of F table



1. Tentatively mount the F table guides U ❶ and L ❷ on both sides of the legs using two bolts each.
2. Tentatively mount there F table supports F ❸ on the leg front using two bolts each.
3. Tentatively mount five F table stoppers ❹ on the rear legs using two bolts each.

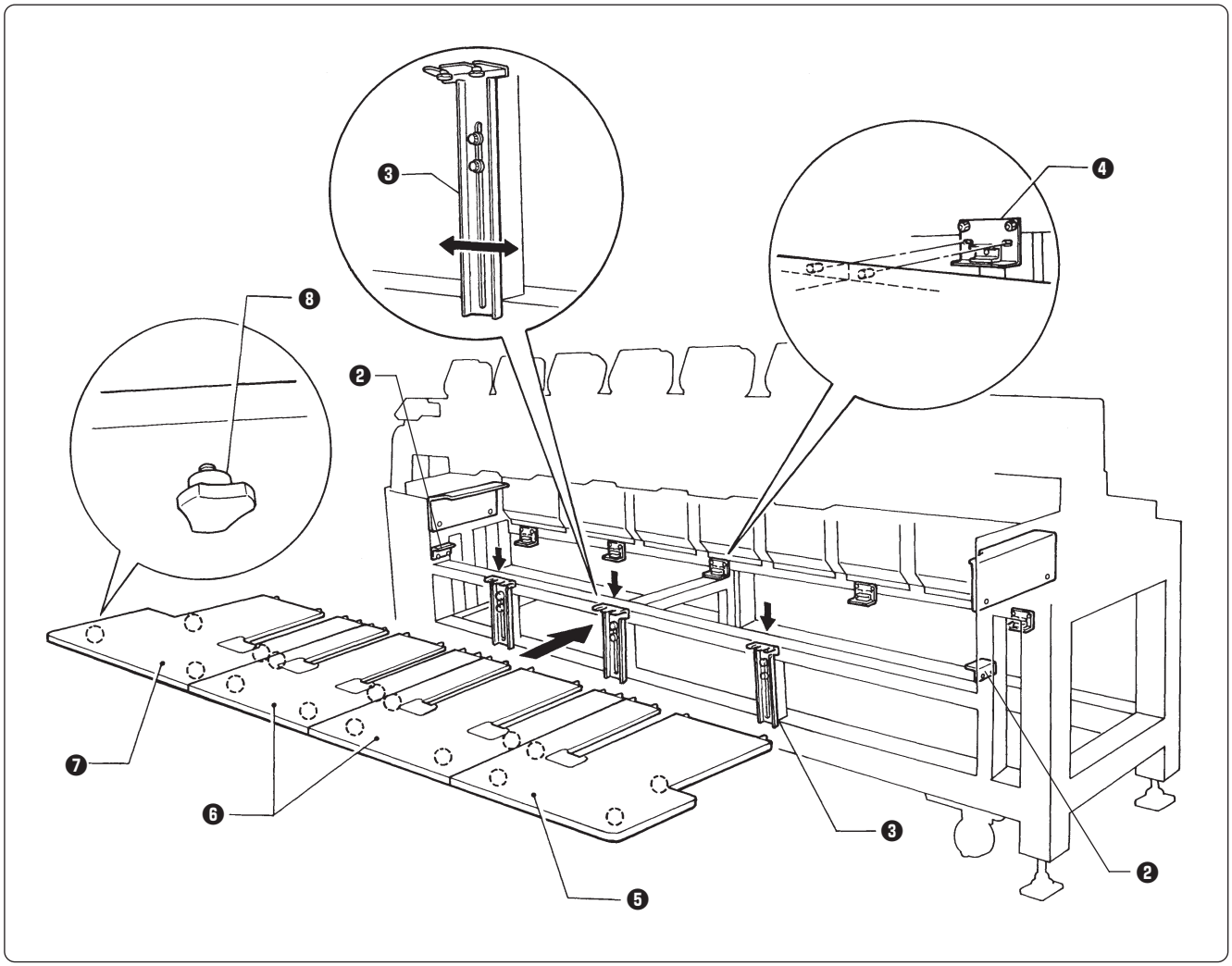
Note) • The steps 1 and 3 are required only when the F table set is purchased separately from the machine.
• The F table is a standard attachment.



4. Mount four thumb bolts ❽ each on the rear of F table R ❺, M (2 pcs.) ❻, and L ❼.

5. Mount five thumb bolts on the steel pipe below the front leg.

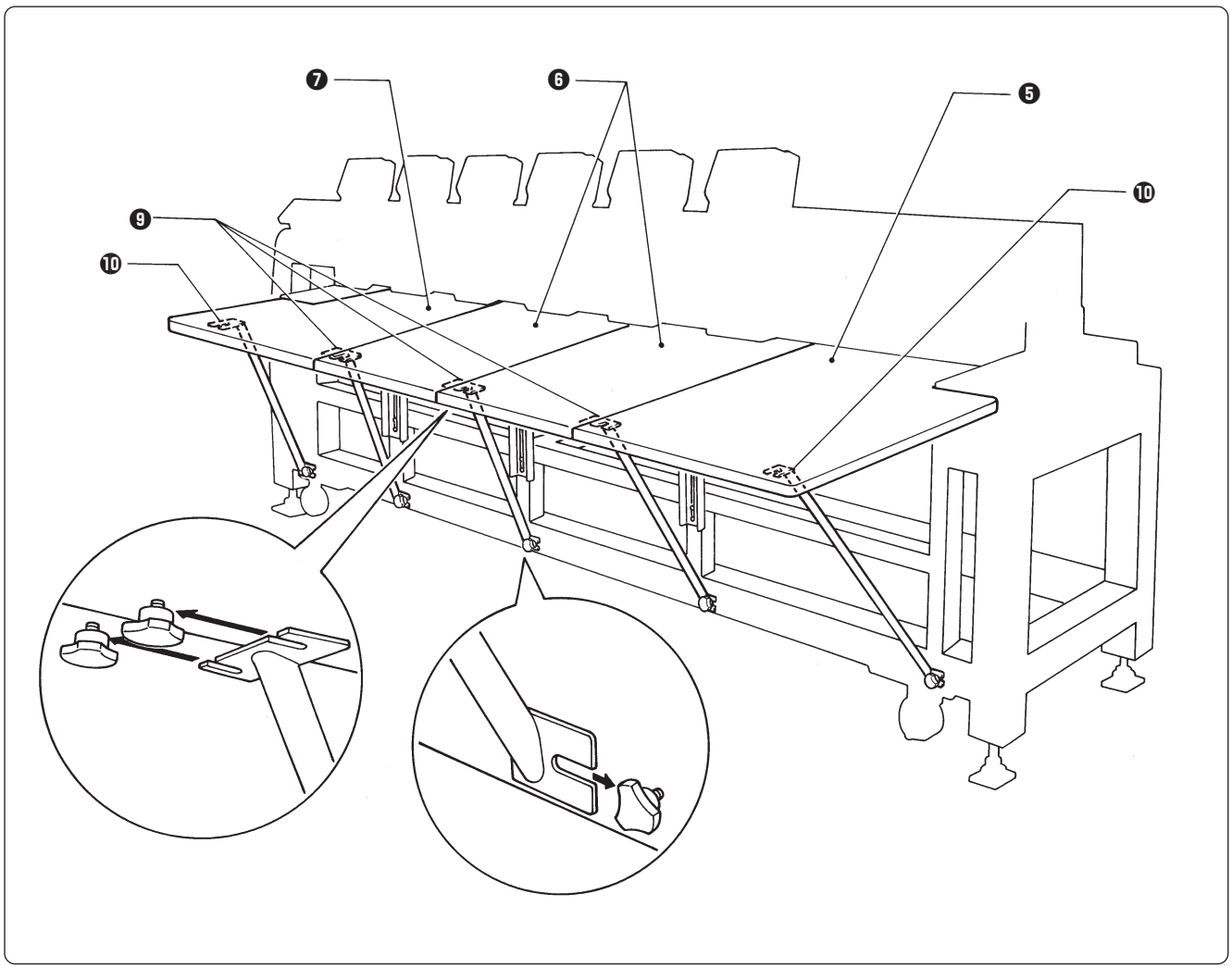
6. Insert the pins attached to the rear of the F table R ❺, M (2 pcs.) ❻, and L ❼ into the cover ❾ on the leg. Adjust the height of the F table guide U ❶ and the F table support F ❸ so that the table top surface will become 1 mm lower than the bed top surface. After adjustment is finished, tighten each bolt securely.



7. Dismount the F table R ❺, M (2 pcs.) ❻, and L ❼ once, and lower the F table support F ❸. Then, place the F table R ❺, M (2 pcs.) ❻, and L ❼ on the F table guide L ❷ bending section. Fix the F table support F ❸ at this height and insert the pins on the rear of the F table R ❺, M (2 pcs.) ❻, and L ❼ into the holes of the F table stopper ❹.

   Note) Fix the F table stopper and the F table guide L securely at this position.

8. Insert the F table R ❺, M (2 pcs.) ❻, and L ❼ into the upper and lower positions respectively, then check if the table can be securely fixed by the thumb bolts ❽. If not, shift the F table support F ❸ to the right and left for further adjustment.



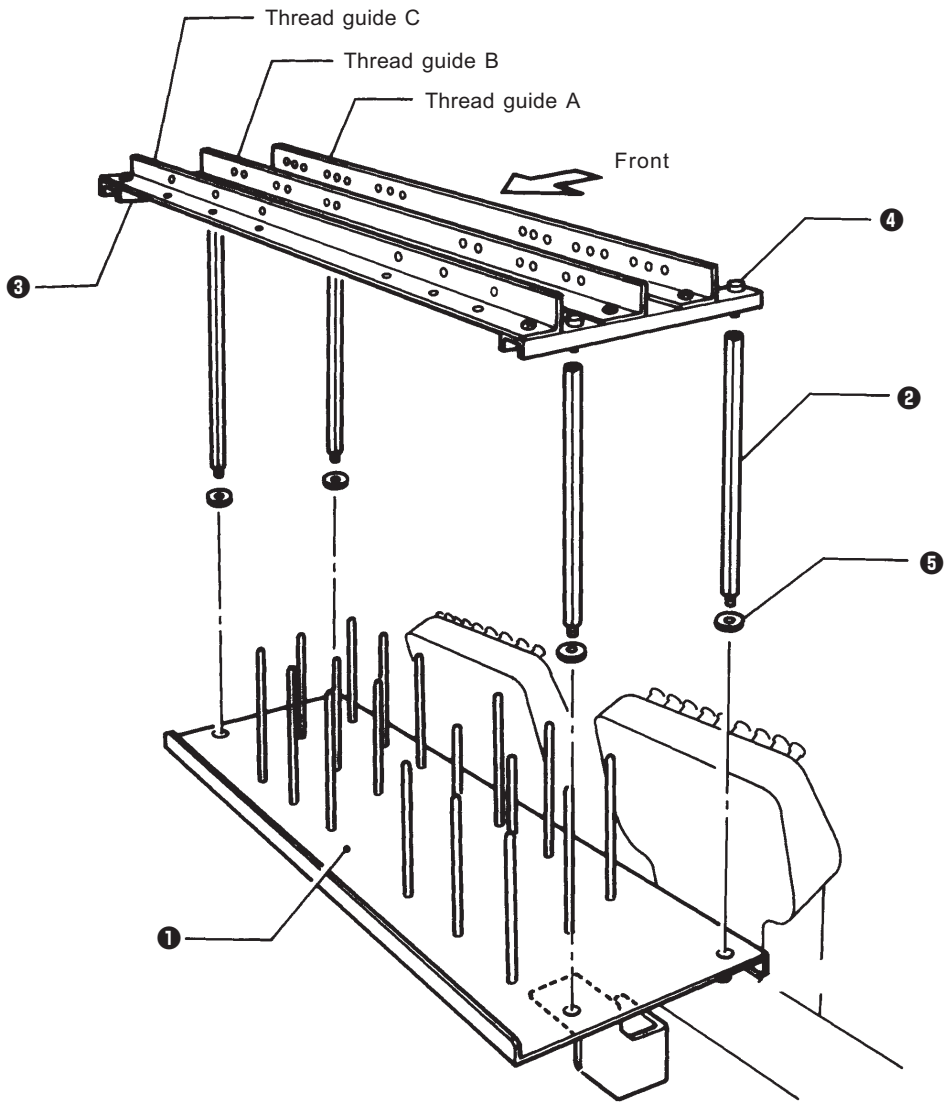
9. Fix the legs and the table using the F table stays A (3 pcs.) ❾ and B (2 pcs.) ❿ while the F table R ❺, M (2 pcs.) ❻, and L ❼ are fixed at the upper position.

   * Dismounting can be carried out in the reverse procedures.

   Note) • Use two F table stays (B) with one notch at both ends of the F table R ❺ and L ❼.
   • When mounting the F table stays A (3 pcs.) ❾ and B (2 pcs.) ❿, fit the F table stay notch into the table, then fix the notch to the legs using the thumb bolts.
   Dismounting can be carried out in the reverse procedures.
   • When the F table is at the lower position, the F table stays A and B need not be used.

2-5 Mounting of Cotton Stand

■ BES-960BC

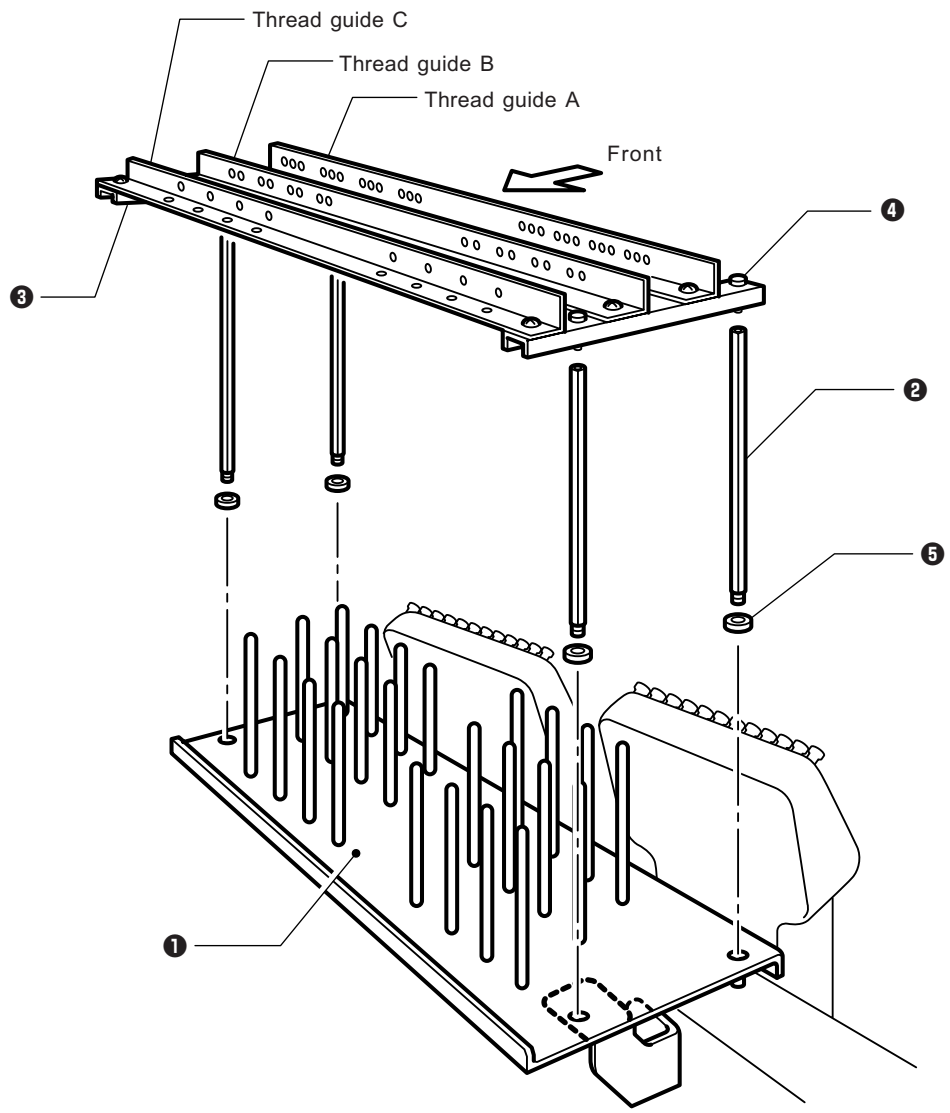


1. Attach four thread guide support bars ❷ to the cotton stand assembly ❶, while fitting into the four holes.

2. Mount the thread guide assembly ❸ on the thread guide support bars ❷ using the four screws ❹.

   Note) • When mounting, use one flat washer ❺ below the thread guide support bar ❷.
   • Pay careful attention to the front and back directions of the thread guides (A, B, C).

■ BES-1260BC



1. Attach four thread guide support bars ❷ to the cotton stand assembly ❶, while fitting into the four holes.

2. Mount the thread guide assembly ❸ on the thread guide support bars ❷ using the four screws ❹.

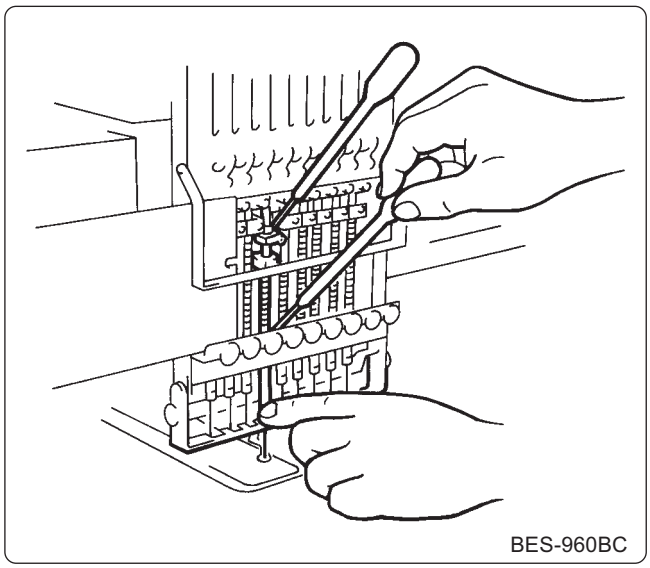
   Note) • When mounting, use one flat washer ❺ below the thread guide support bar ❷.
   • Pay careful attention to the front and back directions of the thread guides (A, B, C).

2-6 Lubrication to Needle Bar Case

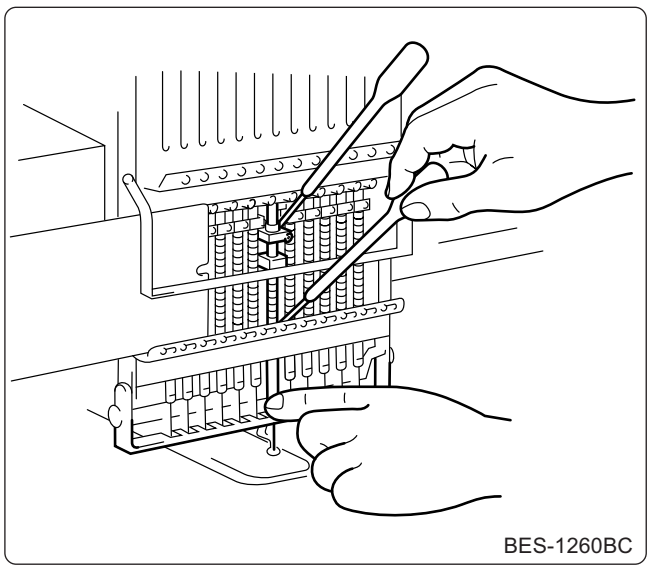
Proper lubrication is necessary for keeping the machine head in good condition.

⚠ CAUTION

Turn off the power switch before starting any cleaning work, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.



BES-960BC



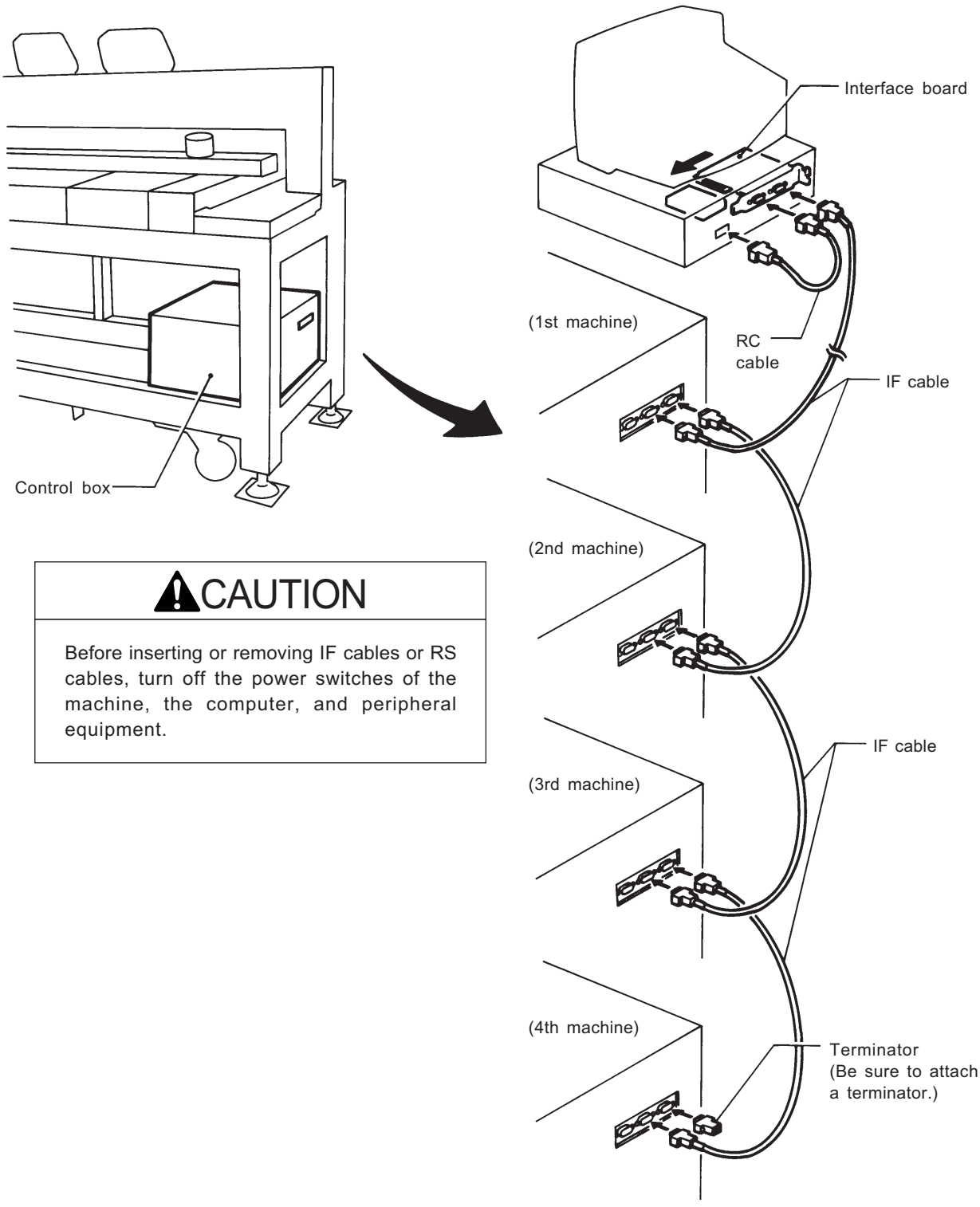
BES-1260BC

Before operating the machine for the first time after unpacking or after leaving the machine without operation for a long period of time, supply one or two drops of oil to two sections of the needle bar. (See the left figure.)

Note) • Use the Brother's specified embroidery machine oil (Nisseki Embroidery Lube No. 10 or the equivalent).

• Supplying an excessive amount of oil will cause dripping onto the material.

2-7 Connection of Personal Computer to Machines (for connecting 4 sets)

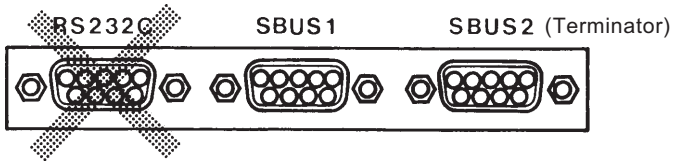


⚠CAUTION

Before inserting or removing IF cables or RS cables, turn off the power switches of the machine, the computer, and peripheral equipment.

1. Turn off the power switch.
2. Open the cover of the personal computer and insert an interface board into the slot for the PCI bus.
3. Connect the interface board male connector and the personal computer RS-232C connector (COM1 or RS-232C-1) using the attached short RS cable.

4. Connect the interface board female connector and the control box connector SBUS1 of the first machine using an IF cable.



5. Connect the control box connector SBUS2 of the first machine and the control box connector SBUS1 of the second machine using an IF cable.

6. Connect the control box connector SBUS2 of the second machine and the control box connector SBUS1 of the third machine using an IF cable.

7. Connect the control box connector SBUS2 of the third machine and the control box connector SBUS1 of the forth machine using an IF cable.

8. Attach a terminator to the control box connector SBUS2 of the forth (last) machine.

* The IF cables used for connection are identical. There is no difference between the two ends of the IF cable.

* The order of connecting four machines is arbitrary.

* The maximum number of connecting machines is four.

* A terminator should be connected to the connector SBUS2 of the lastly connected machine. Connection to SBUS1, 2 can be interchangeable.

* Do not connect anything to the RS-232C connector.
Optional paper tape reader cannot be connected to this connector.

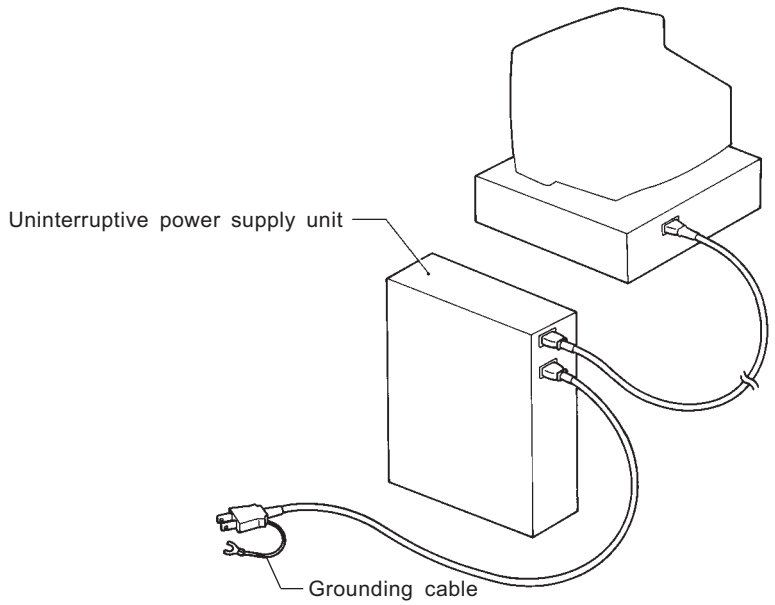
2-8 Connection of Power Supply

■ Uninterruptive power supply

This unit is for protecting a personal computer from commercial power interruption, voltage drop, and external noise. Use of an uninterruptive power supply is strongly recommended.

Note) This unit is not an attachment of the Brother's embroidery machine, and should be purchased separately from a different source.

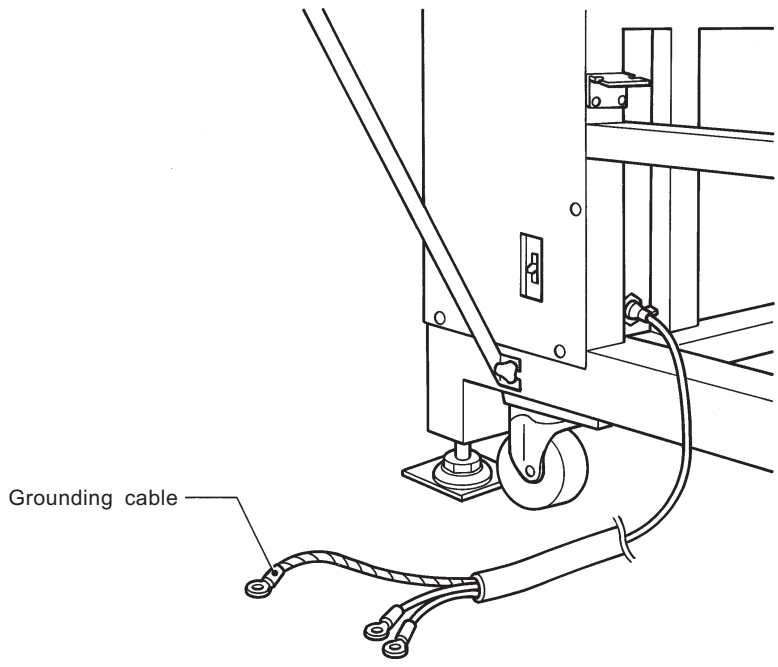
Note) When using an uninterruptive power supply, be sure to establish grounding.



■ Grounding

Note) • When connecting the power supply, make sure to connect it to the grounding cable (with green and yellow stripes).

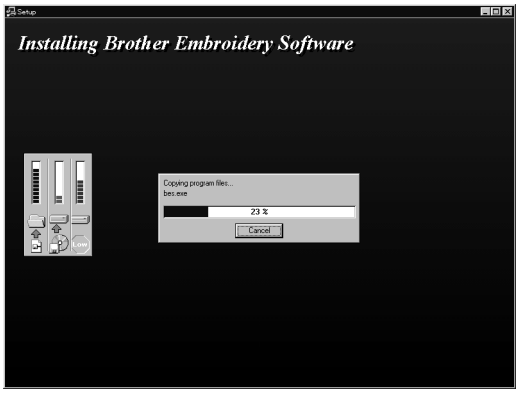
• When plugging in the outlet, use a plug suited to the outlet.



2-9 Installation of Software

Use an attached CD-R for installing software. If a personal computer with no CD-R drive unit is used, connect a drive unit to the computer.

1. Set the CD-R for installation.
   Setting the CD-R starts the installation program automatically.
2. The screen for user registration is displayed. Input your name and department. Click [OK] after inputting is finished.
3. Check the user information. Click [OK] if the contents are correct.
4. Specify a folder for setup.
5. Click [TO NEXT] to start installation.



6. After setup is properly finished, a message is displayed.
7. Click [OK] to complete installation.

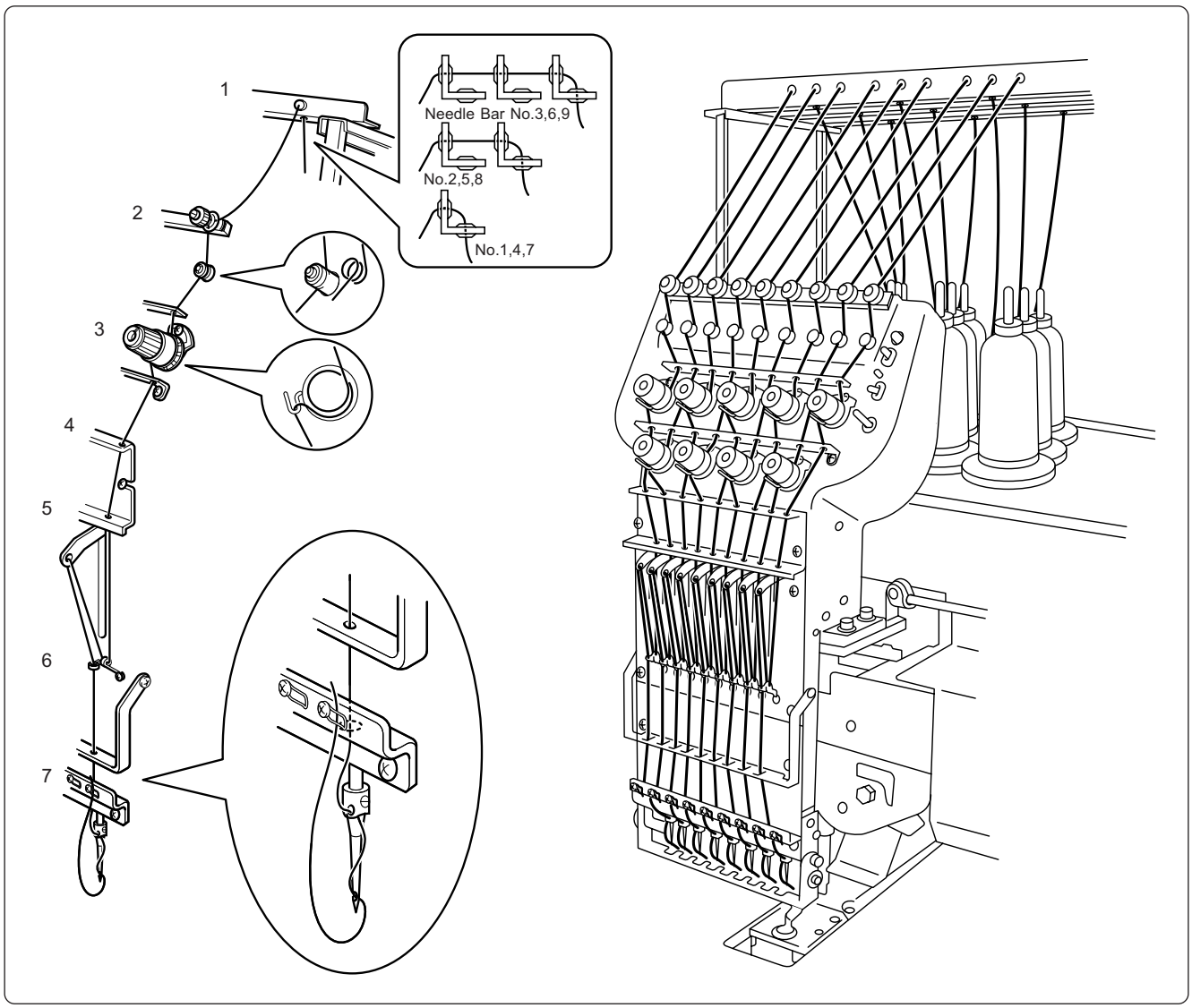
3. Preparation for Embroidering

⚠ CAUTION

Turn off the power switch before starting preparation.
Failure to do so may start the machine unintentionally through an accidental activation of the START switch, resulting in bodily injuries.

3-1 Upper Threading

■ BES-960BC

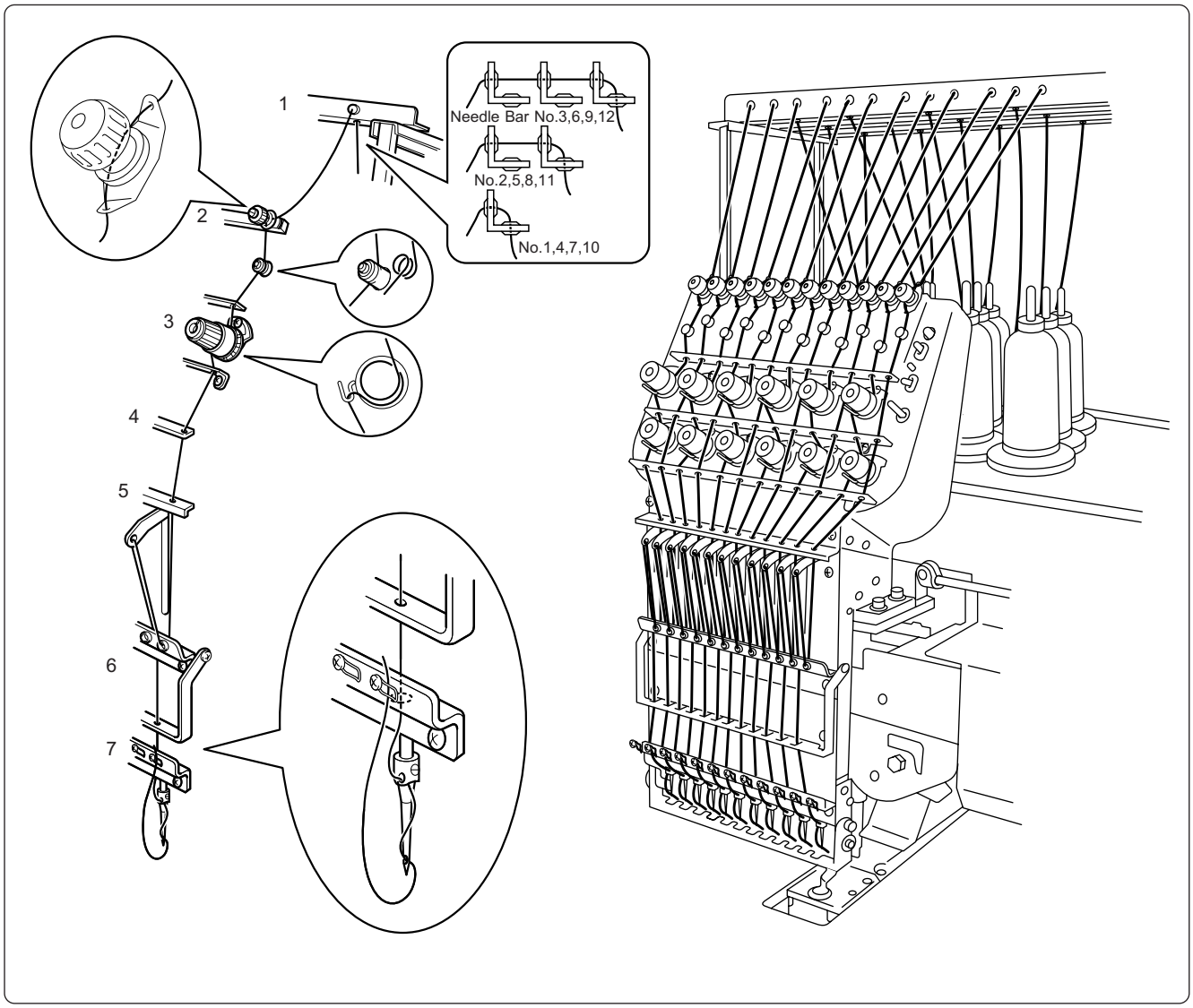


1. Pass the upper thread from the cotton stand through the hole of the thread guide right above each cotton stand bar from the lower side.

2. Pass the thread under the thread guide tension disk by lifting it with a finger, and then wind it onto the pulley twice.

3. Pass the thread through the hole of the upper thread guide (U), wind it into the tension disk clockwise once, and place it on the spring.
4. Pass the thread through each hole of the upper thread guide (U) and the thread guide (C).
5. After passing the thread through the hole of the thread guide (U), insert the thread into the right side of the inner thread guide, and pass it through the hole of the thread take-up.
6. Bring the thread to the inner thread guide again to insert it into the hole from the upper section, then into the lower thread guide.
7. Pass the thread through the hole of the needle bar thread guide, then pass it through the needle eye, without passing it through the presser foot.

■ BES-1260BC



1. Pass the upper thread from the cotton stand through the hole of the thread guide right above each cotton stand bar from the lower side.
2. Pass the thread under the thread guide tension disk by lifting it with a finger, and then wind it onto the pulley twice.

3. Pass the thread through the hole of the upper thread guide (U), wind it into the tension disk clockwise once, and place it on the spring.

4. Pass the thread through each hole of the upper thread guide (U) and the thread guide (C).

5. After passing the thread through the hole of the thread guide (U), insert the thread into the right side of the inner thread guide, and pass it through the hole of the thread take-up.

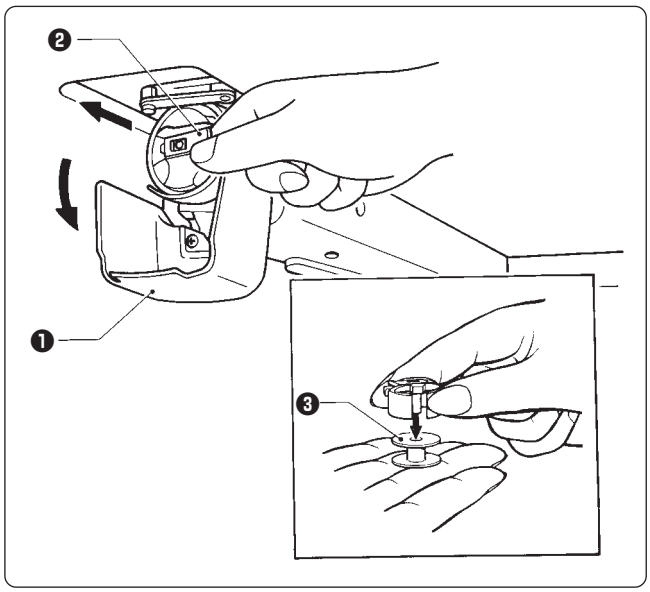
6. Bring the thread to the inner thread guide again to insert it into the hole from the upper section, then into the lower thread guide.

7. Pass the thread through the hole of the needle bar thread guide, then pass it through the needle eye, without passing it through the presser foot.

3-2 Replacement of Bobbin

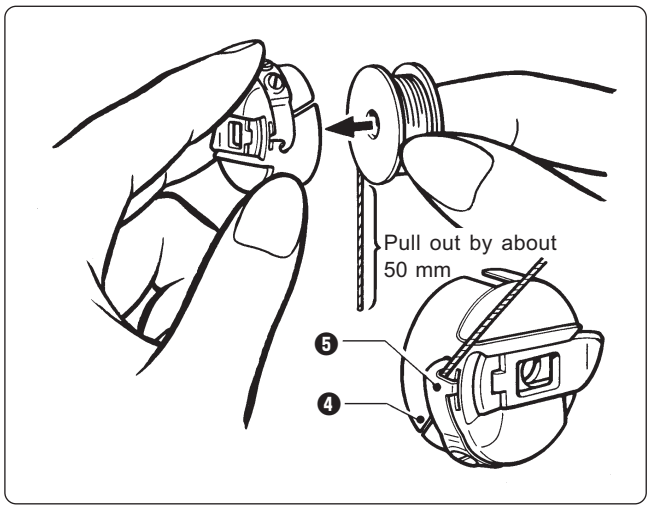
Note) Remove dust, lint and oil from the bobbin case before replacement.

■ Removing bobbin case



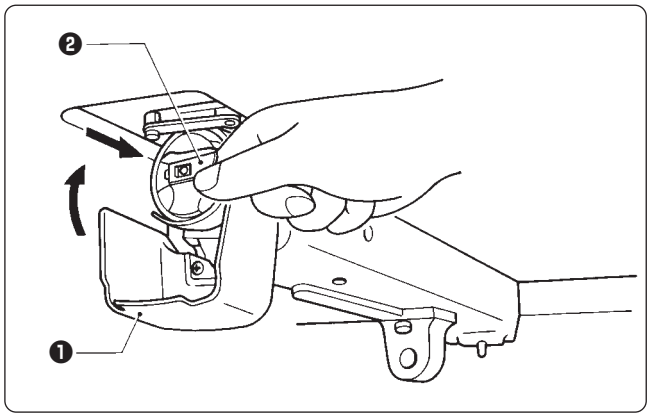
1. Open the rotary hook cover B ❶.
2. Hold the knob ❷ and take out the bobbin case.
3. Close the knob and take out the bobbin ❸.

■ Replacing bobbin



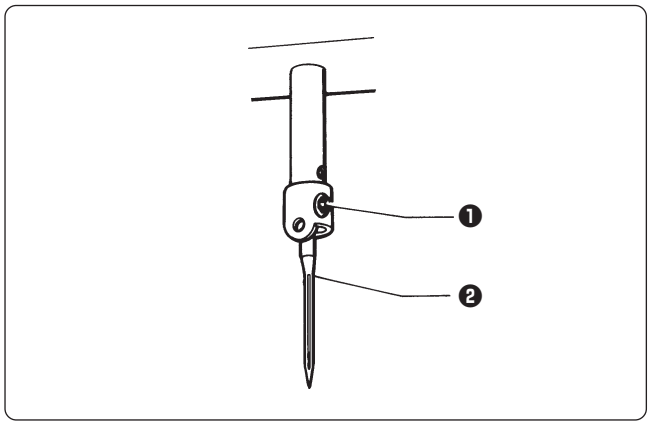
1. Put a new bobbin in the bobbin case.
2. Slide the thread under the tension spring ❺ through the notch ❹.
3. Pull out the thread from the hole of the tension spring ❺.
4. Pull out the thread by about 50 mm.

■ Attaching bobbin case



1. Hold the knob ❷ and attach the bobbin case securely.
2. Close the rotary hook cover B ❶.

3-3 Replacing and Selecting Needle



* Relationship between materials and needles

Material	Needle	Needle thickness
Denim Leather	DB x K5	#14, #16, #18
Handkerchief		#9, #10
Shirt Towel		#11, #12, #13

■ Removing needle

Loosen the set screw ❶ and remove the needle ❶.

■ Attaching needle

With the flat side facing the front, insert the needle all the way until it meets the end of the needle bar. Tighten the set screw ❶ firmly.

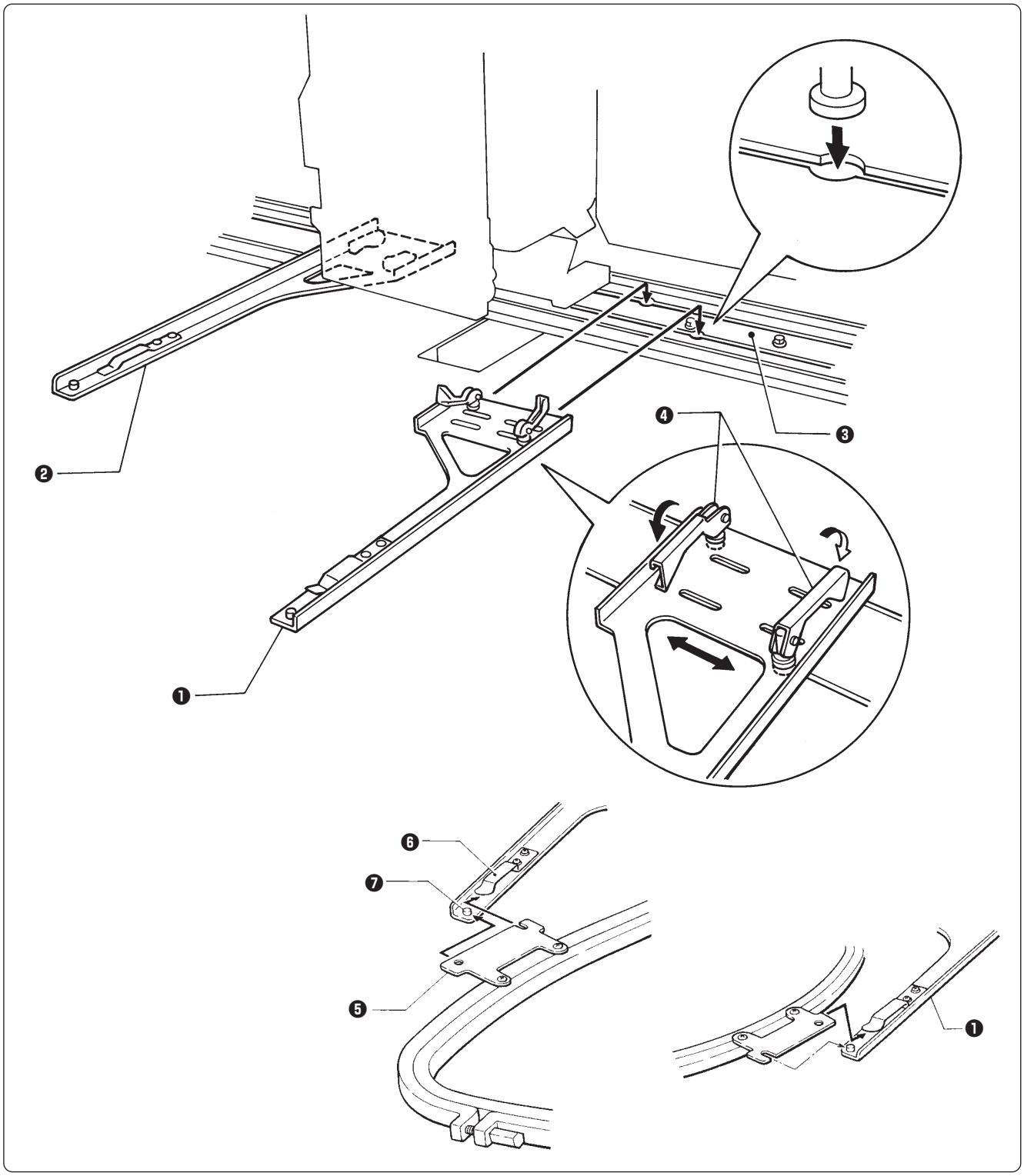
Note) • Set the needle so that the notched part will come on the rotary hook side.
• The needle should not be angled to the left (when viewed from the front).

■ Selecting needle

- When using special threads such as gold, silver, and rame yarn, use a heavy-duty needle (#11 ~ #16). For better finish, paste the waxed paper on the back of the material.
- In general, use DBxK5 #11 ~ #18 according to the material thickness. For knitted materials, use DBxK23 #11 because its rounded point prevents the knit thread from breaking.

3-4 Attachment of Embroidery Hoop and Frame

■ Tubular square hoop

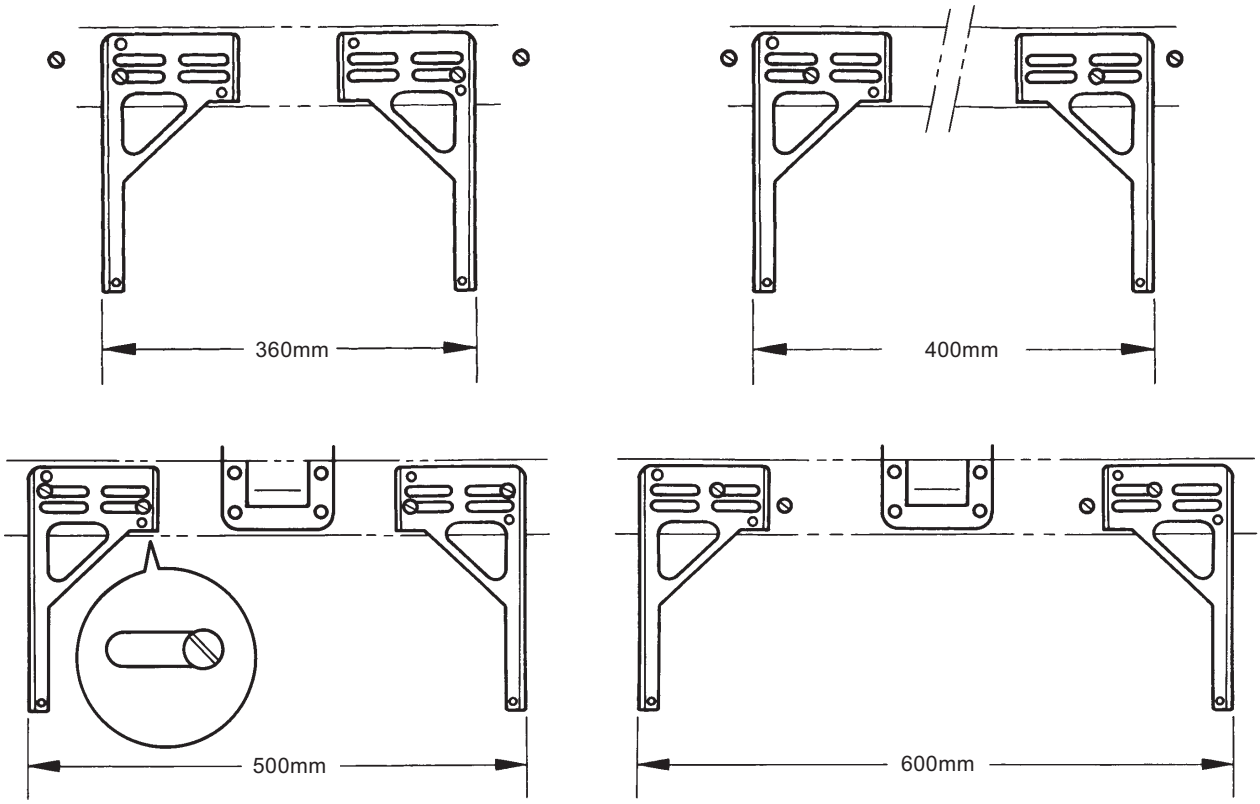


1. Insert the fixing pins of the tubular round arms R ❶ and L ❷ into the notches of the X-axis feed frame ❸. Slide the arm to the right and left and lower the fixing lever ❹ to fix them.

2. Set the right and left fixtures of the tubular square hoop ❺ while sliding them under the flat spring ❻ upward. Then fit the frame projecting part ❼ into the hole of the tubular square hoop ❺ securely.

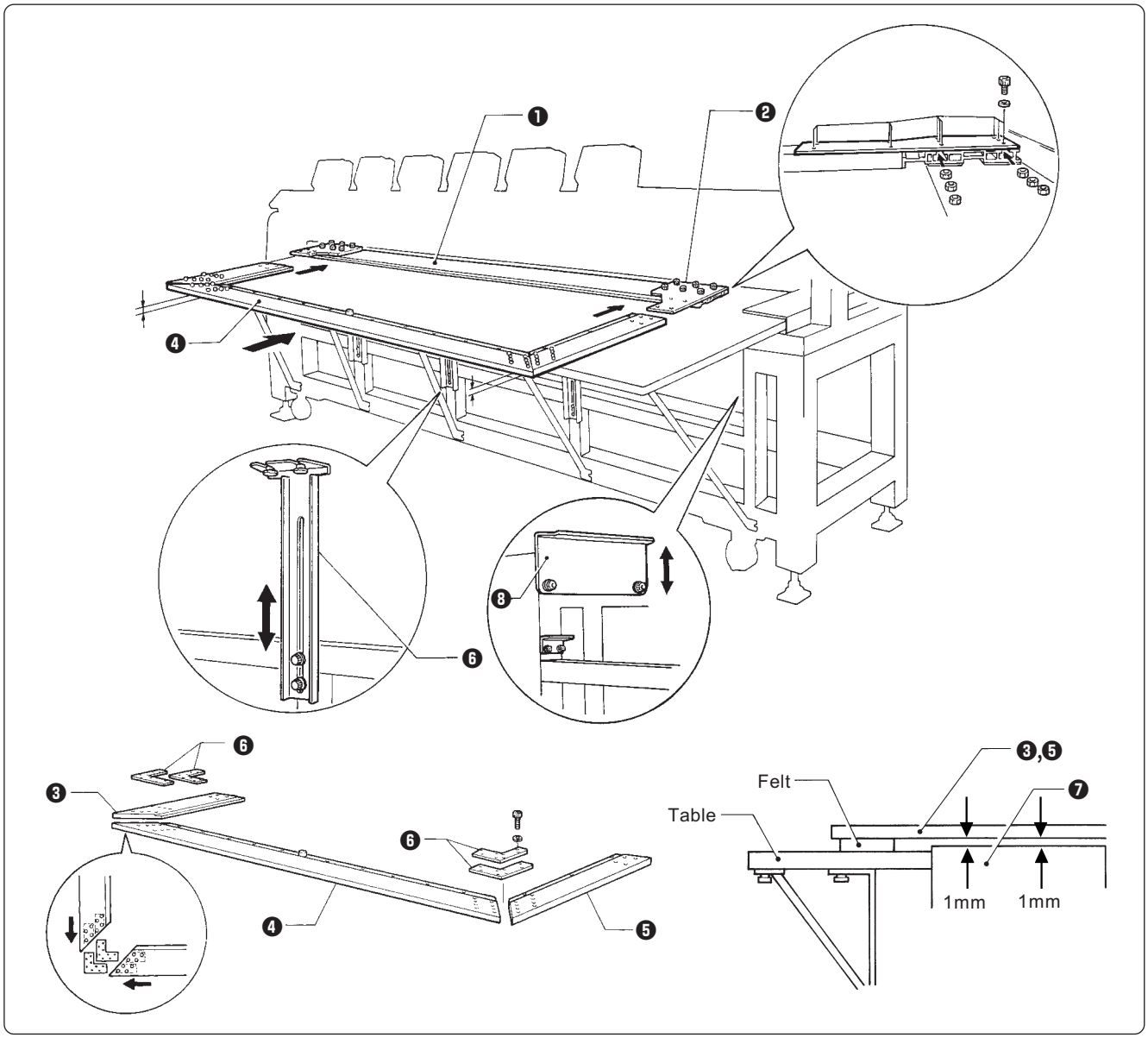
- By changing the tubular round arm mounting width, various sizes can be set.

