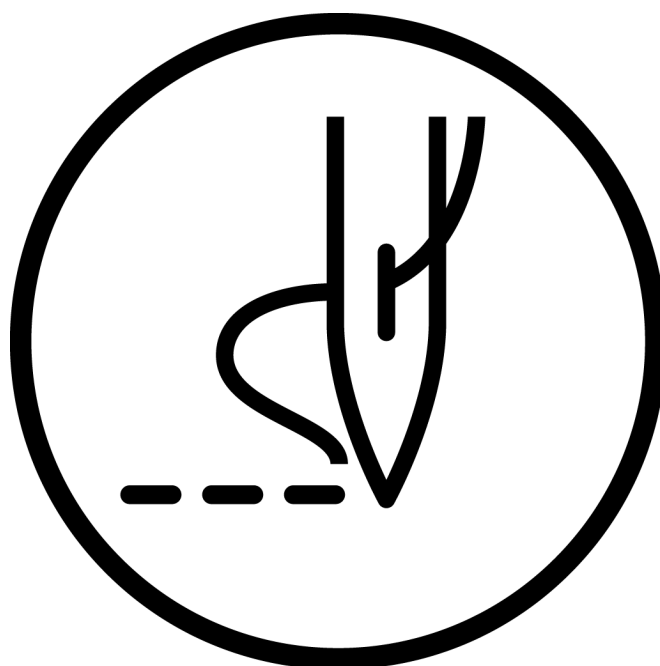


BAS-365K BAS-370K

INSTRUCTION MANUAL

Please read this manual before using the machine.
Please keep this manual within easy reach for quick reference.

PROGRAMMABLE ELECTRONIC PATTERN SEWER



brother

Thank you very much for buying a BROTHER sewing machine. Before using your new machine, please read the safety instructions below and the explanations given in the instruction manual.

With industrial sewing machines, it is normal to carry out work while positioned directly in front of moving parts such as the needle and thread take-up lever, and consequently there is always a danger of injury that can be caused by these parts. Follow the instructions from training personnel and instructors regarding safe and correct operation before operating the machine so that you will know how to use it correctly.




SAFETY INSTRUCTIONS

[1] Safety indications and their meanings

This instruction manual and the indications and symbols that are used on the machine itself are provided in order to ensure safe operation of this machine and to prevent accidents and injury to yourself or other people.


The meanings of these indications and symbols are given below.

Indications

 DANGER	The instructions which follow this term indicate situations where failure to follow the instructions will result in death or serious injury.
 WARNING	The instructions which follow this term indicate situations where failure to follow the instructions could result in death or serious injury.
 CAUTION	The instructions which follow this term indicate situations where failure to follow the instructions may result in minor or moderate injury.

Symbols



..... This symbol () indicates something that you should be careful of.

The picture inside the triangle indicates the nature of the caution that must be taken.
(For example, the symbol at left means “beware of injury”.)



..... This symbol () indicates something that you must not do.



..... This symbol () indicates something that you must do.

The picture inside the circle indicates the nature of the thing that must be done.
(For example, the symbol at left means “you must make the ground connection”.)

[2] Notes on safety

DANGER



Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the control box cover. Touching areas where high voltages are present can result in severe injury.

WARNING



Do not allow any liquids to get onto this sewing machine, otherwise fire, electric shocks or operating problems may occur.



If any liquid gets inside the sewing machine (machine head or control box), immediately turn off the power and disconnect the power plug from the electrical outlet, and then contact the place of purchase or a qualified technician.

CAUTION

Environmental requirements



Use the sewing machine in an area which is free from sources of strong electrical noise such as electrical line noise or static electric noise. Sources of strong electrical noise may cause problems with correct operation.



Any fluctuations in the power supply voltage should be within $\pm 10\%$ of the rated voltage for the machine. Voltage fluctuations which are greater than this may cause problems with correct operation.



The power supply capacity should be greater than the requirements for the sewing machine's power consumption. Insufficient power supply capacity may cause problems with correct operation.



The pneumatic delivery capability should be greater than the requirements for the sewing machine's total air consumption. Insufficient pneumatic delivery capability may cause problems with correct operation.



The ambient temperature should be within the range of 5°C to 35°C during use. Temperatures which are lower or higher than this may cause problems with correct operation.



The relative humidity should be within the range of 45% to 85% during use, and no dew formation should occur in any devices. Excessively dry or humid environments and dew formation may cause problems with correct operation.



In the event of an electrical storm, turn off the power and disconnect the power cord from the wall outlet. Lightning may cause problems with correct operation.



Do not connect anything to the USB port other than the USB memory. If this is not observed, problems with operation may result.

Installation



Machine installation should only be carried out by a qualified technician.



Be careful not to get your feet caught in the casters when transporting the sewing machine. Otherwise injury may result.



Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.



Do not connect the power cord plug until installation is complete.

If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.



Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.



All cords should be secured at least 25 mm away from any moving parts. Furthermore, do not bend the cords too tightly, otherwise there is the danger that fire or electric shocks could occur.



Attach the safety cover.















Lower the adjusters to secure the sewing machine.





Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

CAUTION











Sewing

-  To prevent problems, do not use objects with sharp points to operate the LCD panel.
-  This sewing machine should only be used by operators who have received the necessary training in safe use beforehand.
-  The sewing machine should not be used for any applications other than sewing.
-  Be sure to wear protective goggles when using the machine.
If goggles are not worn, there is the danger that if a needle breaks, parts of the broken needle may enter your eyes and injury may result.
-  Turn off the power switch at the following times. If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.
 - When replacing the bobbin and needle
 - When not using the machine and when leaving the machine unattended
-  Lower the adjusters to secure the sewing machine.
-  Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.
-  Do not place any part of your body on top of the auxiliary plate when starting the sewing machine. Otherwise, injury or damage to the sewing machine may result.
-  Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.
-  If you use a frame for a small sewing area for sewing data within a large sewing area by mistake, the needle will sew onto the frame, and injury or damage to the sewing machine may result.
-  If an error occurs in machine operation, or if abnormal noises or smells are noticed, immediately turn off the power switch. Then contact your nearest Brother dealer or a qualified technician.
-  If the machine develops a problem, contact your nearest Brother dealer or a qualified technician.


Cleaning

-  Turn off the power switch before carrying out these operations. If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.
-  Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result.
Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.
Keep the oil out of the reach of children.

Maintenance and inspection

-  Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
-  Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.
-  Turn off the power switch and disconnect the power cord before carrying out the following operations. If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.
 - Inspection, adjustment and maintenance
 - Replacing consumable parts such as the rotary hook
-  Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
-  The clamp should be carried by two or more people.
-  When replacing parts and installing optional accessories, be sure to use only genuine Brother parts.
Brother will not be held responsible for any accidents or problems resulting from the use of non-genuine parts.
-  If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.
-  Do not climb inside the sewing machine assembly.
-  Set the clamp so that it does not protrude from the auxiliary plate within the whole of the feed area. Otherwise, injury or damage to the sewing machine may result.

Modification

-  To prevent accidents and problems, do not modify the sewing machine (including the control devices) yourself. Brother will not be held responsible for any accidents or problems resulting from modifications made to the equipment.

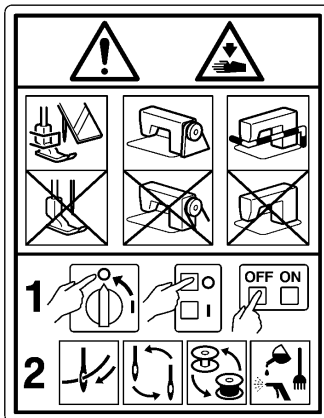
[3] Warning labels

The following warning labels appear on the sewing machine. Please follow the instructions on the labels at all times when using the machine. If the labels have been removed or are difficult to read, please contact your nearest Brother dealer.

1

	⚠ 危険		⚠ 危険	
	高電圧部分にふれて、大けがをすることがある。 電源を切り、5分たってからカバーをはずすこと。		触摸高电压部分，会导致受伤。 在切断电源5分钟后，再开启盖罩。	
⚠ DANGER	⚠ GEFAHR	⚠ DANGER	⚠ PERIGRO	
Hazardous voltage will cause injury. Turn off main switch and wait 5 minutes before opening this cover.	Hochspannung verletzungsgefahr! Bitte schalten sie den hauptschalter aus und warten sie 5 minuten, bevor sie diese abdeckung öffnen.	Un voltage non adapte provoque des blessures. Eteindre l'interrupteur et attendre 5 minutes avant d'ouvrir le capot.	Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.	

2



CAUTION

Moving parts may cause injury.

Operate with safety devices* installed.

Turn off the power before carrying out operations such as threading, changing the needle, bobbin, knives or hook, cleaning and adjusting.

* Safety devices
Eye guard, side cover, Y guide frame cover, Y motor cover, needle bar bracket cover, front cover, etc.

3



Be careful to avoid injury from moving parts.

4



Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.

5



Direction of operation

6

brother
Lubricating Oil for Machining
ミシン用潤滑油

⚠ CAUTION

Lubricating oil may cause inflammation to eye and skin.
Wear protective glasses and gloves.

Swallowing oil can cause diarrhoea and vomiting.
Do not swallow.

Keep away from children. FIRST AID

Eye contact:
-Rinse with plenty of cold water.
-Seek medical help.
Skin contact:
-Wash with soap and water.
If swallowed:
-Seek medical help immediately.
-Do not induce vomiting.

⚠ 注意

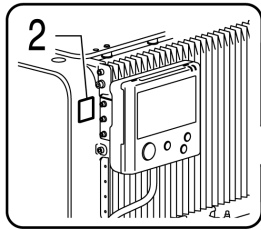
目に入ったり皮膚につくと、炎症を起こすことがある。保護めがね、手袋を使うこと。

飲み込むと、下痢、嘔吐する。飲み込まないこと。

- 子供の手の届かない所に置いてください。
- 目に入った場合は、清浄な水で15分間洗浄し、医師の診断を受けてください。
- 皮膚に触れた場合は、水と石けんで十分に洗ってください。
- 飲み込んだ場合は、無理に吐かせずに、直ちに医師の診断を受けてください。

第4類 第3石油類
危険等級III 火気厳禁

ブラザー工業株式会社
〒448-0803
愛知県刈谷市野田町北地蔵山1番地5
電話：0566-95-0085



Thread take-up cover

Eye guard

Y guide frame cover

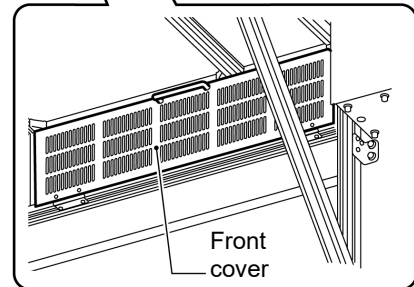
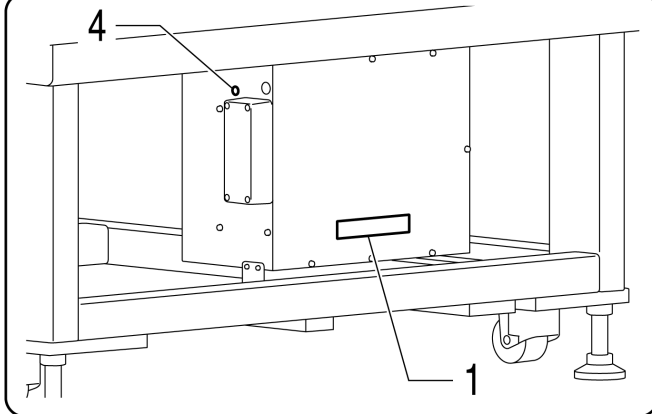
Needle bar bracket cover

Finger guard

3

Side cover U

Side cover D-R



Front cover

Y motor cover

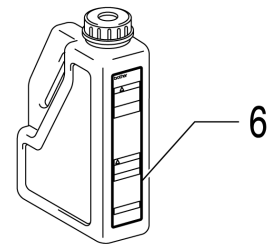
Side cover U

Side cover D-L

Y guide frame cover

3

Y guide frame cover



6

4708B

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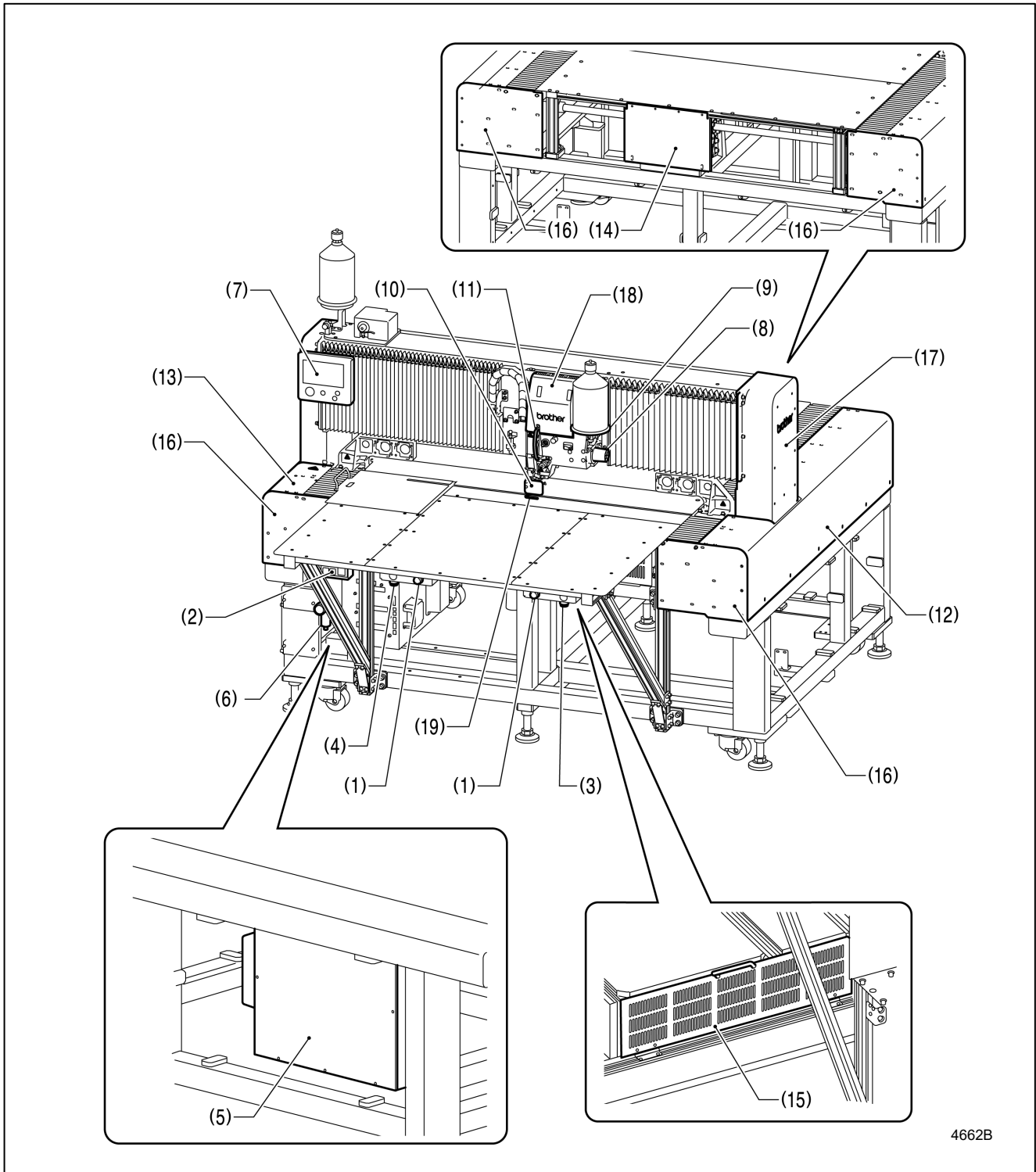
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1. NAMES OF MAJOR PARTS



4662B

- (1) STOP switch
- (2) Power switch
- (3) Right switch
- (4) Left switch
- (5) Control box
- (6) Solenoid valve
- (7) LCD panel
- (8) Pulley
- (9) Cotton stand

Safety devices:

- (10) Eye guard
- (11) Thread take-up cover
- (12) Side cover D-R
- (13) Side cover D-L
- (14) Y motor cover

- (15) Front cover
- (16) Y guide frame cover
- (17) Side cover U
- (18) Needle bar bracket cover
- (19) Finger guard

2. SPECIFICATIONS

Model name	BAS-365K-0A0	BAS-370K-0A0
Stitch formation	Single needle lock stitch	
Max. sewing area	800mm × 400mm	800mm × 700mm (Maximum 850mm)
Stitch length	0.05 – 20.0 mm (0.05 mm units)	
Max. sewing speed	2,700sti/min	2,500sti/min
Intermittent presser foot lift amount	28 mm from auxiliary plate (During reverse needle lifting)	
Intermittent presser foot stroke	0 – 10 mm (0.1 mm units)	
Maximum No. of stitches	100,000 stitches (per program)	
Max. program number [*1]	999	
Oil	Brother-specified sewing machine oil	
Needle	DP × 17#24 (Standard installation at time of shipment)	
Hook	Double-capacity shuttle hook	
Motor	AC servo motor 800W	
Feed mechanism	Intermittent feed (pulse motor drive)	
Machine head lifter	–	Standard equipment
Machine head lift amount	–	70 mm
Needle cooler device	Standard equipment	
Wiper device	Standard equipment	
Thread trimmer	Standard equipment	
Digital tension	Standard equipment	
Error detection device	Standard equipment (Dynamic tension detection method)	
Data storage format	On-board SD card	
Weights	Approx. 700kg	Approx. 900kg
Installation area [*2]	1,800mm×1,300mm	1,800mm×2,080mm
Operating temperature range	5-35°C	
Operating humidity range	45-85% (No dew formation)	
Power source	Single-phase 200V, 220V 3-phase 200V- 240V / 1200VA	
Power supply environment	Rated voltage ±10%	
Air pressure/consumption	0.5 Mpa / Needle cooler device On: 8 l/min. Off: 0.2 l/min.	

[*1] The number of data items and stitches that can be stored will vary depending on the number of stitches in each program.

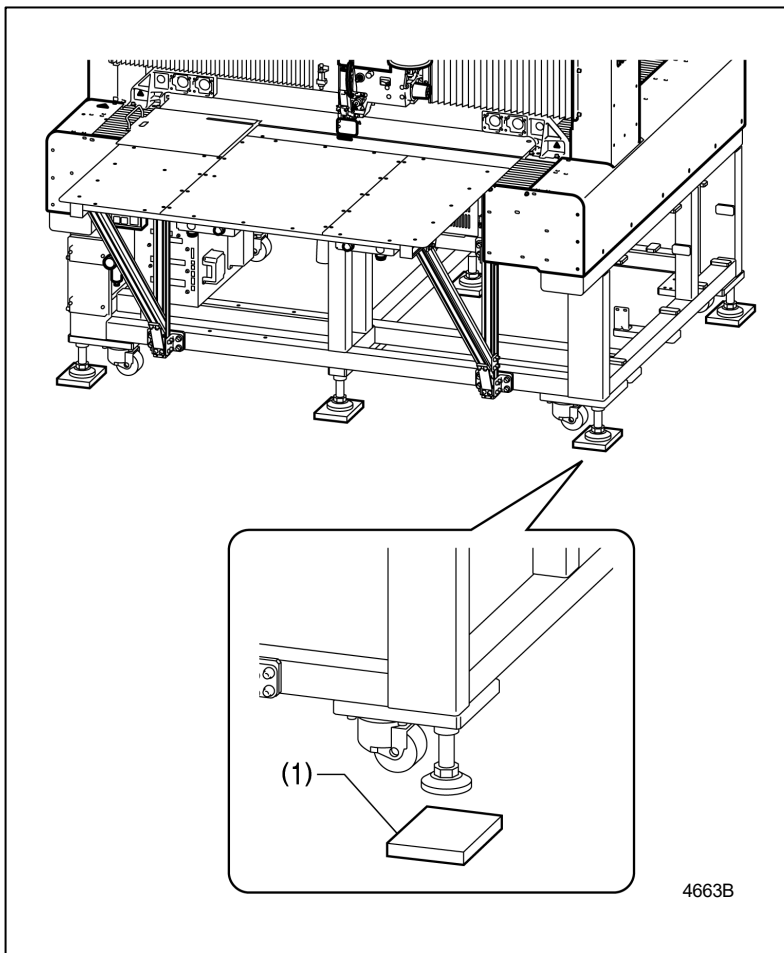
[*2] Calculate the necessary installation area by taking into account the amount of space required for working after installation.

3. INSTALLATION

⚠ CAUTION

- | | |
|---|--|
| <p>⊘ Machine installation should only be carried out by a qualified technician.</p> <p>⚠ Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.</p> <p>⊘ Do not connect the power cord plug until installation is complete.</p> <p>If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.</p> | <p>⚠ All cords should be secured at least 25 mm away from any moving parts. Furthermore, do not bend the cords too tightly, otherwise there is the danger that fire or electric shocks could occur.</p> <p>⚡ Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.</p> <p>⚠ Attach the safety cover.</p> |
|---|--|

3-1. Installing the sewing machine

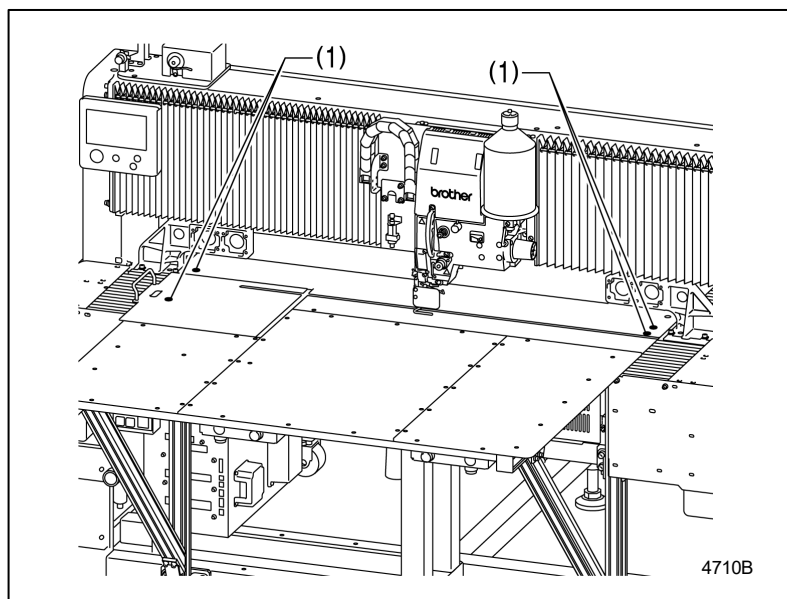


1. Place the sewing machine onto the rubber cushions.

[NOTE]

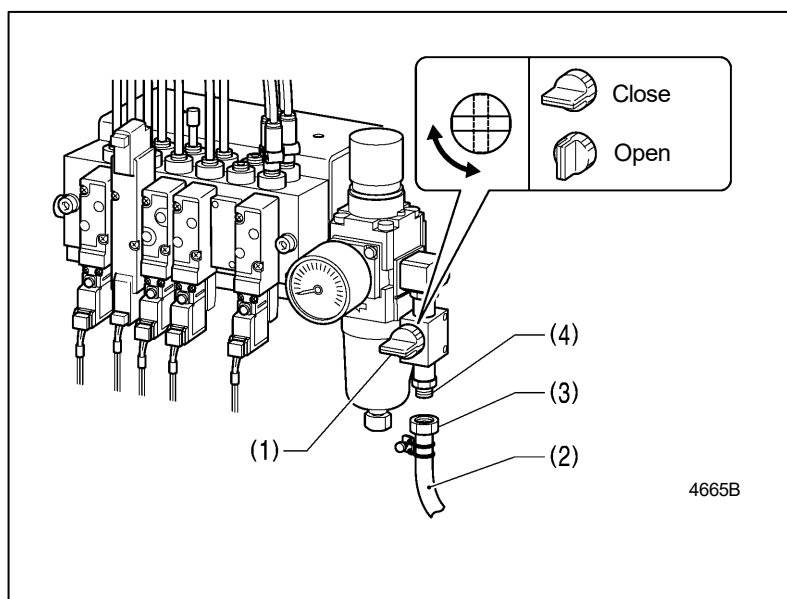
- Use a hoist to install the sewing machine.
- Position the six rubber cushions (1) so that the adjusters come to about the middle of the six rubber cushions (1).
- Position the sewing machine so that the top of the auxiliary plate is level.
- When moving from the installation position, be careful not to get your feet caught by the casters.
- When moving the sewing machine, make sure the head is lowered.

3-2. Removing the screws from the auxiliary plate



1. Remove the four screws (1) from the auxiliary plate.

3-3. Installing the air hose



1. Close the cock (1).
2. Turn the nut (3) at the end of the air hose (2) and connect it to the valve (4).
3. Open the cock at the compressor.
 - * Check that no air is leaking from the connection of the valve (4) and air hose (2).
4. Open the cock (1).
(The meter pointer will turn clockwise.)

[NOTE]

Turn the cock (1) gently to open it.

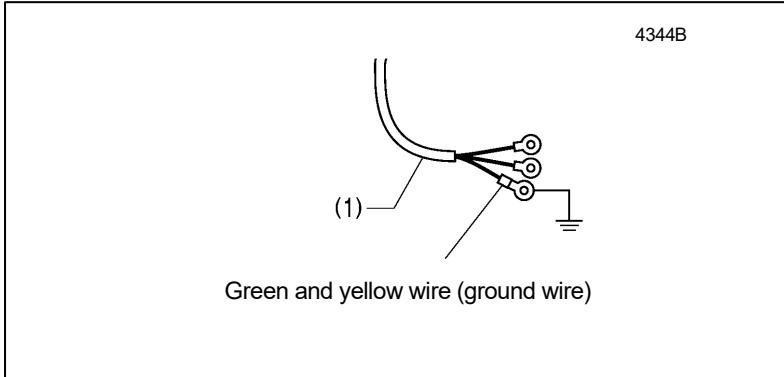
5. Adjust the air pressure. (Refer to "7-14. Adjusting the air pressure".)

3-4. Connecting the power cord

CAUTION



Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.



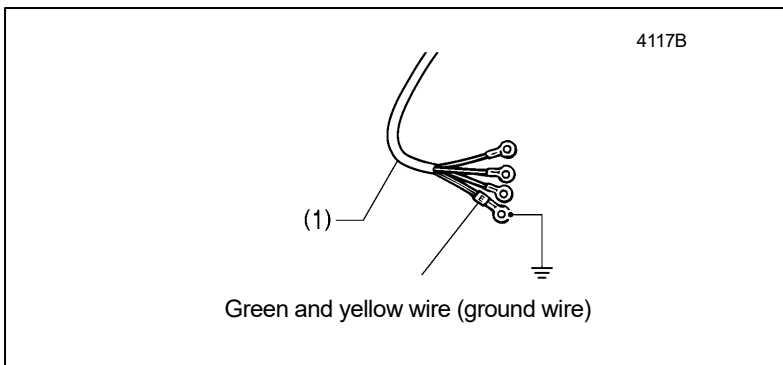
Connect cords that match the voltage specifications.

< EU specifications >

1. Attach an appropriate switch and cable to the power cord (1). (The green and yellow wire is the ground wire.)
2. Insert the power plug into a properly-grounded electrical outlet.

[NOTE]

Do not use extension cords, otherwise machine operation problems may result.



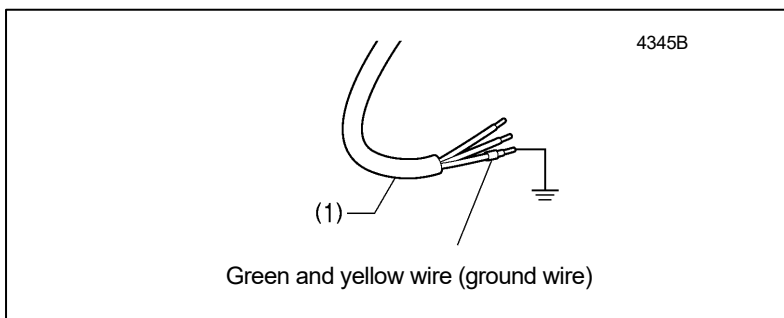
Connect cords that match the voltage specifications.

< 200 V system >

1. Attach an appropriate plug to the power cord (1). (The green and yellow wire is the ground wire.)
2. Insert the power plug into a properly-grounded electrical outlet.

[NOTE]

Do not use extension cords, otherwise machine operation problems may result.



3-5. Lubrication

 **CAUTION**

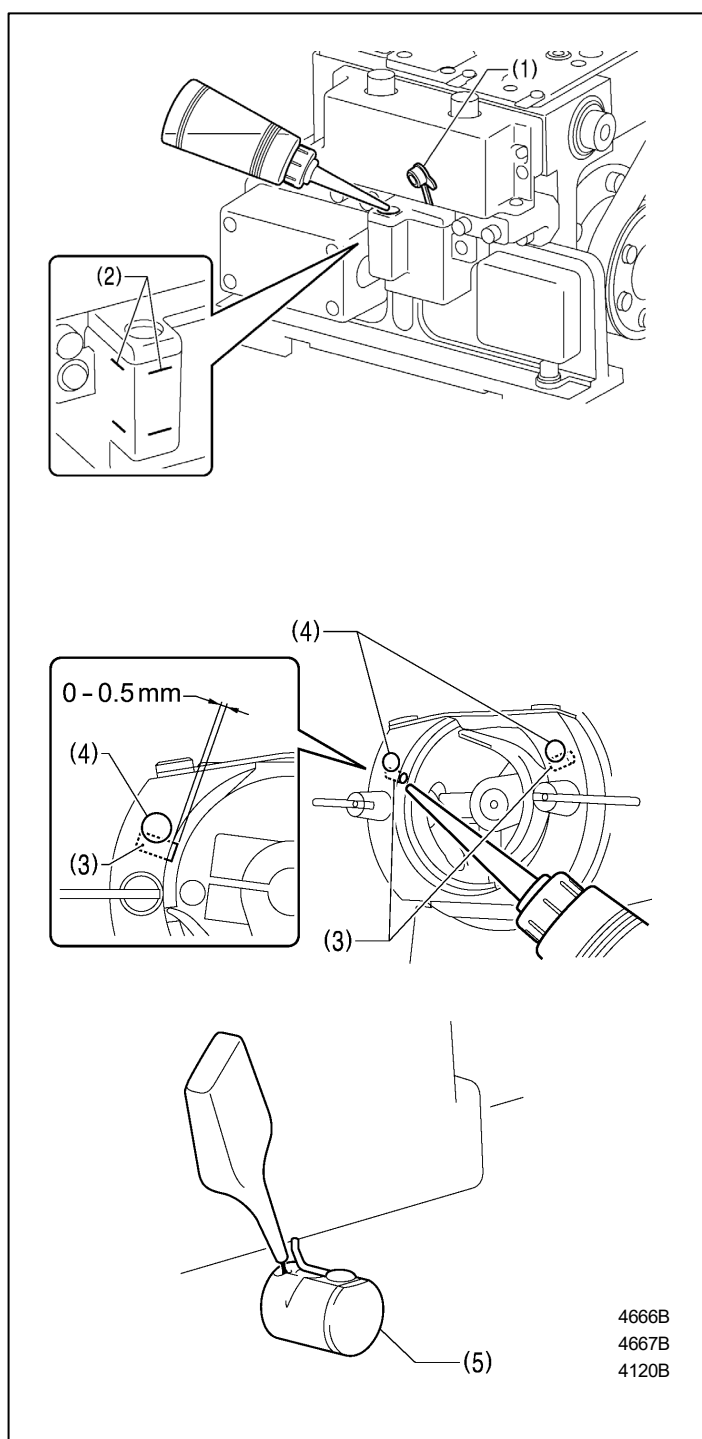

Do not connect the power cord plug until installation is complete

If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.



Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result.

Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.



- The sewing machine should always be lubricated and the oil supply replenished before it is used for the first time, and also after long periods of non-use.
- Use only the Brother-specified sewing machine oil for lubrication oil.

1. Move the rotary hook unit and remove the auxiliary plate while referring to "7-1 Preparing the rotary hook for maintenance"
2. Remove the oil feeding pocket cover (1).
3. Insert the nozzle of the oiler deeply into the oil feeding pocket, and then add lubricating oil.
4. Check that the lubricating oil comes to the upper reference line(2) in the oil gauge window.
5. Replace the oil feeding pocket cover (1).
6. Pour oil in through the two holes of the shuttle race base assembly so that the felt (3) is lightly moistened. If it is difficult to add oil, you can also remove the rubber cap (4) and pour in the oil through the hole.

[NOTE]

- **The two pieces of felt (3) should normally project by 0 to 0.5 mm from the hook race. Be careful not to push in the felt (3) when lubricating.**
 - **If there is no more oil on the felt (3) of the shuttle race base assembly, problems with sewing may result.**
7. If using the needle cooler (5), fill it with silicon oil. (Refer to "4-6. Threading the upper thread" for details on using the needle cooler (5).)

4666B
4667B
4120B

4. PREPARATION BEFORE SEWING

⚠ CAUTION



Turn off the power switch before installing the needle.



If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.

Set the clamp so that it does not protrude from the auxiliary plate within the whole of the feed area. Otherwise, injury or damage to the sewing machine may result.



The clamp should be carried by two or more people.

4-1. Preparing the clamp

Prepare the clamp while referring to the information below.

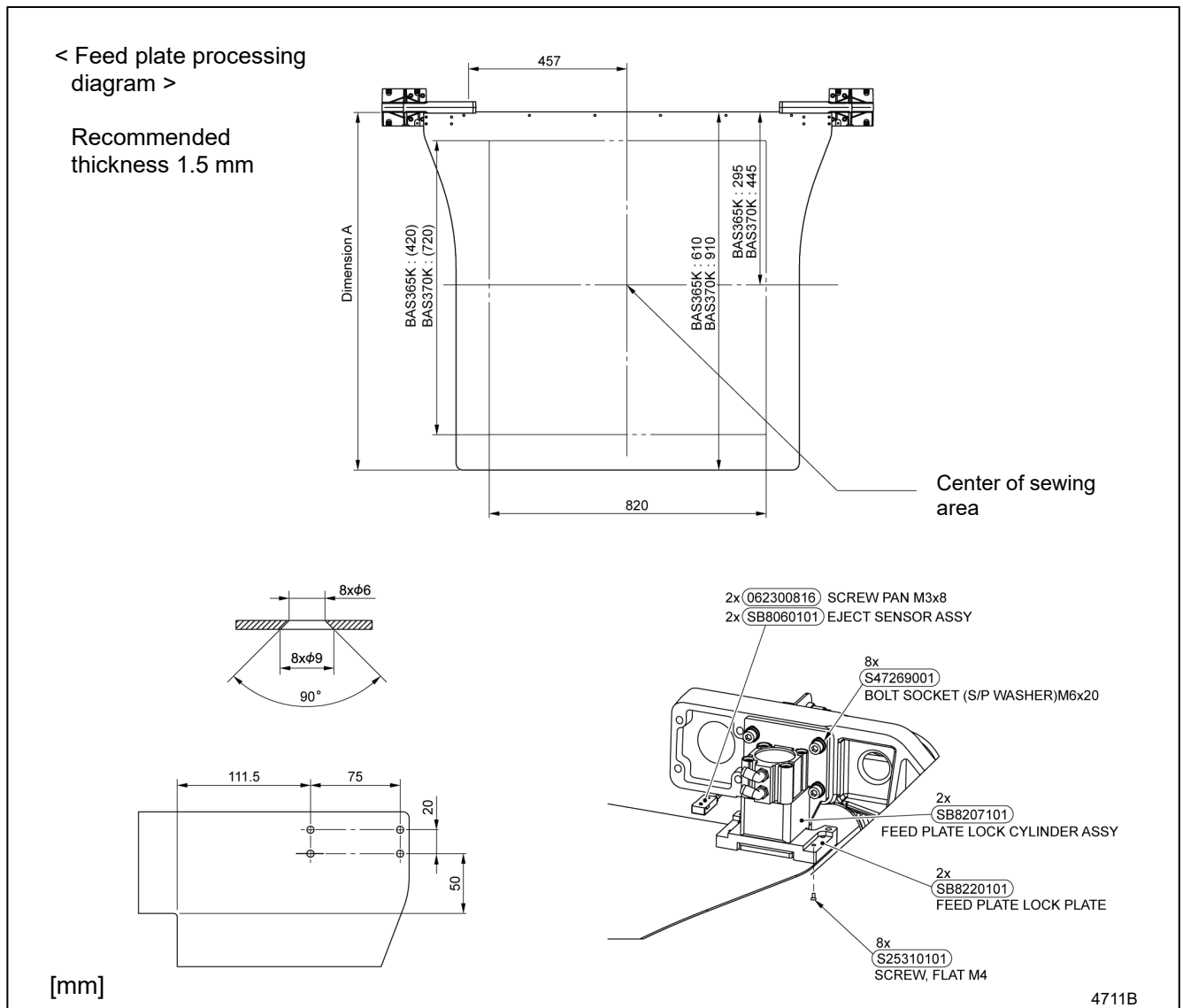
Process the work clamp and feed plate which match the sewing pattern, while referring to the processing diagram below.

Values in () are the recommended sizes when sewing using the maximum area (BAS-365K: 800x400 mm, BAS-370K: 800x700 mm)

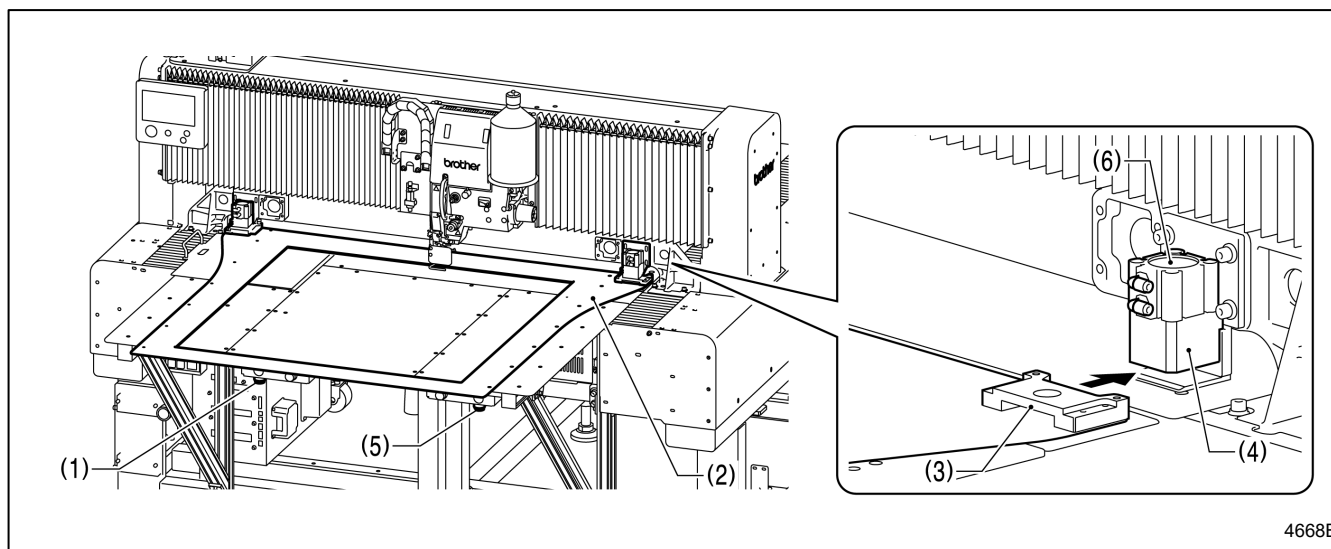
Refer to the Service Manual if changing the size of the maximum sewing area.

[NOTE]

- If dimension A is 950mm or more, the clamp will protrude from the auxiliary plate when it moves to the maximum forward position.
- Make a chamfer of about C0.5 at the ridge line on the bottom of the feed plate.
- Use air hoses with outer diameters of 4 mm.

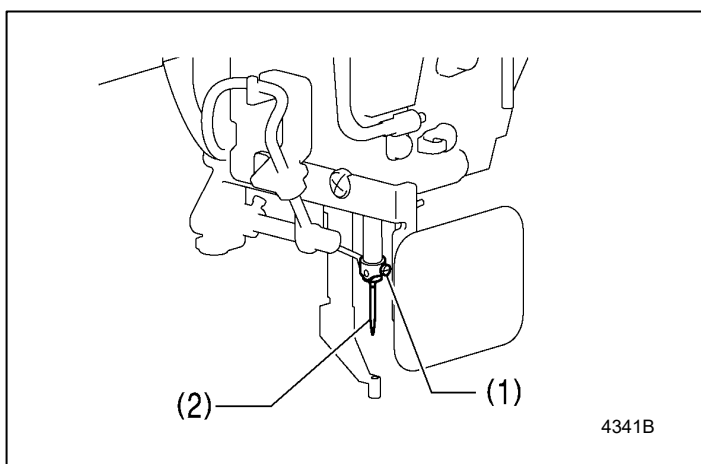


4-2. Removing and installing the feed plate (When using the optional lock cylinder)



1. When the left switch (1) is pressed, the feed plate (2) will unlock so that it can then be removed.
Pull the feed plate (2) directly forward to remove it.
2. When installing the feed plate (2), if the two feed plate lock plates (3) are fitted into the gaps in the two cylinder mounting blocks (4) and the left switch (1) and the right switch (5) are then pressed simultaneously, the two lock cylinders (6) will operate and the feed plate (2) will be locked.

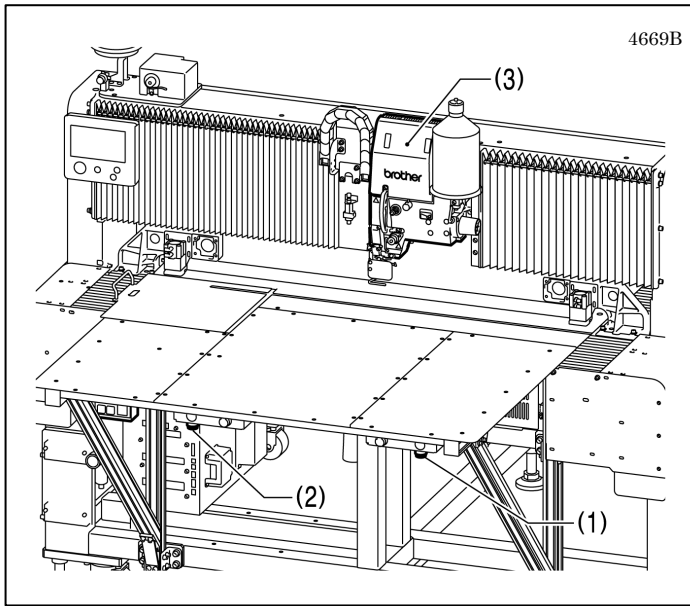
4-3. Installing the needle



1. Loosen the set screw (1).
2. Insert the needle (2) in a straight line as far as it will go, making sure that the long groove on the needle is at the left of the sewing machine, and then securely tighten the set screw (1).

4-4. Hand start switch operation method

<When machine head is raised>



When the right switch (1) and the left switch (2) are pressed simultaneously, the machine head (3) will drop, and when the left switch (2) is pressed, it will rise. When the right switch (1) and the left switch (2) are pressed together while the machine head (3) is lowered, the sewing machine will start.

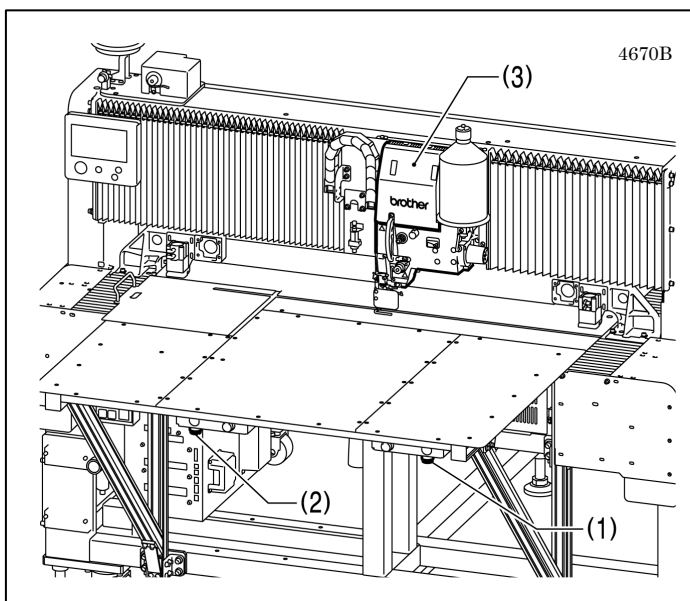
[NOTE]

Use a work clamp and feed plate which are suitable for the sewing area. If a work clamp or feed plate which is unsuitable for the sewing area is used, the needle may break and injury may occur.

When sewing is finished, the machine head will rise and move to the sewing start position.

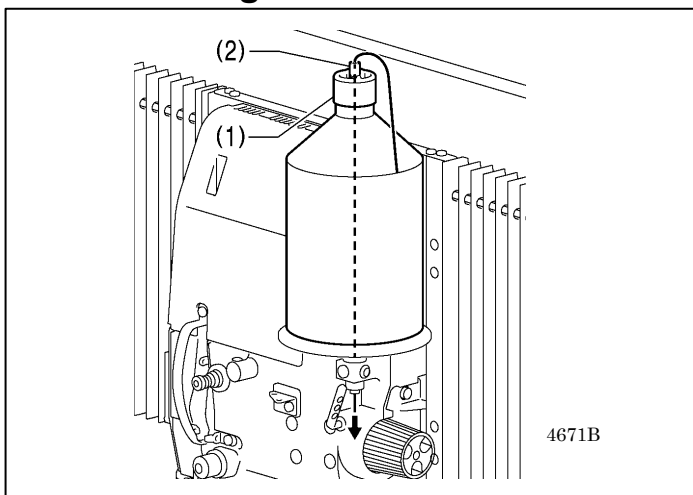
Do not place your hands or other objects on top of the auxiliary plates. Otherwise they might collide with the clamp or other objects and injury may result.

<When machine head is lowered>



Check that the clamp is not directly below the needle and the intermittent presser foot when the needle bar base is lifted down. The needle and intermittent presser foot will collide with the clamp, and injury or problems with operation may result.

4-5. Threading the thread

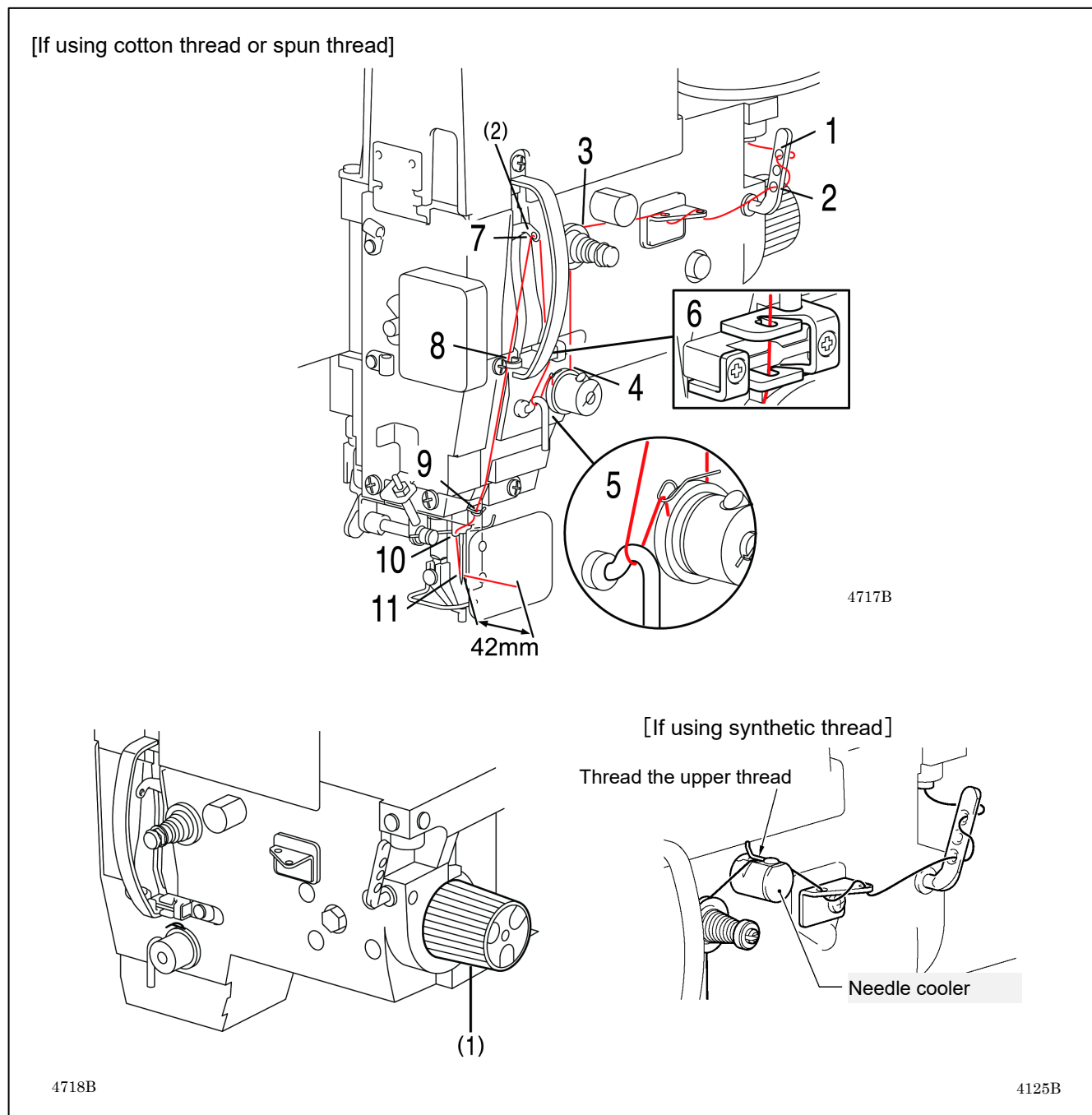


1. Set the thread spool in place, and then place the thread spool presser (1) against the top part of the thread spool to hold it in place.
2. Pass the thread through the top of the thread spool shaft (2).

4-6. Threading the upper thread

Thread the upper thread correctly as shown in the illustration below.

- * When using threading mode for threading, the thread can be threaded more easily.
(Refer to "Threading mode" on the next page.)

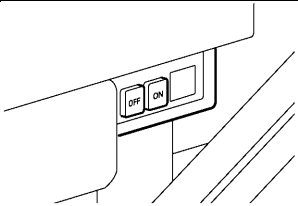
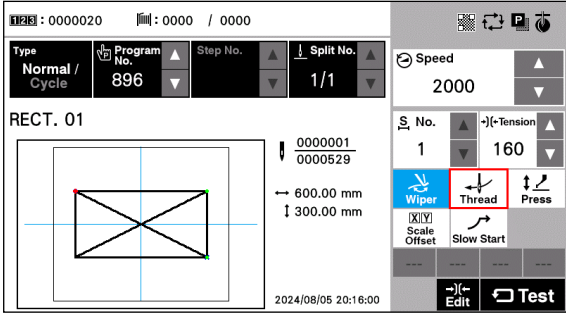
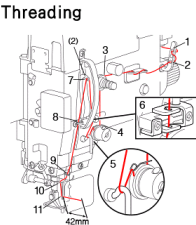
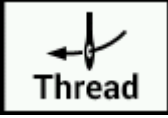

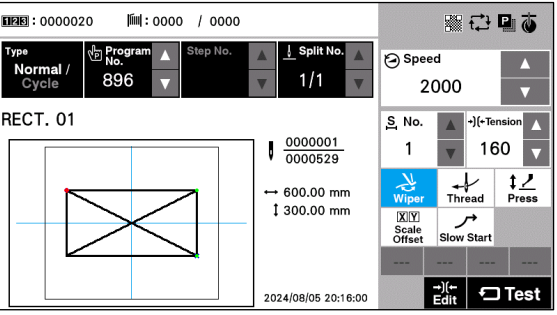



- Turn the machine pulley (1) and raise the thread take-up (2) to its highest position before threading the upper thread. (This will make threading easier and it will prevent the thread from coming out at the sewing start.)
- When threading the thread through the needle, allow a distance of approximately 42mm between the needle hole and the end of the thread.
If it is too long, the thread may become tangled, and if it is too short, the thread may pull out at the sewing start.

4. PREPARATION BEFORE SEWING

<Threading mode>

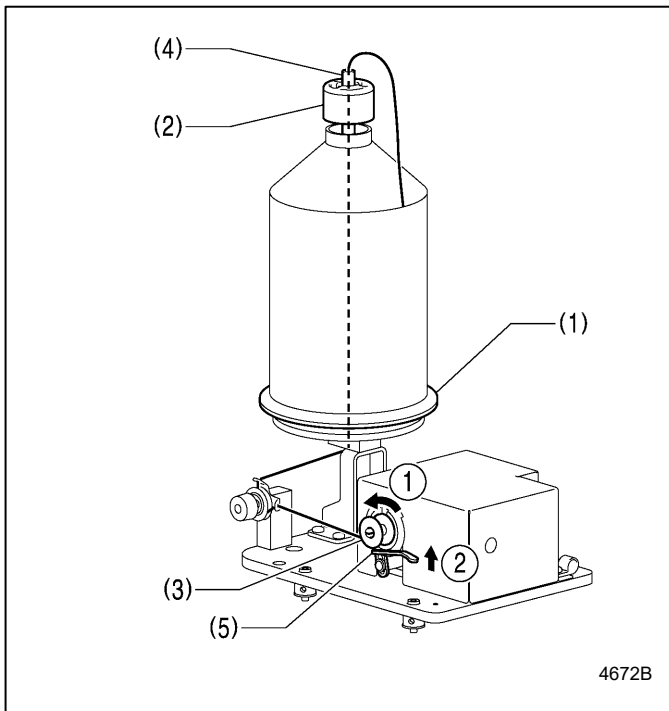
Threading mode is safe because the sewing machine will not start even when the hand start switch is depressed.

1	 <p style="text-align: right;">4126B</p>	Turn on the power.
2	 <p>The needle bar base will lower. Be careful not to touch the sewing machine.</p> <p style="text-align: right;">OK</p>  <p>Threading</p> <ol style="list-style-type: none"> 1. Turn the hand pulley (1) and raise the thread take-up (2) to its highest position before threading the upper thread. (This will make threading easier and it will prevent the thread from coming out at the sewing start.) 2. When threading the thread through the needle, allow a distance of approximately 42 mm between the needle hole and the end of the thread. 3. Touch the OK key to return to the previous screen. <p style="text-align: center;">◀ 1/2 ▶</p> <p style="text-align: right;">OK</p>	<p>Touch the Thread key on the screen.</p>  <ul style="list-style-type: none"> • The tension discs will open. <p>* Case the BAS-370K</p> <p>[NOTE1] If the needle bar base is raised at times such as when the threading screen is displayed, the screen shown at left will be displayed. Touch the OK key to lower the needle bar base. Be careful not to touch it with your hands.</p> <p>[NOTE2] If the position of the needle bar base is far away and the thread is difficult to thread, you can touch the  key to move the needle bar base to the left edge. You can return the needle bar base to its original position by touching this key on more time.</p>
3	<p>Threading the thread.</p>	
4	<p>Ending threading mode</p> <p>The display will return to the previous screen.</p>  <p style="text-align: right;">OK</p>	<p>Touch the OK key on the screen.</p> <p>• The sewing machine will return to the status that it was at before switching to threading mode.</p> <p>[NOTE3] If you would like to redo sewing after moving the needle bar base to the left edge, be sure to touch the  key to return the needle bar base to its original position before touching the OK key.</p>

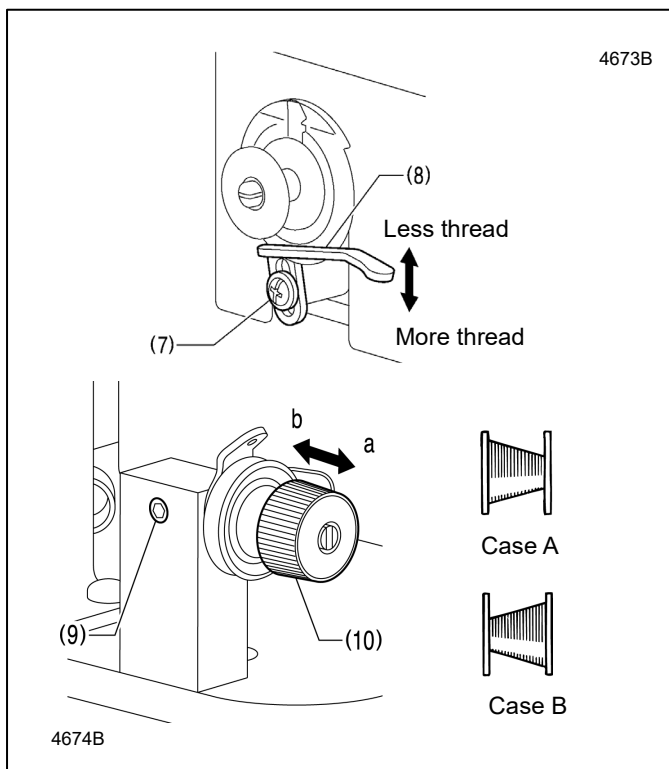
4-7. Winding the bobbin thread


CAUTION


Do not touch any of the moving parts or press any objects against the sewing machine while winding the thread.
If this is not observed, it may result in serious injury or damage to the devices.



1. Place the thread on top of the thread spool bracket (1), and then place the thread spool presser (2) against the top part to hold the thread in place.
2. Place the bobbin onto the bobbin winder shaft (3).
3. Pass the thread through the thread spool shaft (4) from the top to the bottom.
4. Thread the thread as shown in the illustration, and then turn the bobbin several times in the direction of ① to wind the thread.
5. When the bobbin presser arm (5) is pushed in the direction of ②, the thread will start being wound.
6. When winding is finished, the bobbin presser arm (5) will automatically release the bobbin, and winding will stop.

**Adjusting the bobbin winding amount**

Loosen the screw (7) and move the bobbin presser (8).

If the thread winds onto the bobbin unevenly

Loosen the set screw (9) and move the bobbin winder tension assembly (10) forward and back to adjust.

* For case A, move the bobbin winder tension assembly (10) in the direction of a, and for case B, move it in the direction of b.

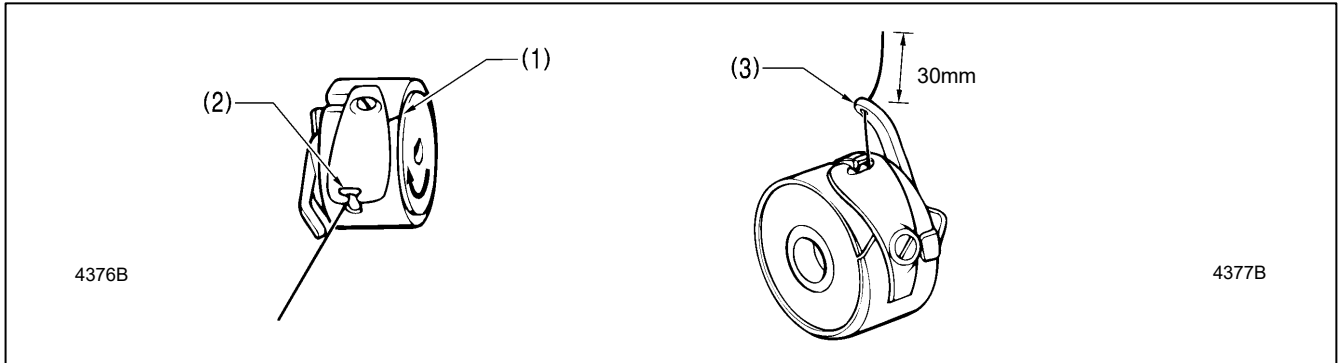
4-8. Installing the bobbin case

⚠ CAUTION



Turn off the power switch before installing the bobbin case.

If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.



1. While holding the bobbin so that the thread winds to the right, insert the bobbin into the bobbin case.
2. Pass the thread through the slot (1) and pull it out from the thread hole (2).
3. Check that the bobbin turns in the direction of the arrow when the thread is pulled.
4. Pass the thread through the lever thread hole (3), and then pull out approximately 30 mm of thread.
5. Hold the latch on the bobbin case and insert the bobbin case into the rotary hook.

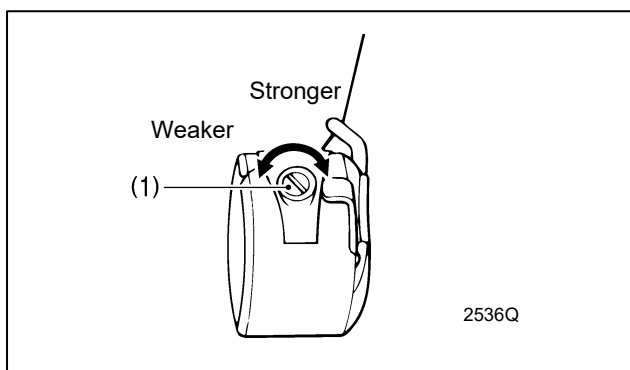
4-9. Thread tension

[Thread tension reference]

	Heavy-weight materials	Air bags
Upper thread	#20 or similar	Air bag thread
Bobbin thread	#20 or similar	Air bag thread
Upper thread tension (N) [Tension value]	1.4 - 1.8 [140 - 180] [*1]	2.5 - 3.5 [250 - 350] [*1]
Bobbin thread tension (N)	0.3 - 0.4	1.9 - 2.1
Pre-tension (N)	0.2 - 0.4	0.2 - 0.4
Needle	DP x 17 #19	DP x 17 #24

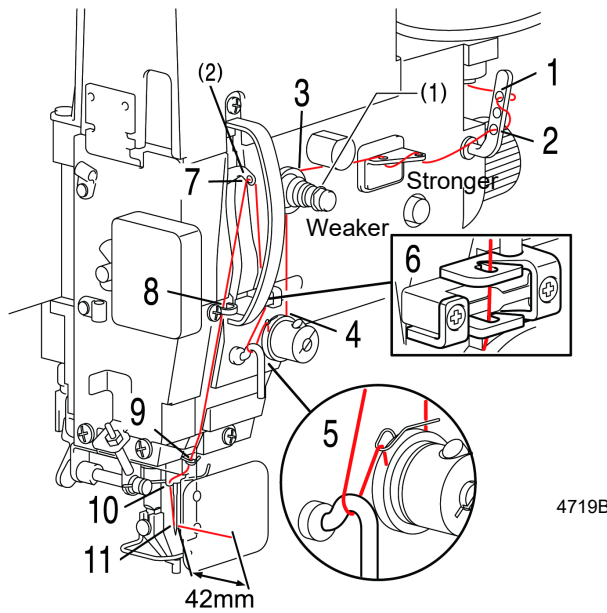
[*1] This is the tension value when the pretension is 0.2 N.

4-9-1. Bobbin thread tension



Adjust the thread tension to the weakest possible tension by turning the thread tension nut (1) until the bobbin case will not drop by its own weight while the thread end coming out of the bobbin case is held.

4-9-2. Upper thread tension

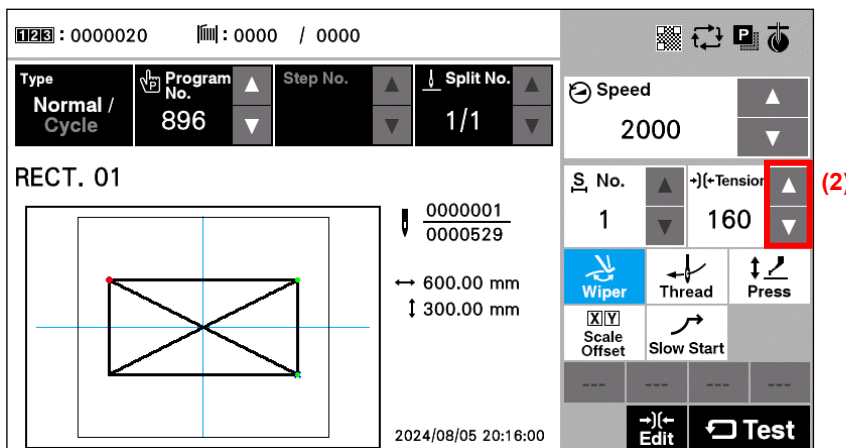


4719B

Use the digital tension to adjust the tension as appropriate for the material being sewn. (Refer to "Setting the tension value" below.)

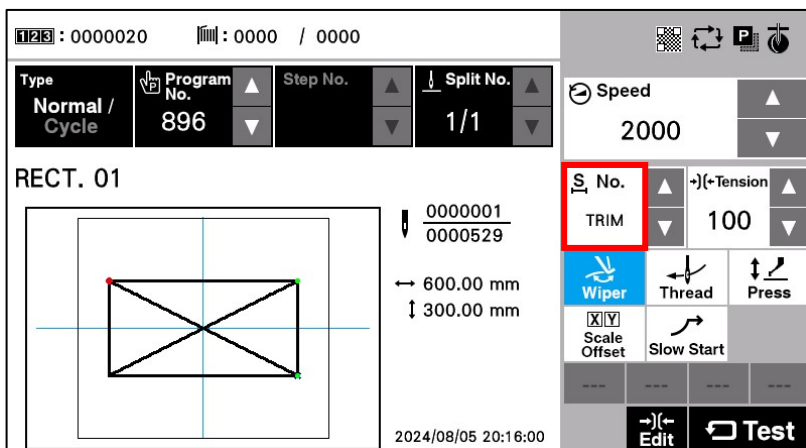
Additionally, adjust the memory switch No. 589 "Thread trimming tension" (refer to "9-1. Memory switch setting method" and "9-2. List of memory switch settings") to ensure the upper thread trailing length is about 42mm.

[Sewing operation screen]



Setting the tension value

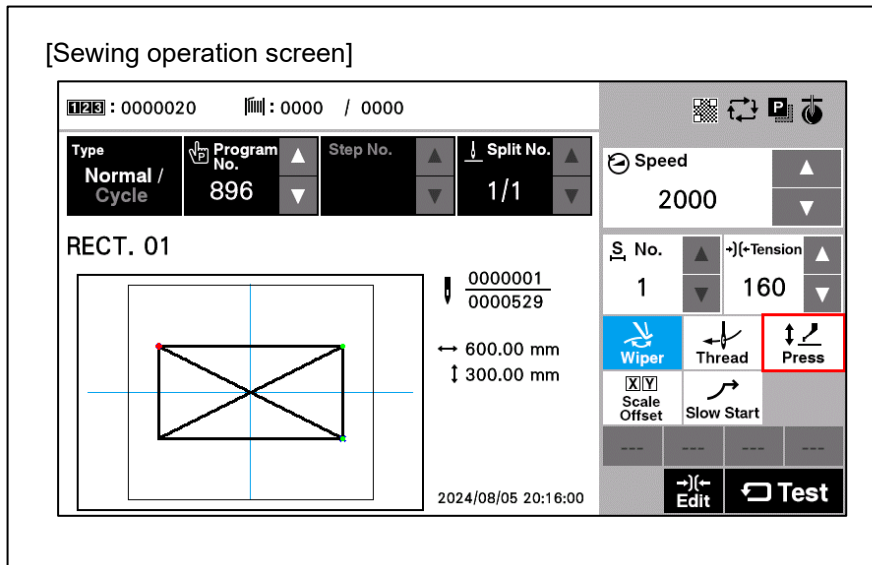
Touch the Δ and ∇ keys (2) on the sewing operation screen to increase or decrease the Tension value.



By selecting "TRIM" with the Section No. key, you can set the tension during thread cutting.

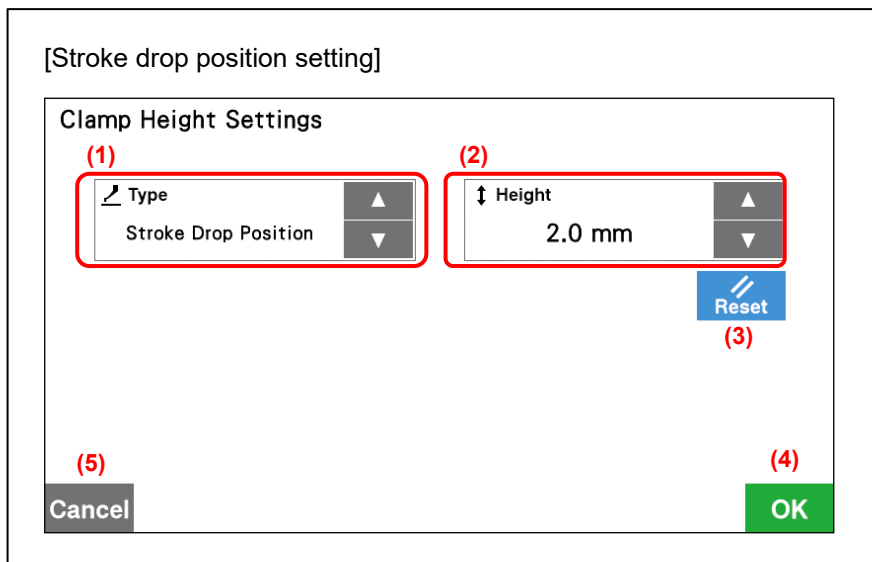
The values set here will be reflected in the memory switch No.589.

4-10. Setting the presser foot lift amount

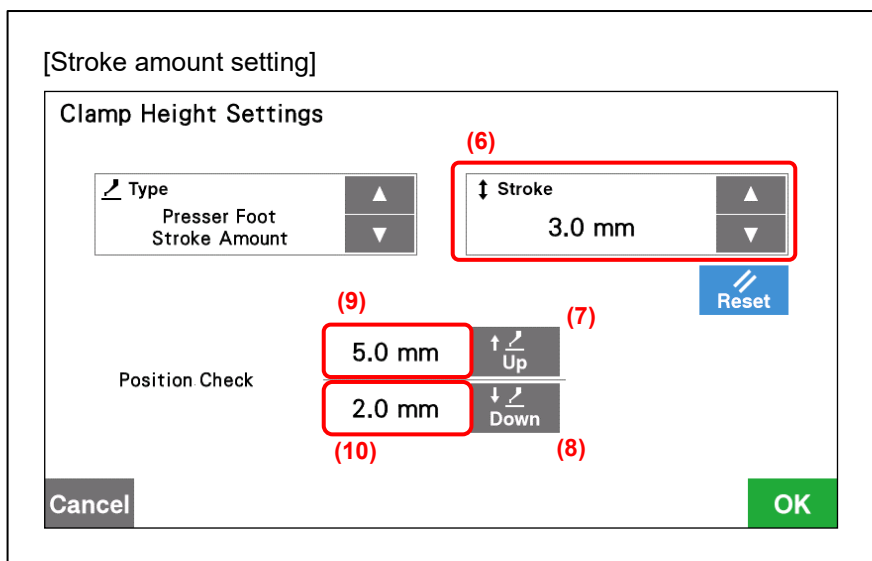


The settings for the work clamp and intermediate presser foot lift amounts can be changed using the [Sewing operation screen].

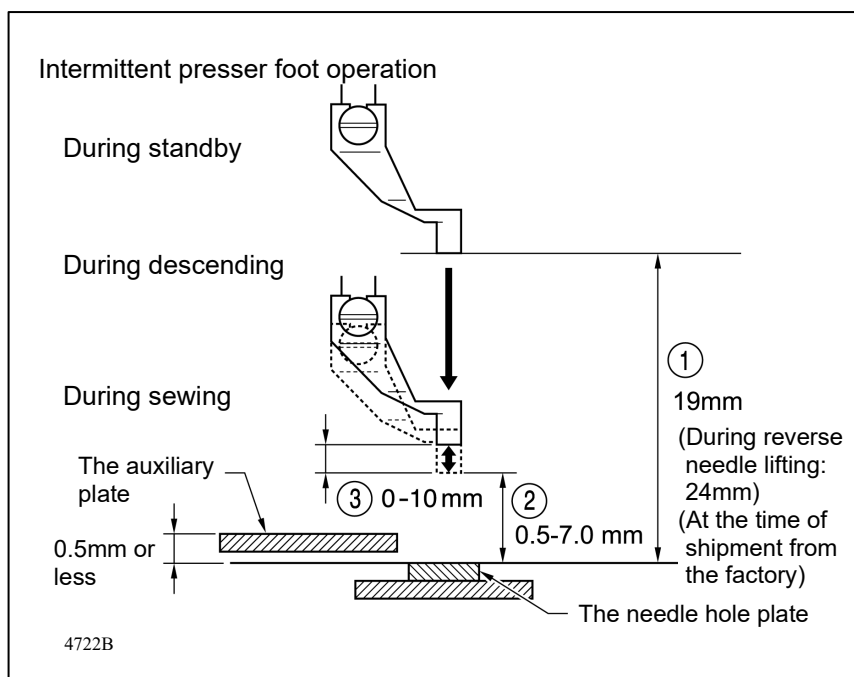
Touch the "Press" key to display the setting screen for the work clamp lift amount.



Adjust the intermittent presser foot height by setting the intermittent presser foot stroke drop position and the intermittent presser foot stroke amount.



Type (1)	Touch the \triangle or ∇ key (1) to select the item to change.
Height (2)	Touch the \triangle or ∇ key (2) to change the stroke drop position. If you change the value, the sewing machine's intermittent presser foot will move. Setting range: 0.5 to 7.0 mm, 0.1 mm units, initial value: 2.0 mm
Reset key (3)	Touch to return the value which currently appears in the display to the value which was first displayed when you switched to the setting screen. The sewing machine's intermittent presser foot will move according to this value.
OK key (4)	Touch to confirm the setting value and return to the [Sewing operation screen].
Cancel key (5)	Touch to discard the setting value and return to the [Sewing operation screen].
Stroke (6)	Touch the \triangle or ∇ key (6) to change the stroke amount. If you change the value, the sewing machine's intermittent presser foot will move. Setting range: 0.0 to 10.0 mm, 0.1mm units, initial value: 3.0 mm
Stroke UP key (7)	This raises the intermittent presser foot. However, the key is disabled while the intermittent presser foot is rising.
Stroke DOWN key (8)	This lowers the intermittent presser foot. However, the key is disabled while the intermittent presser foot is lowering.
Intermittent height (9)	Displays the sum of the value set for the stroke drop position and the value set for the stroke amount. ("Intermittent presser foot operation" ②)
Stroke drop position (10)	Displays the value set for the stroke drop position. ("Intermittent presser foot operation" ③)

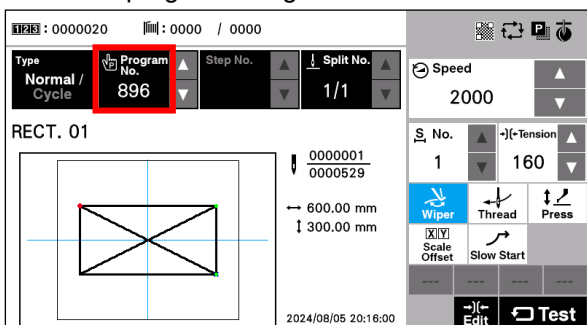


- ① Intermittent presser foot lift amount
- ② Intermittent presser foot stroke drop position
- ③ Intermittent presser foot stroke amount

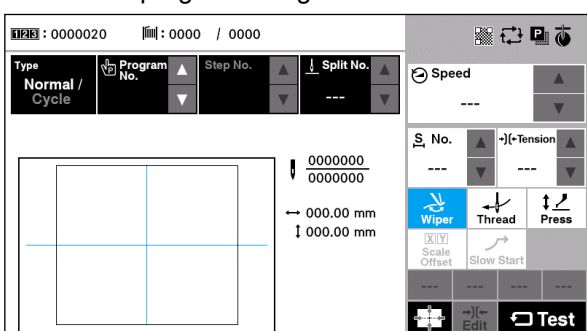
* After the presser foot has been replaced, it will be necessary to make corrections to the "Intermittent presser foot stroke drop position". Ask the place of purchase for information on the correction method.

4-11. Starting up

< When a program is registered >



< When no program is registered >



Turn on the power.

If a program has been registered, the program number and a preview of the sewing pattern will be displayed.

No programs are registered at the time of shipment from the factory, and so "---" is displayed as the program number (No.).

For details on the sewing data reading method, refer to "3. USING STORAGE MEDIA" in the "LCD Panel/Operation Panel" Instruction Manual".

5. SEWING

WARNING



Do not allow any liquids to get onto this sewing machine, otherwise fire, electric shocks or operating problems may occur.



If any liquid gets inside the sewing machine (machine head or control box), immediately turn off the power and disconnect the power plug from the electrical outlet, and then contact the place of purchase or a qualified technician.

CAUTION



This sewing machine should only be used by operators who have received the necessary training in safe use beforehand.



The sewing machine should not be used for any applications other than sewing. Turn off the power switch at the following times.



If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.

- When replacing the bobbin and needle
- When not using the machine and when leaving the machine unattended

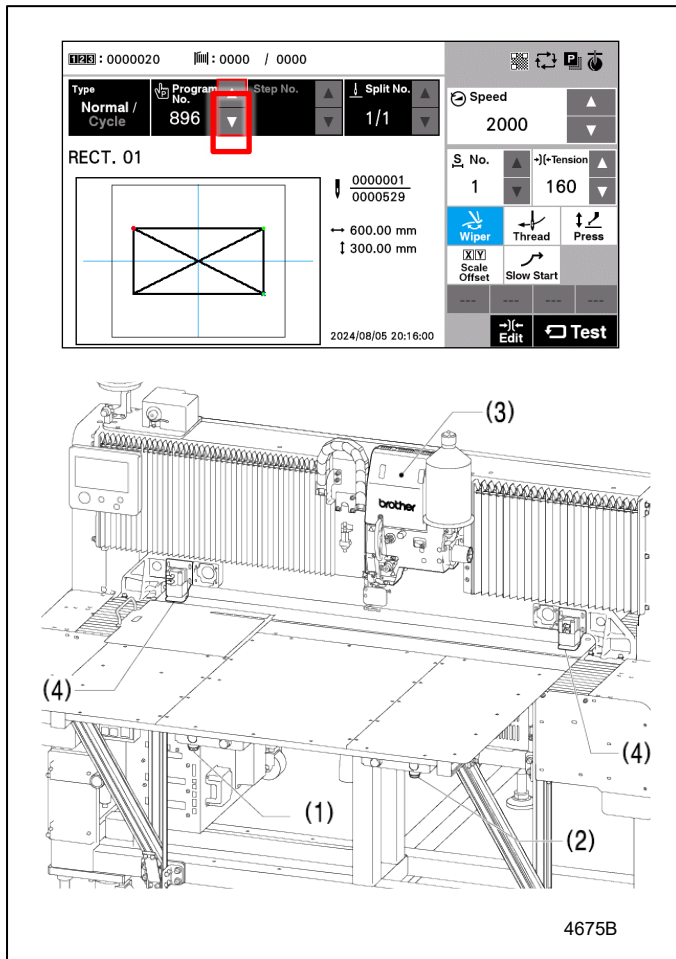


Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.



If you use a frame for a small sewing area for sewing data within a large sewing area by mistake, the needle will sew onto the frame, and injury or damage to the sewing machine may result.

5-1. Sewing



1. Turn on the power.
2. Touch the \triangle or ∇ key to select the number for the program to be sewn.
 - * For details on reading sewing data from USB memory devices, refer to "10-4. Importing items of sewing data separately".
3. When the left switch (1) and the right switch (2) are pressed together, the machine head (3) of the BAS-370K only will rise and home position detection will start. Home position detection is complete, the lock cylinder (4) (optional part) will automatically be unlocked.
4. Set the clamp.
5. When the left switch (1) and the right switch (2) are pressed together, the machine head (3) of the BAS-370K only will drop and the clamp is locked by the lock cylinder (4). When the left switch (1) and the right switch (2) are pressed together in this condition, sewing will start.
6. After sewing is completed, the thread will be trimmed, and then the machine head (3) of the BAS-370K only rises and the clamp is released by the lock cylinder (4).

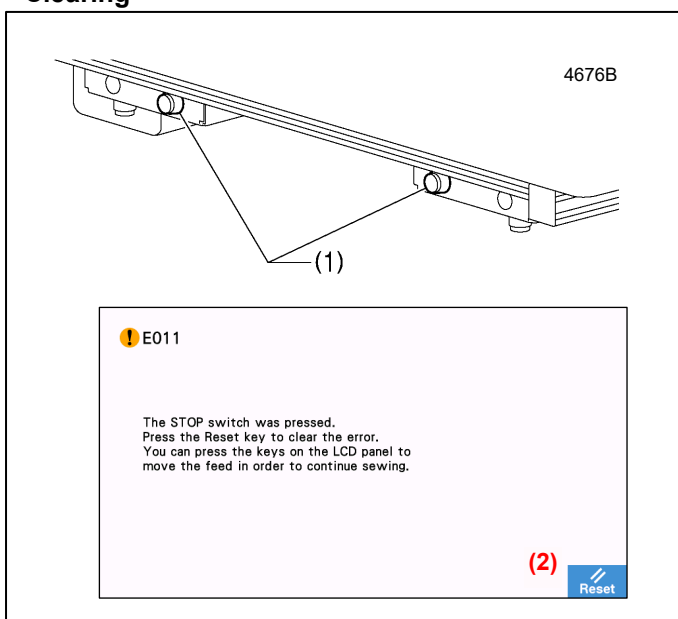
Use a clamp which will hold the material securely so that it does not slip.

- * For the BAS-370K only, if you press the left switch (1) while the machine head is lowered, the machine head will rise.

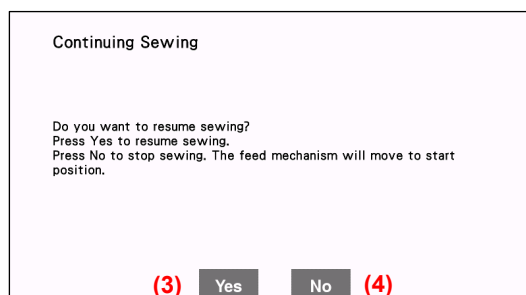
5-2. Using the STOP switch

If you press the emergency stop switch (1) to during actual sewing, an error dialog box will be displayed and the sewing machine will immediately stop.

<Clearing>



1. Touch the Reset key (2).
The thread will be trimmed, and then the error dialog box on the screen will disappear and the buzzer will stop.
2. A dialog box asking you to confirm if you want to continue sewing will be displayed.



<Continuing sewing from a stopping point>

If the thread breaks or the bobbin thread runs out during sewing, you can then continue sewing from the point where the thread broke or ran out.

<p>1</p>		<p>Touch "Yes" (3) to return to the resewing standby screen.</p>
<p>2</p>		<p>Touch the ◀▶ keys (5) and (6) on the screen to return to the position where sewing is to be resumed. When you touch the ◀ key (5), the feed will move backward by 1 stitch, and when you touch the ▶ key (6), the feed will move forward by 1 stitch.</p>
<p>3</p>		<p>Press the left switch (1) and the right switch (2) together.</p>

<Returning to the sewing start position without continuing sewing>

If you do not wish to continue sewing, touch "No" (4).

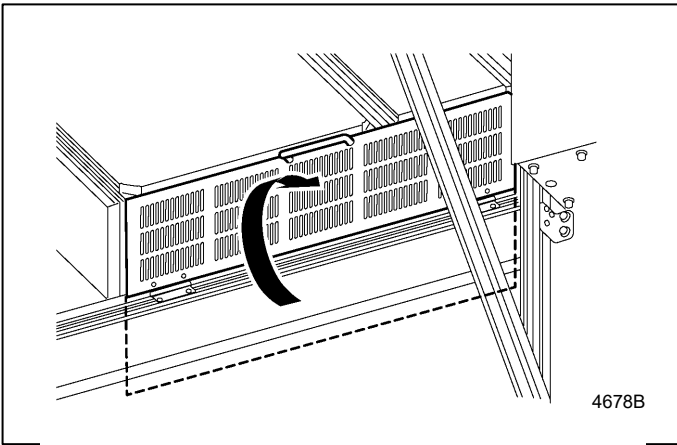
The machine head will rise or drop on conjunction with home position detection.

- After home position detection is carried out, the mechanism will return to the sewing start position.

5-3. Opening and closing the front cover

If the front cover is opened during sewing, the sewing machine will stop immediately and an error dialog box will be displayed.

<Clearing>



1. Close the front cover.
2. Refer to "5-2. <Clearing>", "<Continuing sewing from a stopping point>" and "<Returning to the sewing start position without continuing sewing>"

[NOTE]

If you touch the Reset key without closing the front cover, the error will not be cleared.

6. CLEANING

CAUTION



Turn off the power switch before carrying out cleaning.

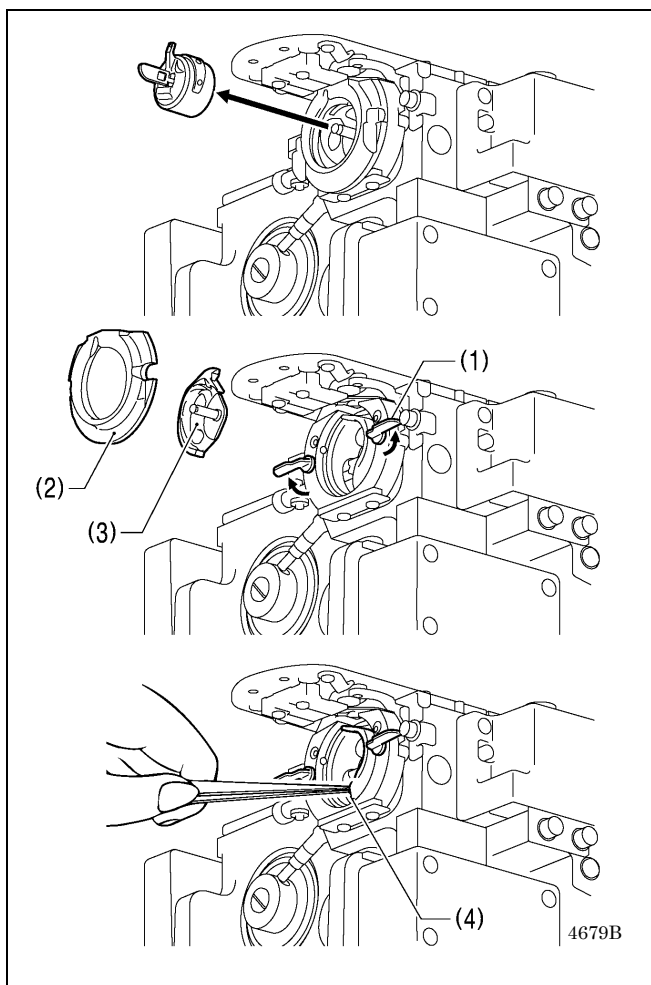
If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.



Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result.

Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

6-1. Cleaning the rotary hook



1. Remove the bobbin case.

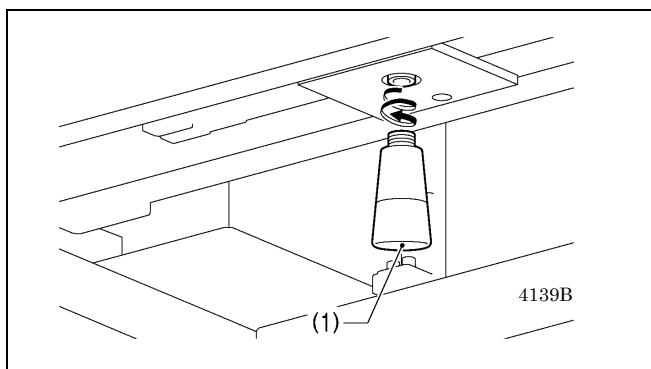
* It may be easier to clean the rotary hook if it is done in maintenance mode. Refer to "7-1. Preparing the rotary hook for maintenance".

* When the machine head moves in maintenance mode, it will rise up.

2. Open the setting claw (1) in the direction indicated by the arrow, and then remove the shuttle race base (2) and the shuttle hook (3).

3. Clean all the dust and lint from around the driver (4), the top of the rotary hook thread guide and the shuttle race.

6-2. Draining the oil

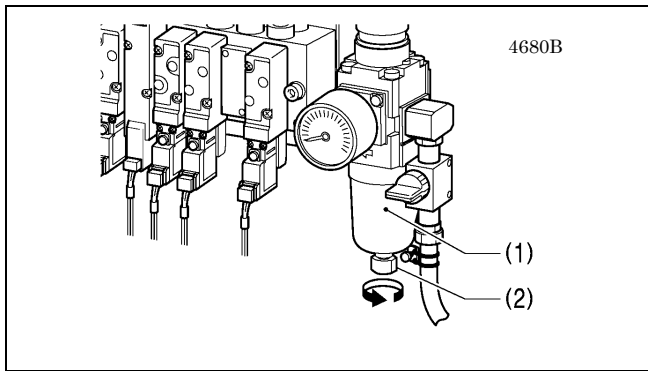


1. Remove and empty the oiler (1) whenever it is full.

2. After emptying oiler (1), screw it back into its original position.

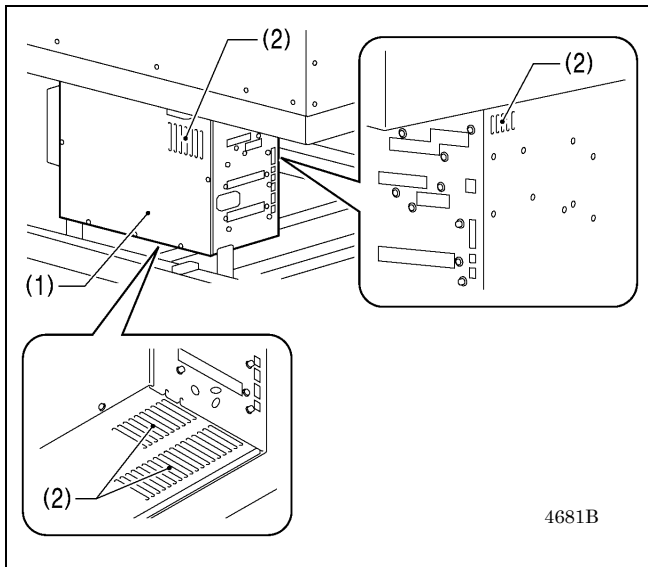
* Dispose of waste oil correctly in accordance with local regulations.

6-3. Checking the regulator



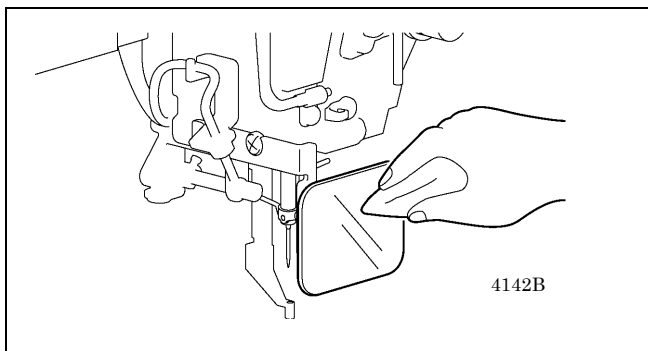
1. If water collects in the bottle of the regulator (1), turn the drain cock (2) in the direction of the arrow to drain the water.
2. After draining the water, tighten the drain cock (2).

6-4. Cleaning the control box air inlet ports



Use a vacuum cleaner to clean the filter in the air inlet ports (2) of the control box (1) at least once a month.

6-5. Cleaning the eye guard

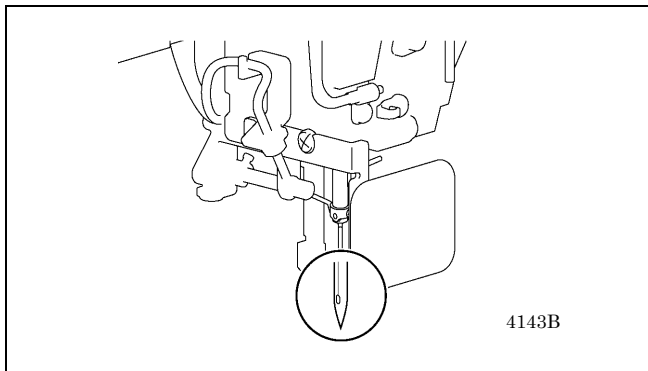


Wipe the eye guard clean with a soft cloth.

[NOTE]

Do not use solvents such as kerosene or thinner to clean the eye guard.

6-6. Checking the needle

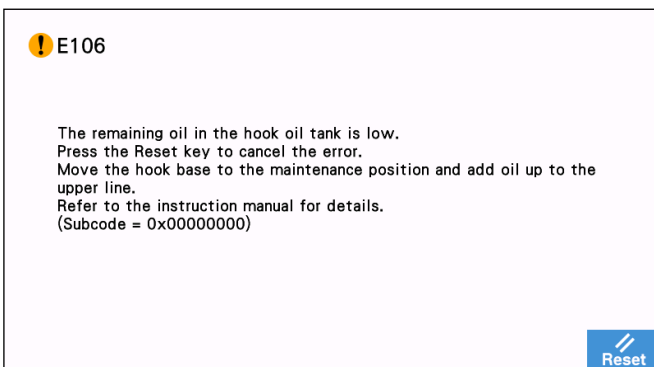


Always check that the tip of the needle is not broken and also that the needle is not bent before starting sewing.

6-7. Lubrication

If the lubrication warning [E106] appears (when the rotary hook lubrication sensor is on), carry out lubrication while referring to "3-5. Lubrication".

- * If the lubricating oil level reaches the lower reference line in the oil gauge window when the rotary hook lubrication sensor is off, add more lubricating oil.



6. CLEANING

6-8. Applying grease

When the grease lubrication warning [E100] [E101] is displayed, please replenish the grease to the needle bar metal and spline nut.

- * When the warning for both grease and oil replenishment [E104] [E105] is displayed, please refer to "6-9. Adding gearbox lubricating oil" and replenish both grease and oil.

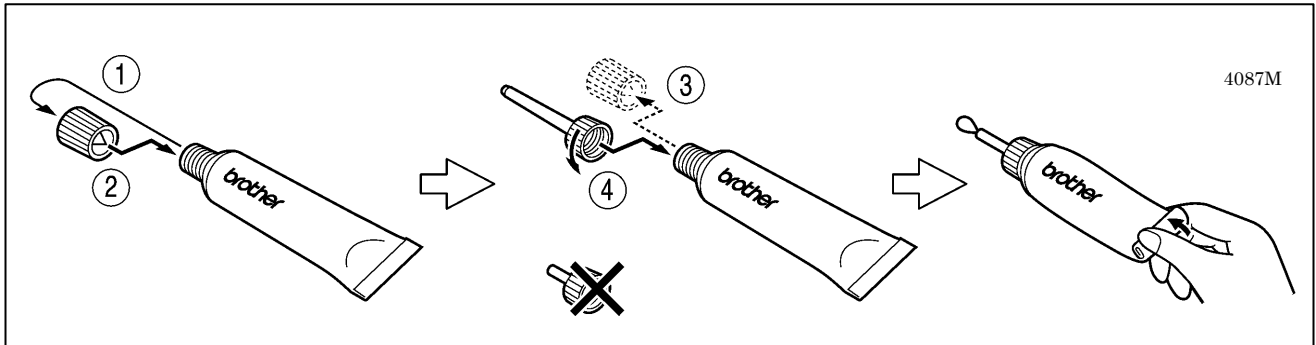
6-8-1. Applying grease to the needle bar bush

<Applying grease>

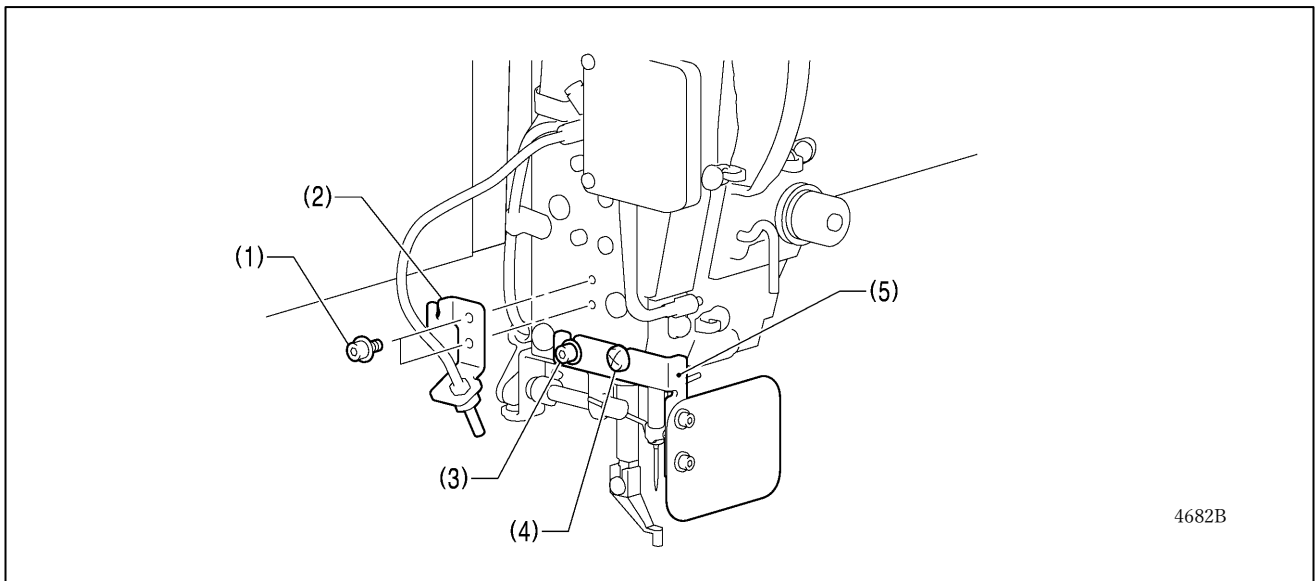
Use Brother-specified "Grease unit (SB1275-201)".

Ask the place of purchase for details on obtaining these items.

1. Using the tube

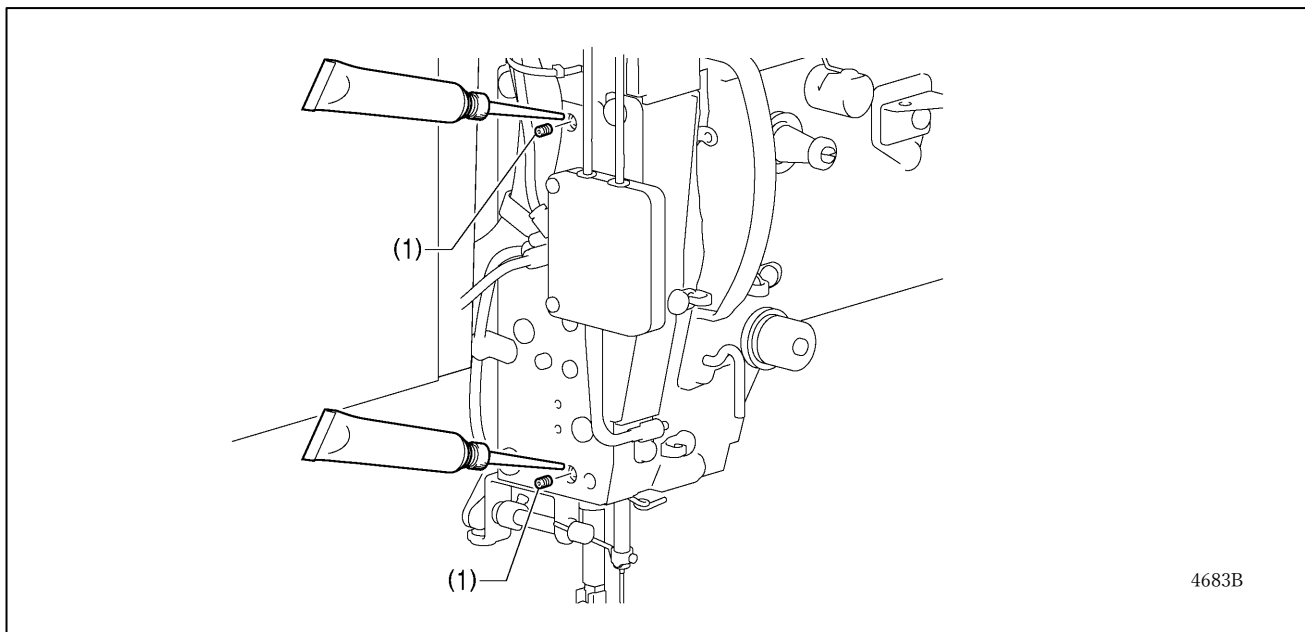


2. Removing the needle cooler device and eye guard



Loosen the two bolts (1), remove the needle cooler device (2), and then loosen the bolt (3) and the screw (4) and remove the eye guard assembly (5).

3. Applying grease



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Remove the two set screws (1) from the two holes in the face plate, and apply grease to the holes.

Tighten the set screws to a torque of 1 N.m. If the set screws are tightened too firmly, it may damage the sewing machine.