  Note) Change the width, referring to the pin position.



Note) If two pins cannot be inserted properly, remove one of them.

■ Holder base (optional)



Attaching the holder base frame

1. Set the table. (Refer to "2-4 Mounting of Table" (Page 33) for details.)
2. Mount the frame connecting plate R ❷ on the X-axis feed frame ❶, using six bolts, washers, and nuts.
3. Insert the frame connecting plate ❻ into the holder base frame L ❸, holder base frame C ❹, and holder base frame R ❺, using bolts and washers.
4. From the front, put the holder base frame C assembly ❹ under the frame connecting plate R ❷ and fix it using four bolts.
5. Check that the clearance between the table and the mounted holder base frame C assembly ❹ is even when viewed from the machine front.

   [Adjustment] Loosen three bolts of the F table support F ❻ and move it in the direction of the arrow for adjustment.

6. Check that the clearance between the Y-axis cover ❼ and the mounted holder base frames L ❸ and R ❺ is even when viewed from the right and left sides.

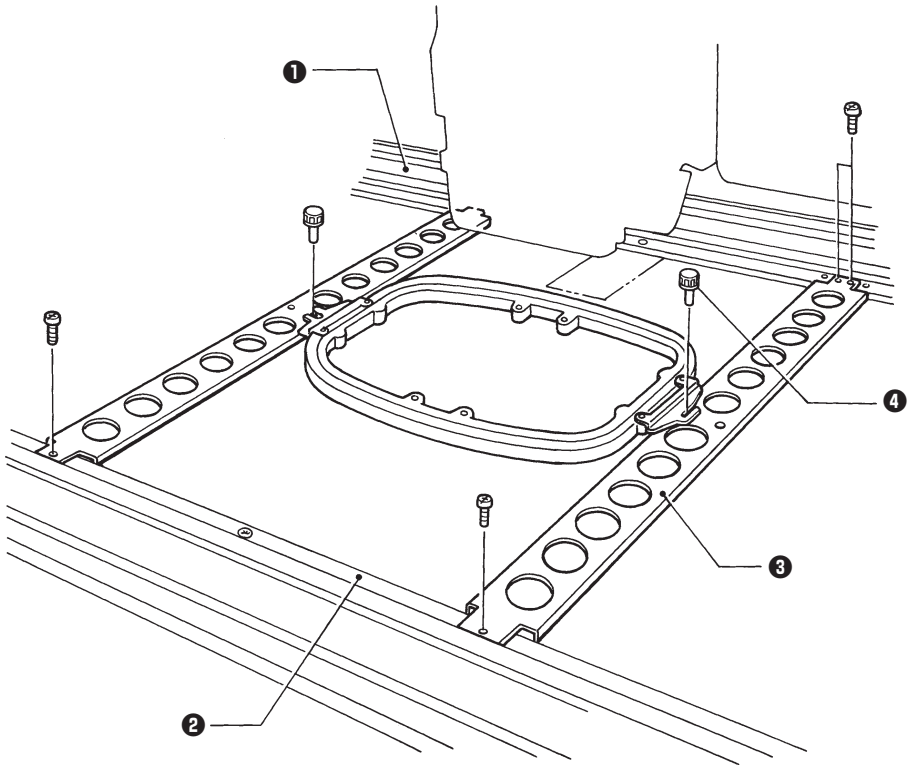
   [Adjustment] Loosen the right and left bolts of the F table guide U ❽ and move it in the direction of arrow for adjustment.

7. Tighten each bolt securely after adjustment is finished.

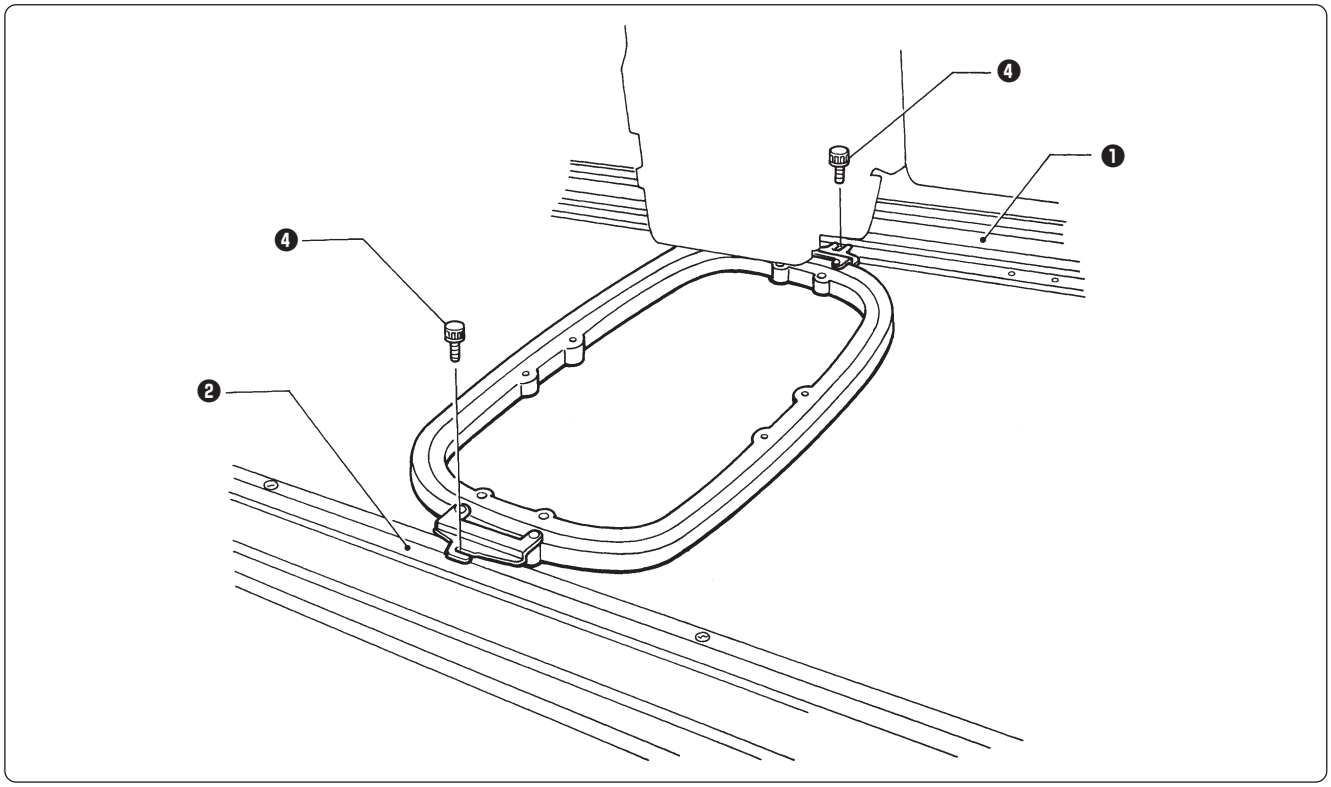
Attaching the holder base

1. Mount the holder base mounting frame ❸ on the X-axis feed frame ❶ and holder base frame C ❷, using three clamp screws.

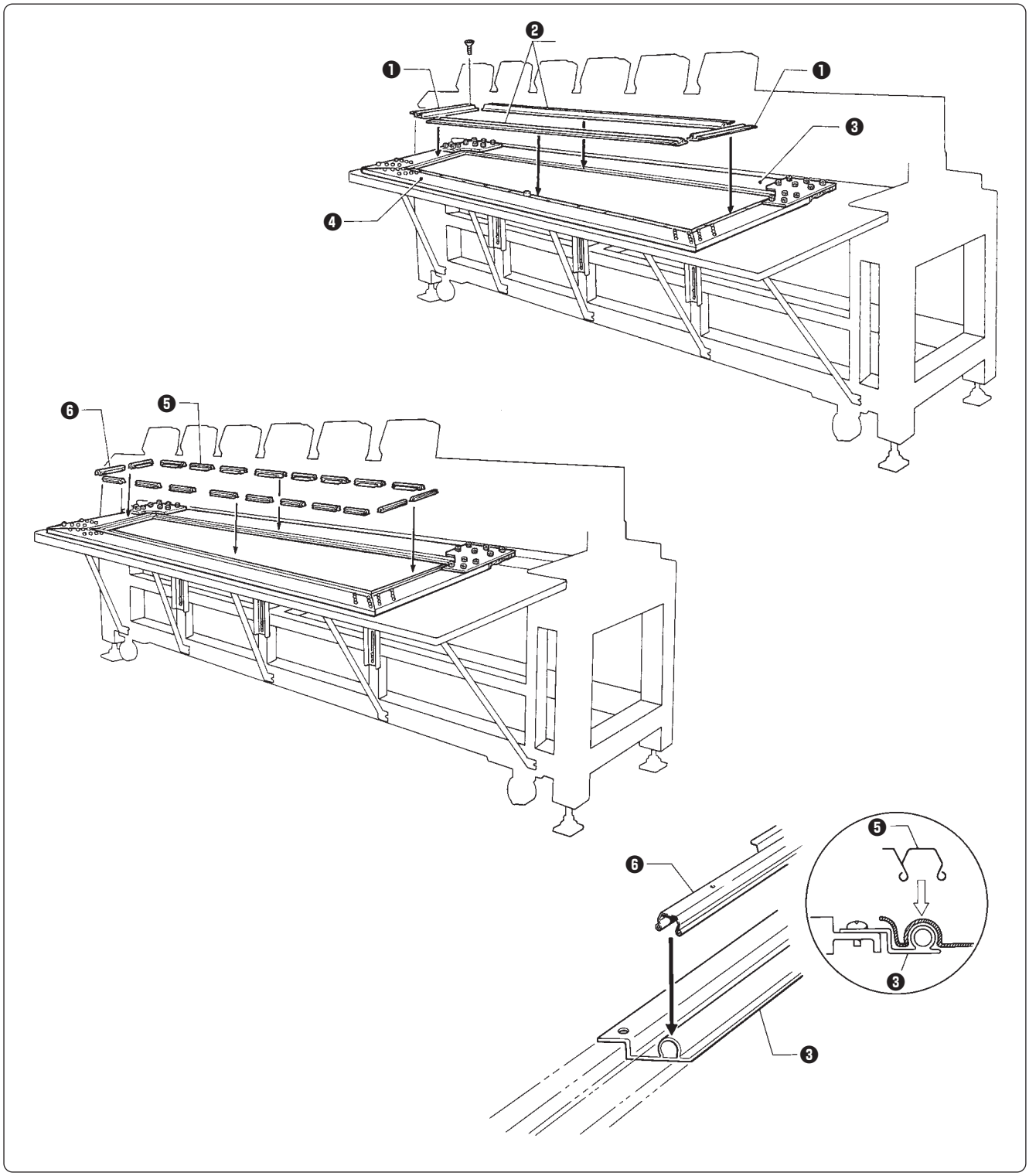
2. When the mounting pitch of the holder base is 370 mm, mount the holder base horizontally to the holder base mounting frames ❸ using the thumb bolts ❹.



3. When the mounting pitch of the holder base is 550 mm, mount the holder base vertically to the X-axis feed frame ❶ and holder base frame C ❷ using the thumb bolts ❹.



■ Sash frame (optional)



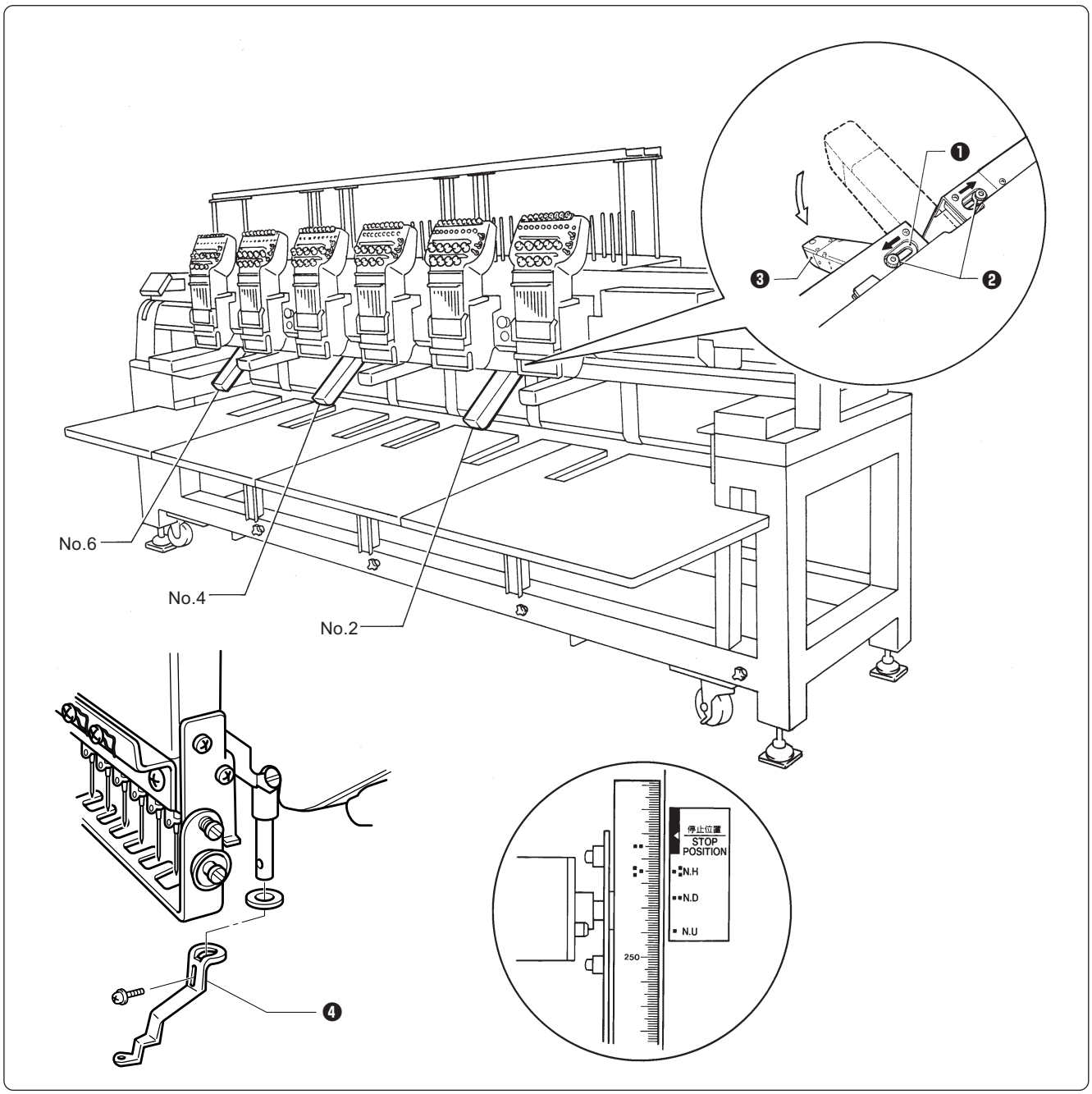
Attaching the sash frame

1. Set the table. (Refer to "2-4 Mounting of Table" (Page 33) for details.)
2. Mount two vertical sash frames ❶ on the holder base frames L and R, and two horizontal sash frames ❷ on the X-axis feed frame ❸ and the holder base frame C ❹, using the screws.
3. Set the material. Then, set 16 clips 290 ❻ horizontally in two sides and 4 clips 220 ❻ vertically on the right and left sides.

3-5 Bed Retract

When embroidery within the maximum area by mounting the tubular square hoop, there is a possibility that the hoop interferes with the bed. Retract the bed of several machine heads to avoid interference.

Note) The machine heads are numbered 1 ~ 6 from the right side.



1. Loosen two bolts ❷ that secure the bed support ❶, and move the bolts ❷ to the right and left.

   Note) • The bed is secured by two bolts and supported at three places.
   • When loosening the bolts, support the bed by hand.

2. Lower the machine bed ❸ slowly until it comes into contact with the leg.

3. Tighten the bolts ❷ again.

4. Set the needle bar case at the needle bar No. 1. Remove the presser foot ❹ from the retracted machine bed.

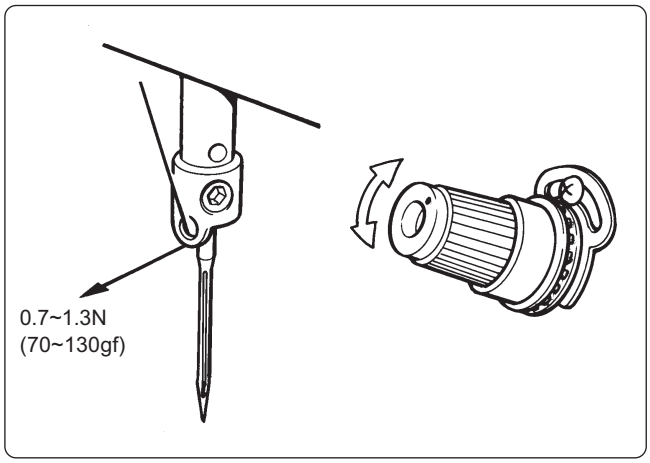
   Note) • The head of the retracted bed is stopped.
   • When removing the presser foot, align the pulley indication mark 3 first.
   • To operate the machine in retract position, set the bed in contact with the legs.

Resetting of bed retract

1. Move the machine bed ❸ little by little until it comes into contact with the bed support ❶.
2. Loosen two bolts ❷ and insert the bed into the right and left directions, then tighten the bolts securely again.
3. Mount the presser foot for the reset bed ❸.

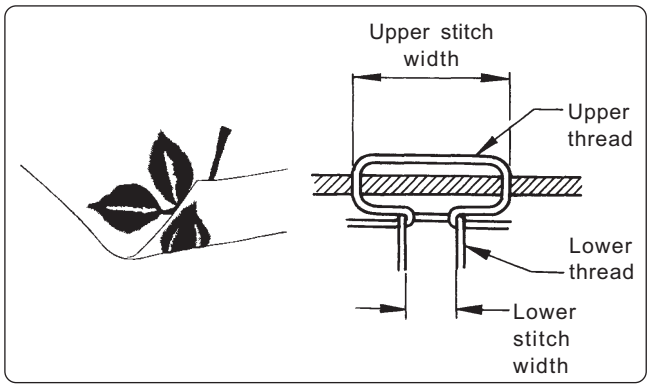
   (Refer to "Chapter 10. Standard Adjustment" for mounting the presser foot.)

3-6 Adjustment of Thread Tension



■ Adjustment of upper thread

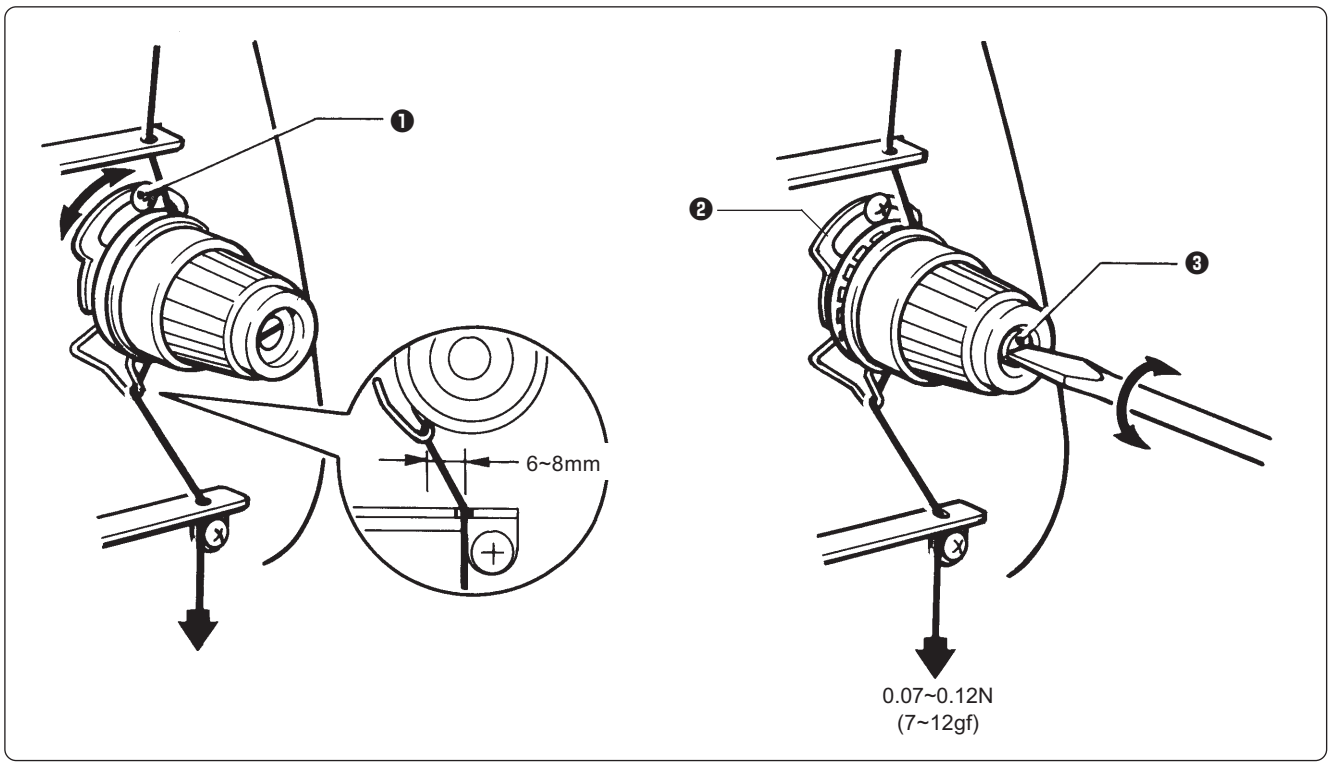
Adjust upper thread tension to 0.7~1.3N (70~130 gf) when the thread is pulled at the needle bar thread guide.



* Correct adjustment

Turn the upper thread tension dial so that the needle thread can be pulled to the back of the material and that the lower stitch width will be about 1/3 of the upper stitch width.

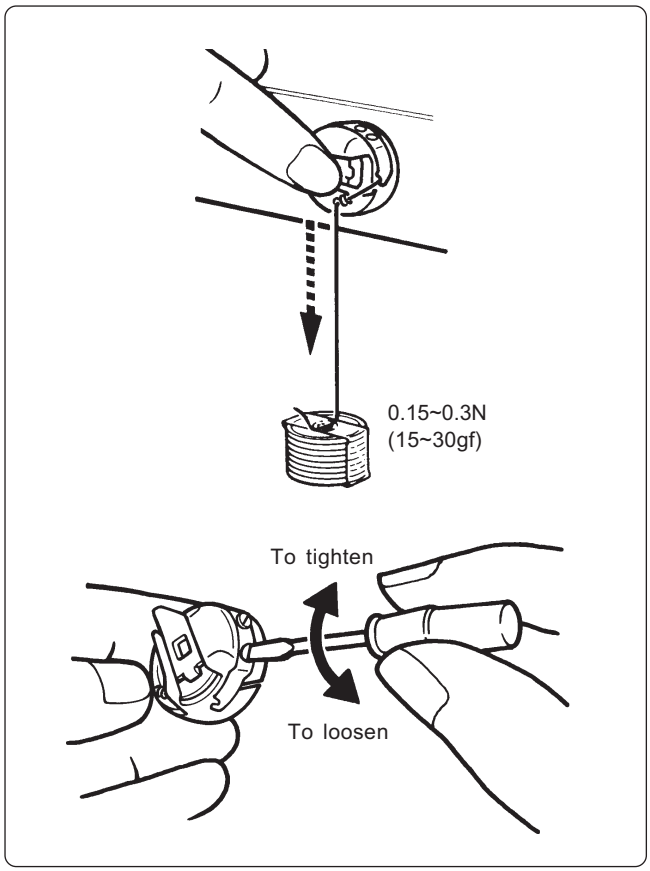
■ Adjustment of tension spring



1. The tension spring should be adjusted to 6~8 mm in height and 0.07~0.12 N (7~12 gf) in force.

2. For adjusting the height, loosen the screw ❶ and turn the tension spring bracket ❷.

3. For adjusting the tension spring force, insert a driver tip in the groove of the thread tension bar ❸ and turn it.



■ Lower thread tension

The standard tension of the lower thread is 0.15~ 0.3N (15~30gf).

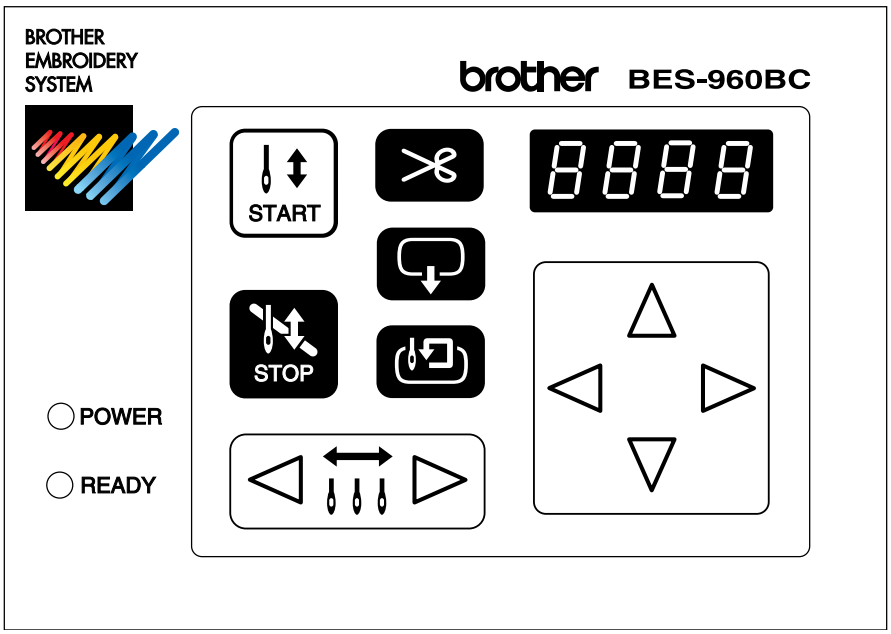
This tension may vary depending on the used thread. In general, press the bobbin case to a smooth vertical surface and hang the designated number of coins. Turn the thread tension screw so that the lower thread will come out smoothly.

Chapter 3
Embroidering Procedures

After installation of machine and setting-up of the personal computer (PC), start embroidering. This chapter explains about the operation panel on the machine as well as precautions for the actual embroidering process.

Functions of Operation Panel

Operation Panel



Starts embroidering.
Restarts after moving the carriage to embroidering start position by using the jog switch.
Restarts embroidering after a suspension.

Cancels errors during embroidering.
Exits from the embroidering mode. Hold down switch and press switch.
Suspends embroidering.

Trims thread during suspension.

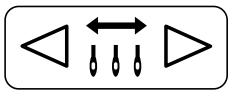
Checks the embroidering area.

Exits from embroidering mode. Press this switch while holding down STOP switch simultaneously to stop embroidering.

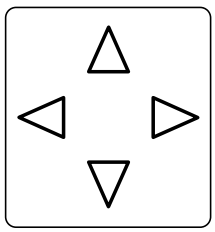
Moves the hoop automatically when embroidering position is out of the embroidering area.

Sets the machine to the inching mode when this switch is pressed during suspension.

Moves the hoop to software-set position. When this switch is pressed again, the hoop returns to the previous position.



Moves the needle bar. The needle moves by the diameter every time this switch is pressed.



Moves the hoop.

Step-back or forward is available during suspension, by one stitch every time the switch is pressed (Use lr switches only.)

Changes the speed range during embroidering (Use ud switches only).

Carries out inching of the hoop when the switch is pressed in the inching mode (Jog appears on the panel).

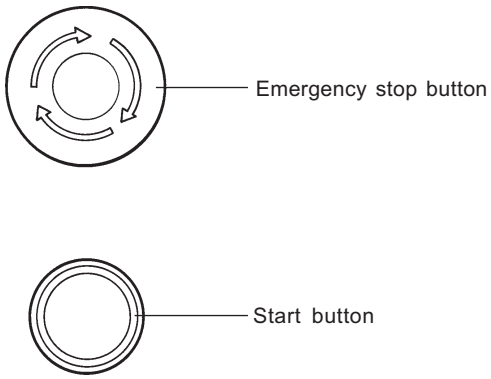
■ Canceling errors

When an error message appears, it is canceled by pressing STOP switch.

Pressing other switches can stop alarm sound.

When thread breakage or wiper out error has occurred, step-back or forward switch can be used to cancel errors.

Switches at Machine Heads



■ Emergency stop button

Stops embroidering operation. When embroidering is stopped, StoP flashes.

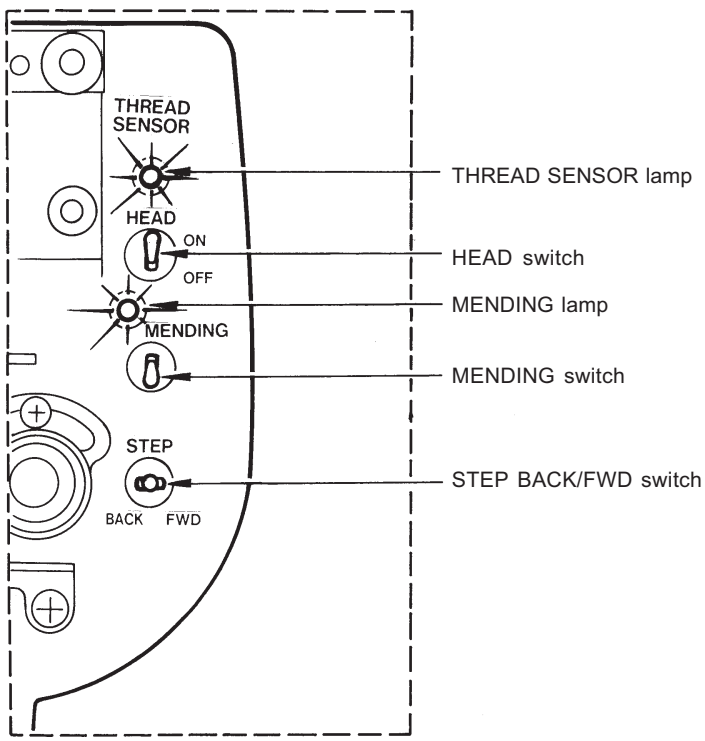
Refer to "Resetting Emergency Stop" (→ page 177) to stop flashing.

■ Start button

Starts embroidering. Holding down this button executes embroidering at a low speed.

When resuming embroidering after an emergency stop, release emergency stop before pressing this button. Refer to "Resetting Emergency Stop" (→ page 177) for details.

Switches on Tension Plate



■ THREAD SENSOR lamp

When red light is on, thread breakage sensor is functioning. When the light is off, the sensor is not effective. When the embroidery machine stops due to thread breakage, the lamp flashes.

■ HEAD switch

When it is set to ON, needle bar on the head moves for embroidering. When it is set to OFF, the needle bar does not move for embroidering.

■ MENDING lamp

This lamp lights up when the embroidery machine is in the mending mode.

■ MENDING switch

This switch is set to ON to drive or to suspend the machine head during embroidering for a designated period of time.

■ STEP BACK/FWD switch

When it is turned to BACK, the machine steps back. When it is turned to FWD, the machine steps forward. If you keep the switch turned for a while, the machine will continue stepping even after you let the switch alone. When it is turned to the opposite side, the machine stops.

During timing adjustment of the rotary hook in the test mode, the rotary hook slightly rotates to the left/right when this switch is turned to left/right respectively. Refer to "Adjustment of timing Between Needle and Rotary Hook" (→ page 222) for further details.

Flowchart of Preparation for Embroidering

Run PC.

▼

Run software (→ page 65).

▼

Turn on the machine power. (→ page 65).

Register the machine name for initial start-up (→ page 65).

▼

Retrieve the embroidery data by using explorer (→ page 66).

"Chapter 4 Selecting and Transferring Embroidery Data" (→ page 67)

▼

Edit the retrieved embroidery data.
"Chapter 5 Editing Embroidery Data" (→ page 91)

Click of the machine controller.

▼

Press on the operation panel.

▼

Press

on the operation panel.

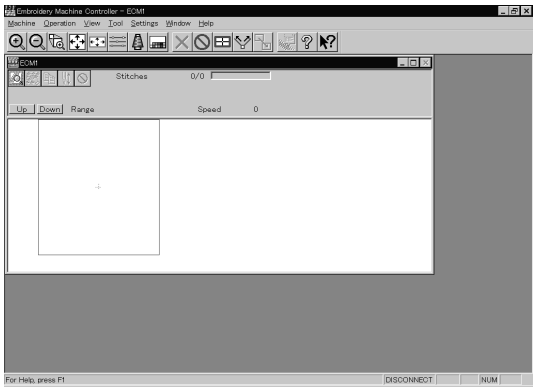
Run the Software

1. Double-click the shortcut icon "Brother Embroidery Controller" on the desktop.
   The software starts up.

Turn on the Machine Power

1. Turn on the power to the machine.

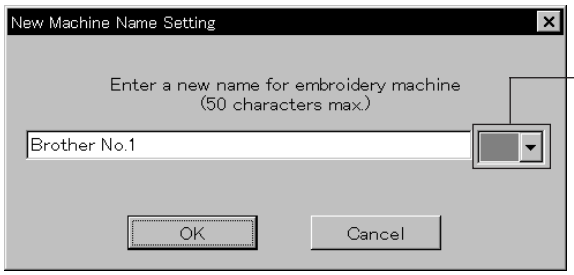
2. The computer screen changes when the machine is turned on.



Register the Machine Name

Enter the machine name if the software is run for the first time or when a new machine is connected.

1. Enter a machine name.

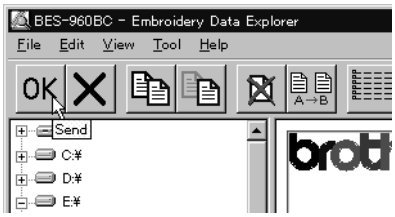


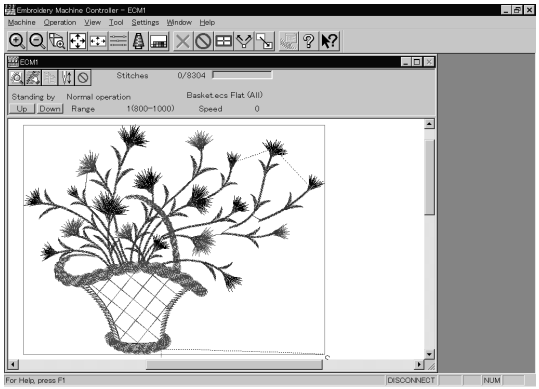
Select an identifying color for the machine.
This color is shown on the title bar for a while when the arrow pointer is moved to the title bar of a machine window.

2. Click [OK].

Retrieve the Embroidery Data

1. Click .
   The embroidery data explorer starts up.

2. Double-click the desired data or click OK after clicking the desired data.


3. The selected data is transferred to the machine controller.


4. Click .
   The data is transferred to the machine for preparation of embroidering.

Start Embroidering

1. Check that the READY lamp on the machine operation panel is on.

   ◯ POWER

   ● READY

2. Press to check the embroidering area.

3. Press to start embroidering.

Chapter 4
Selecting and Transferring Embroidery Data

Clicking on the machine controller brings up a screen which allows selecting or transference of registered embroidery data. Moving, copying, and deleting of embroidery data can also be carried out on this screen.

Functions (Command Reference)

File menu

New		Creates a new directory. (→ page 70)
Exit of Selection		Transfers embroidery data to the machine controller. (→ page 71)
Exit		Exits from embroidery data explorer.

Edit menu

Copy		Copies the selected embroidery data. (→ page 73)
Move		Moves the selected embroidery data to a different directory. (→ page 74)
Delete		Deletes the selected embroidery data. (→ page 75)
Rename		Renames the selected embroidery data. (→ page 76)

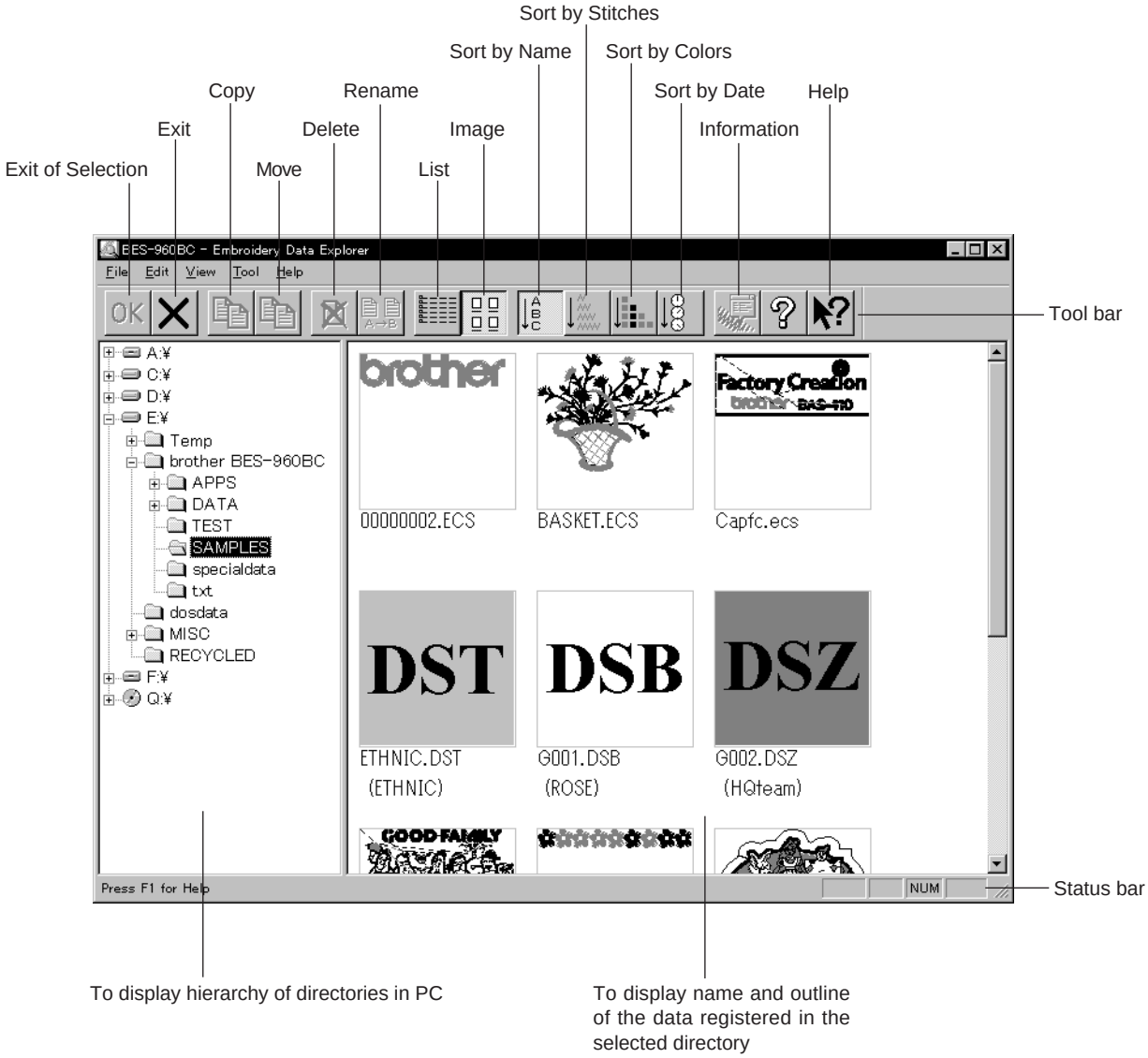
View menu

Tool Bar		Displays the tool bar.
Status Bar		Displays the status bar.
List		Displays embroidery data in the text form. (→ page 79)
Image		Displays the image of embroidery data. (→ page 79)
Sort by Name		Sorts embroidery data by name. (→ page 79)
Sort by Stitches		Sorts embroidery data by the number of stitches in ascending order. (→ page 79)
Sort by Colors		Sorts embroidery data by the number of colors in ascending order. (→ page 79)
Sort by Date		Sorts embroidery data by date. (→ page 79)
Refresh		Displays the latest data by updating the screen. (→ page 79)

Tool menu

Find Files	Retrieves files. (→ page 77)
DST/DSB/DSZ → ECS Conversion	Reads DOS format data. (→ page 80)
Barudan FDR → ECS Conversion	Reads non-DOS format data. (→ page 83)
Barudan FMC → ECS Conversion	Reads non-DOS format data. (→ page 83)
Tape → ECS Conversion	Reads data in paper tape. (→ page 85)
ECS → DST Conversion	Converts ECS data to DST data. (→ page 88)
Setup	Defines settings of data reading. (→ page 87)

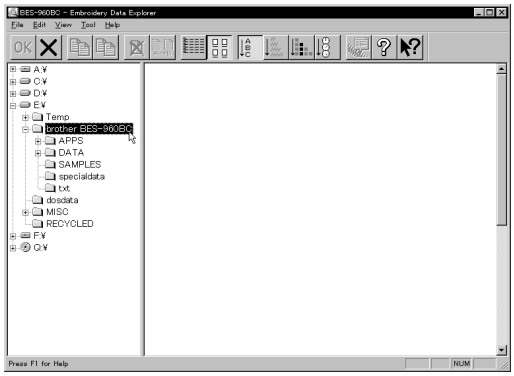
Description of Screen



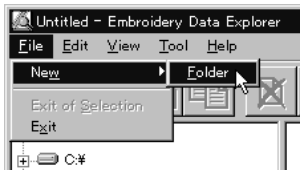
Creating a Directory

Creates a new directory. A directory can be created within another directory.

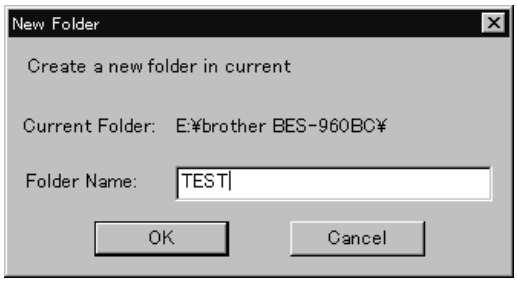
1. Click and select a parent directory in the window on the left.



2. Select [New] - [Folder] from File menu.

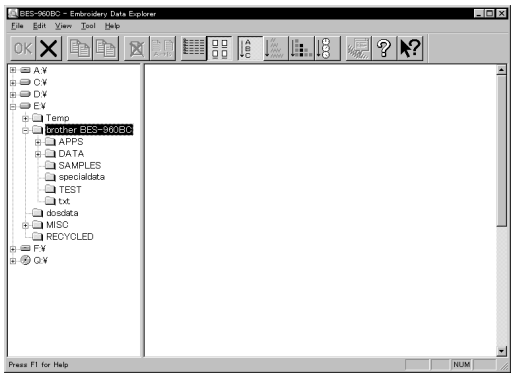


3. Enter a new folder name.



4. Click [OK].

5. A new directory is added to the window.

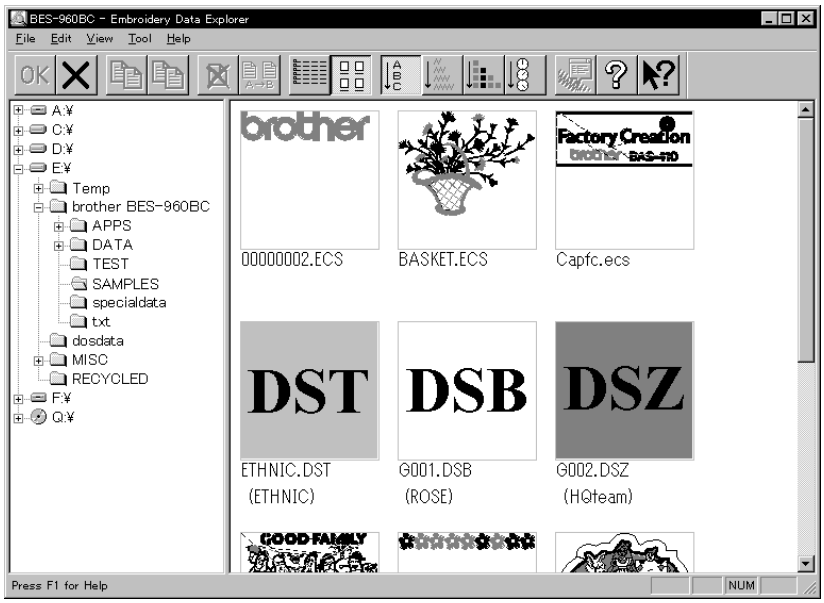


Selecting Data

Transfer registered embroidery data to the machine controller or Embroidery data editor.

1. Double-click data, or click data and OK .

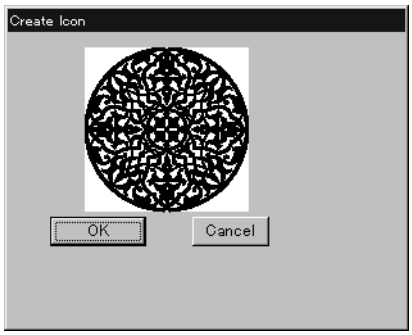
   The explorer exits automatically after transferring the selected data.



Selecting DST and DSB data

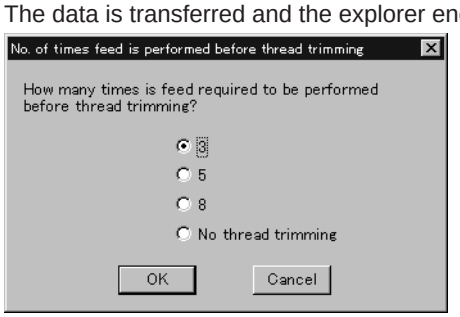
1. Double click DST or DSB data or click the data and click OK .

2. The pattern image is displayed. To read the selected data, click "OK".



3. Set the number of feeds for trim. Select the number of settings and click "OK".

   The data is transferred and the explorer ends automatically.



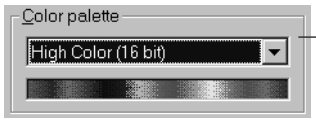
To select data on a network:

1. Before starting the software, click [START] - [PROGRAM] - [EXPLORER].
2. Select [Map Network Drive] from Tool menu.
3. Select the desired drive and enter the path, and click [OK].
4. Exit from the explorer.

If no image appears:

If no image of embroidery data appears, select "Display Detail" on "Screen" of the control panel to adjust display color.
Choose one of the following options, then restart PC.

- 256 colors
- High color (16 bits)
- Full-color (24 bits)



Select the display color using "Color Pallet".

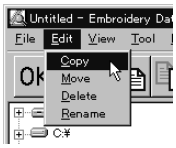
Copy

Copies embroidery data.

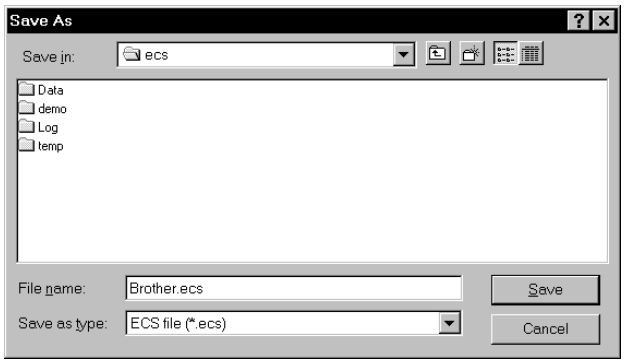
■ Select from the menu or drag the data icon to the destination.

Select from Menu

1. Click data for selection.
2. Select [Copy] from Edit menu or click .



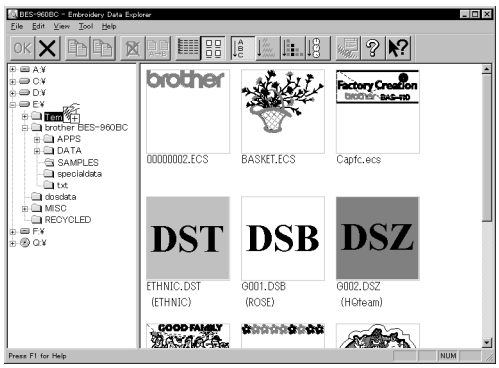
3. Select destination directory. Name copy data.



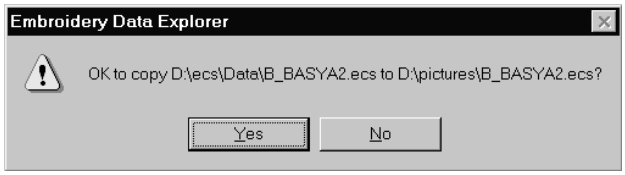
4. Click [Save].

Drag Data

1. Click data for selection.
2. Drag data to destination directory while pressing [Ctrl] key.
   The pointer turns into . Release the mouse button when the directory name is inverted.



3. Check that the copy destination directory is correct, then click [Yes].



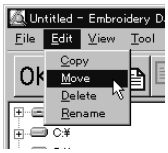
Moving Data

Moves embroidery data to a different directory.

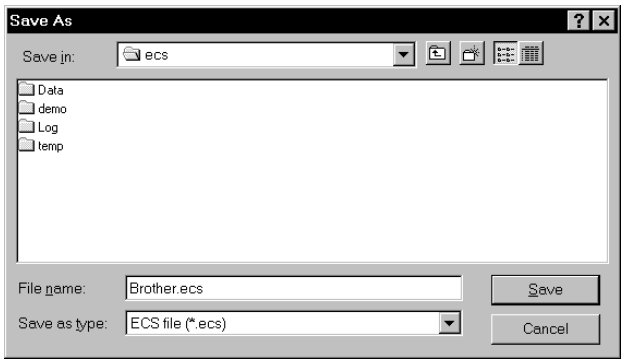
■ Select from the menu or drag the data icon to the destination.

Select from Menu

1. Click data for selection.
2. Select [Move] from Edit menu or click .

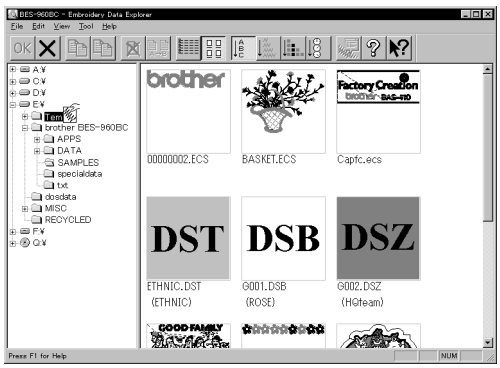


3. Select the destination directory and click [Save].

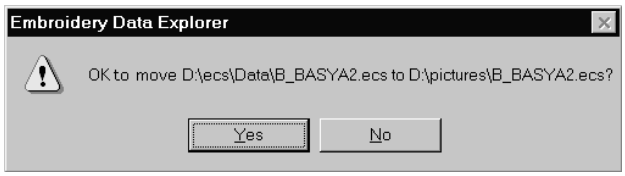


Drag Data

1. Click data for selection.
2. Drag data to the destination directory.
   The arrow pointer turns into . Release the mouse button when the directory name is inverted.



3. Check that the copy destination directory is correct, then click [Yes].

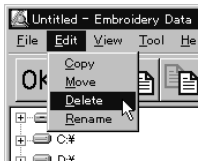


Deleting Data

Deletes embroidery data.

1. Click data for selection.
   The frame of selected data becomes red.

2. Select [Delete] from Edit menu or click .



3. Click [Yes] to delete the selected data.

Renaming Data

Renames the registered embroidery data.

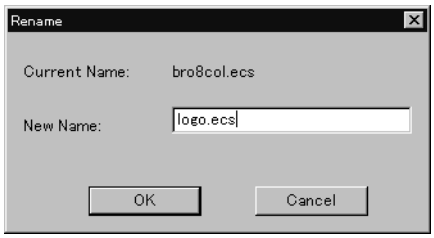
■ Data name consists of the name area and three characters called "extension" which indicates data type. Enter ".ECS" at the end of the data name.

■ Upper and lower cases are not distinguished in the data name.

1. Click data for selection.
   The frame of selected data turns red.

2. Select [Rename] from Edit menu or click .

3. Enter a new data name.
   Enter a data name including extension.



4. Click [OK].

Finding Data

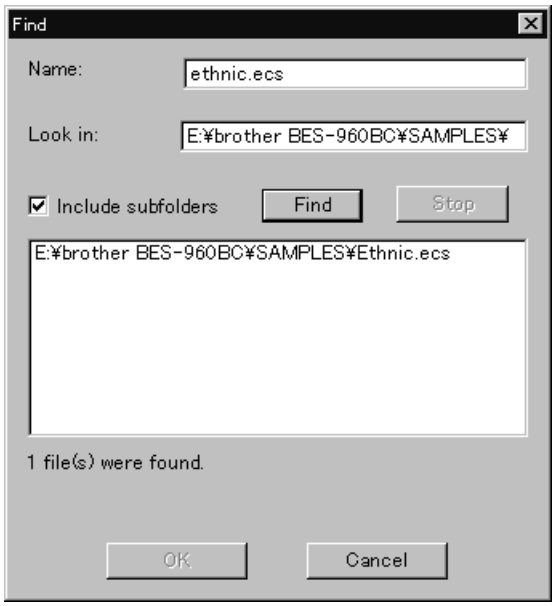
Retrieves and views embroidery data.

1. Select [Find Files] from Tool menu.

2. Enter the file name of embroidery data for search.
   Enter the file name correctly.

3. Click [Find].

If the specified embroidery data is found, the data is displayed.



Finding Files With Wildcard Characters

Wildcard characters can be used as a substitute of a single character or multiple characters. Characters "?" and "*" can be used as wildcard characters for search.

■ Using "?"