4. Installing the needle cooler device and eye guard

6-8-2. Applying grease to the spline nut

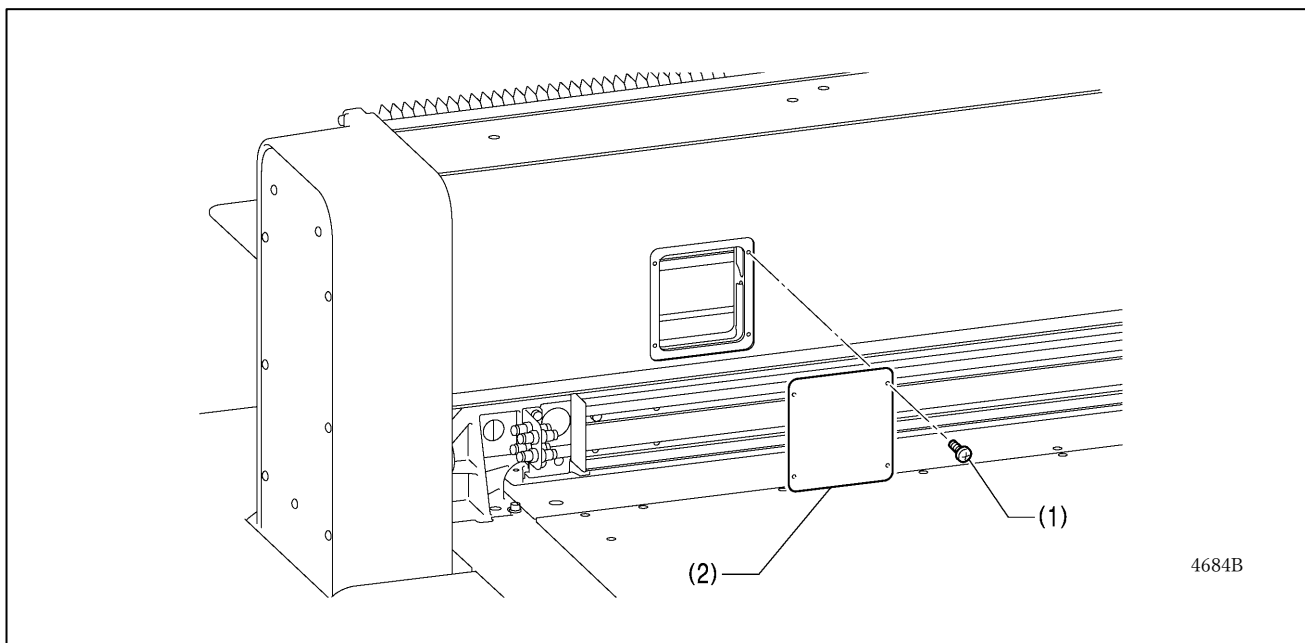
< Applying grease >

It is recommended to use THK AFB-LF grease.

For the grease gun, it is recommended to use THK MG70 (H type nozzle).

Ask the place of purchase for details on obtaining this item.

1. Remove the X guide frame cover

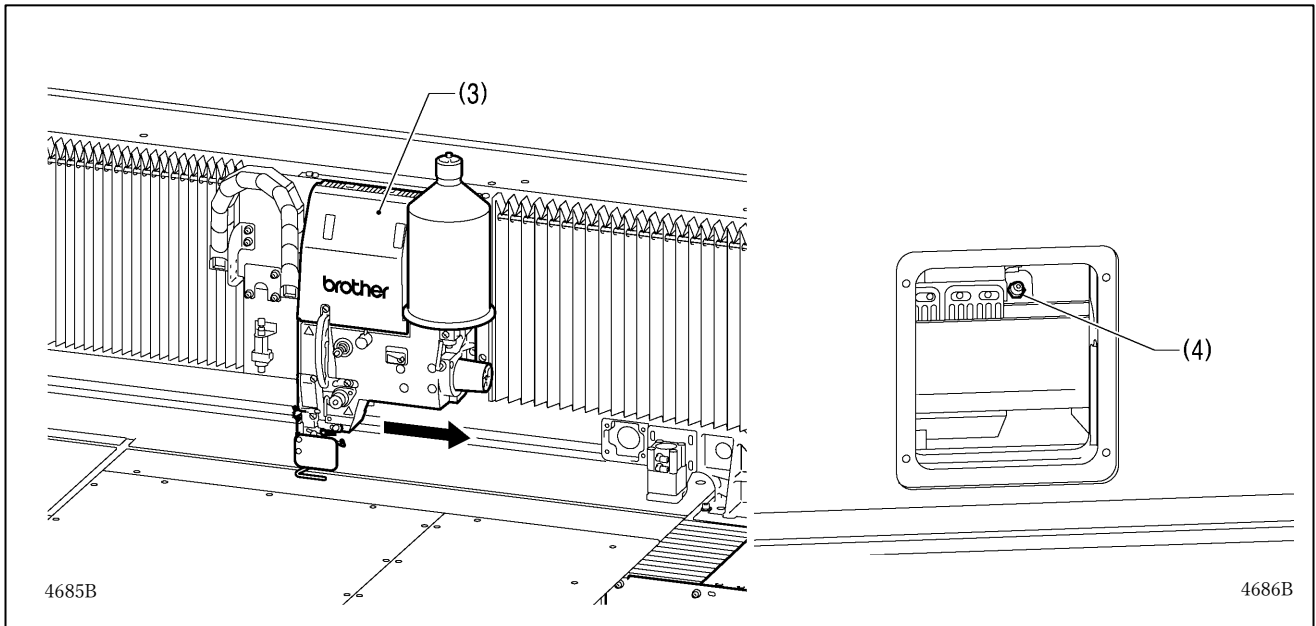


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Remove the four screws(1), and then remove the X guide frame cover(2).

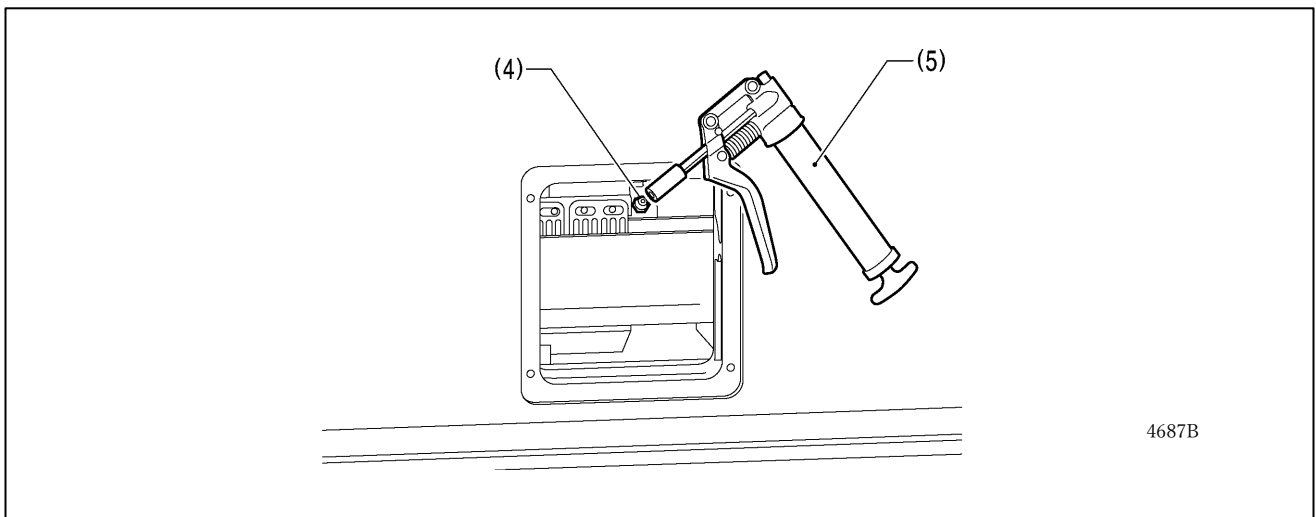
6. CLEANING

2. Moving the machine head



Move the machine head (3) to a position where the grease inlet (4) can be accessed.

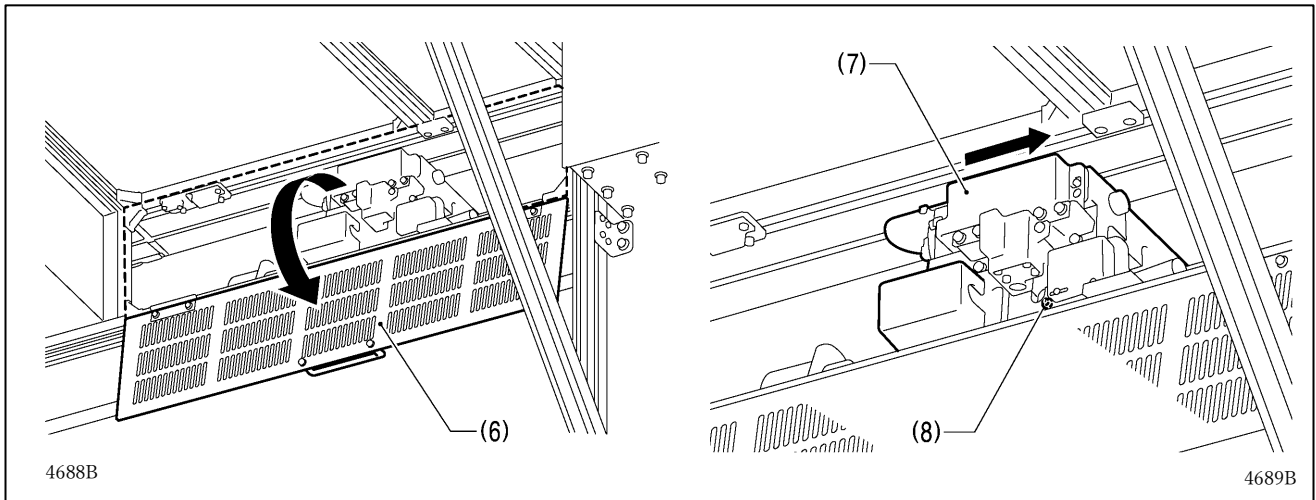
3. Applying grease to the upper shaft spline nut



Push the tip of the grease gun (5) onto the grease inlet (4) and add 5 cc or more of grease. A single stroke of the grease gun (MG70) delivers 0.6 cc, so check that grease is coming out of the tip of the nozzle, and then operate the grease gun for 4.5 or more strokes. While adding the grease, operate the machine head repeatedly for several strokes to gradually draw the grease inside.

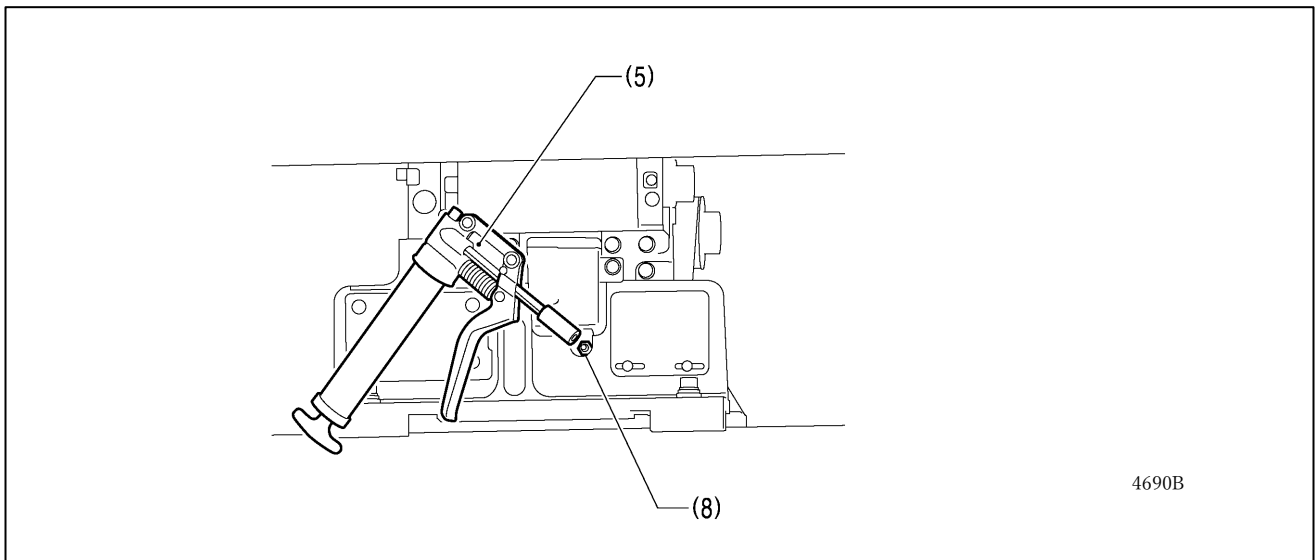
4. Install the X guide frame cover (2).

5. Moving the rotary hook base



Open the front cover (6) and move the rotary hook base (7) to a position where the grease inlet (8) can be accessed.

6. Applying grease to the lower shaft spline nut



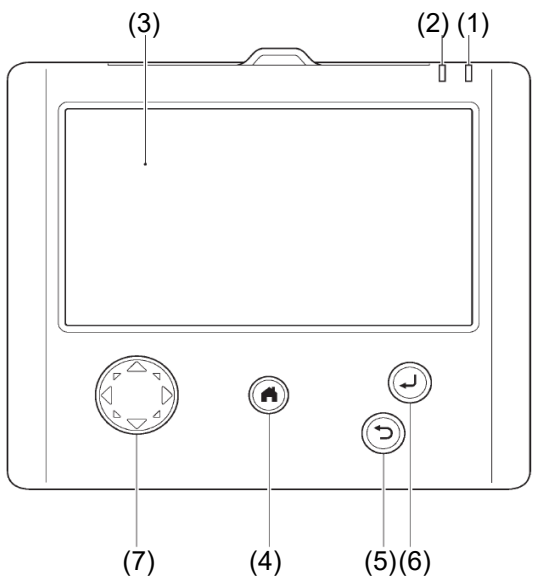
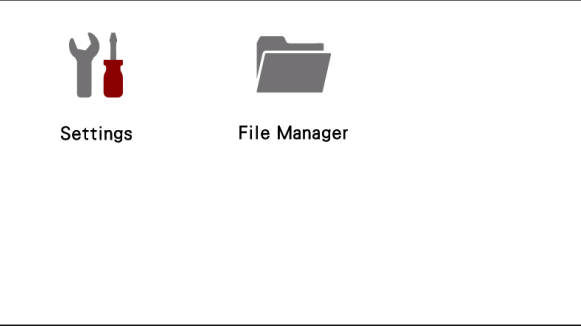
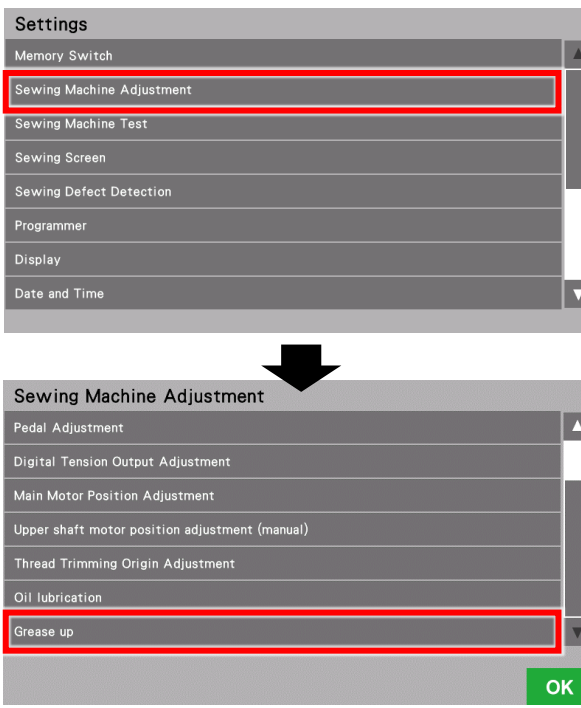
Push the tip of the grease gun (8) onto the grease inlet (5) and add 5 cc or more of grease. A single stroke of the grease gun (MG70) delivers 0.6 cc, so check that grease is coming out of the tip of the nozzle, and then operate the grease gun for 4.5 or more strokes. While adding the grease, operate the rotary hook base repeatedly for several strokes to gradually draw the grease inside.

7. Tighten the front cover(6).

6. CLEANING

<Grease-up counter initialization method>

After applying grease, carry out the procedure given below to initialize the cumulative number of stitches up to when the grease was applied.

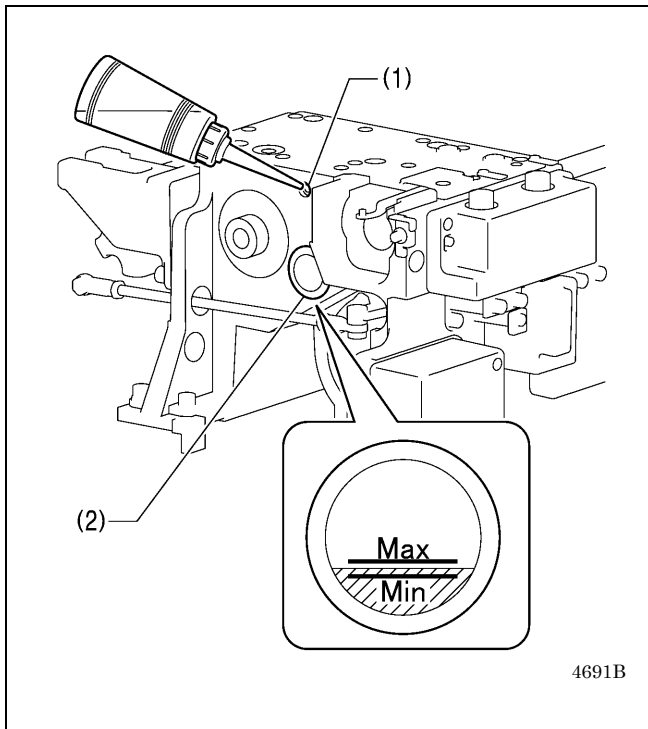
1		Turn off the power for the sewing machine.
2		While pressing the HOME key (4) and the ENTER key (6), turn on the power switch. Keep holding down the HOME key (4) and the ENTER key (6) until the home screen is displayed.
3		When the screen shown at left appears, release the keys.
4		Touch Settings → Sewing Machine Adjustment → Grease up.

<p>5</p>	<p>Grease up</p> <p>Press OK key after grease up has been completed.</p> <p>Cancel OK</p> <p>↓</p> <p>Grease up</p> <p>The grease up counter has been reset successfully.</p> <p>OK</p> <p>If you touch OK in the screen shown at left, the grease up counter will be initialized.</p>
<p>6</p>	<p>After the initialization is complete, turn off the power.</p>

6-9. Adding gearbox lubricating oil

<Adding lubricating oil>

Use only the lubricating oil specified by Brother.
Ask the place of purchase for details on obtaining this item.



1. Push the tip of the oiler against the oil feeding pocket(1) at the left side of the rotary hook base to add oil.

When the oil level is in between the two reference lines in the oil gauge window(2) below the oil feeding pocket, the correct amount of oil has been added.

[NOTE]

- If the oil level is below the lower reference line, operating problems such as motor seizure may result.
- Do not allow the oil level to go past the top reference line. Oil leaks may occur during sewing machine operation.

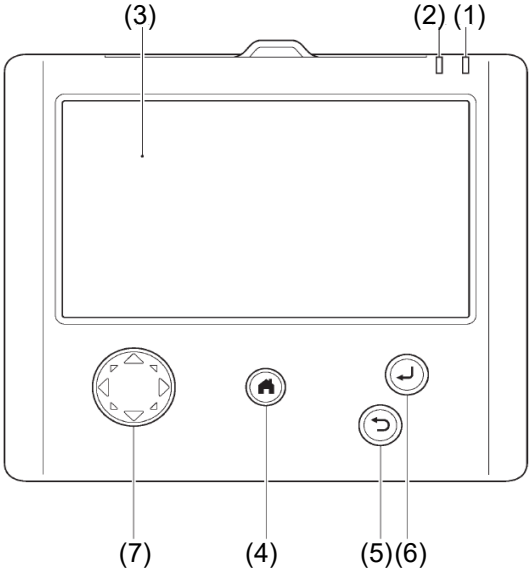

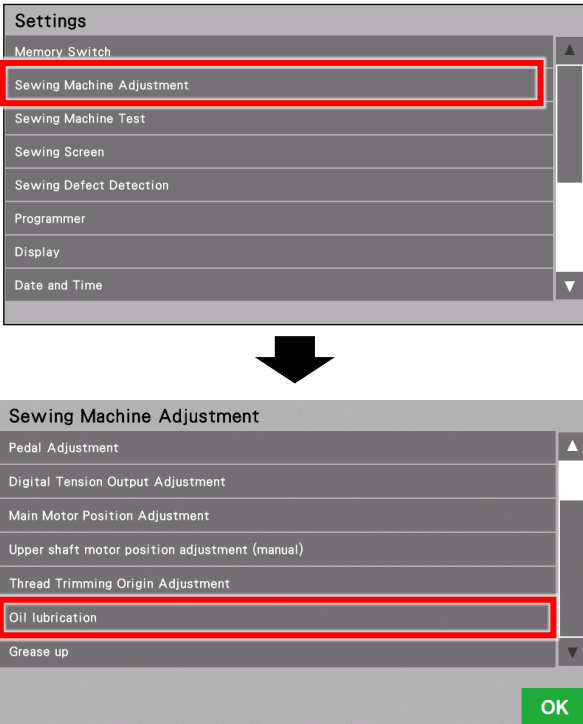
2. After adding oil, carry out the initialization operation.

[NOTE]

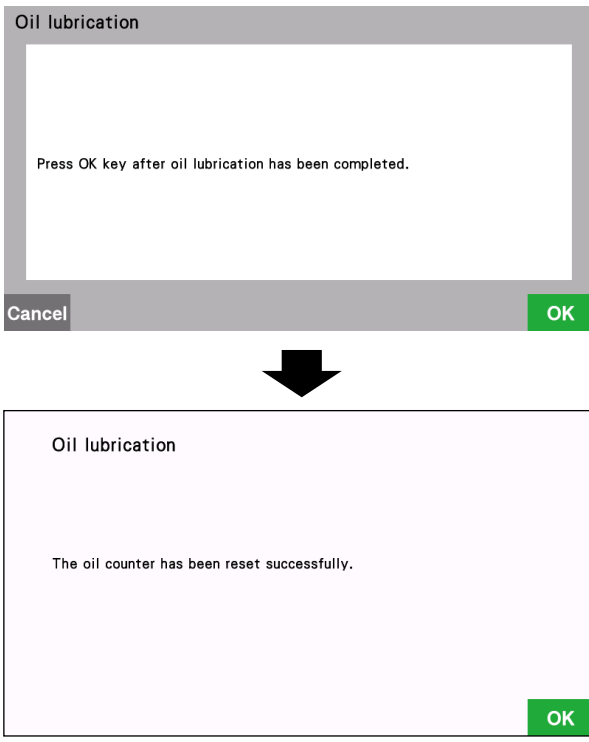
If you continue to use the sewing machine after carrying out the initialization procedure but without adding oil, problems with the sewing machine may result.

<Oil lubrication counter initialization method>

After adding oil, carry out the procedure given below to initialize the cumulative number of stitches up to when the oil was added.

1		Turn off the power for the sewing machine.
2		<p>While pressing the HOME key (4) and the ENTER key (6), turn on the power switch.</p> <p>Keep holding down the HOME key (4) and the ENTER key (6) until the home screen is displayed.</p>
3		When the screen shown at left appears, release the keys.
4		Touch Settings → Sewing Machine Adjustment → Oil lubrication.

6. CLEANING

5	 <p>Oil lubrication</p> <p>Press OK key after oil lubrication has been completed.</p> <p>Cancel OK</p> <p>Oil lubrication</p> <p>The oil counter has been reset successfully.</p> <p>OK</p>	If you touch OK in the screen shown at left, the oil lubrication counter will be initialized.
6	After the initialization is complete, turn off the power.	

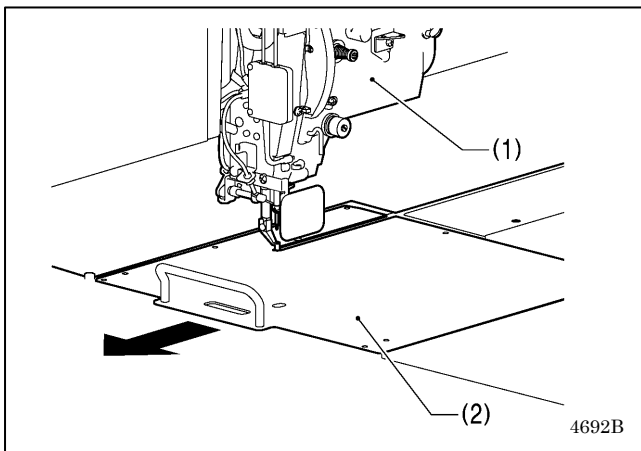
7. STANDARD ADJUSTMENTS

⚠ CAUTION

- ⊘ Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
- ⚠ Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.
- ⚠ Turn off the power switch and disconnect the power cord before carrying out the following operations.
If this is not done, the sewing machine may operate if a switch is pressed by mistake, which could result in serious injury.
 - Inspection, adjustment and maintenance
 - Replacing consumable parts such as the rotary hook
- ⚠ Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.
- ⚠ If the power switch and air need to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
- ⊘ Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result.
Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.
Keep the oil out of the reach of children.
- ⚠ If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.

Carry out the following adjustments with the machine head lowered.

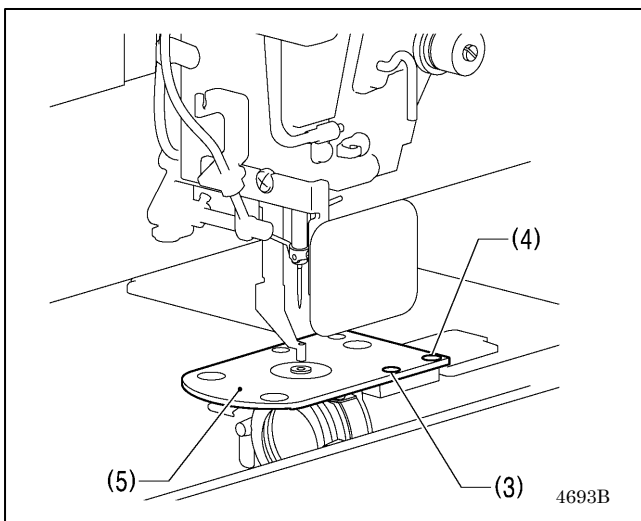
7-1. Preparing the rotary hook for maintenance



When carrying out adjustments in the area around the rotary hook, first switch [Digital Adjustment > Maintenance] (refer to "7-4. Needle bar and rotary hook adjustment using the digital adjustment function") on the panel and follow the instructions on the screen to the left edge.

Next, pull the auxiliary plate (2) at the front of the machine head (1) in the direction of the arrow to remove it.

* When the machine head moves to the left end, it will rise up.



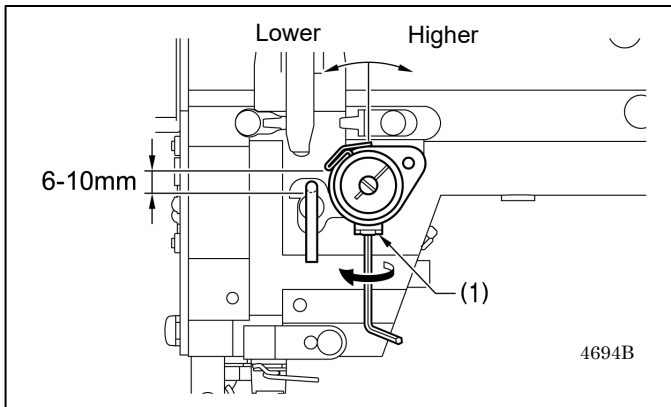
Next, remove the two screws (3) and the two flat screws (4), and then remove the needle plate (5).

Applicable tasks: Adjusting the needle and rotary hook timing
Acquiring the reference position for the needle, driver and rotary hook
Adjusting the driver (needle guard) position
Adjusting the clearance between the needle and rotary hook tip
Adjusting the shuttle race thread guide
Replacing the movable knife and fixed knife

7. STANDARD ADJUSTMENTS

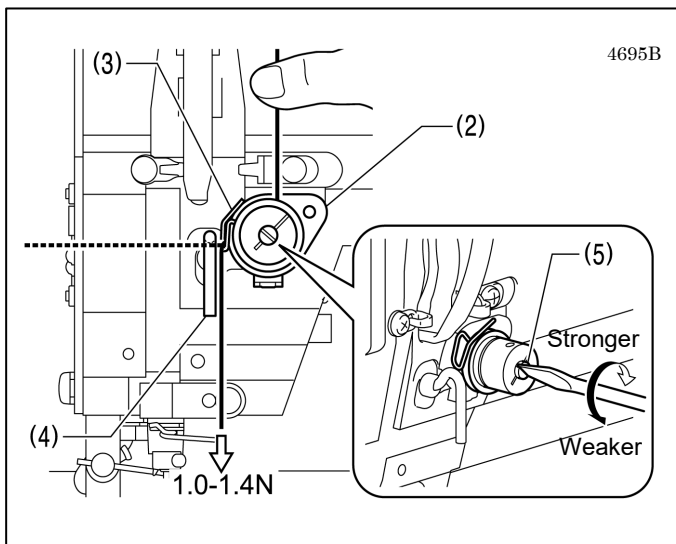
7-2. Thread take-up spring

Thread take-up spring height (mm)	6 - 10
Thread take-up spring tension (N)	1.0 - 1.4



<Thread take-up spring height>

Loosen the set screw (1) and turn the adjuster to adjust.



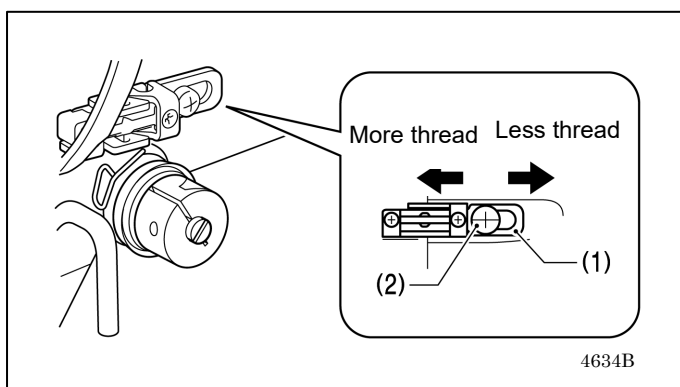
<Thread take-up spring tension>

1. Press the upper thread slightly above the tension bracket (2) with a finger to stop the thread spooling out.
2. Pull the upper thread downward so that the thread take-up spring (3) is extended to the same height as the base of the thread guide arm (4), and then measure the tension of the thread take-up spring (3).
3. Use a screwdriver to turn the tension stud (5) in order to adjust the tension of the thread take-up spring (3).

[NOTE]

If the thread tension spring (3) is not adjusted correctly, the upper thread trailing length will be uneven after thread trimming.

7-3. Adjusting the position of the upper thread tension sensor



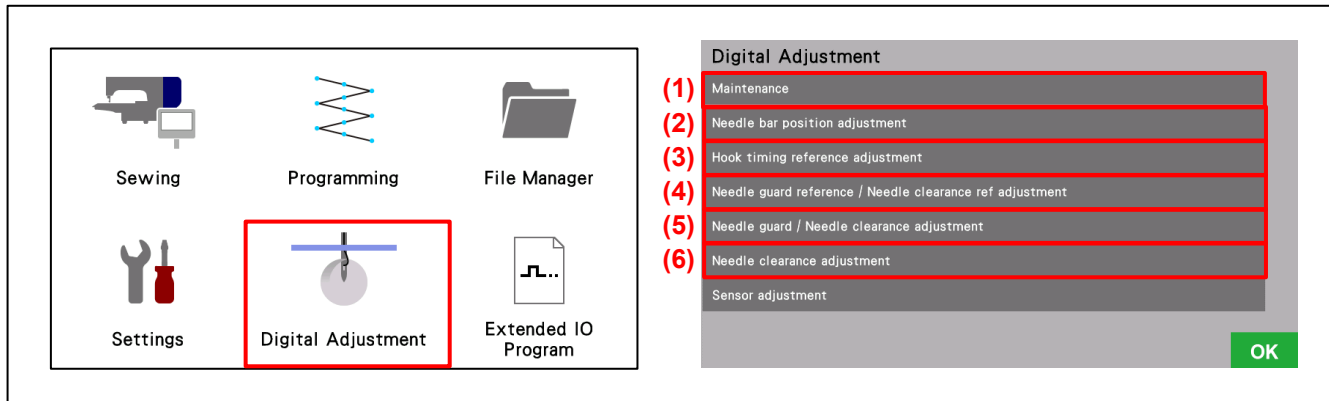
To adjust the position, loosen the screw (2) and then move the upper thread tension sensor (1).

When sewing heavy-weight material, move the upper thread tension sensor (1) to the left. (The thread take-up amount will increase.)

When sewing light-weight material, move the upper thread tension sensor (1) to the right. (The thread take-up amount will decrease.)

7-4. Needle bar and rotary hook adjustment using the digital adjustment function

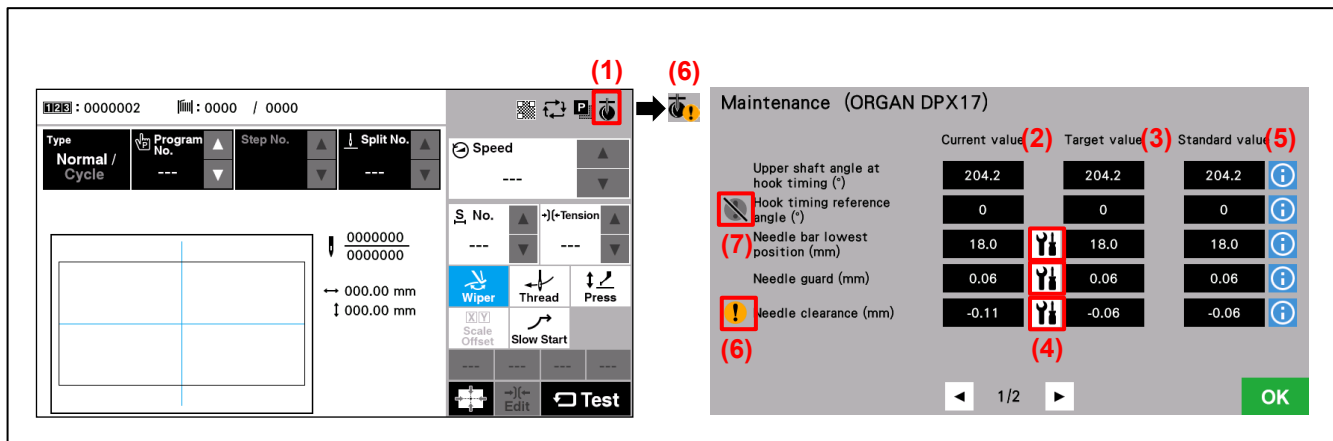
The needle bar and hook can be adjusted using the digital adjustment on the home screen.



(1) Maintenance	7-4-1. Checking method for adjustment status
(2) Needle bar position adjustment	7-4-2. Adjusting the needle bar position
(3) Standard timing adjustment	7-4-3. Adjusting the needle and rotary hook timing
(4) Needle guard and needle clearance standard adjustment	7-4-4. Acquiring the reference position for the needle, driver and rotary hook
(5) Needle guard and needle clearance adjustment	7-4-5. Adjusting the driver (needle guard) position 7-4-6. Adjusting the clearance (needle clearance) between the needle and rotary hook tip
(6) Needle clearance adjustment	7-4-6. Adjusting the clearance (needle clearance) between the needle and rotary hook tip

7-4-1. Checking method for adjustment status

You can check the adjustment condition of the needle bar and rotary hook by looking at [Maintenance] under "Digital adjustment", or by touching the maintenance mark (1) on the sewing screen.



The current value (2) displays the current adjustment status based on sensor information.

- * The values displayed by the maintenance mark show the information which was last obtained by the sensors since the machine was started.
- * The sensor information is acquired when sewing is completed, when various adjustments are performed using digital adjustment, and when the maintenance screen is displayed from digital adjustment on the home screen.

The target value (3) can be set by the user as desired. It can be changed using the change button (4). For how to change the target values for [Upper shaft angle when the needle and rotary hook meet] and [The needle and rotary hook timing standard angle], please refer to "7-4-3. Adjusting the needle and rotary hook timing".

- * The change button will not be displayed on the maintenance mark.

The standard value (5) is the target value recommended by the manufacturer and is displayed as a reference.

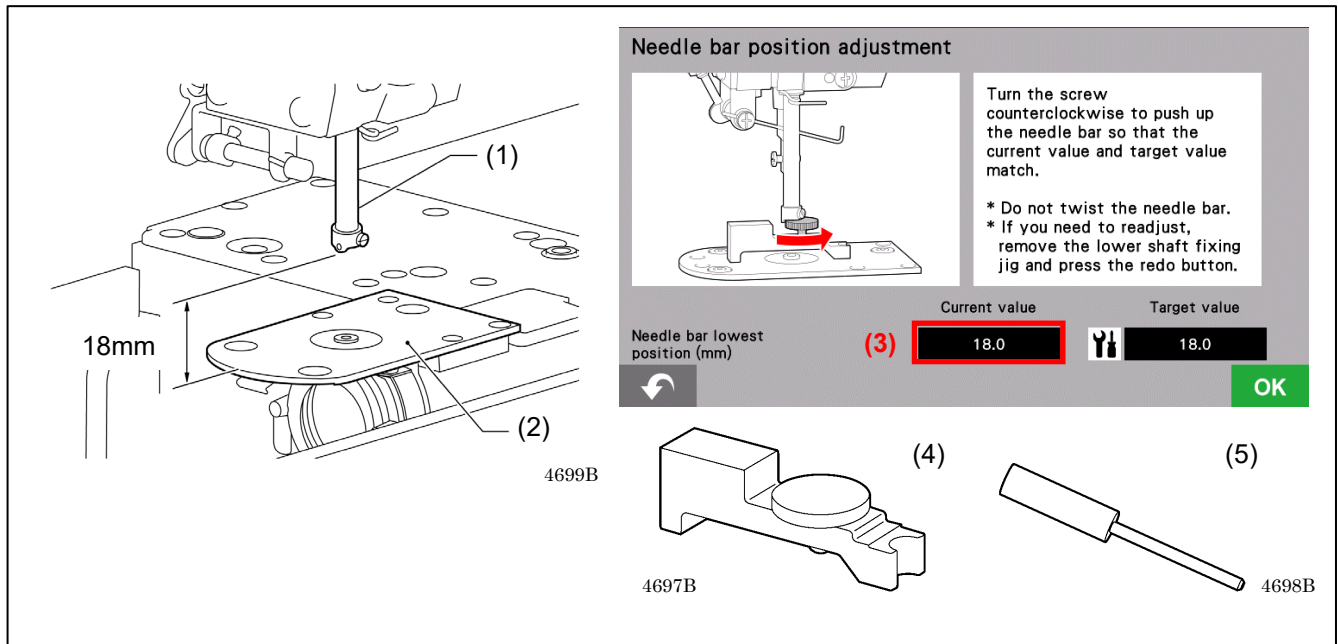
If the current values exceed the target value thresholds which have been set using the [memory switch setting], a warning icon (6) will be displayed.

If the sensing function is disabled in the [memory switch setting], the sensing disabled mark (7) will be displayed.

7. STANDARD ADJUSTMENTS

7-4-2. Needle bar position

Adjust the position of the needle bar while following the panel flowchart in "Needle bar position adjustment" under "Digital adjustment".



The distance from the base of the needle bar to the needle plate (2) when the needle bar (1) is at its lowest position is displayed on the panel. The standard adjustment target value by the manufacturer is 18 mm (ORGAN DP×17). Use the <Needle bar adjustment tool assembly (SC5692-001)> (3) and <Lower shaft fixed shaft (SC5693-001)> (4) as the adjustment tools.

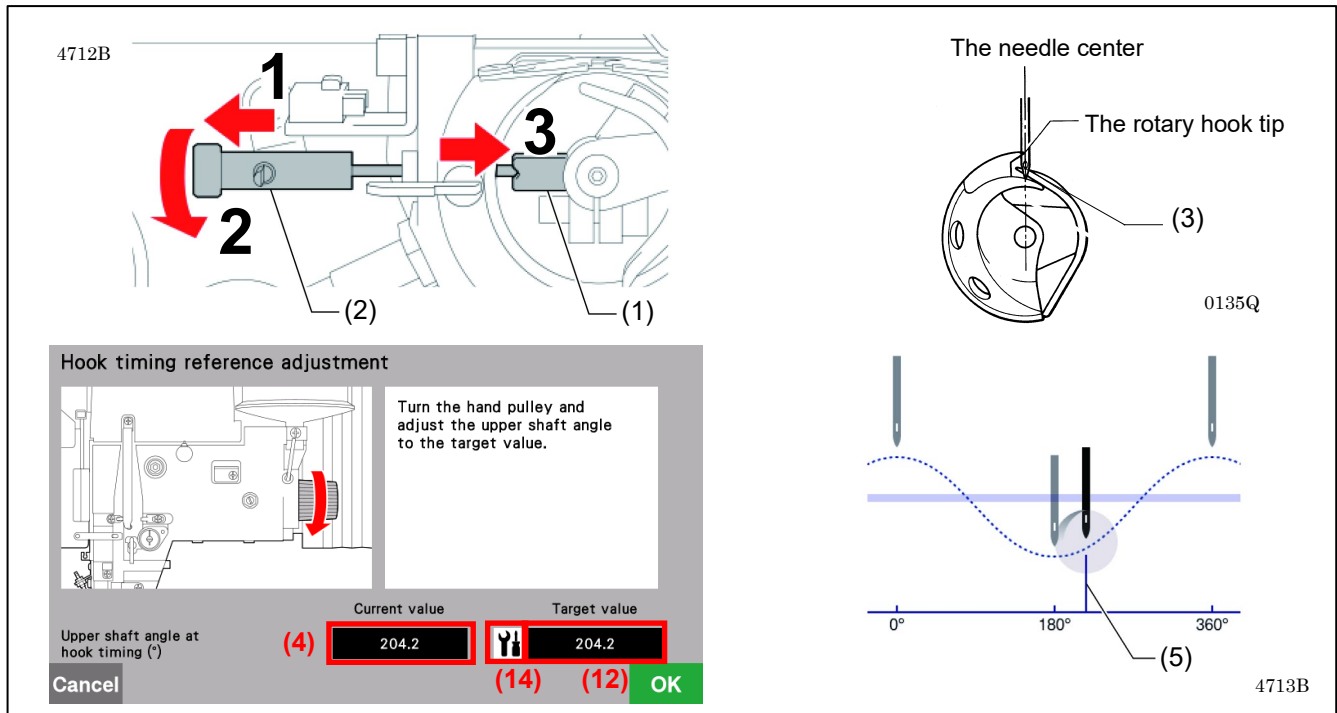
* If you carry out adjustment of the needle bar position without following the panel flowchart, damage may result.

If the lowest position for the needle bar diverges by more than ± 0.4 mm (can be varied using memory switch) from the target value during sewing, a warning icon will be displayed on the sewing screen and the maintenance screen.

* If using a DP×5 needle, the warning mark display will not work when using the digital adjustment function to carry out [needle bar position adjustment].

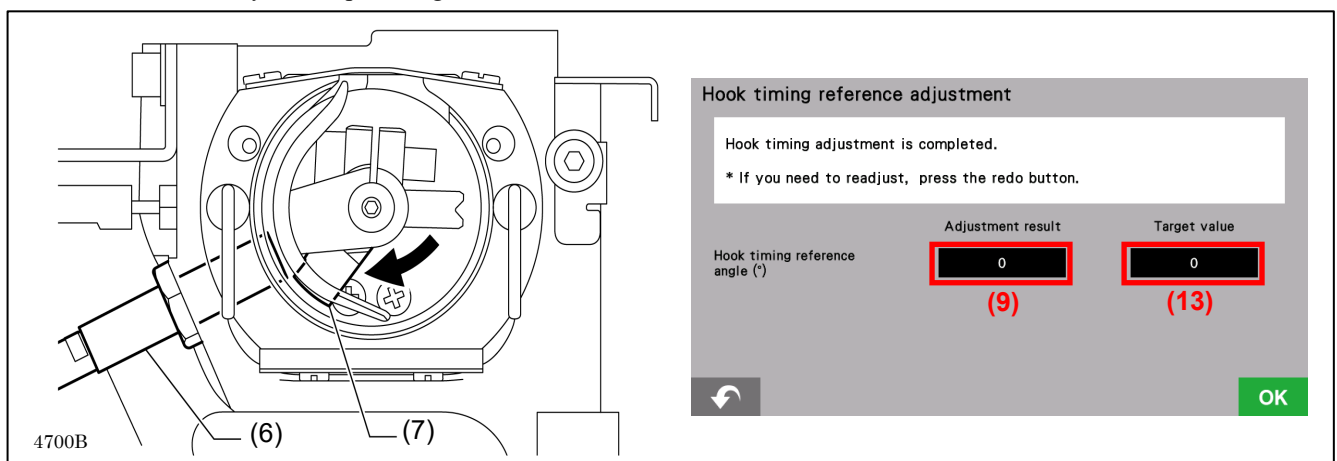
7-4-3. Adjusting the needle and rotary hook timing

Adjust the timing of the needle and rotary hook while following the panel flowchart in "Standard timing adjustment" under "Digital adjustment".



When the driver (1) is provisionally secured using the index plunger (2), driver can be secured in the position where the needle center and the rotary hook tip are aligned (needle and rotary hook meet) (3). In this condition, adjust the position of the needle when it meets the rotary hook by changing the angle* (4) of the upper shaft.

- * Angle (5) of vertical needle movement position when highest needle position is 0°. The standard adjustment target value by the manufacturer is when the needle center is aligned with the rotary hook tip when the upper shaft angle is 204.2° (ORGAN DPx17).
- * If you are using anything other than the <Shuttle hook LH (SA8197-101)>, the standard timing adjustment using [Standard timing adjustment] is not supported. Set the upper shaft angle to 204.2° and fix the driver so that the needle center and the rotary hook tip are aligned.



Operate the sewing machine to rotate the driver, and make a note of the upper shaft angle at the point when the sensor (6) detects the projection (7) on the driver (when the sensor reacts).

The difference between [The upper shaft angle at the moment when the sensor (6) detects the protrusion (7) of the driver] and [Upper shaft angle at the time of sensor reaction when the upper shaft angle at hook timing has been adjusted to the standard value (204.2°) (8) (Pre-obtained in digital adjustment > sensor adjustment > hook timing reference sensor)] is displayed as the adjustment result of the hook timing reference angle (9) and the current value of hook timing reference angle on the maintenance screen (10).

The standard value for the hook timing reference angle is 0° (11). The standard state is the rotation phase of the hook when the target value (12) of the [Upper shaft angle at hook timing] on the upper shaft angle adjustment screen of the [hook timing reference adjustment] is set to the standard value (204.2°) (8).

The target value (13) for the hook timing reference angle is the amount of change from the standard state of the rotational phase of the hook when the target value (12) of the [upper shaft angle at hook timing] is altered.

7. STANDARD ADJUSTMENTS

If the standard needle and rotary hook timing during sewing varies by more than $\pm 2^\circ$ (can be varied using memory switch) from the target value, a warning icon will be displayed on the sewing screen and the maintenance screen.

Maintenance (ORGAN DPX17)

	Current value	Target value (12)	Standard value (8)
Upper shaft angle at hook timing (°)	204.2	204.2	204.2
Hook timing reference angle (°) (10)	0	0 (13)	0 (11)
Needle bar lowest position (mm)	18.0	18.0	18.0
Needle guard (mm)	0.06	0.06	0.06
Needle clearance (mm)	-0.11	-0.06	-0.06

1/2 OK

Maintenance (ORGAN DPX17)

	Current value	Target value (12)	Standard value (8)
Upper shaft angle at hook timing (°)	204.2	204.2	204.2
Hook timing height (mm)	---	2.8 (15)	2.8
Needle bar lowest position (mm)	18.0	18.0 (17)	18.0
Upper thread loop catching position (18)	Target value is standard		
Upper thread loop size	Target value is standard		
Thread tightening unevenness condition	Target value is standard		

2/2 OK

(13)

The target value (12) for the upper shaft angle when the needle and rotary hook meet can be changed using the change button (14) in the upper shaft angle adjustment screen "when adjusting the standard timing", or by referring to page 2 of "Maintenance" under "Digital adjustment" (refer to "7-4-1. Checking method for adjustment status").

When the target value (15) for the meeting height* is changed, the target value (12) for the upper shaft angle at the meeting point and the target value (13) for the meeting timing reference angle are also changed in conjunction.

* The amount of needle rise from the lowest point of the needle bar to the meeting point (when the needle center and the rotary hook tip are aligned) (16)

The differences from when the adjustments have been made to the standard values for the supplementary position for the upper thread loops, the size of the upper thread loops and the upper thread tightening (18) can be checked by a combination of the target value (15) for the height of the needle bar and the target value (17) when the needle bar is at its lowest position. Refer to the following table when setting the target values.

Table: |Difference between target value and standard value for height when needle and rotary hook meet|
 ≠ |Difference between target value and standard value for needle bar lowest position|

Height when needle and rotary hook meet Height at needle bar lowest position	Standard and target values are the same	Target value is higher than standard value	Target value is lower than standard value
Standard and target values are the same	Loop: Standard Supplementary position: Standard Tightening: Standard	Loop: Large Supplementary position: Low Tightening: Weak	Loop: Small Supplementary position: High Tightening: Strong
Target value is higher than standard value	Loop: Standard Supplementary position: Low Tightening: Standard	Loop: Large Supplementary position: Low Tightening: Weak	Loop: Small Supplementary position: High Tightening: Strong
Target value is lower than standard value	Loop: Standard Supplementary position: High Tightening: Standard	Loop: Large Supplementary position: Low Tightening: Weak	Loop: Small Supplementary position: High Tightening: Strong

Table: |Difference between target value and standard value for height when needle and rotary hook meet|
 = |Difference between target value and standard value for needle bar lowest position|

Height when needle and rotary hook meet Height at needle bar lowest position	Target value is higher than standard value	Target value is lower than standard value
Target value is higher than standard value	Loop: Large Supplementary position: Low Tightening: Weak	Loop: Small Supplementary position: Standard Tightening: Strong
Target value is lower than standard value	Loop: Large Supplementary position: Standard Tightening: Weak	Loop: Small Supplementary position: High Tightening: Strong

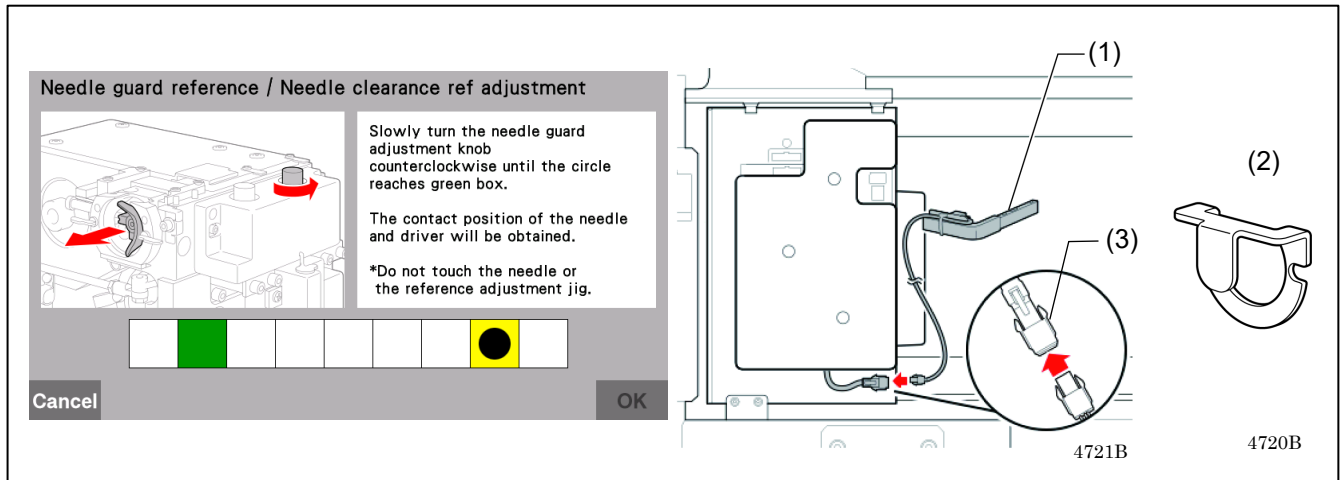
7. STANDARD ADJUSTMENTS

7-4-4. Acquiring the reference position for the needle, driver and rotary hook

Obtain the contact position (standard position) for the needle and driver and the rotary hook tip when the needle center and the rotary hook tip are aligned while following the panel flowchart in [Needle guard and needle clearance standard adjustment] under "Digital adjustment".

* Note that if the following are not satisfied, the precision of the information obtained will drop.

- Needle bar position adjustment and timing standard adjustment have been completed.
- The needle has been inserted so that it faces correctly.
- The needle is not dirty or bent.
- The rotary hook and driver are not dirty.

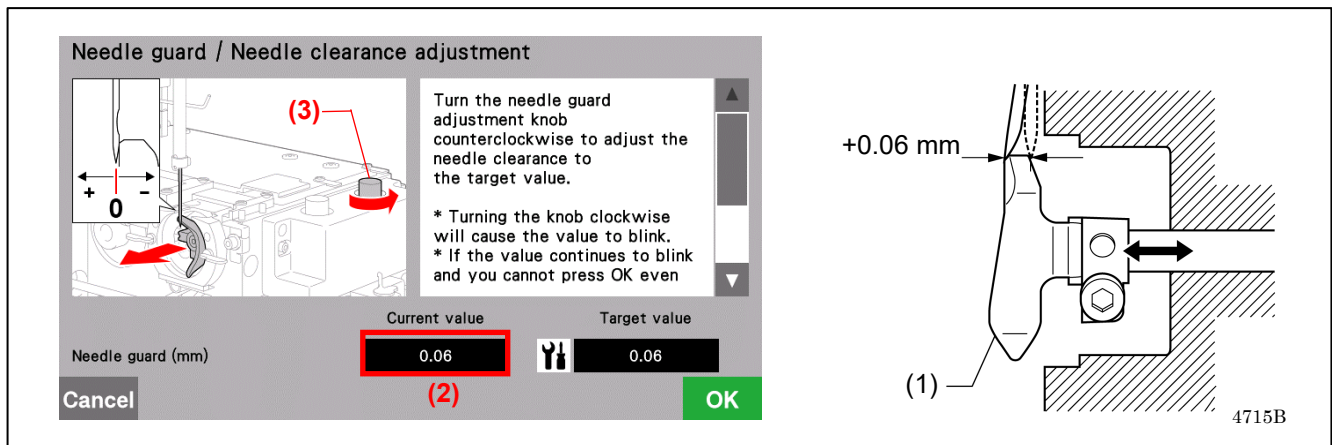


Use the <Standard timing adjustment tool (SC7675-001)> (1) and <Large rotary hook tool (SC9046-001)> (2) as the adjustment tools.

- * Always be sure to turn off the power for the sewing machine before connecting the standard timing adjustment tool to the connector (3) underneath the control box.
- * If the following have been changed, carry out the [Needle guard and needle clearance standard adjustment] again. There will be a discrepancy between the current value of the needle guard and needle clearance displayed on the panel ("7-4-5. Adjusting the driver (needle guard) position" and "7-4-6. Adjusting the clearance (needle clearance) between the needle and rotary hook tip") and the actual positions.
 - Needle count
 - Needle Manufacturer
 - Needle and rotary hook timing
 - Standard timing adjustment (needle and rotary hook timing)
 - Sensing > Sensor adjustment > Needle guard sensor AB, Needle clearance sensor AB

7-4-5. Adjusting the driver (needle guard) position

Adjust the position (needle guarding) of the driver (1) with respect to the needle when the needle center and the rotary hook tip are aligned while following the panel flowchart in [Needle guard and needle clearance adjustment] under "Digital adjustment".



The position of the driver relative to the needle is shown in panel (2).

Turn the needle guard adjustment knob (3) to adjust the position of the driver.

The target value recommended by the manufacturer is when the driver contacts the needle by 0.06mm.

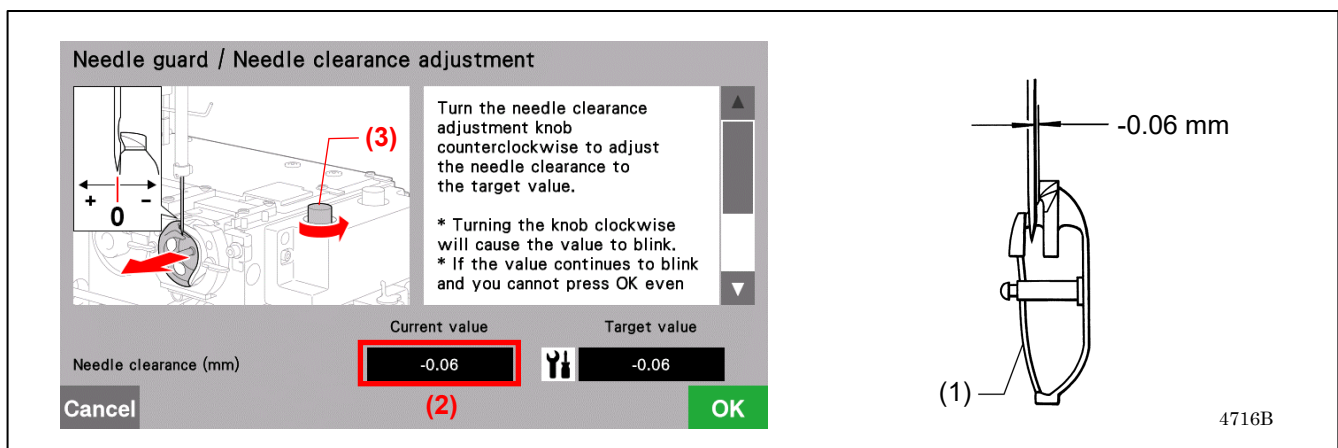
If this value varies by more than ± 0.03 mm (can be varied using memory switch setting) during sewing and when the sewing machine starts, a warning icon will be displayed on the sewing screen and the maintenance screen.

[NOTE]

If the driver crosses the needle more than necessary, it will cause problems with the thread tension. Furthermore, if it does not cross the needle at all, the tip of the rotary hook will interfere with the needle and skipped stitches may occur.

7-4-6. Adjusting the clearance (needle clearance) between the needle and rotary hook tip

Adjust the gap (needle clearance) between the needle and the inner rotary hook (1) when the needle center and the rotary hook tip are aligned while following the panel flowchart in [Needle guard and needle clearance adjustment] (or [Needle clearance adjustment] if only adjusting the needle clearance) under "Digital adjustment".



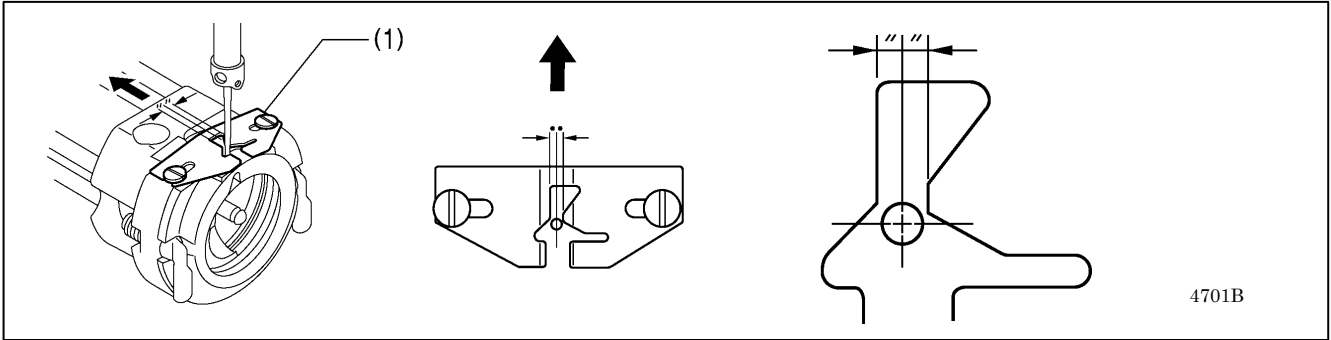
The position of the inner rotary hook relative to the needle is shown in panel (3).

Turn the needle clearance adjustment knob (3) to adjust the position of the inner rotary hook.

The target value recommended by the manufacturer is when the clearance between the needle and the rotary hook tip is 0.06mm.

If this value varies by more than ± 0.03 mm (can be varied using memory switch) during sewing and when the sewing machine starts, a warning icon will be displayed on the sewing screen and the maintenance screen.

7-5. Adjusting the shuttle race thread guide



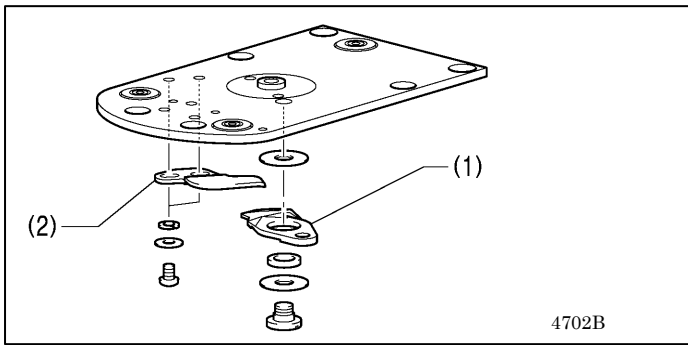
Install the shuttle race thread guide (1) by pushing it in the direction of the arrow so that the needle groove is aligned with the center of the needle plate hole.

[NOTE]

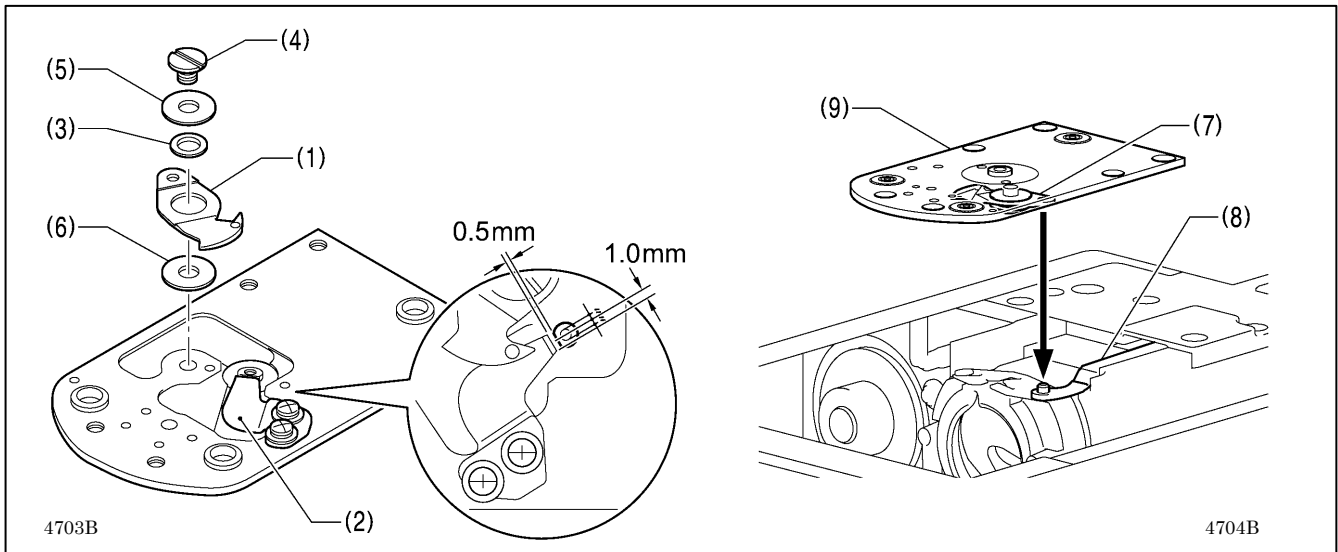
If the shuttle race thread guide (1) is in the wrong position, thread breakages, soiled thread or tangling of the thread may occur.

The position of the shuttle race thread guide (1) is adjusted at the time of shipment from the factory. It should not be changed if possible.

7-6. Replacing the movable and fixed knives

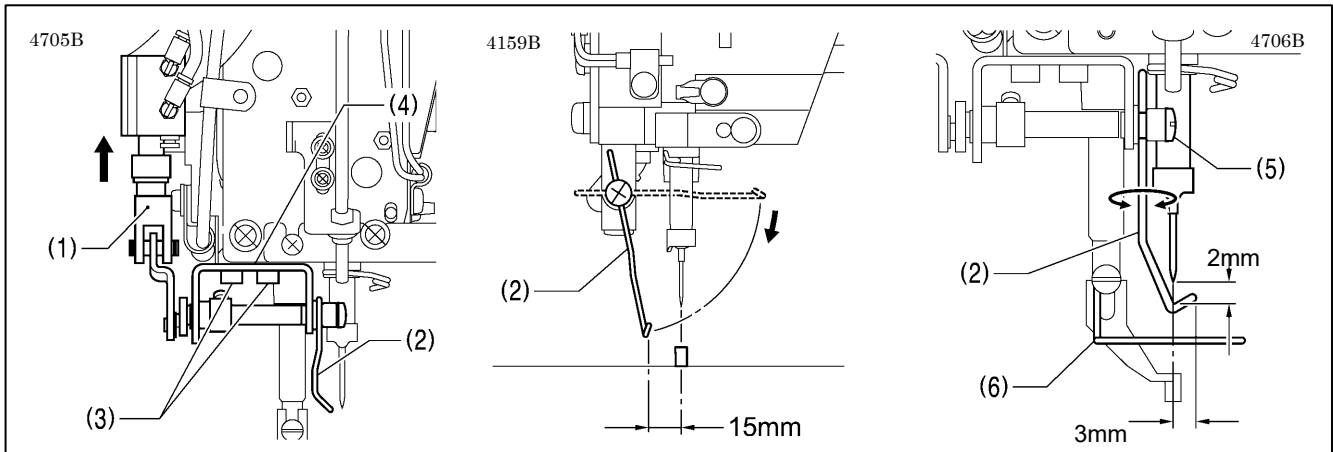


1. Remove the movable knife (1) and the fixed knife (2).



2. Install the new fixed knife (2) in the positions shown in the illustration.
3. Apply grease to the outside of the collar (3) and to the shoulder screw (4), and then install the new movable knife (1) together with the thrust washer (5) and movable knife spacer (6).
4. Check that the movable knife (1) and fixed knife (2) cut the thread cleanly. Replace the movable knife spacer with accessory spacers (10) ($t=0.2, 0.3, 0.4$) so that the knives trim the thread accurately.
 - * If the knife pressure is too weak and the thread is not completely cut, use a thinner movable knife spacer.
 - * If the knife pressure is too strong and the movable knife (1) turns stiffly, use a thicker movable knife spacer.
5. Apply grease to the pin (7) of the movable knife, insert it into the hole in the movable knife connecting plate (8), and then install the needle plate (9).
6. Check that the needle is aligned with the center of the needle hole.

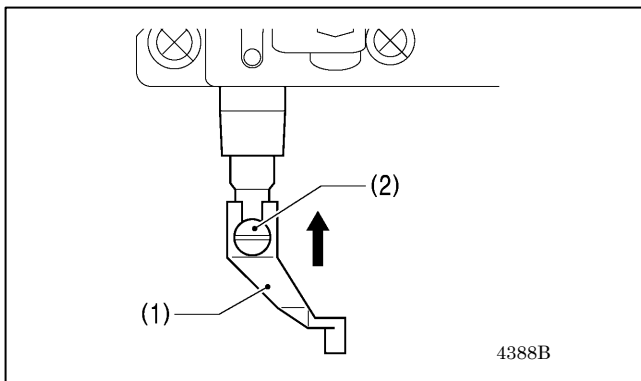
7-7. Adjusting the thread wiper



1. Loosen the two screws (3) and move the thread wiper shaft bracket (4) to the left or right to adjust so that the thread wiper (2) is 15 mm to the left of the needle center when the cylinder (1) operates until it is pulled out to its full stroke.
2. Loosen the screw (5) and adjust the position of the thread wiper (2) so that the distance from the thread wiper to the tip of the needle is approximately 2 mm and the tip of the thread wiper (2) is approximately 3 mm from the center of the needle when the thread wiper (2) passes below the needle during operation.

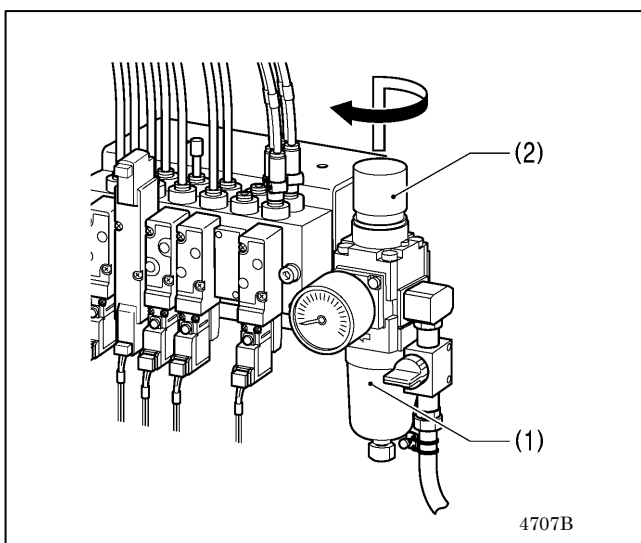
[NOTE] Check that the thread wiper (2) does not touch the finger guard (6).

7-8. Intermittent presser foot installation position



With the intermittent presser foot (1) pushed up to its highest position, install it with the screw (2).

7-9. Adjusting the air pressure



Lift up the handle (2) of the regulator (1) and then turn it to adjust the air pressure to 0.5 MPa. After adjustment is complete, push the handle (2) downward to lock it.

8. USING THE LCD PANEL (BASIC OPERATIONS)



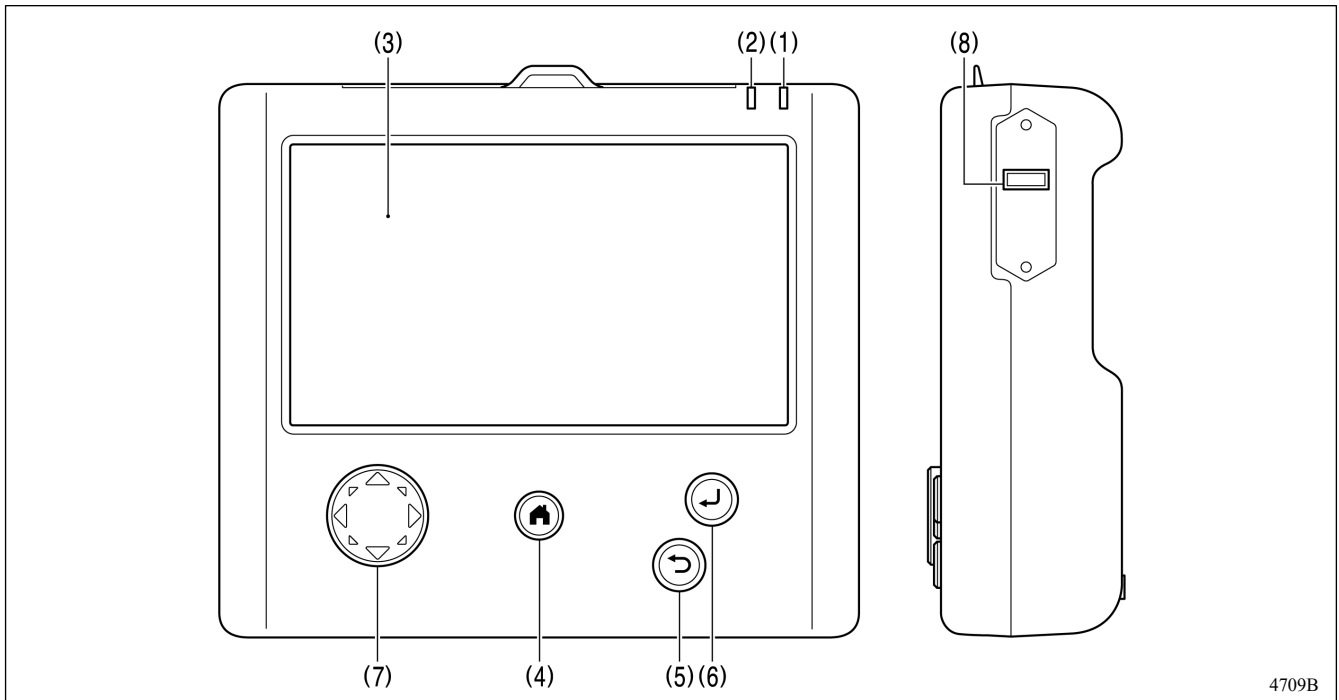
CAUTION



To prevent problems, do not use objects with sharp points to operate the LCD panel.

8-1. Name and function of each LCD panel item

8-1-1. Main names and functions



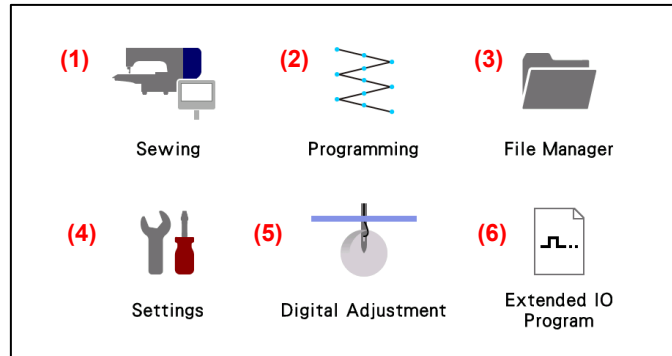
4709B

(1) Power indicator	Illuminates when the power is turned on.
(2) Caution indicator	Illuminates when an error occurs.
(3) LCD/touch panel	This displays messages and touch keys (icons).
(4) HOME key	This key is used to return to the home screen.
(5) BACK key	This key is used for operations such as returning to the previous step and canceling settings.
(6) ENTER key	This key is used for operations such as confirming settings.
(7) JOG key	This key is used when programming sewing data.
(8) USB port×2	Connect USB media or other device.

8. USING THE LCD PANEL (BASIC OPERATIONS)

8-1-2. Home screen

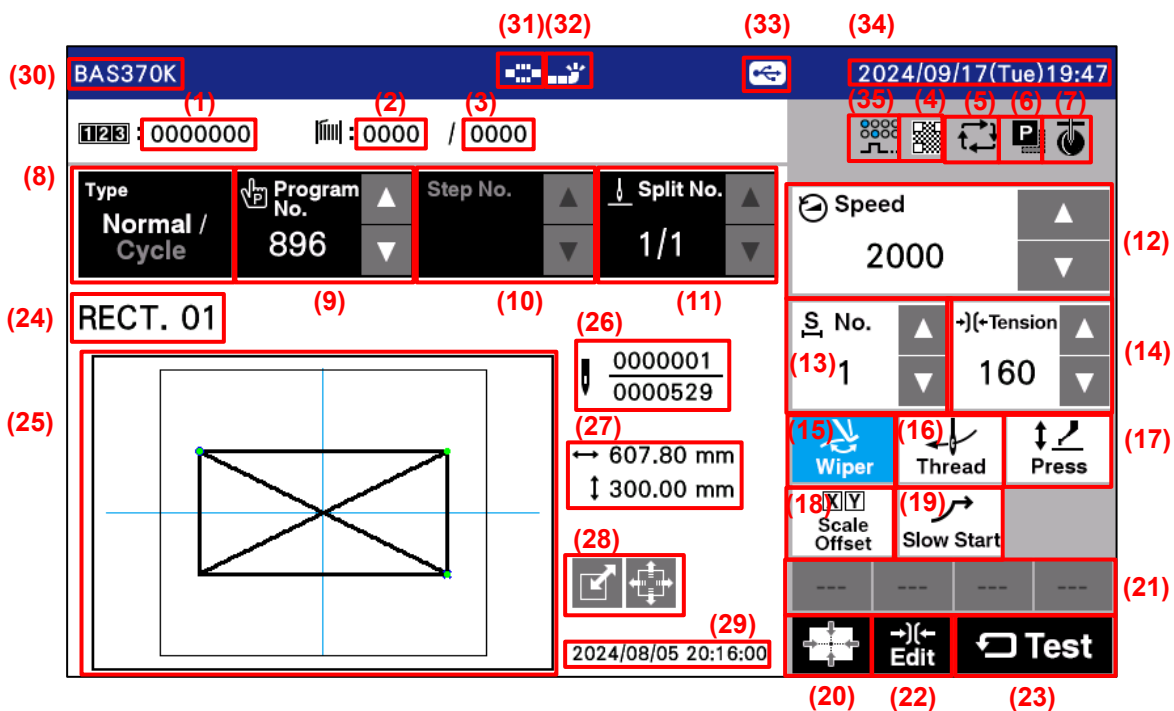
Press the HOME key to display the [home screen].



(1) Sewing key	Touch to switch to the [sewing operation screen].
(2) Programming key	Touch to switch to the [programming screen].
(3) File Manager key	Touch to switch to the [file manager screen].
(4) Settings key	Touch to switch to the [setting menu screen].
(5) Digital adjustment key	Touch to switch to the [digital adjustment setting screen].
(6) Extended I/O Program Key	Touch to switch to the [Extended I/O Program Screen].

8-1-3. Sewing operation screen

- When the power is turned on while the LCD panel is connected to the sewing machine, this screen is displayed automatically.
- If any other screen is being displayed, touch the sewing key in the home screen to display this screen.



(1) Production counter key	This shows the production counter value. If you keep pressing this key, the display switches to the setting menu screen.
(2) Bobbin thread counter key	This shows the bobbin thread counter value. If you keep pressing this key, the display switches to the setting menu screen.
(3) Bobbin thread setting key	Displays the bobbin thread setting value. If you keep pressing this key, the display switches to the setting menu screen.
(4) QR code	Displays information on the sewing machine as a QR code.

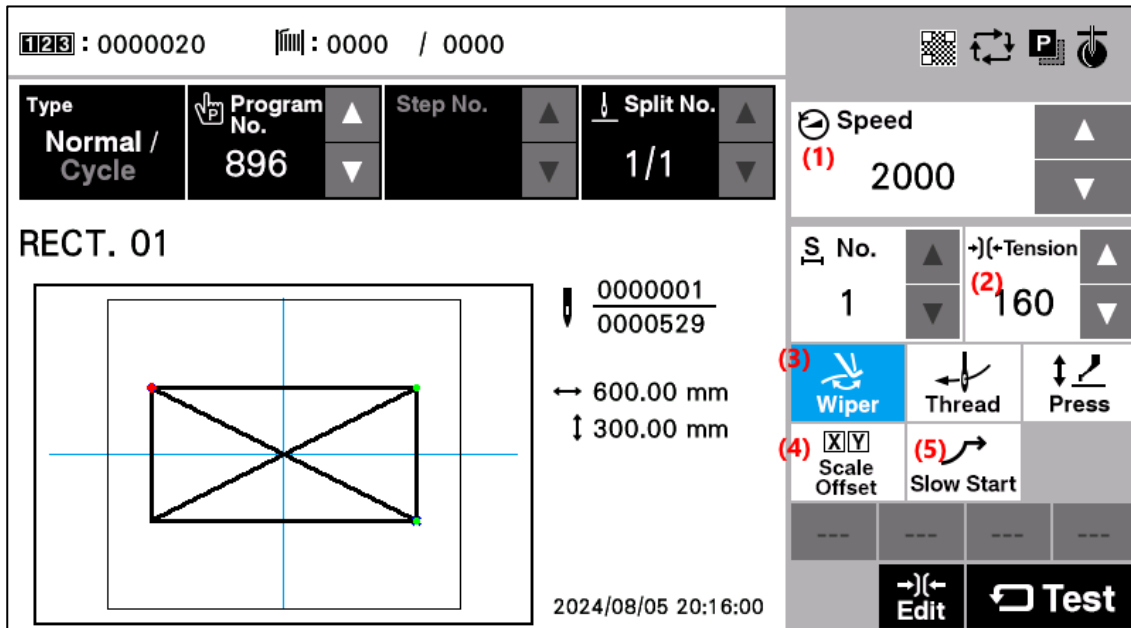
8. USING THE LCD PANEL (BASIC OPERATIONS)

(5) Cycle program key	Touch to switch to the cycle program editing screen.
(6) Copy key	Touch to switch to the sewing program copying screen.
(7) Maintenance key	Changes the screen to the maintenance information screen.
(8) Type key	Touch to select the program type.
(9) Program No. keys	Touch to display/select the current program number.
(10) Step No. keys	Touch to display/select the current step number.
(11) Split No. keys	Touch to display/select the current split number.
(12) Speed keys	Touch to display/select the sewing speed.
(13) Section No. key	Touch to display/select the section number for the digital tension. These are not displayed when digital tension is not being used.
(14) Tension key	Touch to display/select the digital tension value. These are not displayed when digital tension is not being used.
(15) Wiper key	Touch to switch the thread wiper on/off.
(16) Thread key	Touch to switch to the threading screen.
(17) Press key	Touch to switch to the Adjust Press Height setting screen.
(18) Scale Offset key	Touch to switch to the Scale/Offset setting screen.
(19) Slow Start key	Touch to switch to the Slow Start setting screen.
(20) Direct selection key	You can register normal/cycle program numbers into each of these keys. When you keep pressing a key, the program assigned to that key is selected.
(21) Start position move key	The feed moves to the start point of the sewing data.
(22) Edit key	Touch to switch to digital tension editing mode. This is not displayed when digital tension is not being used.
(23) Test key	Touch to switch to test mode.
(24) Comments	Shows comments about the sewing data.
(25) Preview	Shows a preview of the sewing data.
(26) Current stitch number / Total number of stitches	Shows the current stitch number and the total number of stitches.
(27) Sewing area size	Shows the size of the sewing data area.
(28) Scale/Offset key	This is displayed when the Scale/Offset setting values have been changed from the default setting values. Touch the key to display the setting value.
(29) Sewing data information	Shows information about the sewing data.
(30) Model name	Shows the model name and specifications.
(31) Skipped stitch detection function	Shows the skipped stitch detection function enabled or disabled.
(32) Thread breakage detection function	Shows the thread breakage detection function enabled or disabled.
(33) External media	Displayed when external media is connected to the USB port.
(34) Date and time	Shows the current date and time.
(35) Extended IO check key	Touch to switch to the extended IO check screen.

8-2. Parameter setting method

Parameter settings are made at the [sewing operation screen].

- * For details on the sewing data reading method, refer to "10. Using storage media".
- * For details on memory switch setting methods, refer to "9-1. Memory switch setting method".



Sewing speed

Use the “Speed” Δ and ∇ keys (1) to make the setting.

- Setting range: 200 sti/min to Refer to the table below.
100 sti/min units Initial value: 2,000 sti/min

Table: Maximum speed for each model

BAS-365K	2700 sti/min
BAS-370K	2500 sti/min

Digital tension

Touch the “Tension” Δ or ∇ keys (2) to change the tension value.

- Setting range: 0 to 500 Initial value: 160

Thread wiping

Touch the “Wiper” key (3) to turn the wiper on or off. (The initial value varies for each model and specification.)
When the setting is on, the key is displayed in blue.

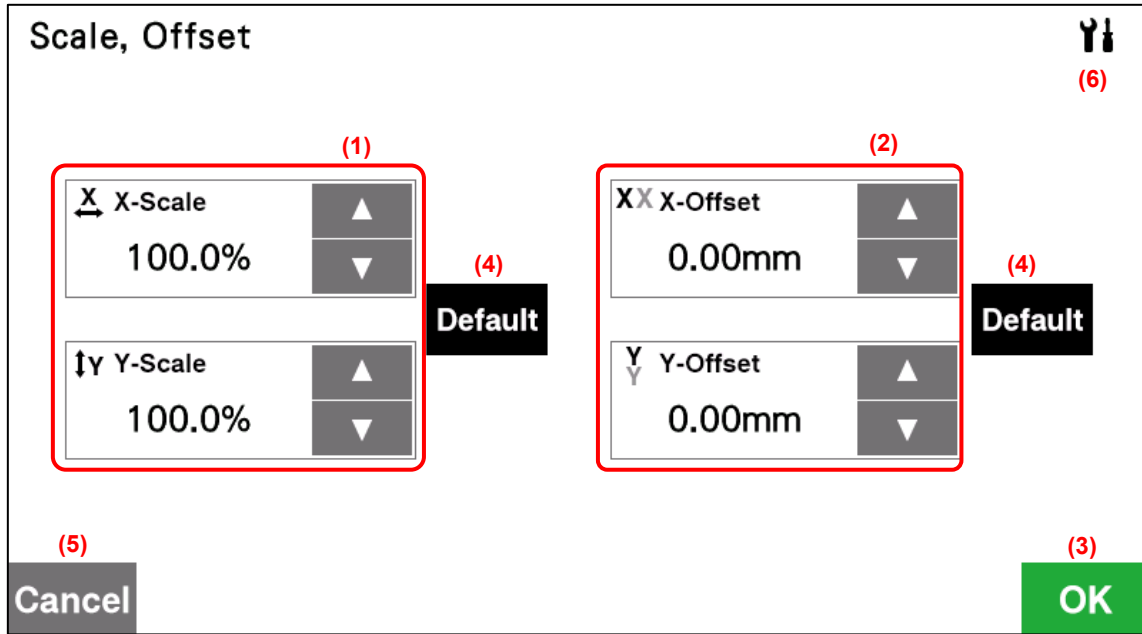
8-2-1. X/Y-scale, X/Y-offset

Touch the “Scale Offset” key (4) in the sewing operation screen to display the X/Y-scale and X/Y-offset setting screen.

Use when you would like to enlarge, reduce or move the pattern without changing the sewing data.

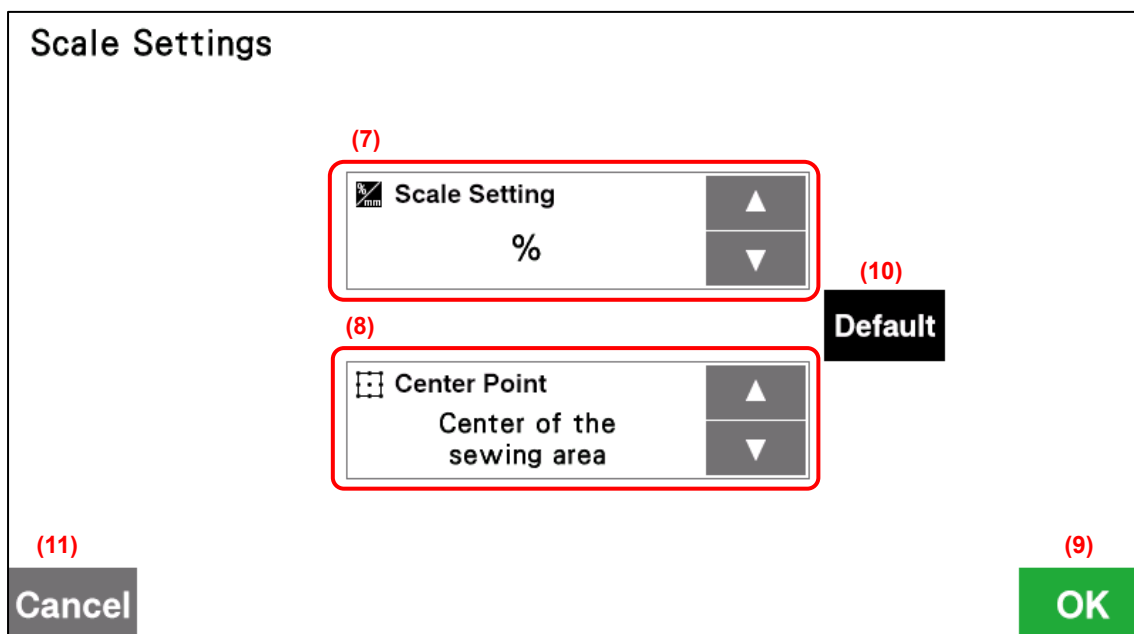
- * When memory switch no. 400 is set to ON, the X-scale, Y-scale, sewing speed and work clamp height can be recorded separately for each program number.

[X/Y-scale and X/Y-offset screen]



(1) X/Y-scale (X-Scale, Y-Scale)	Limited by available sewing area. Setting range: 0 to 400%, 0.1% units, initial value: 100%
(2) Offset (X-Offset, Y-Offset)	When activating the offset, first carry out home position detection (*). Setting range: 0 to sewing machine area size, 0.05 mm units Initial value: 0 mm
(3) OK key	Touch to confirm the setting and return the display to the previous screen. It cannot be touched if the data is outside the sewing area as a result of enlarging or moving it parallel.
(4) Default key	Touch to return the setting to the initial value.
(5) Cancel key	Touch to return to the previous screen without changing the setting.
(6) Setting key	Touch to display the screen for setting the center point for scaling and the display units (% or mm).

[Scale setting screen]

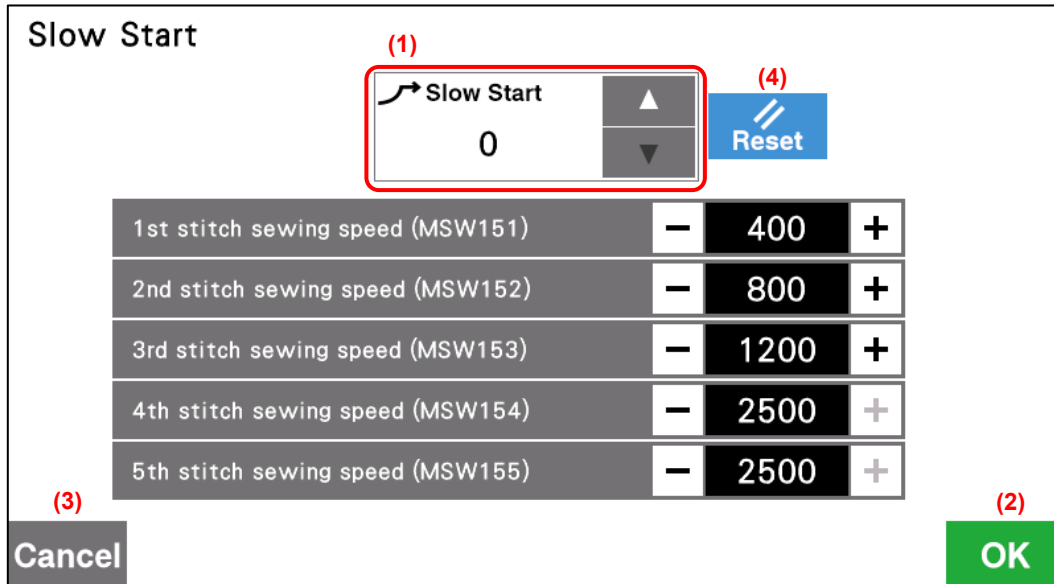


(7) Scale setting units	Touch to change the scaling units. Setting units: mm
(8) Scaling center point	Touch to change the scaling center point. Setting range: Sewing frame center position, sewing start position, center of pattern, forward center of pattern, rear center of pattern, rear-left corner of sewing area, front-left corner of sewing area, rear-right corner of sewing area, front-right corner of sewing area Initial value: Center of sewing frame
(9) OK key	Touch to confirm the setting and return the display to the previous screen.
(10) Default key	Touch to return the setting to the initial value.
(11) Cancel key	Touch to return to the previous screen without changing the setting.

8-2-2. Slow start pattern

Touch the “Slow Start” key (5) in the [sewing operation screen] to display the slow start setting screen. This is used to stop the thread from pulling out at the sewing start, and at times when skipped stitches might easily occur.

* When memory switch no. 400 is set to ON, slow start patterns can be recorded separately for each program number.



(1) Slow Start	Touch the Δ or ∇ key to adjust the starting-up speed at the sewing start. * The smaller the number, the slower the start. * Refer to the following table for the speed setting values.
(2) OK key	Touch to confirm the setting value and return to the [sewing operation screen.]
(3) Cancel key	Touch to return to the [sewing operation screen] without changing the setting value.
(4) Reset key	Touch to return the value to the value which was first displayed when you switched to the setting screen.
(5) Sewing start speed	Displays the speed for stitches 1 to 5. When the slow start is set to 0, you can change the speed using the + - keys.

Table Setting values and starting-up speeds

	Lo	0	1	2	3	4	5	6	7	8	9
Sewing speed for 1st stitch	*2	200	200	300	400	400	400	400	400	600	800
Sewing speed for 2nd stitch	*2	200	300	400	400	500	600	800	1000	1200	
Sewing speed for 3rd stitch	*2	300	400	500	600	800	1000	1200	1600	*1	
Sewing speed for 4th stitch	*2	500	600	700	900	1200	1400	*1	*1	*1	
Sewing speed for 5th stitch	*2	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1

*1 Sewing will be carried out at the sewing speed which is set by the “Sewing speed” parameter.

*2 Sewing is carried out at the speeds set in memory switch Nos. 151 to 155.

8. USING THE LCD PANEL (BASIC OPERATIONS)

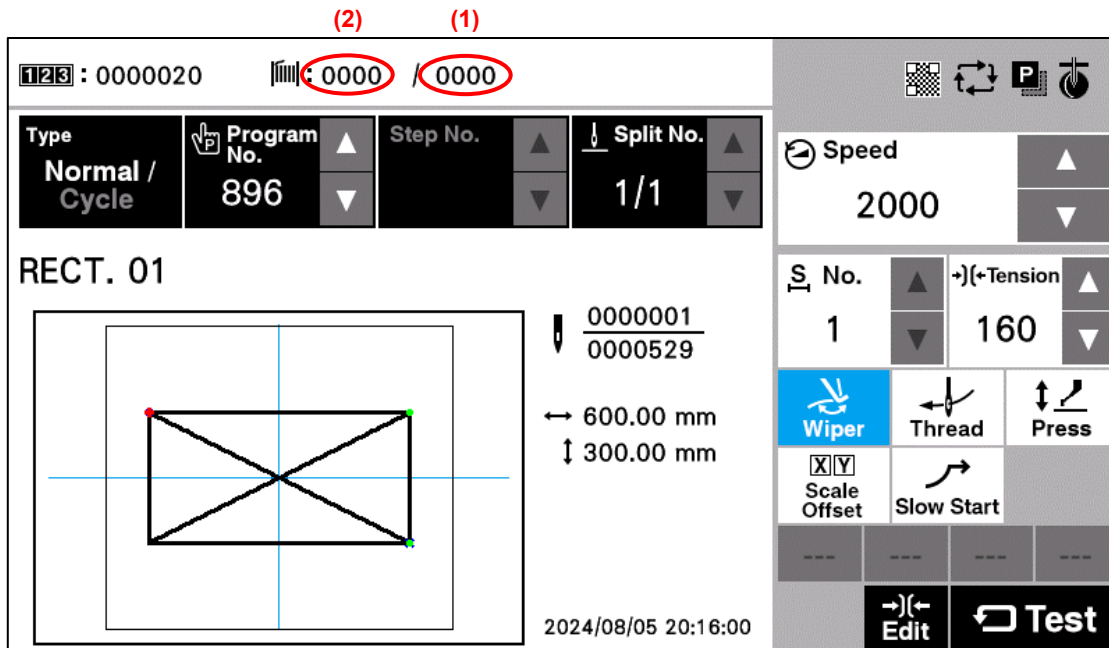
8-2-3. Using the bobbin thread counter

If you use the bobbin thread counter to set the number of articles which can be sewn with the amount of bobbin thread available, you can stop the bobbin thread running out in the middle of sewing a pattern.

<Setting the bobbin thread setting value>

If you keep pressing the “bobbin thread setting” key (1) in the [sewing operation screen], the screen will switch to the input screen for the bobbin thread setting value.

[Sewing operation screen]

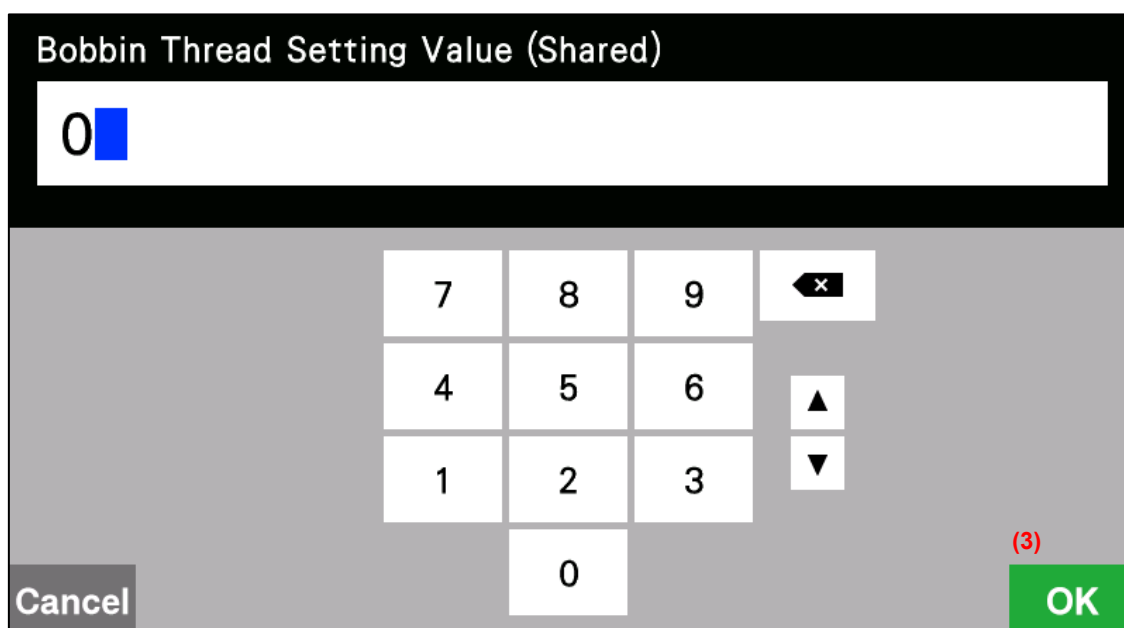


Enter the value and then touch the “OK” key (3) to confirm the value.

When the bobbin thread setting value has been set, the same value will appear as the “bobbin thread counter value” (2).

- If the value is set to [0000], the bobbin thread counter will not operate.

The bobbin thread setting value can be set to "0"- "9999".



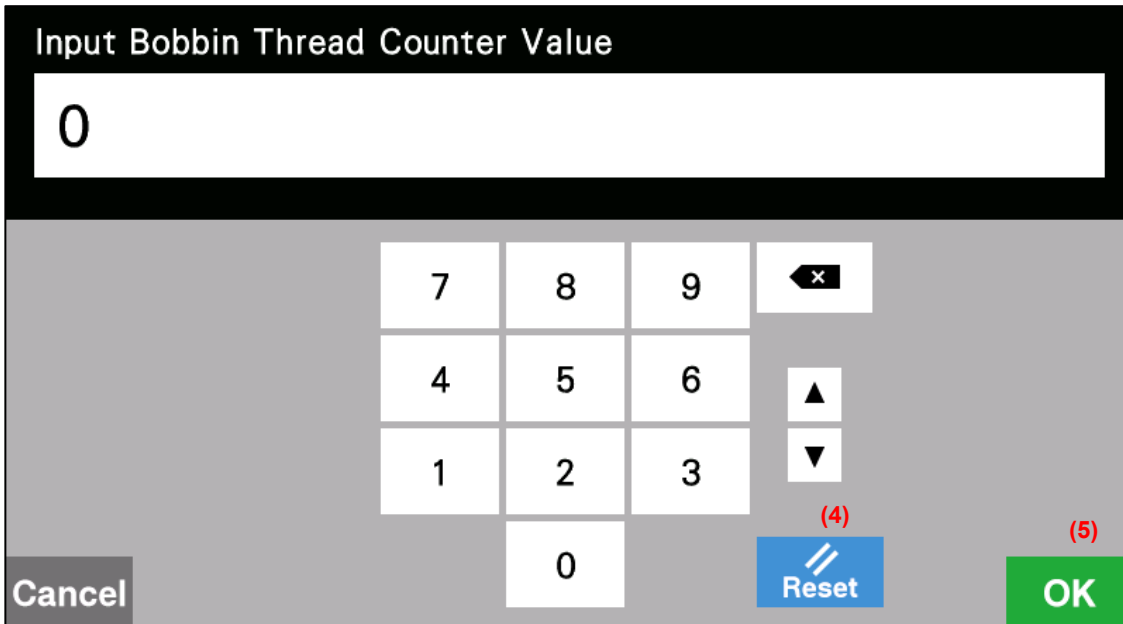
<Setting the bobbin thread counter value>

If you keep pressing the “bobbin thread counter” key (2) in the [sewing operation screen,] the screen will switch to the input screen for the bobbin thread counter value.

Enter the value and then touch the “OK” key (5) to confirm the value.

Touch the “Reset” key (4) to set the bobbin thread setting value as the bobbin thread counter value.

The bobbin thread counter value can be set from "0" to the (bobbin thread setting value.)

**<Bobbin thread counter operation>**

If the initial value for the bobbin thread counter is set to a value other than "0", the bobbin thread counter will operate. The counter value decreases by 1 each time sewing of an item is completed, and when it reaches "0", a message screen is displayed and the buzzer sounds.

When this happens, the sewing machine cannot be operated.

Touch the “Reset” key (6) to return the bobbin thread counter value to the initial value, and then sewing will be possible again.