The wildcard character "?" represents any single character. For instance, if "Basket?.ecs" is entered to the file name box, the search will find any file name including 'Basket' and a following character. Any number of wild characters can be used to replace other characters.

■ Using "*"

The wildcard character "*" represents a character or combination of characters. For instance, if "*.ecs" is entered to the file name box, the search will find all files with extension "ecs".

Adjusting Screen Display

Selects the information type to display on the screen.

■ Tool bar

If it is checked, the tool bar appears.

■ Status bar

If it is checked, the status bar appears.

■ File display format

Choose either option.

List	Displays a list of all embroidery data names and details in the directory in text format.
Image	Displays a list of all embroidery data names and images in the directory.

■ File sorting order

Choose one of the following options.

Sort by Name	Sorts files by name.
Sort by Stitches	Sorts files by the number of stitches in ascending order.
Sort by Colors	Sorts files by the number of colors in ascending order.
Sort by Date	Sorts files by date.

■ Updating to the latest information

Displays the latest information.

1. Select [Refresh] from View menu.

Reading Data in Floppy Disk

Reads data in a floppy disk and registers it as embroidery data.

■ The following data formats can be registered.

•DOS format data

Tajima	Data with file name "xxxx.DST"
Barudan	Data with file name "xxxx.DSB"
Zanks	Data with file name "xxxx.DSZ"

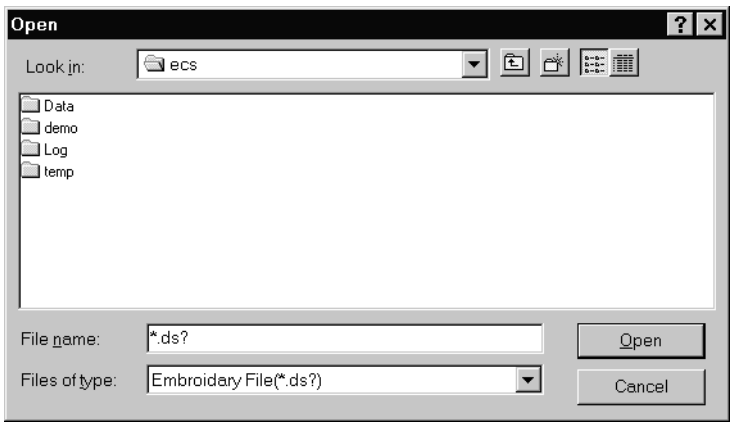
•Other data

Barudan FDR
Barudan FMC

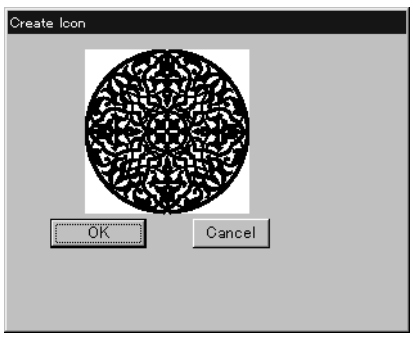
Reading DOS Format Data

1. Select [DST/DSB/DSZ → ECS Conversion] from Tool menu.

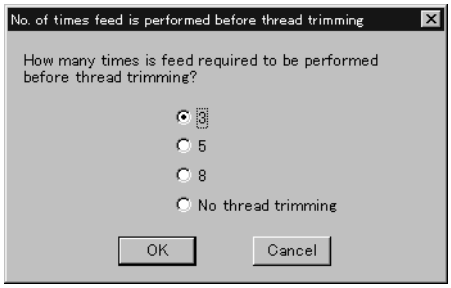
2. Select data to read and click [Open].



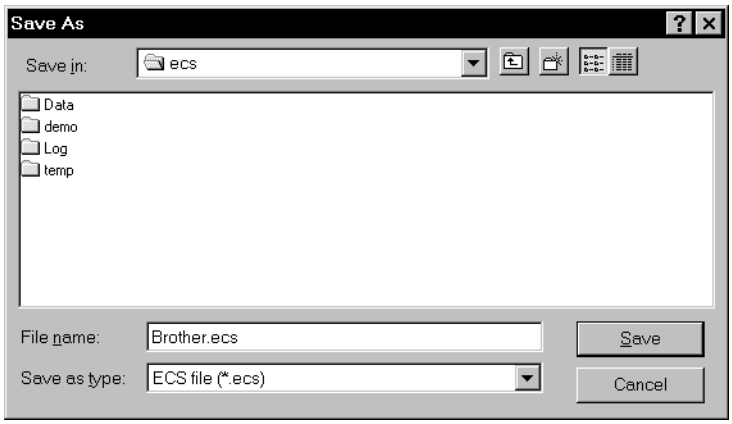
3. The image of the selected pattern appears.



4. Set feed counts for thread breakage. Select the desired count and click [OK].



5. Select the directory to save and name the file.
Do not change extension ".ECS".



6. Click [Save].

Other Data

Viewing Files

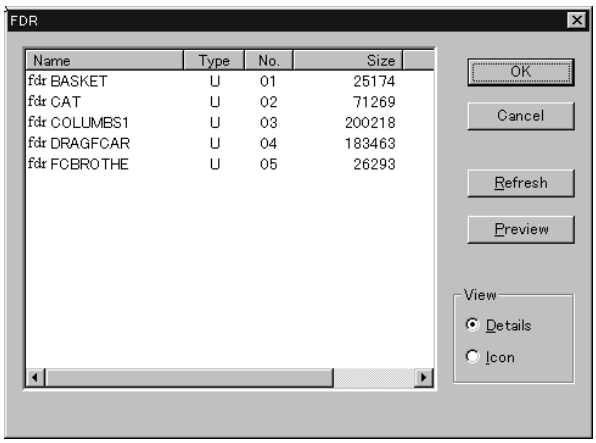
To view files of FDR and FMC data, carry out the following steps:

■ Details

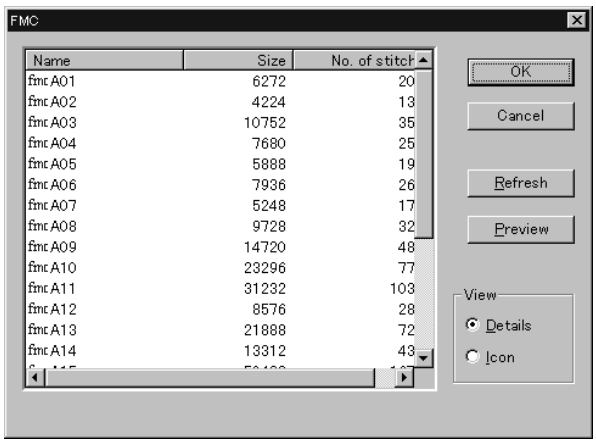
Select "Details" from "View".

Names, types, Numbers and sizes of FDR data are displayed.

Names, types, number of stitches of FMC data are displayed.



When reading FDR data



When reading FMC data

■ Icon

Select "Icon" from "View".

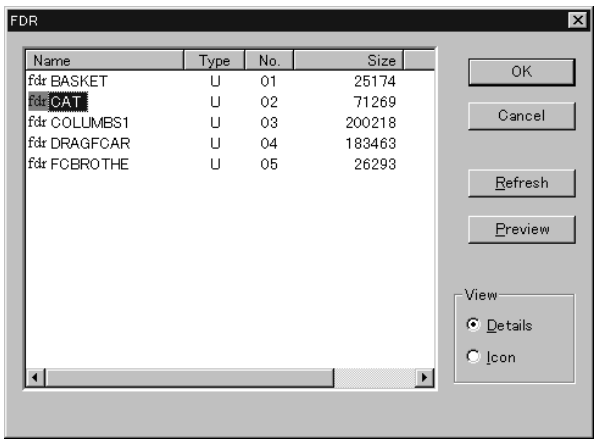
■ Preview and Refresh

The data image can be displayed before reading the data. Click the desired icon or the name for display. Select "Preview" to display the data image. On the detailed display, "fdr" and "fmc" changes to image display. To cancel the preview, click "Refresh".

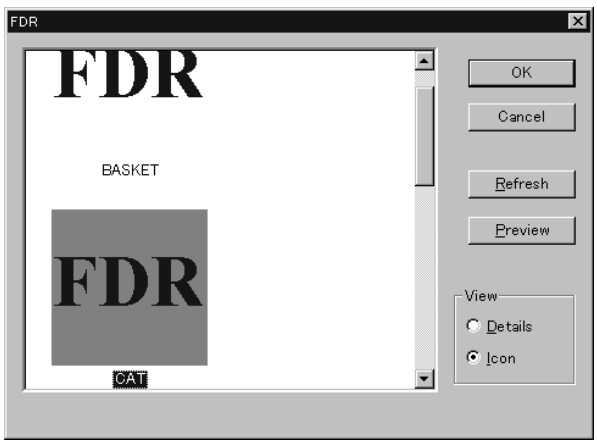
1. Set the floppy disk such as Barudan which is non-DOS format at the floppy disk drive of the PC.

2. Select [Barudan FDR → ECS Conversion] or [Barudan FMC → ECS Conversion] from Tool menu.

3. Select data to read and click [OK].

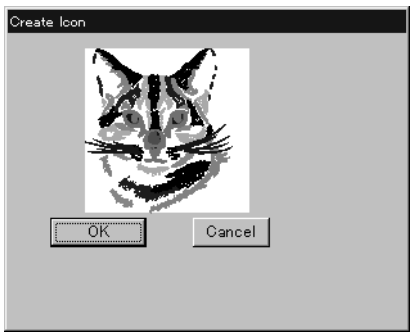


When "Details" is selected

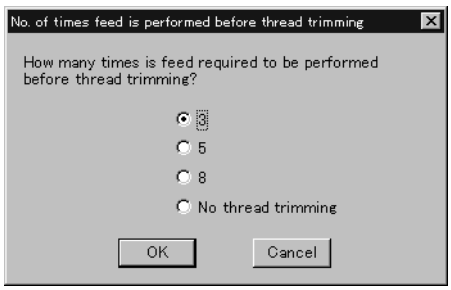


When "Icon" is selected

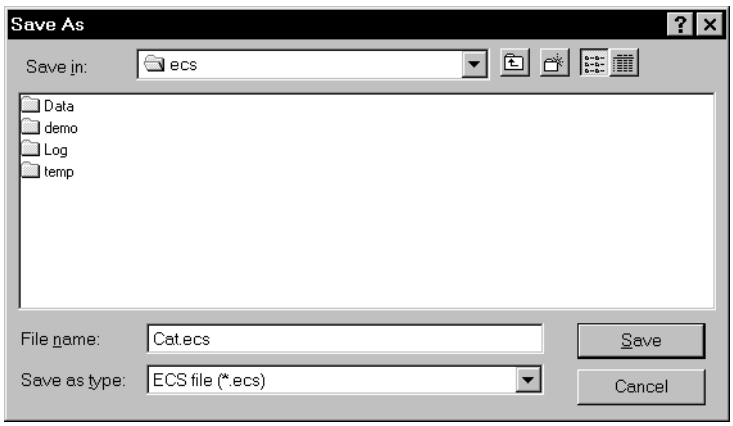
4. The image of the selected pattern appears. To convert the selected data into ECS data. Click "OK".



5. Set feed counts for thread breakage. Select the desired count and click [OK].



6. Select the directory to save the file and name the file.
Do not change extension ".ECS".



7. Click [Save].

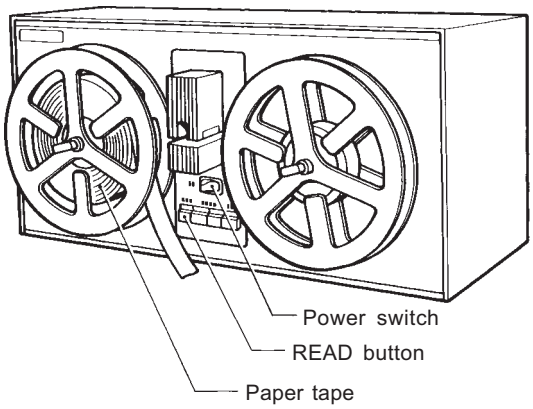
Reading Data in Paper Tape

Saves data in paper tape as embroidery data.

■ An optional paper taper reader is required for reading data.
■ Before saving any data, check that the paper tape reader (optional) is connected to PC correctly. Refer to "Tape Reader" (→ page 240) for connecting procedures.
■ Available interfaces are as follows:
• COM1
• COM2
■ Readable data formats of paper tape are as follows:
• Tajima
• Barudan
• Zanks (ZSK)

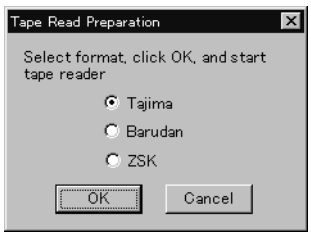
1. Turn on the power to the paper tape reader.

2. Set paper tape after the LED of READ button light up.

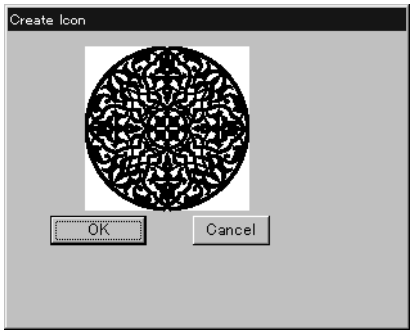


3. Select [Tape → ECS Conversion] from Tool menu.

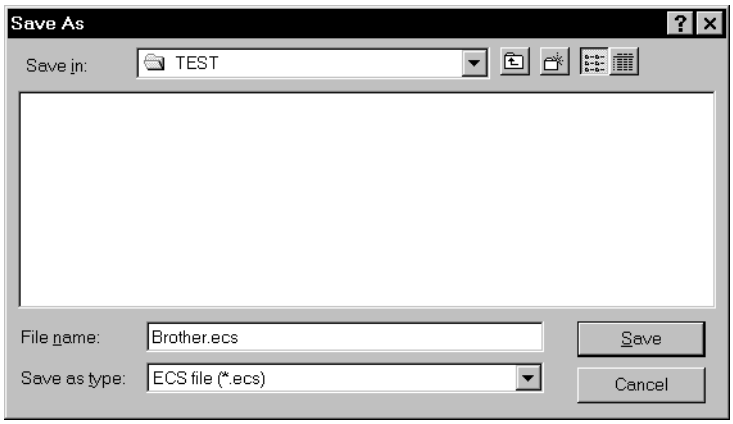
4. Select data format and click [OK].
The paper tape reader (optional) starts reading data.



5. The image of the selected pattern appears.



6. Select the directory to save and name the file.
Do not change extension ".ECS".



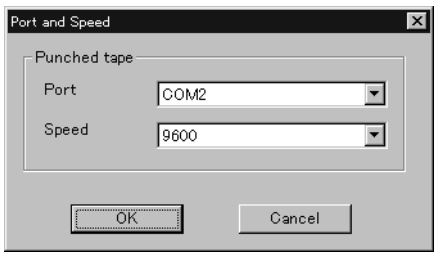
7. Click [Save].

Settings for Data Reading

Sets up the interface and data transfer speed of the paper tape reader or external disk drive.

1. Select [Setup] from Tool menu.

2. Select port and speed.



3. Click [OK].

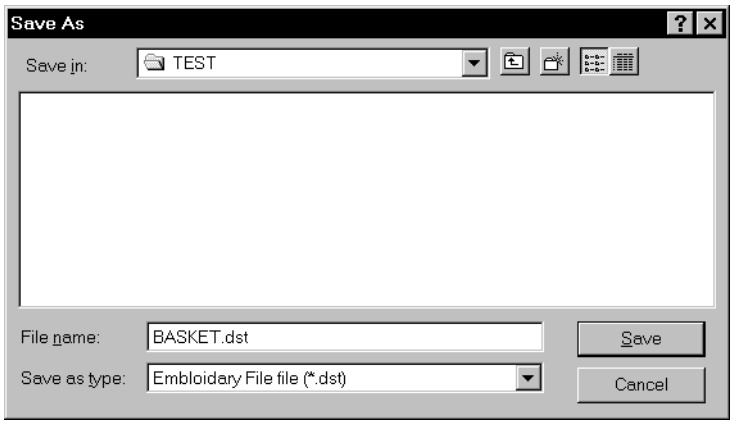
Writing Data in DST Format

Convert the ECS data into DST data for saving.

1. Click the desired ECS data to convert into DST data.

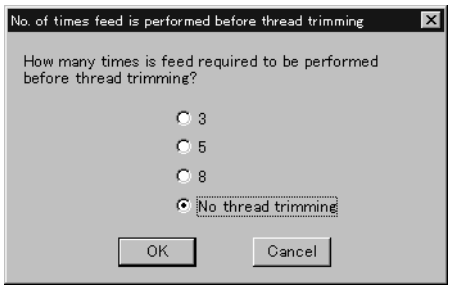
2. Select [ECS to DST conversion] from Tool menu.

3. Select the directory to save and name the file.
   Do not change extension ".dst".



4. Click [Save].

5. Set feed counts for thread breakage.Select the desired count and click [OK].



Viewing Data Information

Detail information of embroidery data can be checked.

■ The following items can be checked.

Pattern name	File name and path of embroidery data
File Version	Version number of the file
No. of stitches	The number of stitches in embroidery data
No. of colors	The number of colors used in embroidery data
Mask Size	Size of masking
Start of Embroidering	Coordinates of embroidering start position
End of Embroidering	Coordinates of embroidering end position
Last modified	Date of last revision of data

1. Click data for selection.
   The frame of the selected data turns red.

2. Select [Design Information] from Help menu or click .

3. After checking, click [OK].

Chapter 5
Editing Embroidery Data

Clicking of the machine controller brings up a screen which allows editing of embroidery data. This screen allows simple processing of embroidery data and display setting of display.

Functions (Command Reference)

File menu

Open		Selects embroidery data. (→ page 95)
Merge		Add other pattern to the pattern in editing. (→ page 115)
Save		Saves the edited embroidery data over the current file. (→ page 117)
Save as		Saves the edited embroidery data as a separate file. (→ page 118)
Print		Prints embroidery data. (→ page 120)
Print Preview		Views printing condition of embroidery data.
Print Setup		Designates printer settings.
Exit Editing		Exits from editing of embroidery data.

Edit menu

Undo		Returns to the previous step. (→ page 103)
Redo		Repeats the step of "Undo". (→ page 103)
Rotate		Rotates the image. (→ page 104)
Horizontal Flip		Flips the image horizontally. (→ page 105)
Vertical Flip		Flips the image vertically. (→ page 105)
Point Symmetry		Rotates the image 180 degrees about the center. (→ page 105)
Repeat		Repeats copying of the image. (→ page 105)
Resize		Resizes the image. (→ page 107)
Delete 0 Stitch		Deletes 0-movement stitches. (→ page 107)
Insert or delete code		Insert or delete the code for trim, pause and color change. (→ page 108)
Insert lock stitch		Insert the lock stitch between the first and the second stitch of "trim" - "feed" - "stitch" - "stitch".(→ page 109)

Change menu

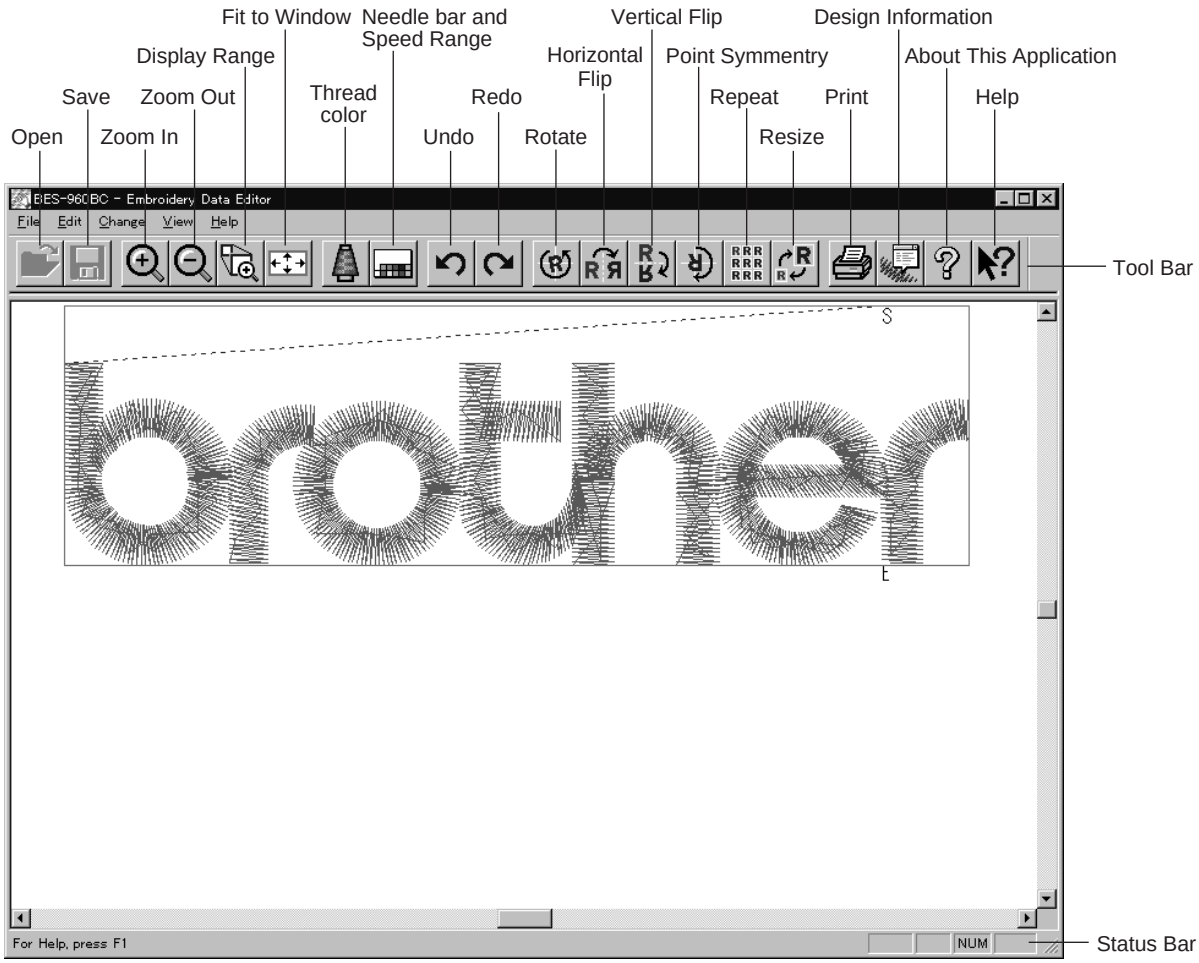
Start	Changes the start position of embroidery data. (→ page 110)
End	Changes the end position of embroidery data. (→ page 111)
Mask	Changes the mask of embroidery data. (→ page 112)
Group	Group the patterns created in "Repeat" into one. (→ page 113)

View menu

Centering		Centers embroidery data. (→ page 96)
Zoom		Zooms in or out. (→ page 96)
Needle Penetration		Displays the needle penetration positions. (→ page 98)

Embroidering Start/End		Displays the start/end positions of embroidering. (→ page 98)
Trim and pause		Displays the code insertion position for trim and pause. (→ page 98)
Needle bar and speed range		Displays the setting screen for needle bar and speed range. (→ page 99)
Thread color		Displays the pattern in thread color. (→ page 101)
Tool Bar		Shows/hides the tool bar. (→ page 102)
Status Bar		Shows/hides the status bar. (→ page 102)

Description of Screen

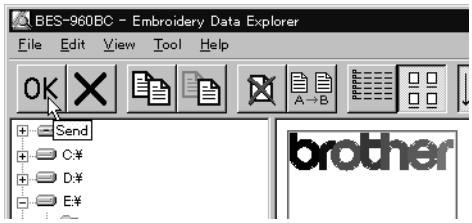


Opening Embroidery Data

This function is available with embroidery data editor.

1. Select [Open] from File menu or click .
   Double-click the data or click the data and .

2. Click a file for selection and click [Open].

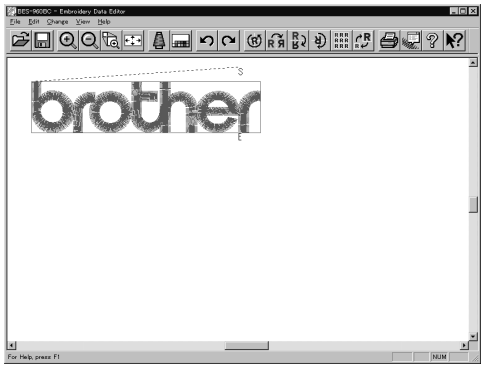


Setting Display

Sets the condition of the display screen. Items with check marks to the left are selected.

Centering

Brings the image to the center of the screen.



Before selecting

After selecting

1. Select [Centering] from View menu.

Zoom

Zooms in/out the pattern.

■ The following four types of zooming are available.

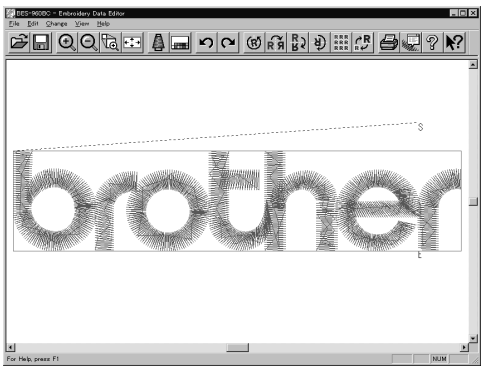
Zoom In	Enlarges the image to 125%.
Zoom Out	Reduces the image to 80%.
Range	Magnifies the range defined by the mouse to the full window size.
Full Window	Displays the whole image to the size of the window.

Zoom In

1. Select [Zoom] - [Zoom In] from View menu or click .

   Repeats zooming of the image by the number of clicks.

Before selecting

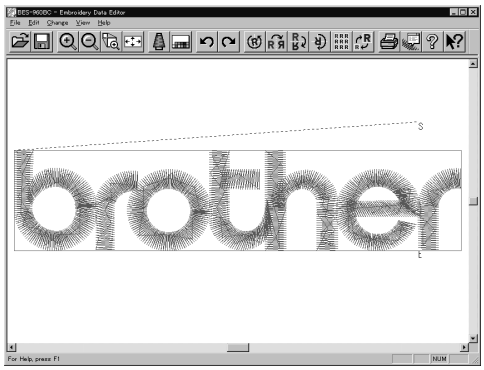


After selecting

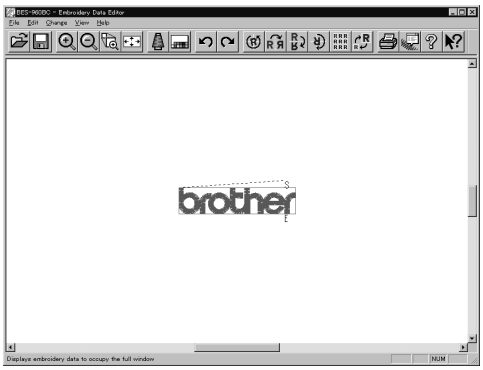
Zoom Out

1. Select [Zoom] - [Zoom Out] from View menu or click .

   Repeats zooming of the image by the number of clicks.



Before selecting

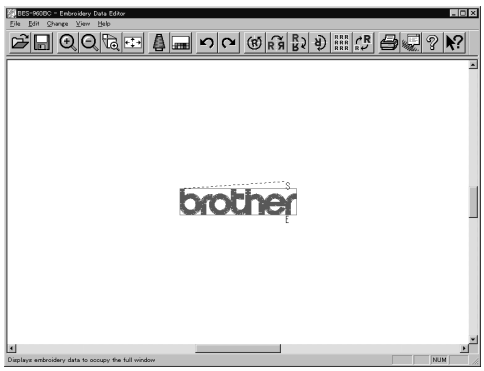


After selecting

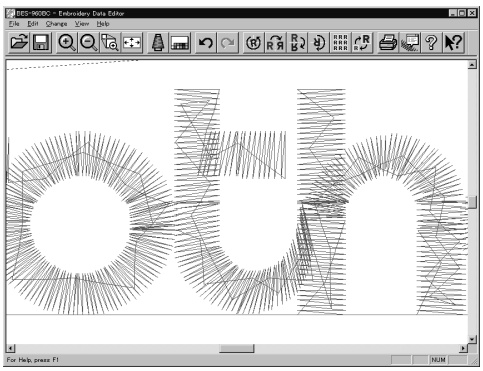
Range

1. Select [Zoom] - [Range] from View menu or click .

2. Drag and define the range to zoom in with the mouse.



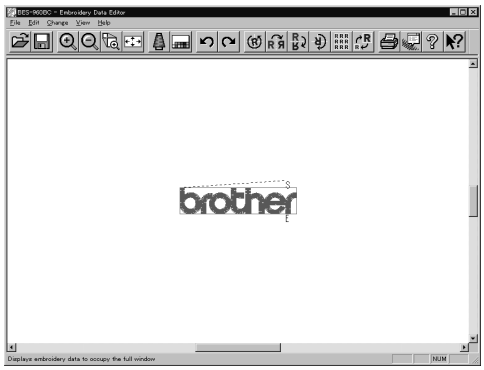
Before selecting



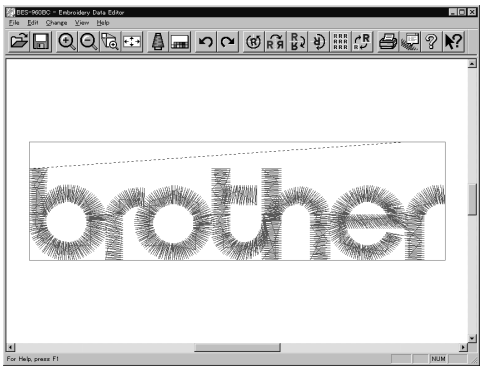
After selecting

Fit to window

1. Select [Zoom] - [Fit to window] from View menu or click .



Before selecting

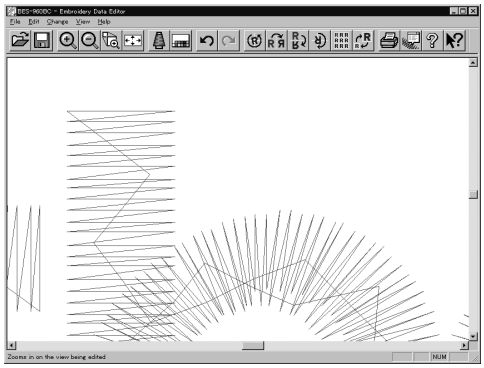


After selecting

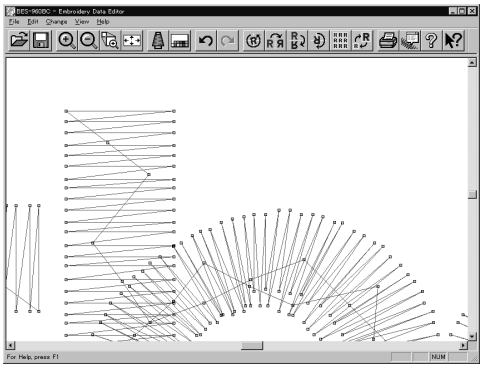
Needle Penetration

Chooses whether or not the needle pevetration positions are displayed.

1. Select [Needle Penetration] from View menu.



Before selecting

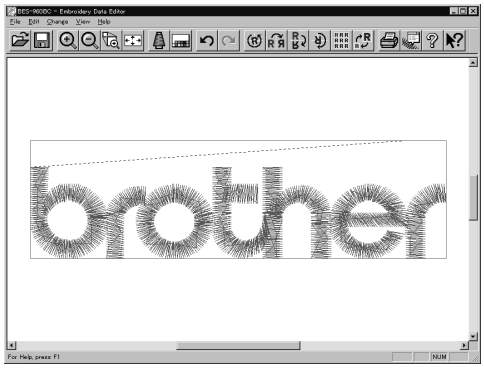


After selecting

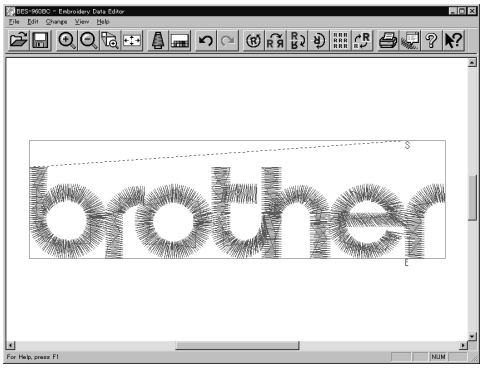
Embroidering Start/End

Displays start and end points as "S" and "E" on the screen respectively.
If points "S" and "E" are identical, "E" has priority over "S".

1. Select [Embroidering Start/End] from View menu.



Before selecting



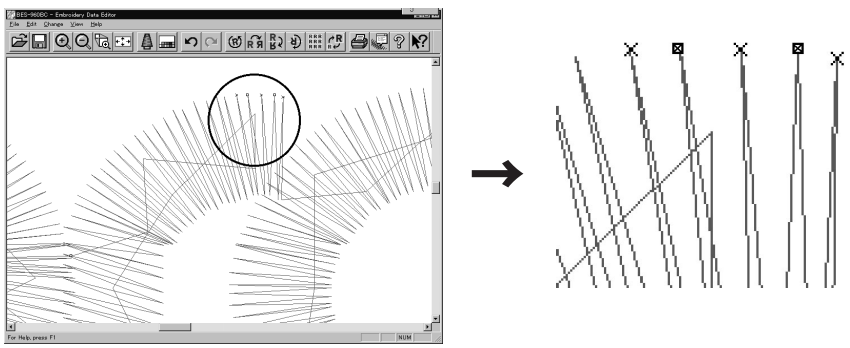
After selecting

Trim and pause

Displays the position of the trim code and the pause code.

Trim is displayed by × and pause is displayed by ⊠ .

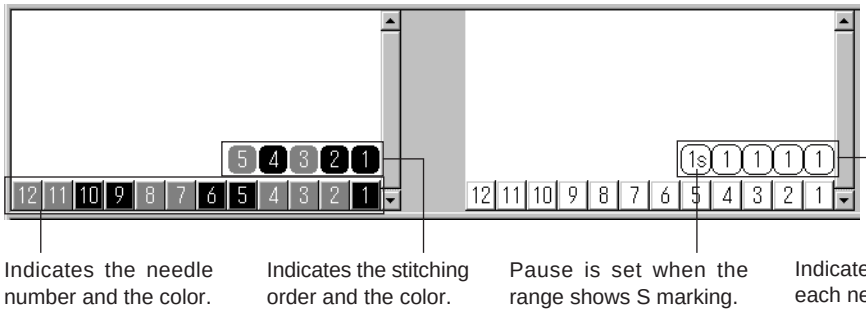
1. Select "Trim and pause" from the "View



Needle Bar and Speed Range

Displays status of the needle bar and speed range.

1. Select the [Needle bar and speed range] from the View menu or click .

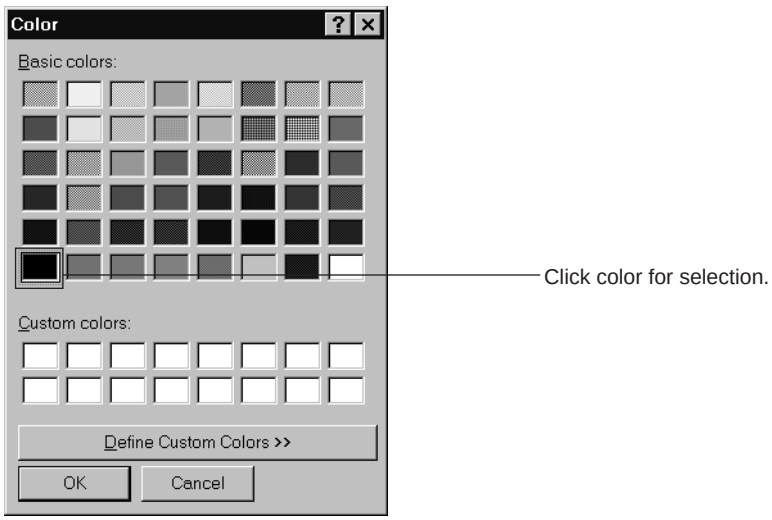


Change of display color

■ When the color of the embroidering sequence is changed, the color displayed on the screen is changed. When ending embroidering or reading other data, the confirmation screen for saving the setting appears.

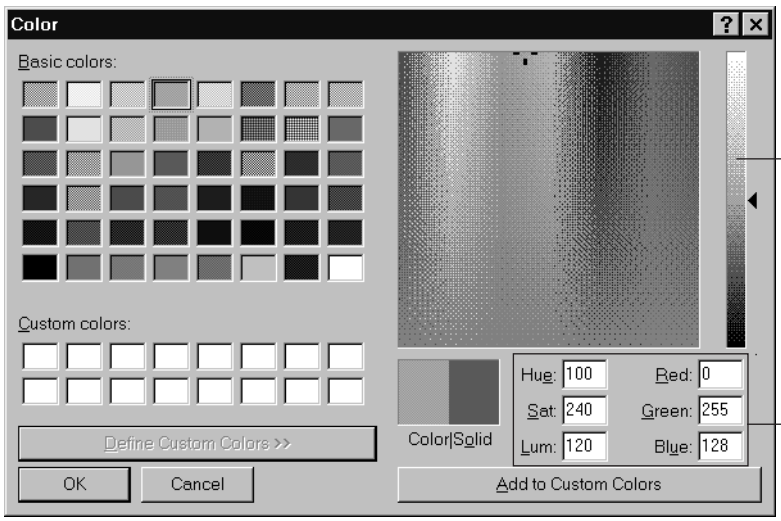
1. Double click the desired embroidering sequence to change the color.

2. Select a new color among the basic colors,then click [OK].

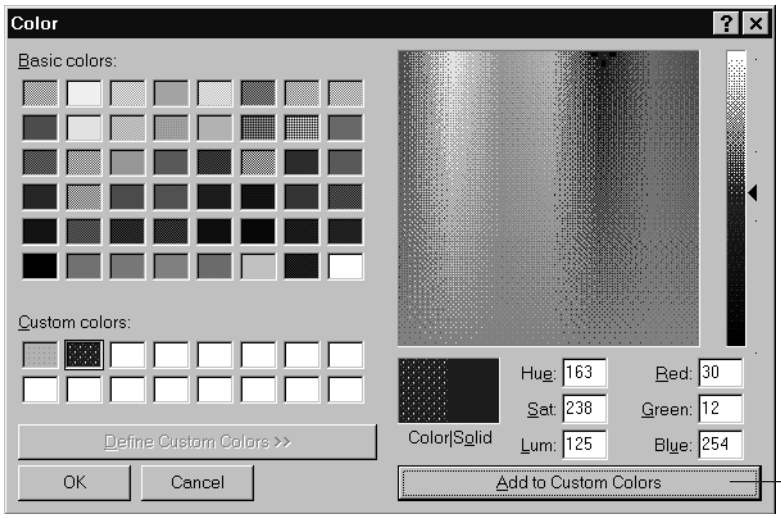


3. Click [Create color] to create a new color.

4. Select a color by clicking on the color chart or by inputting a value.

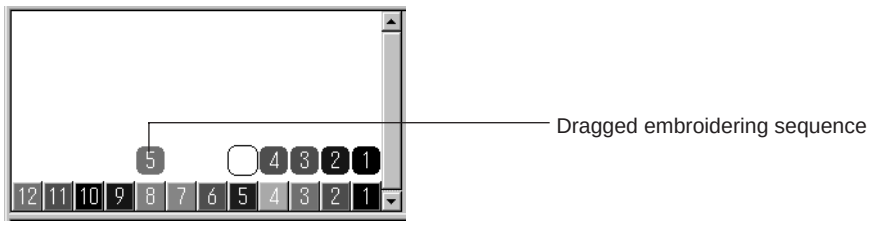


5. Click [Add Color] to register the selected color.



Changing needle bar allocation

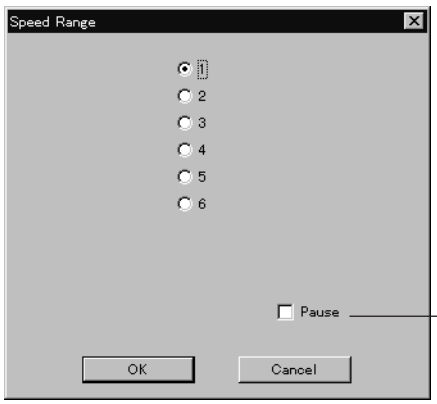
1. Drag the embroidering sequence on the needle bar number.



Setting the range

1. Double click the desired needle bar range to change.

2. Click the desired range.



Click here to put a check mark for pause before starting the designated embroidering sequence.

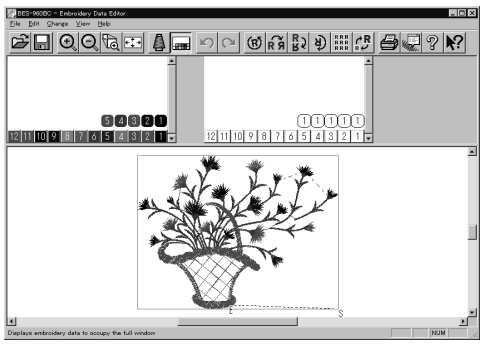
3. Click [OK].

Thread Color

The embroidery data is displayed in thread color.

■ This functions is available only when the embroidery data edit is started from the machine controller.

1. Select [Thread color] from the View menu or click .



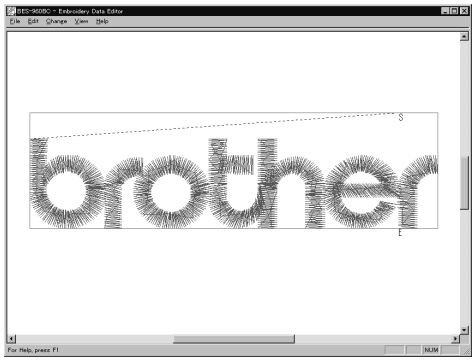
Before selecting

After selecting

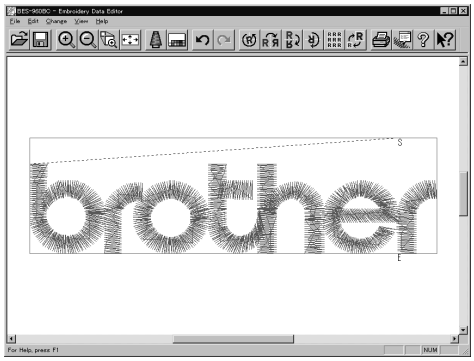
Tool bar

Shows/hides the tool bar. The tool bar contains icons with the same functions as the menu.

1. Select [Tool Bar] from View menu.



Before selecting

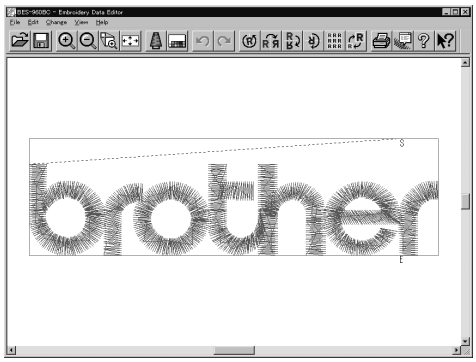


After selecting

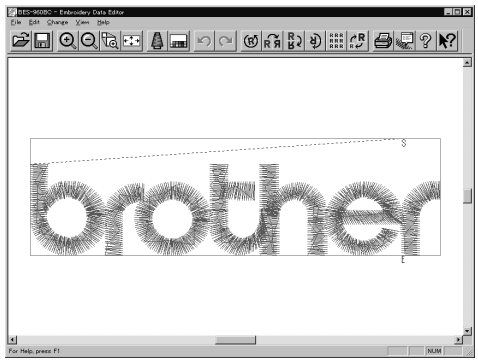
Status Bar

Shows/hides the tool status. The status bar provides information on the current status and advice for operation.

1. Select [Status Bar] from View menu.



Before selecting



After selecting

Back to Previous Status

Undo

Makes the edit or change invalid. The screen returns to the state before the change.

■ The screen can return to 3 steps maximum.

1. Select [Undo] from the Edit menu or click .

Redo

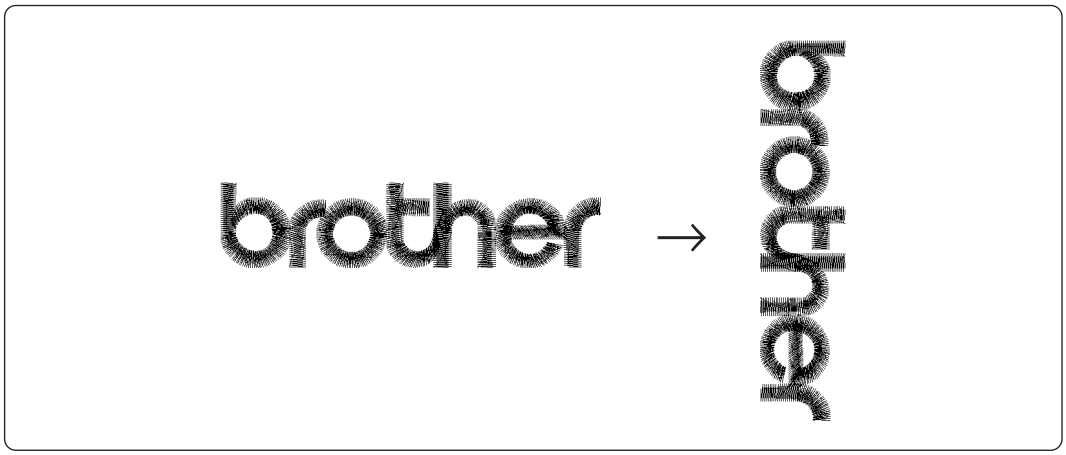
Repeats the canceled step of "Undo".

■ The screen can return to 3 steps maximum.

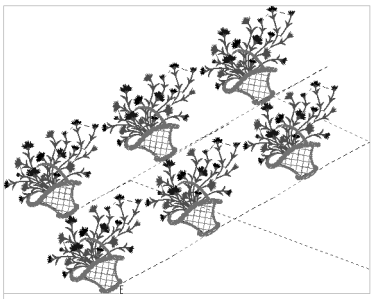
1. Select [Redo] from the Edit menu or click .

Editing

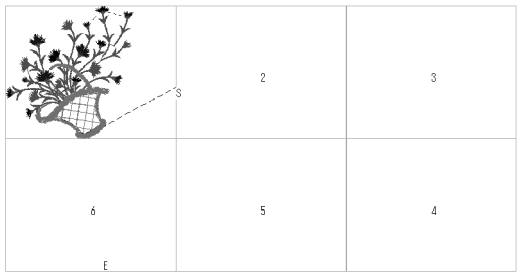
Rotate



■ Available range of rotation is -359 to 359 degrees.
■ When the patterns to be repeated are grouped, the whole pattern rotates. When they are not grouped, each pattern rotates in each hoop.



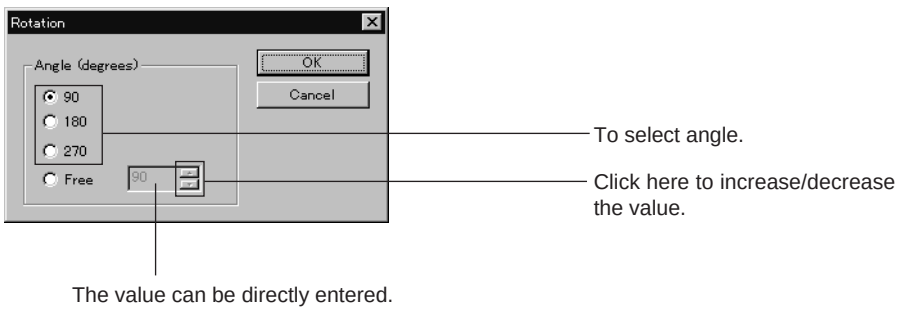
When the patterns are grouped



When the patterns are not grouped

1. Select [Rotate] from View menu or click .

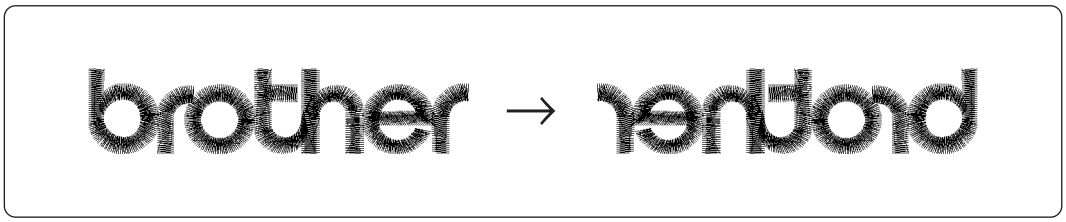
2. Select angle.
If [Free] is selected, specify the angle.



3. Click [OK].

Horizontal Flip

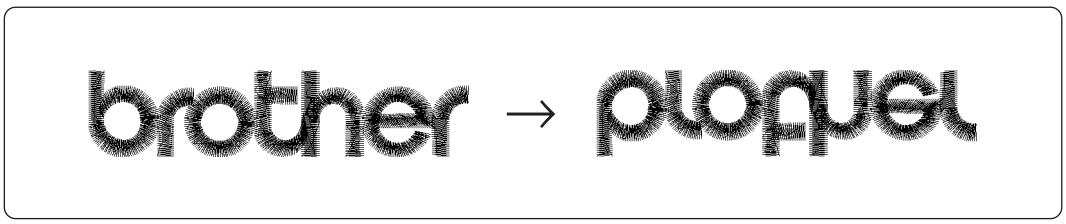
Flips the image horizontally.



1. Select [Horizontal Flip] from Edit menu or click .

Vertical Flip

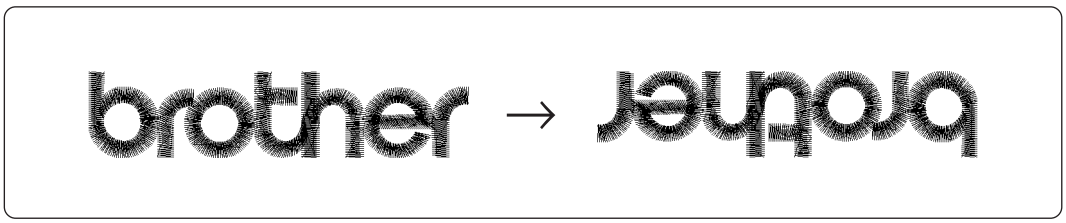
Flips the image vertically.



1. Select [Vertical Flip] from Edit menu or click .

Point Symmetry

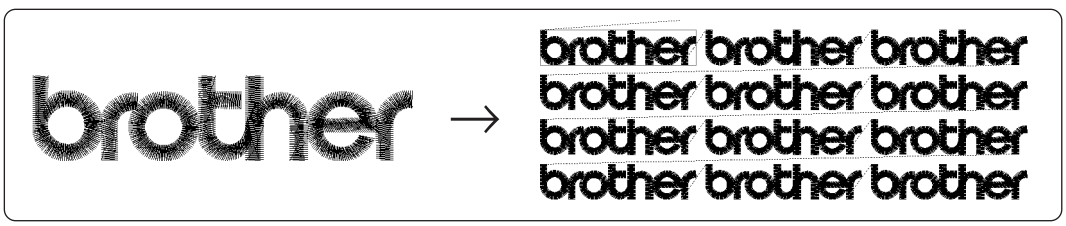
Flips the image 180 degrees to the center position of the image.



1. Select [Point Symmetry] from Edit menu or click .

Repeat

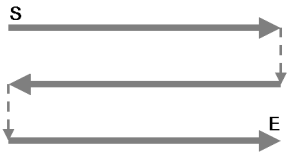
Repeats copying of the image by the specified number.



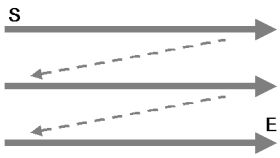
■ The number for repetition is 1 to 100 for both vertical (Row) and horizontal (Column) directions.

■ The unit for repetition can be set in inches. To use the inch unit, set the length to [inch] on the [Configuration] of Tool menu of the machine controller. (→ page 141)

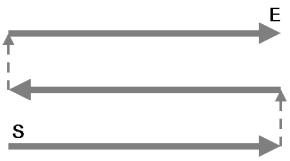
■ The pattern connection can be set in "Direction" as follows:



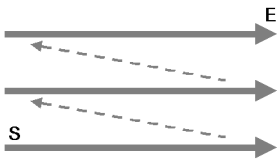
From top left,alternating directions



From top left,left to right direction



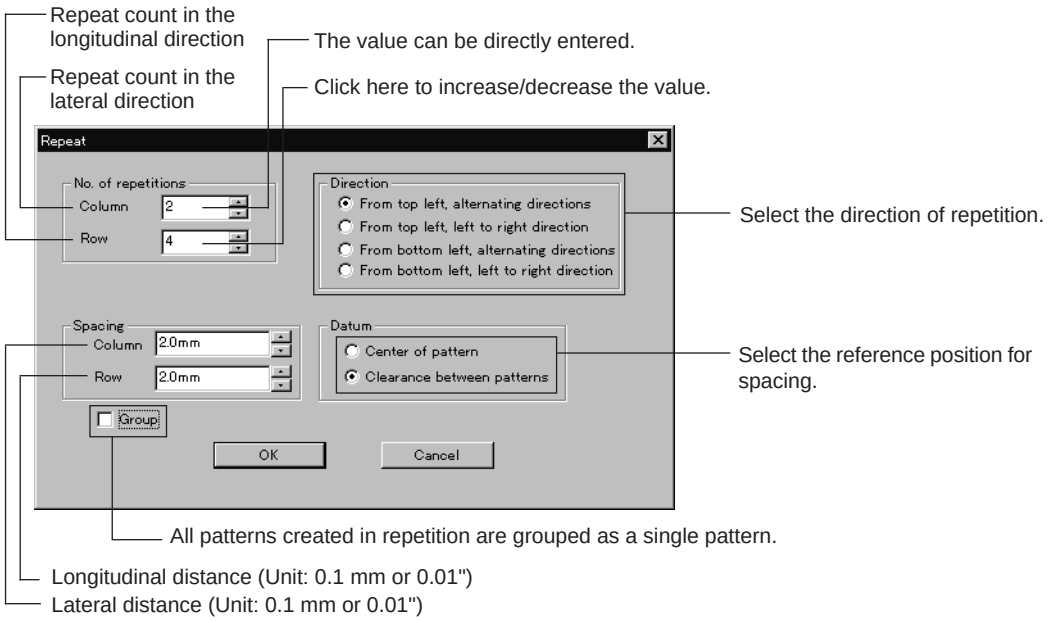
From bottom left,alternating directions



From bottom left,left to right direction

1. Select [Repeat] from Edit menu or click .

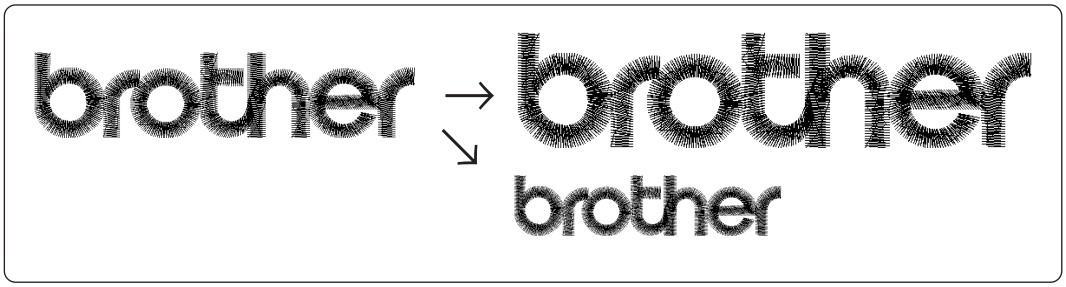
2. Specify the number, interval and direction of repetition.