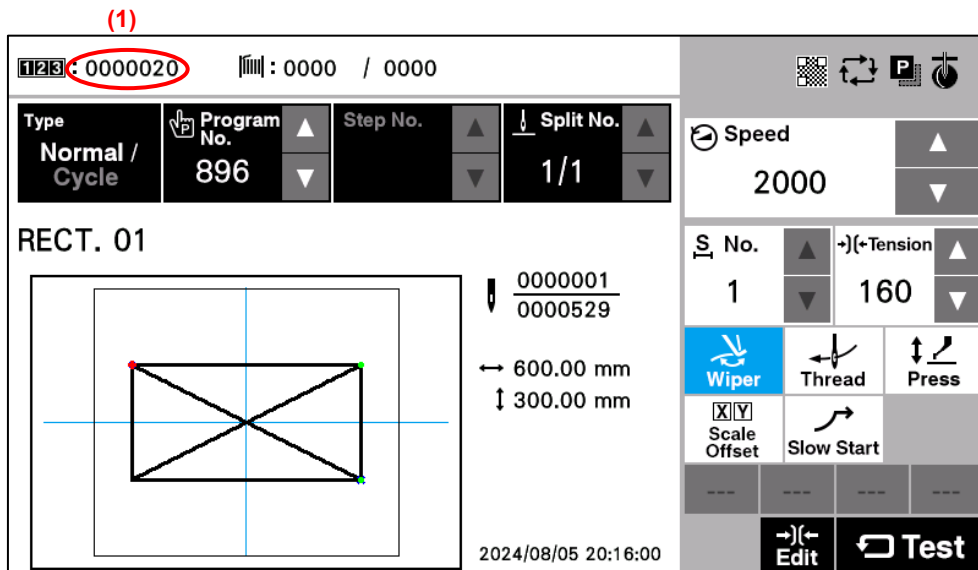
[Message screen]

8. USING THE LCD PANEL (BASIC OPERATIONS)

8-2-4. Using the production counter

<Setting the counter value>

If you keep pressing the “production counter” key (1) in the [sewing operation screen,] the screen will switch to the input screen for the production counter.

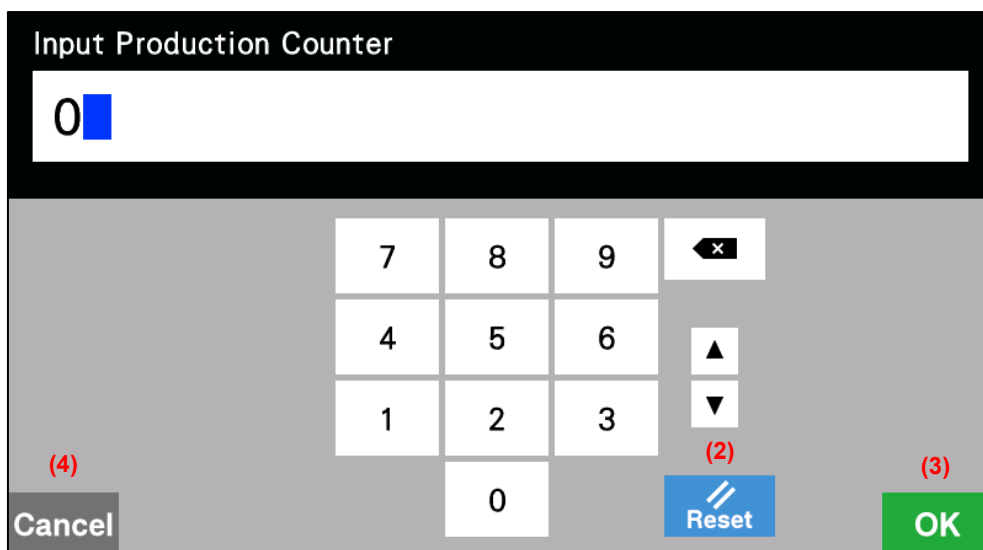


The counter value can be set to a value from "0" to "9999999".

If you would like to return the value to "0", touch the “Reset” key (2) and then touch the “OK” key (3).

After doing this, the display will return to the [sewing operation screen.]

Touch the “Cancel” key (4) to return to the [sewing operation screen] without changing the value.



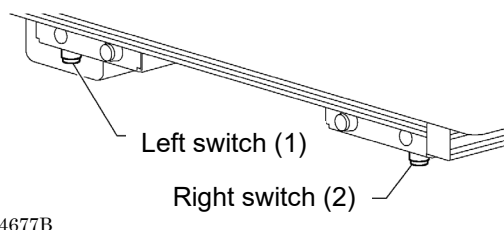
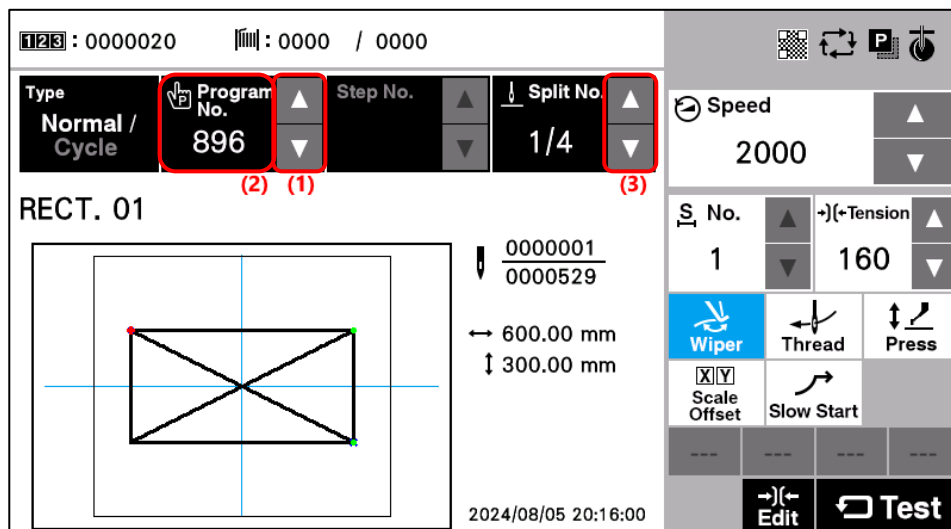
<Production counter operation>

The production counter always operates, and it increases by 1 each time sewing of an item is completed.

8-2-5. Split number setting method

If split codes (sewing interrupt data) exist in one program, the number which indicates the pattern which has been divided by the split codes is called the split number.

[Sewing operation screen]



1. Touch the "Program No." Δ or ∇ key (1) to select the program number which includes the split code.
 - The "Program No." value (2) will flash.
2. Press the left switch (1) and the right switch (2) simultaneously to detect the home position.
 - The feed mechanism will move to the home position and the program number will be confirmed. (The "Program No." setting (2) will stop flashing and illuminate steadily.)
3. Use the "Split No." Δ or ∇ key (3) to select the split number.

The setting for memory switch No. 403 lets you select the split mode.

Continuous split

Memory switch No. 403 = 0

- Sewing is carried out each time in the order of steps 1 \rightarrow 2 \rightarrow 3 \rightarrow 1 (for example, if there are two split codes).

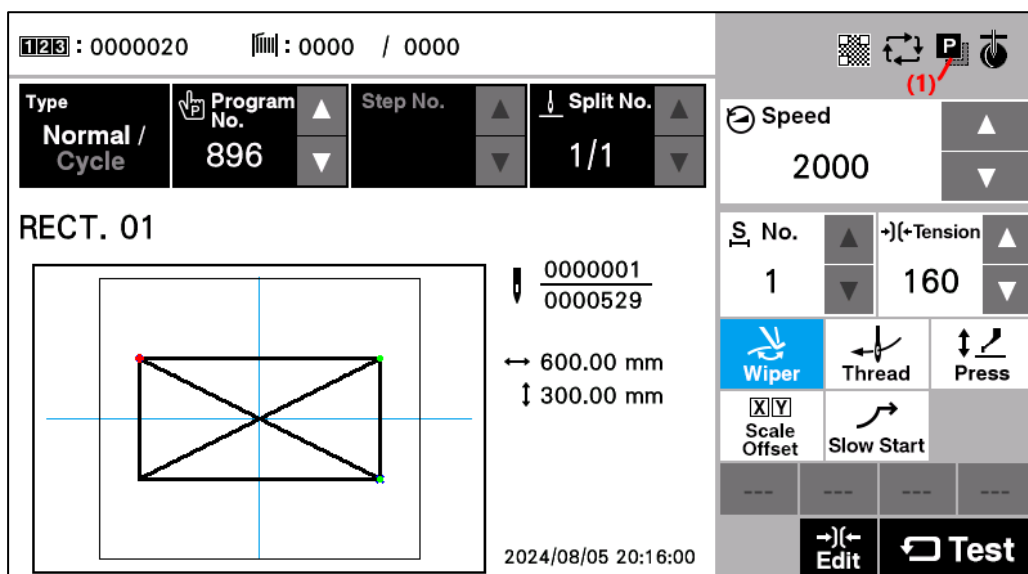
Independent split

Memory switch No. 403 = 1

- The pattern for the displayed split number is sewn independently.

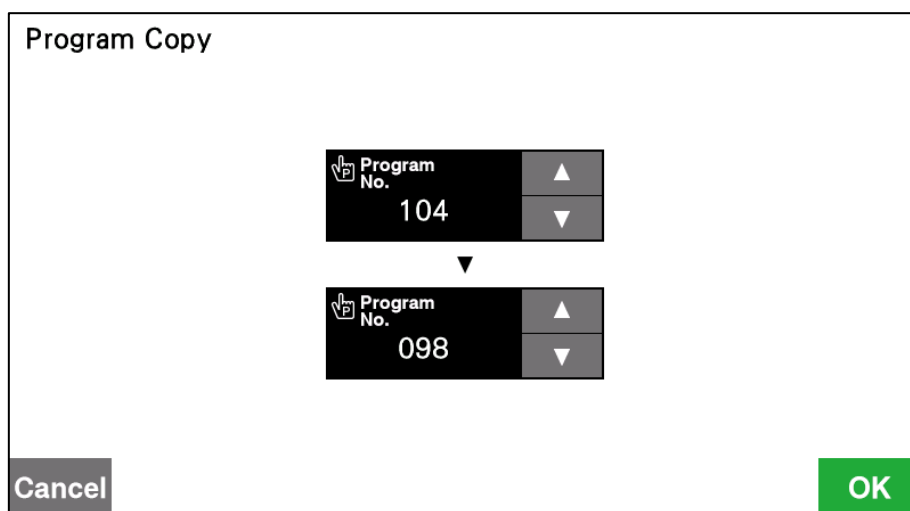
8-3. Copying programs

[Sewing operation screen]



Touch the Copy key (1) to switch to the [program copy screen.]

[Program copy screen]

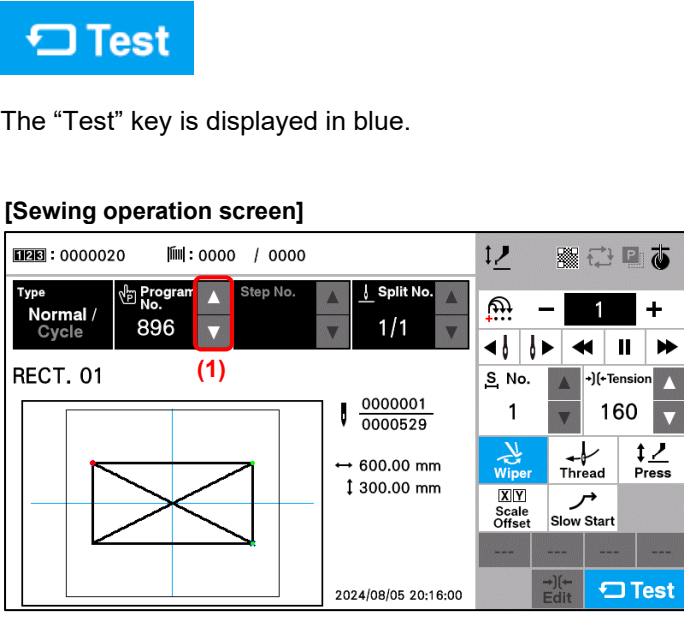
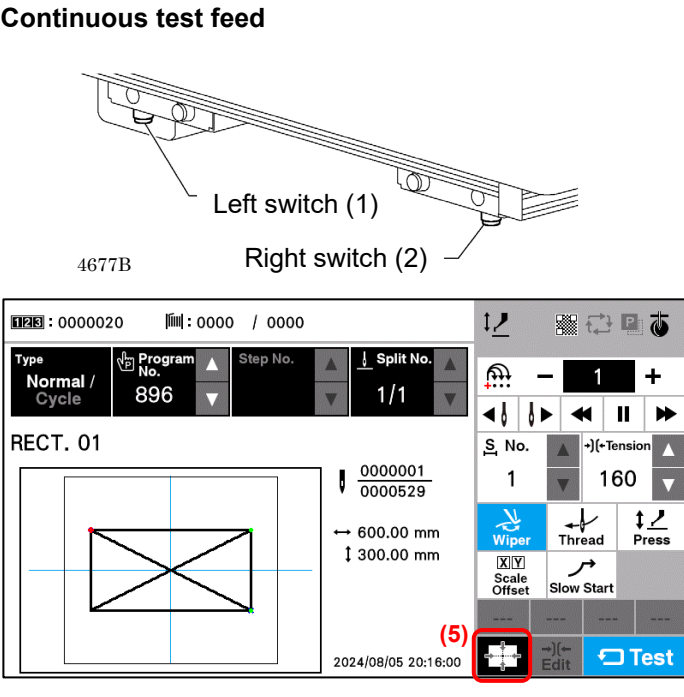
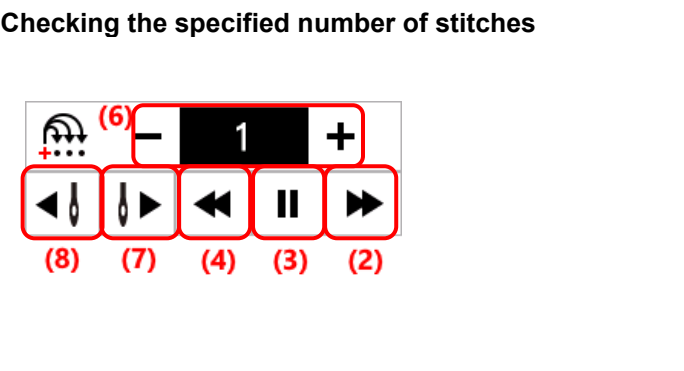


Select the copy source program No. and the copy destination program No.
 Touch the “OK” key to carry out copying. After copying, the display will return to the previous screen.
 Touch the “Cancel” key to return to the previous screen without copying.

- * The number which is selected as the copy destination program number will flash only if sewing data already exists in a program assigned to that number.

8-4. Checking the sewing pattern

Use test feed mode to operate the feed mechanism in order to check the needle movement. Check that the needle hole does not come out from the frame of the work clamp.

<p>1</p>	 <p>The “Test” key is displayed in blue.</p> <p>[Sewing operation screen]</p>	<p>1. Touch the “Test” key at the [sewing operation screen.]</p> <p>2. Press the Δ or ∇ key (1) to set the program number that you would like to check.</p>
<p>2</p>	 <p>4677B</p>	<p>1. Lower the work clamp and then press the left switch (1) and the right switch (2) simultaneously. Or you touch the continuous feed key (2), the feed mechanism will start moving continuously one stitch at a time. (The “current stitch number” in the stitch number display will increase by 1 each time.)</p> <p>2. When the feed reaches the end of the pattern, it stops.</p> <ul style="list-style-type: none"> • If you would like to stop the feeding operation, touch the continuous feed stop key (3). • If you touch the continuous feed key (4), the feed mechanism will start moving continuously in the direction of the sewing start position one stitch at a time. • Touch the Move to sewing start key (5) to return to the sewing start.
<p>3</p>		<p>1. At the specified number of stitches, touch the + or - key (6) to specify the number of stitches to move.</p> <p>2. If you touch the stitch forward key (7) or the stitch back key (8), the feed mechanism will move by the specified number of stitches</p> <ul style="list-style-type: none"> • If you would like to stop the feeding operation, touch the continuous feed stop key (3). • Touch the Move to sewing start key (5) to return to the sewing start.

9. USING THE LCD PANEL (ADVANCED OPERATIONS)



CAUTION

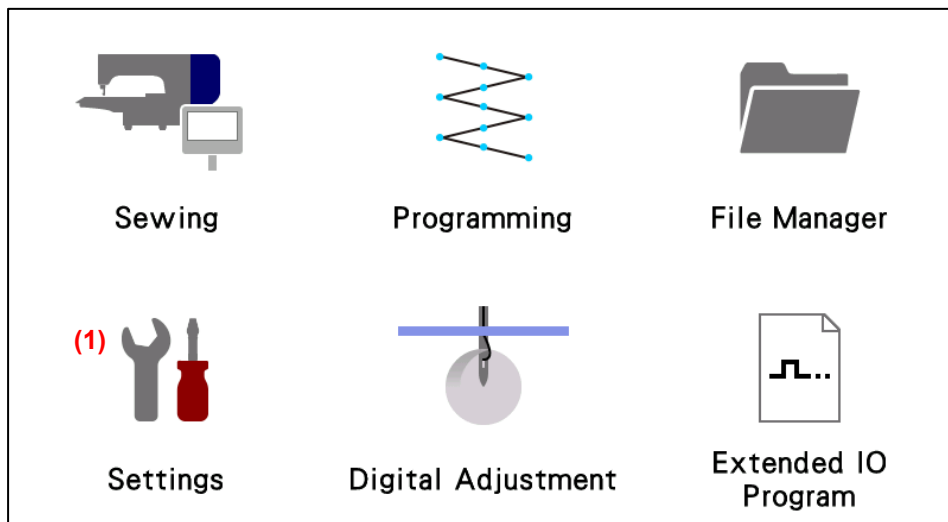


To prevent problems, do not use objects with sharp points to operate the LCD panel.

9-1. Memory switch setting method

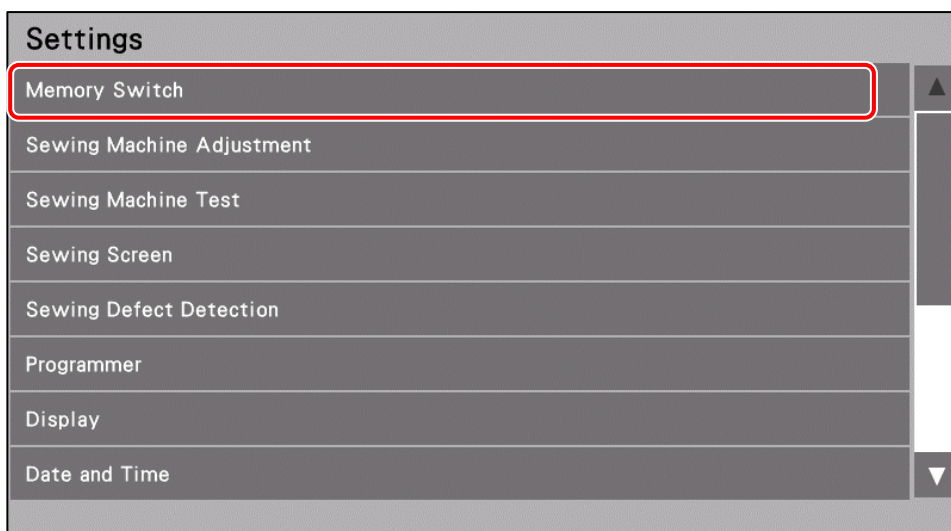
Press the HOME key to switch to the [Home screen].

[Home screen]

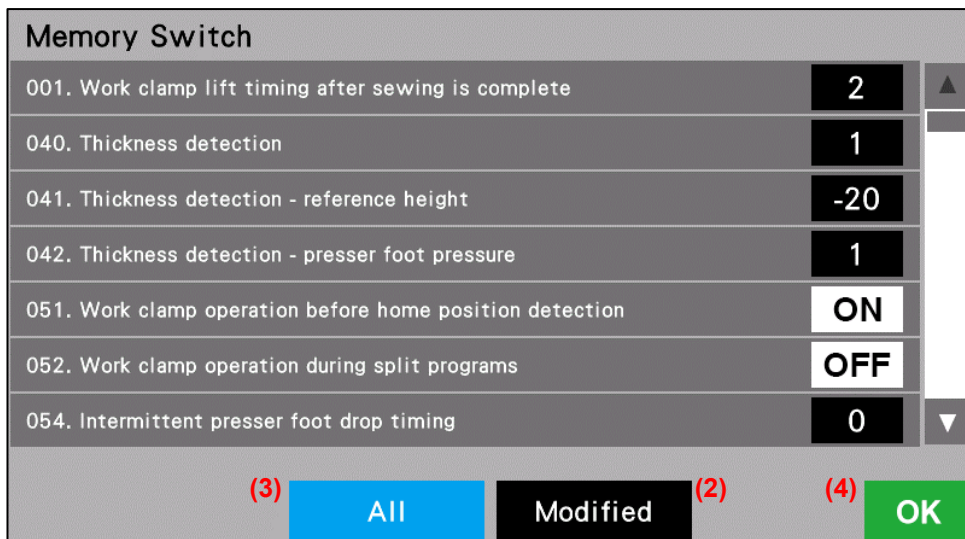


Touch the “Settings” key (1) to switch to the [Setting menu screen].

[Setting menu screen]

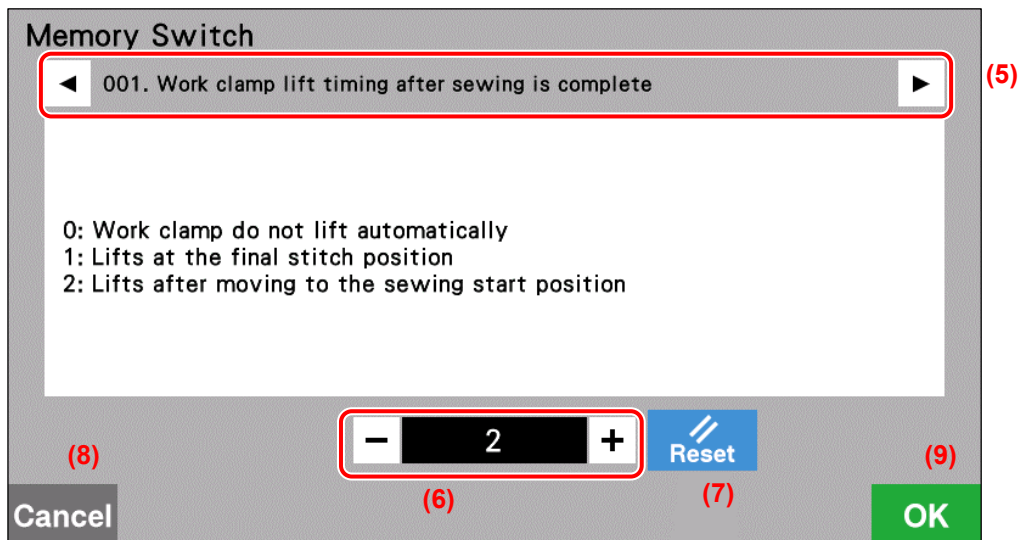


Select “Memory Switch”.

[Memory switch selection screen]

Select the number of the memory switch that you would like to change the setting for.

- When you touch the number of the memory switch you would like to change the setting for, the display will change to the [Memory switch editing screen].
- Touch the “OK” key (4) to return to the [Setting menu screen].
- “Modified” (2): This displays the numbers of memory switches that have been changed from default settings.
- “All” (3): This displays all memory switches.

[Memory switch editing screen]

This lets you change memory switch values.

- Number [◀ ▶] keys (5): These change the memory switch number.
- Value [◀ ▶] keys (6): These change the memory switch setting value display (ON/OFF, number).
- “Reset” key (7): This displays the initial value.
- “Cancel” key (8): This returns the display to the [Memory switch selection screen] without confirming the value.
- “OK” key (9): This confirms the value and then returns the display to the [Memory switch selection screen].

9-2. List of memory switch settings

No.	Function name		
	Setting range	Setting details	Initial value
001	Work clamp lift timing after sewing is complete		
	0	Work clamp do not lift automatically	2
	1	Lifts at the final stitch position	
	2	Lifts after moving to the sewing start position	
040	Thickness detection		
	0	Disabled	1
	1	Use as common parameter (according to setting value of No. 41)	
	2	Measure reference height at the sewing start point	
	3	Measure reference height at reference height measurement code	
041	Thickness detection - reference height -50 – 1700		-50 - 1700 mm (0.01 mm unit) 0
042	Thickness detection - presser foot pressure		
	1	Standard	1
	2	Weak	
051	Work clamp operation before moving to start point		
	OFF	Work clamp cannot be raised or lowered before moving to start point	ON
	ON	Work clamp can be raised and lowered before moving to start point	
052	Work clamp operation during split programs		
	OFF	Work clamp lifts automatically when sewing pauses due to a split program	OFF
	ON	Work clamp does NOT lifts automatically when sewing pauses due to a split program	
054	Intermittent presser foot drop timing		
	0	Same movement as setting 1, but it does not drop at the feed retract position	0
	1	Presser foot drops at the sewing start, regardless of the work clamp switch operation	
057	Work clamp operation when moving to sewing start position		
	OFF	Work clamp stays lowered after moving to start position	ON
	ON	Work clamp lifts automatically after moving to start position	
058	Work clamp operation during cycle program		
	OFF	Lift up automatically when completing sewing one step	OFF
	ON	Lift up only when completing sewing the last step in the cycle program	
059	Setting for work clamp weight		
	0	Weight as standards	0
	1	Use heavier clamp and feed plate (Limit setting value of memory switch no. 163 is maximum 2000)	
060	Time between work clamp drops - upper shaft starts		
	0 - 3000	100ms unit	0
061	Number of stitches to presser foot rise up at the sewing start		
	0	Disable drop down	3
	1-3	Number of stitches in drop down condition	
062	Time between locking feed plate lock and dropping working clamp		
	0 - 1000	100ms unit	100
063	Time until clamp descends		
	0 - 1000	100ms unit	100
066	Drop down timing for presser foot stroke		
	-65 - 20	-65 (earlier) to 20 (slower) degree (1 degree unit)	0
067	Rise up timing for presser foot stroke		
	-20 - 65	-20 (earlier) to 65 (slower) degree (1 degree unit)	0

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

No.	Function name		
	Setting range	Setting details	Initial value
070	Type of foot switch used * When using the foot switch, please be careful not to pinch your hand when lowering the needle bar base.		
	2	2 pedal foot switch (Option)	4
	3	3 pedal foot switch (Option)	
	4	Hand switch	
074	Hand switch operating mode		
	1	Standard	1
	2	Two stage hand switch	
093	Collision monitoring when presser foot drops		
	OFF	Disabled	ON
	ON	Enabled	
094	Intermittent presser foot waiting position offset		
	-10 - 5	100mm unit	0
150	Highest needle position stop		
	OFF	Disabled	OFF
	ON	When the upper shaft stops, the motor operates in reverse to return the needle bar close to its highest position	
151	1st stitch sewing speed at the sewing start		
	200 - 2700	100 sti/min unit (BAS365K)	400
	200 - 2500	100 sti/min unit (BAS370K)	
152	2nd stitch sewing speed at the sewing start		
	200 - 2700	100 sti/min unit (BAS365K)	800
	200 - 2500	100 sti/min unit (BAS370K)	
153	3rd stitch sewing speed at the sewing start		
	200 - 2700	100 sti/min unit (BAS365K)	1200
	200 - 2500	100 sti/min unit (BAS370K)	
154	4th stitch sewing speed at the sewing start		
	200 - 2700	100 sti/min unit (BAS365K)	2700(BAS365K)
	200 - 2500	100 sti/min unit (BAS370K)	2500(BAS370K)
155	5th stitch sewing speed at the sewing start		
	200 - 2700	100 sti/min unit (BAS365K)	2700(BAS365K)
	200 - 2500	100 sti/min unit (BAS370K)	2500(BAS370K)
156	Sewing speed for 5th stitch before the sewing end		
	400 - 2400	100 sti/min unit	2400
157	Sewing speed for 4th stitch before the sewing end		
	400 - 2000	100 sti/min unit	2000
158	Sewing speed for 3rd stitch before the sewing end		
	400 - 1700	100 sti/min unit	1700
159	Sewing speed for 2nd stitch before the sewing end		
	400 - 800	100 sti/min unit	800
163	Sewing speed limit value		
	1200-2700 (BAS365K)	Sewing speed limit value (100 sti/min unit) (Setting range will be different by setting memory switch No. 59)	2700(BAS365K)
	1200-2500 (BAS370K)		2500(BAS370K)
164	Thread trimming		
	OFF	All thread trimming operations are disabled	ON
	ON	Thread trimming is carried out in accordance with the sewing data	

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

No.	Function name		
	Setting range	Setting details	Initial value
165	Stop position at highest needle position		
	-20 - 20	Negative value --- needle bar height become high. (angle display)	0
166	Delay time until reverse operation starts		
	10 - 500	10 ms unit	150
167	Servo lock operation		
	OFF	Disabled	ON
ON	Enabled		
168	Servo lock timer setting		
	1 - 120	1 sec unit	1
172	Enable trimming position control error		
	OFF	Disabled	ON
ON	Enabled		
173	Starting angle for needle up signal		
	0 - 40	1 degree unit	20
174	Stopping angle for needle up signal		
	40 - 80	1 degree unit	60
175	Starting angle for needle down signal		
	160 - 200	1 degree unit	180
176	Stopping angle for needle down signal		
	200 - 240	1 degree unit	220
185	Add extra stitch before trimming		
	OFF	Disable	OFF
ON	Enable		
186	Extra stitch length		
	5 - 20	0.01 mm unit	1.0
187	Motor pos adjustment before trimming for long thread trimming		
	0-52	1 pulse unit	0
251	Feed speed		
	1	100 mm/s (Slow)	3
	2	200 mm/s	
	3	300 mm/s	
	4	400 mm/s	
	5	500 mm/s (Fast)	
252	High-speed test feed method		
	OFF	Normally slow, but becomes faster when the work clamp switch or left switch is depressed	OFF
ON	High-speed feeding starts at the same time test feeding starts		
253	Moving method to the sewing start point		
	0	Depress the start switch or both the left and right switches when program No. is blinking	2
	1	Press the start position move key when program No. is blinking	
	2	Both 0 and 1 are valid	
3	Turn on extended input when the program number is blinking (specified in the extended IO mapping settings)		

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

No.	Function name		
	Setting range	Setting details	Initial value
254	Movement path to start position from mechanical origin point		
	0	No specified routing	0
	1	To home position from X to Y, to starting point from Y to X	
	2	To home position from Y to X, to starting point from X to Y	
255	Feed speed during test mode		
	1	50mm/s	2
	2	100mm/s	
	3	200mm/s	
	4	300mm/s	
275	Second home position function		
	OFF	Disabled	OFF
	ON	Enabled * Use coordinates set by memory switch No. 276, 277	
276	2nd Origin X		
	-400 - 400	1 mm unit	0
277	2nd Origin Y		
	-200 - 200	1 mm unit (BAS365K)	0
	-425 - 425	1 mm unit (BAS370K)	
280	Changes the overall X feed timing		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
281	X Feed timing for the 1st stitch at the sewing start		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
282	X Feed timing for the 2nd stitch at the sewing start		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
283	X Feed timing for the 3rd stitch at the sewing start		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
284	X Feed timing for the 3rd stitch before the sewing end		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
285	X Feed timing for the 2nd stitch before the sewing end		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
286	X Feed timing for the 1st stitch before the sewing end		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
290	Changes the overall Y feed timing		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
291	Y Feed timing for the 1st stitch at the sewing start		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
292	Y Feed timing for the 2nd stitch at the sewing start		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
293	Y Feed timing for the 3rd stitch at the sewing start		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
294	Y Feed timing for the 3rd stitch before the sewing end		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
295	Y Feed timing for the 2nd stitch before the sewing end		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

No.	Function name		
	Setting range	Setting details	Initial value
296	Y Feed timing for the 1st stitch before the sewing end		
	-80 - 80	-80 (earlier) to 80 (slower) 1 degree unit	0
301	Memory switch category display		
	OFF	Disabled	ON
	ON	Enabled	
351	Counting method for production counter		
	0	Counted for each item of sewing data	0
	1	Counted for each thread trimming operation	
	2	Counted when sewing data ends or when split stops	
352	Counting method for bobbin thread counter		
	0	Counted for each item of sewing data	0
	1	Counted for each thread trimming operation	
	2	Counted when sewing data ends or when split stops	
	3	Counted according per 10 needles	
353	Counter timing for bobbin thread counter		
	OFF	Counted at the end of sewing	OFF
	ON	Counted at the start of sewing	
354	Switching program/split numbers using an external switch		
	0	Function disabled	0
	1	Switch program number * Switching numbers via extended input. The hundreds digit of the program number is specified by memory switch No.355.	
	2	Switch split number	
355	Hundreds digit of program No. when switching with external switch		
	0 - 9	Hundreds digit of the program number * Valid only when memory switch No. 354 is 1	0
360	Increment of production counter		
	0 - 99	0 - 99	1
400	Detailed settings sewing condition		
	OFF	Use common parameter	OFF
	ON	Use parameter of each program	
403	Select split mode		
	0	Continuous split	0
	1	Independent split	
407	Program No. assigned to the direct selection key 1		
	OFF	Disable	OFF
	001 - 999	Single program No.	
	C01 - C30	Cycle program No.	
408	Program No. assigned to the direct selection key 2		
	OFF	Disable	OFF
	001 - 999	Single program No.	
	C01 - C30	Cycle program No.	
409	Program No. assigned to the direct selection key 3		
	OFF	Disable	OFF
	001 - 999	Single program No.	
	C01 - C30	Cycle program No.	

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

No.	Function name		
	Setting range	Setting details	Initial value
410	Program No. assigned to the direct selection key 4		
	OFF	Disable	OFF
	001 - 999	Single program No.	
C01 - C30	Cycle program No.		
460	X direction sewing area limitation		
	0 - 800	mm (BAS365K / BAS370K)	800
461	Y direction sewing area limitation		
	0 - 400	mm (BAS365K)	400(BAS365K) 700(BAS370K)
	0 - 850	mm (BAS370K)	
469	Digital tension setting value		
	OFF	Use parameter of each program	ON
ON	Use common parameter		
550	Output continue time for needle cooler device		
	0	Disabled	0
	100 - 2000	Enabled for using needle cooler (Output time for after machine is stopped, Unit : 100 ms)	
551	Upper thread tension release at the sewing start		
	0	Not released	0
	1 - 3	Released during the specified number of stitches *Set tension value for first stitch using memory switch No. 587	
552	Tension release timing during thread trimming		
	-80 - 70	1 degree unit	0
558	External error monitoring input		
	OFF	Disabled	OFF
	ON	Enabled (option input No. 13 [AIRSW])	
560	Automatic ejector		
	0	Disabled	3 (BAS365K) 0 (BAS370K)
	1	Standard operation	
	2	Sewing starts when cassette sensor is ON	
	3	Start switch is enabled even if cassette sensor is OFF	
567	Tension disc status during feeding		
	OFF	Opened	OFF
	ON	Not opened	
568	Monitor pallet sensor during sewing		
	OFF	Disabled	OFF
	ON	If pallet sensors turn off during sewing, stop sewing and show error message.	
569	Timing for bobbin thread detector device		
	0	Disabled	0
	1	Detect before sewing	
	2	Detect after sewing	
	3	Detect before and after sewing	
570	Bobbin thread detection sensor cleaning time		
	0 - 3000	ms	30
577	On time of pneumatic-type thread wiper		
	100 - 990	10 ms unit	100

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

No.	Function name		
	Setting range	Setting details	Initial value
578	Sensor check when entering clamp or threading mode		
	OFF	Disabled	ON
	ON	Enabled	
580	Bobbin thread clamp function		
	OFF	Disable	OFF
	ON	Enable	
581	Stitch count for bobbin thread release		
	1-5	1-5 (stiches) Only activates when MSW580: Bobbin thread clamp function is ON. At the sewing start, the clamped bobbin thread will be released on stitch count P (=MSW581) · Q degree (=MSW582) (MSW582: upper shaft angle for bobbin thread release, use as a set)	1
582	Upper shaft angle for bobbin thread release		
	5-359	5-359(degree) only activates when MSW580: Bobbin thread clamp function is ON at the sewing start, the clamped bobbin thread will be released on needle num P (=MSW581) · Q degree (=MSW582) (MSW581: number of needles for bobbin thread release, use as a set)	355
587	Tension value for first stitch		
	0 - 500	0 - 500 * Set Upper thread tension release at the sewing start using memory switch No. 551	0
588	Tension disk mode		
	OFF	For presser tension disk	OFF
	ON	For rotary tension disk	
589	Thread trimming tension		
	0 - 500	Tension value	100
590	Bar-code reader device		
	OFF	Disabled	OFF
	ON	Enabled	
	* Please ask the place of purchase for details		
596	Bobbin winder device		
	OFF	Disabled	ON
	ON	Enabled	
650	Error release method when operation has stopped		
	0	Press the Reset key	0
	1	Press the Reset key or the STOP switch	
652	Thread trimming operation when sewing is paused		
	OFF	Thread trimming is not carried out when the pause is canceled	ON
	ON	Thread trimming is carried out when the pause is canceled	

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

No.	Function name		
	Setting range	Setting details	Initial value
653	Resuming sewing after sewing is paused		
	OFF	Reset key → Yes key (one stitch move backward) → Wait for start	OFF
	ON	Reset key → Wait for start	
654	Ignore split No. when moving to start position after paused		
	OFF	Move to nearest split point before current position	OFF
	ON	Move to sewing start point regardless of split No.	
656	Start position return when sewing is paused		
	OFF	Mechanism moves to sewing start position directly	OFF
	ON	Mechanism steps back to the sewing start position along the sewing path	
657	Time from error occurring to buzzer stopping		
	0	Buzzer does not stop	0
	5 - 30	Buzzer stops after the specified time (sec)	
750	Continuous operation mode		
	0	Disabled	0
	1	Enabled	
751	Continuous operation cycle time adjustment timer		
	0 - 30000	Interval of operation (Unit: 10ms)	200
752	Sewing machine ID code		
	0 - 99	0 to 99 (To specify folder name on storage media)	0
756	Hook timing reference sensing		
	OFF	Disabled	ON
	ON	Enabled	
757	Hook timing reference angle tolerance threshold		
	1 - 20	0.1 mm unit	2
759	Needle bar height sensing		
	OFF	Disabled	ON
	ON	Enabled	
760	Needle bar position tolerance threshold		
	2 - 8	0.1 mm unit	4
762	Needle guard and needle clearance sensing		
	OFF	Disabled	ON
	ON	Enabled	
763	Needle guard upper limit tolerance threshold		
	0 - 10	0.01 mm unit	3
764	Needle guard lower limit tolerance threshold		
	-10 - 0	0.01 mm unit	-3
766	Needle clearance upper limit tolerance threshold		
	0 - 10	0.01 mm unit	3
767	Needle clearance lower limit tolerance threshold		
	-10 - 0	0.01 mm unit	-3
771	Hook oil supply sensor		
	OFF	Disabled	ON
	ON	Enabled	
772	Hook oil sensor warning time interval		
	1 - 60	1 hour unit	6

9-3. Using cycle programs

Sewing patterns that have been recorded in user programs can be saved in up to 30 cycle programs.

One cycle program can contain up to a maximum of 50 steps.

When sewing the sewing patterns in a certain order, it can be useful to save them in a cycle program beforehand.

* If memory switch No. 400 is set to OFF, cycle program setting and selection cannot be carried out.

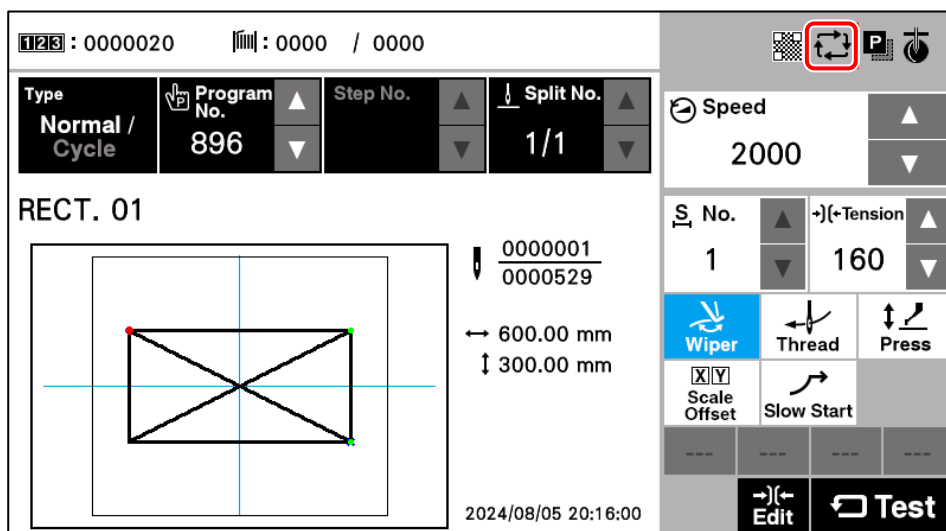
<Registration method>

This describes the procedure using an example in which program number 106 is registered as the 1st step, program number 200 is registered as the 2nd step and program number 252 is registered as the 3rd step of cycle program number C01.

1. Touch the “Cycle program” key in the [Sewing operation screen] to switch to the [Cycle program editing screen].

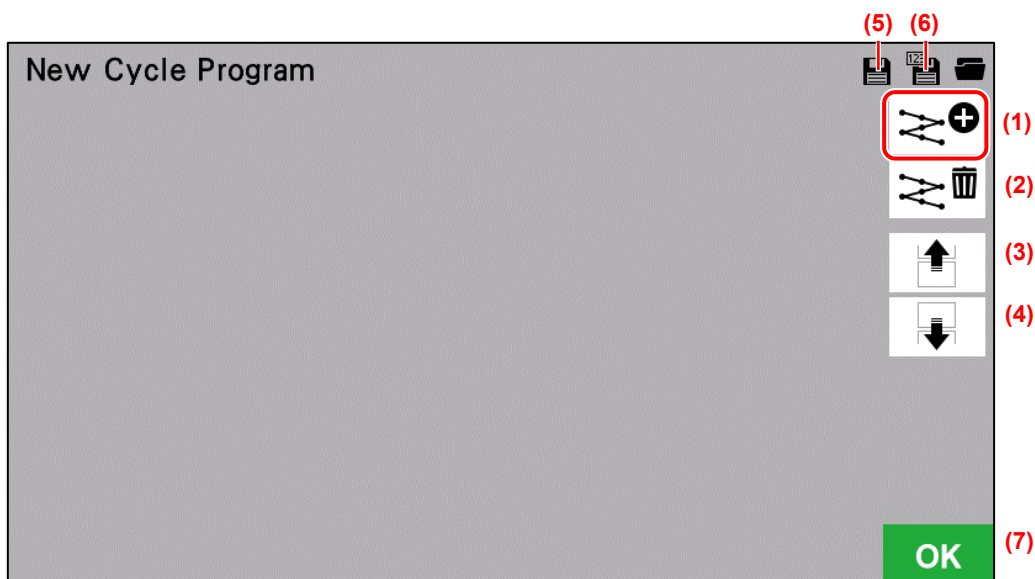
* To edit a cycle program which has already been created, first select the desired cycle program number and then touch the “Cycle program” key.

[Sewing operation screen]



2. Touch the “Add step” key (1) in the [Cycle program editing screen] to switch to the [Add step screen].

[Cycle program editing screen]



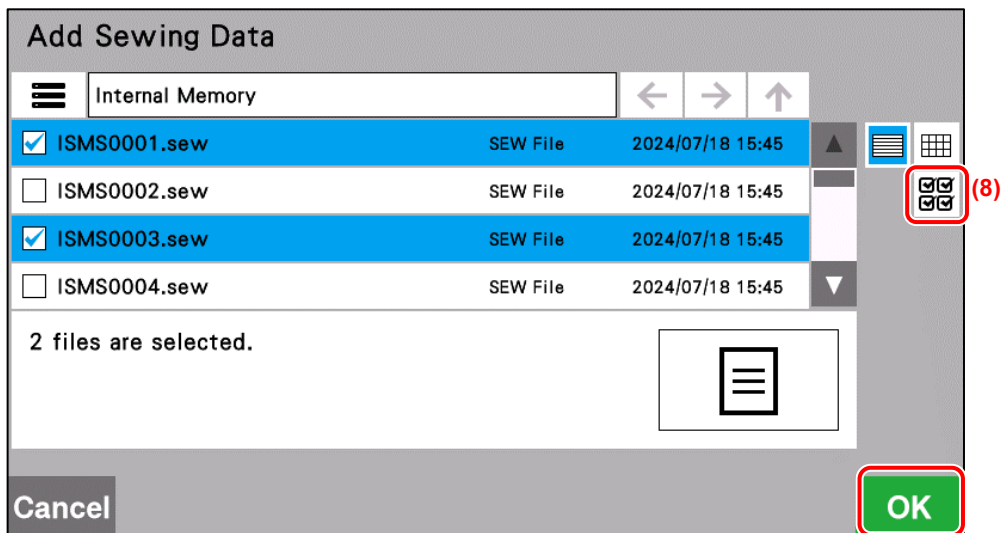
Descriptions of keys

(1)	Add step	Switches to the screen for selecting a program to add.
(2)	Delete step	Deletes the program which is currently selected.
(3)	Move step (forward)	Moves the currently-selected program one step toward the start.
(4)	Move step (backward)	Moves the currently-selected program one step toward the end.
(5)	Save	When saving a new program: Switches to the [Cycle program save screen]. When saving an existing cycle program that has been edited: The [Save program] dialog box is displayed.
(6)	Save as ...	Switches to the [Cycle program save] screen.
(7)	OK	Switches to the [Sewing operation screen].

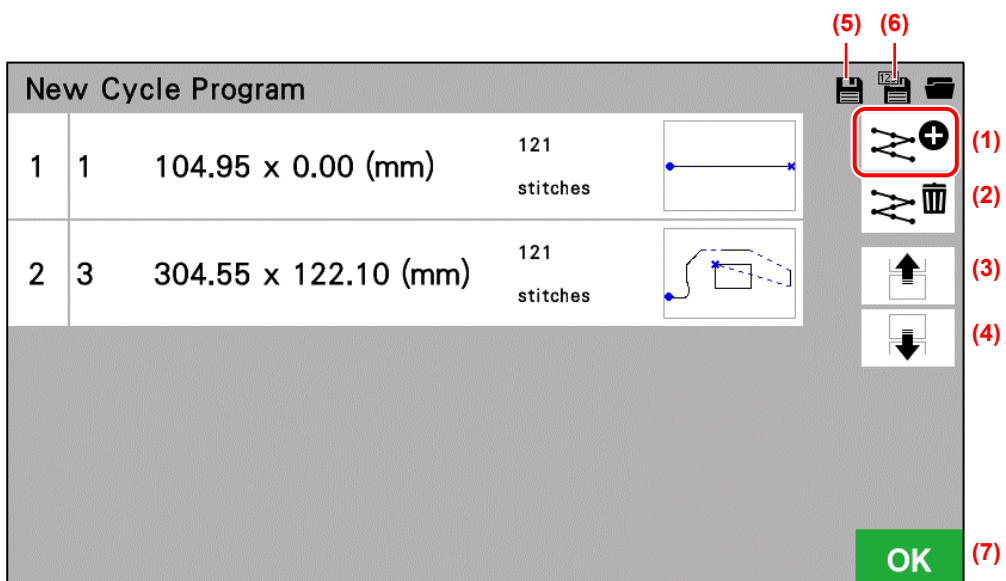
3. Select "Program No." in the [Add step screen] and then touch the "OK" key to add that program number. The display will then return to the [Cycle program editing screen].

* If you touch the multiple select key (8), you can select multiple files.

[Add step screen]



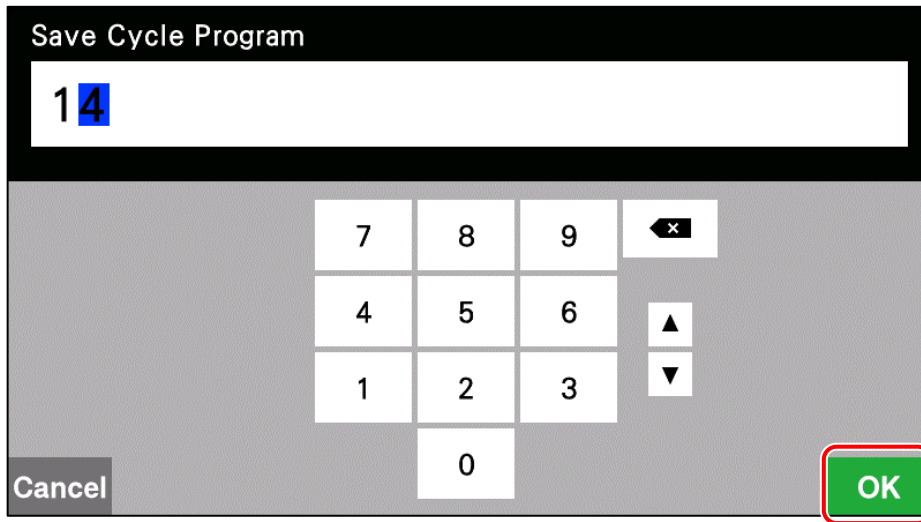
[Cycle program editing screen]



9. USING THE LCD PANEL (ADVANCED OPERATIONS)

- Repeat the operations in steps 2. and 3. to create the desired cycle program, and then touch the “Save” key (5) or “Save as ...” key (6) to switch to the [Cycle program save screen].
- Enter the cycle program number, and then touch the “OK” key. The cycle program will be saved and the display will return to the [Cycle program editing screen]. Numbers from C01 to C30 can be saved.

[Cycle program save screen]

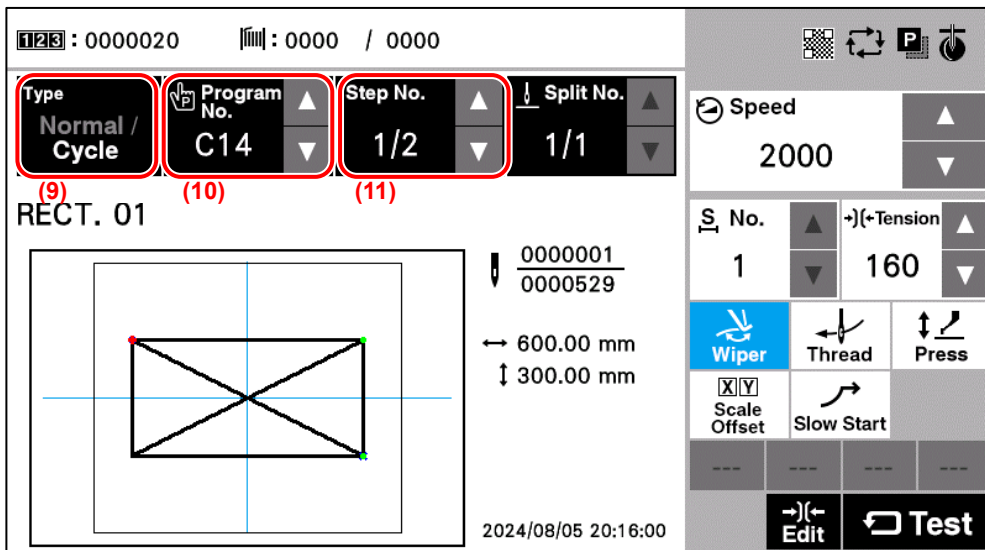


- Touch the “OK” key (7) in the [Cycle program editing screen] to return to the [Sewing operation screen].

<Method of use>

When cycle programs have been registered, you can select the cycle program numbers from the [Sewing operation screen].

[Sewing operation screen]



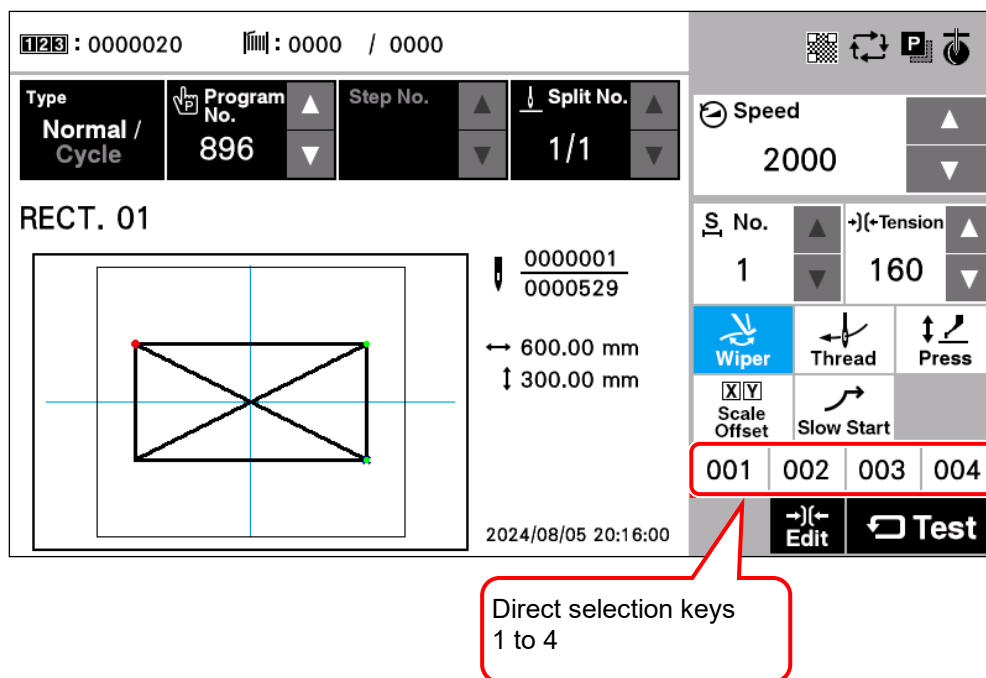
Descriptions of keys

(9)	Type key	Select Cycle.
(10)	Program No. keys	The currently selected cycle program number is displayed. Touch the ∇ Δ keys to select the cycle program number that you would like to use.
(11)	Step No. keys	The currently selected step number is displayed. Touch the ∇ Δ keys to select the step number.

9-4. Direct selection

You can use the direct selection keys to directly select program numbers and cycle program numbers.

[Sewing operation screen]



<Recording method>

This is carried out using memory switch Nos. 407 to 410.

Setting range: OFF, 001 - 999, C01 - C30

	Direct selection 1 key	Direct selection 2 key	Direct selection 3 key	Direct selection 4 key
Corresponding memory switch number	407	408	409	410
Initial value	No registration	No registration	No registration	No registration

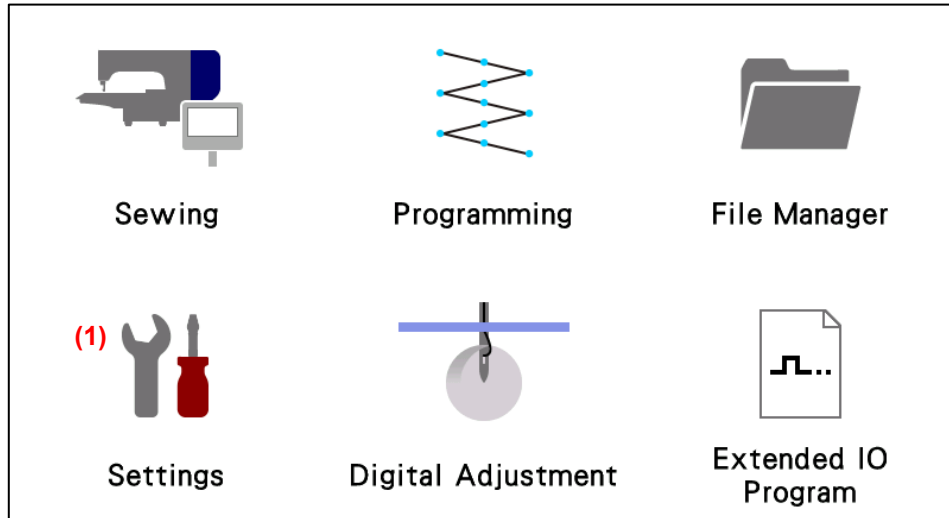
- If there are no program numbers registered in a direct selection key (i.e. it is OFF), "---" will be displayed and the display will become inactive.
- If a program number (sewing pattern) which has been registered in a direct selection key cannot be loaded, the display will be inactive and the key cannot be selected.
- If you keep pressing a direct selection key, the display will switch to the settings for the program number displayed with this key.

9-5. Setting the sewing screen display

This lets you set whether the codes which are displayed in the sewing screen preview are displayed or not displayed.

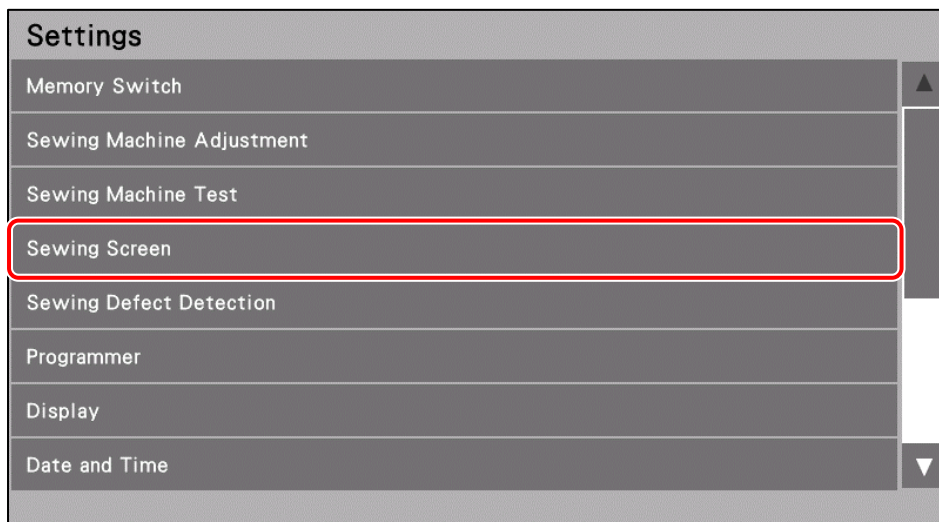
1. Press the HOME key to switch to the [Home screen].
Touch the Settings key (1) to switch to the [Setting menu screen].

[Home screen]



2. Select "Sewing Screen".

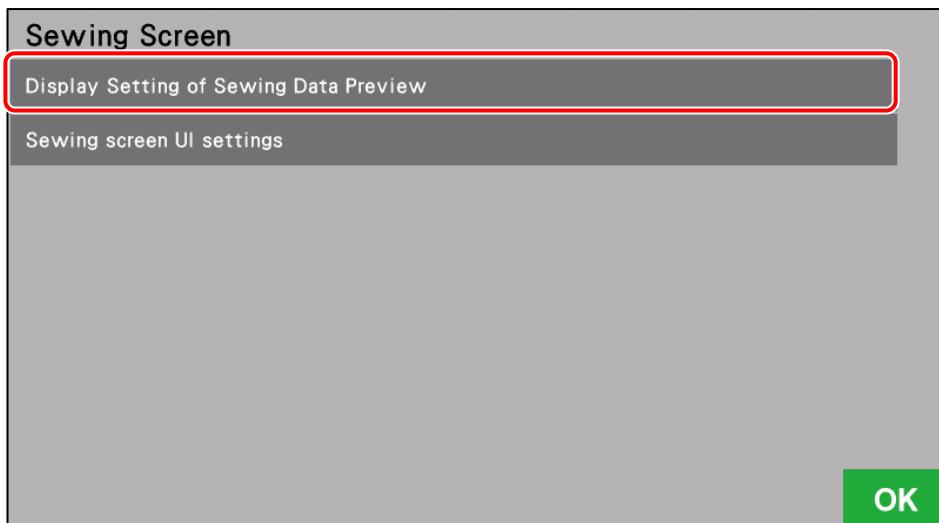
[Setting menu screen]



9-5-1. Display Setting of Sewing Data Preview

1. Select "Display Setting of Sewing Data Preview".

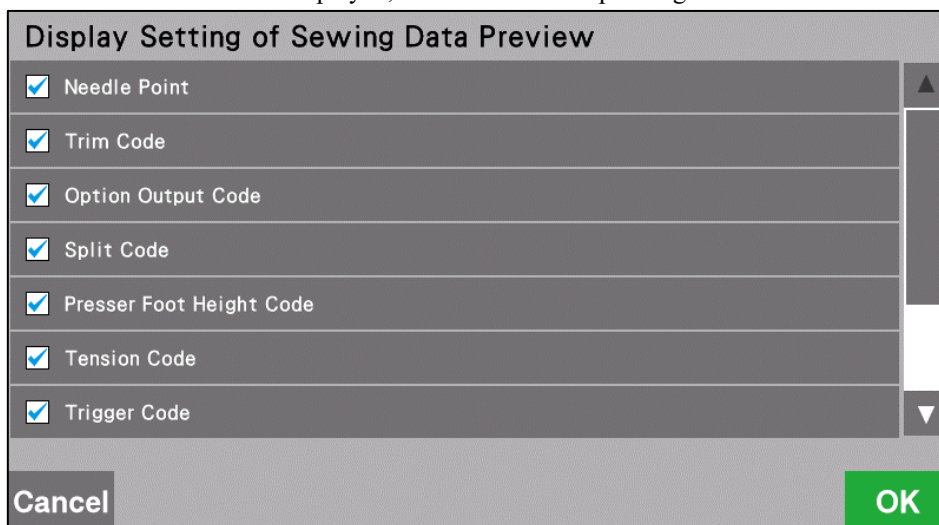
[Sewing Screen]



2. The codes which can be switched between displayed and not displayed in the sewing screen preview are displayed in a list.

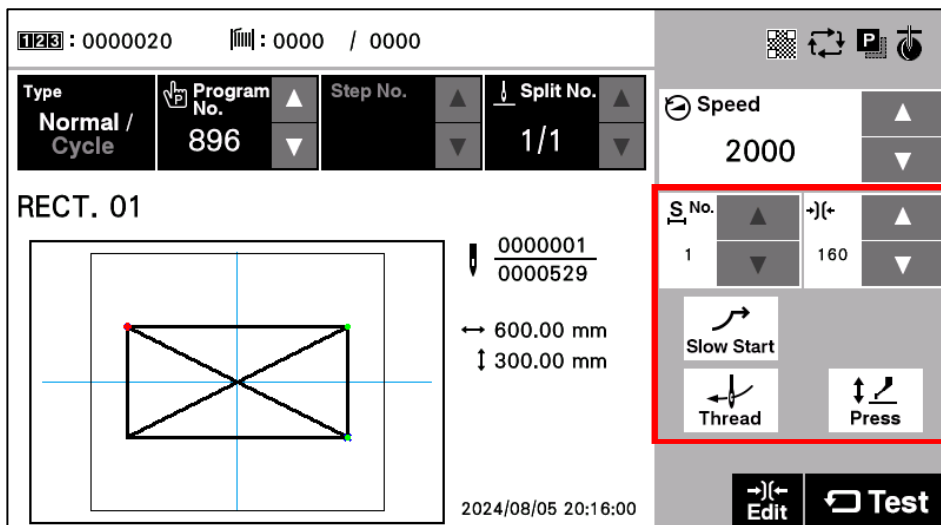
If you would like the codes to be displayed, select the corresponding check box.

If you would like the codes to be not displayed, unselect the corresponding check box.



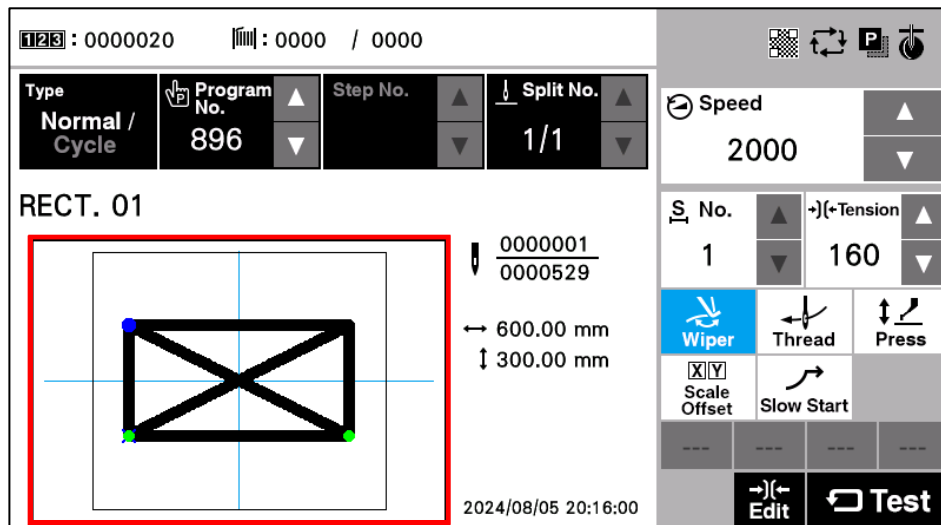
9-5-2. Sewing Mode Big Button Function

When "Big Icon in Sewing Mode" is turned on, some of the buttons in the sewing screen appear larger on the screen.



9-5-3. Preview Big Needle Point Function

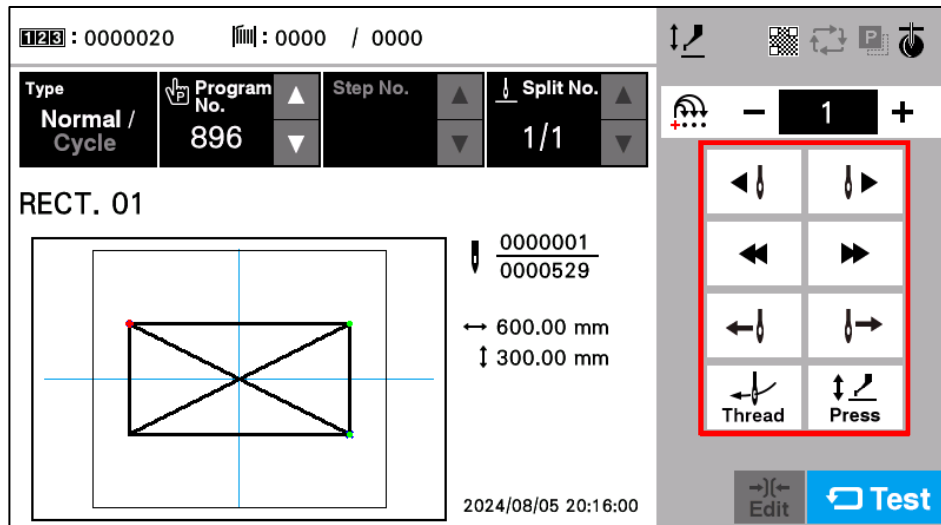
When "Big Needle Point in Sewing Mode" is turned on, the cursors which indicate the sewing point and the current feed position in the preview display appear larger in the display.



9. USING THE LCD PANEL (ADVANCED OPERATIONS)

9-5-4. Test Mode Big Button Function

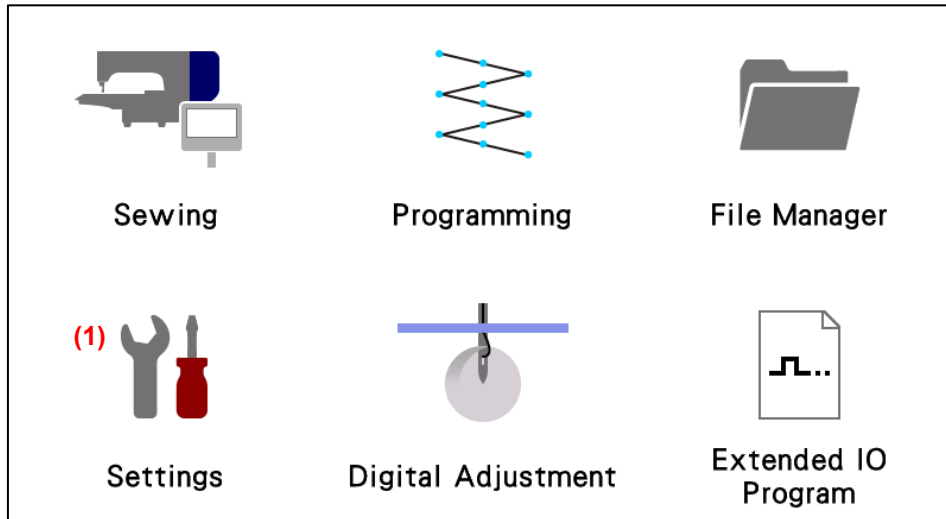
When "Big Icon in Test Mode" is turned on, some of the buttons in the sewing screen appear larger on the screen during test mode.



9-6. Initialization method

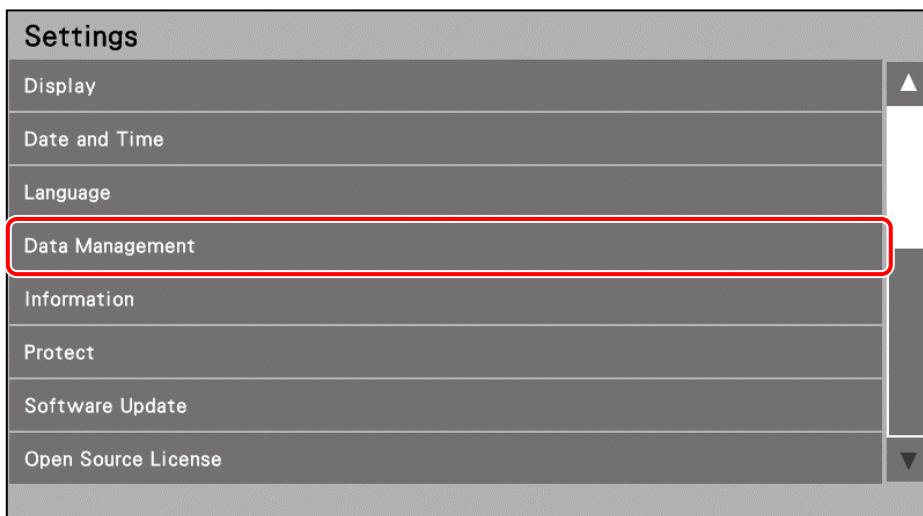
1. Press the HOME key to switch to the [Home screen].
Touch the Settings key (1) to switch to the setting menu screen.

[Home screen]



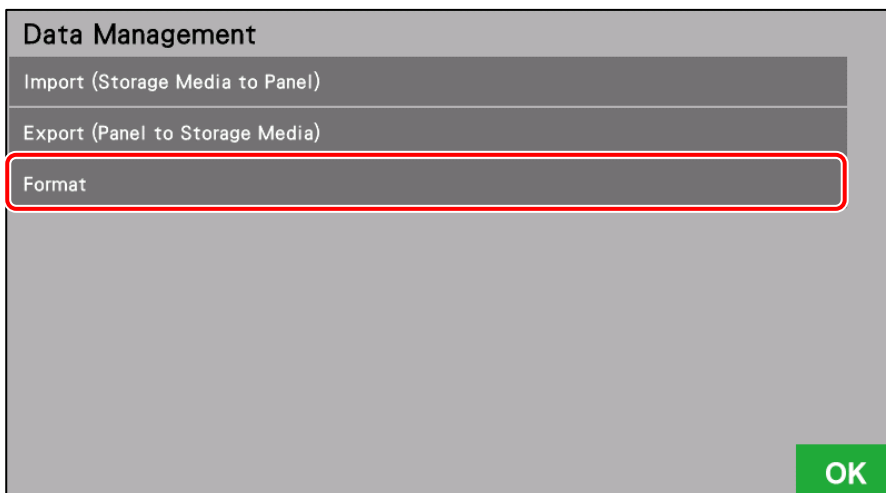
2. Select "Data Management".

[Setting menu screen]



9. USING THE LCD PANEL (ADVANCED OPERATIONS)

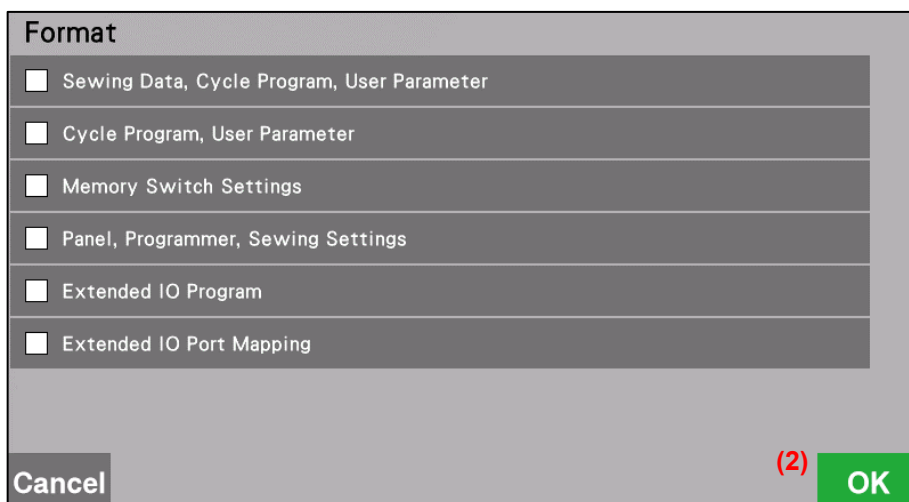
3. Select "Format".



4. The following four items will be displayed for initialization.

- Sewing data, cycle program, user parameter
- Cycle program, user parameter
- Memory Switch Settings
- Panel settings, programmer settings, sewing settings
- Extended IO Program
- Extended IO Port Mapping

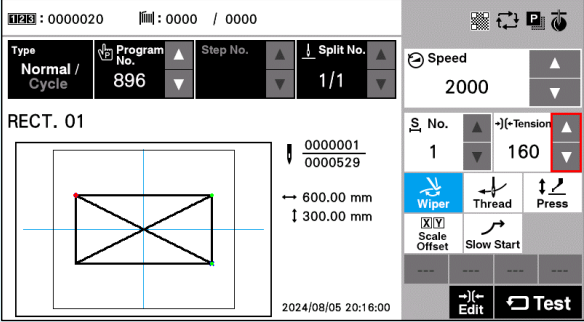
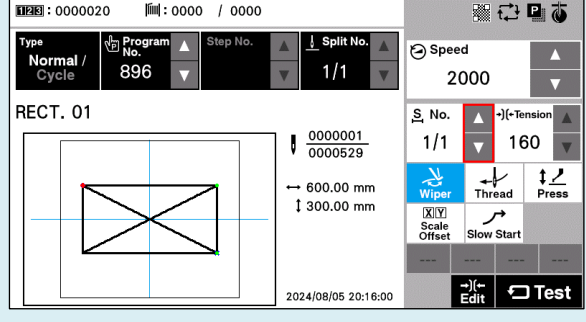
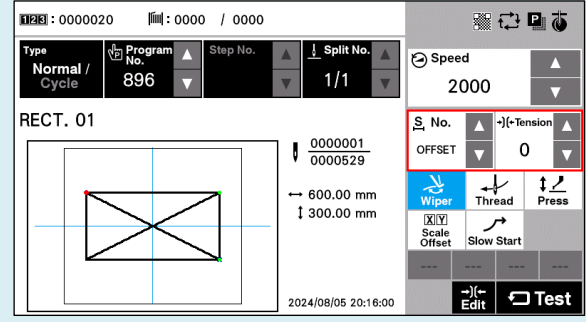
Place a check mark against the items you would like to initialize, and then touch the "OK" key (2) to start the initialization.



5. When initialization is finished, the finished message screen will be displayed.

9-7. Using the digital tension

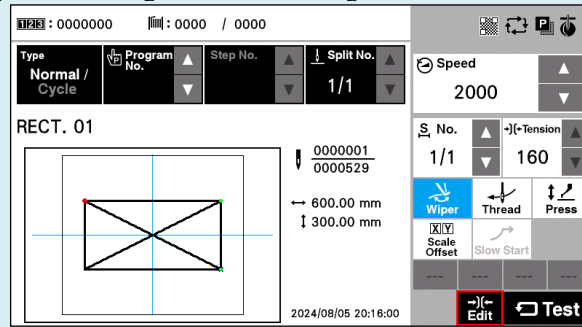
The dedicated tension (a mode which allows the tension value to be changed in the middle of sewing data) can be used by changing the setting for memory switch No. xxx.

Memory switch No. 469=ON For common tension	Memory switch No. 469=OFF For dedicated tension
<p>Sewing screen</p> <p>Changing the tension values</p> <p>The tension values can be changed at the sewing screen. The entire program uses the same tension value, and so there are no sections and the tension value cannot be changed.</p> 	<p>Changing the tension values</p> <p>The tension values cannot be changed at the sewing screen. If multiple tension codes have been set in the sewing data, the sections can be changed.</p> 
<p>Changing the offset value</p> <p>The entire program uses the same tension value, and so the offset value cannot be changed. It is also not displayed.</p>	<p>Changing the offset value</p> <p>The offset value can be changed at the sewing screen. The offset value can be displayed by touching (if the smallest section number is being displayed in the section number display column) or (if the largest section number is being displayed).</p> <p>* What is the offset number?</p> <p>For example, if the tension value is 350 for section No. 1 and the tension value is 200 for section No. 2 and the offset value is -10, the actual tension output value will be 340 for section 1 and 190 for section 2.</p> <p>The offset value is the same for all programs. The reason for using the offset value is to adjust for individual differences between sewing machines.</p> 

9. USING THE LCD PANEL (ADVANCED OPERATIONS)

Switching to digital tension editing mode

When you touch the [Edit] key at the sewing screen, the sewing machine will switch to digital tension editing mode.

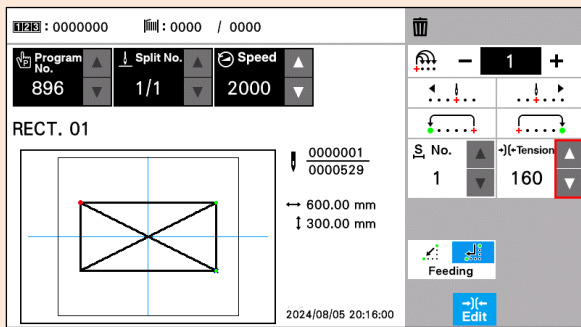


Digital tension editing mode

This mode can be used for editing the tension and carrying out test sewing.

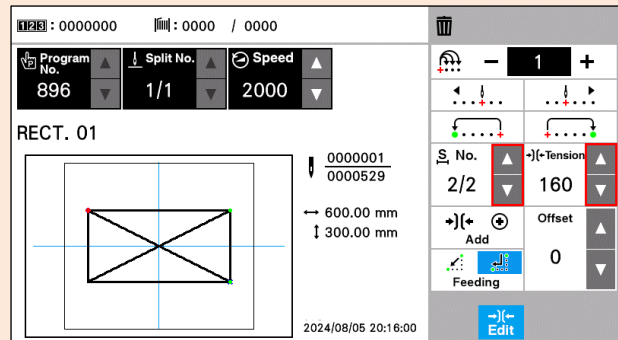
Changing the tension values

The tension values can be changed in digital tension editing mode. The entire program uses the same tension value, and so there are no sections and the tension value cannot be changed.



Changing the tension values

The tension values can be changed in digital tension editing mode. If multiple tension codes have been set in the sewing data, the sections can be changed.

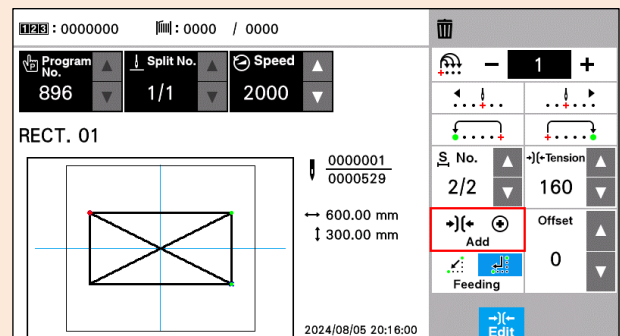


Adding tension codes

Not possible

Adding tension codes

Move to the sewing point where you would like to add a tension code, and then touch the [Add] key to add the tension code. The initial value is the same as the tension value for the previous section.

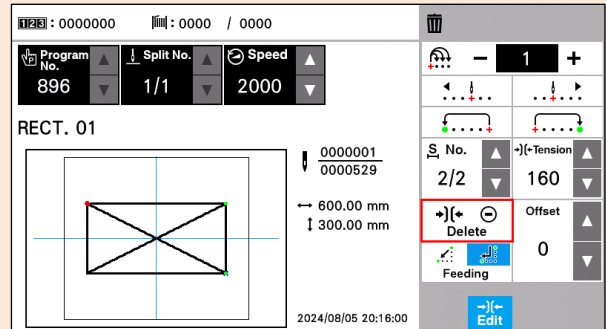


Deleting tension codes

Not possible

Deleting tension codes

Move to the sewing point where the tension code to be deleted is, and then touch the [Delete] key to delete the tension code.

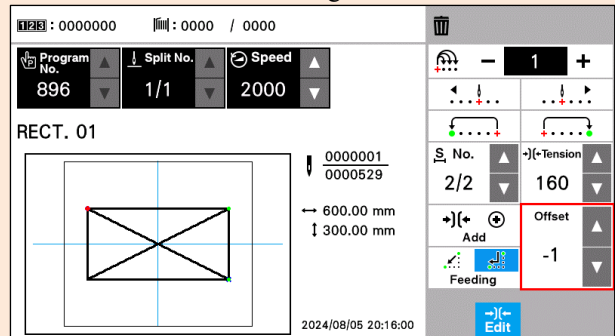


Changing the offset value

Because a single tension value is used for all programs, the offset value cannot be changed. It is also not displayed.

Changing the offset value

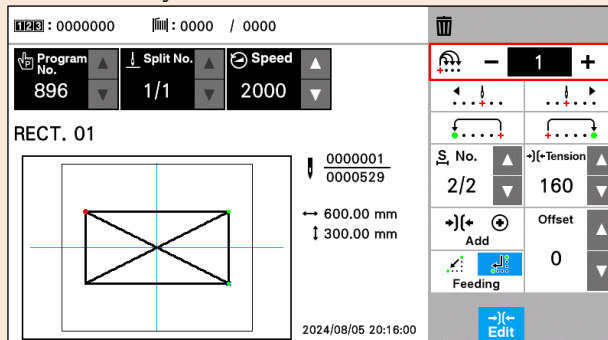
The offset value can be changed.



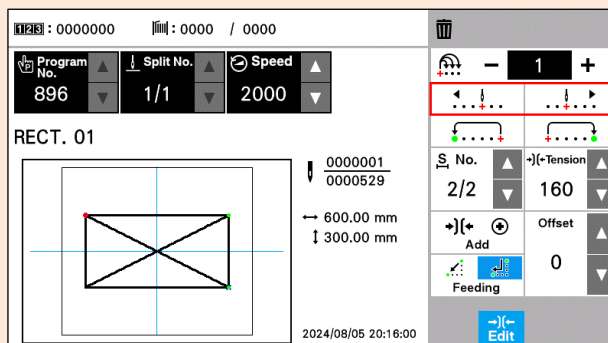
Feeding

Feeding by the specified number of stitches

You can set the number of stitches to move by.

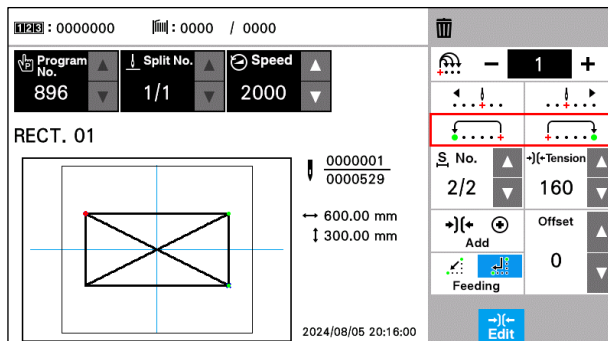


The feed moves forward or backward by the specified number of stitches. (It stops at split codes, and at start and end points.)



Moving to a tension code position

The feed moves from the current sewing position to the next forward or backward tension code. (It does not stop at split codes.)

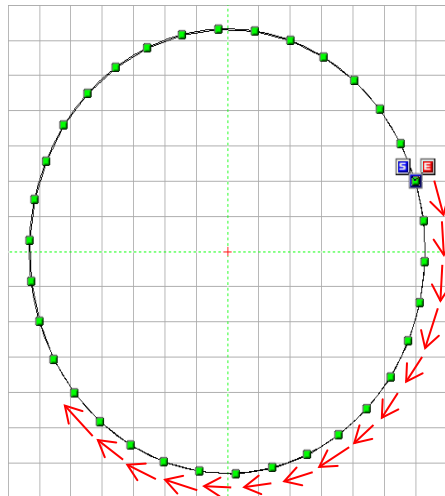
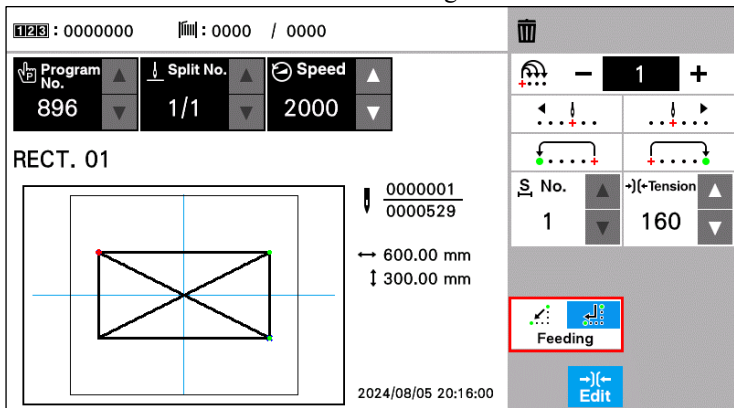


Feed movement method

The feed movement method can be changed. The movement method changes each time the [Feeding] key is touched. The following two movement methods are available.

Following the sewing points

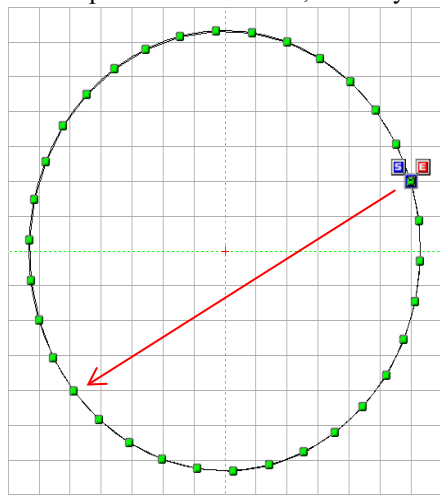
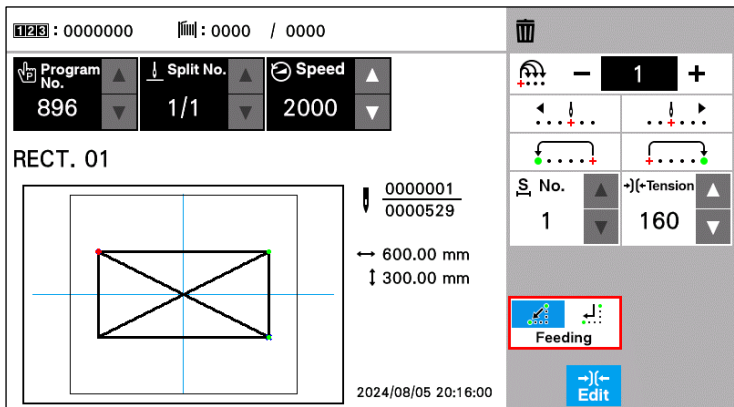
This is the same as the feed method during normal test mode.



Moving along nearly the shortest path

The feed moves from the current sewing point to the target sewing point along a path that is close to the shortest path possible.

* Depending on factors such as the type of work clamp being used, the work clamp and the needle bar, etc. may collide if some paths are used.



9. USING THE LCD PANEL (ADVANCED OPERATIONS)

Carrying out sewing (test sewing)

In digital tension editing mode, sewing is carried out while the left switch (1) and right switch (2) are being depressed, and sewing stops at the point where the start switch is released. Accordingly, it is possible to carry out operations in the order of sewing --> stopping --> changing the tension --> sewing --> and so on, which is useful for setting the tension values so that the target sewing quality can be achieved.

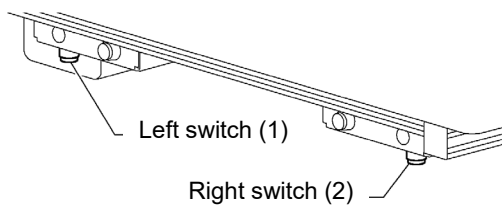
When the left switch (1) and right switch (2) are depressed, sewing starts, and when it is released, sewing stops in the needle down position at that point.

If the start switch is depressed again while sewing is stopped, sewing will continue while the switch is being depressed.

If the work clamp switch is depressed while sewing is stopped, thread trimming is carried out.

* After test sewing has been carried out once, it is not possible to carry out feed operations such as "Feeding by the specified number of stitches" while the status is still the same as before the thread has been trimmed.

When moving the feed, first trim the thread.



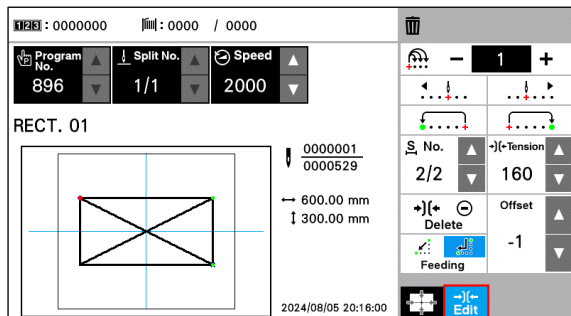
4677B

Switching to the sewing screen (Exiting digital tension editing mode)

When you touch the [Edit] key in digital tension editing mode, the display changes to the sewing screen.

At this time, the edits (tension value changes and tension code additions and deletions) made in digital tension editing mode will be confirmed.

Furthermore, if test sewing is in progress, thread trimming will be carried out when digital tension editing mode is exited.



9-8. Using material thickness detection

The thickness of the material which has been measured using this function is only a guide, and is not a guarantee of measurement of accurate thickness.

When a material detection code which corresponds to the thickness of the material being sewn is set, material setting errors can be prevented.

[NOTE] Material thickness detection and reference height measurement codes operate only when they are set to the following positions:

- The sewing start point
- The point immediately after the feed or basting

9-8-1. Setting the reference height

The method of setting the reference height varies depending on the value for memory switch No. 40.

The value for memory switch No. 40	Setting method
1	The same reference height will be used for all programs
2	Measurement of reference height at sewing start
3	Measurement of reference height by position of reference height measurement code

<When memory switch No. 40 is set to "1">

If you would like to set a reference height that will be common to all programs, set memory switch No. 40 to "1". Refer to "11-6. Editing programs (Editing sewing points)" in the programmer Instruction Manual for details on the setting method for the reference height.

<When memory switch No. 40 is set to "2">

Measurement of the reference height is carried out at the sewing start. There is no need to set the reference height beforehand.

<When memory switch No. 40 is set to "3">

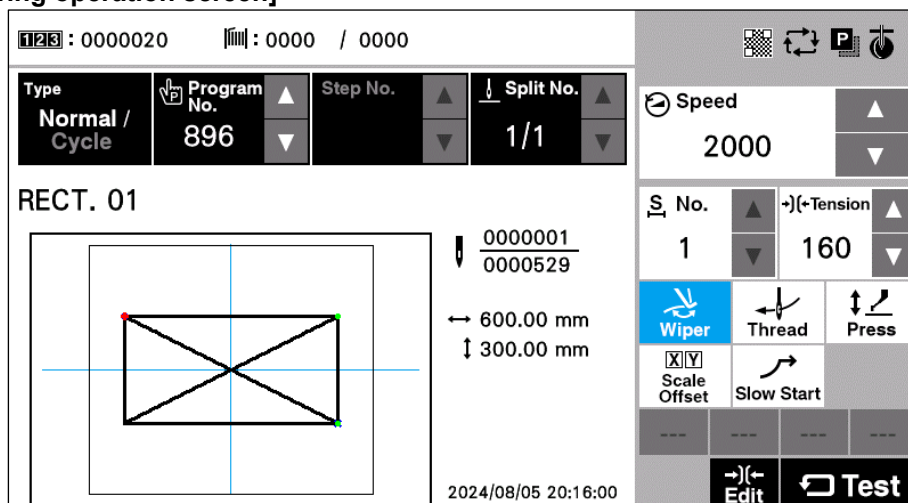
Measurement of the reference height is carried out by the position of the reference height measurement code during sewing. Set the reference height acquisition code at the position where you would like to acquire the reference height for the program. Refer to "11-6. Editing programs (Editing sewing points)" in the programmer Instruction Manual for details on the setting method for the code.

* The reference height measurement code must be set before the material thickness detection code.

9-8-2. Measure the material thickness

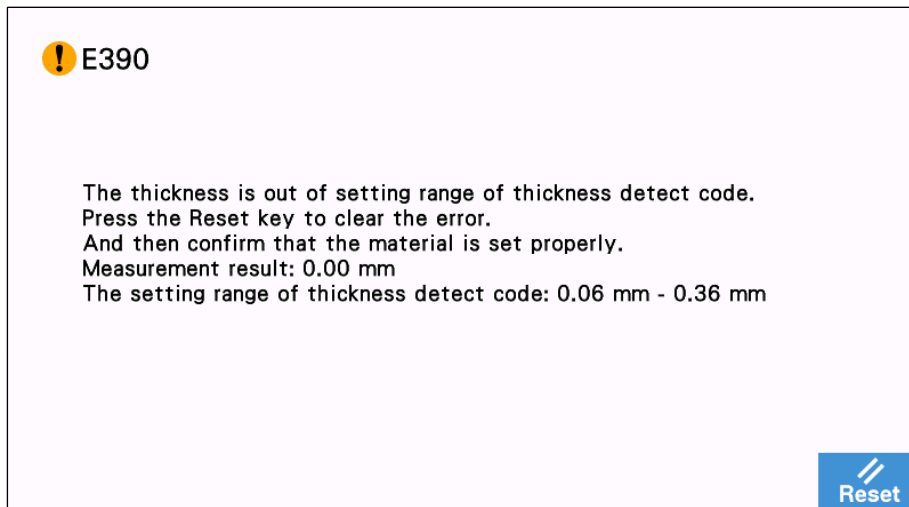
In the sewing operation screen, open the program which contains the material thickness detection code. Refer to the section on adding material thickness detection codes in "11-6. Editing programs (Editing sewing points)" in the programmer Instruction Manual for details on the setting method for the material thickness detection code.

[Sewing operation screen]



9. USING THE LCD PANEL (ADVANCED OPERATIONS)

When the feed reaches the material thickness detection code, the intermittent presser foot drops and the material thickness is measured. If the measurement result is not within the range of the upper limit and lower limit for the thickness which have been set for the material thickness detection code, the following error screen will be displayed.



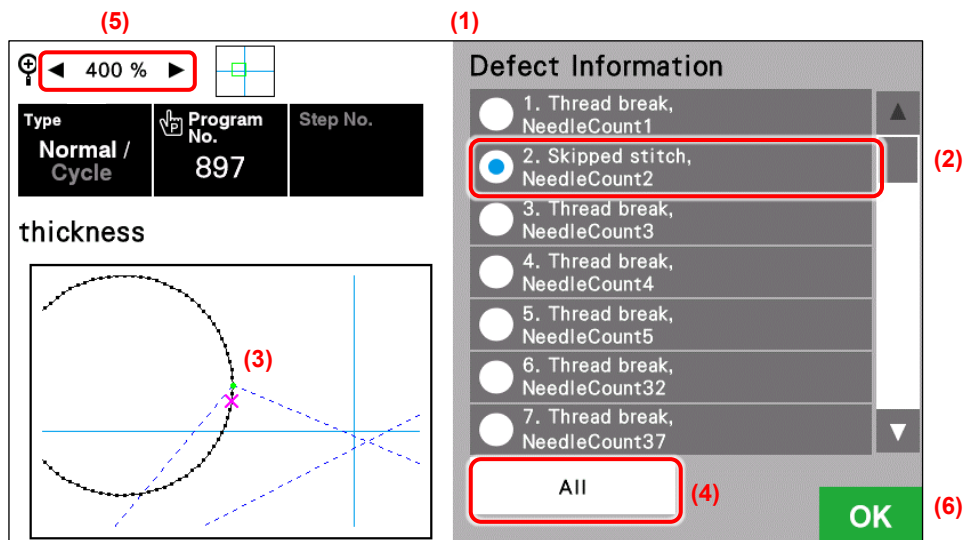
9-9. Using sewing defect detection

Sewing errors including “thread breakages” and “skipped stitches” are detected from position detection using the upper thread tension data and the sewing machine's main shaft motor encoder.

9-9-1. Error result display

When an error is detected during sewing, the sewing machine will stop and the result will be displayed. In addition, all of the problems which occurred during sewing will be displayed in a list at the sewing end. The reference standard for whether or not the sewing machine stops can be changed from the function setting menu. (Refer to "9-9-3. Function setting".)

[Sewing operation screen]

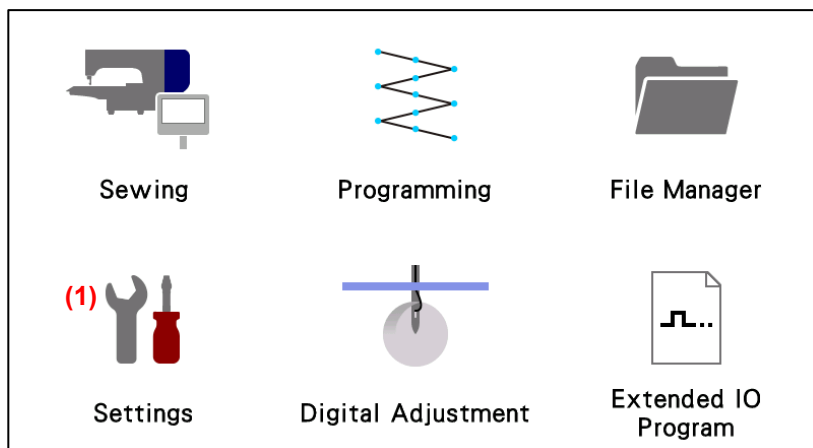


(1)	Error information list	The types of errors detected and the stitch number when they occurred are displayed in a list.
(2)	Selected error information	You can select items in the error information list by clicking on them.
(3)	Selected error position information	The currently-selected error information will be highlighted in the preview screen. * The color will vary depending on the type of error.
(4)	All key	This selects the entire error information list.
(5)	Zoom In/Out key	This zooms in and out of the preview of the sewing data.
(6)	OK key	The result display will close and the display will switch to the sewing screen.

9-9-2. Sewing defect detection menu

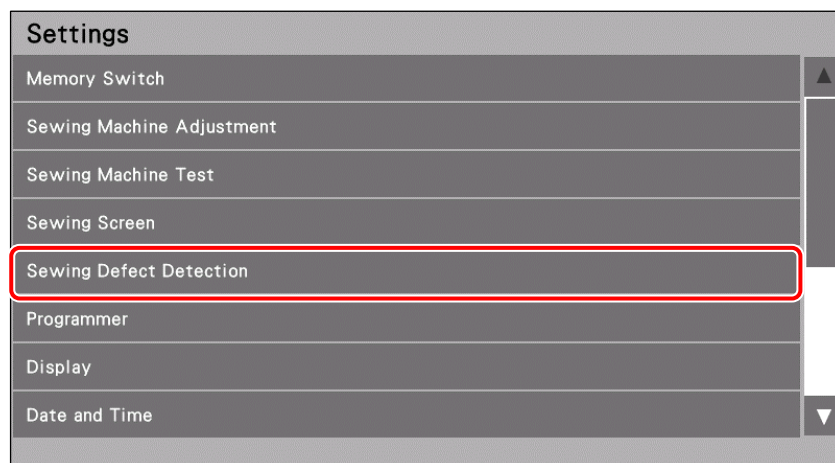
1. Press the HOME key to switch to the [Home screen].
Touch the "Settings" key (1) to switch to the [Setting menu screen].

[Home screen]



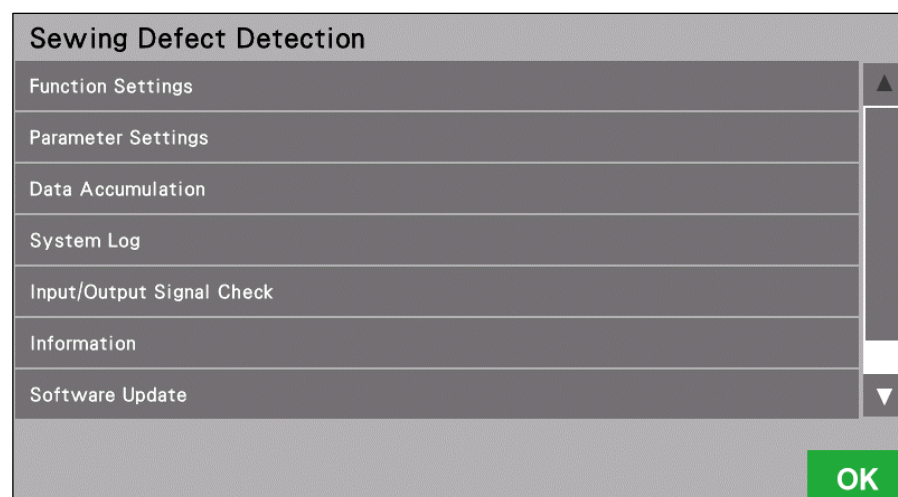
2. Select "Sewing error detection function".

[Setting menu screen]



3. [Sewing Defect Detection menu screen] is displayed.