3. Click [OK].

Resize

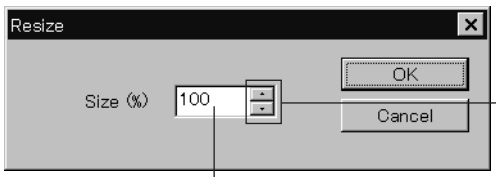
Resizes the image.



■ Available range of resizing is 50 to 200%.
■ Resizing changes the thread density along with the percentage.

1. Select [Resize] from Edit menu or click .

2. Specify the percentage of resizing.



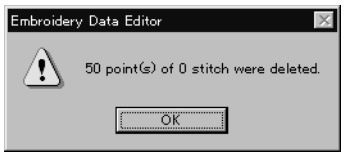
3. Click [OK].

Delete 0 Stitch

Deletes 0-movement stitches.

1. Select [Delete 0 Stitch] from Edit menu.

2. Deleted result is displayed. Click [OK].

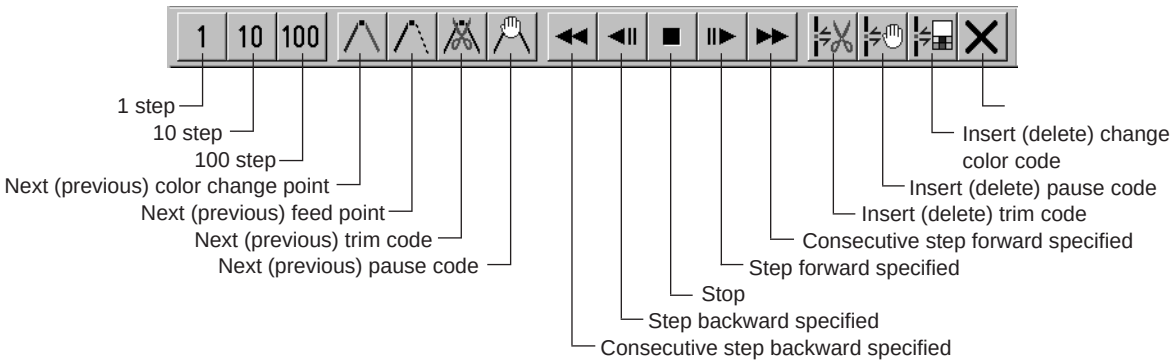


Insert or Delete Code

Codes of trim, pause and color change can be inserted or deleted by moving the needle to the desired position.

1. Select [Insert or delete code] from the Edit menu.

   Needle movement tool bar is displayed.



2. Select the movement method of needle position.

   Click either of the following buttons:

1 step	1	Moves the needle position by 1 step each.
10 step	10	Moves the needle position by 10 step each.
100 step	100	Moves the needle position by 100 step each.
Next (previous) color change point		Moves the needle position to the next (previous) color change point.
Next (previous) feed point		Moves the needle position to the next (previous) feed point.
Next (previous) trim code		Moves the needle position to the next (previous) trim code.
Next (previous) pause code		Moves the needle position to the next (previous) pause code.

3. Move the needle position to the desired position.

   Click either of the following buttons:

Consecutive step backward specified	◀◀	The needle position returns consecutively until the "Stop" button is pressed.
Step backward specified	◀II	The needle position returns for the specified length.
Stop	■	The needle position stops movement.
Step forward specified	II▶	The needle position moves forward for the specified length.
Consecutive step forward specified	▶▶	The needle position moves forward consecutively until the "Stop" button is pressed.

4. Insert or delete the code.

   Click either of the following buttons:

Insert (delete) trim code		Insert (or delete) the trim code at the current needle position.
Insert (delete) pause code		Insert (or delete) the pause code at the current needle position.
Insert (delete) change color code		Insert (or delete) the change color code at the current needle position.

5. To end code insertion or deletion, click ✕.

Insert Lock Stitch

Find the pattern of [Trim] - [Feed] - [Stitch] - [Stitch] and insert the lock stitch between the first and the second stitches.

■ Insertion method of lock stitch depends on the length of the second stitch as follows:

Stitch length	Method of lock stitch
1.2 mm or more	Insert 3 stitches of 0.3 mm stitch.
From 0.9 mm to less than 1.2 mm	Insert 2 stitches of 0.3 mm stitch.
From 0.6 mm to less than 0.9 mm	Insert 1 stitch of 0.3 mm stitch.
Less than 0.6 mm	Do not insert the lock stitch.

■ The inserted lock stitch cannot be deleted. However, use [Undo] in the Edit menu to return to the status before inserting the lock stitch just after the lock stitch is inserted.

1. Select [Insert lock stitch] from the Edit menu.

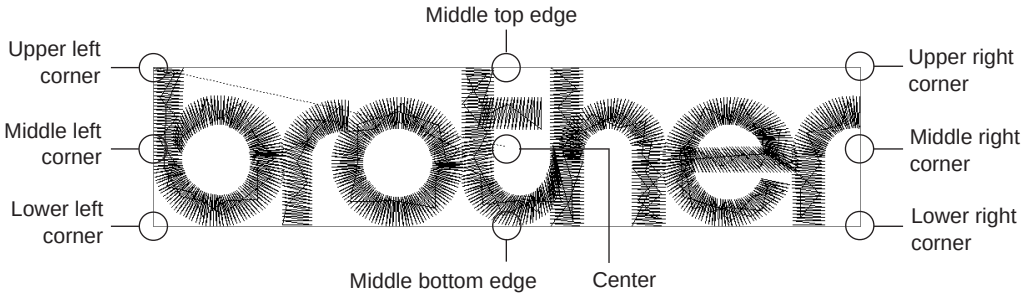
2. If the lock stitch can be inserted, click [Yes].

Changing Data

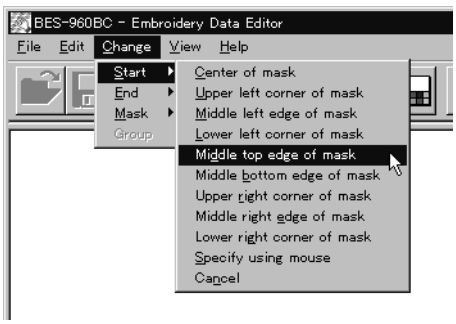
Changing Start

Changes the start position of embroidering.

Options	Functions
Center, upper left corner, middle left corner, lower left corner, middle top edge, middle bottom edge, upper right corner, middle right corner, or lower right corner of the mask	Starts embroidering at the specified position.
Specify using mouse	Starts embroidering at the position clicked with the mouse.
Cancel	Cancels the specified position.



1. Select [Start] from Change menu.

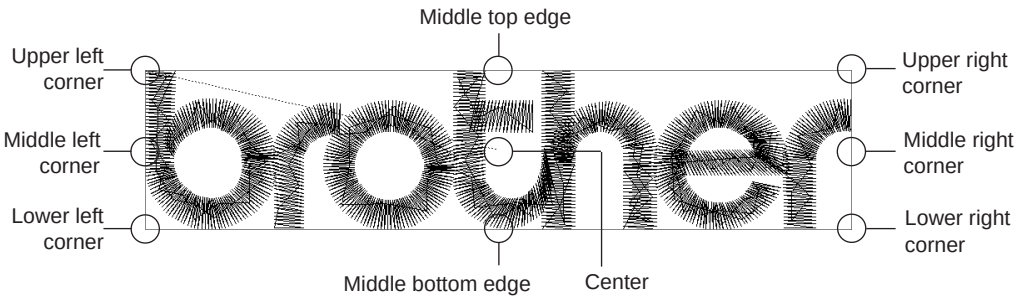


Click the start position if [Specify using mouse] is selected.

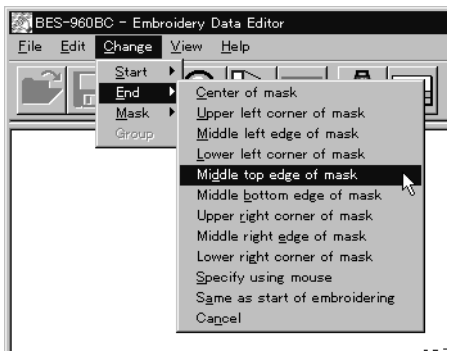
Changing End

Changes the end position of embroidering.

Options	Functions
Center, upper left corner, middle left corner, lower left corner, middle top edge, middle bottom edge, upper right corner, middle right corner, or lower right corner of mask.	Ends embroidering at the specified position.
Specify using mouse	Ends embroidering at the position clicked with the mouse.
End at start position	Ends embroidering at the end position.
Cancel	Cancels the specified position.



1. Select [End] from Change menu.



Click an end position if [Specify using mouse] is selected.

Mask

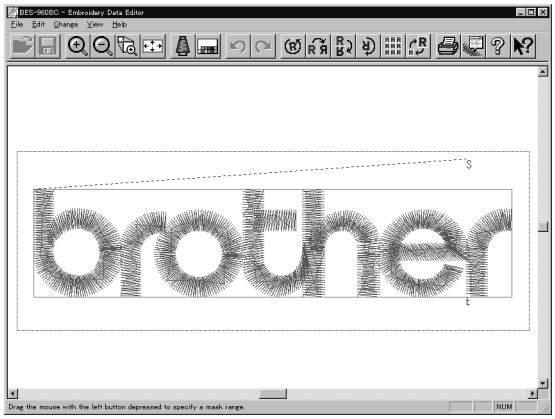
Changes the mask that represents the periphery of embroidery data. Since the automatic mask is a rectangle, the pattern within the hoop may be displayed as an error. In this case, set masking in manual mode.

■ Mask is displayed in a khaki line.

■ There are two types of mask setting as follows:

Automatic	The system measures the image size to create a mask automatically.
Manual	After selecting this mode, specify the mask area using the mouse.

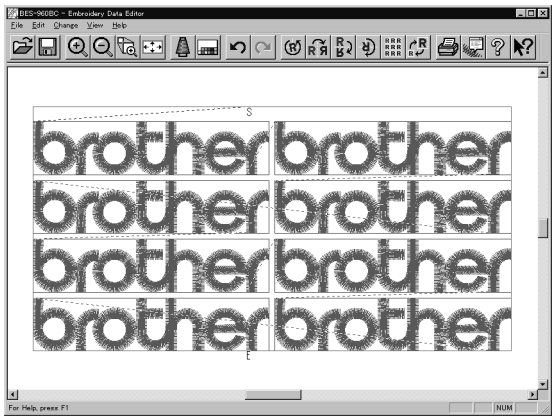
1. Select [Mask] from Change menu. Select automatic or manual mode.
   If [Automatic] is selected, a mask is created automatically.
   If [Manual] is selected, drag the area with the mouse to specify the mask.



Group

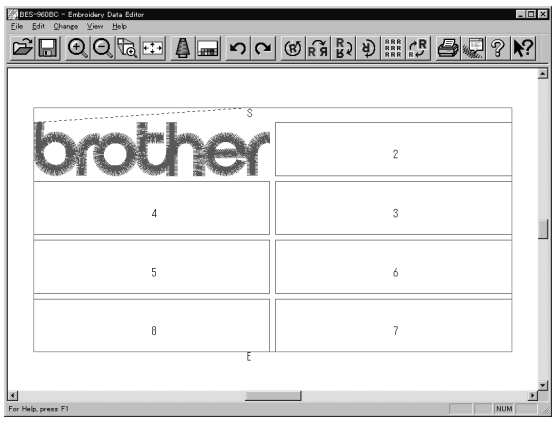
All patterns created in repetition are grouped as a single pattern.

■ The difference between the grouped pattern and the non-grouped pattern is as follows:



When the patterns are grouped

- Each pattern is displayed in each mask.
- The whole grouped pattern rotates. (→ page 104)



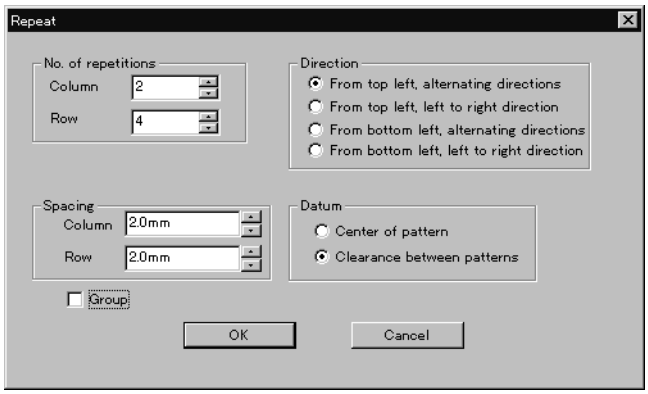
When the patterns are not grouped

- The pattern is displayed only in the original copy source. Figures in other masks represent the embroidering sequence.
- Each pattern in the mask rotates individually. (→ page 104)

Setting Group for Repetition

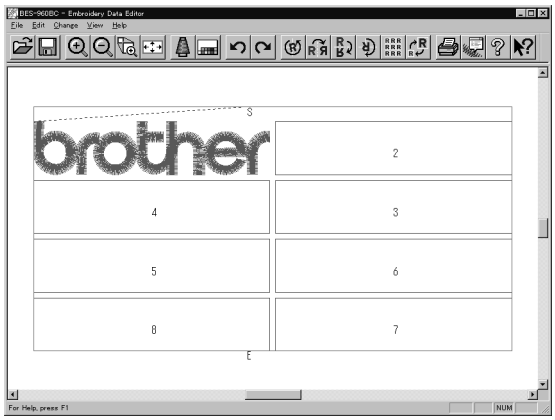
1. Select [Repeat] in the Edit menu or click .

2. Click the checkbox of [Group] to put a check mark.



Selecting from Menu

1. Select [Group] from Change menu.

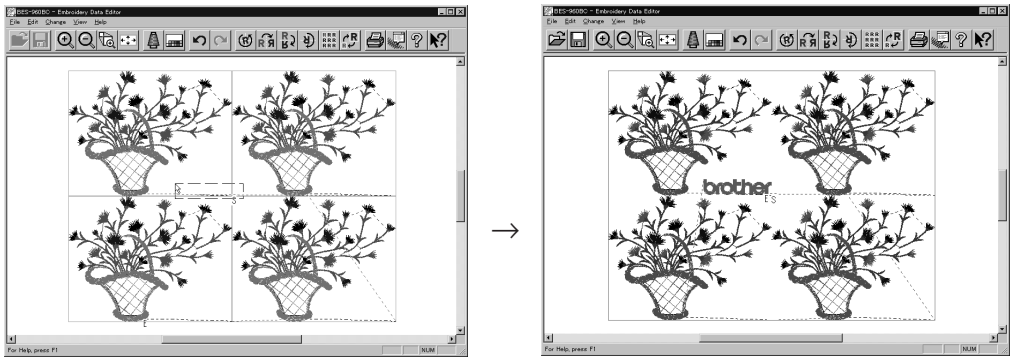


Merge

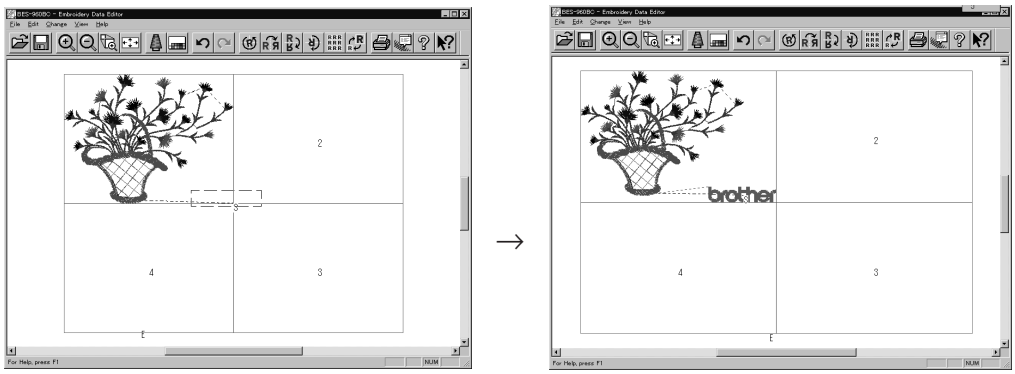
Merge other patterns to the pattern in editing.

■ If the pattern to be merged is repetition data, it is automatically grouped and merged.

■ If the pattern to be merged is grouped repetition data, it is merged at the specified position.

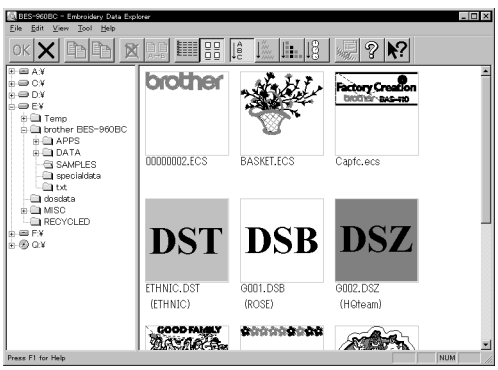


■ If the pattern to be merged is non-grouped repetition data, it is merged to each pattern. If the pattern does not fit the mask, the mask is automatically adjusted.



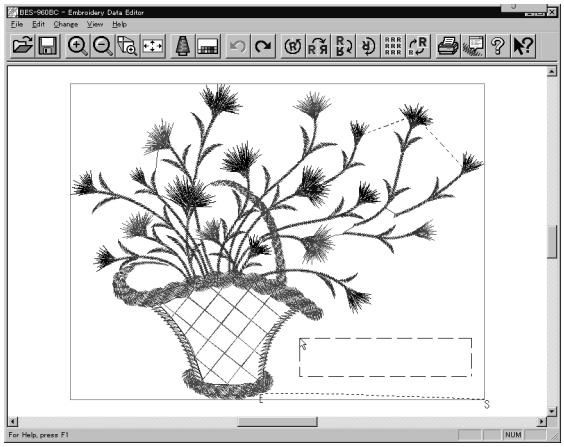
1. Select [Merge] from the File menu.

2. Select the pattern to be merged.



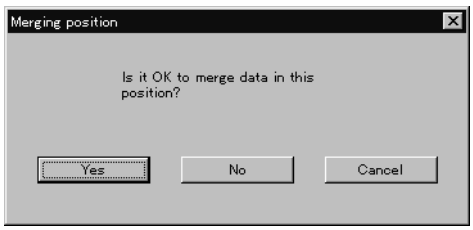
3. The pattern mask is displayed in a broken line. Move the mask to the desired position for merging. Click the mouse.

   Move the mouse while pressing the shift key. The mask moves horizontally and vertically.



4. If the position is acceptable, click [Yes].

   When [No] is clicked, repeat the steps from 3.



5. The pattern is merged.

Saving Data

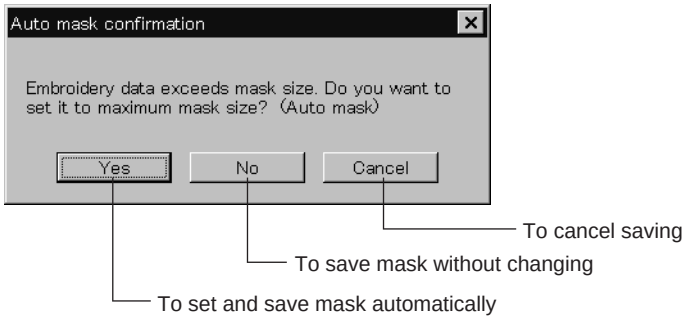
Saves the edited data. The edited data can be saved over the current file or renamed as a separate file.

Save

Saves the edited data over the current file. The original data is deleted.

1. Select [Save] from File menu or click .

2. If the edited data is larger than the mask, choose whether to carry out automatic masking or not.



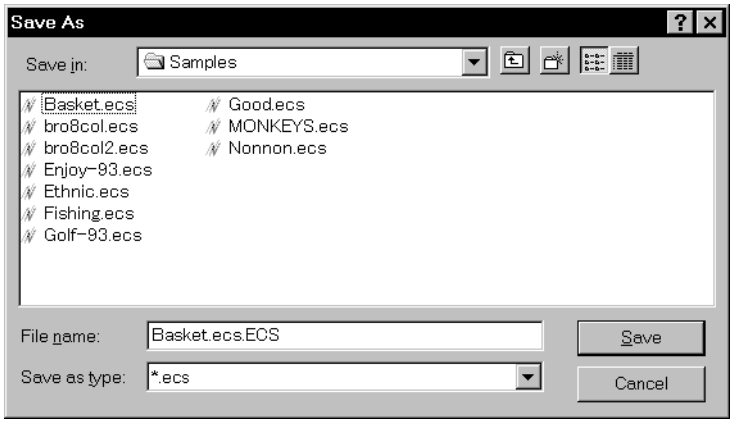
3. If color etc. has been is changed, the pattern image appears.

Save As...

Renames and saves the edited data as a new file.

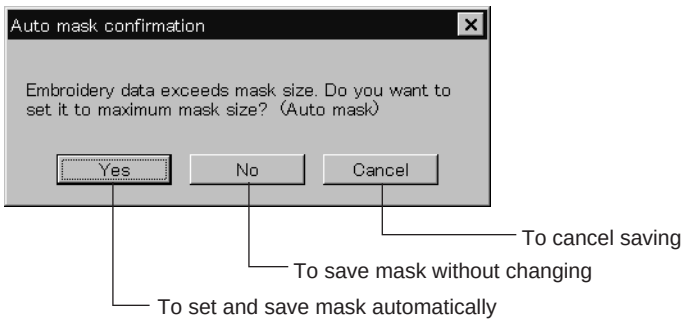
1. Select [Save as...] from File menu.

2. Select the directory to save the new file. Enter a new file name.



3. Click [Save].

4. If the edited data is larger than the mask, choose whether to carry out automatic masking or not.



5. If color etc. has been is changed, the pattern image appears.

Viewing Data Information

Detail information of embroidery data can be checked.

■ The following items can be checked.

No. of stitches	The number of stitches in embroidery data
No. of colors	The number of colors used in embroidery data
Mask Size	Size of masking
Start of Embroidering	Coordinates of embroidering start position
End of Embroidering	Coordinates of embroidering end position

1. Select [Design Information] from Help menu or click .

2. After checking, click [OK].

Printing Data

Prints data in editing.

1. Select [Print] from File menu or click .
   Specify the number of copies and other conditions. Click [OK].

Chapter 6 Embroidering

The PC controls the machine operation as well as settings of the machine. Note that the menu which appears on the screen depends on whether the power to the machine is turned on or off.

Functions (Command Reference)

When the Power to the Machine is Off

File menu

Exit	Exits the machine controller.

View menu

Tool Bar	Displays the tool bar. (→ page 126)
Status bar	Displays the status bar. (→ page 127)

Tool menu

Edit Embroidery Data	Runs the embroidery data editor.
Embroidery Data Explorer	Runs the embroidery data explorer.
Production Report	Runs the production report.
Upgrade Interface Board	(→ page 127)
Reset Interface Board	(→ page 127)

Configuration menu

Communication Port	Sets the communication port between the PC and machine. (→ page 127)
Language	Changes display language. (→ page 128)

When the Power to the Machine is On

Machine menu

Save	The machine data is overwritten for saving. (→ page 171)
Save As	The machine data is saved as a different name. (→ page 171)
Minimize Window Size	Minimizes the size of display screen on the machine. (→ page 138)
Rename Machine	Renames the machine. (→ page 136)
Machine Information	Displays machine information. (→ page 137)
Exit	Exits from the machine controller.

Operation menu

Start Sending	Starts embroidering. (→ page 162)
Stop Machine	Suspends embroidering. (→ page 163)
Cancel Embroidering	Cancels embroidering. (→ page 163)
Home Position	Moves the home position. (→ page 164)
Step F/B	Carries out step-forward or step-back. (→ page 165)
Move Embroidery Position	Moves embroidering position. (→ page 169)
Centering Pattern	Moves pattern to the center. (→ page 170)
Test	Tests the machine. (→ page 173)

View menu

Tool Bar	Displays the tool bar. (→ page 126)
Status Bar	Displays the status bar. (→ page 127)
Zoom In	Zooms in the embroidery data. (→ page 129)
Zoom Out	Zooms out the embroidery data. (→ page 129)
Zoom In Specified Range	Zooms in the specified range. (→ page 130)
Fit to Window	Displays the whole embroidery area. (→ page 130)
Whole Pattern	Displays the whole embroidery data. (→ page 130)
Grid	Displays 1 x 1 cm square grids on the background. (→ page 131)
Hoop	Displays the outline of embroidery hoop. (→ page 131)
Needle Penetration	Displays the position of needle penetration. (→ page 132)
Thread Color	Adjusts the color of the embroidery data to the thread spool. (→ page 132)
Needle Bar and Speed Range	Displays needle bar and speed range. (→ page 132)
Grid Setting	Sets the color and the pitch of grid. (→ page 136)

Tool menu

Language	Changes display language. (→ page 128)
Edit	Allows editing of embroidery data.
Embroidery Data Explorer	Allows selection of embroidery data. (→ page 174)
Production Report	Creates production report. (→ page 174)
Run Embroidery Data Editor independently	Runs the embroidery data editor. (→ page 174)
Run Embroidery Data Explorer independently	Runs the embroidery data explorer. (→ page 174)
Copy to Another Machine	Copies embroidery data to other machines. (→ page 140)
Configuration	Sets configuration for embroidering. (→ page 141)
Version Upgrades	Upgrades the version of the machine parts. (→ page 141)

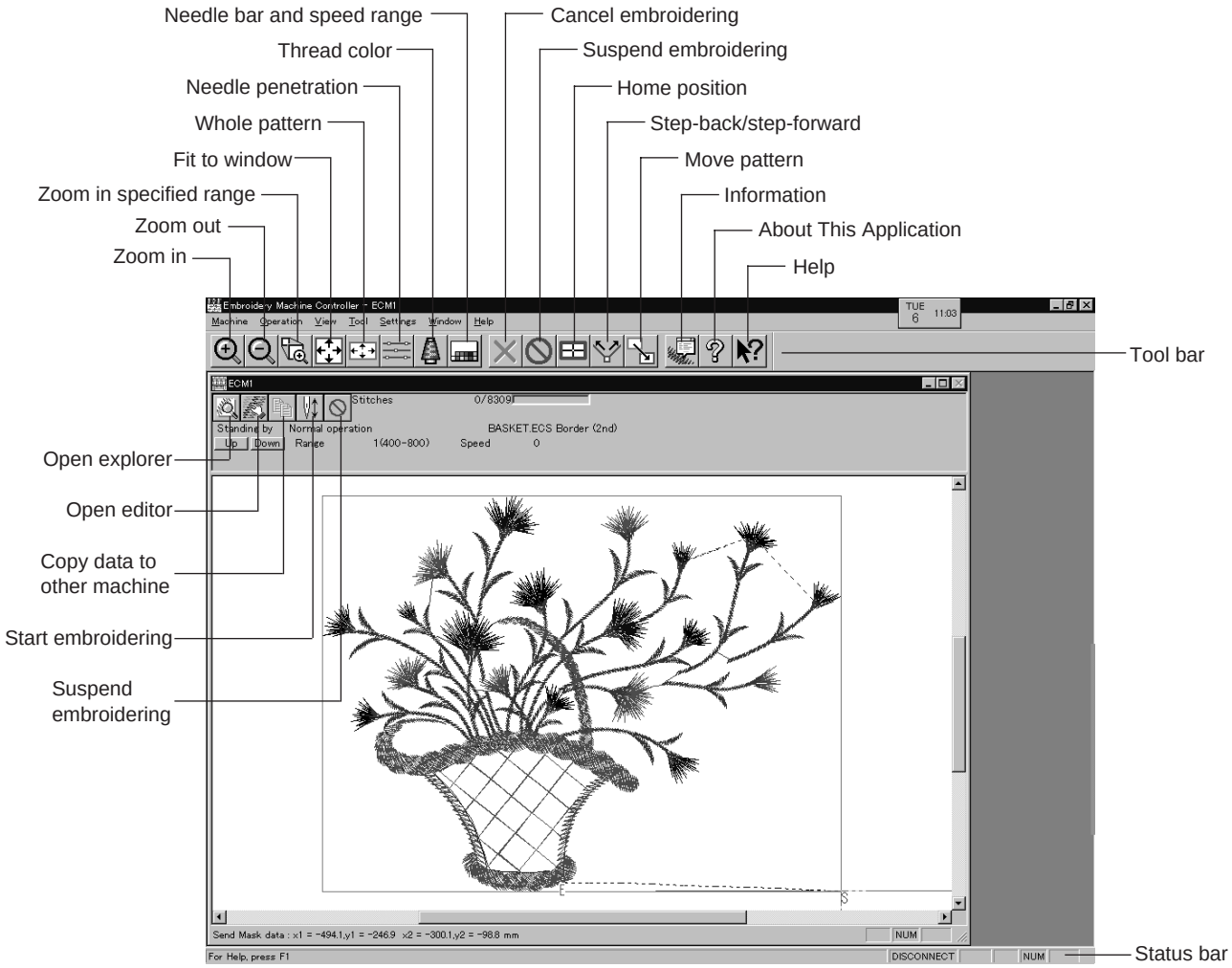
Settings menu

Same Needle Bar	Uses the same needle bar for all embroidering. (→ page 142)
Same Speed Range	Sets the head. (→ page 143)
Speed Range	Defines the speed range. (→ page 144)
Head Operation Suspend	Cancels the head operation which is not halted on the machine side. (→ page 144)
Hoop Feed Position	Sets the hoop feed position. (→ page 145)
Embroidery Area	Sets the area for embroidering. (→ page 146)
Embroidery Hoop	Sets the type of embroidery hoop. (→ page 146)
Thread Trimming	Sets the inching and thread removal amount. (→ page 149)
Boring	Sets boring. (→ page 150)
Thread Breakage Sensor	Sets operation of thread breakage sensor. (→ page 151)
Automatic Step Back	Sets automatic step back count for thread breakage. (→ page 152)
Automatic Hoop Feed	Feeds hoop to the hoop feed position automatically after embroidering. (→ page 152)
End of Embroidery	Sets if the machine returns to the start point after end of embroidery. (→ page 153)
Mending	Sets details of mending. (→ page 154)
Adjust	Sets the adjusting value. (→ page 154)
Default Settings	Resets changes of the machine setting to the default at the factory shipment. (→ page 156)
Show Setting	Shows the contents of settings. (→ page 157)
Load Setting	Loads the setting details. (→ page 158)
Save Setting	Saves the changed setting. (→ page 159)
Load Hoop	Selects the hoop type. (→ page 160)

Window menu

Cascade	Cascades windows. (→ page 137)
Tile	Tiles windows. (→ page 137)
Arrange Icons	Align icons. (→ page 139)

Description of Screen



Settings before Turning On the Machine

Describes settings available before the machine is turned on.

■ The following items can be set.

- Displaying the tool bar
- Displaying the status bar
- Upgrading the version of interface board (*)
- Resetting the interface board (*)
- Communication port
- Language

(*) Dealer engineers carries out version upgrading and resetting of the interface board.

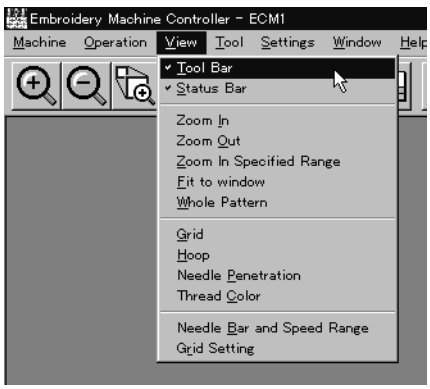
Displaying the Tool Bar

Shows/hides the tool bar. The tool bar contains icons with the same functions as the menu.

■ There are two kinds of tool bars as follows:

Main	Main menu items are displayed on this tool bar.
Step Back	This tool bar appears during step-back/forward.

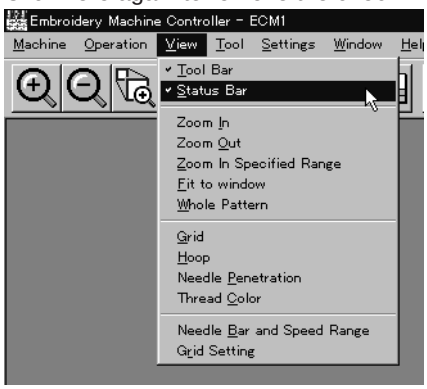
1. Select [Tool Bar] from View menu and put the check mark.
   Click here again to remove the check mark. Then the tool bar disappears.



Displaying the Status Bar

Shows/hides the status bar. The status bar provides information on the current status and advice for operation.

1. Select [Status Bar] from View menu and put the check mark.
   Click here again to remove the check mark. Then the status bar disappears.



Upgrading the Version of Interface Board

Upgrades the version of interface board program connected to PC. This function is protected by a password. A dealer engineer will use this function if required.

Reset Interface Board

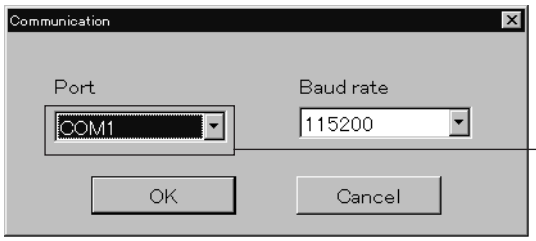
Resets the CPU on the interface board connected to PC to give the same effect as restart.
This function is protected by a password. A dealer engineer will use this function if required.

Communication Port

Sets communication port between PC and machine.

1. Select [Communication Port] from Configuration menu.

2. Select communication port for use.



3. Click [OK].

Language

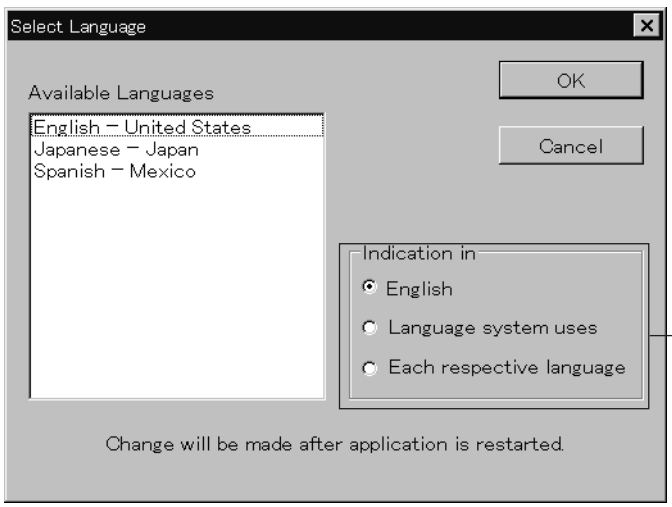
Changes display language.

■ The following three languages are displayed as "Available Languages".

English	Displays English.
Languages system uses	Displays the system language of PC.
Each respective language	Displays the local language.

1. Select [Language] from Configuration menu (Tool menu when the power to machine is on).

2. Select display language among "Available Languages".



When "Each respective language" is selected, the list for "Available Languages" may not be displayed properly.

3. Click [OK].

4. Exit and rerun the software.

Settings after Turning Power On

Describes settings available after turning power on to the machine.

Tool Bar

Shows/hides the tool bar. The tool bar contains icons with the same functions as the menu.

Refer to page 126.

Status Bar

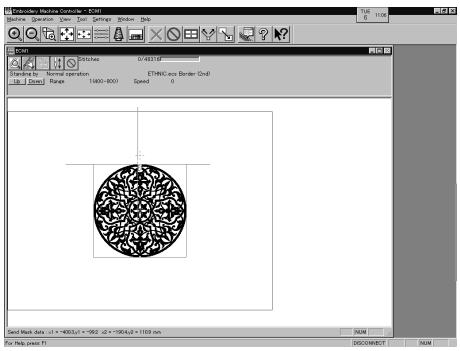
Shows/hides the status bar. The status bar provides information on the current status and advice for operation.

Refer to page 127.

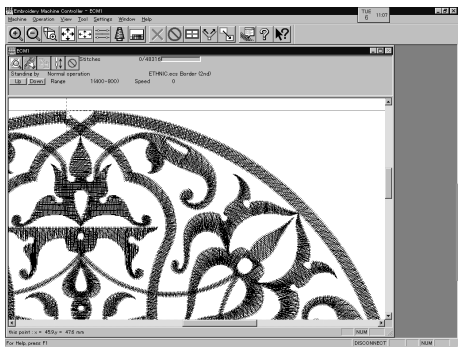
Zoom In

Enlarges the image to 125%.

1. Select [Zoom In] from Display menu or click .
   Repeats zooming of the image by the number of clicks.



Before selecting

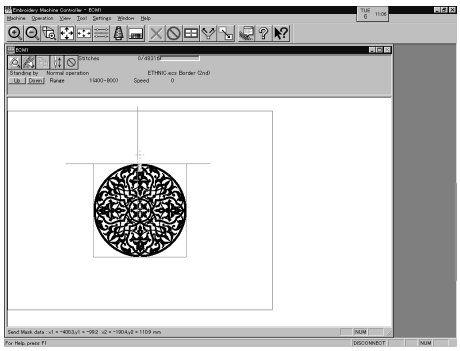


After selecting

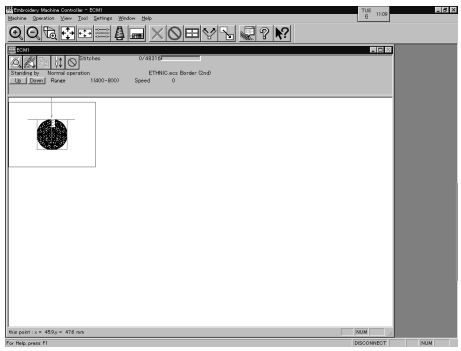
Zoom Out

Reduces the image to 80%.

1. Select [Zoom Out] from Display menu or click .
   Repeats zooming of the image by the number of clicks.



Before selecting



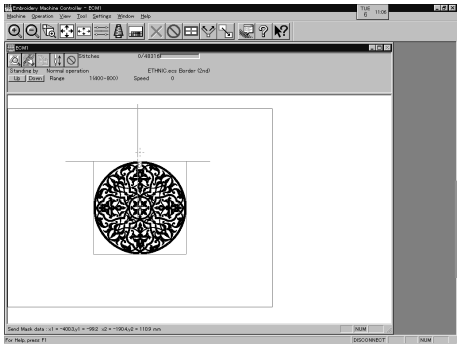
After selecting

Zoom In Specified Range

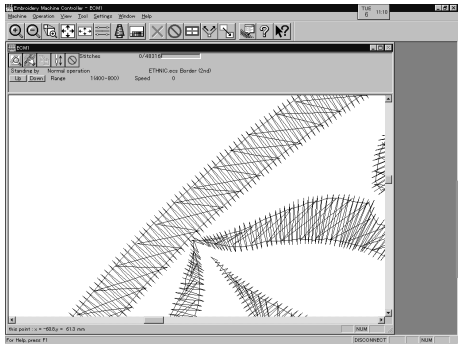
Enlarges the range specified with the mouse to the full window size.

1. Select [Zoom In Specified Range] from Display menu or click .
   The arrow pointer turns into .

2. Drag and specify the range to zoom in with the mouse.



Before selecting

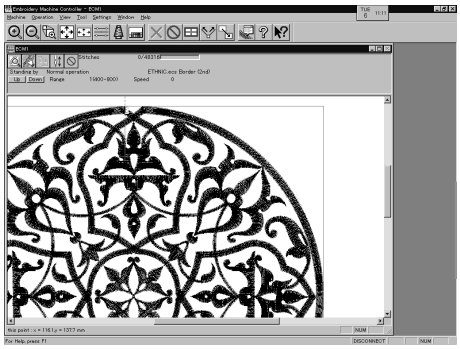


After selecting

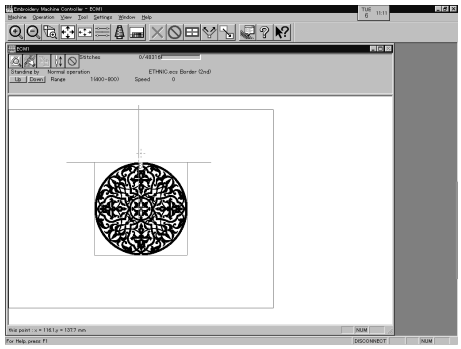
Fit to Window

Displays the whole embroidery area.

1. Select [Fit to Window] from View menu or click .



Before selecting

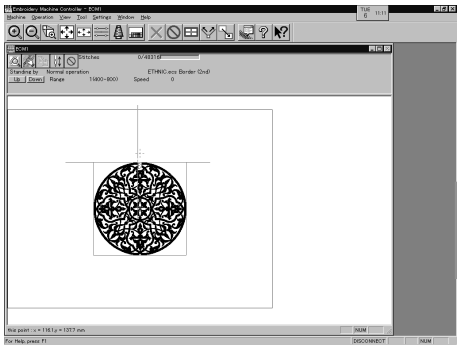


After selecting

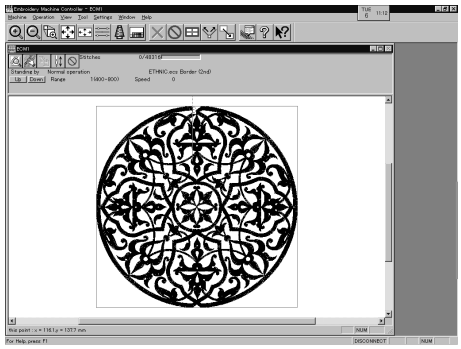
Whole Pattern

Displays the whole pattern.

1. Select [Whole Pattern] from View menu or click .



Before selecting



After selecting

Grid

Displays 1 x 1 cm square grids on the background.

1. Select [Grid] from View menu and put the check mark.

Before selecting

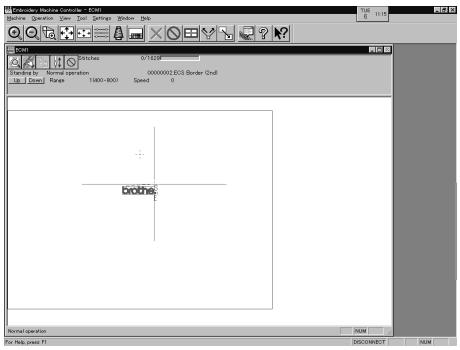
After selecting

Hoop

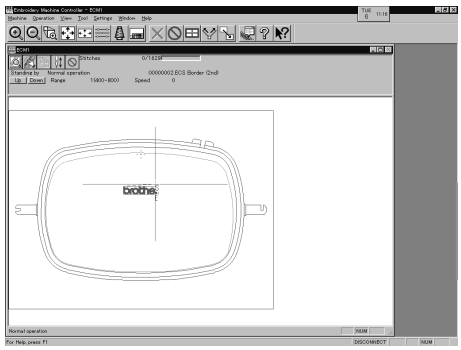
Displays the outline of embroidery hoop. The type of embroidery hoop can be changed in [Load Hoop] of Settings menu.

■ Embroidering is allowed within the green guide in the hoop.

1. Select [Hoop] from the View menu and put a check mark.
   If the hoop is not displayed, carry out the step to read the hoop. For details, refer to [Load Hoop] (page 160).



Before selecting

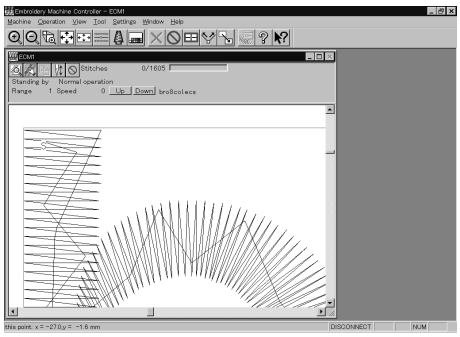


After selecting

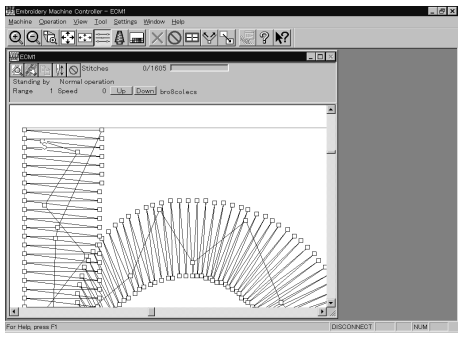
Needle Penetration

Chooses whether or not the needle penetration positions are displayed. Clicking also provides the same function.

1. Select [Needle Penetration] from View menu and put the check mark.



Before selecting



After selecting

Thread Color

Displays the pattern using colors currently set to the needle bar. Clicking also provides the same function.

1. Select [Thread Color] from View menu and put the check mark. Display color of the image changes.

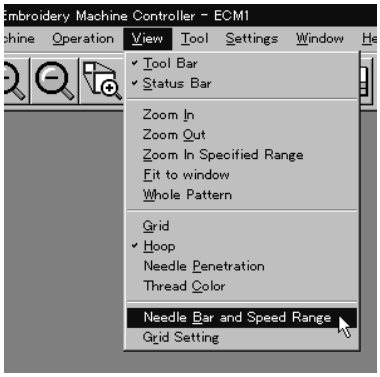
Before selecting

After selecting

Needle Bar and Speed Range

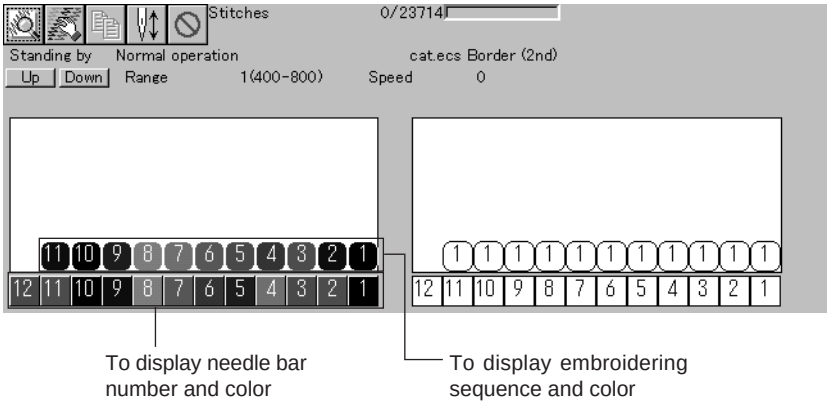
Displays the needle bar and speed range.

1. Select [Needle Bar and Speed Range] from View menu and put the check mark or click .



Setting Needle Bar

Needle bar allocation and display color can be changed on this screen.

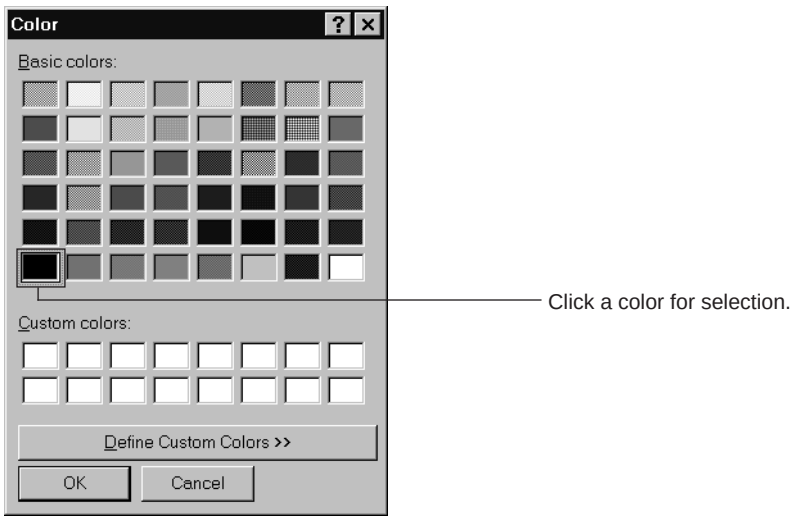


Changing display colors

- The color of needle bar changes to the actual color.
- Changing the thread spool also changes the display color. A confirmation screen to save appears before exiting from embroidering or retrieving other data.

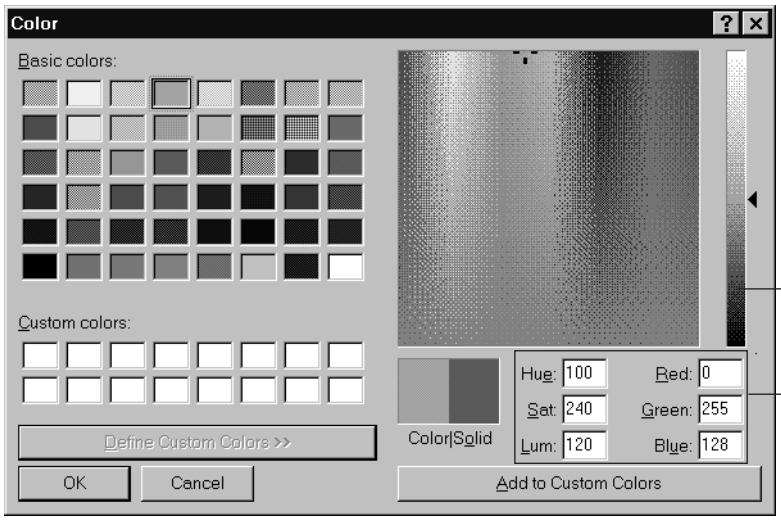
1. Double-click the thread spool or needle bar number.

2. Click a new basic color.

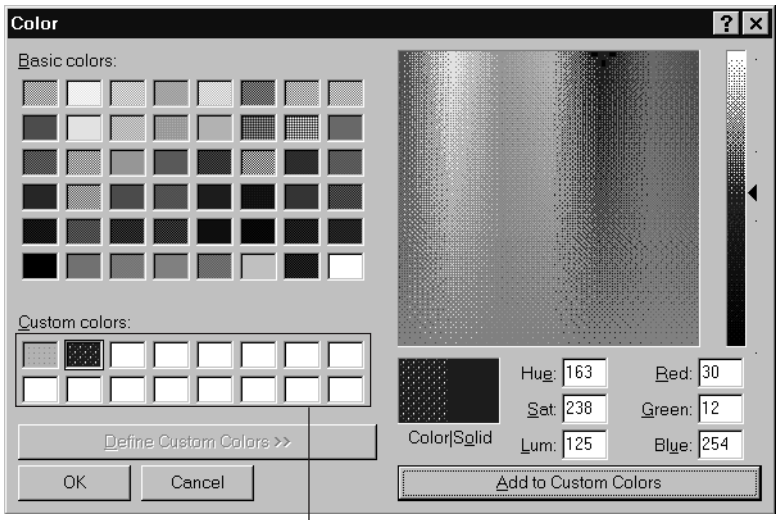


3. Click [Create Color] to create a new color.

4. Click the color chart or enter values to create a new color.

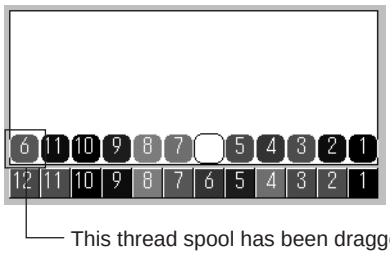


5. Click [Add Color] to register a new color.



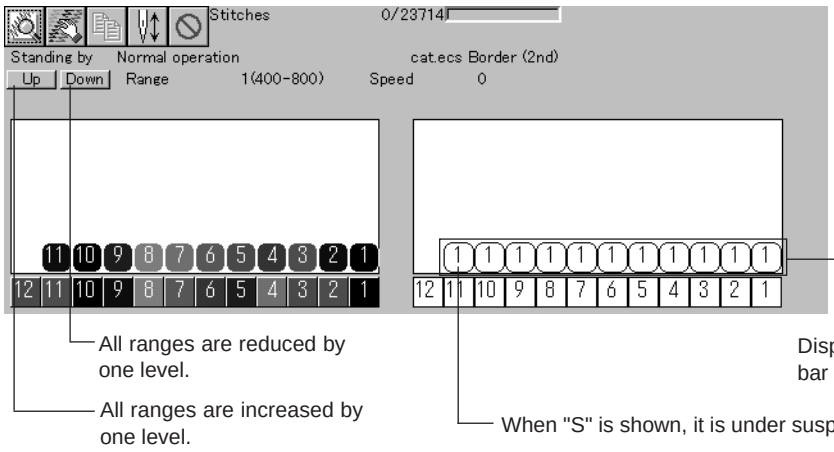
Changing needle bar allocation

1. Drag a thread spool to the desired needle bar number.



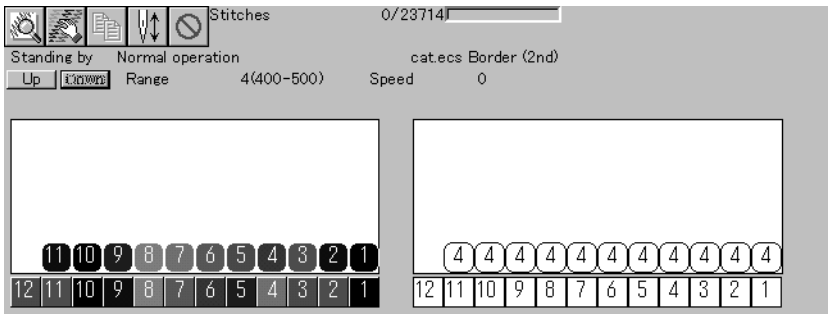
Setting Ranges

There are two methods for setting ranges.



Changing all ranges

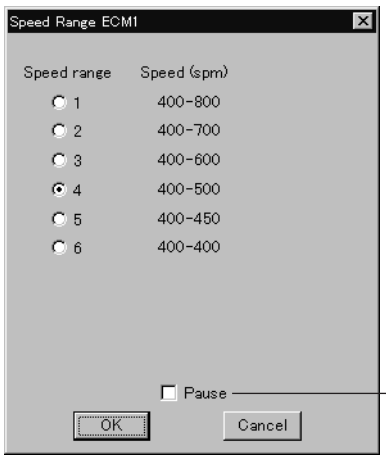
1. Click [Up] to increase range. Click [Down] to reduce range.
   One clicking changes the range by one level.



Changing individual range

1. Double-click the range display.

2. Click a speed range for selection.



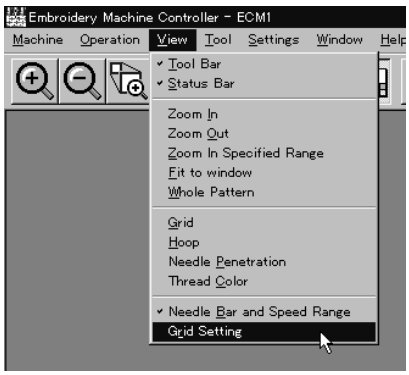
3. Click [OK].