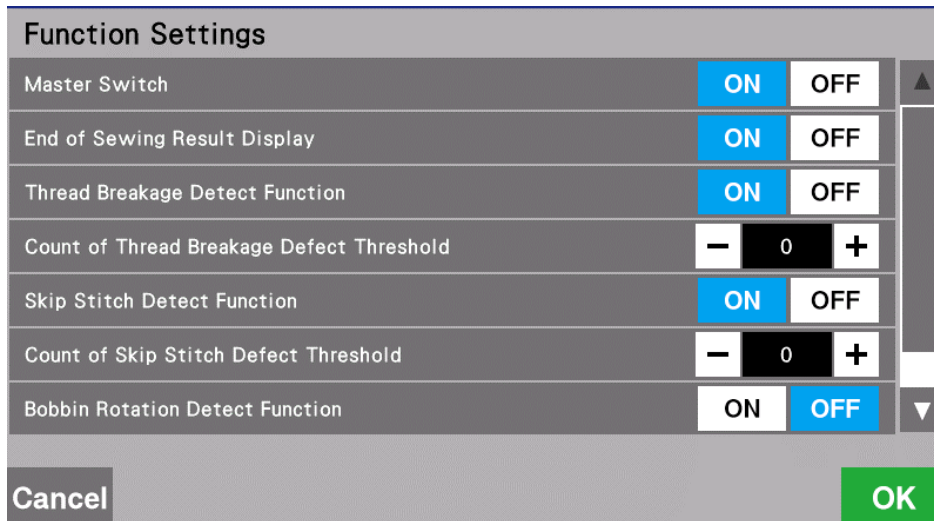
[Sewing Defect Detection menu screen]



9-9-3. Function Settings

Select “Function setting” on the [Sewing Defect Detection menu screen].

[Function Settings]



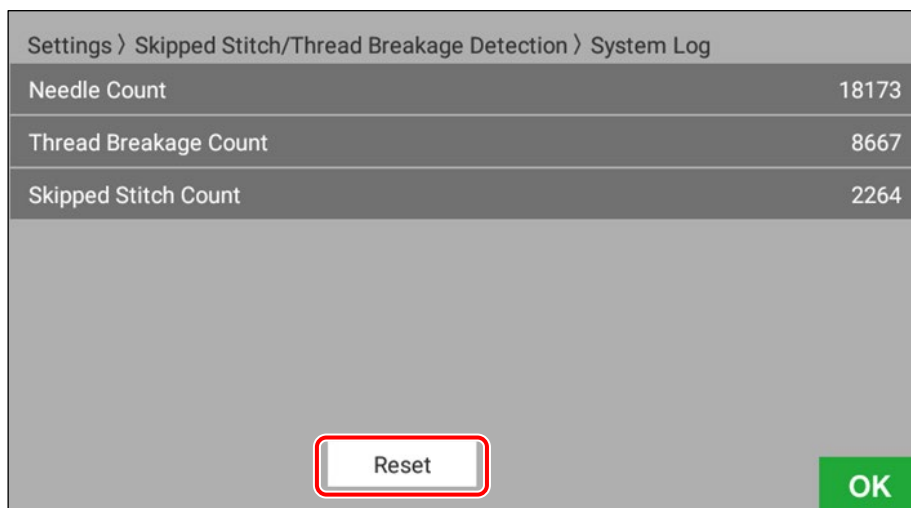
Master Switch	This selects whether the sewing defect detection function is enabled or disabled.
End of Sewing Result Display	This selects whether the sewing defect detection results are displayed or not at the sewing end.
Thread Breakage Detection Function	This selects whether the thread breakage detection function is enabled or disabled.
Thread Breakage Defect Threshold	1 - 100: The sewing machine stops after the set number of thread breakage errors is detected. 0: The sewing machine does not stop.
Skipp Stitch Detect Function	This selects whether the skipped stitch detection function is enabled or disabled.
Skip Stitch Defect Threshold	1 - 100: The sewing machine stops after the set number of skipped stitch errors is detected. 0: The sewing machine does not stop.
Bobbin Rotation Detect Function	This selects whether the bobbin rotation detection function is enabled or disabled.
Bobbins Rotation Failure Count Setting	1 - 100: The sewing machine stops due to the detection of bobbin rotation failure during the setting count. 0: The sewing machine does not stop.

9-9-4. System Log

Select "System Log" on the [Sewing Defect dDetection menu screen].

This displays the cumulative number of stitches and the number of errors. Press "Reset" to clear all of the counters and return them to "0".

[System Log]



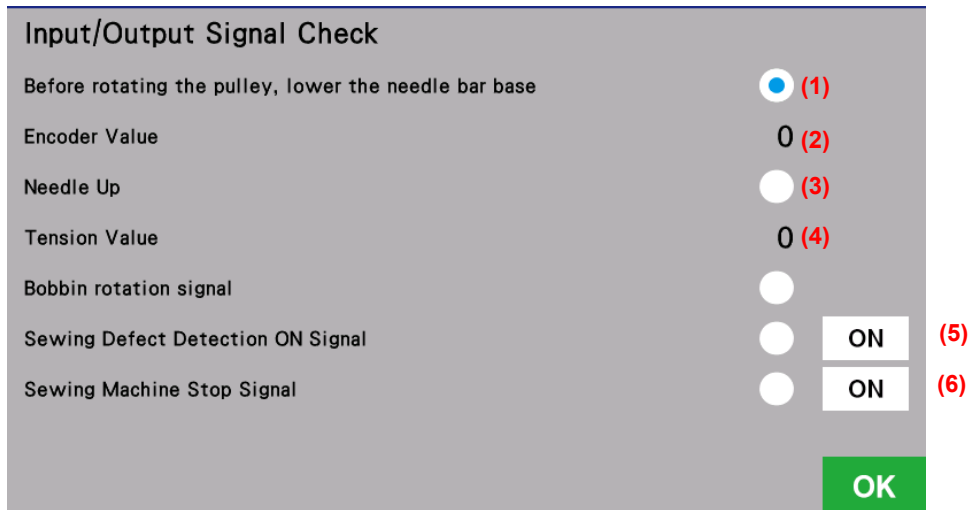
Settings › Skipped Stitch/Thread Breakage Detection › System Log	
Needle Count	18173
Thread Breakage Count	8667
Skipped Stitch Count	2264

Reset OK

9-9-5. Input/Output Signal Check

In the [Sewing Defect Detection menu screen], select “Input/Output Signal Check”. This lets you check the input and output signals for the sewing defect detectors.

[Input/Output Signal Check]



(1)	Encoder Value	Main shaft motor encoder value
(2)	Needle Up	Needle up signal
(3)	Tension Value	Upper thread tension
(4)	Bobbing rotation signal	Signal for detecting bobbin rotation
(5)	Sewing Defect Detection ON Signal	This signal switches the defect detector to enable or disable defect detection.
(6)	Sewing Machine Stop Signal	This signal stops the sewing machine when an error occurs.

9-9-6. Information

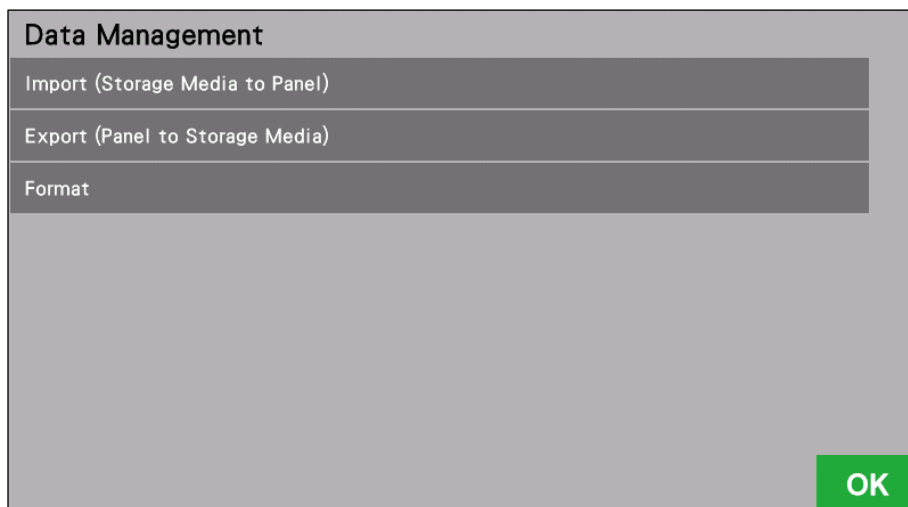
In the [Sewing Defect Detection menu screen], select “Information”.

Displays the serial number, software version, etc. of the sewing defect detection device.

9-9-7. Data Management

In the [Skipped Stitch/Thread Breakage Detection menu screen], select "Data Management". The following [Data Management] screen will be displayed.

[Data Management]



9-9-7-1. Import

In the [Data Management] screen, select "Import (Data Recording Media -> Panel)".

Items to be imported	File name	Folder name
Parameter setting values	sddsettings.ism	\BROTHER\ISM\ISMDK**\ (The sewing machine's ID code appears in the ** part. The ID code can be set using memory switch No. 752.)

The parameter setting values to be read will be displayed. Select the check box and then touch the "OK" key to start reading. When reading is finished, the finished message screen will be displayed.

9-9-7-2. Export

In the [Data Management] screen, select "Export (Panel -> Data Recording Media)".

The following item will be displayed for writing.

- parameter setting values

Select the check box and then touch the "OK" key to start writing. When writing is finished, the finished message screen will be displayed.

You can export the error detection data to the data recording media by selecting "Log".

Items to be imported	File name	Folder name
Parameter setting values	sddsettings.ism	\BROTHER\ISM\ISMDK**\ (The sewing machine's ID code appears in the ** part. The ID code can be set using memory switch No. 752.)

9-9-7-3. Initialization

In the [Data Management] screen, select "Format".

The parameter setting values to be initialized will be displayed. Select the check box and then touch the "OK" key to start initialization. When initialization is finished, the finished message screen will be displayed.

10.USING STORAGE MEDIA



CAUTION



Do not connect anything to the USB media other than the USB memory. If this is not observed, problems with operation may result.
To prevent problems, do not use objects with sharp points to operate the LCD panel.

10-1. Notes on handling

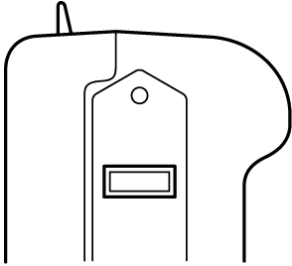
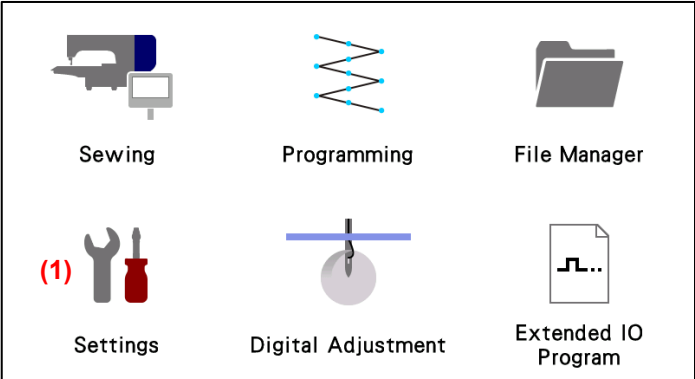
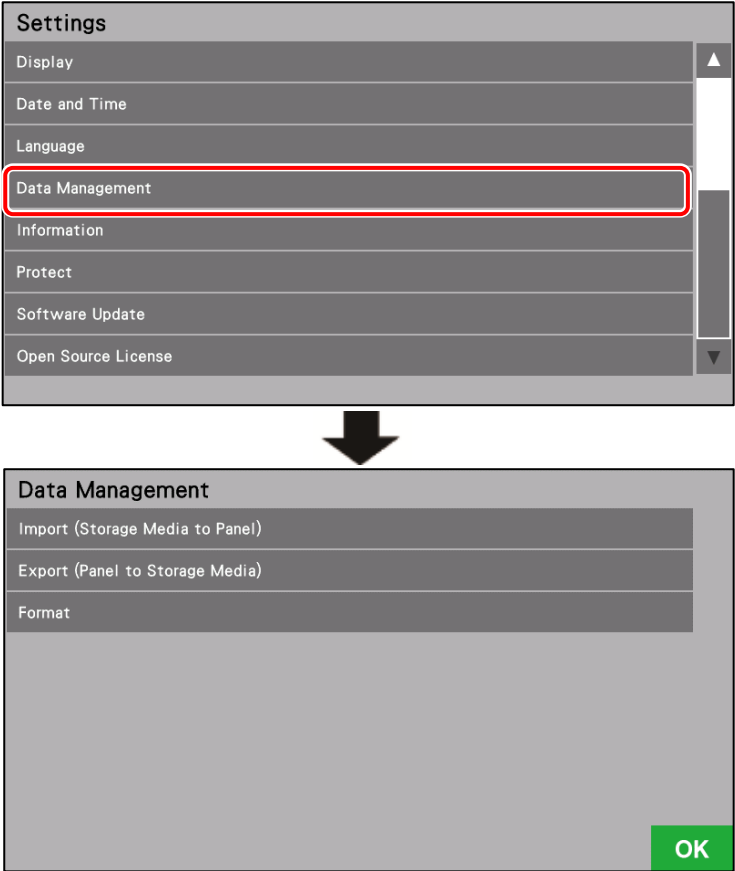
<USB media>

- Compatible file formats: FAT16, FAT32
- Max. size: 32 GB

10-2. Folder structure

Data type	File name	Folder name
Sewing data	ISMS0***.SEW ISMS0***.EMB (*** is the program number.)	.SEW: \BROTHER\ISM\ISMDK**\sew .EMB: \BROTHER\ISM\ISMDK**\emb (The sewing machine's ID code appears in the ** part. The ID code can be set using memory switch No.752.)
Memory switch	memorysw. ism	\BROTHER\ISM\ISMDK**
User parameter	userparam. ism	\BROTHER\ISM\ISMDK**
Cycle program	ISMICYC**.SEW (** is the cycle program number.)	\BROTHER\ISM\ISMDK**\cyc
Extended I/O Program	ISMSEQ00.seq	\BROTHER\ISM\ISMDK**\seq
Extended I/O Port Allocation	portmap.ism	\BROTHER\ISM\ISMDK**
Panel setting values	settings.db	\BROTHER\ISM\ISMDK**
Error log	e*****. ism m*****. ism (***** is the serial number.)	\BROTHER\ISM\ISMLDT\

10-3. Importing and exporting data

<p>1</p>	<p style="text-align: center;">USB port</p> 	<p>Insert an SD card or USB media.</p> <p>[NOTE]</p> <ul style="list-style-type: none"> • Make sure that the media is facing the correct way when inserting it. • Always be sure to keep the cover closed except when inserting and removing the media, otherwise dust may get inside and cause problems with operation.
<p>2</p>	<p>[Home screen]</p>  <p>[Setting menu screen]</p> 	<ul style="list-style-type: none"> • Press the HOME key to switch to the [Home screen]. • Touch the Settings key (1) to switch to the setting menu screen. • If you select "Data Management" > "Import (Storage Media to Panel)", the display switches to the import screen. If you select "Data Management" > "Export (Panel to Storage Media)", it switches to the [Export screen].
<p>3</p>	<p>Select the items to be imported or exported, and then touch the "OK" key (2).</p>	

10-4. Importing items of sewing data separately

If you would like to import sewing data separately, do it from the file manager screen.
For details, refer to "12. File management".

11. Program Creation

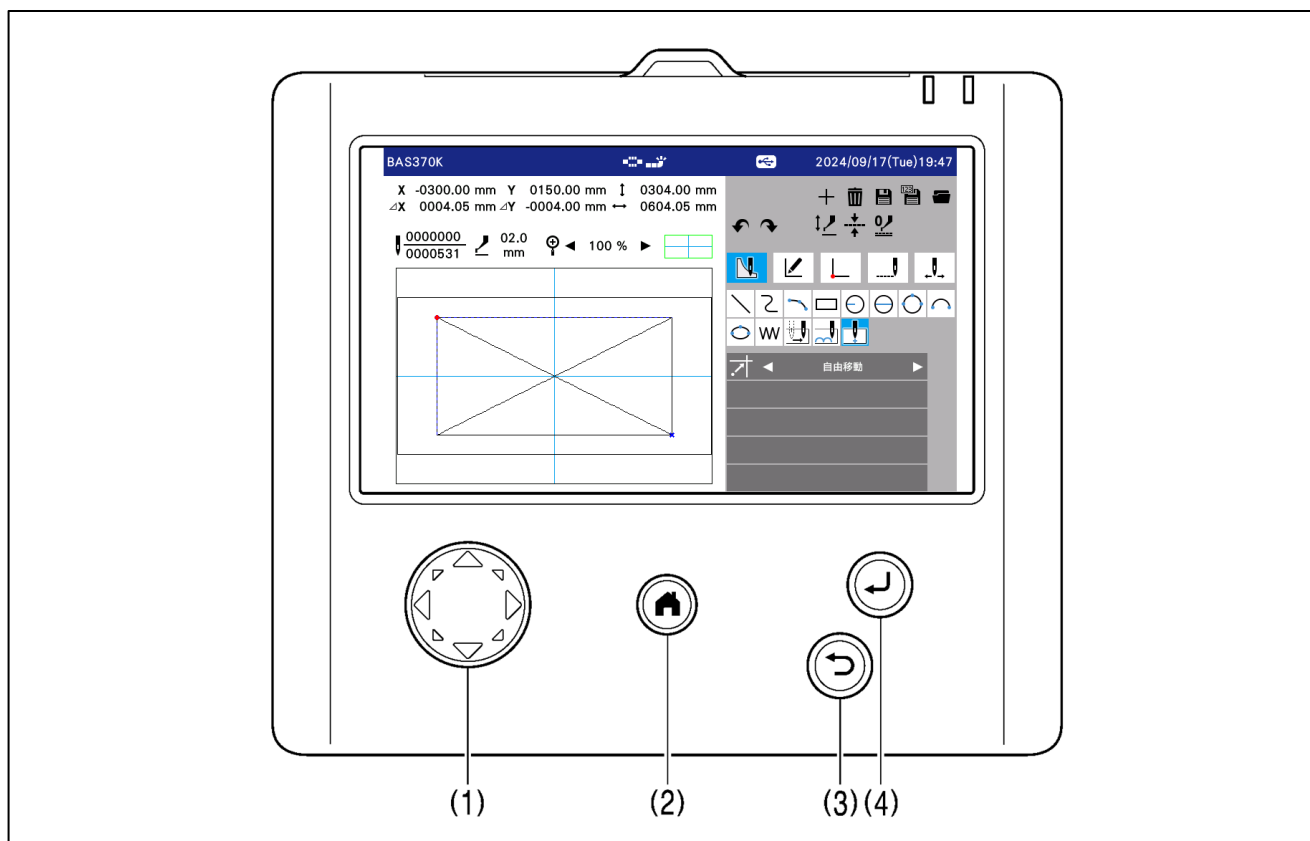
11-1. How to create a program

While being operated by the programmer, a number of icons are displayed on the screen which illustrate its operations and functions.

This chapter describes the procedure for programming with icons.

11-1-1. Keys to be used


Below is an explanation of the keys which are used when programming.

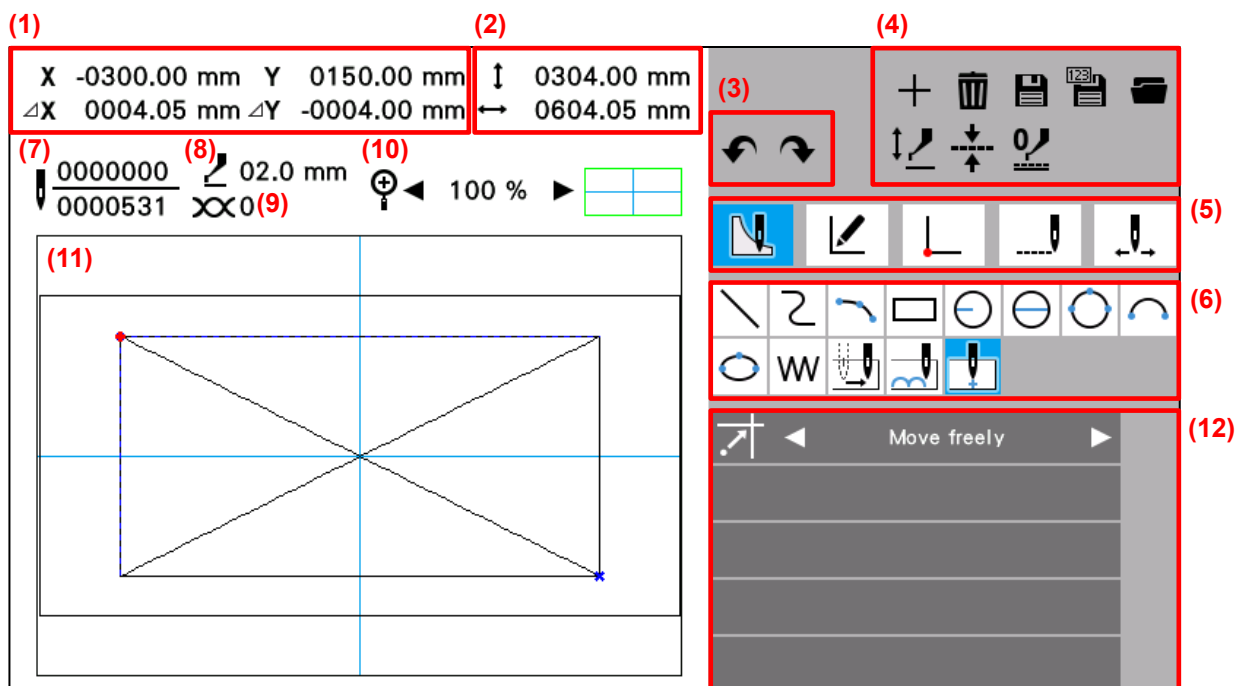
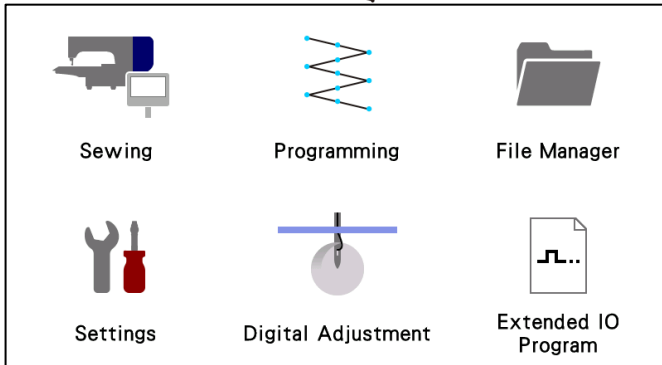


(1) JOG Key	This key is used when programming sewing data.
(2) HOME Key	This key is used to return to the home screen.
(3) BACK Key	This key is used to return to the previous step or to cancel the changed settings.
(4) ENTER Key	This key is used for operations such as confirming settings.

11. Program Creation

11-1-2. About the programming screen















At the Home screen, touch  to display the programming screen.



(1)	Shows the difference between the current cursor position the position at the previous step.
(2)	Shows the size of the program.
(3)	Use to redo and restore programs
(4)	Used to delete all programs and to save and load programs.
(5)	Shows icons which can be used in the various modes.
(6)	Switches the mode.
(7)	Shows the current number of needle positions and the total number of stitches.
(8)	Show the height of the intermittent presser foot at the current needle position.
(9)	Show the digital tension setting value at the current needle position.
(10)	Use to display and change program zoom ratio and zoom position.
(11)	Shows an image of the program.
(12)	Sets the values used by the various functions.

















11-1-3. Description of icons








Programming








 Creating data	 Creating a line
	 Creating a curve
	 Creating an arc
	 Creating a rectangle
	 Creating a circle of the specified radius (clockwise or counterclockwise)
	 Creating a circle of the specified diameter (clockwise or counterclockwise)
	 Creating a circle by specifying three points
	 Creating a semicircle
	 Creating an ellipse
	 Creating needle drop data
	 Creating feed data
	 Creating basting data
	 Specifying the sewing start point

11. Program Creation

Editing programs






 Editing outlines	 Deleting an outline
	 Moving an outline
	 Copying an outline
	 Rotating an outline
	 Moving an outline symmetrically
	 Copying an outline symmetrically
	 Moving an outline by an offset
	 Copying an outline by an offset
	 Resizing an outline
	 Changing the line type of an outline
	 Adding and deleting backtick stitches for an outline
	 Switching the sewing start and end points for outlines
	 Changing the connection method for an outline
	 Combining outlines
	 Changing the sewing order for an outline

 <p>Editing outline component points</p>	 <p>Deleting an outline component point</p>
	 <p>Moving an outline component point</p>
	 <p>Adding an outline component point</p>
	 <p>Changing curve shapes</p>
	 <p>Changing the attributes of outline component points</p>
	 <p>Separating an outline at a component point</p>









 <p>Editing sewing points</p>	 <p>Deleting a sewing point</p>
	 <p>Moving a sewing point</p>
	 <p>Adding a sewing point</p>
	 <p>Changing the attributes of sewing points</p>
	 <p>Separating an outline at a sewing point</p>
	 <p>Setting bar tacking at a sewing point</p>
	<p>CODE Adding and deleting codes at sewing points</p>

11. Program Creation

Checking programs



 Checking	 Moving backward one stitch at a time
	 Moving forward one stitch at a time
	 Moving to the start position
	 Measuring distances

Buttons for running external functions

	Creating a new file
	Deleting all changes to the program being edited
	Saving
	Saving with a different filename
	Opening a file
	Operating the intermittent presser foot [*1]
	Measure the material thickness [*1]
	Set the reference height for material thickness [*1]

[*1] Displayed only when the sewing machine is operating.

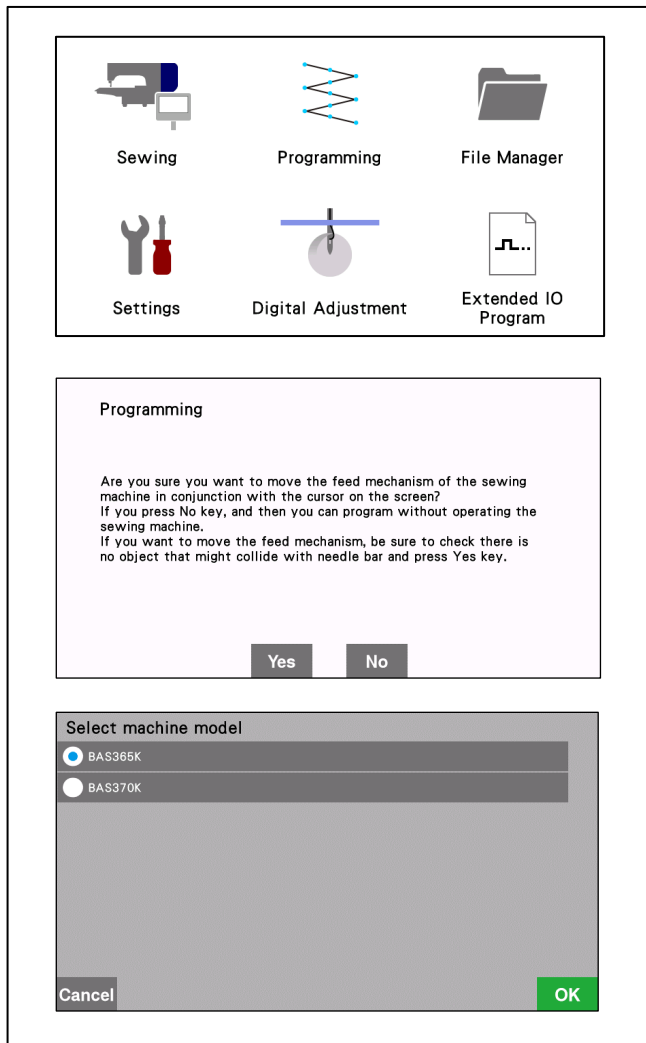
Other


	Undoing changes
	Redoing changes

11-2. Programming procedure

The procedure for programming with icons is as follows.

■1. Displaying the programming screen



1. At the Home screen, touch .

2. The programming screen will be displayed.

If you press **Yes** when the following message is displayed, the sewing machine will operate and programs can then be created.

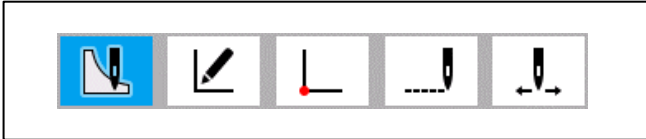
Furthermore, if you press **No** on the screen, the model selection screen will be displayed, so select the applicable model and then touch **OK**. At this time, you can create programs without operating the sewing machine.


If the message on the left is displayed, press **Yes** to start again from the program which was not saved when operation was last stopped.

If a program is currently being created, the dialog screen shown on the left will be displayed.

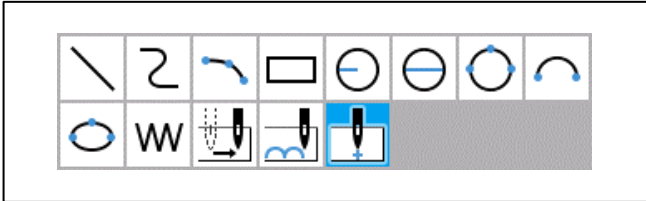
11. Program Creation



■2. Starting program creation



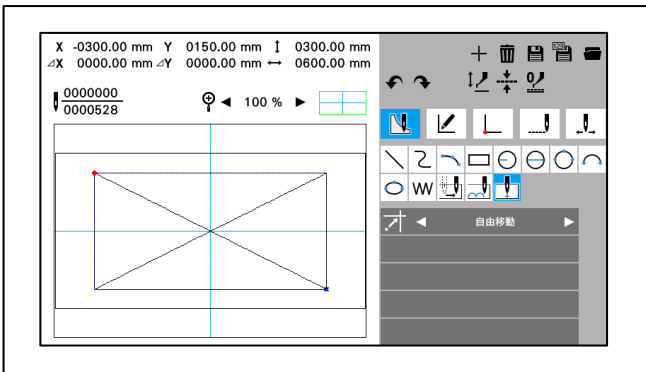
1. Touch .

■3. Set the sewing start position.



1. Touch .
2. Use the jog key to move the cursor in the + direction.
3. Once you have set the sewing start position, press .


■4. Creating program



1. Select the desired icon from the icons in the top-right corner of the screen, and then create a program for the design you would like to sew. The programs you create are enabled until you delete them.
2. For detailed explanations on creating programs, refer to "11-3. Creating programs" and "11-8. Programming example".

■5. Saving the created program



1. For details on the operation method, refer to "Chapter 12. File management".
2. Touch .

< When saving a new program >

The first screenshot shows a 'Name' input field containing '104'. Below it is a numeric keypad with buttons for digits 0-9, a backspace key, and up/down arrow keys. 'Cancel' and 'OK' buttons are at the bottom.

The second screenshot shows a 'Comment' input field containing '4 Feeds w/split code'. Below it is a full QWERTY keyboard with a backspace key and arrow keys. 'Cancel' and 'OK' buttons are at the bottom.

1. The numeric keypad screen will be displayed, so touch the keys to enter the program number. Touch **OK** to continue to the comment entry screen. Touch **Cancel** to return to the programming screen without saving the changes.
2. The keyboard screen will be displayed, so touch the keys to enter a comment. When you touch **OK**, the file will be saved in the panel internal memory and the display will return to the programming screen. Touch **Cancel** to return to the programming screen without saving the changes.

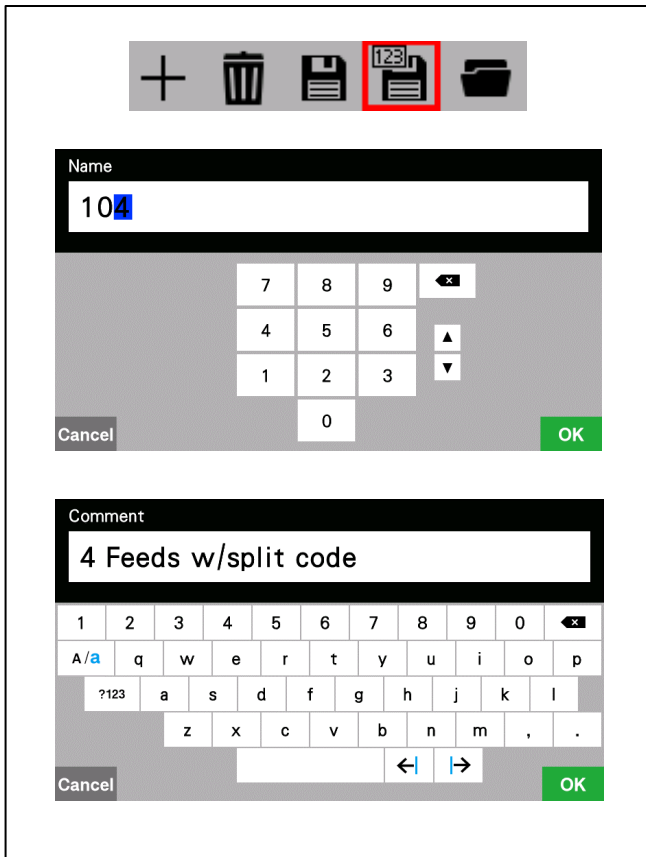
< When overwriting an existing program number >


The dialog box has a title bar 'Programming'. The main text reads: 'Unsaved changes exist. Are you sure you want to exit the editor? If you press the Yes key, and then changes are discarded.' At the bottom are 'Yes' and 'No' buttons.

1. The program saving dialog screen will be displayed, so touch **Yes** to overwrite the existing file. Touch **No** to return to the programming screen.

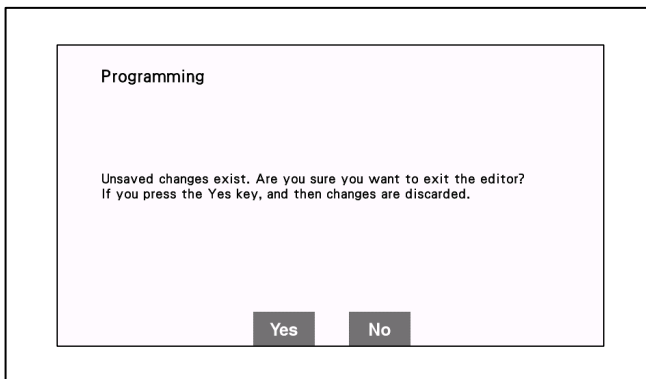
11. Program Creation


■6. Saving programs with a different name



1. Touch  .
2. The numeric keypad screen will be displayed, so touch the keys to enter the program number. Touch **OK** to continue to the comment entry screen. Touch **Cancel** to return to the programming screen without saving the changes.
3. The keyboard screen will be displayed, so touch the keys to enter a comment. When you touch **OK**, the file will be saved in the panel internal memory and the display will return to the programming screen. Touch **Cancel** to return to the programming screen without saving the changes.
4. When you touch **OK** on the numeric keypad screen or the keyboard screen, the file will be saved in the panel internal memory and the display will return to the programming screen. Touch **Cancel** to return to the programming screen without saving the file.


■7. Ending programming



1. Press  at the programming screen. (The display will return to the Home screen.)
2. If a program is currently being created, the dialog screen shown on the left will be displayed. Touch **Yes** to discard the program which has been completed and end programming. Touch **No** to return to the programming screen.

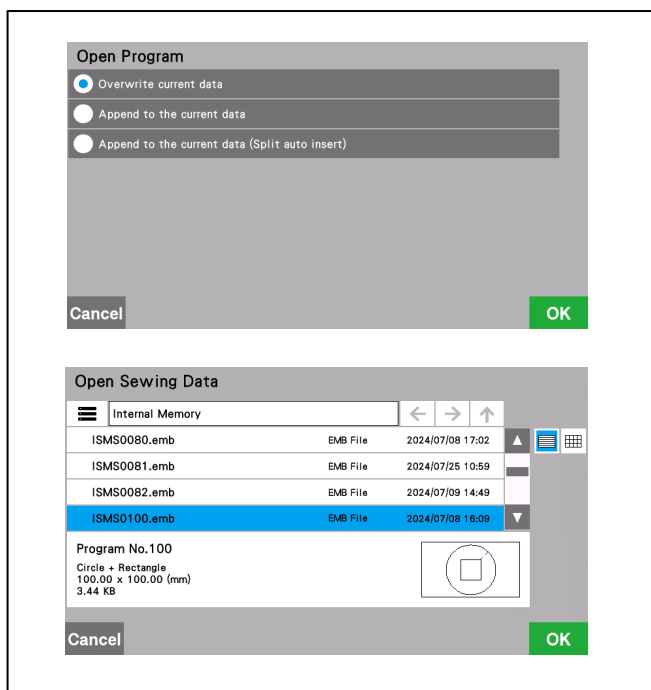
■8. Loading programs which have already been created




1. For details on the operation method, refer to "Chapter 12. File management".
2. Touch  .

If there is a program which is currently being created, the following dialog screen will be displayed. Select either [Overwrite current data], [Append to the current data] or [Append to the current data (Split Auto Insert)], and then touch **OK** . Refer to the following for details on each selection item.


Selection item	Operation
Overwrite current data	Discard the data which is currently being created, and display the data which has been loaded.
Append to the current data	The data is connected via feeding to the end of the program which is currently being edited.
Append to the current data (Split Auto Insert)	The data is connected via feeding to the end of the program which is currently being edited, and a code (split) is inserted at the beginning of the loaded data.



3. Touch  to select the media to load the file from, and then navigate to the folder to load the file from.
4. Select the file to be loaded from the file list, and then touch **OK** .
5. The details of the file which have been loaded will appear in the programming screen.

■9. Deleting programs



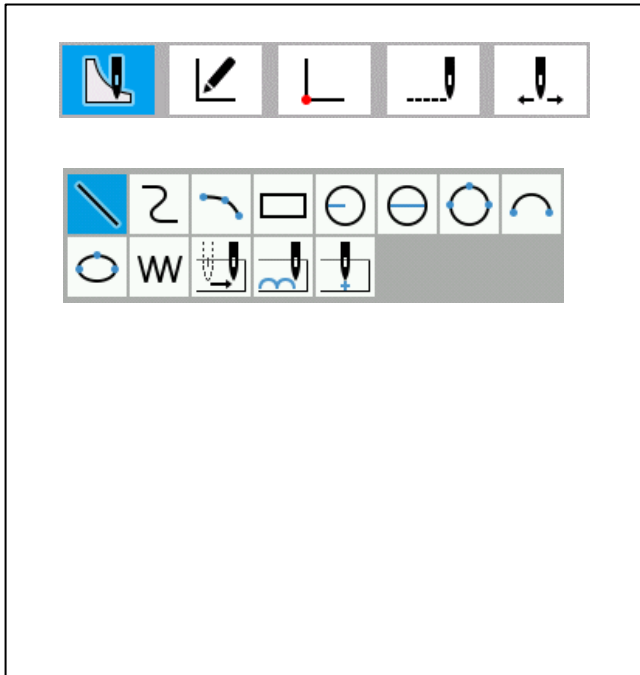
1. Touch  .
2. The program which is currently being edited will be deleted and the display will return to the initial status.





11-3. Creating programs

This section describes icons used for creating and editing program and how to use them.

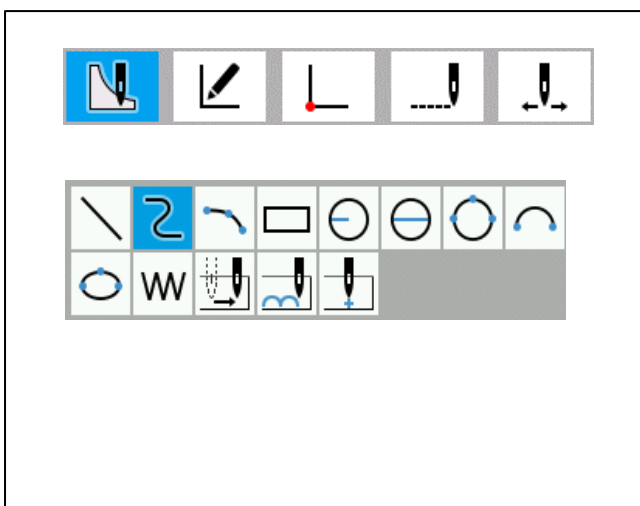
- * For details about operations, refer to "11-8. Programming example".
- * For details on the setting method for zigzag stitches, refer to "11-8-9. Zigzag stitch".
- * In the program, ● indicates the sewing start point and × indicates the sewing end point.





11-3-1. Creating a line

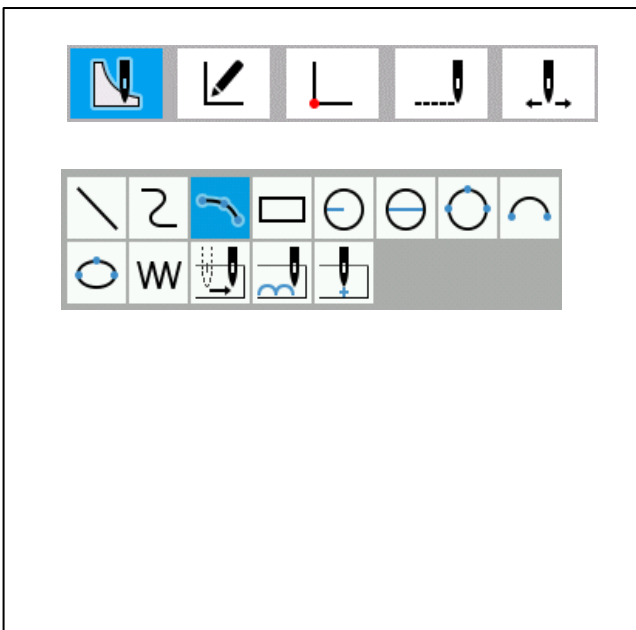








1. Touch .
2. Touch .
3. Make the settings for each item.
 - * Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor + to the next point, and then press .
5. Repeat step 4 until the shape you would like to sew has been created. Move the cursor + to the end point, and then press  twice.
 - * You can connect straight lines, curves and arcs together.

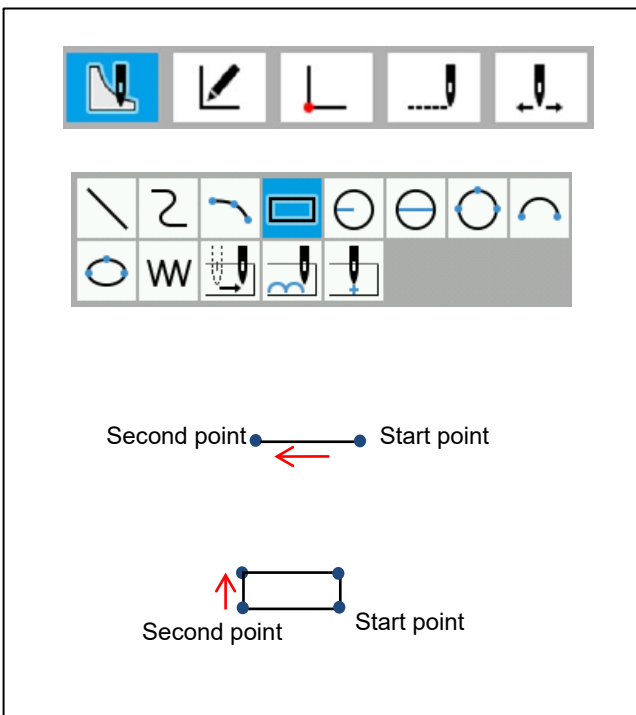
11-3-2. Creating a curve









1. Touch .
2. Touch .
3. Make the settings for each item.
 - * Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor + to the next point, and then press .
5. Repeat step 4 until the shape you would like to sew has been created. Move the cursor + to the end point, and then press  twice.

11-3-3.  Creating an arc

1. Touch .
2. Touch .
3. Make the settings for each item.
 - * Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor  to the second point, and then press .
5. Use the jog key to move the cursor  to the third point, and then press .
 - * If you would like to create more than three points for the arc, you can continue entering more points.



11-3-4.  Creating a rectangle

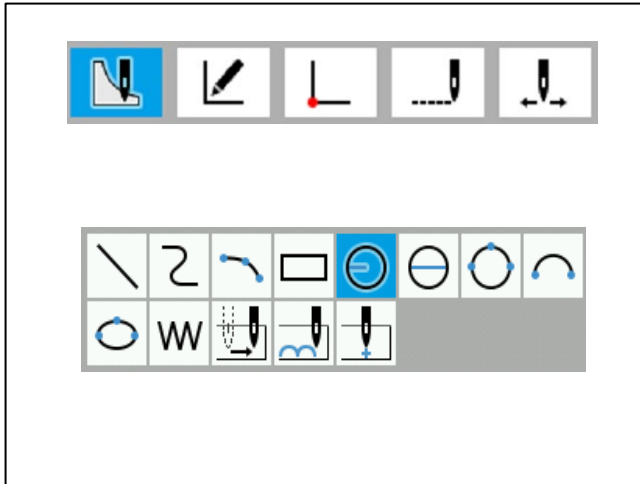
1. Touch .
2. Touch .
3. Make the settings for each item.
 - * Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor  to the second point, and then press .
5. Use the jog key to set the rectangle shape.


To create the rectangle shape, move the cursor  from the single side which was created in step 4 to the desired position for the rectangle, and then press .

11-3-5.    Creating a circle





The following three options are available for creating a circle.

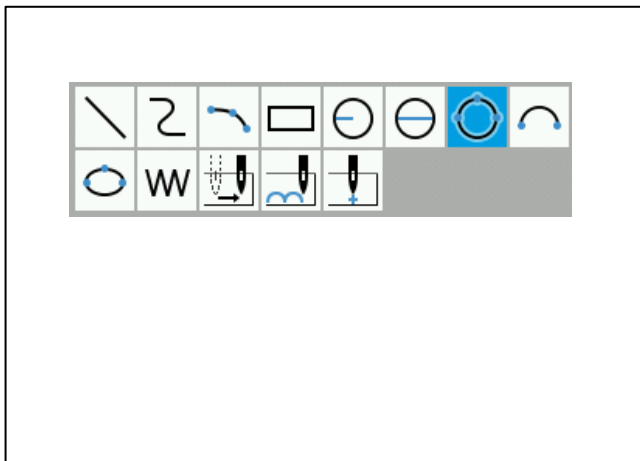
-  Specify a radius to create a circle (clockwise or counterclockwise)
-  Specify a diameter to create a circle (clockwise or counterclockwise)









1. Touch .

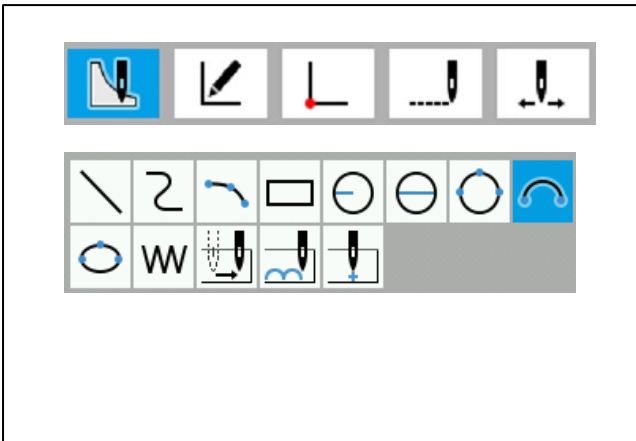
< If   is selected >




2. Touch  or .
3. Make the settings for each item.
 - * Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor  to the second point, and then press .

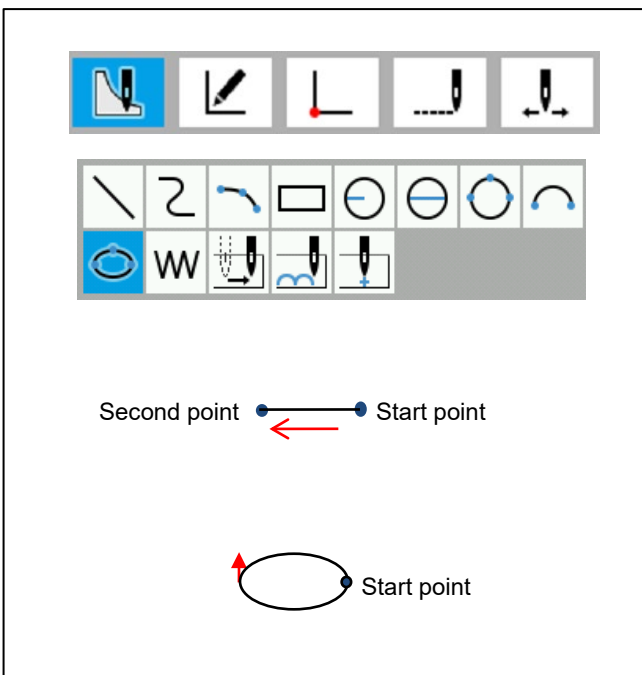






< If  is selected >

2. Touch .
3. Make the settings for each item.
 - * Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor  to the second point, and then press .
5. Use the jog key to move the cursor  to the third point, and then press .

11-3-6.  Creating a semicircle

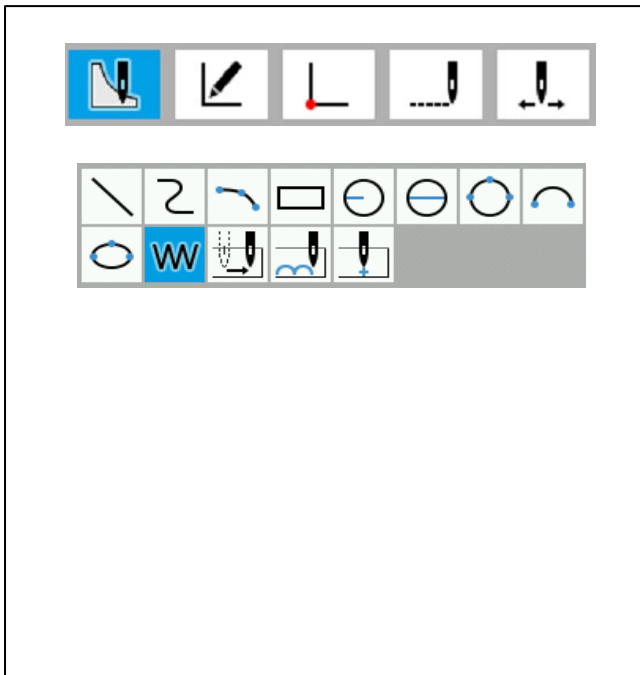
1. Touch  .
2. Touch  .
3. Make the settings for each item.
* Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor **+** to the point which you would like to set, and then press .



11-3-7.  Creating an ellipse


1. Touch  .
2. Touch  .
3. Make the settings for each item.
* Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor **+** to the second point on the long axis (short axis), and then press .
5. Use the jog key to move the cursor **+** to the position for the short axis (long axis), and then press .

11-3-8. **W** Creating needle drop data

Create needle drop data for the current needle position.