Grid Setting

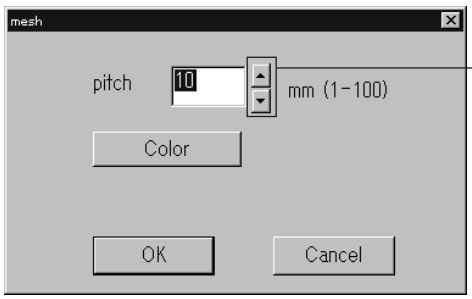
Sets the pitch and the color of grid.

■ The grid interval can be set at the increment of 1 mm (0.1 inch for inch unit).
■ The value for setting is 1 - 100 mm (0.1 - 10 inches for inch unit).

1. Select [Grid setting] from the View menu.



2. Set the pitch.
Click the [color] to change the grid color. For setting, refer to steps 2 to 5 in page 133.



Click this to increase or decrease the value.

Renaming Machine

Rename the registered machine.

■ Up to 50 half-size (25 full-size) characters can be registered for a machine name.

1. Select [Rename Machine] from Machine menu.

2. Enter a new name.

Select an identifying color for the machine.
This color is shown on the title bar for a while when the arrow pointer is moved to the title bar of a machine window.

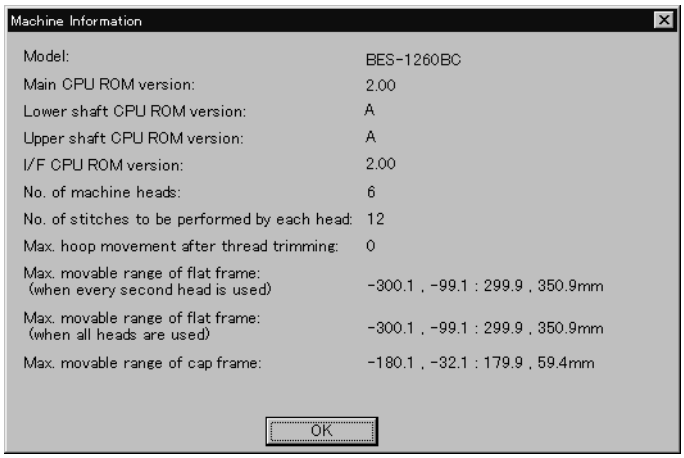
3. Click [OK].
If the message "The entered name already exists" appears, enter another name.

Viewing Machine Information

Detail specification of the machine can be displayed.

1. Select [Machine Information] from Machine menu.

2. Click [OK] after checking the information.



Design Information

Detail specification of the embroidery data can be checked.

Pattern name	File name and path of embroidery data
No. of stitches	The number of stitches in embroidery data
No. of colors	The number of colors used in embroidery data
Mask Size	Size of masking
Start of Embroidering	Coordinates of embroidering start position
End of Embroidering	Coordinates of embroidering end position

1. Select [Design Information] from Help menu or click .

2. After checking, click [OK].

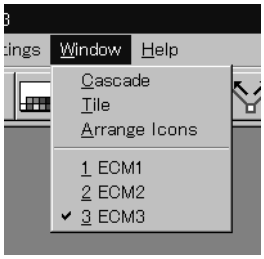
Setting Window Display

Specifies the window that displays machine condition if multiple machines are connected simultaneously.

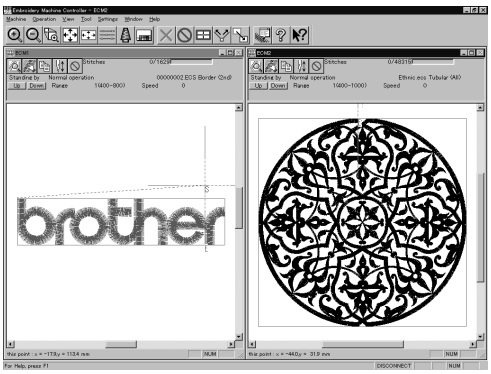
■ There are two types of window display as follows:

Cascade	Windows are slightly offset.
Tile	Windows are tiled.

1. Select [Cascade] or [Tile] from Window menu.



When [Cascade] is selected



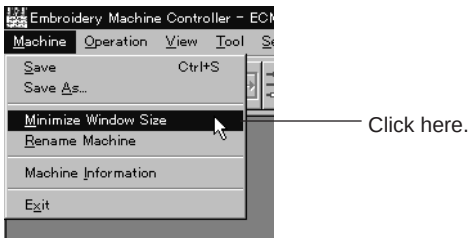
When [Tile] is selected

Minimizing and Aligning Windows

Windows on the screen can be minimized to the icon size and aligned.

Minimize Window Size

1. Select [Minimize Window Size] from Machine menu or click _ on the upper right corner of the screen.



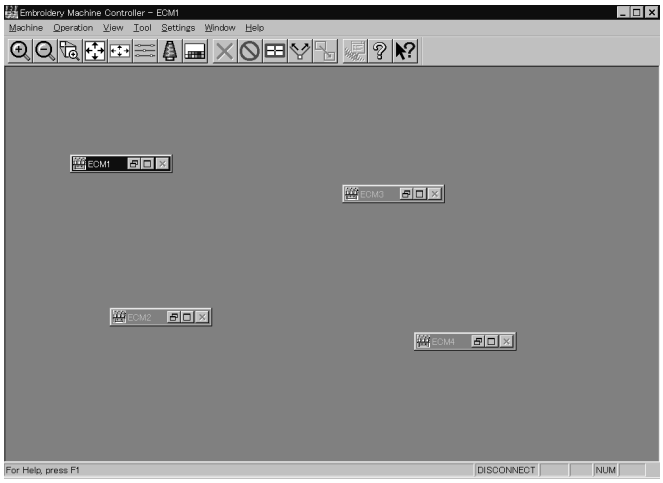
2. The window is minimized.

Arrange Icons

Minimized windows that are scattered can be aligned.

■ This command is available for minimized windows.

1. Select [Arrange Icons] from Window menu.



2. The minimized windows are aligned.

Changing window size

Several square buttons with figures are displayed at the right end of the title bar. These buttons are used to change the window size.

- If this button is clicked when running an ordinary software, it is displayed on the task bar in the minimized size as a button.
- If this button is clicked, the window size changes to a medium size.
- If this button is clicked, the window changes to the full size of the desktop.
- This button is used to end the software or to close the folder. This button cannot be clicked when the machine window is displayed.

Language

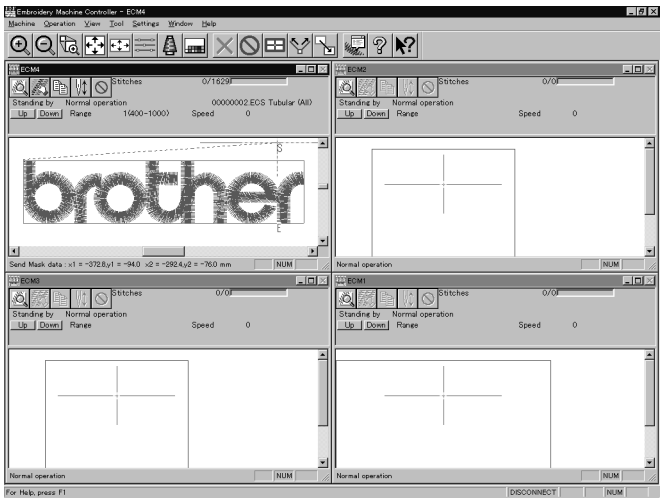
Changes display language.

Refer to page 128.

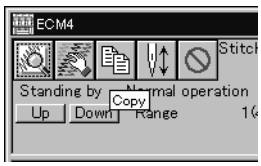
Copying Data to Other Machines

When multiple machines are connected, the embroidery data of a machine can be copied to another machine.

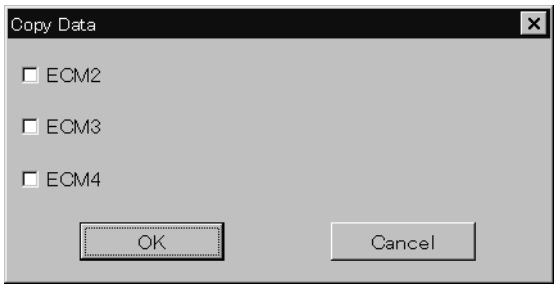
1. Click the window of the machine displaying the copy source data.



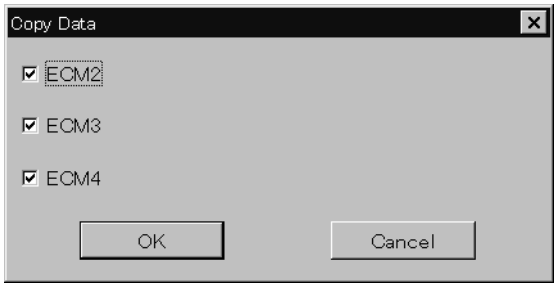
2. Click .



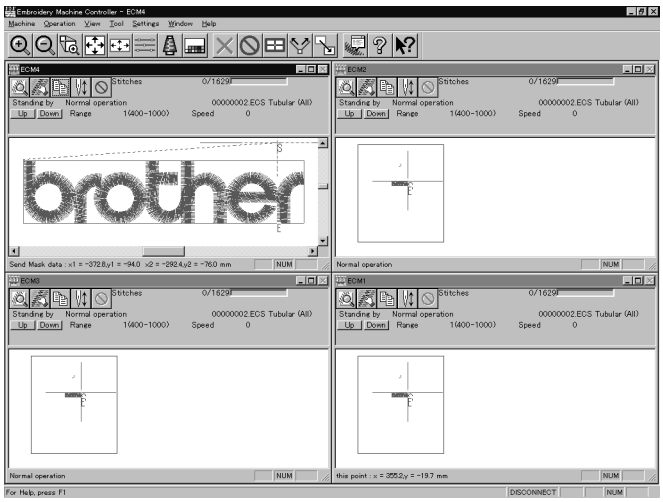
3. Click and select the machine name of the destination.



4. Click [OK].



The data, is copied.

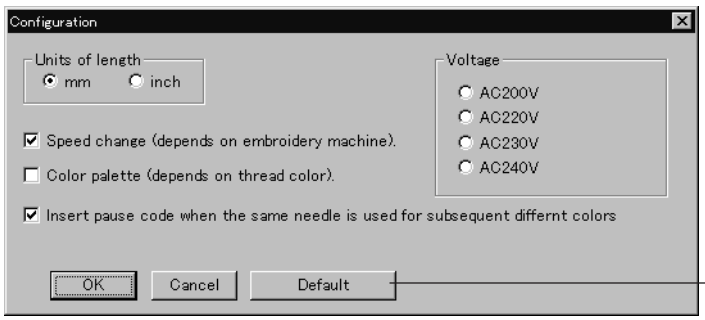


Configuration

Sets the environment of data reading and display.

1. Select [Configuration] from Tool menu.

2. Click and select the item for setting.



Select the applicable power voltage.

Click here to the default setting.

3. Click [OK].

Upgrading the Machine Program

Upgrades the programs at each part of the machine.
This function is protected by a password. A dealer engineer will use this function if required.

Setting the Machine

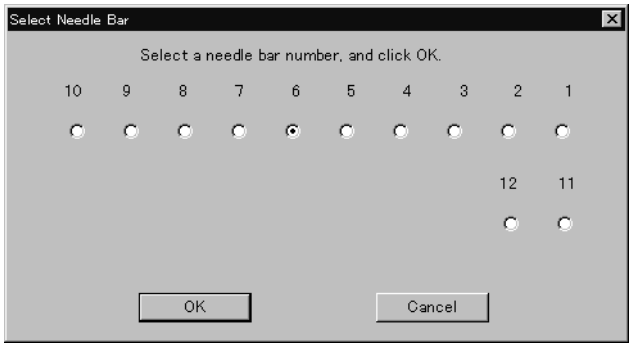
Performs the detail setting of the embroidering status. Items that can be selected in Setting menu are explained here.

Same Needle Bar

Patterns are sewn by one needle.

1. Select the [Same Needle Bar] from Settings menu.

2. Click the needle number for selection.



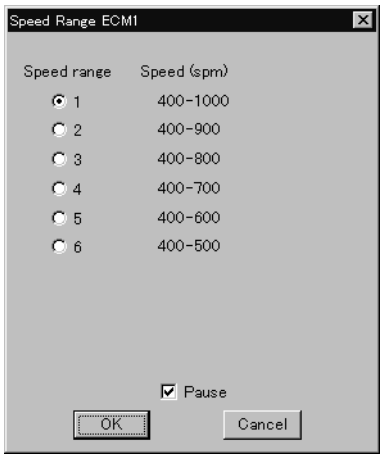
3. Click [OK].
   The embroidering sequence appears at all specified needle points.

Same Speed Range

Embroiders patterns at the specified speed range.

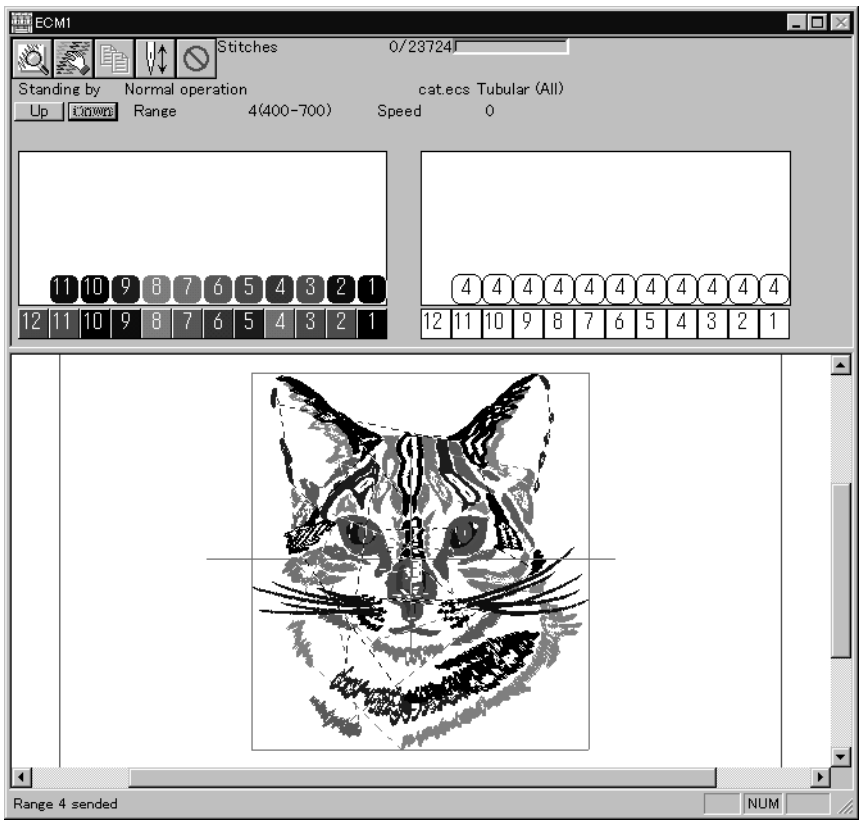
1. Select [Same Speed Range] from Settings menu.

2. Click a speed range for selection.



3. Click [OK].

The speed range appears at the specified areas.



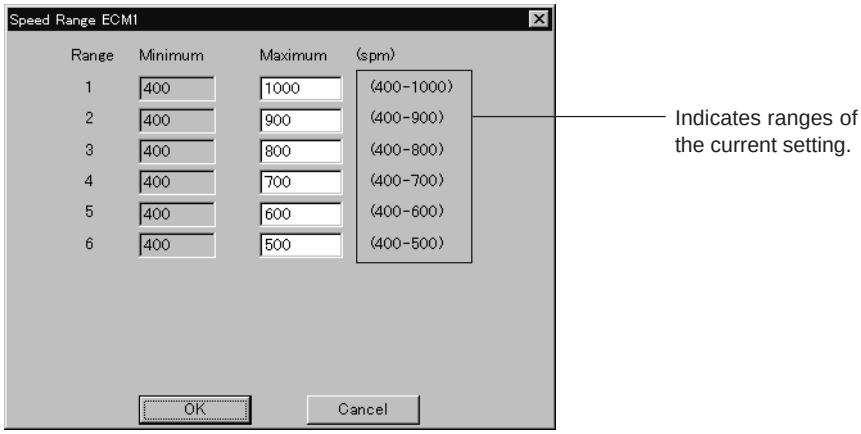
Speed Range

Specifies the maximum speeds for respective ranges suitable for the hoop type.

■ Actual embroidering speed depends on the pitch.
■ Before shipment, "1" is set to the highest speed; "6" is set to the lowest speed.

1. Select [Speed Range] from Settings menu.

2. Specify the desired range.



When a value exceeding the above ranges is entered, it is automatically set to the min. or max. speed.

3. Click [OK].

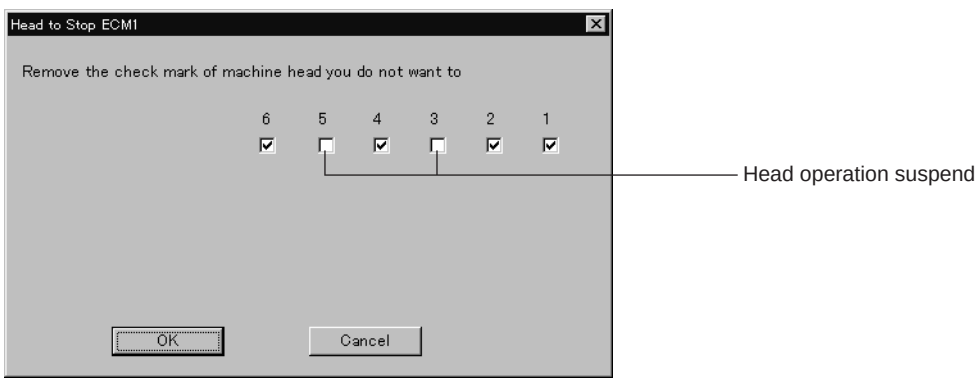
Head Operation Suspend

Sets the machine head for rest.

■ Setting at the machine head has priority.
■ When the HEAD switch at the machine head is set to ON and then to OFF, the setting is canceled.

1. Select [Head Operation Suspend] from Settings menu.

2. Click the machine head that needs to be at rest and remove the check mark.



3. Click [OK].

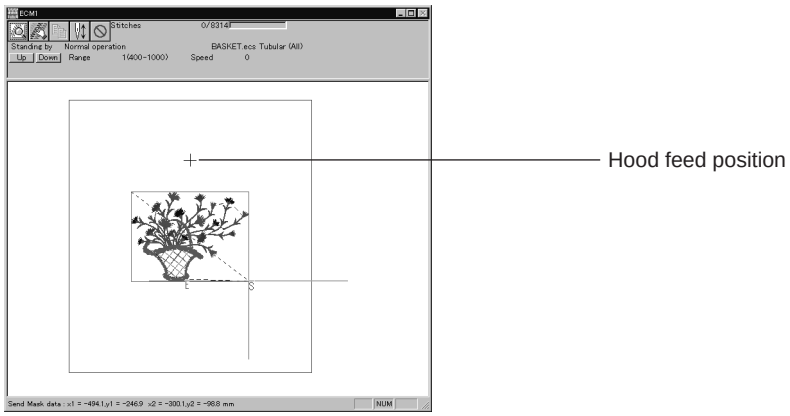
Hoop Feed Position

Set the basic position of the hoop (hoop feed position) for cancellation of embroidering.

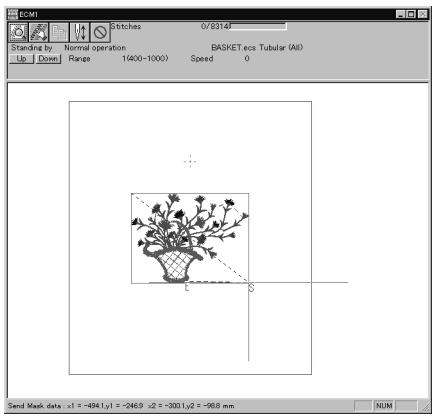
■ The hoop feed position can be set only in the embroidering area surrounded by a red frame.

1. Select [Hoop Feed Position] from Settings menu.

2. Click the point to feed the hoop.



3. The gray cross appears and shows the hoop feed position.

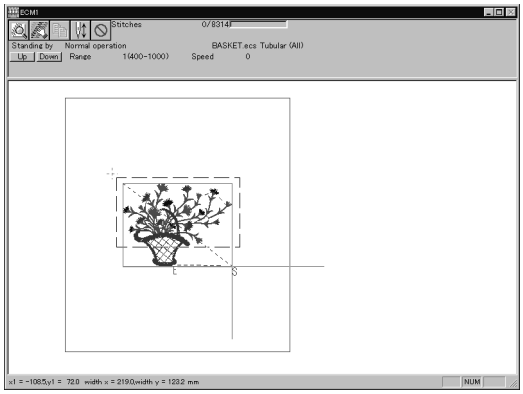


Embroidery Area

Sets the embroidery area.

1. Select [Embroidery Area] from Settings menu.

2. Drag the embroidery area using the mouse for designation.



The embroidery area is displayed in light blue.

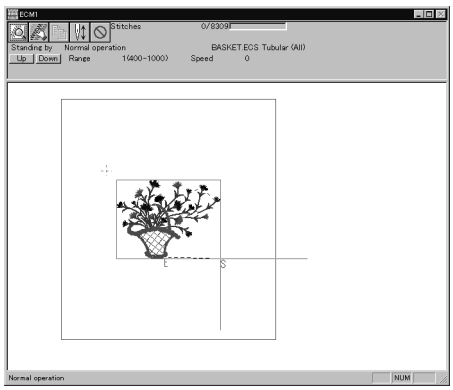
Embroidery Hoop

The type of specified embroidery hoop changes the display.

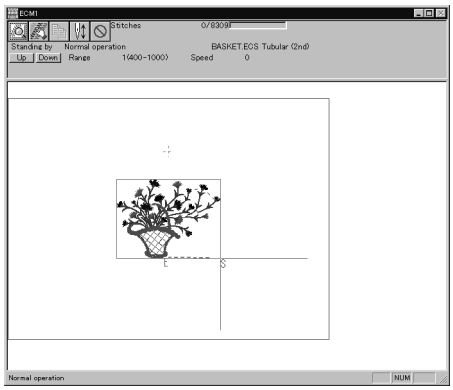
■ The following selections are available:

Tubular (All)
Tubular (every 2nd head)
Flat (All)
Flat (every 2nd head)
Border (All)
Border (every 2nd head)
Cap (All)

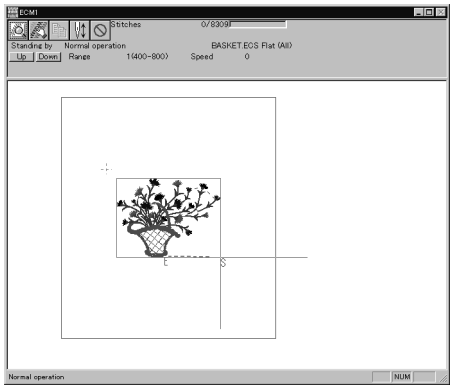
■ When "Tubular (All)" is selected



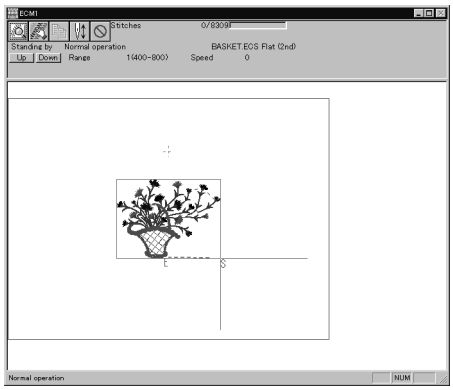
■ When "Tubular (every 2nd head)" is selected



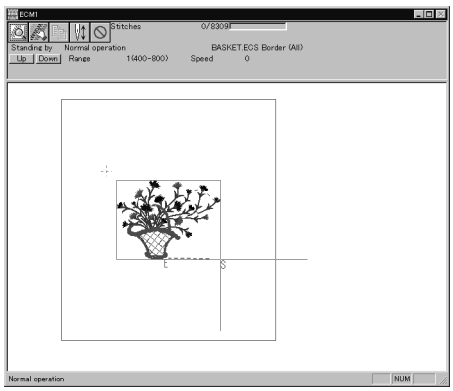
■ When "Flat (All)" is selected



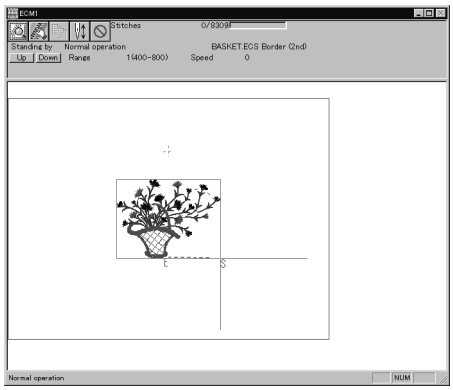
■ When "Flat (every 2nd head)" is selected



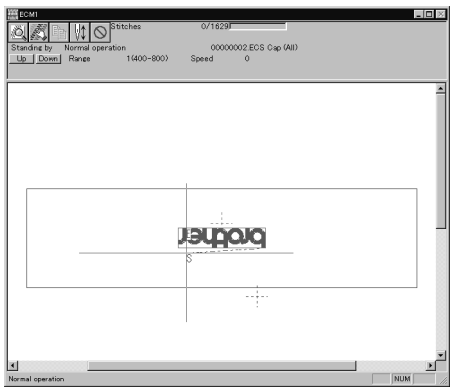
■ When "Border (All)" is selected



■ When "Border (every 2nd head)" is selected

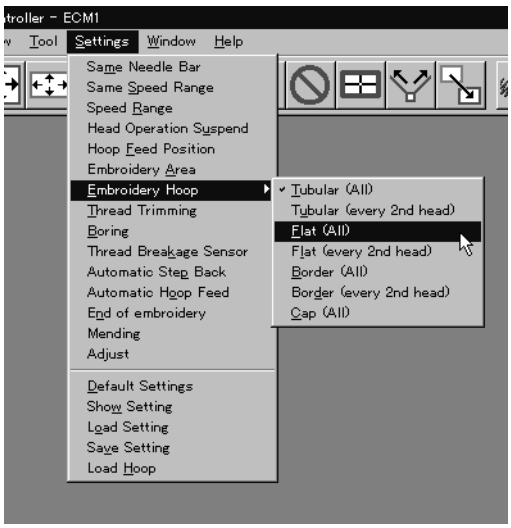


■ When "Cap (All)" is selected



The image is displayed upside down.
The speed is automatically adjusted to 800 rpm or less.

1. Select [Embroidery Hoop] and the type from Settings menu.



The pattern direction and embroidering area may vary depending on the selected embroidery hoop type. Make sure that the selection is correct.

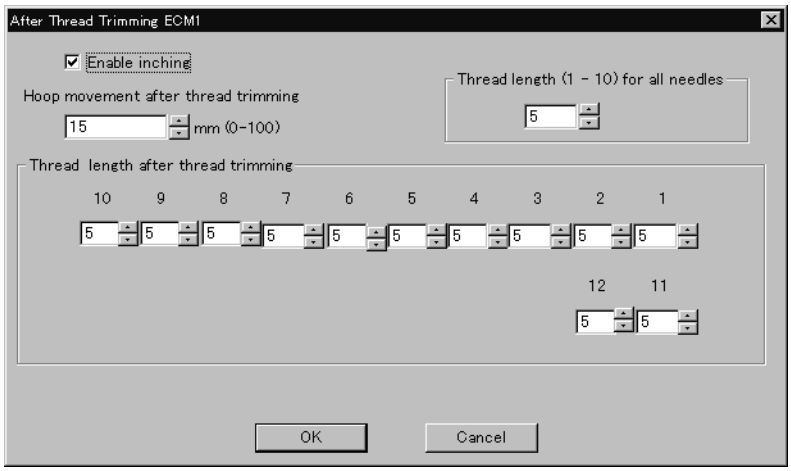
Thread Trimming

■ The following items can be set:

Enable inching	Sets inching motion for thread trimming.
Hoop movement after thread trimming	Sets the needle penetration length for trimming. The length can be set in inches. To set the length in inch unit, select [Inch] from the [Configuration] of Tool menu. The available values are as follows: For mm 0 - 100 mm (The standard value is 15 mm.) For inch 0 - 3.9 inch (The standard value is 0.6 inch.)
Thread length (1-10) for all machines	Sets the overall thread amount through the needle. Value of 1 to 10 can be set. The smaller the value is, the shorter the length is.
Thread length after thread trimming	Sets the overall thread amount through the needle. Value of 1 to 10 can be set. The smaller the value is, the shorter the length is.

1. Select [Thread Trimming] from Settings menu.

2. Set inching, thread length, etc.



3. Click [OK].

Boring

Turns on/off the machine boring mode.

■ The following items can be set:

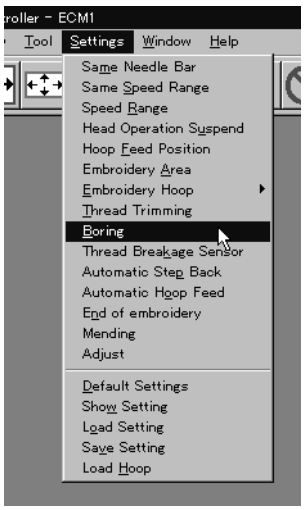
Boring	Sets ON/OFF of boring.
Shift data	Shifts data by 15 mm to needle number 1. The screen display remains unchanged.

■ Boring can be set only for embroidery data which is prepared for boring. Make sure that the data is correct before embroidering.

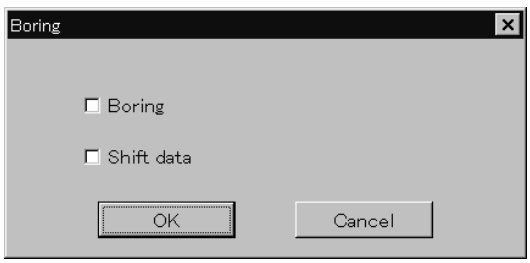
■ Install the following optional parts on the machine before embroidering.
- Boring knife
- Needle plate for boring

■ If the embroidery data for boring is zoomed in or out, or is rotated, embroidering may not be correctly carried out.

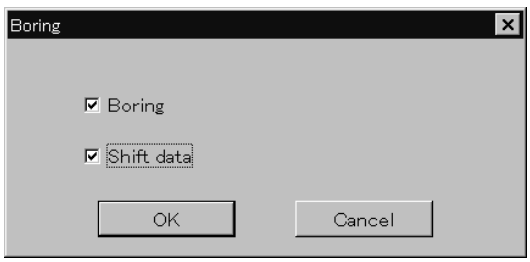
1. Select [Boring] from Settings menu.
   When the boring mode is on, the check mark (√) appears at the top of [Boring] in the menu.



2. Click the setting item to put the check mark.



3. Click [OK].

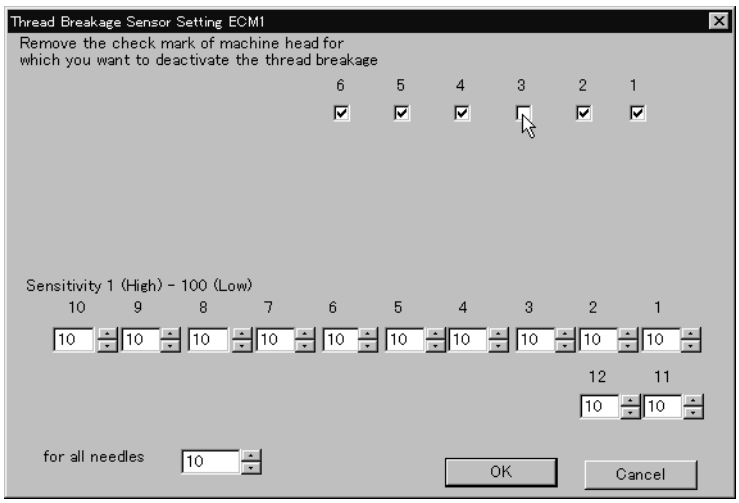


Thread Breakage Sensor

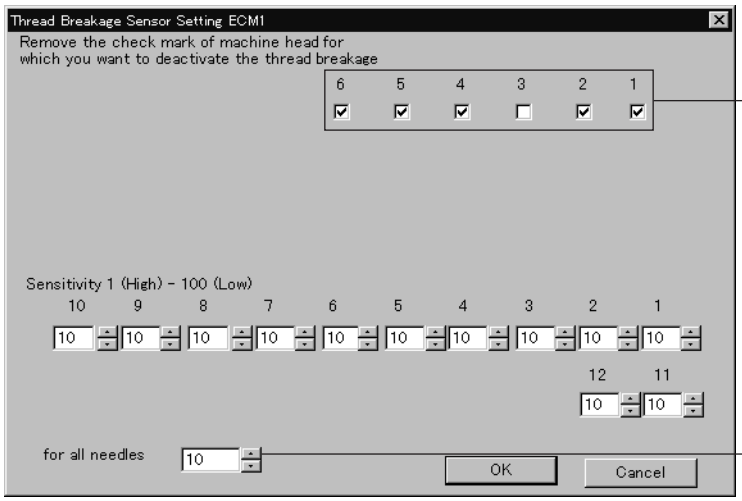
The sensor for thread breakage can be turned ON/OFF or the sensor sensitivity for each needle bar can be set.

■ The sensitivity can be set within the range of 1 - 100. The smaller the value is, the higher the sensitivity is.

1. Select [Thread Breakage Sensor] from Setting menu.
2. Click the head you want to disable the sensor and remove the check mark (√).



3. Adjust the sensor sensitivity.



The sensor sensitivity for each needle bar is adjusted individually.

All sensor sensitivities for all needle bars are adjusted simultaneously.

4. Click [OK].

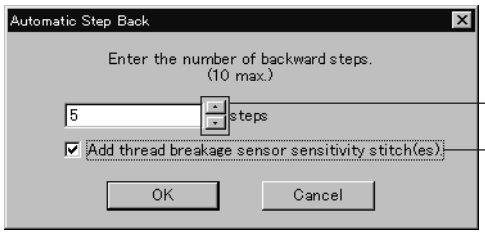
Automatic Step Back

Sets the number of stitches for automatic step back if thread breakage occurs.

■ The number of stitches that can be set is from 0 to 255.
■ Additional step-back can be made for sensitivity value of the thread breakage sensor.

1. Select [Automatic Step Back] from Settings menu.

2. Enter the number of stitches for automatic step back.



Click here, and the value decreases/increases.

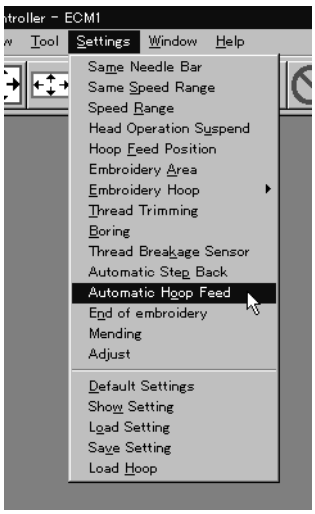
Click here to give additional step-back for the sensing distance with the thread breakage sensor.

3. Click [OK].

Automatic Hoop Feed

Sets automatic hoop feed for a thread breakage.

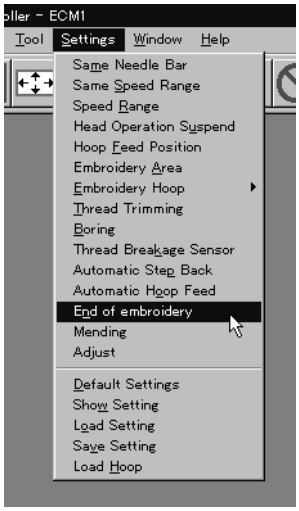
1. Select [Automatic Hoop Feed] from Settings menu and put the check mark (√).



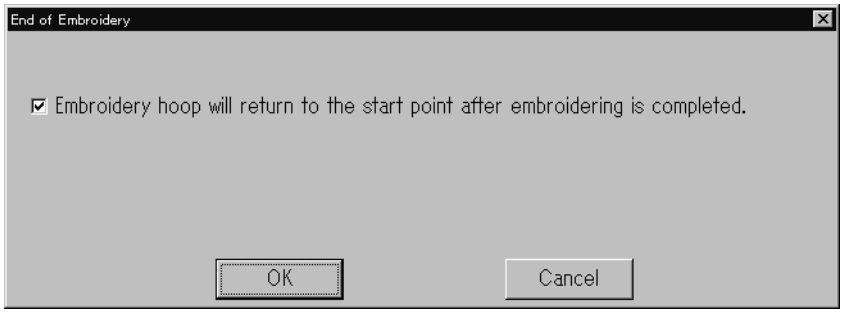
End of Embroidery

Sets if the machine returns to the start point after end of embroidery.

1. Select [End of embroidery] from the Settings menu.



2. Click the checkbox to put a check mark (V) when the machine returns to the start point after end of embroidery. Click [OK].



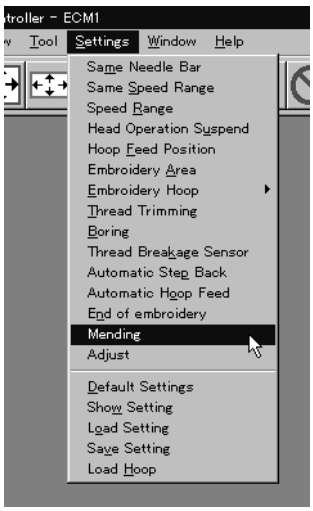
Mending

Sets the details of mending.

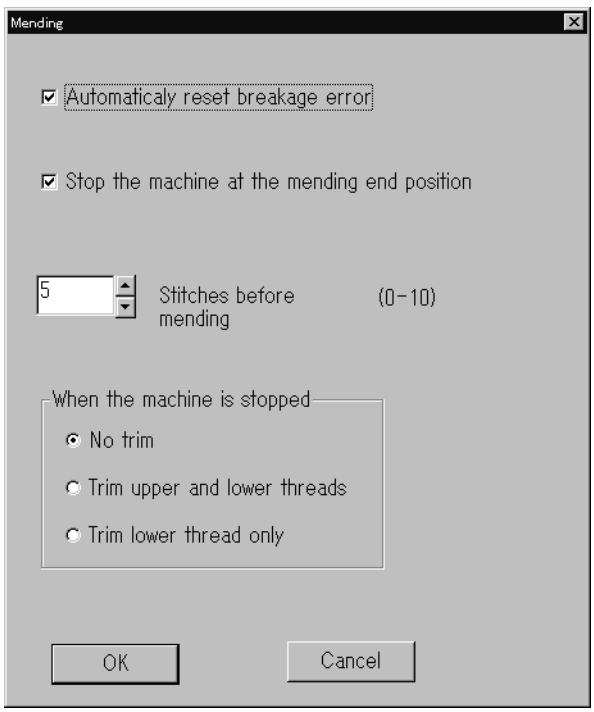
■ Items and descriptions are as follows:

Automatically rest breakage error	Error is automatically canceled when a thread breakage occurs.
Stop the machine at the mending end position	The needle bar stops at the mending end position.
Stitches before mending	Sets the number of stitches for stopping before mending. The values for setting are 1 - 10.
When the machine is stopped	Selects how the trimming is made during stopping.

1. Select [Mending] from the Settings menu.



2. Click [OK] when the items are set.

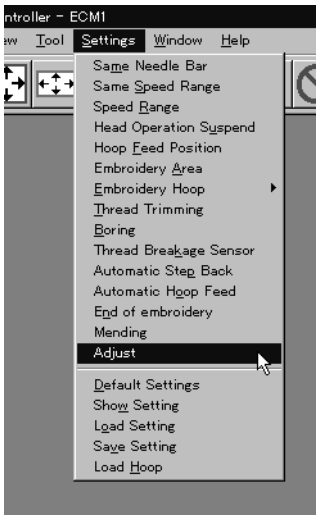


Adjust

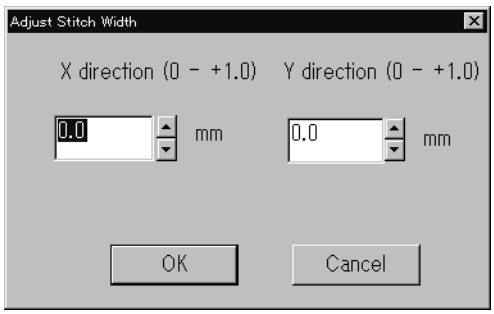
Adjustment value of the needle is set.

■ The adjustment value is set at the increment of 0.1 mm.
■ The setting range is 0 - 1.0 mm in X and Y directions.

1. Select [Adjust] from the Settings menu.



2. When setting is complete, click [OK].



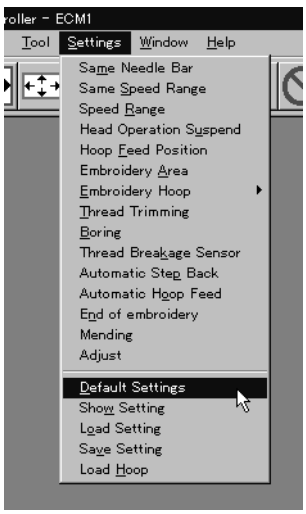
Default Settings

Resets changes of the machine setting to the default.

■ Items for setting and initialization are as follows:

Speed Range	Automatically selects the value suitable for the hoop type.	
Head Operation Suspend	Cancels the head operation which is not set for rest on the machine.	
Hoop Feed Position	Returns to the machine home position.	
Embroidering Area	Sets the size each for the selected hoop.	
Thread Trimming	Inching motion Thread removal feed length Thread remaining amount	Yes 15 mm (0.6 inch) 5
Boring	Boring Data shift	No No
Thread Breakage Sensor	All sensors are on. Sensitivity	 10
Automatic Step Back	0	
Thread Breakage Sensor Sensitivity	Not affected by the thread breakage sensor sensitivity	
Automatic Feed Hoop	No	
Return to the start point	Yes	
Mending	Automatically rest breakage error Stop the machine at the mending end position Stitches before mending Trim during stop in mending setting	Yes Yes 5 stitches No
Adjustment	0.0 mm for X direction 0.0 mm for Y direction	

1. Select [Default Settings] from Settings menu.



2. Click [OK].

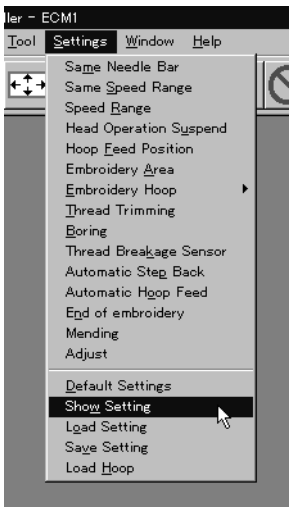
Show Setting

Shows the setting contents and defaults.

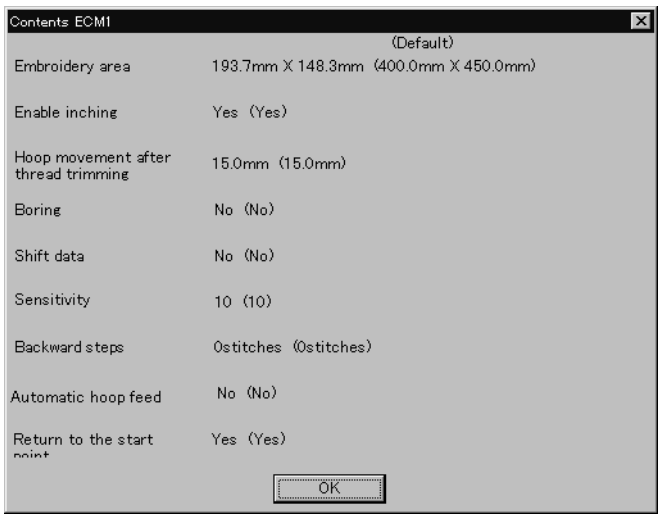
■ The following items are shown:

- Embroidering area
- Thread trimming inching motion
- Thread removal feed length
- Boring
- Shift
- Thread breakage sensor sensitivity
- Automatic step back
- Automatic feed hoop
- Return to the stant point

1. Select [Show Contents] from Settings menu.



2. After checking, check [OK].

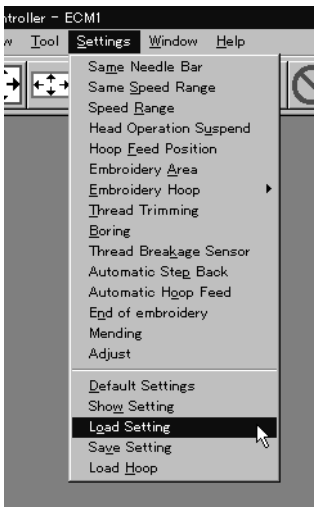


Load Setting

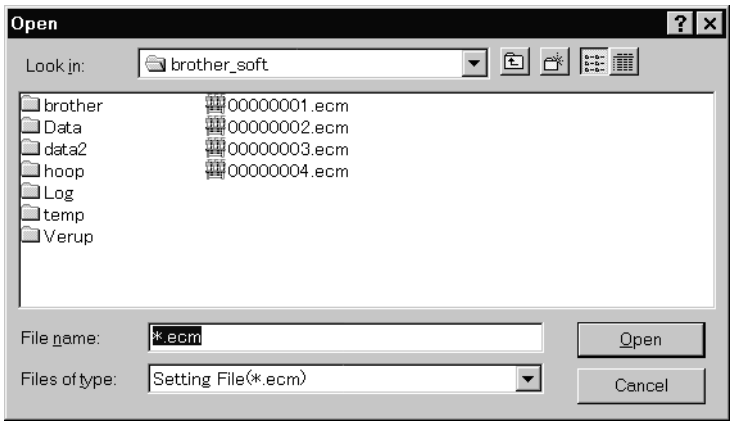
Load the setting.

■ The set file has an extension of "ecm".

1. Select [Load setting] from the Settings menu.



2. Select the folder and click [Open].



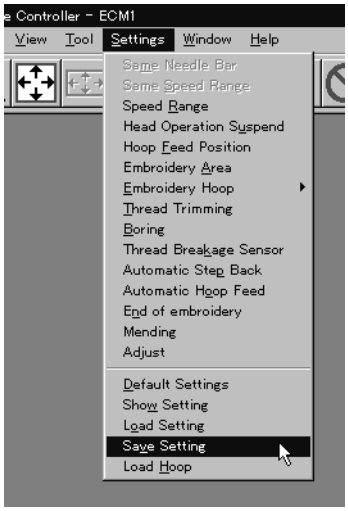
Save Setting

Saves the edit settings.

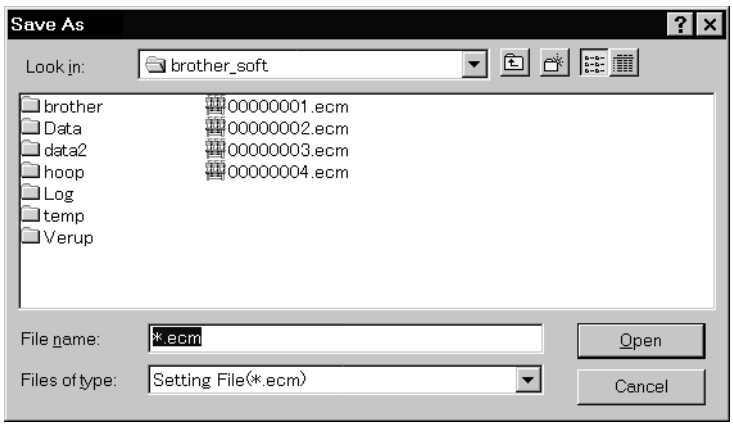
■ Save the setting files with an extension of "ecm".

1. Change the setting.

2. Select [Save setting] from the Settings menu.



3. Select the registration folder and put a file name.

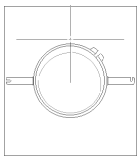
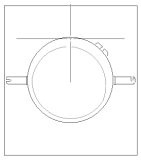
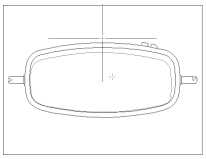
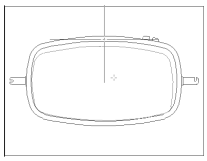
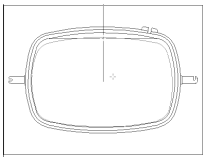
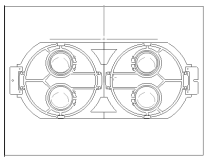
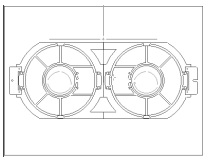
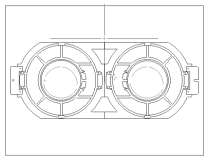
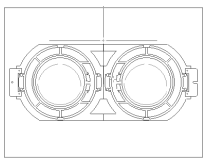
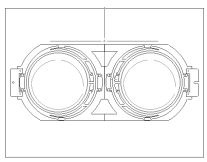
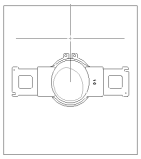
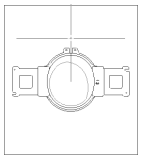
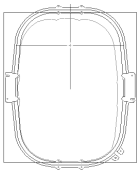
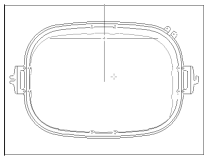
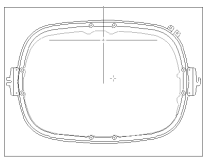
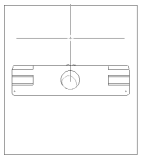
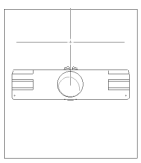
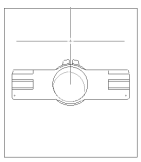


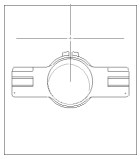
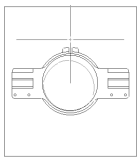
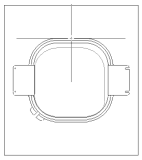
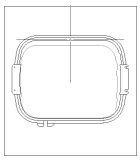
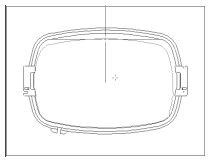
4. Click [Save].

Load Hoop

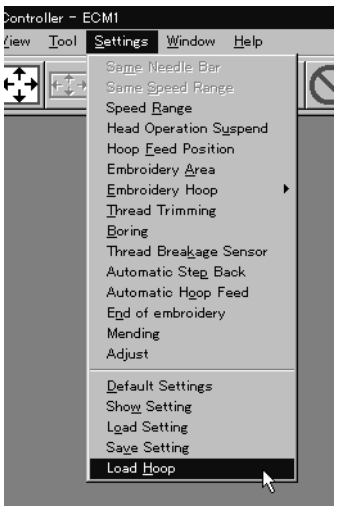
Load the optional hoop displayed in "Hoop".

■ The hoop file to be loaded has an extension of "ehp".
■ The types and the shapes of hoop for loading are as follows:

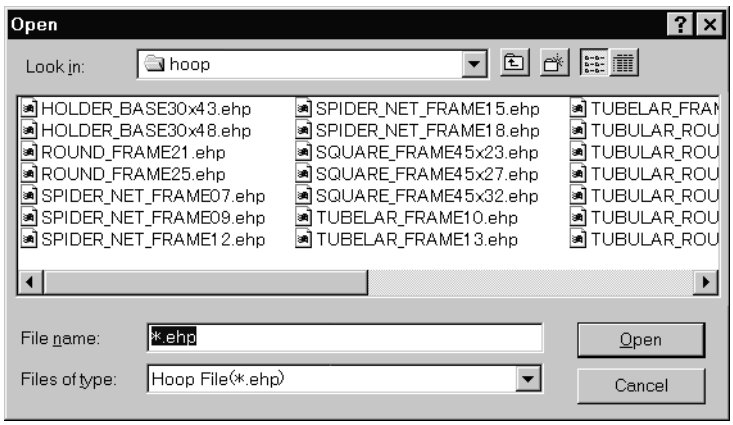
ROUND_FRAME21.ehp		ROUND_FRAME25.ehp	
SQUARE_FRAME45X23.ehp		SQUARE_FRAME45X27.ehp	
SQUARE_FRAME45X32.ehp		SPIDER_NET_FRAME07.ehp	
SPIDER_NET_FRAME09.ehp		SPIDER_NET_FRAME12.ehp	
SPIDER_NET_FRAME15.ehp		SPIDER_NET_FRAME18.ehp	
TUBULAR_FRAME10.ehp		TUBULAR_FRAME13.ehp	
TUBULAR_FRAME30X43.ehp		HOLDER_BASE30X43.ehp	
HOLDER_BASE30X48.ehp		TUBULAR_ROUND07.ehp	
TUBULAR_ROUND09.ehp		TUBULAR_ROUND12.ehp	

TUBULAR_ROUND15.ehp		TUBULAR_ROUND18.ehp	
TUBULAR_ROUND24X24.ehp		TUBULAR_ROUND24X30.ehp	
TUBULAR_ROUND32X45.ehp			

1. Select [Load hoop] from the Settings menu.



2. Select the folder and click "Open".

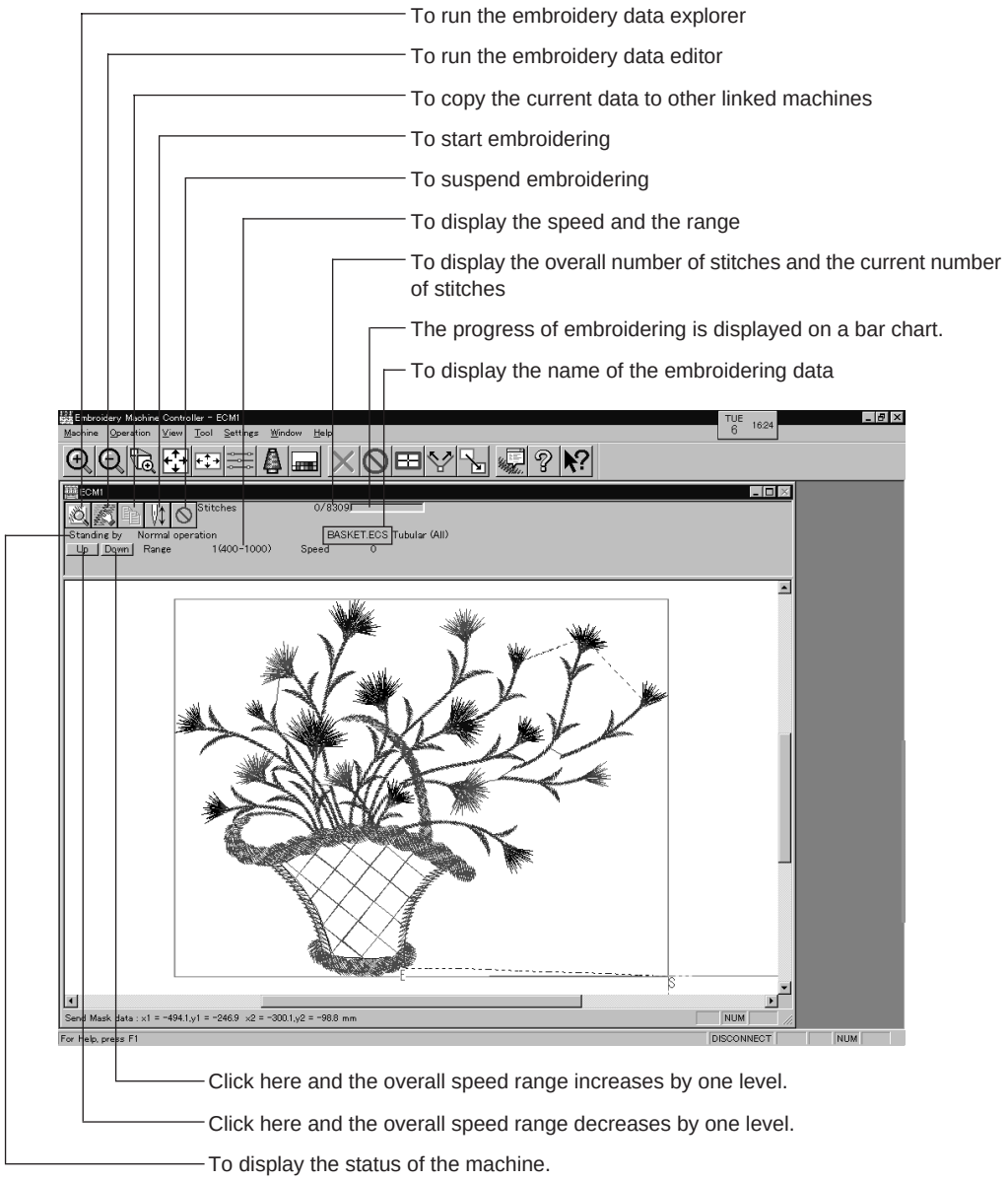


Embroidering

How to start embroidering and operation after the start are explained here.

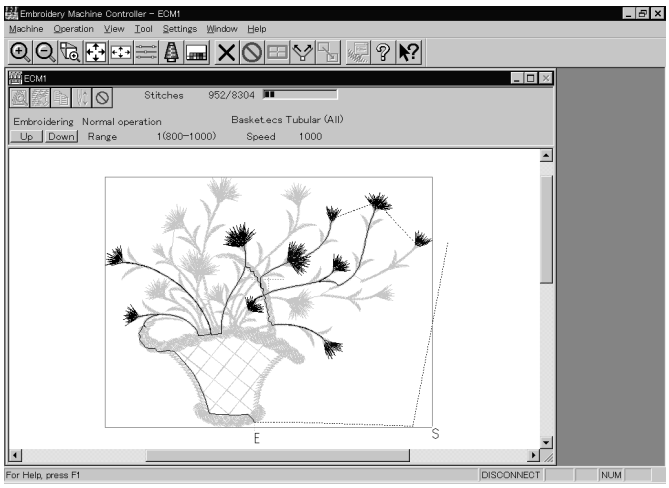
Starting Embroidering

■ The following screen appears when the edit data is retrieved from the explorer.



1. Click .
   "Hoop" appears at the machine display window.

2. Press the button. Embroidering starts.
   Embroidery data appears in gray, indicating the embroidering status.



Pause

1. Click .

Canceling

1. Press the button while pressing the button on the machine operation panel.

2. Click .

3. The check screen appears. Click [Yes] to cancel.

Moving the Home Position

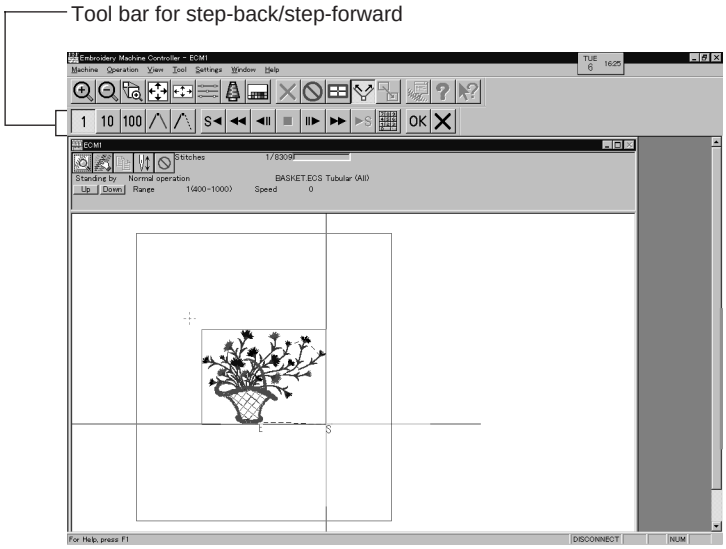
Move the selected machine home position.

1. Select [Home Position] from Operation menu or click .

Step-forward/Step-back

Allows step-forward or step-back of stitches without embroidering.

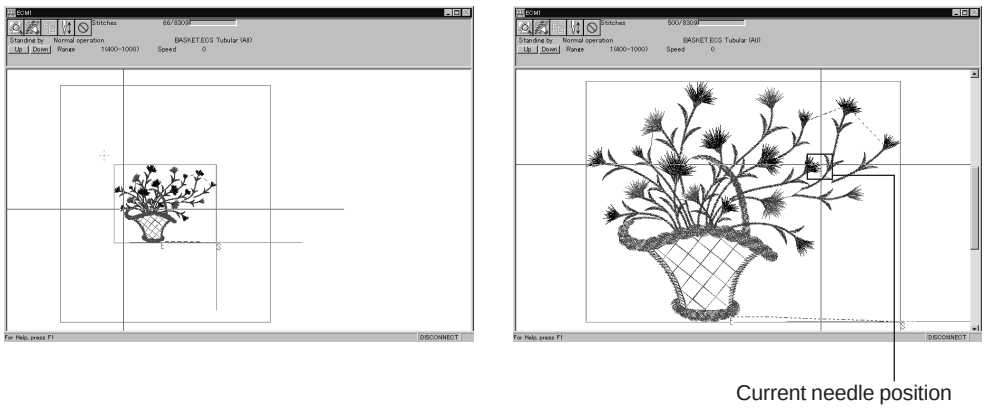
■ Click to stop embroidering for step-forward/back mode.
■ The special tool bar appears in the step-forward/back mode.



Entering in the Step-forward/Step-back Mode

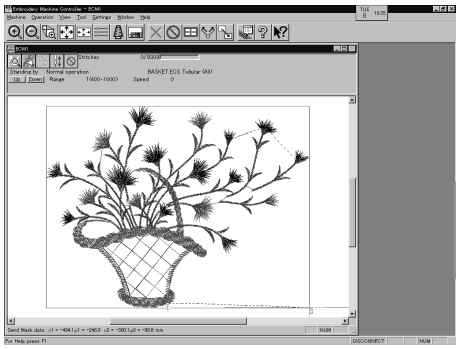
1. Click to stop embroidering.

2. Select [Step F/B] from the Operation menu or click .
   A cross appears on the screen. The current needle position is the intersection of the vertical and horizontal lines.



Canceling step-forward/step-back

1. Click ✕ of the step forward/back tool bar.
   The cross disappears and the step forward/back mode is canceled.



Setting Step-forward/Back Distance or Timing

Select step-forward/back distance or timing.

■ The functions of icons are as follows:

1	Moves forward (backward) by 1 stitch.
10	Moves forward (backward) by 10 stitches.
100	Moves forward (backward) by 100 stitches.
	Moves to the next (previous) color change.
	Moves to the next (previous) feed.

1. Click the icon to select the desired function.

Stepping Forward/Back

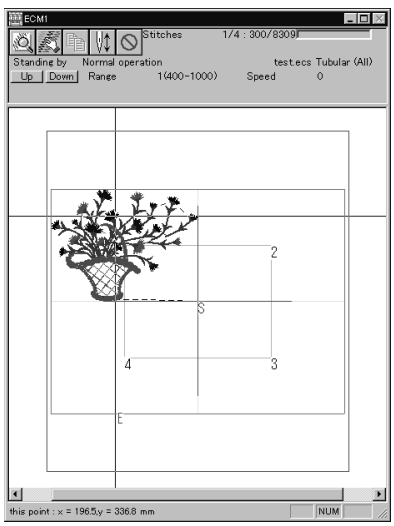
Steps forward/back the stitches actually.

■ The functions of icons are as follows:

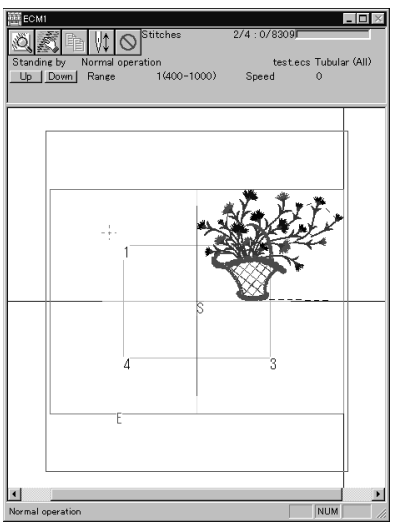
S◀	Returns to the start position. For repeating patterns, returns to the start position of the current pattern.
◀◀	Moves backward by the specified distance continuously. Click ■ to stop movement.
◀II	Moves backward by the specified distance.
■	Click this to stop after clicking ◀◀ or ▶▶ .
II▶	Moves forward by the specified distance.
▶▶	Moves forward by the specified distance continuously. Click ■ to stop movement.
▶S	This is selected for repeating patterns. The machine goes to the start position of the next pattern.
	Specify the travel length from the embroidery start point.

■ Selection of movement to the start position. The needle moves as follows:

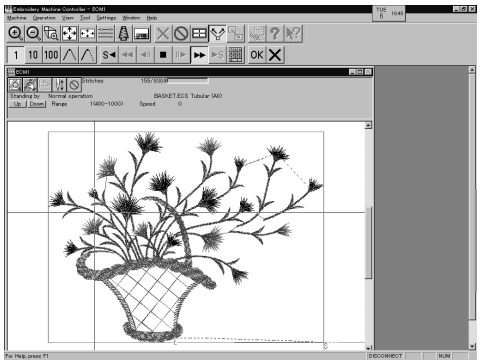
Click the S◀ icon and the needle moves to the start position of the current pattern.



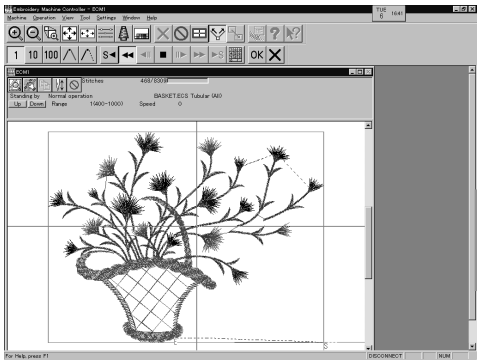
Click the ▶S icon and the needle moves to the start position of the next repeating pattern.



1. Select the icon and move the cross to the desired position for step forward/back.



Forward



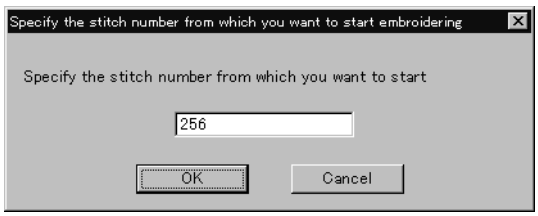
Backward

Specifying the Value

Specify the travel length from the embroidery start point.

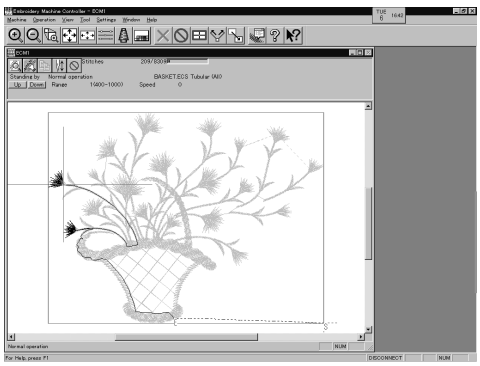
1. Click .

2. Input the number of stitches to start embroidery. Click [OK].

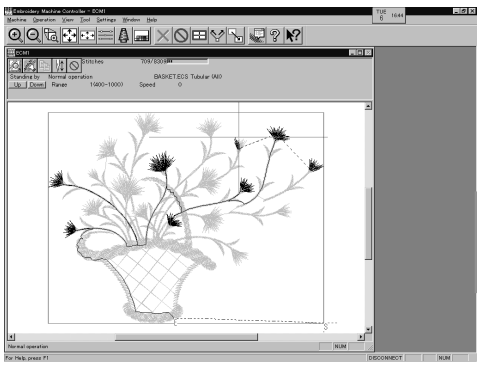


Resuming Embroidering

1. Click OK in the tool bar.
   The cross disappears. The embroidery status at the step forward/backward position of the stitches is displayed.



Forward



Backward

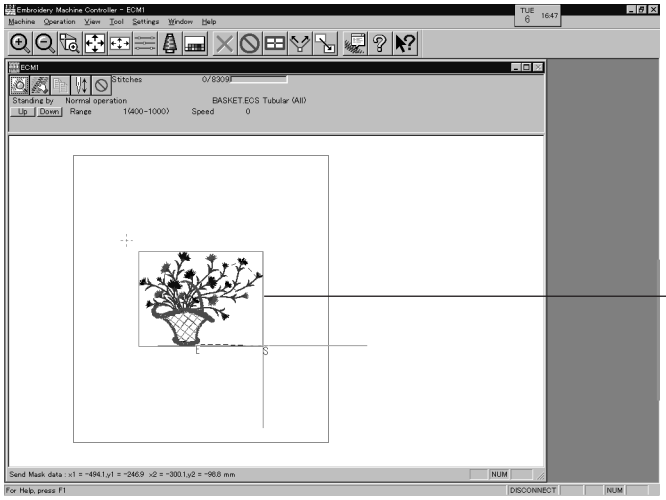
2. Click .
   It is ready to resume embroidering and "Hoop" appears at the machine display window.

3. Press START on the machine.

Moving Embroidery Position

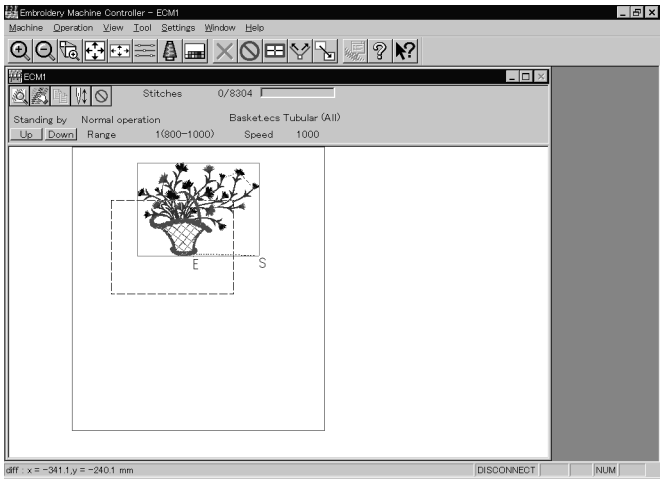
Changes the position of embroidery data.

■ Movement is allowed only in the embroidering area (within the red frame).



1. Select [Move Embroidery Position] from Operation menu or click .

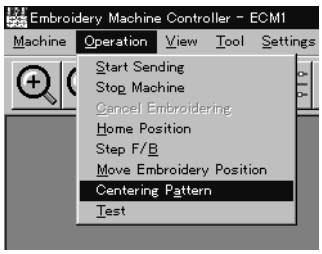
2. The pointer turns into . Drag the embroidery data.
   The mouse arrow becomes + while dragging.



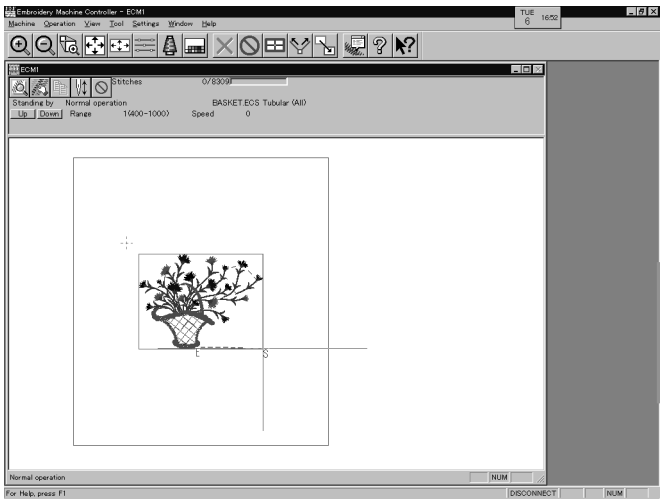
Centering Pattern

Moves the pattern to the machine home position.

1. Select [Move Pattern] from Operation menu.



2. The pattern is moved.



Saving Data

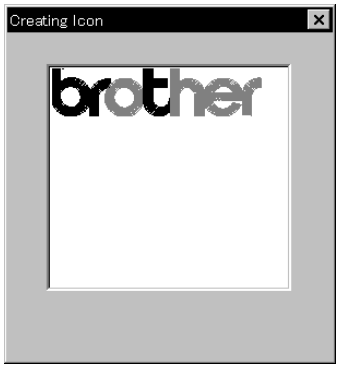
Saves the edited data. The edited data can be saved over the current file or renamed as a separate file.

Save

Saves the edited data over the current file. The original data is deleted.

1. Select [Save] from File menu or click .

2. If color etc. has been is changed, the pattern image appears.

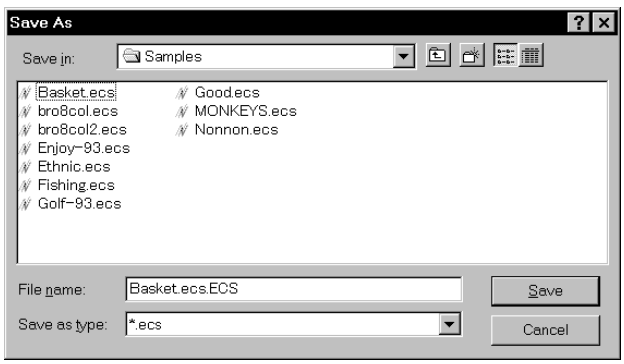


Save As...

Renames and saves the edited data as a new file.

1. Select [Save as...] from File menu.

2. Select the directory to save the new file. Enter a new file name.



3. Click [Save].

4. If color etc. has been is changed, the pattern image appears.

Test

Carries out sensor information check, actuator operation test, test for main shaft rotation, etc. for machine maintenance.

This function is protected by a password. A dealer engineer will use this function if required.

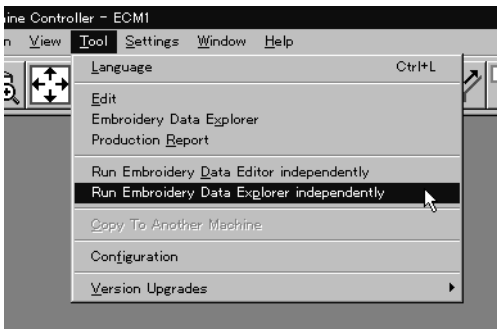
Running Other Programs

Other programs can be started when the machine power is not turned on or when the machine is in operation for embroidery.

■ The following programs can be started:

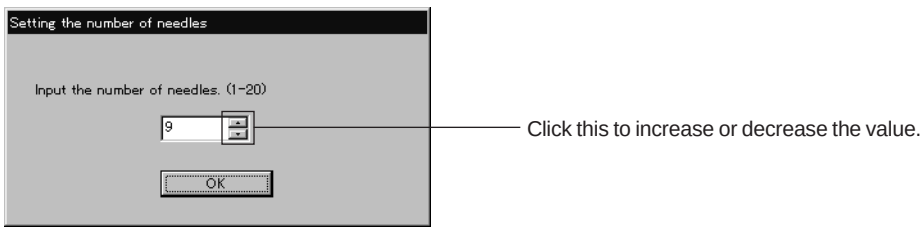
Embroidery data explorer	Allows transfer and copy of the embroidery data. Data transfer to the machine controller is not allowed.
Embroidery data editor	Allows editing of embroidery data.
Production report	Allows display and print-out of production data, etc.

1. Select [Embroidery Data Explorer independently] or [Embroidery Data Editor independently] from Tool menu.



Selecting [Embroidery Data Edit Individual Start]

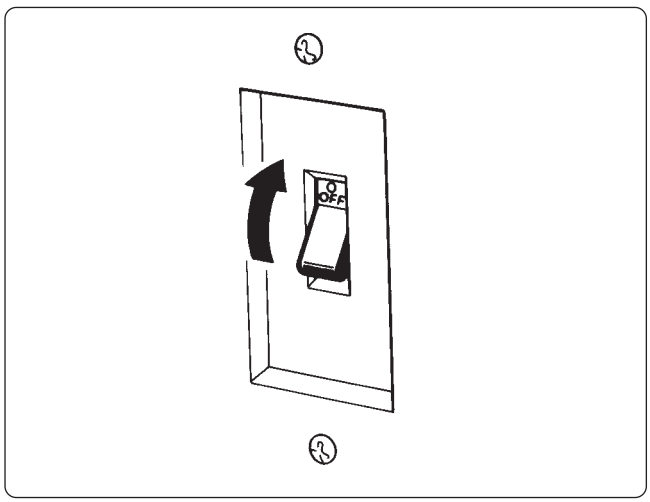
■ Input the number of needle bars. Input the number according to your machine specifications. Click [OK].



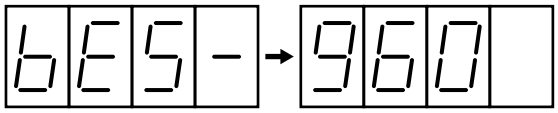
Chapter 7 Operation of Machine

1. Operating Procedures

1-1 Power Source



- Turn the power on to the machine.
- The power lamp lights up and the display window indicates "BES-", and then "960".



- An alarm buzzer sounds three times. Then the needle bar and presser foot move up and the frame moves up to the reference point.
  The machine enters the waiting state for an embroidering data selection.

  Note) When turning the power off and back it on again, wait for at least 10 seconds.

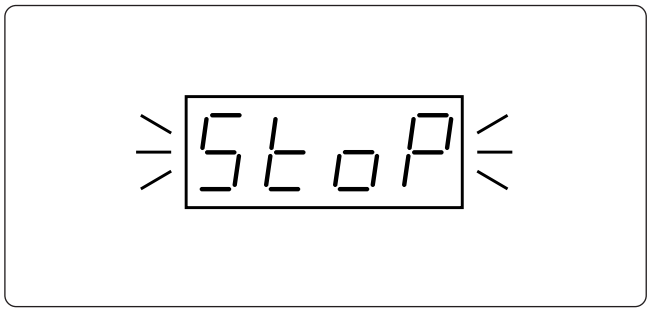
1-2 Preparation for Embroidering

- Select embroidering data while the machine is in the waiting state for an embroidering data selection, and transmit required data by pressing the icon.
- The READY lamp lights up and the machine is placed in the waiting state.
- Using the jog switches (udlr), determine a position to start embroidering.
  Note) An error code is displayed in the display window if a pattern comes out of the hoop.
- Pressing the START switch starts embroidering.

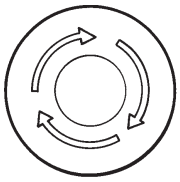
* During embroidering, the speed is indicated in the display window.

- After embroidering is finished, the hoop returns to the start point and the machine is placed in the stand-by state.

2. Resetting Emergency Stop

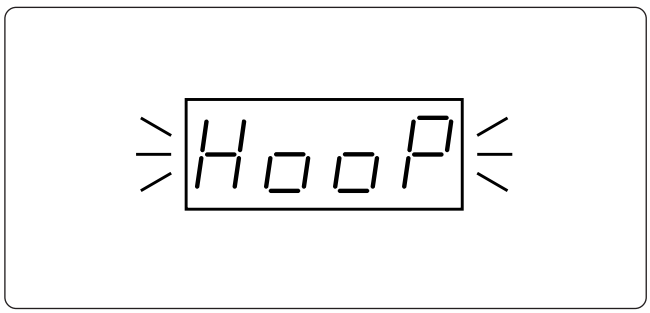


- When either emergency stop button is depressed, "STOP" is displayed while blinking on the operation panel.
- For resetting the emergency stop button, turn the button in the direction of the arrow. The button pops up and is reset.

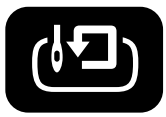


- Check that both emergency stop buttons on the right and left are reset.

3. Permission for Hoop Movement

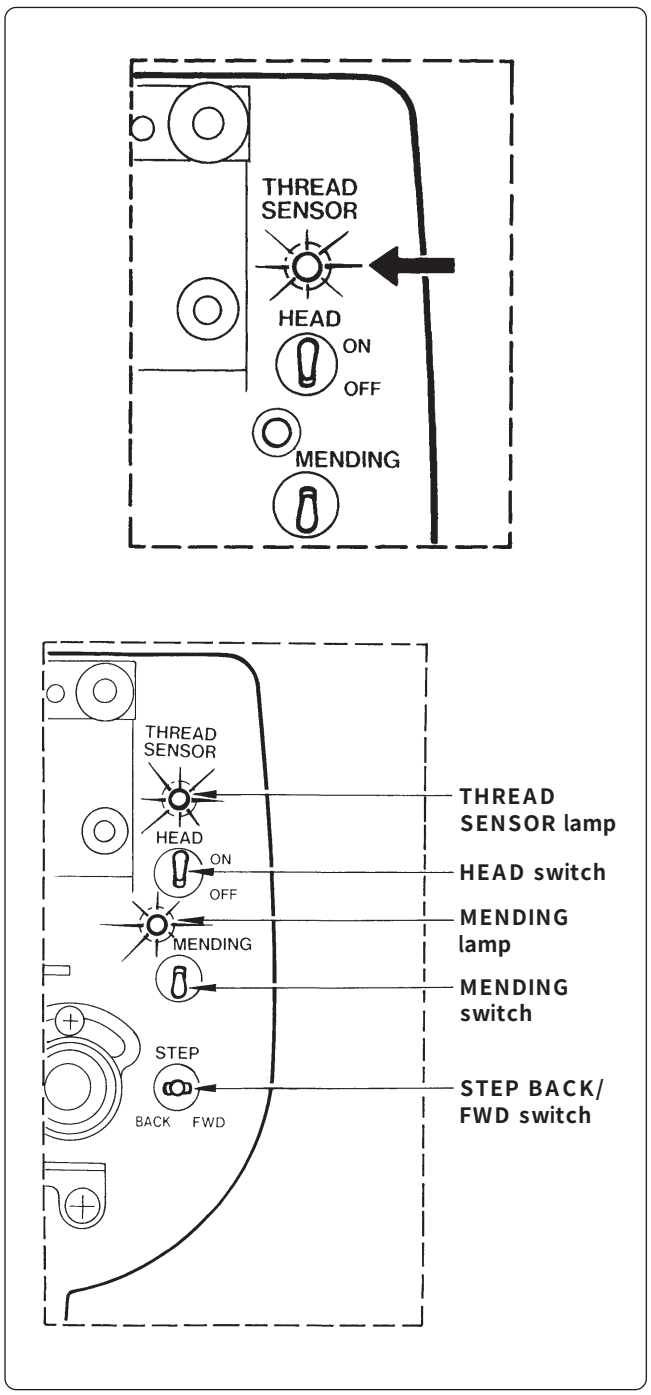


- When the computer has given a command to move the embroidery hoop, "HOOP" is displayed while blinking on the operation panel.
- Press the check switch and the embroidery hoop moves to the designated position.



4. Measures against Thread Breakage

4-1 Remedies



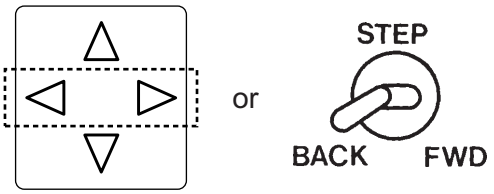
1. If embroidering is suspended due to thread breakage, the THREAD SENSOR lamp of the machine head with a thread breakage blinks.

2. Correct the broken thread and pass it through again.

   * Refer to "Chapter 2, 3-1 Upper Threading" for details.

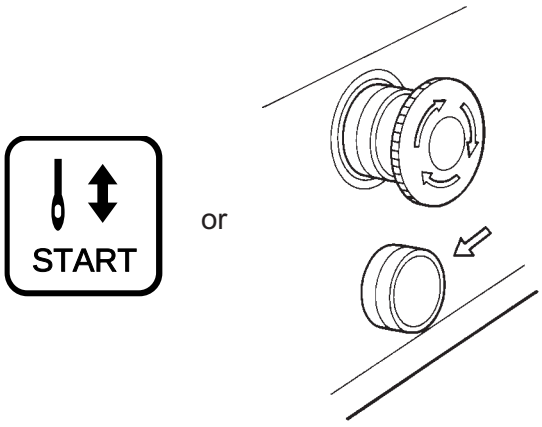
3. Press the STOP switch or press the STEP BACK/FWD switch in order to reset the alarm.

4. Return the hoop to a position where thread breakage occurred by pressing the STEP BACK switch.



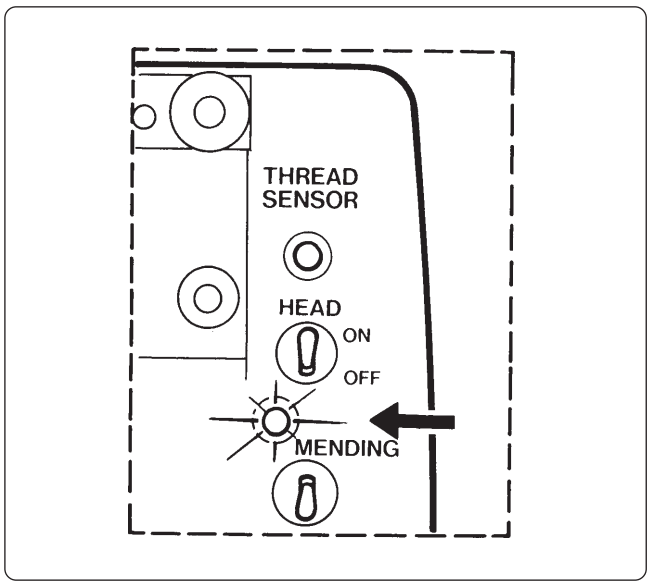
Note) When the switch is turned for 20 stitches or more, the machine continues operation without holding the switch. To stop the machine, turn the switch to the opposite side.

5. Press the START switch on the operation panel or the start switch located between the machine heads to resume operation.



4-2 Mending

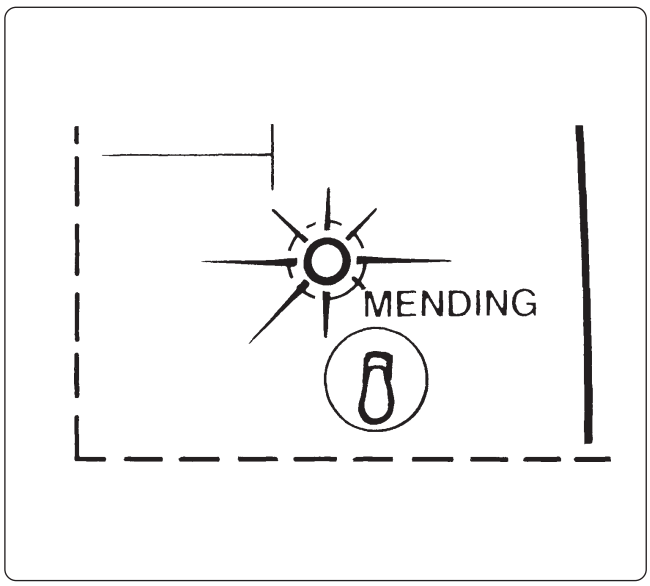
The machine head whose MENDING lamp is lit performs embroidering by the preset number stitches. When it is completed, all the machine heads start normal embroidering operation.



- The MENDING lamps except for the machine head whose needle thread has been broken are turned off.
- At this time, the machine head, whose MENDING lamp is on, performs resewing from the step-back position while the other machine heads (with MENDING lamps off) are stopped. When resewing is completed, the other machine heads (except those halted or with bed retracted) also start embroidering.

■ Manual operation

The mending start and end positions can be set for each machine head using the MENDING switch on the tension plate.



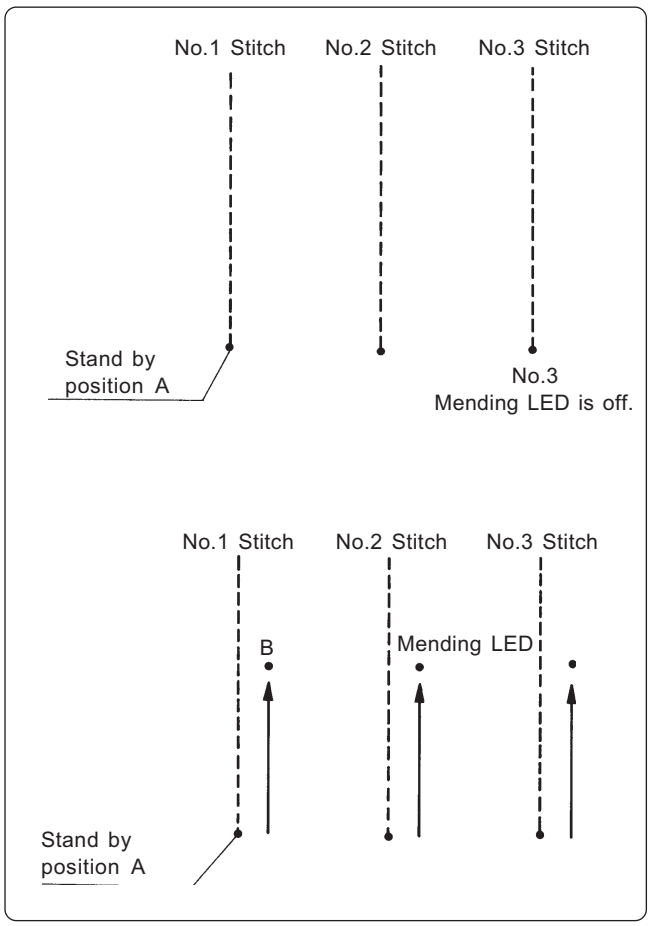
The MENDING lamp is lit when the MENDING switch of each machine head is flipped up during standby. Resewing from the step-back position to this position can be executed.

* When the MENDING switch is flipped up while the MENDING lamp is off, the lamp is turned on; when the MENDING switch is flipped up again while the MENDING lamp is lit, the lamp is turned off.

Note) The mending end position cannot be set for each machine head.

When all MENDING lamps are turned on, the mending end position will be set to the position where one of the lamps is turned off first.

Note) To cancel the mending end position, turn all the MENDING lamps are turned on (except for halted machine heads) .



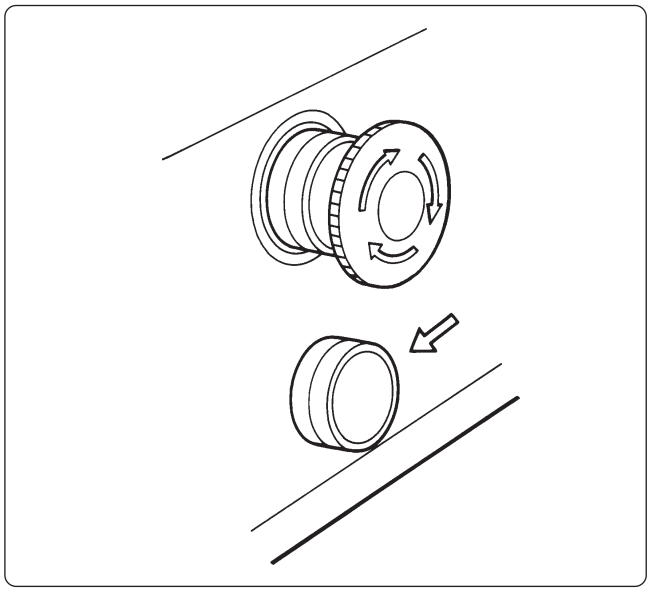
1. Turn off the MENDING lamp No. 3 at the standby position A.
   (The position A should be the mending end position.)
2. Press the jog switch or

to move it backward.
   Turn off the MENDING lamp No. 2 at the position B.
   (The position B does not become the end position; the position A remains the end position.)

   Note) When the MENDING switch of the machine head whose lamp is off is pressed:
   - The MENDING lamp of the machine head is lit, and mending is executed for the machine head.

   Note) When the MENDING switch of the machine head whose lamp is on is pressed:
   - The MENDING lamp of the machine head goes off and mending is not excuted for the machine head.

5. Jog Embroidering



- Jog embroidering can be used for preventing the thread from slipping from the needle at the start of embroidering.
- Jog embroidering can be executed as long as the start switch at the machine head is held down.

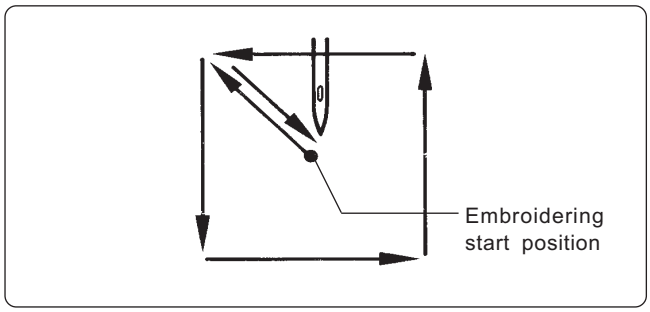
  Note) Never apply a tape on the switch to keep jog operation for a long time. Doing so may cause damage to the machine.

6. Hoop Feed Position

- In order to ease mounting and dismounting of the embroidery hoop, another needle position can be set as a hoop feed position in the movable area additionally to the current needle position. (The hoop feed position should be set by the personal computer.)
- In order to ease material attachment while operation is suspended, the hoop can be moved to the feed position at any time by the hoop feed switch.
- The hoop can also be moved to the feed position automatically after embroidering is finished. Refer to "Automatic Hoop Feed" on Page 152 for details.

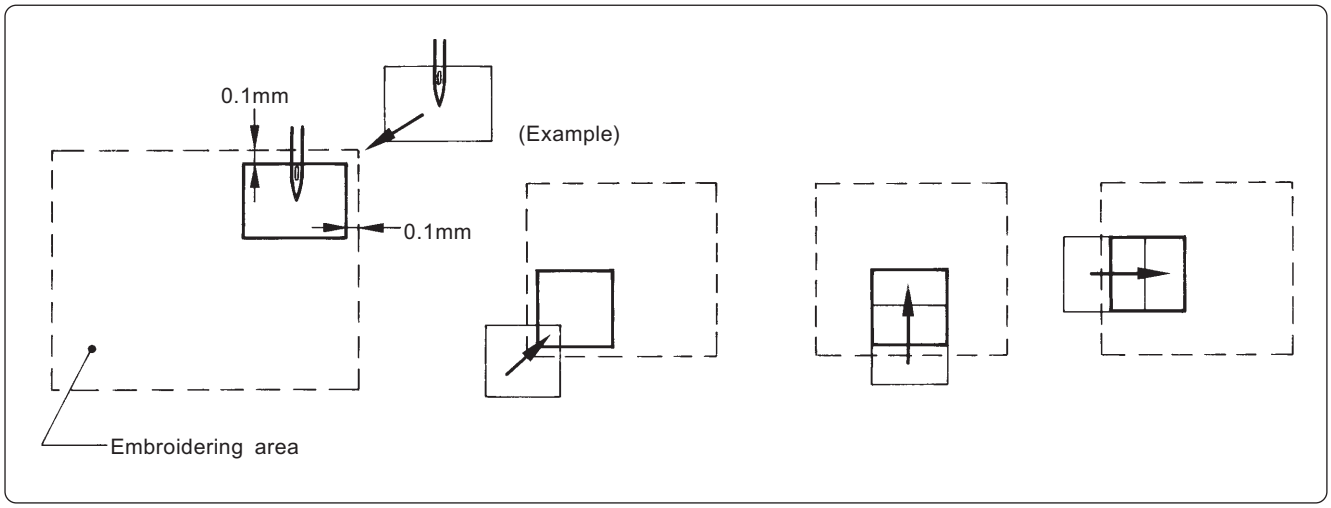
7. Area Check

7-1 External Tracing



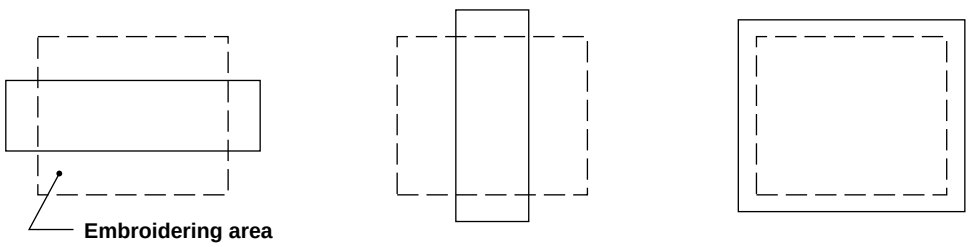
- If the check switch is pressed in other cases than "area over", the rectangular outline of the pattern is traced.

7-2 Automatic Hoop Movement in Area



- If "area over" is displayed, press the check switch. The hoop automatically moves inside the embroidering area, where the pattern is set, at the nearest position.

Note) After finishing the movement inside the area by this function, execute external tracing. Then, check that the needle and the presser foot do not interfere with the hoop before starting embroidering.

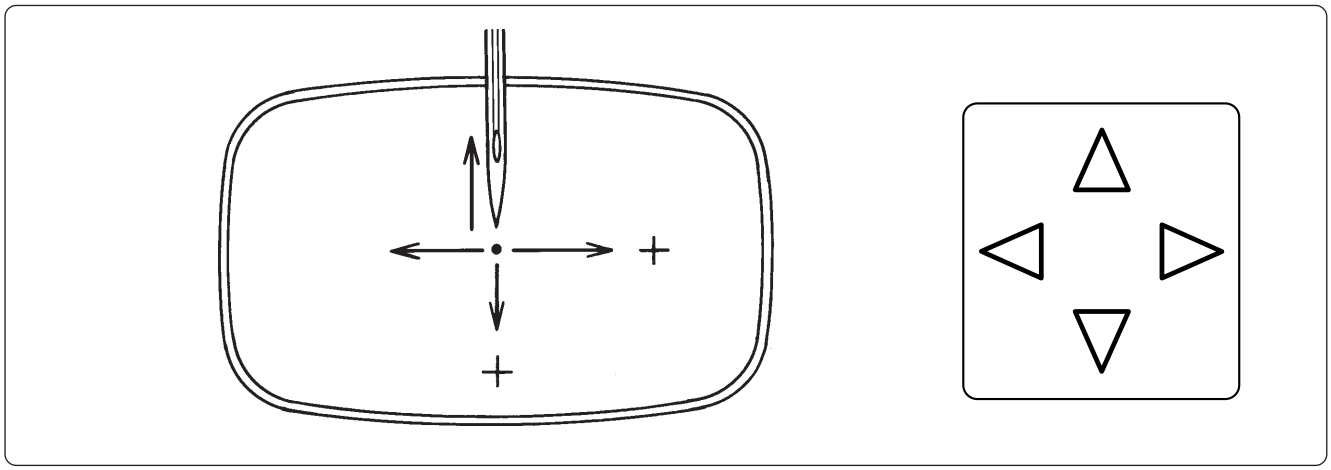


If the pattern is not held in the embroidering area as shown below, the hoop cannot move into the area. Enlarge the embroidering area on the personal computer.

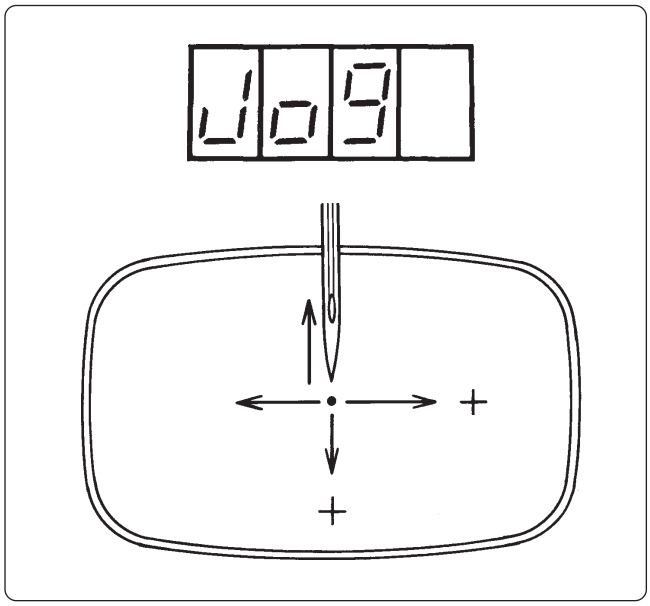
8. Jog Switches

8-1 Hoop Movement to Start Position

The hoop immediately after the embroidering mode becomes valid can be moved so that the start position can be set as required.



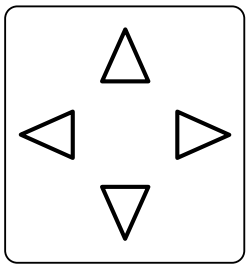
8-2 Inching Mode during Embroidering (Forcible Hoop Movement)



1. Press the jog switch u while pressing the "STOP" switch and "AJST" is displayed.

2. Press the jog switch r to forcibly change the hoop. "JOG" is displayed.

3. Press the "START" switch and press the jog switch. The hoop moves to the direction of the pressed switch.



Note) • Note that the forcible hoop movement will produce deviation of embroidering by the amount.
• If the hoop and material are deviated from each other during embroidering, correct it by using the jog switches.

4. Pressing the STOP switch resets the inching mode.

5. Press the START switch restarts embroidering.

Chapter 8
Creating Production Report

Records and controls the machine operation. The production report can be created based on this data. Detailed information of production report allows efficient embroidering control.

Functions (Command Reference)

File menu

Open Report File		Opens the report file. (→ page 188)
Save As CSV		Saves the current report data in CSV format. (→ page 201)
Print		Prints the report. (→ page 202)
Print Preview		Displays the print preview on the screen.
Page Setup		Displays the setting screen for printing. (→ page 202)
Exit from Production Report		Exits from the production report.

Edit menu

Copy		Copies the selected area to the clipboard. (→ page 203)
Select All		Selects all report data.

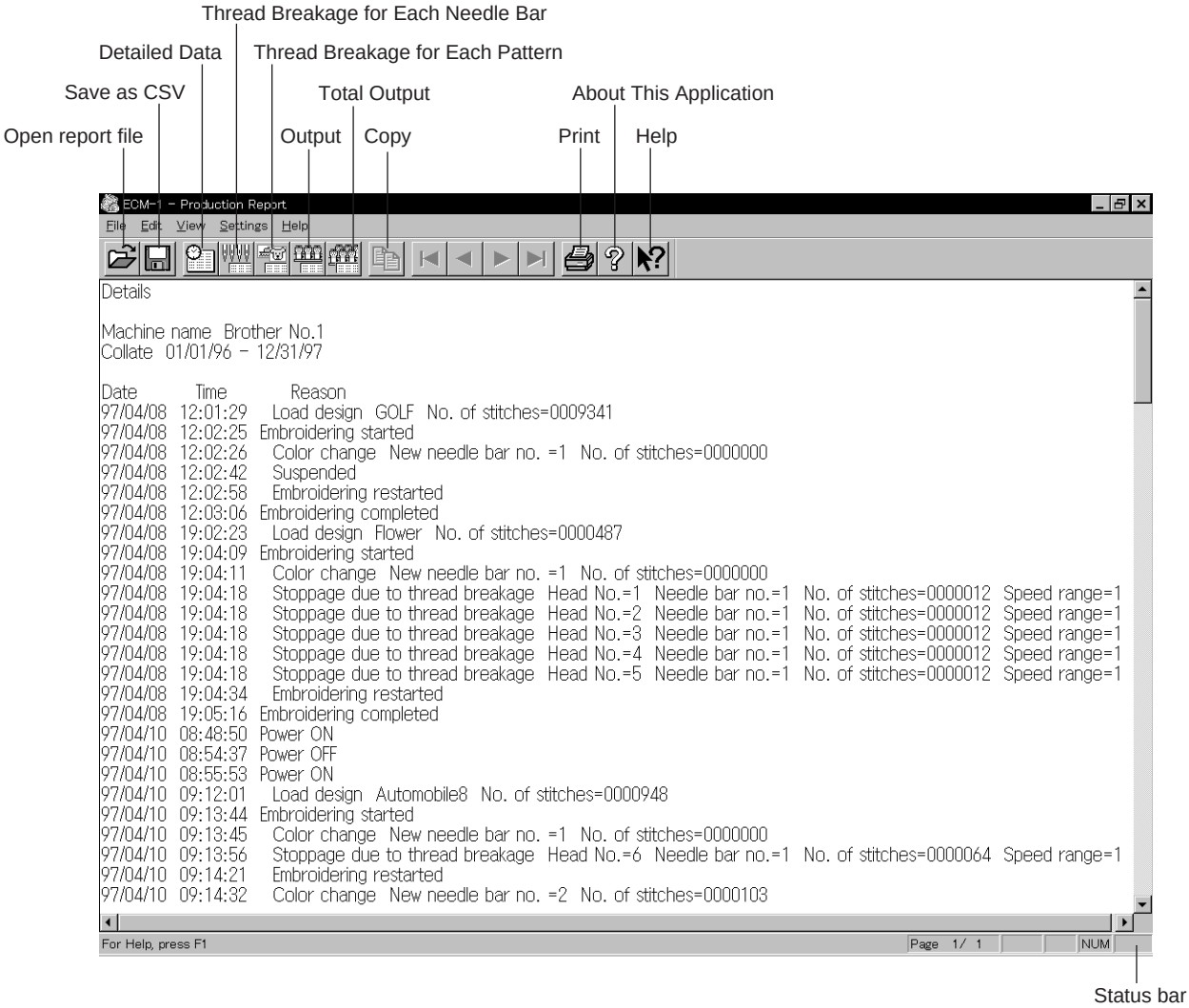
View menu

Details		Displays detail data. (→ page 196)
Thread Breakage Information on Needle Bar		Displays the thread breakage information for each machine needle. (→ page 197)
Thread Breakage information in pattern		Displays the thread breakage information for each pattern. (→ page 197)
Output information		Displays the production output of each machine. (→ page 198)
Total output information		Displays the total production output. (→ page 199)
Top page		Displays the top page.
Previous page		Displays the previous page.
Next page		Displays the next page.
Last page		Displays the last page.
Tool Bar		Displays the tool bar.
Status Bar		Displays the status bar.

Settings menu

Items to be displayed	Sets the display item. (→ page 195)
Delete report file (s)	Deletes the report file. (→ page 204)

Description of Screen



Displaying Report

Displays the machine operation status in the form of report.

■ The following reports can be displayed:

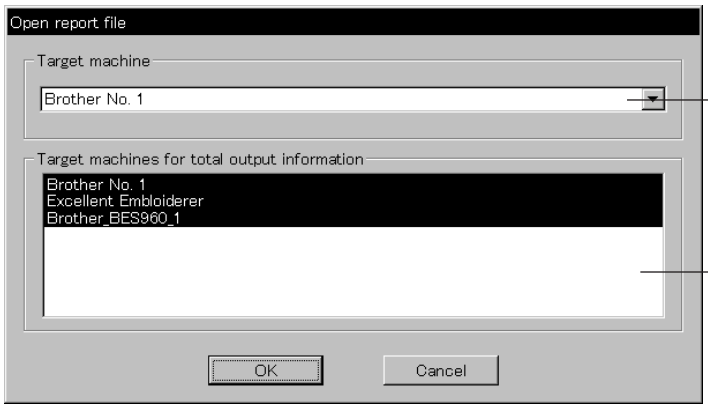
Details	Displays detail data while the machine is in operation.
Thread Breakage information on Needle Bar	Displays the thread breakage information for each machine.
Thread Breakage information in Pattern	Displays the thread breakage information for each pattern.
Output information	Displays production output or efficiency of the selected machine.
Total output information	Displays production output or efficiency of multiple machines.

■ Items to be displayed in each report can be set. For details, refer to "Setting Display Items" (→ page 195).

1. Select the desired report from View menu or on the tool bar.

2. Select [Open] from File menu or click .

3. Select the applicable machine.



Click here to select the machine for detail data, thread breakage and output information.

Click here to select the machine for total output information. Click here again to cancel the selection.

4. Click [OK].

5. Specify the period to read.
   For more information, refer to "General" in "Setting Display Items" on page 195.

6. Click [OK].
   The report appears.

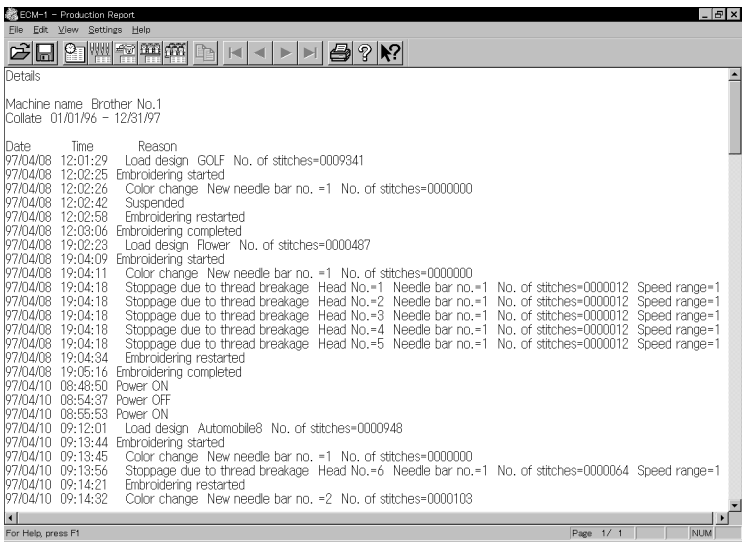
Display Example of Details

Displays the machine information chronologically that are collected within the specified period.

The following information is indicated under the "Reason" column:

Display	Contents
Power ON	The machine power was turned on. If the computer is turned on after the machine power has been on, it shows the time when the computer recognized the machine.
Power OFF	The machine power was turned off. If the computer is turned off before the machine power, it shows the time when the computer program quit.
Load design (*)	The name of the loaded pattern and the number of stitches are indicated. This is also recorded when embroidering was started after the power was turned off and back on.
Embroidering started	Embroidering was started.
Embroidering completed	Embroidering was completed.
Embroidering canceled	Embroidering was canceled. The information on the pattern is deleted from the record.
Color change (*)	The needle bar number and the number of stitches after color change are indicated.
Suspended (*)	The machine operation was suspended by the operator.
Stoppage due to thread breakage (*)	A thread breakage occurred. The head number, the needle bar number and the speed range are indicated.
Error (*)	The machine was stopped due to an error.
Embroidering restarted (*)	Embroidering was restarted after a suspension, a thread breakage, or an error.

The items marked with "*" can be shown or hidden on the " Setting items to be displayed" screen.

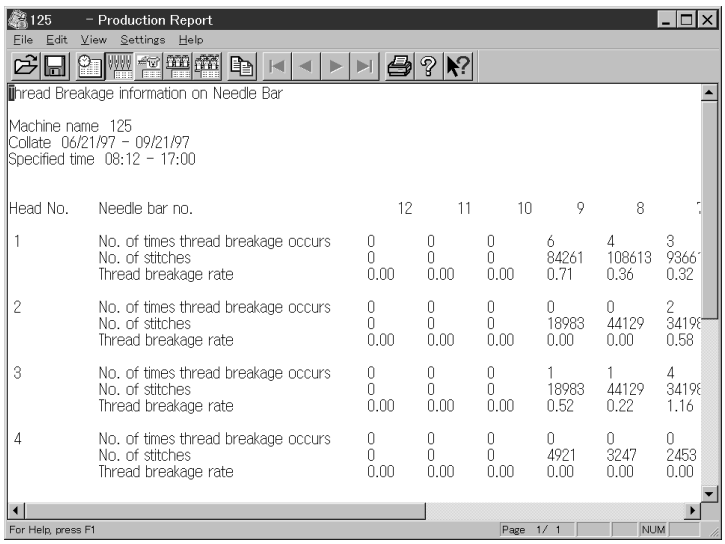


Display Example of Thread Breakage Information on Needle Bar

Displays the information on thread breakage occurrences with head numbers and needle bar numbers. Three needle bars with frequent thread breakage are indicated.

Display	Contents
No. of times thread is trimmed (*)	Number of thread breakage occurrences per needle bar
No. of stitches (*)	Number of stitches embroidered with the needle bar during the specified period
Thread breakage rate (*)	Thread breakage rate per 10,000 stitches (10000 x No. of times thread is trimmed) /No. of stitches
Total (*)	Total for all the heads or all the needle bars
Needle bar with frequent thread breakage occurrence (*)	Three needle bars that have thread breakage frequently, in the decreasing order of frequency

The items marked with "*" can be shown or hidden on the " Setting items to be displayed" screen.

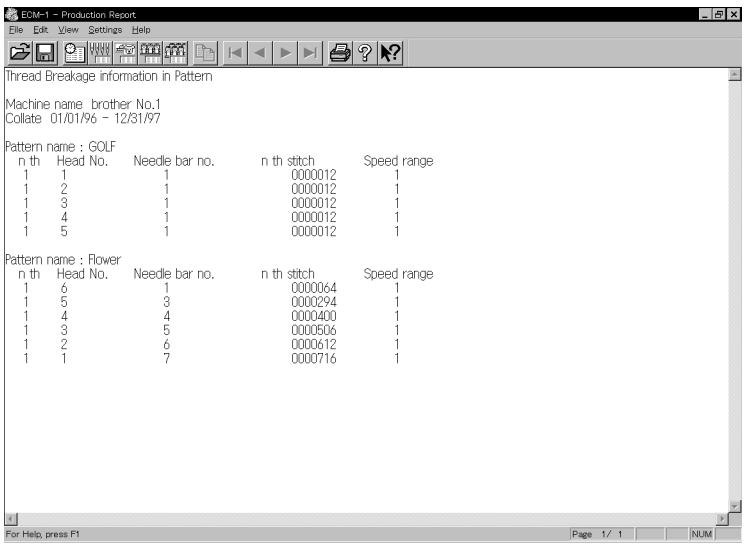


Display Example of Thread breakage Information in Pattern

Displays thread breakage information for each pattern.

Display	Contents
n th	The pattern was embroidered for the "n"th time.
Pattern name	Name of the pattern that was embroidered
Head No. (*)	Head number where a thread breakage occurred
Needle bar no. (*)	Needle bar number where a thread breakage occurred
n th stitch (*)	The ordinal number of the stitch when a thread breakage occurred
Speed range (*)	Speed range that was effective when a thread breakage occurred

The items marked with "*" can be shown or hidden on the " Setting items to be displayed" screen.



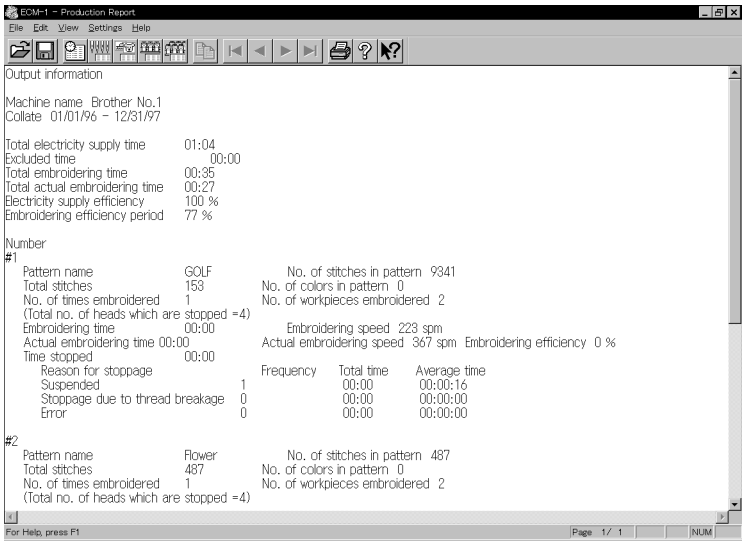
Display Example of Output Information

Displays the production information that are collected during the specified period.

Display	Contents
Total electricity supply time	Total time when the machine was energized within the specified period
Total embroidering time	Total time when the machine embroidered within the specified period
Total actual embroidering time	Total actual time when the machine embroidered within the specified period
Excluded time	Total time of intermission and maintenance for the number of days in the specified period
Electricity supply efficiency	Electricity supply efficiency by calculating below: (Total electricity supply time - excluded time) / total electricity supply time
Embroidering efficiency period	Ratio of the actual embroidering time to the total embroidering time Total actual embroidering time / total embroidering time
Number	The pattern embroidered during the specified period is numbered.
Pattern name	Name of the pattern
No. of stitches in pattern	Number of stitches in the pattern
Total stitches (*)	Total number of stitches by repeating embroidering No. of stitches in pattern X No. of times embroidered
No. of colors in pattern (*)	Number of colors in the pattern
No. of times embroidered (*)	Number of embroidering repeated
No. of workpieces embroidered (*)	Number of finished sheets by one embroidering cycle
Total no. of heads which are stopped	Total number of the heads at rest for one embroidering cycle
Embroidering time (*)	Time from embroidering start to the end for the pattern
Embroidering speed (*)	Average embroidering speed in the embroidering time (the number of stitches per minute) Total stitches/embroidering time
Actual embroidering time (*)	Actual embroidering time excluding the stop time by thread breakage, suspension and errors from the embroidering time
Actual embroidering speed (*)	Average embroidering speed in the actual embroidering time (the number of stitches per minute) Total stitches/actual embroidering time
Embroidering efficiency (*)	Ratio of the actual embroidering time to the embroidering time Actual embroidering time / embroidering time
Time stopped (*)	Total of stop time during embroidering
Reason for stoppage (*)	Reasons for stoppage are indicated. Refer to the next page.

The items marked with "*" can be shown or hidden on the " Setting items to be displayed" screen.

Details of reason for stoppage	
Suspended	Frequency and total time stopped by the operator
Stoppage due to thread breakage	Frequency and total time stopped by thread breakage
Error	Frequency and total time stopped by errors

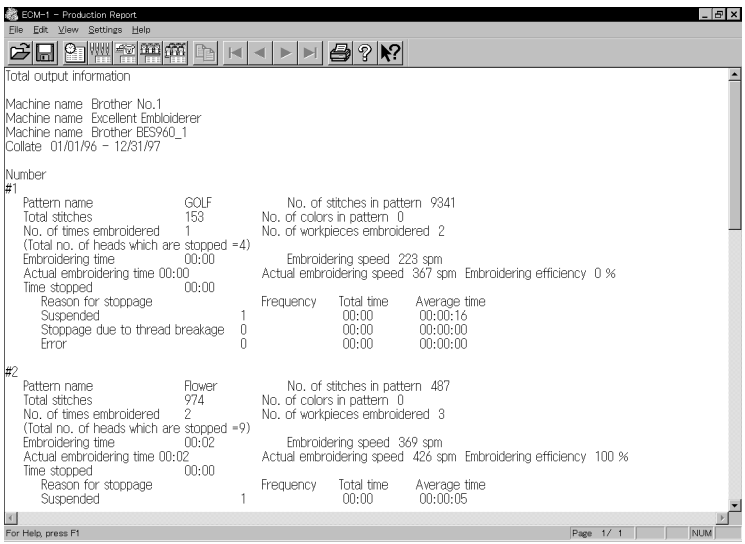


Display Example of Total Output Information

Displays the output information per pattern on multiple machines that are selected.

Display	Contents
Number	The pattern embroidered during the specified period is numbered.
Pattern name	Name of the pattern
No. of stitches in pattern	Number of stitches in the pattern
Total stitches (*)	Total number of stitches by repeating embroidering No. of stitches in pattern X No. of times embroidered
No. of colors in pattern (*)	Number of colors in the pattern
No. of times embroidered (*)	Number of embroidering repeated
No. of workpieces embroidered (*)	Number of finished sheets by one embroidering cycle
Total no. of heads which are stopped	Total number of the heads at rest for one embroidering cycle
Embroidering time (*)	Time from embroidering start to the end for the pattern
Embroidering speed (*)	Average embroidering speed in the embroidering time (the number of stitches per minute) Total stitches/embroidering time
Actual embroidering time (*)	Actual embroidering time excluding the stop time by thread breakage, suspension and errors from the embroidering time
Actual embroidering speed (*)	Average embroidering speed in the actual embroidering time (the number of stitches per minute) Total stitches/actual embroidering time
Embroidering efficiency (*)	Ratio of the actual embroidering time to the embroidering time Actual embroidering time / embroidering time
Time stopped (*)	Total of stop time during embroidering
Reason for stoppage (*)	Reasons for stoppage are indicated. Refer to the next page.

The items marked with "*" can be shown or hidden on the " Setting items to be displayed" screen.



Setting Display Items

Sets display items for each production report.

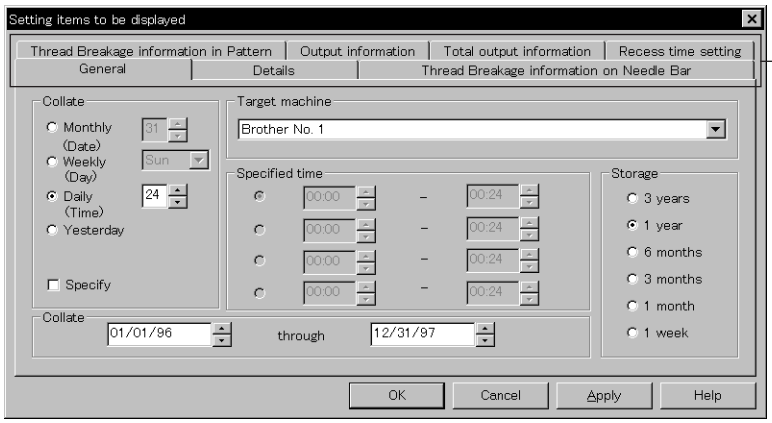
■ The following tab windows can be set:

General	Items related to the overall display of the output report.
Details	Items related to detail data.
Thread Breakage information on Needle Bar	Items related to thread breakage for each needle bar.
Thread Breakage information in Pattern	Items related to thread breakage for each pattern.
Output information	Items related to output information.
Total output information	Item related to total output information.
Recess time setting	Items not included in the efficiency calculation for output information and total output information.

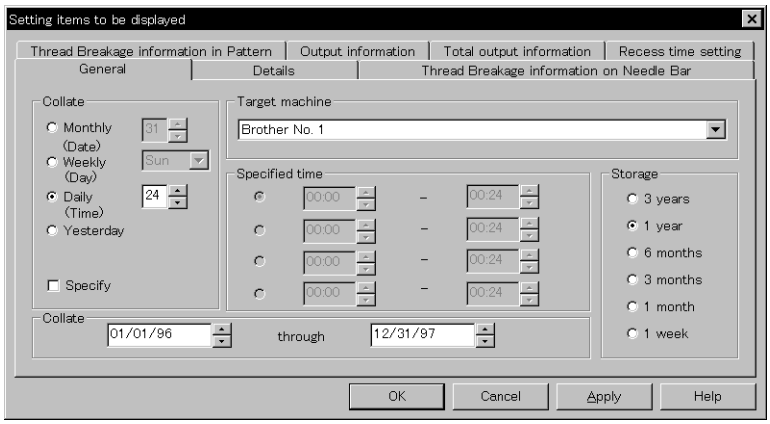
1. Select [Items to be displayed] from Settings menu.

2. "Setting items to be displayed" screen appears.

   Click the tab on the screen and the tab window for the items appears.



General



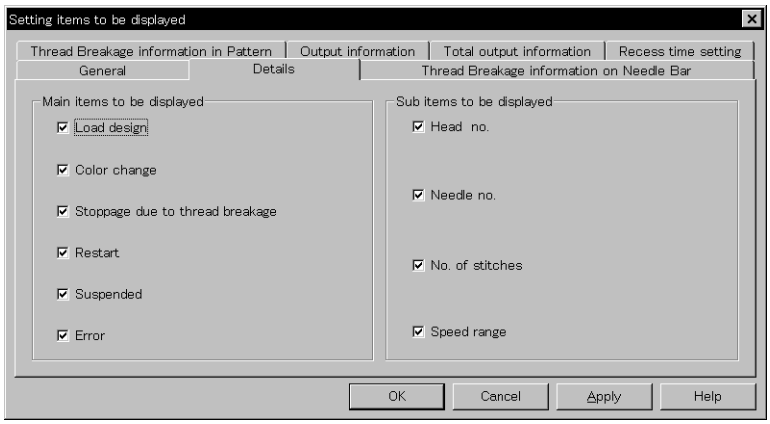
■ Collate

Selects the data collection period. If month, week or day is selected, set the end date or end hour.

■ Storage

Selects the data save period.

Details



■ Main items to be displayed

Displays each event and the time.

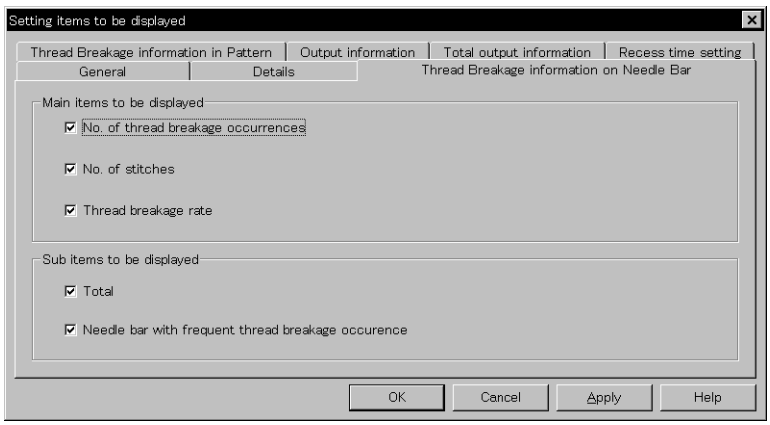
Load design	Transfer time of embroidery data
Color change	Time of color change
Stoppage due to thread breakage	Time of thread breakage
Restart	Time of resuming embroidering after suspension
Stop after pressing button	Time when the emergency stop button was pressed
Suspended Error	Time when an error has occurred

■ Sub items to be displayed

Displays the following for each item in main display items.

Head no.	Head number
Needle no.	Needle number
No. of stitches	Number of stitches
Speed range	Speed range

Thread Breakage Information on Needle Bar



■ Main items to be displayed

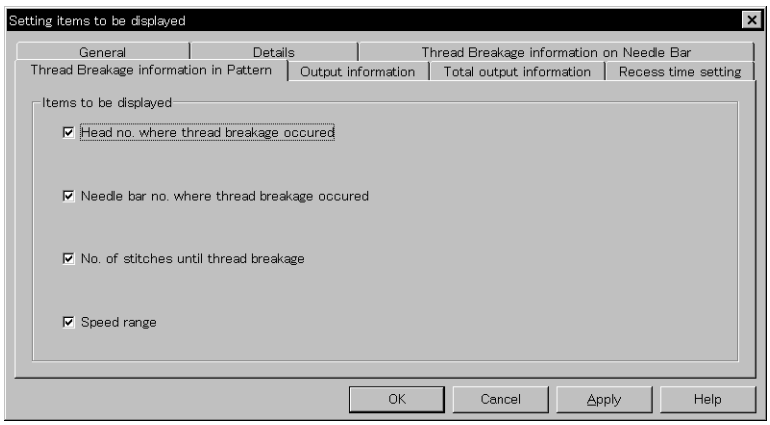
No. of thread breakage occurrences	Number that thread breakage has occurred
No. of stitches	Number of stitches used in embroidery
Thread breakage rate	Rate of thread breakage for 10,000 stitches

■ Sub items to be displayed

Displays the following for each item in main display items.

Total	Total of the item for each head and each needle
Needle Bar with frequent thread breakage occurrences	Data of three needles that have caused thread breakage most frequently

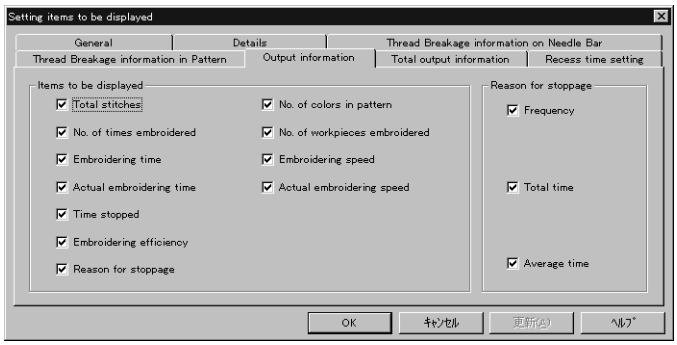
Thread Breakage Information in Pattern



Head no. where thread breakage occurred	Head number that has caused thread breakage
Needle bar no. where thread breakage occurred	Needle number that has caused thread breakage
No. of stitches until thread breakage	Number of stitches until thread breakage has occurred
Speed range	Speed range when thread breakage has occurred

Output Information

Time is calculated to the unit of second, but the display unit is in minute. This may result in minor differences.



■ Items to be displayed

Total stitches	The total number of embroidery stitches from start to end
No. of times embroidered	Number of embroidering
Embroidering time	The total time from start to end spent for embroidery
Actual embroidering time	Time spent for embroidering
Time stopped	Time not spent for embroidering
Embroidering efficiency	Actual embroidery time/Embroidering time (in %)
Reason for stoppage	Event that caused a stop
No. of colors in pattern	Number of colors in pattern
No. of workpieces embroidered	Number of sheets embroidered.
Embroidering speed	Number of total stitches/Embroidering time (number of stitches for 1 minute in operation)
Actual embroidering speed	Number of total stitches/Actual embroidery time (number of stitches for 1 minute in embroidering)

■ Reason for stoppage

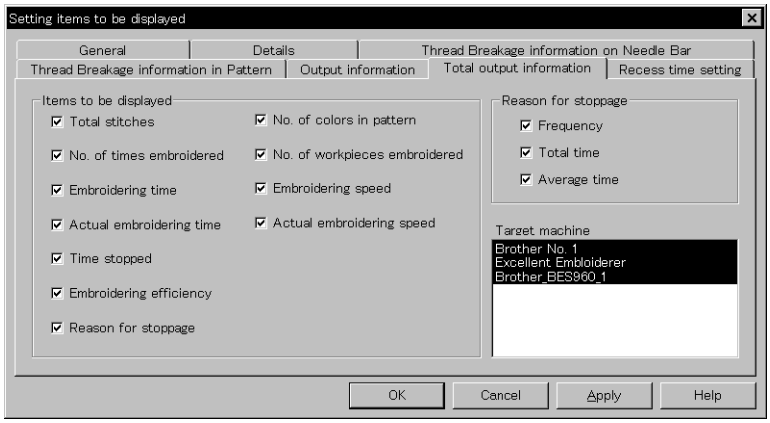
Items for selection appear when [Reason for Stoppage] is clicked in the "Items to be diaplayed" column.

The display shows for three cases: emergency button stop, thread breakage, and error stop.

Frequency	Number of stops
Total time	Total stop time
Average time	Average stop time per occurrence (in seconds)

Total Output Information

Time is calculated to the unit of second, but the display unit is in minute. This may result in minor differences.



■ Items to be displayed

Total stitches	The total number of embroidery stitches from start to end
No. of times embroidered	Number of embroidering
Embroidering time	The total time from start to end spent for embroidery
Actual embroidering time	Time spent for embroidering
Time stopped	Time not spent for embroidering
Embroidering efficiency	Actual embroidery time/Embroidering time (in %)
Reason for stoppage	Event that caused a stop
No. of colors in pattern	Number of colors in pattern
No. of workpieces embroidered	Number of sheets embroidered.
Embroidering speed	Number of total stitches/Embroidering time (number of stitches for 1 minute in operation)
Actual embroidering speed	Number of total stitches/Actual embroidery time (number of stitches for 1 minute in embroidering)

■ Reason for stoppage

Items for selection appear when [Reason for Stoppage] is clicked in the "Items to be displayed" column.

The display shows for three cases: emergency button stop, thread breakage, and error stop.

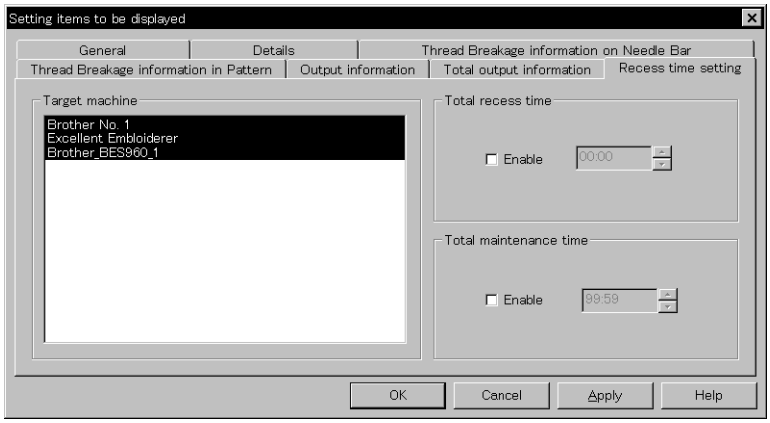
Frequency	Number of stops
Total time	Total stop time
Average time	Average stop time per occurrence (in seconds)

■ Target machine

Click and select the machine for calculation. To cancel the selection, click again.

Recess Time Setting

Sets the time not to be included in the calculation. This time is displayed on the "Output" report as "Time Excluded".



■ Target machine

Click and select the applicable machine for calculation.

■ Total recess time

Set the time not to be included in the day-to-day calculation during the designated period.

■ Total maintenance time

Set the time not to be included in the calculation throughout the period.

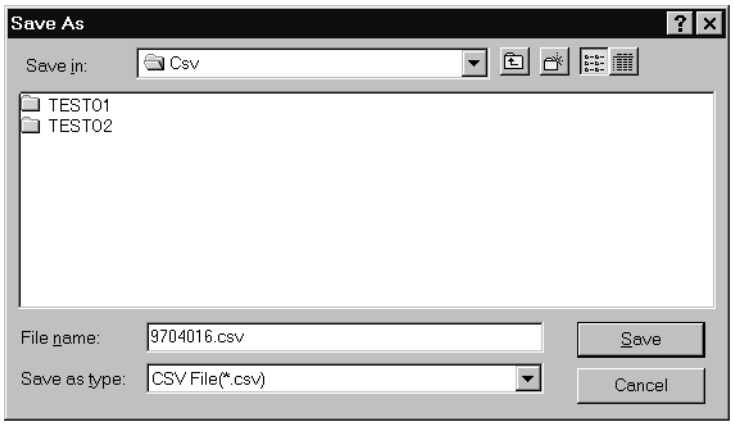
Save As CSV...

Converts the production report data to CSV format that can be read in spreadsheet software.

1. Select [Save As CSV] from File menu or click .

2. The file name "Untitled. csv" automatically appears. To change the name, change "Untitled".

3. Select the directory to be saved and click [Save].



■ What is CSV format?
CSV (Comma Separated Value format) means a type of file formats used for PC. Data in each item is divided by commas and recorded as a text file. This format is mainly used for a spreadsheet software or data base software. The extension is "csv".

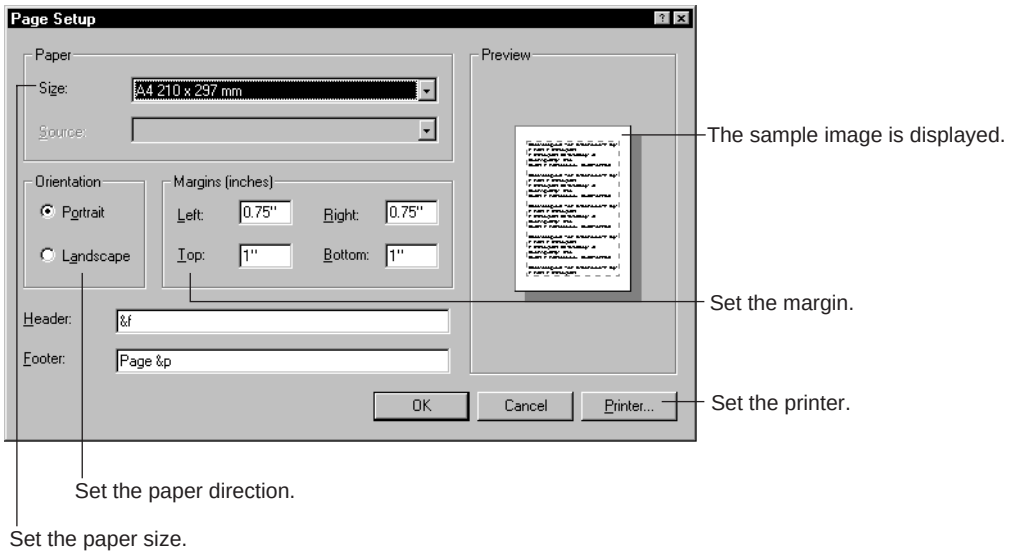
Printing Production Report

Prints the production report from a printer.

Page Setup

Printing method is set as required.

1. Select [Page setup] from the File menu.
   Setting screen is displayed.



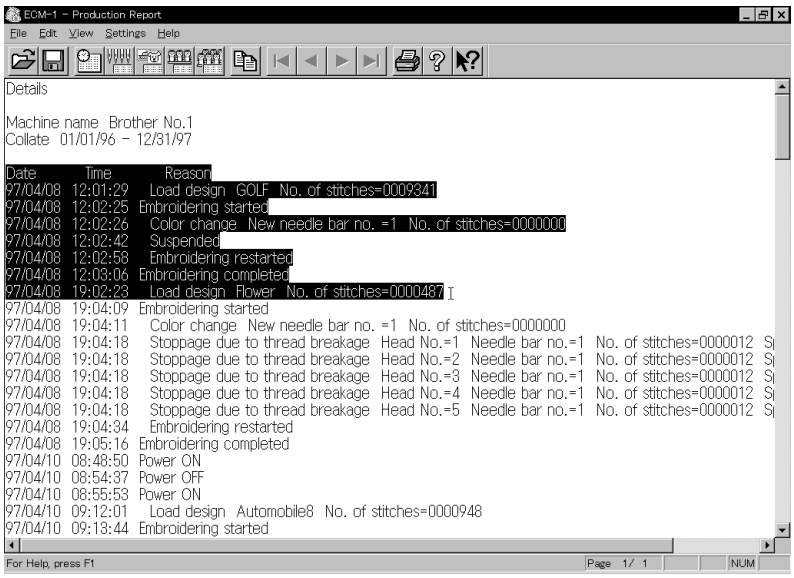
Print

1. Select [Print] from File menu or click .
   Set the number of sheets and click [OK].

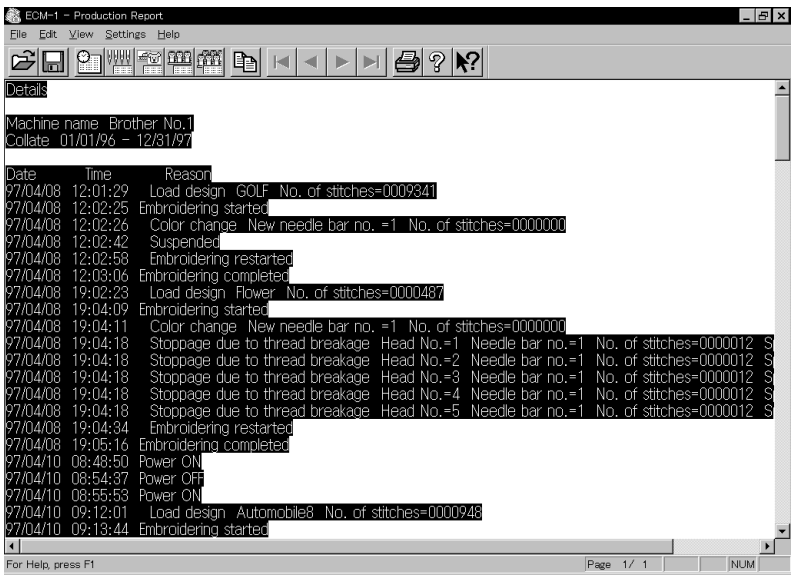
Copying Report Data

Copies the selected area as text data. This allows use of the production report on other word processing software.

1. Select [Select All] from Edit menu, or drag and select the area to be copied.



When dragging for selection



When selecting [Select All]

2. Select [Copy] from Edit menu or click .

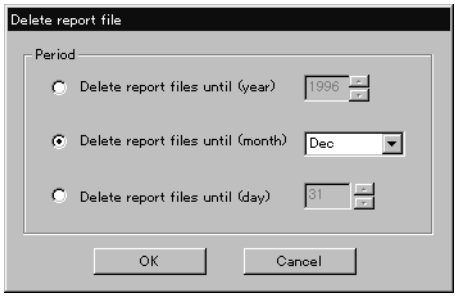
3. The area is copied as text data. Start a word processing software and select [Paste] from Edit menu.
   Copied data is saved until another data is copied or cut.

Deleting Report

Deletes the record data for production report.

1. Select [Delete report file(s)] from Settings menu.

2. Set the period to be deleted.



3. Click [OK].

Chapter 9 Maintenance

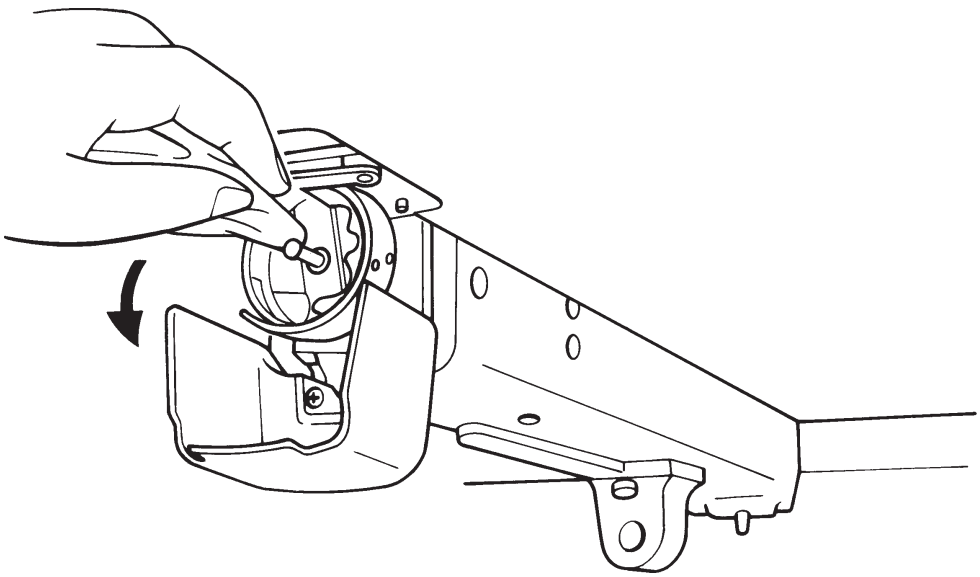
⚠ CAUTION

Turn off the power switch before starting maintenance.
Failure to do so may start the machine unintentionally through an accidental activation of the START switch, resulting in bodily injuries.

Be sure to wear protective goggles and gloves when handling the lubricating oil or grease, so that no oil or grease gets into your eyes or onto your skin, otherwise inflammation can result.
Furthermore, do not drink the oil or grease under any circumstances, as they can cause vomiting and diarrhoea.
Keep the oil out of the reach of children.

- Keep the machine clean at all times to prevent machine trouble.
- Keep the machine clean.
  Remove dirt with a soft, dry cloth. If necessary, clean with the detergent-soaked cloth, then wipe off the detergent with a cloth dampened with (hot) water.
- Caution
  Never use benzene or thinner for cleaning the machine.

1. Cleaning Rotary Hook



2. Oiling

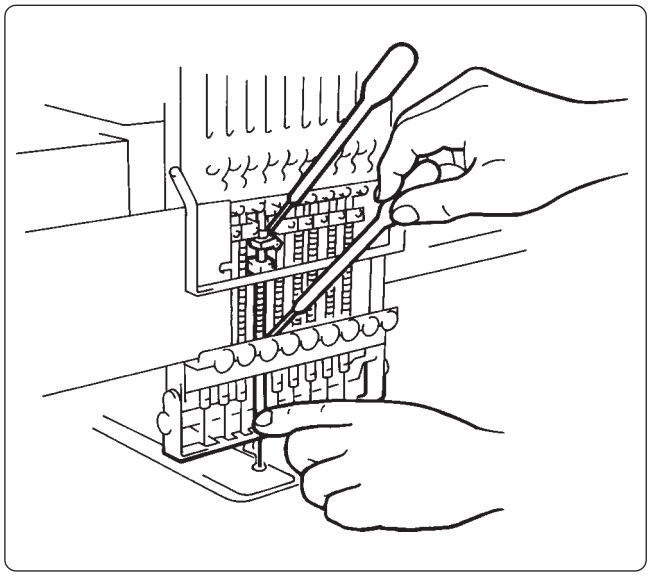
To extend the machine's service life, supply oil to the following places at regular intervals.

(Note) • When oiling, be sure to supply Brother's machine oil (Nisseki Sewing Lube #10 or the equivalent) using the dropper.

• Excessive oiling may cause the material to be stained.

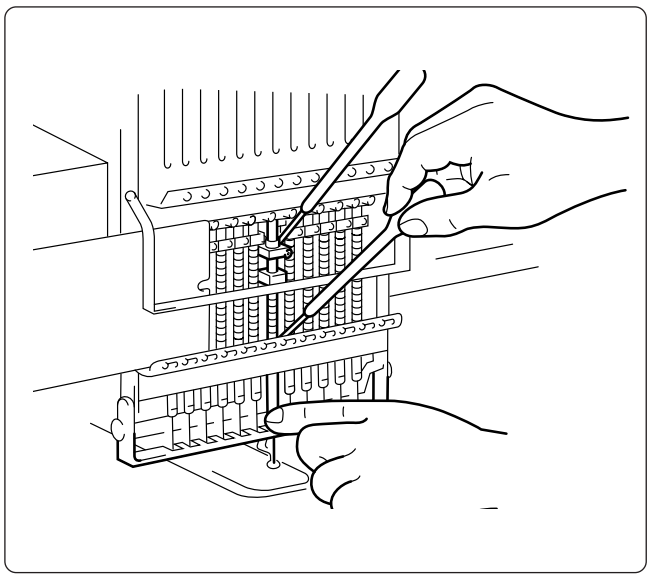
2-1 Head

■ BES-960BC



■ Supply oil to the needle bars (18 positions) once a day as shown on the left.

■ BES-1260BC

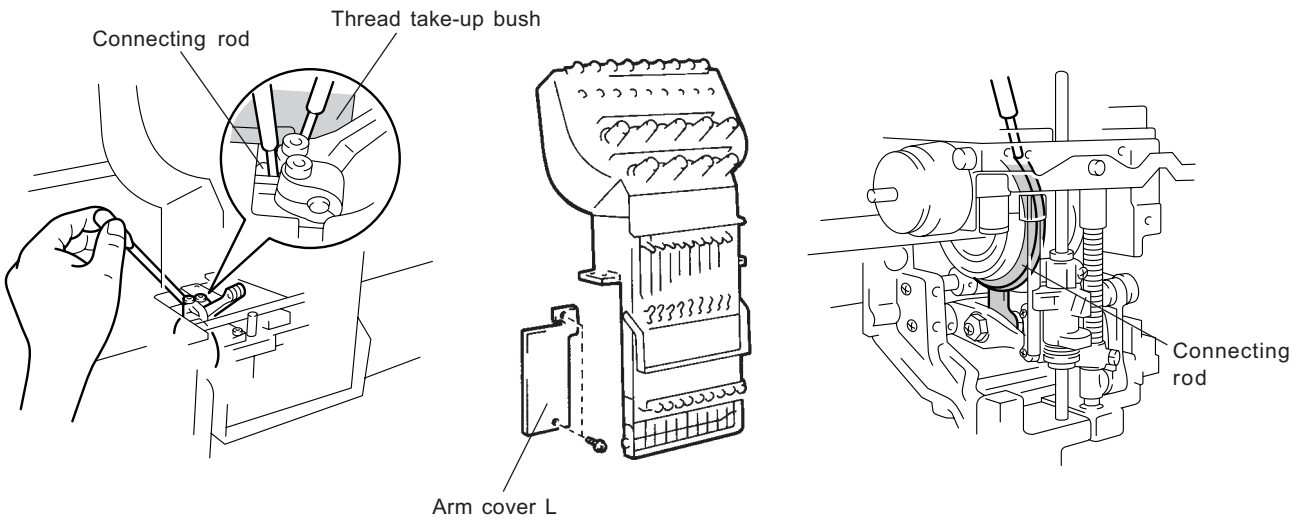


■ Supply oil to the needle bars (24 positions) once a day as shown on the left.

■ BES-960BC

Lubricate the following part indicated by the arrow ("clearance" between the connecting rod and the needle thread take-up bearing) once a week.

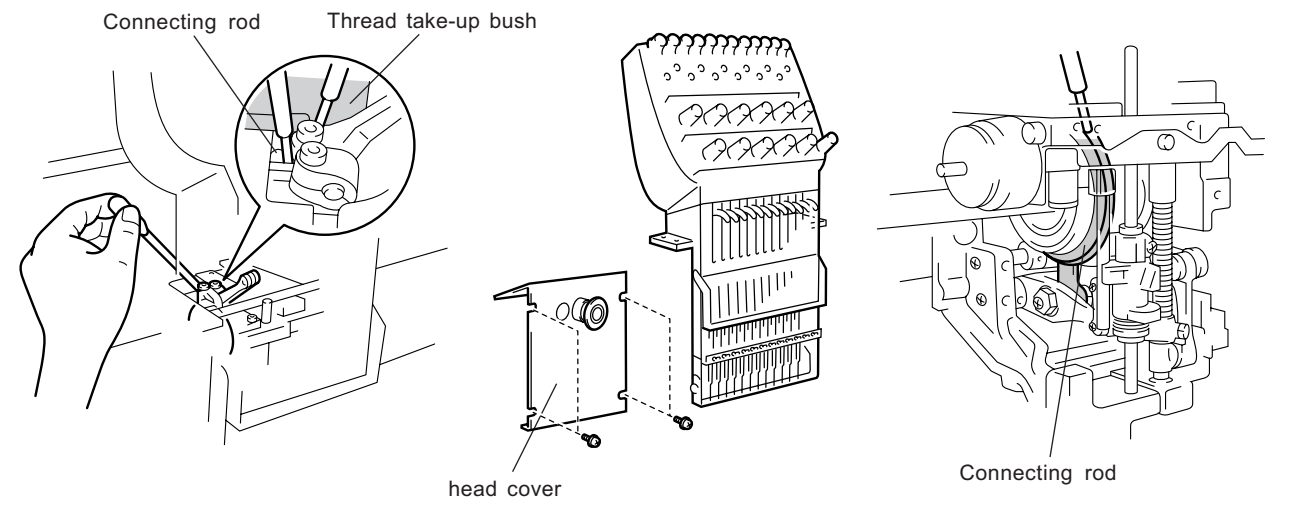
(Note) • In lubrication, select needle bar 9 and remove arm cover L to check the lubrication area. Be sure to wipe off excessive oil spilt at the lower part of the arm.



■ BES-1260BC

Lubricate the following part indicated by the arrow ("clearance" between the connecting rod and the needle thread take-up bearing) once a week.

(Note) • In lubrication, select needle bar 12 and remove the head cover to check the lubrication area. Be sure to wipe off excessive oil spilt at the lower part of the arm.



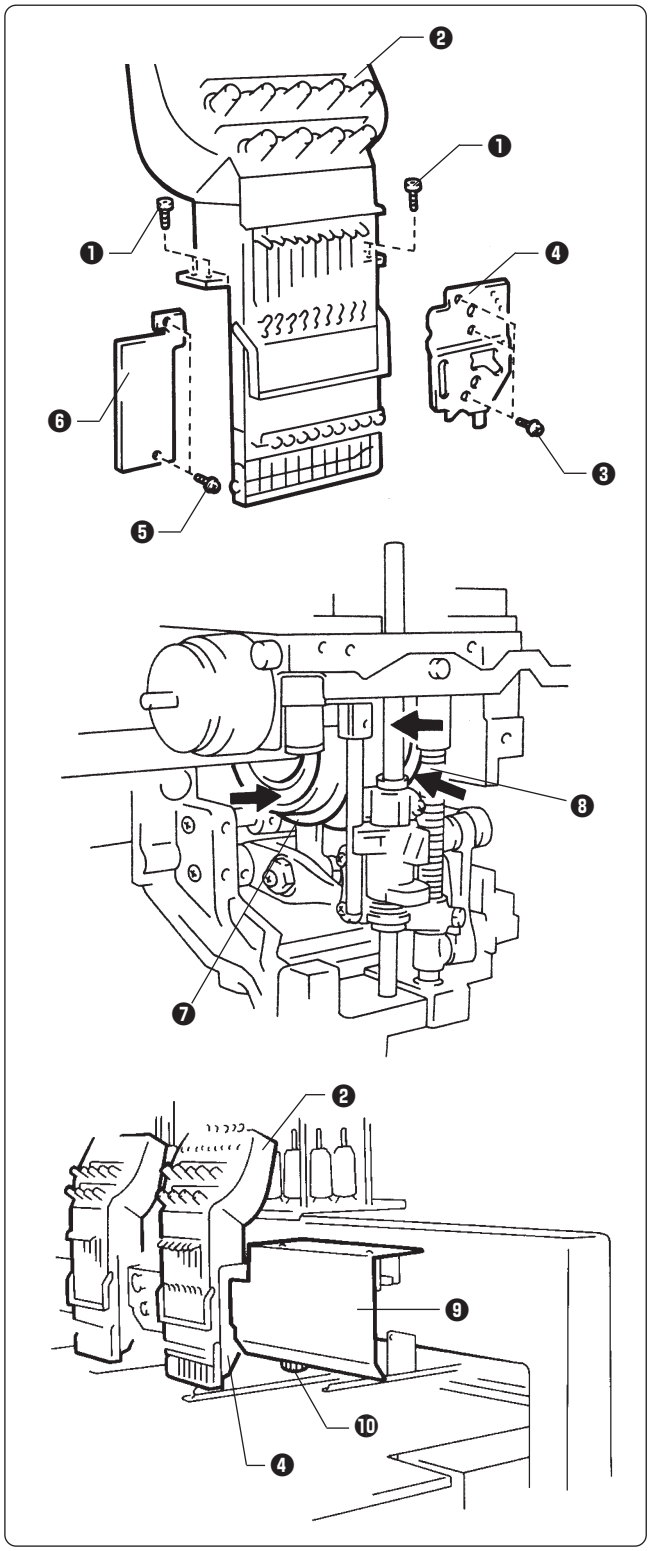
3. Greasing

To extend the machine's service life, supply grease to the following places at regular intervals.

(Note) • When greasing, be sure to use the grease tank BR2 (black) provided with the machine.
• For overhauling, contact your distributor or refer it to trained experts.

3-1 Head

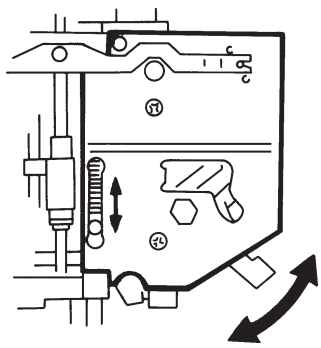
■ Grease two places indicated by the arrow once a month.

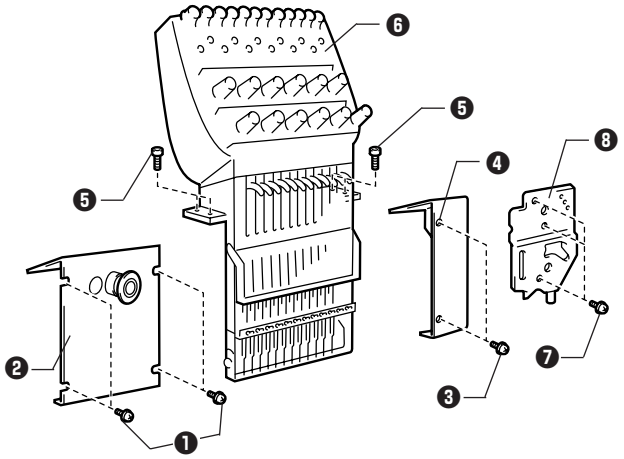


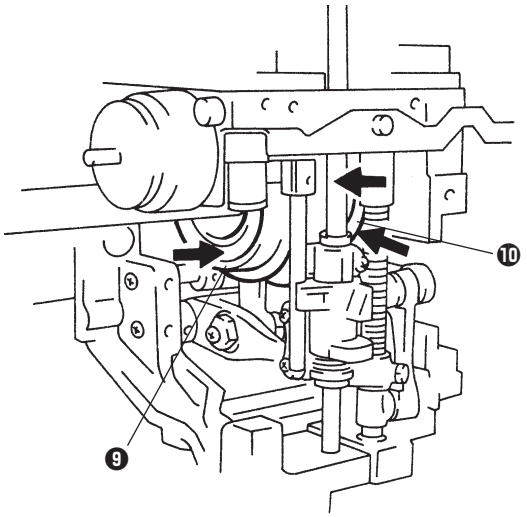
BES-960BC

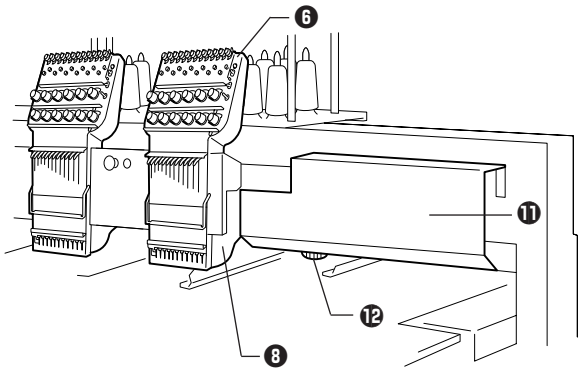
1. Remove two connectors from the rear of the needle bar case.
2. Loosen four bolts ❶, and remove the needle case ❷.
3. Loosen three screws ❸, and remove the presser foot guide plate ❹.
4. Loosen two bolts ❺, and remove the arm cover L ❻.
5. Grease all the grooves of the thread take-up cam ❼ and the work clamp cam ❽.
6. After greasing, assemble in the reverse order.

   (Note) • When assembling the needle bar case ❷, place it on the machine and turn the change pulley ❿ behind the cover ❾ at right. Check that it is engaged, and then tighten the bolts.
   • When attaching the presser foot guide plate ❹, move the presser foot up and down by the retracting lever to check that is it not distorted.









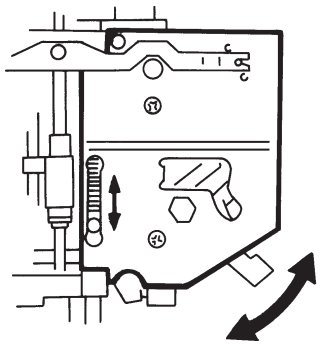
BES-1260BC

1. Remove two connectors from the rear of the needle bar case.
2. Loosen four screws ❶, and remove the head cover ❷, and loosen two screws ❸ and remove the head cover R❹.

   (Note) Because the heads No.1 and No.2 have the head covers R and L respectively, remove both the the covers when greasing.
3. Loosen four bolts ❺, and remove needle bar case ❻.
4. Loosen three bolts ❼, and remove presser foot guide plate ❽.
5. Grease all the grooves of the thread take-up cam ❾ and the work clamp cam ❿.
6. After greasing, assemble in the reverse order.

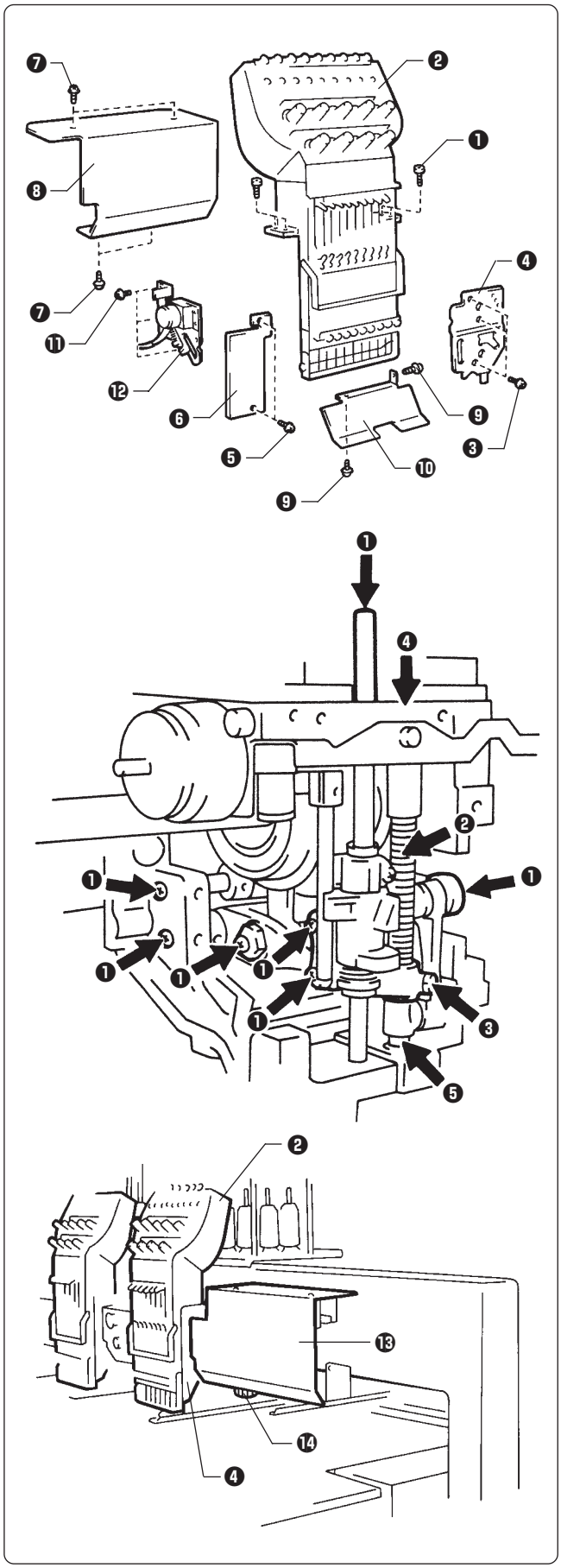
   (Note) • When assembling the needle bar case ❻, place it on the machine and turn the change pulley ⓬ behind the cover ⓫ at right. Check that it is engaged, and then tighten the bolts.

   • When attaching the presser foot guide plate ❽, move the presser foot up and down by the retracting lever to check that is it not distorted.



■ Grease the places indicated by the arrow once in six months.

(Note) When greasing, be sure to use the grease tank BR2 (black) provided with the machine.



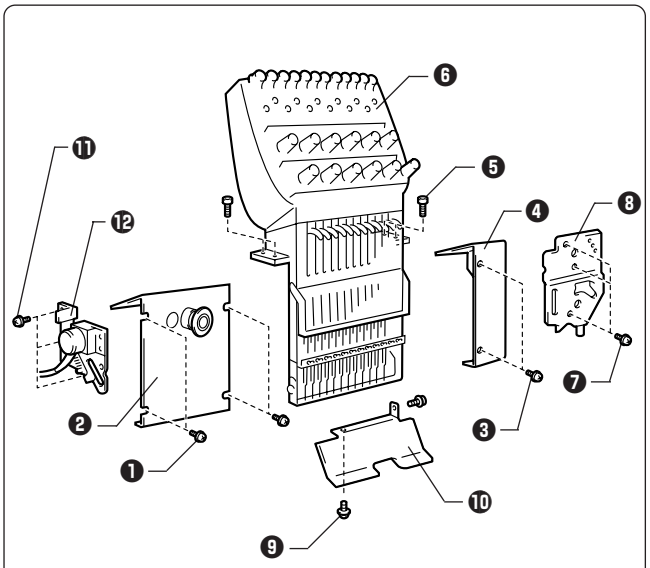
BES-960BC

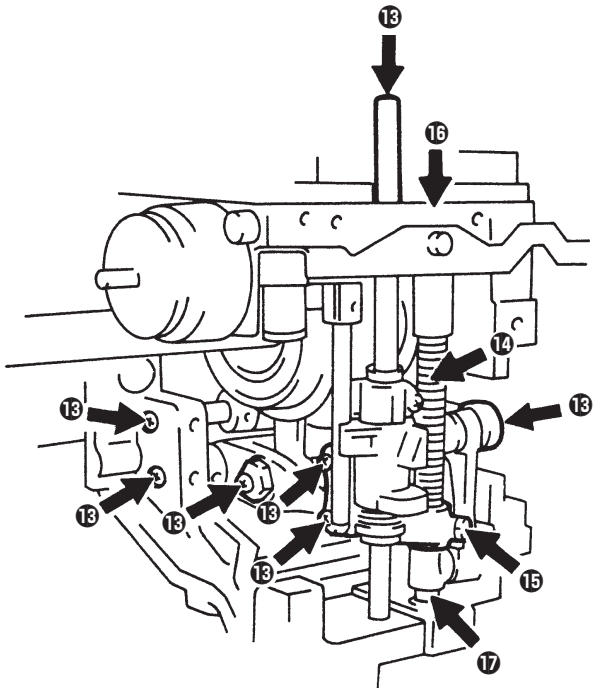
1. Remove two connectors from the rear of the needle bar case.
2. Loosen four bolts ❶, and remove the needle case ❷.
3. Loosen three screws ❸, and remove the presser foot guide plate ❹.
4. Loosen two screws ❺, and remove the arm cover L ❻.
5. Loosen four screws ❼, and remove the head cover ❽.
6. Loosen two bolts ❾, and remove the cap eaves guide ❿.
7. Loosen three bolts ⓫, and remove the wiper solenoid assembly ⓬.
8. Remove the screws at the places indicated by the arrow, insert grease into the tapped hole using the syringe. Then tighten the bols.
9. After greasing, assemble in the reverse order.

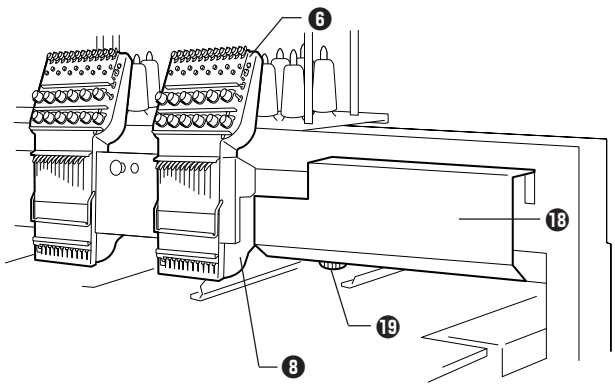
   (Note) • When assembling the needle bar case ❷, place it on the machine and turn the change pulley ⓮ behind the cover ⓭ at right. Check that it is engaged, and then tighten the bolts.

   • When attaching the presser foot guide plate ❹, move the presser foot up and down by the retracting lever to check that is it not distorted.

   For more information, refer to the illustration in step 6 on page 209.







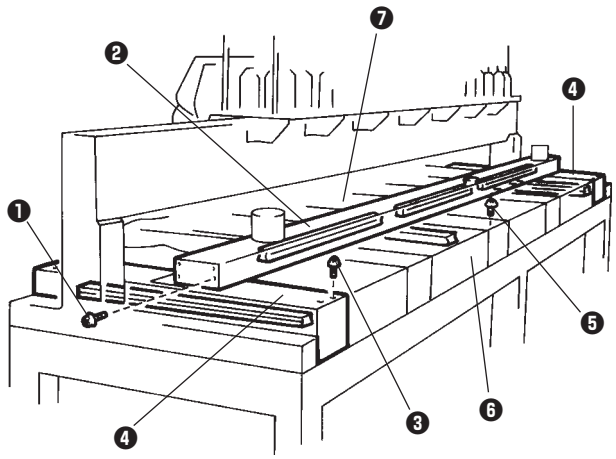
BES-1260BC

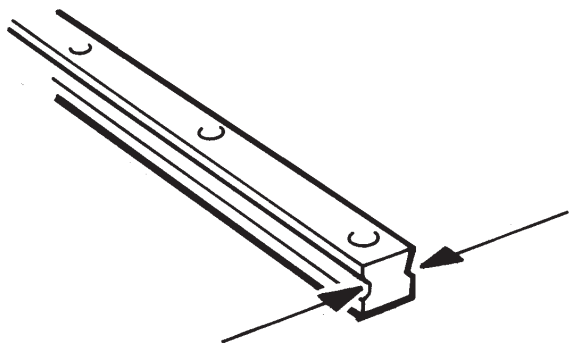
1. Remove two connectors from the rear of the needle bar case.
2. Loosen four screws ❶, and remove the head cover ❷, and loosen two screws ❸ and remove the head cover R❹.
   (Note) Because the heads No.1 and No.2 have the head covers R and L respectively, remove both the the covers when greasing.
3. Loosen four bolts ❺, and remove the needle case ❻.
4. Loosen three screws ❼, and remove the presser foot guide plate ❽.
5. Loosen two bolts ❾, and remove the cap eaves guide ❿.
6. Loosen three bolts ⓫, and remove the wiper solenoid assembly ⓬.
7. Remove the screws ⓭ at the places indicated by the arrow, insert grease into the tapped hole using the syringe. Then tighten the screws. Also grease the presser bar spring ⓮, the pressure bar guide bracket ⓯, the pressure bar metal U ⓰ and D ⓱.
8. After greasing, assemble in the reverse order.
   (Note) • When assembling the needle bar case ❻, place it on the machine and turn the change pulley ⓳ behind the cover ⓲ at right. Check that it is engaged, and then tighten the bolts.
   • When attaching the presser foot guide plate ❽, move the presser foot up and down by the retracting lever to check that is it not distorted.
   For more information, refer to the illustration in step 6 on page 209.

3-2 Feed Guide Section

■ Check the X-feed linear guides (3 positions) and the Y-feed linear guides (one each on the right and left).

(Note) When greasing, be sure to use the grease tank 30 provided with the machine.





Procedure

1. Loosen 12 screws ❶, and remove the X-feed cover ❷.
2. Loosen eight screws ❸, and remove the Y-feed cover ❹ from the right and left.
3. Loosen 13 screws ❺, and remove the bed covers B ❻ and C ❼.
4. Grease the X-feed linear guides (3 positions), the Y-feed linear guides (one each on the right and left), and the linear guide inside the No. 3 bed. Slide the guide to spread grease entirely.
5. After greasing, assemble in the reverse order.

Chapter 10 Standard Adjustment

⚠ CAUTION

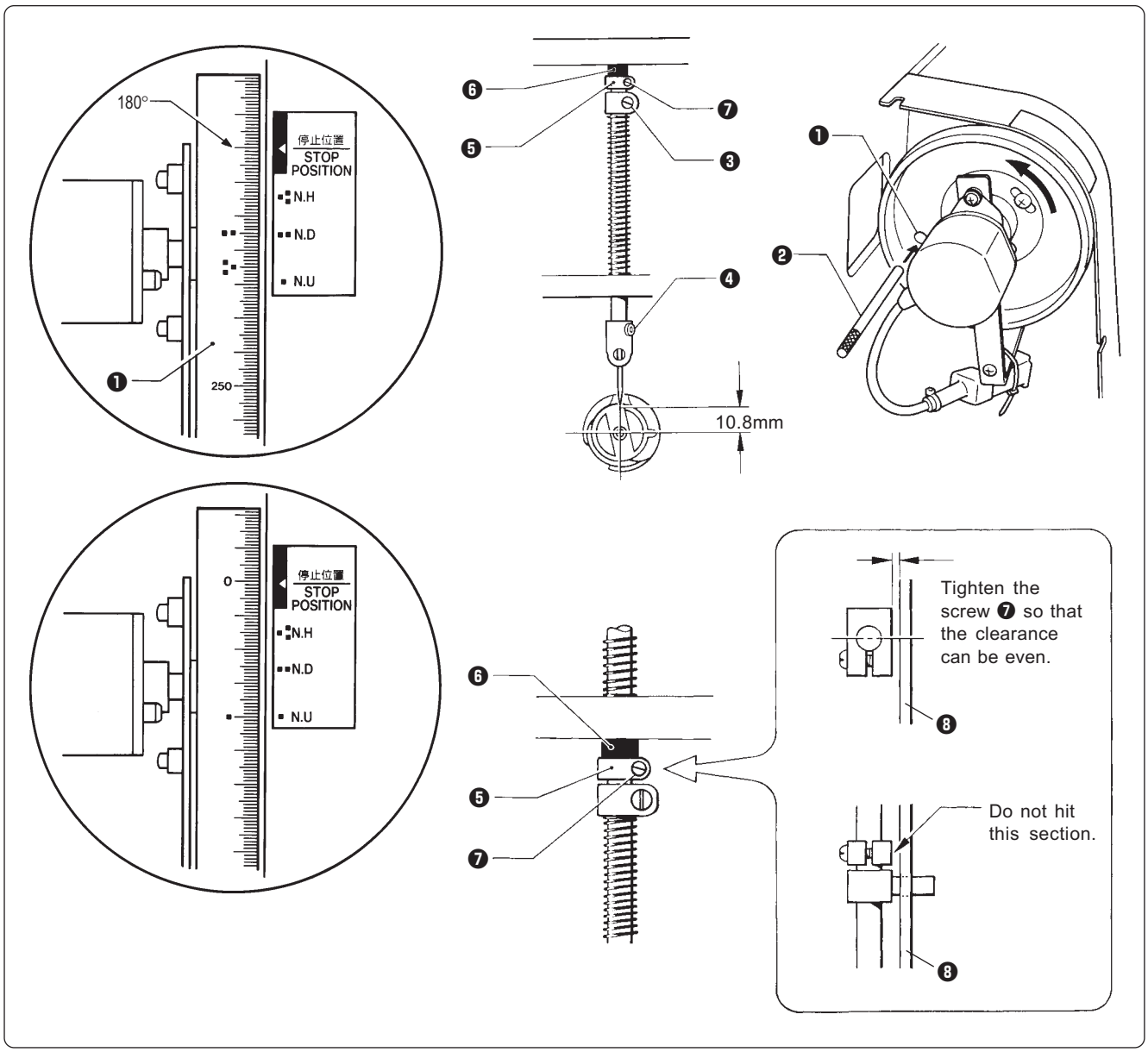
Turn off the power switch and pull out the plug before starting adjustment. Failure to do so may start the machine unintentionally through an accidental activation of the START switch, resulting in bodily injuries.

• Adjustment

If adjustment should be made while the power switch is turned on, pay special attention to your safety.

Maintenance and inspection of the machine should be conducted only by trained engineers.

1. Adjusting Needle Bar Height



1. Dismount the pulley cover and turn the pulley ❶ until the pulley scale indicates 180˚ and the needle bar is set at the lowest position. (The pulley "2" mark and the stop mark "2" are aligned.)

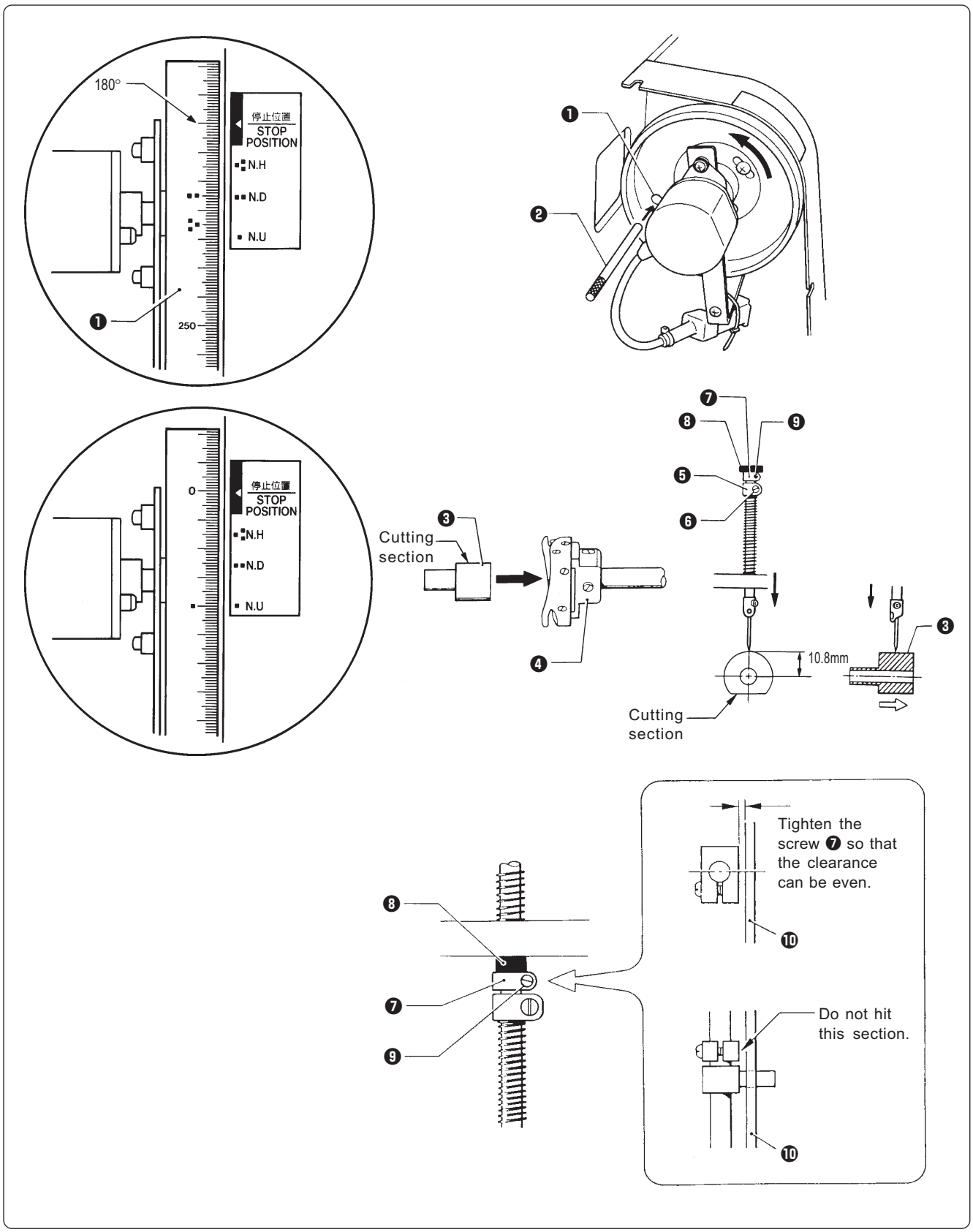
2. Insert the positioning bar ❷ into the hole of the pulley ❶ and fix the drive shaft.
   Note) Turn the pulley securely in the clockwise direction to eliminate a backlash.

3. Loosen the needle bar clamp set screw ❸ when the needle tip is positioned 10.8 mm above the center of the rotary hook shaft. Adjust the position of the needle bar thread guide so that the set screw ❹ on it is turned to the right by 25 ~ 30˚. Tighten the needle bar clamp set screw ❸ securely.
   Note) When tightening the needle bar clamp set screw ❸, the hole in the needle bar guide should face the front.

4. After adjustment is finished, remove the positioning bar ❷.

5. Set the needle bar at the highest position (where the pulley indication mark "1" and the cover indication mark "1" are aligned). Lightly press the top dead center stopper ❺ toward the cushion rubber ❻, and tighten the top dead center stopper screw ❼ while pressing down the needle bar clamp so that it faces the front.
   Note) Make sure that the top dead center stopper does not hit the needle bar guide rail ❽ at this time.

■ When using the bottom dead center gauge



1. Turn the pulley ❶ until the scale of pulley ❶ indicates 180˚ (where the pulley indication mark "2" and the stop mark "2" are aligned) and the needle bar is set at the lowest position.

2. Insert the positioning bar ❷ into the hole of the pulley ❶ and fix the drive shaft.
   Note) Turn the pulley securely in the clockwise direction.

3. Insert the bottom dead center gauge ❸ into the rotary hook ❹.

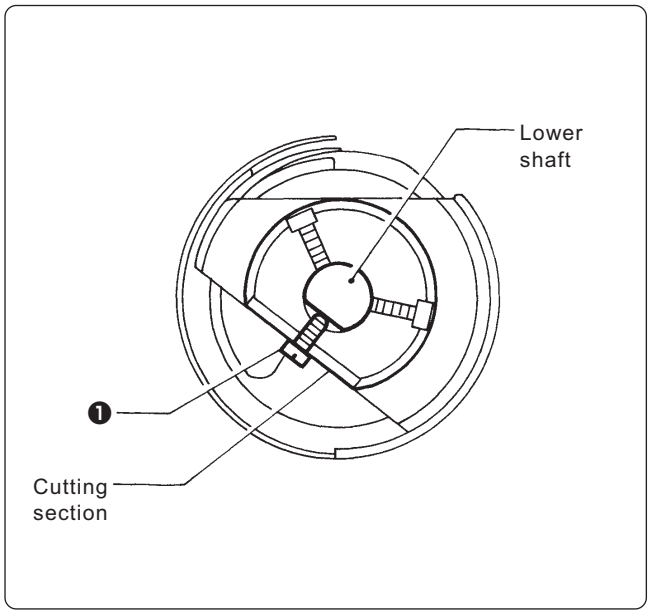
4. Loosen the screw ❻ of the needle bar clamp ❺ and move the needle bar up and down until the needle tip touches the gauge ❸ lightly.
   Note) • The needle point should touch the gauge at a place other than the cutting section.
   • The bottom dead center gauge should be set in or removed from the rotary hook with its cutting section facing upward.

5. Tighten the screw ❻ of the needle bar clamp ❺ securely.

6. After adjustment is finished, remove the positioning bar ❷.

7. Set the needle bar at the highest position (where the pulley indication mark "1" and the cover indication mark "1" are aligned). Lightly press the top dead center stopper ❼ toward the cushion rubber ❽, and tighten the top dead center stopper screw ❾ while pressing down the needle bar clamp so that it faces the front.
   Note) Make sure that the top dead center stopper ❼ does not hit the needle bar guide rail ❿ at this time.

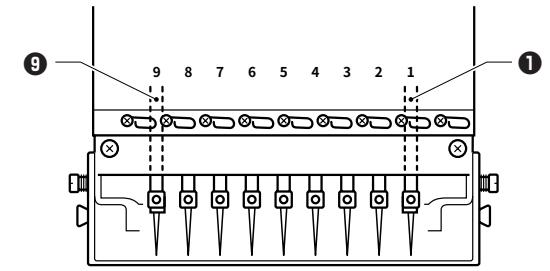
2. Replacing (Attaching) Rotary Hook



1. Turn the power switch off.
2. Tighten the screw ❶ of the rotary hook cutting section to fit to that of the lower shaft ❷.
3. When mounting, press it inward until it stops.

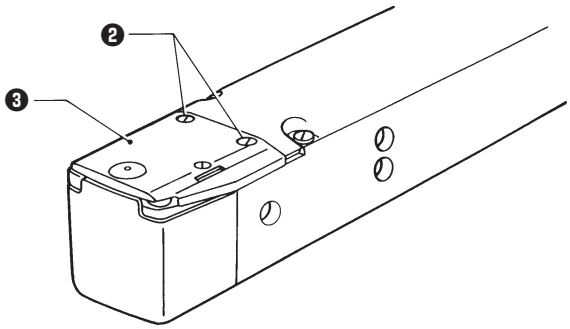
   Note) After replacing rotary hooks, refer to "4. Adjustment of Timing Between Needle and Rotary Hook (Page 222)" and adjust the timing.

3. Adjustment of Clearance Between Needle and Rotary Hook

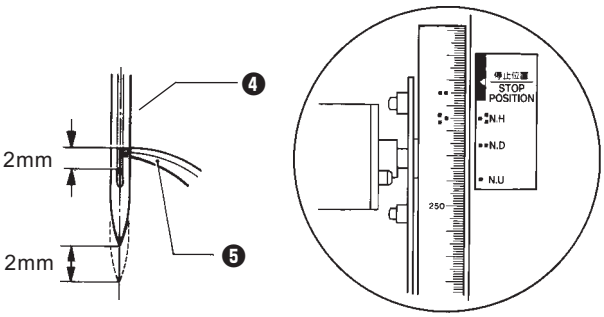


1. Turn the power switch off.
2. Select the needle bar No. 1 ❶.

   The illustration at the left shows the case of BES-960BC. For BES-1260BC, the No. 12 needle becomes 9.

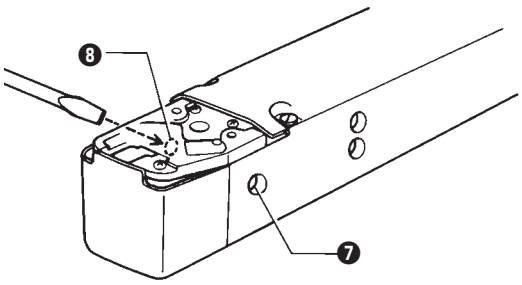


3. Remove two flat screws ❷ and dismount the needle plate ❸.



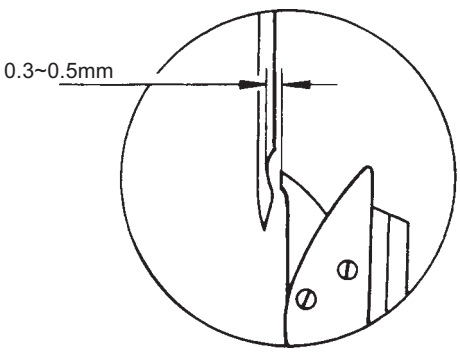
4. Adjust the needle ❹ and the rotary hook's ❺ point so that they can put together at 2 mm above the needle bar lowest point (180˚) where the pulley indication mark "3" and the stop mark "NH3" are aligned.
5. Turn the rotary hook manually so that the point comes upward.
6. Loosen the set screw ❼ on the side of the bed ❻.
7. Turn the eccentric screw ❽ on the left side of the bed ❻ using a regular screwdriver and adjust a clearance between the needle and the rotary shaft to 0.3 ~ 0.5 mm.

   Note) Check that the needle bar height is 2 mm at this time.

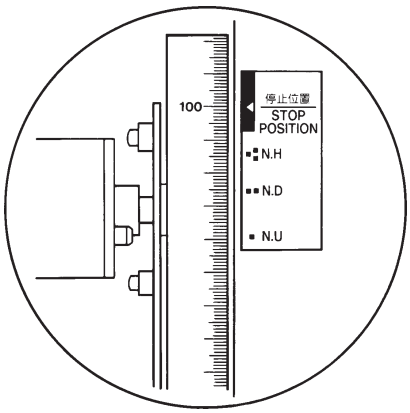


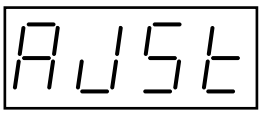
8. Adjust the clearance between the needle and the rotary hook's point to 0.3 ~ 0.5 mm at the needle bar No. 9 ❾ (No. 12 needle for BES-1260BC).

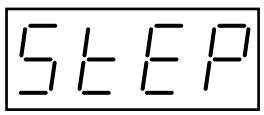
   Note) If the clearance between the needle and the rotary hook's point is not within the range of 0.3 ~ 0.5 mm, adjust again as described in step ❹ until the clearance between the needle bar No. 1 or No. 9 (No. 12 for BES-1260BC) and the rotary hook's point becomes within 0.3 ~ 0.5 mm.

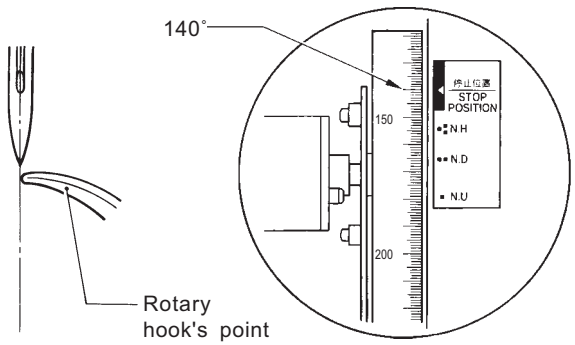


4. Adjustment of Timing Between Needle and Rotary Hook









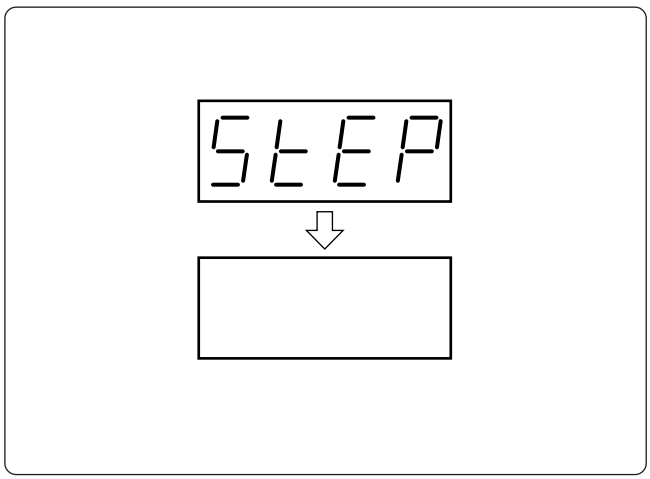
1. Turn the power switch on.
2. Check that the machine pulley is at the stop position (at 100˚ of the scale). If not, turn the pulley until it comes to the stop position.
3. While the machine is at the stop position, press the JOG switch (d) while holding down the STOP switch. "AJST" is indicated on the display.

d

4. Pressing the START switch. "STEP" is indicated. The rotary hook in each machine head rotates to the currently set timing position and the rotary hook can be adjusted.

5. Turn the machine pulley manually until the relationship between the needle point and the rotary hook's point can be easily checked (at around 140° of the scale).
6. Press the STEP BACK/FWD switch to move the rotary hook for each head to adjustment.
   - STEP BACK
     For rotating the rotary hook little by little in the clockwise direction
   - STEP FWD
     For rotating the rotary hook little by little in the counterclockwise direction

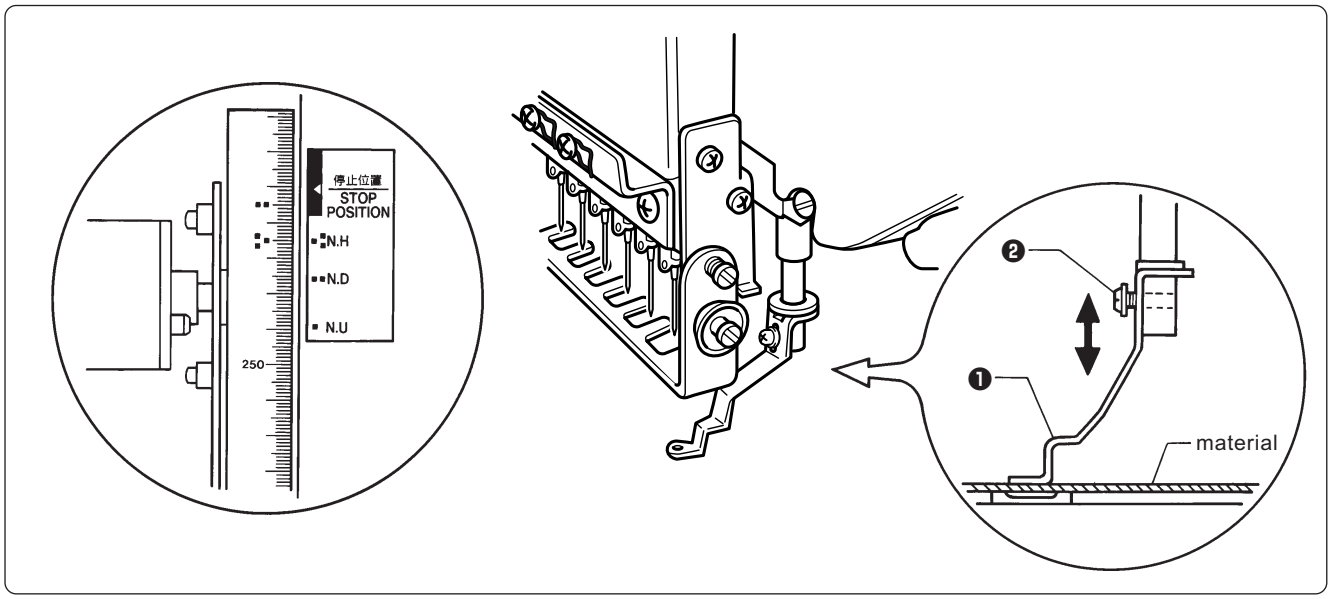
   Make this adjustment for each machine head so that the needle and the rotary hook's point can fit with each other.



7. After timing adjustment the is finished for each head, set the pulley to the stop position (at 100˚ of the scale) and press the STOP switch. "STEP" disappears from the display, and the machine enters the standby state.

The adjustment of the rotary hook is completed and the timing is stored. The rotary hook returns to the stop position accordingly.

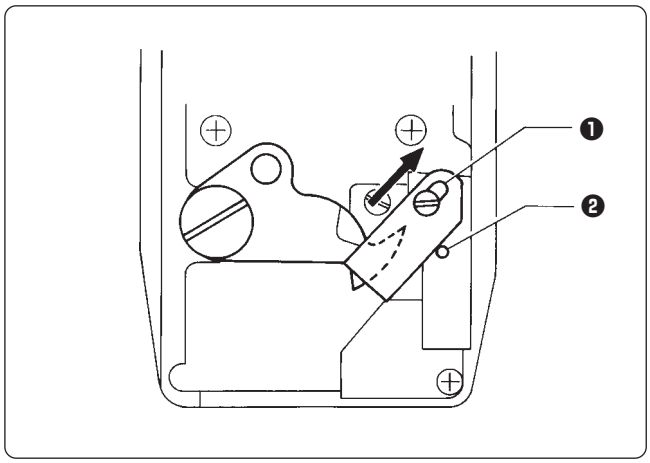
5. Adjustment of Presser Foot Height



1. Turn the power switch off.
2. Select the needle bar No. 1.
3. Loosen the screw ❷ of the presser foot ❶, and adjust the presser foot ❶ until it comes above the cloth top surface when it is at the bottom dead center (where the pulley indication mark "3" and the cover indication mark "3" are aligned).

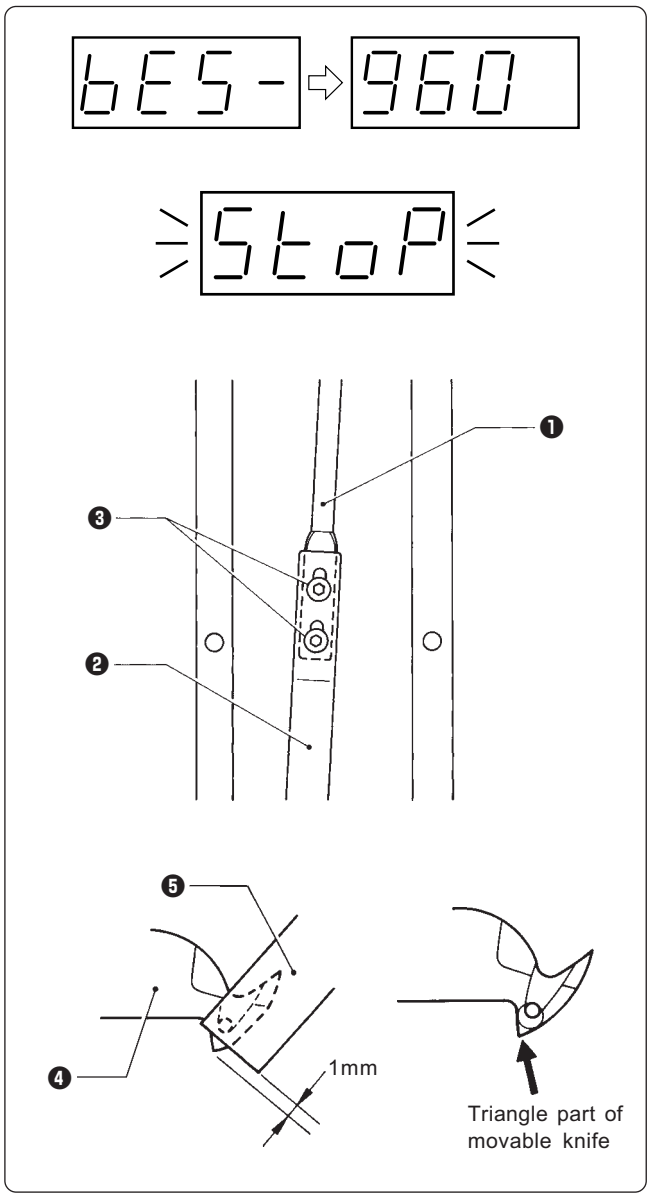
6. Adjustment of Thread Trimmer

6-1 Attaching the Fixed Knife

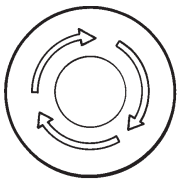


Attach the fixed knife ❶ to the pin ❷ and move it backward to the end of the slot, then mount it there.

6-2 Checking the Movable Knife Position



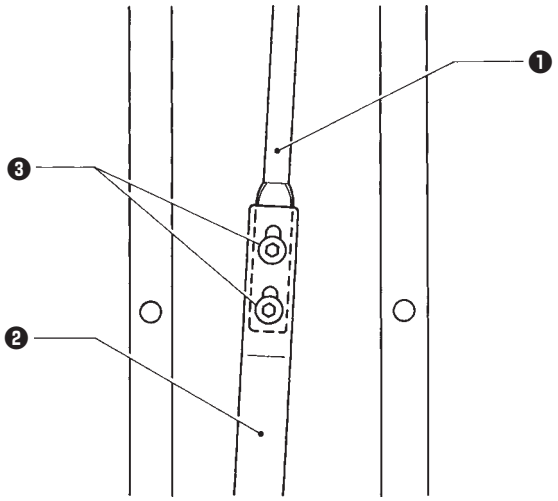
1. Turn the power switch on and wait until the hoop home position detection is finished.
2. Press the JOG switch (u) immediately after pressing the Emergency stop button.



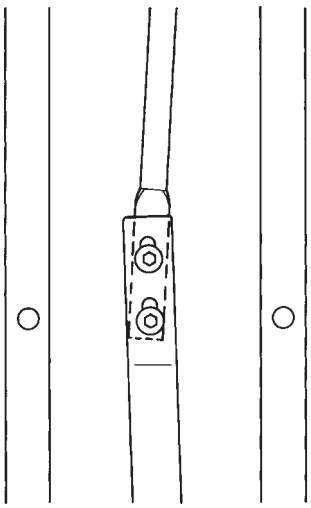
u

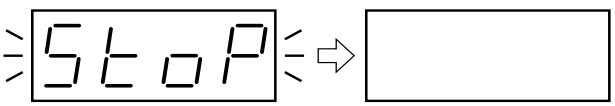
Adjust the movable knife position in this state.

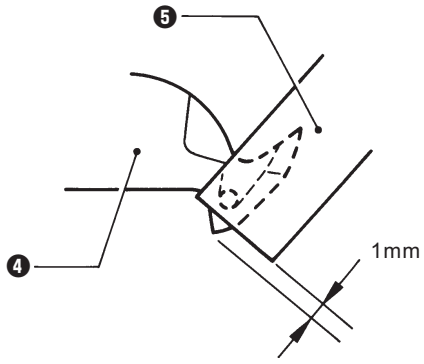
3. Loosen two bolts ❸ that connect the thread trimmer connecting rods B ❶ and C ❷.
4. Tighten the two bolts ❸ until the triangle part of the movable knife ❹ is projected by 1 mm from the fixed knife ❺.



* Bad example







* Precautions for tightening the two bolts ❸:

- The thread trimmer connecting rod B ❶ has a backlash of about 0.1 ~ 0.2 mm back and forth. Tighten the two bolts ❸ while pulling them forward by the backlash amount.
- Tighten the two bolts ❸ so that the thread trimmer connecting rods B ❶ and C ❷ are positioned in a straight line.

5. After adjustment is finished, reset the emergency stop button.
   "STOP" stops blinking and disappears.

6. Turn the power switch off once, then on again. Check that the clearance between the movable knife ❹ and the fixed knife ❺ is 1 mm.

7. When adjusting again, follow the step 2 and after.

Chapter 11 List of Error Codes

Code	Error	Measures
E-02	Overtravel occurs during home position detecting movement.	Turn the power off once, then on again. If the same error occurs again, the area sensor is faulty.
E-03	The stop switch is pressed during home position detecting movement.	Press STOP and clear the error message. Pressing START restarts the home position detecting movement again.
E-04	Zero detecting movement out of range	Turn the power off once, then on again. If the same error occurs again, the X- or Y-axis mechanism is faulty.
E-05	Needle stop position error	Adjust the pulley stop position (100°) above the needle and press STOP.
E-06	Needle bar case position error	Press STOP. If the error persists, the color-change mechanism is faulty.
E-07	Needle bar case lock	
E-08	Stop switch or emergency switch was pressed while the needle bar case is traveling.	Press STOP.
E-09	X-axis home position detection error	Turn the power off once, then on again. If the same error occurs again, the X-axis mechanism is faulty.
E-0A	Thread breakage error	After passing through the thread, press STOP.
E-14	Y-axis home position detection error	Turn the power off once, then on again. If the same error occurs again, the Y-axis mechanism is faulty.
E-18	X-axis stepping motor connector error	Check that the connector of the X-axis stepping motor is properly connected, and press STOP.
E-21	Hoop overhang (+X)	Set the embroidering area again on the personal computer or move the hoop to a sewable position. (The hoop can be moved to a sewable position by pressing .)
E-22	Hoop overhang (+Y)	
E-23	Hoop overhang (+X, +Y)	
E-24	Hoop overhang (-X)	
E-25	Hoop overhang (+X, -X)	
E-26	Hoop overhang (-X, +Y)	
E-27	Hoop overhang (+X, -X, +Y)	
E-28	Hoop overhang (-Y)	
E-29	Hoop overhang (+X, -Y)	
E-2A	Hoop overhang (+Y, -Y)	
E-2B	Hoop overhang (+X, +Y, -Y)	
E-2C	Hoop overhang (-X, -Y)	
E-2D	Hoop overhang (+X, -X, -Y)	
E-2E	Hoop overhang (-X, +Y, -Y)	
E-2F	Hoop overhang (+X, -X, +Y, -Y)	

Code	Error	Measures
E-31	Needle overhang (+X)	Set the embroidering area again on the personal computer or move the hoop to a sewable position.
E-32	Needle overhang (+Y)	
E-33	Needle overhang (+X, +Y)	
E-34	Needle overhang (-X)	
E-36	Needle overhang (-X, +Y)	
E-38	Needle overhang (-Y)	
E-39	Needle overhang (+X, -Y)	
E-3C	Needle overhang (-X, -Y)	
E-A1	Spindle motor lock	Press STOP. If the same error occurs frequently, the spindle mechanism is faulty.
E-A2	Main PC board temperature too high	Turn the power off once, then on again. If the same error occurs again, the spindle motor or main PC board is faulty.
E-A3	Spindle motor voltage too low	
E-A4	Spindle motor voltage too high	
E-A5 E-A6 E-A7	Spindle motor CPU error	Press STOP.
E-B0	Lower shaft CPU error	Press STOP.
E-B1	Thread tangle in rotary hook	Check that no lint is tangled in the rotary hook and press STOP.
E-B2	Lower shaft motor zero point error	
E-B3	Lower shaft standby position error	Press STOP.
E-B4	Lower shaft motor mode error	
E-B5	Lower shaft communication error	
E-B6	Lower shaft parameter error	
E-B7	Lower shaft overheat error	Turn the power off once, then on again. If the same error occurs again, the lower shaft or fan motor is stopped main PC board is faulty.
E-B8	Lower shaft motor overcurrent error	
E-B9	Thread trimming motor zero point error	Turn the power off, and check the thread trimming mechanism. Press STOP. If the same error occurs again, the thread trimming mechanism is faulty.

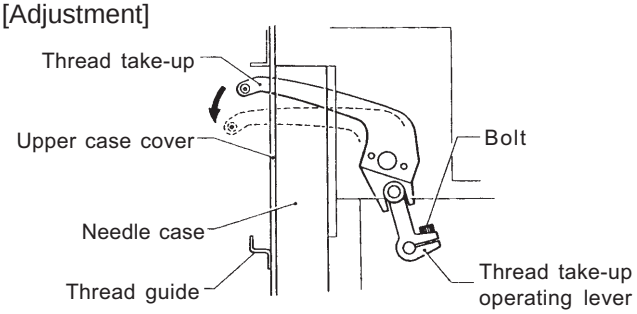
Code	Error	Measures
E-BA	Power frequency error	Turn the power off once, then on again. If the same error occurs again, the power PC board or power supply is faulty.
E-BC	Service interruption error	Press STOP.
E-BD	Lower shaft flash memory error	Turn the power off once, then on again. If the same error occurs, the main PC board is faulty.
E-BE	Lower shaft version-up error	Press STOP and clear the error display and upgrade the version again.
E-C1	Area over during embroidering	Set the embroidering area again on the personal computer.
E-C2	Wiper out error	If the wiper is tangled with a thread, remove it. Then press STOP.
E-C4	Presser foot down error	Press STOP.
E-C7 E-C8	Lower shaft motor home position error	Press STOP.
E-C9	Embroidering start error	Press STOP. Check that the READY lamp is on before pressing START.
E-CB	Spindle rotation speed error	Press STOP and clear the error display. Then press START. If the same error occurs again, there is a possibility that the spindle is overloaded.
E-CE	Cylinder bed position error	Secure to bed.
E-D0	Power PC board error	Turn the power off once, then on again. If the same error occurs again, the power PC board is faulty.
E-D1	Cooling fan motor stop B	Turn the power off. Check that the fan on the left or bottom rear of the control box is not tangled with a harness, etc. before turning the power on again. If the same error occurs again, the fan or the power PC board is faulty.
E-D2	Power voltage upper limit error	Press STOP. If the same error occurs again, the power PC board or the power supply is faulty.
E-D3	Power voltage lower limit error	
E-E1	X-axis pulse motor overcurrent stop	Turn the power off once, then on again. If the same error occurs again, the pulse motor or the main PC board is faulty.
E-E2	Y-axis pulse motor overcurrent stop	
E-E3	Cooling fan motor stop A	Press STOP. If "OFF" is displayed, turn the power off. Check that the fan at the right rear of the control box is not tangled with a harness, etc. before turning the power on again. If the same error occurs again, the fan or the power PC board is faulty.

Chapter 12 Troubleshooting

If there is any indication of trouble with the machine, check and correct as described in the table. If the trouble cannot be corrected, turn off the power and contact your distributor for corrective actions.

Mechanical Section

	Problem	Check Point
Check these points once again	■Thread breakage	• Is the machine properly threaded? • Is thread tension too high? • Is the rotary hook assembly clogged? • Is there thread in the bobbin? • Is the needle bent? • Is there a rough edge or flaw on the needle plate, rotary hook, or bobbin case that might cut the thread? • Is the needle installed correctly (direction, angle, etc.) • Is the presser foot in contact with the material? • Are the thread thickness and needle size correct? • Is a thread with right-hand twist being used? (If such a thread is used, replace with a thread with left-hand twist.) • Is there any adhesive on the needle? • Is the material tension too weak? • Is there too much play between the outer rotary hook and inner rotary hook? • Does the outer rotary hook turn smoothly? • Is the clearance between the rotary hook stopper and the rotary hook adjusted correctly? • Does the thread come out from the bobbin case smoothly?
	■Needle (presser foot) interference with embroidery hoop	• Is the embroidery hoop too small? • Check the size and needle start position in the sewing data.
	■Needle breakage	• Is the needle attached correctly (direction, height, etc.)? • Is the needle bent? • Is the rotary hook attached correctly? • Is the timing set correctly? • Is there any backlash with the needle bar case (back/forth and right/left)? • Is the rotary hook stopper correctly attached to stop the rotary hook? • Is the needle size correct and the tip sharp? • Does the thread pass through the hole center of the presser foot?
	■Not embroidered properly	• Is the material edge caught in the machine? (Are embroidery hoop and other related parts operating correctly?) • Is the material stretched properly? • Is thread tension proper? Does the lower thread come out smoothly?

	Problem	Check Point
Check these points once again	■Machine operation abnormal	• Is any set screw of the rotary encoder loosened? • Is any set screw of the machine pulley loosened? • Is any set screw of the machine motor pulley loosened? • Is embroidery data normal?
	■Upper shaft locks at a certain point in one cycle	• Is the thread take-up stopped due to interference with the upper case cover? [Adjustment]  Loosen the hexagon socket head cap screw of the thread take-up operating lever and adjust the take-up movable range. Tighten it securely afterwards. • Are the needle bar clamp and the top dead center stopper positioned correctly?
	■"E-b1" error display	• Check the rotary hook of a machine head whose MENDING lamp (green) is blinking to see if the thread is caught. [Adjustment] 1.Take out the thread tangled in the rotary hook race so that the rotary hook can be rotated forcibly by manual operation. 2.Check that the machine pulley is set to 100˚ of the scale, and press the END switch. [Measures] 1.If the thread end is left too long or stitching is left loosened before starting embroidering, the thread is caught in the machine and operation stops. 2.When starting embroidering, hook the thread end on the spring or hold it with a hand. 3.Leave thread of about 60 ~ 70 mm from the needle hole when starting embroidering.
	■Upper shaft pulley does not turn.	• Is the presser foot lifted at a retract position when the power is turned on? Lower the presser foot for the six machine heads using the lever.
	■Stitches cannot be made.	• Is the needle attached properly? • Is the timing of the needle and rotary hook correct?

Electrical Section

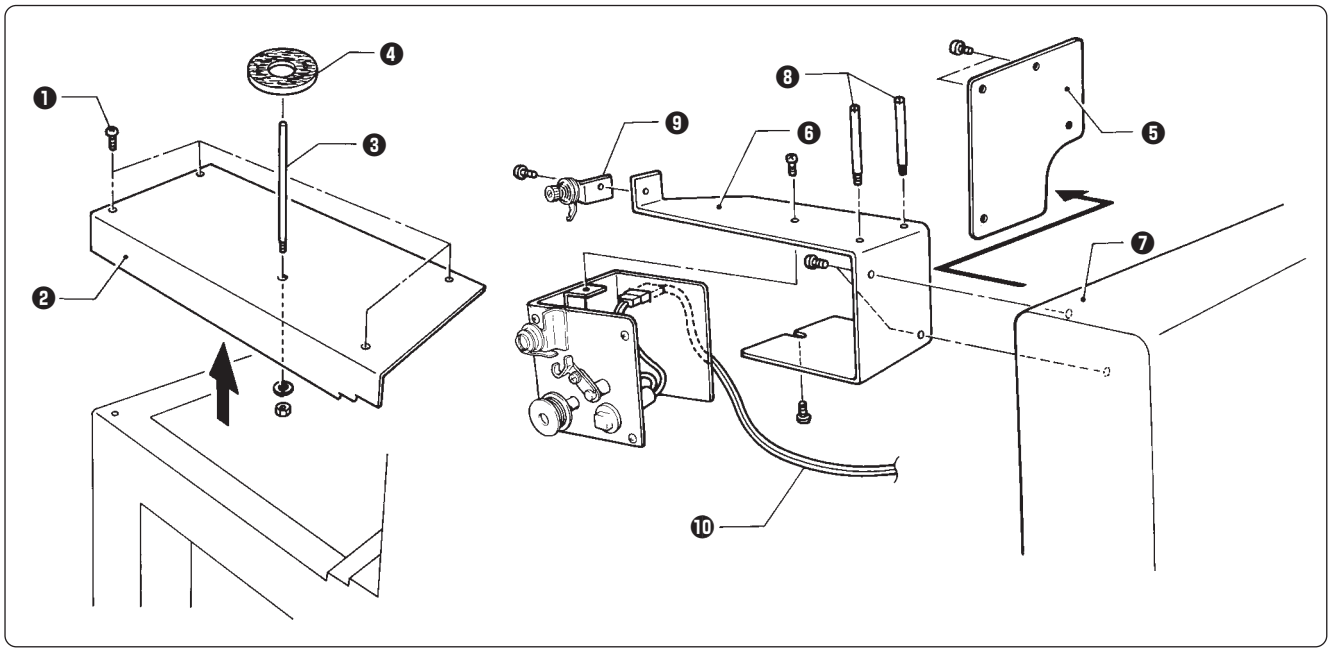
	Trouble	Check Point
Check these points once again	■The power lamp on the operation panel does not light up though the power switch of the machine is turned on.	• Is the cable correctly plugged in? • Is the connector securely connected from the operation panel to the control box?
	■An error is indicated on the operation panel, and no operation is possible.	• Refer to the error code list for troubleshooting. If the error persists, contact your distributor.

Personal Computer Section

	Trouble	Check Point
Check these points once again	■The power lamp does not light up when the computer power switch is turned on.	• Is the cable correctly plugged in the computer? • Is the AC line live?
	■The display does not light up when the computer power switch is turned on.	• Is the display power lamp on? • Is the display's cable correctly connected? • Is the display's contrast correctly adjusted?
	■"Windows" cannot be started.	• Is a floppy disk inserted?
	■"Windows" can be started but the embroidery software cannot.	• Is the selection of other icons possible? • Is the selected icon correct? • Can you double-click more quickly?
	■The window does not open though the machine power is turned on?	• Is the cable to the machine and the interface board correctly connected? • Is the interface board attached properly? (Refer to Page 40.) • Is the correct COM port selected? (Refer to Page 127.)
	■The screen changes when the mouse is not operated for a while.	• The screen saver is preset. Invalidate this function on the control panel screen. Do not validate the power-saving function.
	■The screen of the editor, the explorer or the production report disappears during operation.	• The machine controller screen was clicked so that the current screen is hidden behind it. Move the mouse to the bottom of the screen and select the program (editor, explorer, or production report).
	■Colors set for a design and threads are not available.	• The number of colors is set to 256. Increase the number to 65000 or more on the control panel screen.

Connection and Installation of Optional Equipment

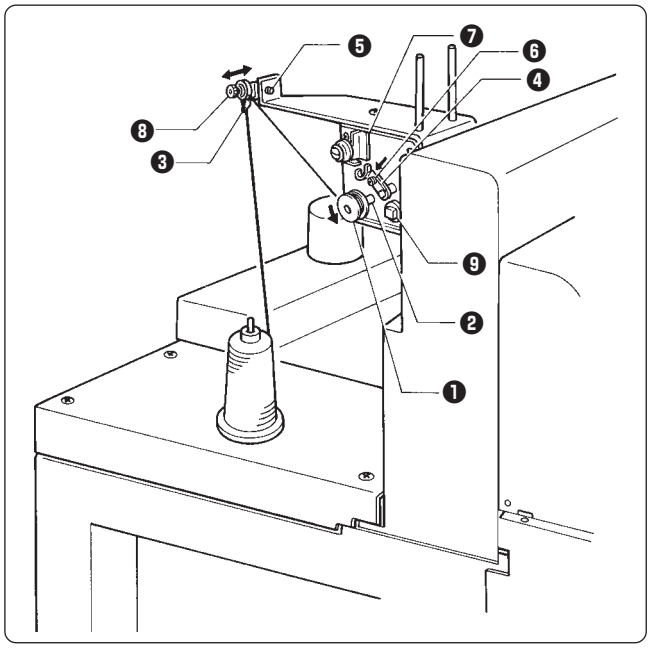
1. Attaching Bobbin Winder



1. Remove four screws ❶ and dismount the side cover LB ❷.
2. Set the spool shaft B ❸ into the hole of the removed side cover LB ❷ and fix the shaft with a nut and a spring washer. Then put the spool mat A ❹ through the spool shaft B ❸.
3. Remove two screws and dismount the bridge cover B ❺.
4. Mount the bobbin winder stay ❻ on the bridge ❼ along with the bridge cover B ❺ using two screws removed from the bridge cover. Then mount the bobbin stand L ❽ on the bobbin winder stay ❻.
5. Mount the bobbin winder assembly ❾ on the bobbin winder stay ❻ using screws.
6. Insert the bobbin winder harness ❿ in the 2P (No. 6) connector on the rear side of the control box.

   Note) Be careful not to allow the bobbin winder harness to come into contact with the hoop in motion.
7. Mount the side cover LB ❷ using four screws ❶.

■Winding lower thread



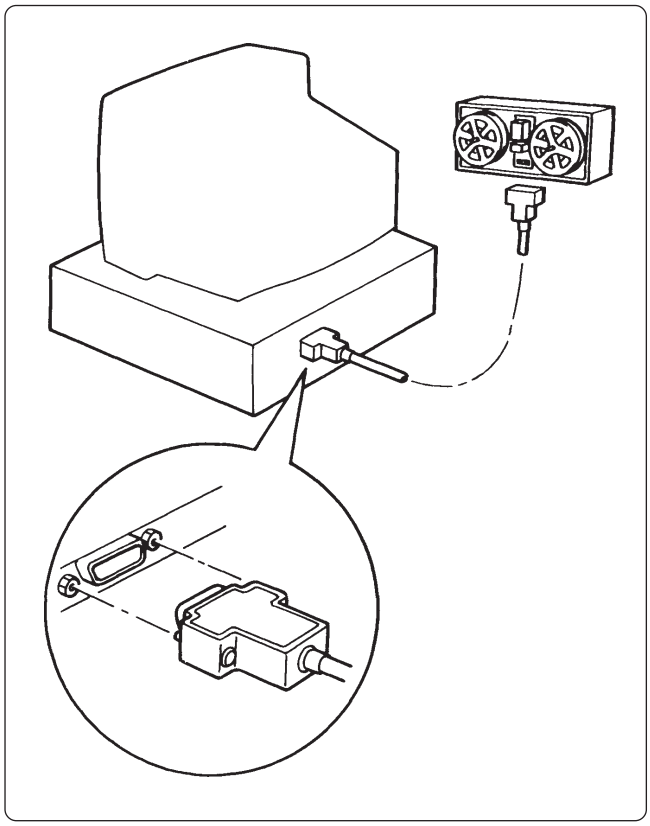
1. Turn the power switch on.
2. Set the bobbin ❶ in the bobbin winder shaft ❷.
3. Put the thread through the thread guide ❸.
4. Wind the thread around the bobbin ❶ several times in the direction of the arrow.
5. Press the bobbin hold ❹.

   Note) If the thread cannot be wound evenly, loosen the screw ❺ and move the thread guide ❸ right and left for adjustment.

   In order to wind more threads around the bobbin, loosen the thread ❻ and move the bobbin hold ❹.
6. After winding is finished, pull out the bobbin from the bobbin winder shaft and trim the thread using the thread trimmer ❼.

   Note)
   - If the thread is wound too tight and comes off from the tension disk, loosen the knob ❽. If the thread is too loose, tighten the knob ❽.
   - If the circuit protector ❾ functions, the bobbin winder motor does not rotate. Leave it for a while for cooling. Then press the circuit protector ❾. (The thread does not come out when the motor is not cooled enough.)

2. Tape Reader



1. Insert one connector (9-pin) of the RS cable for DOS/V into the RS-232C connector on the rear of the personal computer.
2. Tighten two screws to secure the connector.

■ The following paper tape readers can be used for BES-960BC and BES-1260BC. Never use other types than the above. Doing so will result in machine trouble.

Maker	Type	Interface (connector type)	Optional parts for connecting cable
GN DATA COM	GNT27	RS-232C interface (female)	* GNT27RS cable assembly S17064-001 DOSV RS cable assembly S3426-000
	GNT4604	RS-232C interface (DCE connector : female)	* DOSV RS cable assembly S3426-000
		RS-232C interface (DCE connector : male)	* GNT4604 cable assembly S18957-001 DOSV RS cable assembly S3426-000
	GNT2910	RS-232C interface (9-pin/male)	* GNT2910 cable assembly S21660-000 DOSV RS cable assembly S3426-000

* When connecting the paper tape reader, set the switches as shown below:
  • Character length ..... 8 bits
  • Stop bit length ..... 1 bit
  • Baud rate ..... 9,600 bps

* The following paper tape reader that can be connected to the BES-960BC is optionally available from Brother. (Contact your distributor for details.)

Maker	Type	Name	Code	Voltage
GN DATA COM	GNT27	GNT27-100V (assembly)	S18444-000	100 Vac

• When the above paper tape reader GNT27 is optionally purchased from Brother, the GNT27RS cable assembly (S1764-001) is included as a set.

• The switches of the above paper tape reader have been set upon shipment.