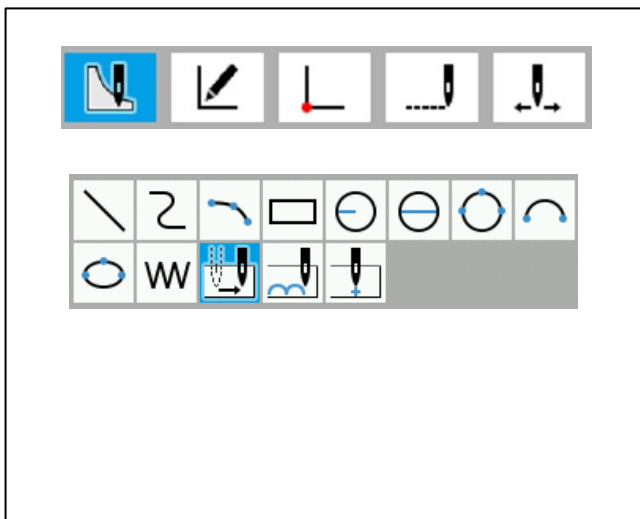





1. Touch .
 2. Touch **W**.
 3. Make the settings for each item.
* Refer to “11-3-11. Setting parameters” for details on the setting method.
 4. Use the jog key to move the cursor **+** to the point where you would like to set the needle down position, and then press .
- To change the maximum pitch, carry out the same procedure as in step 3 to change the setting.
5. Repeat step 4 until the needle drop position can be set.

Move the cursor **+** to the end point, and then press  twice.

11-3-9.  Creating feed data

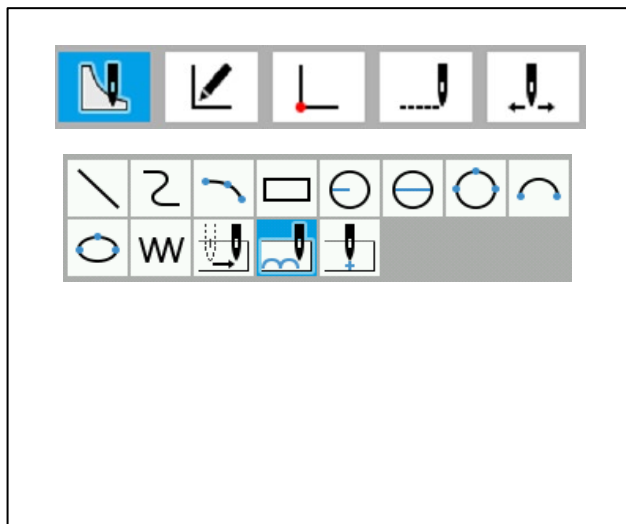
Create (feed) data to move the needle to the next position without needle drop at the current position.







1. Touch .
2. Touch .
3. Make the settings for each item.
* Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor **+** to the point where you would like to set the feed, and then press  twice.

11-3-10. Creating basting data

Create basting data.



1. Touch .
2. Touch .
3. Make the settings for each item.
* Refer to “11-3-11. Setting parameters” for details on the setting method.
4. Use the jog key to move the cursor **+** to the point where you would like to set basting, and then press .
5. Repeat step 4 until the basting position can be set.











Move the cursor **+** to the end point, and then press  twice.

11-3-11. Setting parameters













Operation method

Parameters are displayed in a list at the right edge of the screen, so touch ◀ ▶ to make the settings.

Details of parameter settings

Icon	Parameter	Choices
	Method for Appending [*1]	Insert, Append to beginning, Append to end
	Method for moving cursor	Move freely, Snap to needle point
	Rotation direction [*2]	Clockwise, Counterclockwise
	Line type	Running, V Zigzag, N Zigzag
	Running pitch [*3]	0.3 - 20.0 mm
	Zigzag pitch [*4]	0.1 - 25.5 mm
	Zigzag left width [*4]	0.0 - 25.5 mm
	Zigzag right width [*4]	
	Number of zigzag stitches [*4]	2 - 6 stitches
	Running generation mode [*3]	Equal Pitch, Prioritize Pitch

11. Program Creation

Icon	Parameter	Choices
	Backtack entry mode	No Back Tack, V Back, N Back, Overlap [*6]
	Backtack exit mode	
	Backtack Entry Number of Stitches [*5]	0 - 9 stitches
	Backtack Exit Number of Stitches [*5]	
	Maximum Pitch [*7]	0.3 - 20.0 mm
	Split Auto Insert [*8]	None, Split w/Needle Up
	Outline connection	Feed, Running, Stitch, Baste
	Single stitch · Multiple stitch mode	Single stitch · Multiple stitch Offset input
	Offset direction	Inside/Left side, Outside/Right side
	Offset width	0.0 - 25.5 mm
	No. of copies	1 - 99
	Route	Same direction, Return, Return + Stitch connection

[*1] When adding an existing pattern, you can select the method for appending the program (Insert, Append to end, Append to beginning).

[*2] This can only be set when drawing a circle (radius), circle (diameter), semicircle or ellipse.

[*3] This can only be set when the line type is set to "Running".

[*4] This can only be set when the line type is set to "V Zigzag" or "N Zigzag".

[*5] This can only be set when backtack start mode (backtack end mode) is set to a setting other than "No back Tack".

[*6] This can only be set when drawing a rectangle, circle (radius), circle (diameter), circle (3 points) or ellipse.

[*7] This can only be set when creating needle drop data.

[*8] This can only be set when creating feed data or basting data.

Parameter setting examples

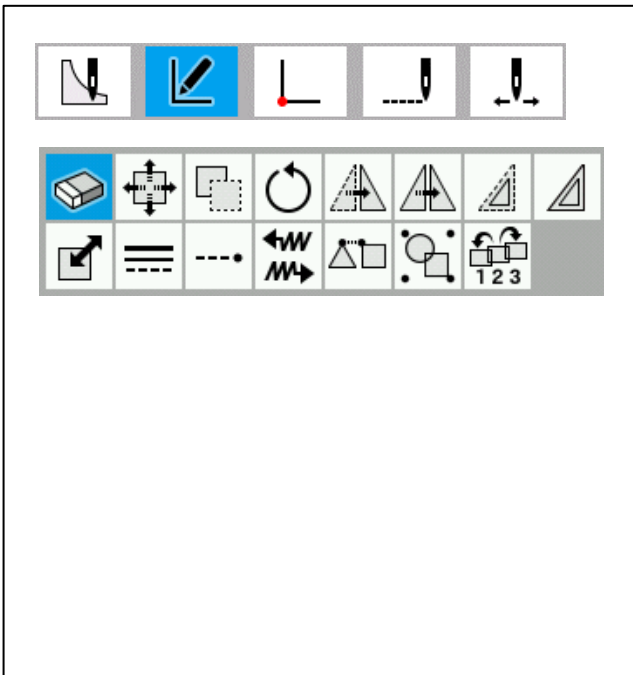
Example 1) To create sewing points which are as even as possible without exceeding the specified pitch: Set the running generation mode to [Equal Pitch].









Example 2) To connect the end point of the previous outline and the start point of the current outline by feeding: Set the outline connection to [Feed].

11-4. Editing programs (Editing outlines)

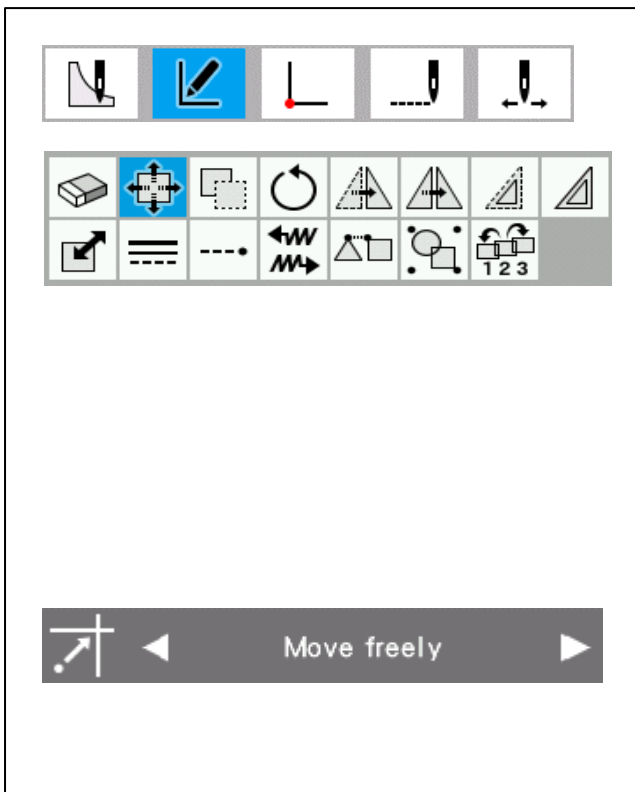
The procedure for editing programs using icons is as follows.















11-4-1. Deleting an outline

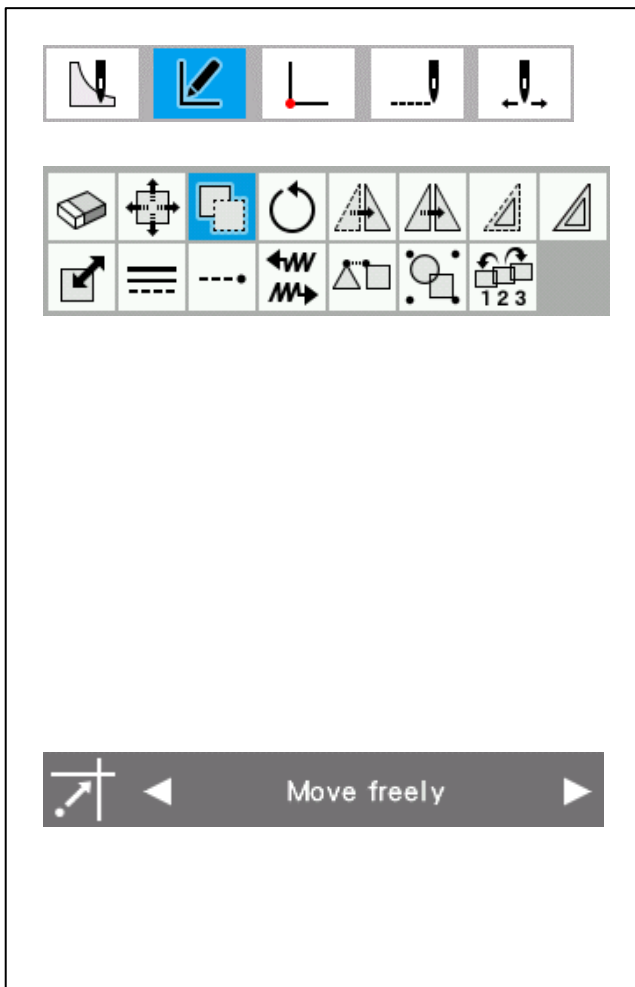














1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to delete.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to delete, repeat steps 3 and 4.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Press .

11-4-2.  Moving an outline

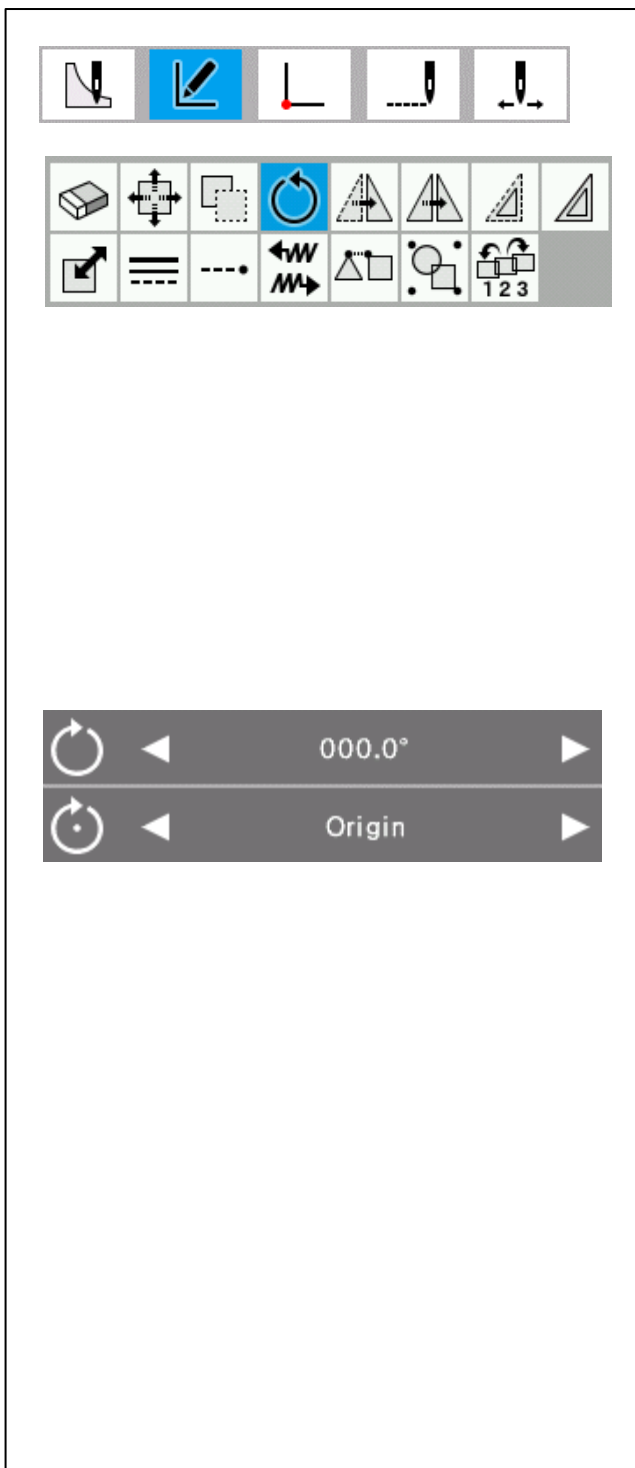













1. Touch .
2. Touch .
3. Use   to position the cursor  at the outline which you would like to move.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to move, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Press .
7. Touch   to set the method for moving the cursor (Move freely, Snap to needle point).
8. Use the jog key to move the cursor  to the place where you would like to move the outline.
9. Press .



11-4-3.  Copying an outline

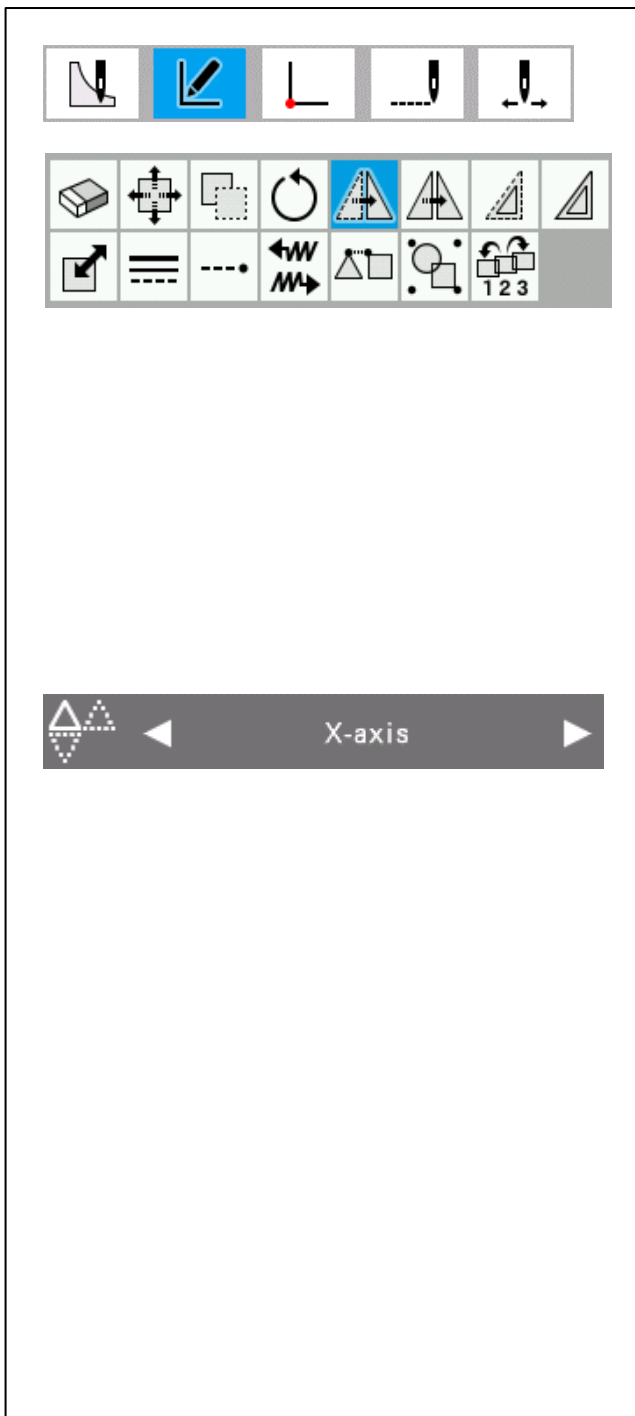
1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to copy.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to copy, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Press .
7. Touch  to set the method for moving the cursor (Move freely, Snap to needle point).
8. Use the jog key to move the cursor  to the place where you would like to copy the outline.
9. Press .












11-4-4.  Rotating an outline





1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to rotate.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to rotate, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the rotation angle, rotation center point and method for moving the cursor (Move freely, Snap to needle point).
 - * Rotation center ... Origin, Center of Mask, Mask top edge, Mask bottom edge, Mask top-left, Mask bottom-left, Mask top-right, Mask bottom-right, Specified point
 - * The method for moving the cursor is set only when the rotation center point is set to "Specified point".
7. Press .
 - * If the rotation center was set to "Specified point" in step 6, you can use the jog key to move the cursor  so that the current cursor position rotates around the center.

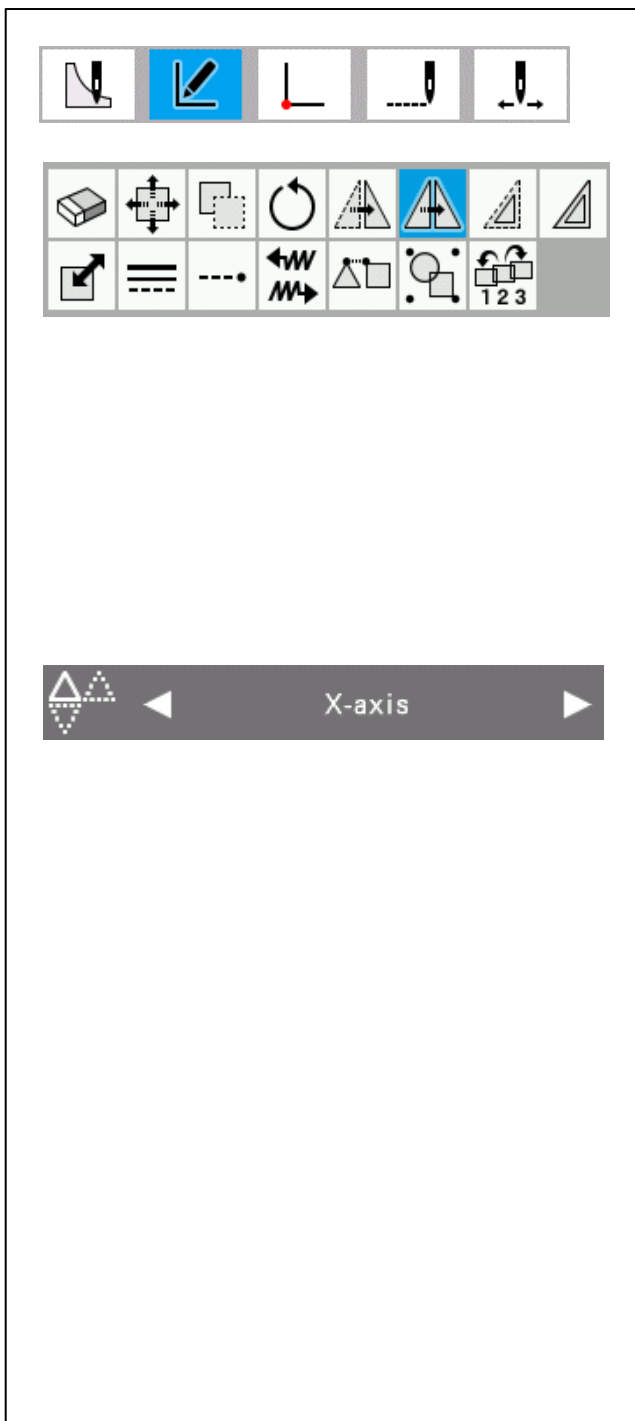
In this case, after moving the cursor , press  once more. In addition, each time you change the rotation angle, the preview is displayed after the outline is rotated.












11-4-5.  Moving an outline symmetrically



1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to move symmetrically.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to move symmetrically, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the symmetry mode and method for moving the cursor (Move freely, Snap to needle point).
 - * Symmetry mode ... X-axis, Y-axis, Center of Mask (horizontal), Center of Mask (vertical), Mask top edge, Mask bottom edge, Mask left edge, Mask right edge, Specified axis
 - * The method for moving the cursor is set only when the symmetry mode is set to "Specified axis".
7. Press .
 - * If the symmetry mode was set to "Specified axis" in step 6, you can use the jog key to move the cursor  so that the current cursor position moves symmetrically around the center.

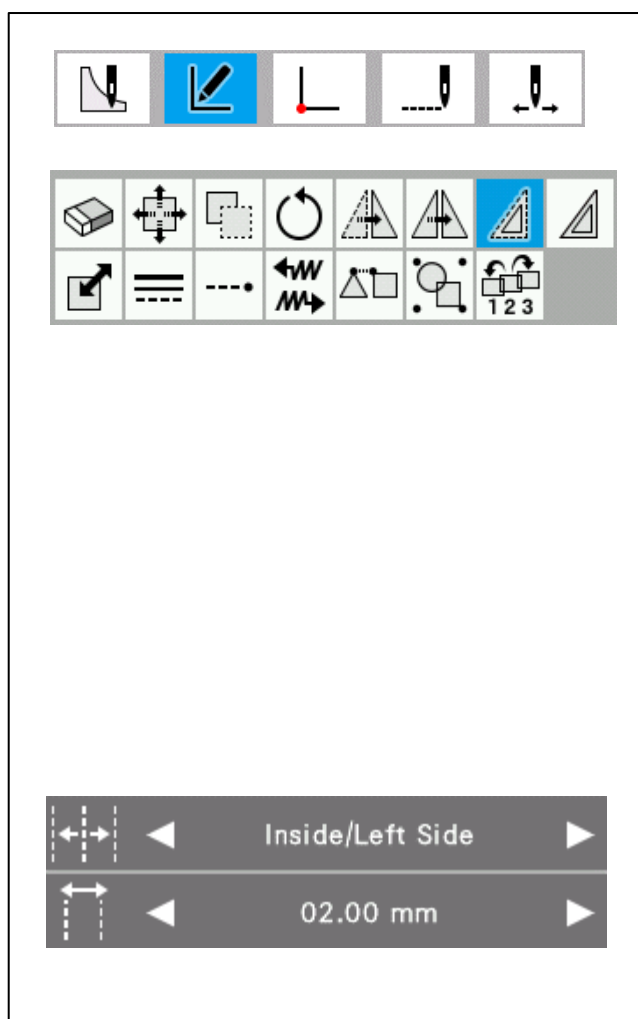
In this case, after moving the cursor , press  once more. When this is done, each time you change the cursor position, the preview is displayed after the cursor is moved.











11-4-6.  Copying an outline symmetrically



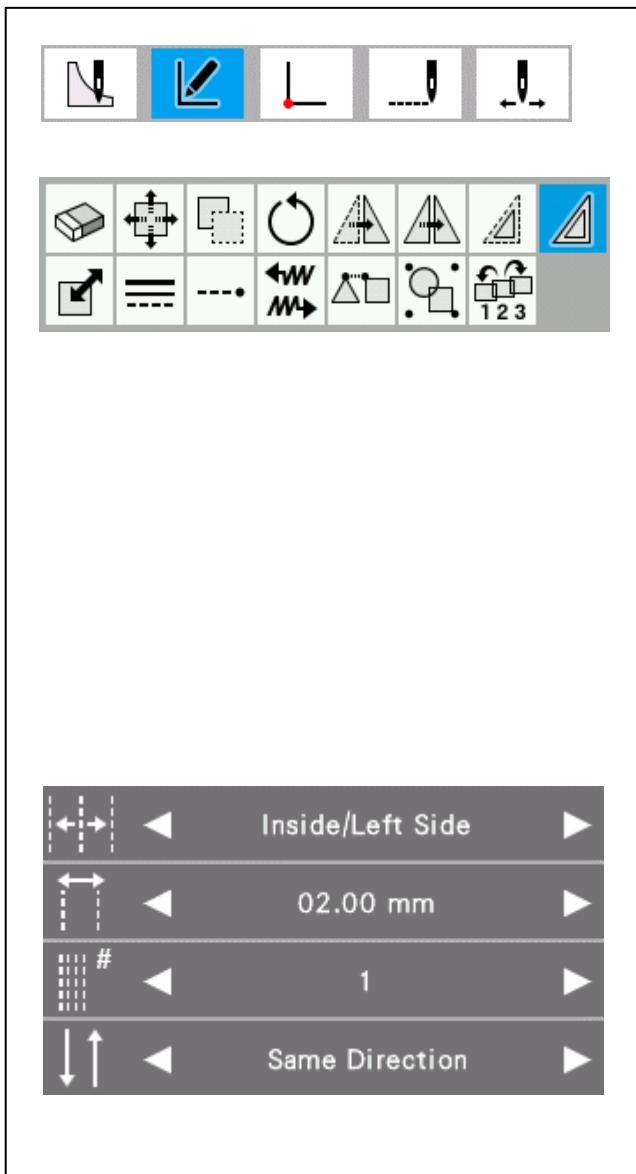
1. Touch  .
2. Touch  .
3. Use  to position the cursor  at the outline which you would like to copy symmetrically.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to copy symmetrically, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the symmetry mode and method for moving the cursor (Move freely, Snap to needle point)
 - * Symmetry mode...X-axis, Y-axis, Center of Mask (horizontal), Center of Mask (vertical), Mask top edge, Mask bottom edge, Mask left edge, Mask right edge, Specified axis
 - * The method for moving the cursor is set only when the symmetry mode is set to "Specified axis".
7. Press  .
 - * If the symmetry mode was set to "Specified axis" in step 6, you can use the jog key to move the cursor  so that the current cursor position moves symmetrically around the center.











In this case, after moving the cursor , press  once more. When this is done, each time you change the cursor position, the preview is displayed after the cursor is moved.

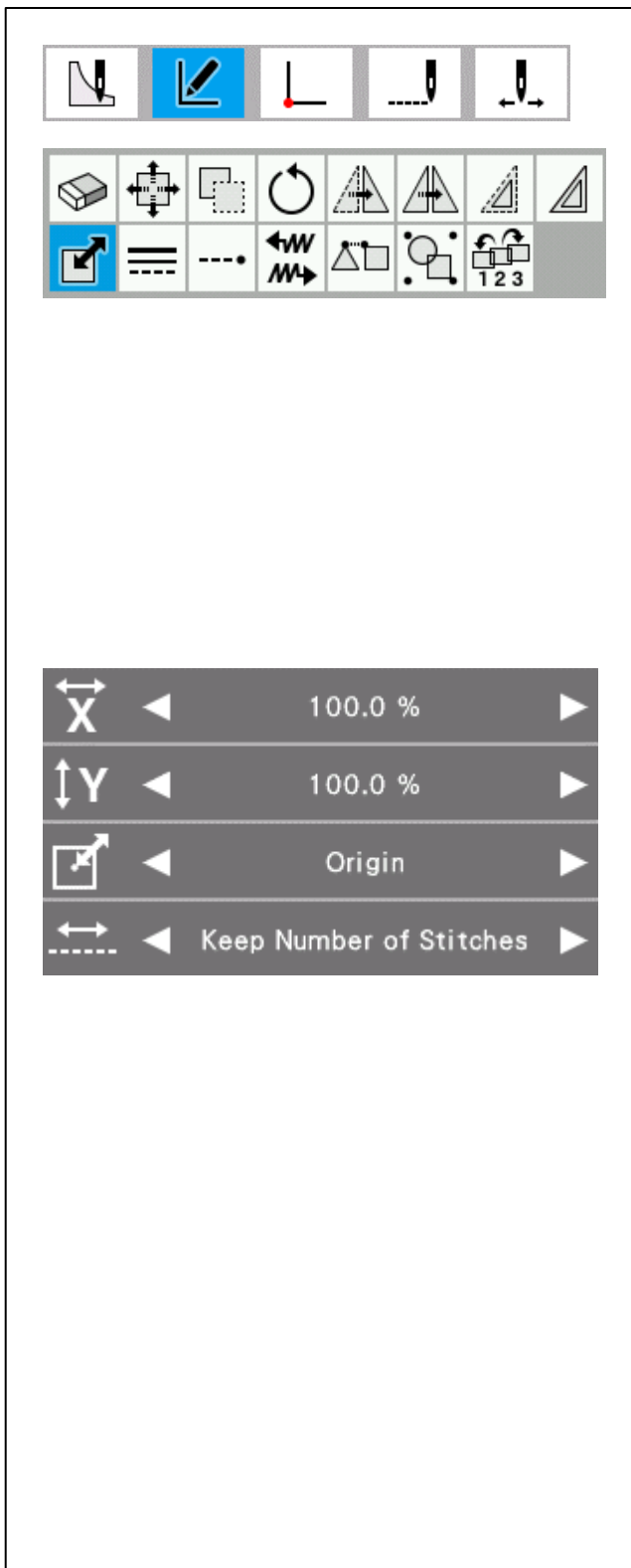
11-4-7.  Moving an outline by an offset












1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to move by an offset.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
 - * Outlines which consist of stitches/feeding /basting and outlines which have been loaded from *.SEW files cannot be moved by an offset.
5. If there is more than one outline that you would like to move by an offset, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the offset direction (Inside/Left Side, Outside/Right Side) and the offset width.
7. Press .



11-4-8.  Copying an outline by an offset



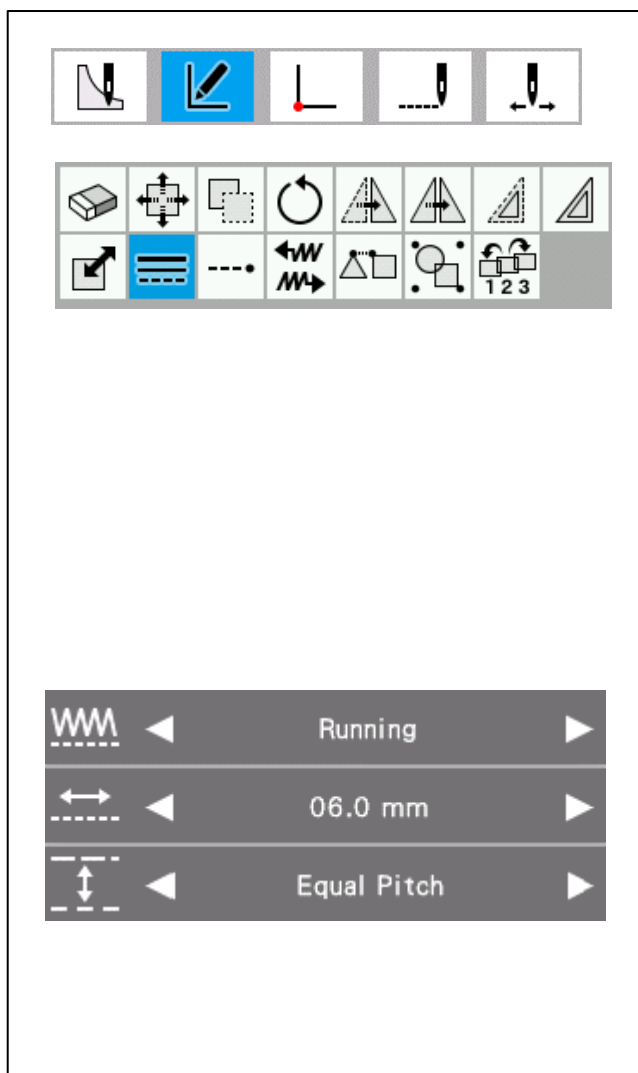
1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to copy by an offset.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
 - * Outlines which consist of stitches/feeding/ basting and outlines which have been loaded from *.SEW files cannot be copied by an offset.
5. If there is more than one outline that you would like to copy by an offset, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the offset direction (Inside/Left Side, Outside/Right Side), the offset width, the number of offset copies (1 to 99) and the offset creation method (Same Direction, Return, Return + stitch connection).
7. Press .











11-4-9.  Resizing an outline

1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to resize.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to resize, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the X ratio, Y ratio, resize center, hold element (stitch number or sewing pitch) and method for moving the cursor (Move freely, Snap to needle point).
 - * Resize center ... Origin, Center of Mask, Mask top edge, Mask bottom edge, Mask top-left, Mask bottom-left, Mask top-right, Mask bottom-right, Specified point
 - * The method for moving the cursor is set only when the resize center is set to "Specified point".
7. Press .
 - * If the resize center was set to "Specified point" in step 6, you can use the jog key to move the cursor  so that the outline is resized with the current cursor position as the resize center.

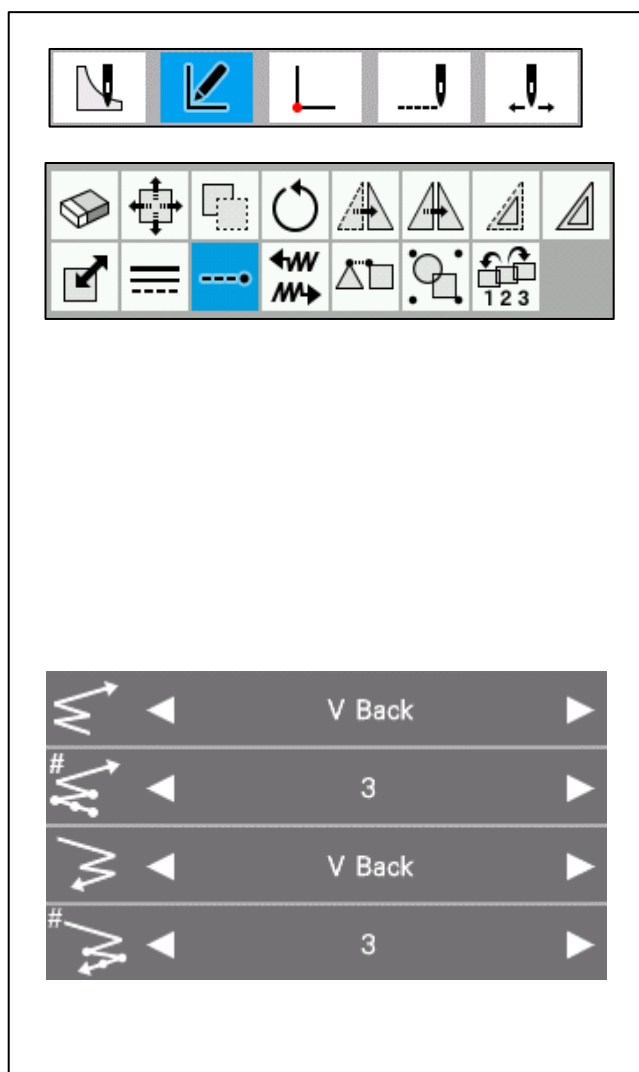
In this case, after moving the cursor , press  once more. In addition, each time you change the X ratio or Y ratio, the preview is displayed after the outline is resized.
 - * Outlines which consist of stitches/feeding /basting and outlines which have been loaded from *.SEW files normally have [Keep Number of Stitches] as their hold element.











11-4-10.  Changing the line type of an outline



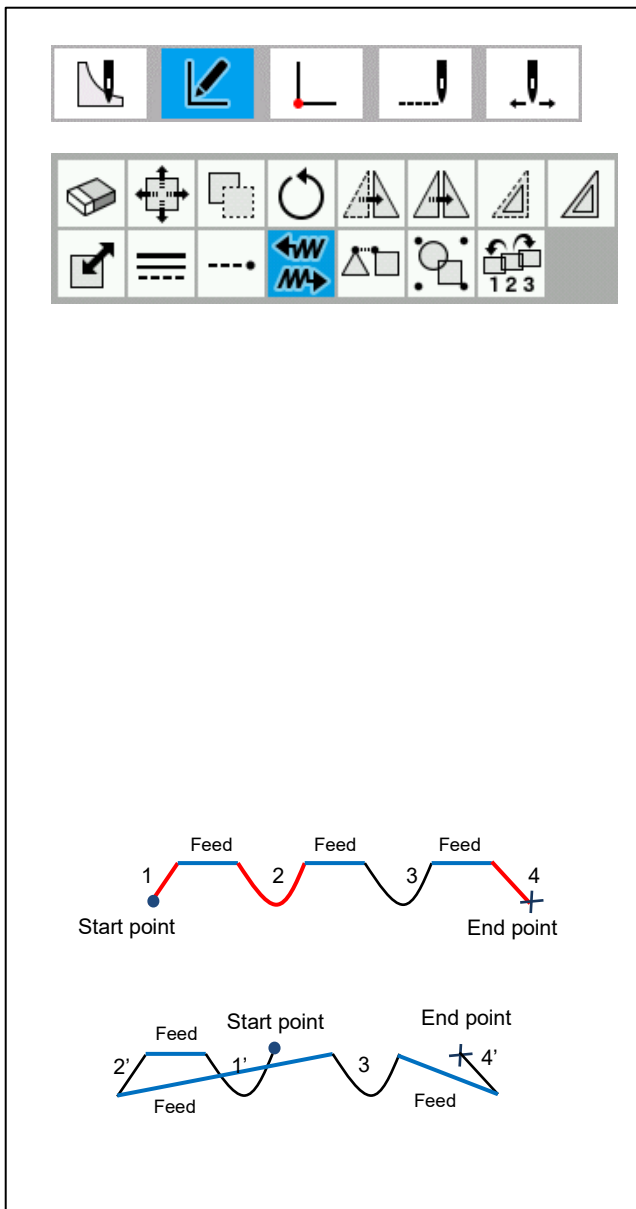
1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to change the line type for.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to change the line type for, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the line type (Running, V Zigzag, N Zigzag, Keep Current Shape), pitch and running generation mode (Equal Pitch, Prioritize Pitch).
 - * For details on the setting method for zigzag stitches, refer to "11-8-9. Zigzag stitch".
 - * Outlines which consist of stitches/feeding /basting and outlines which have been loaded from *.SEW files cannot have their line types changed.
7. Press .










11-4-11. ---- Adding and deleting backtack stitches for an outline



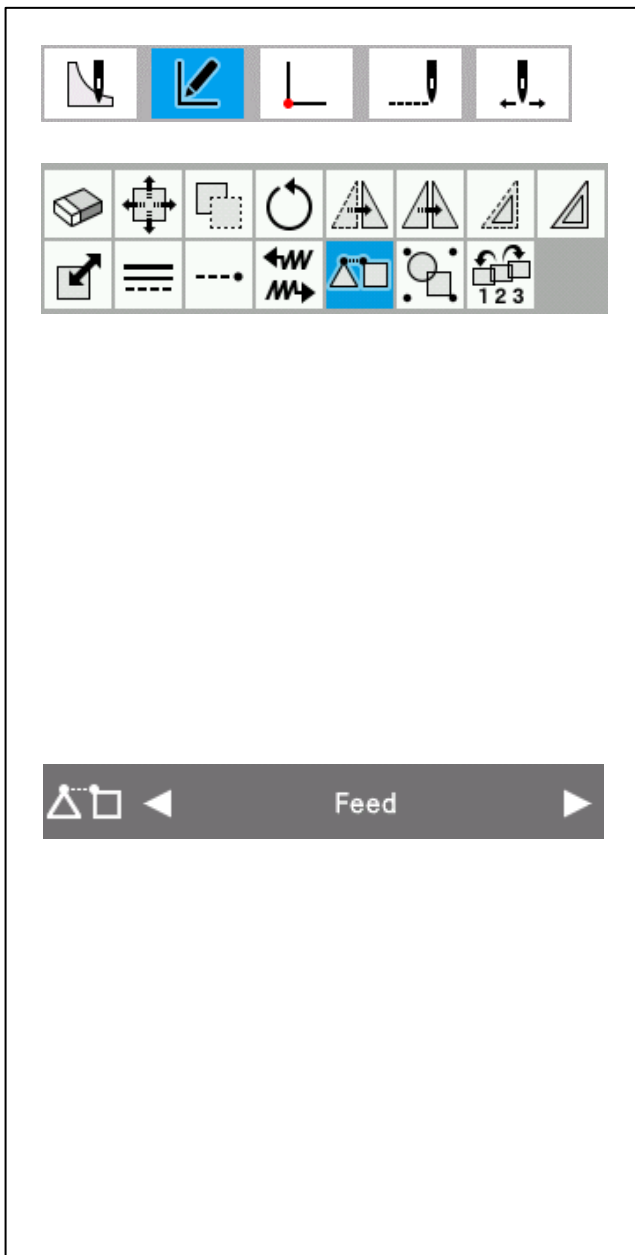
1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to add or delete backtacking for.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to add or delete backtacking for, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the backtack type (start position), number of backtack stitches (0 to 9), backtack type (end position) and number of backtack stitches (0 to 9).
 - * Backtack stitch type ...
No Back Tack, V Back, N Back, Overlap
 - * The "Overlap" setting can only be set for closed outlines (circles specified by radius, circles specified by diameter, circles specified by three points, ellipses, rectangles, etc.).
7. Press .











11-4-12.  Switching the sewing start and end points for outlines



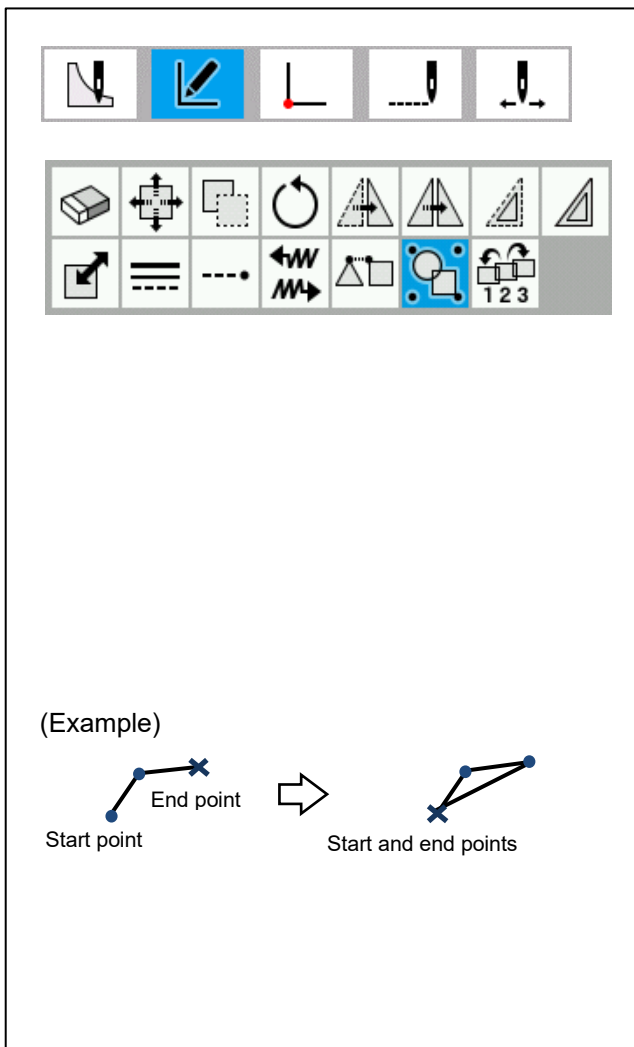
1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to switch the outline start point or end point for.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to switch the start point or end point for, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Press .
- * When multiple continuous outlines are selected, the orders are also switched.

Example: When outlines 1, 2, 3 and 4 have been created, and you select outlines 1, 2 and 4 (red lines) and switch the start and end points:
The sewing order becomes 1', 2', 3, 4'.
(The start and end point for 1', 2' and 4' are reversed.)










11-4-13.  Changing the connection method for outlines

1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to change the outline connection method for.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to change the outline connection method for, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the outline connection method (Stitch, Feed, Running, Baste).
 - * If "Stitch" is set as the outline connection method:
If the maximum pitch of the stitches exceeds 20.0mm, use the "Feed" setting to connect.
 - * If "Running" is set as the outline connection method:
The outline is connected by a straight line at the current outline running pitch.
7. Press .
 - * The end point of the previous outline and the start point of the current outline are connected.

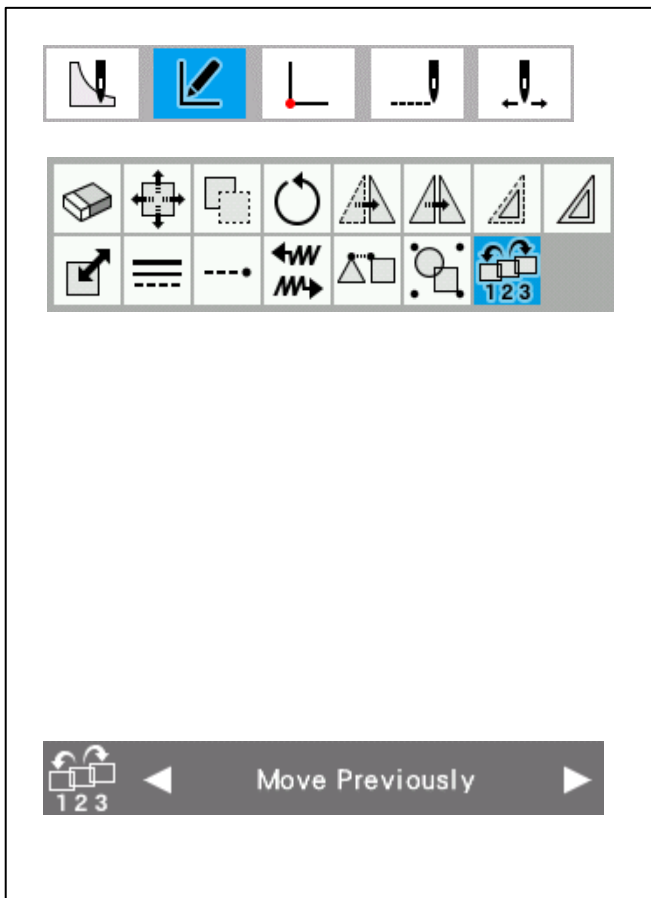
11-4-14.  Combining outlines













The screenshot shows the software interface with two toolbars. The top toolbar contains icons for drawing lines, arcs, and other geometric shapes. The bottom toolbar contains icons for editing, such as moving, copying, and deleting. An example is provided below the toolbars, showing an open outline with a 'Start point' and an 'End point' being combined into a closed outline with 'Start and end points'.

1. Touch .
2. Touch .
3. Use  to position the cursor  at an outline which you would like to combine.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to combine, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Press .
 - * The following outlines cannot be combined.
 - Closed outlines (circles specified by radius, circles specified by diameter, circles specified by three points, ellipses, rectangles, etc.)
 - Outlines which consist of stitches/feeding /basting and other types of outlines
 - * If only one outline is selected, it will become a closed outline.

11-4-15. Changing the sewing order for an outline



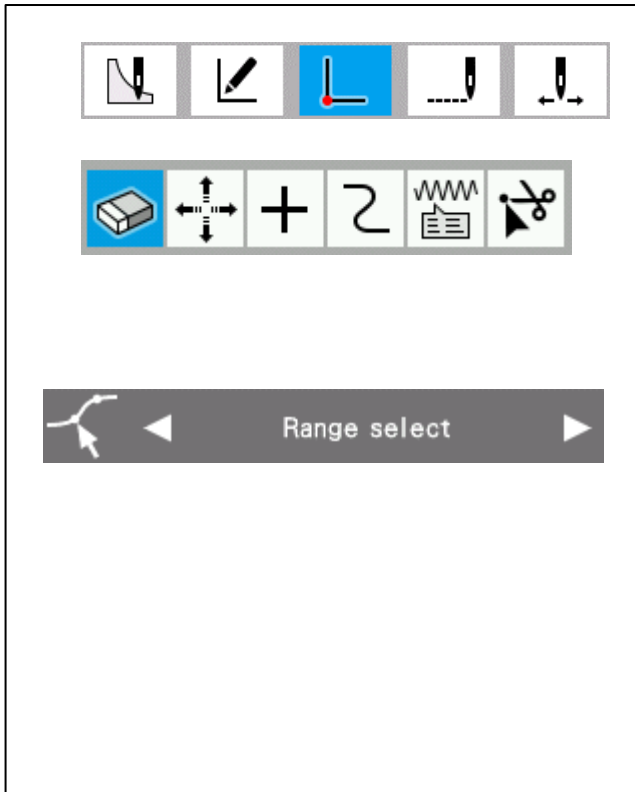
1. Touch .
2. Touch .
3. Use  to position the cursor  at the outline which you would like to change the outline sewing order for.
4. When you press the  key once, the outline will change to red lines and it will be selected. When you press the  key once, the selected outline will be unselected.
5. If there is more than one outline that you would like to change the outline sewing order for, repeat steps 3 and 4.
 - * To select all outlines
Hold down  to select all outlines.
 - * To unselect all outlines
Hold down  to unselect all selected outlines.
6. Touch  to set the sewing order (Move Forward, Move Back, Move to start, Move to end).
7. Press .





11-5. Editing programs (Editing outline component points)

This section describes the icons which are used when editing outline component points and how to use them.









* You cannot edit the outline component points for outlines which have been loaded from *.SEW files.

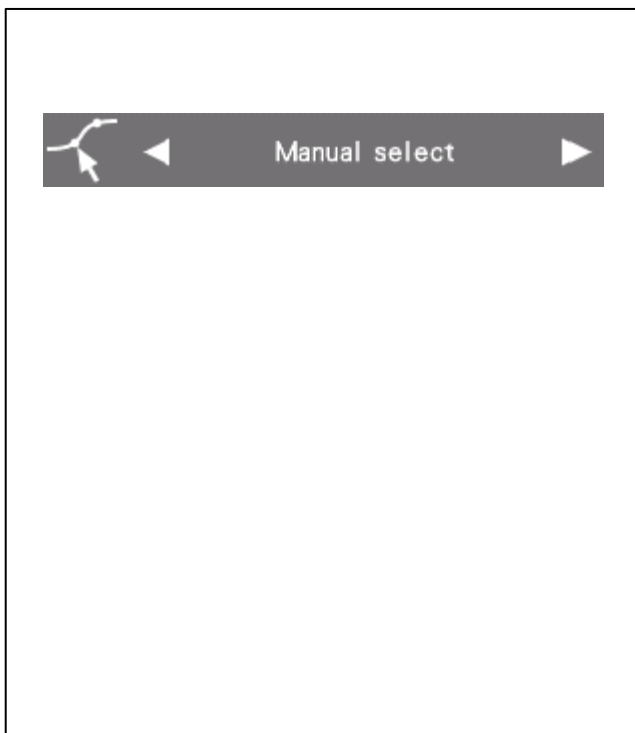
11-5-1. Deleting an outline component point












1. Touch .
2. Touch .
3. Touch   to set the selection method.

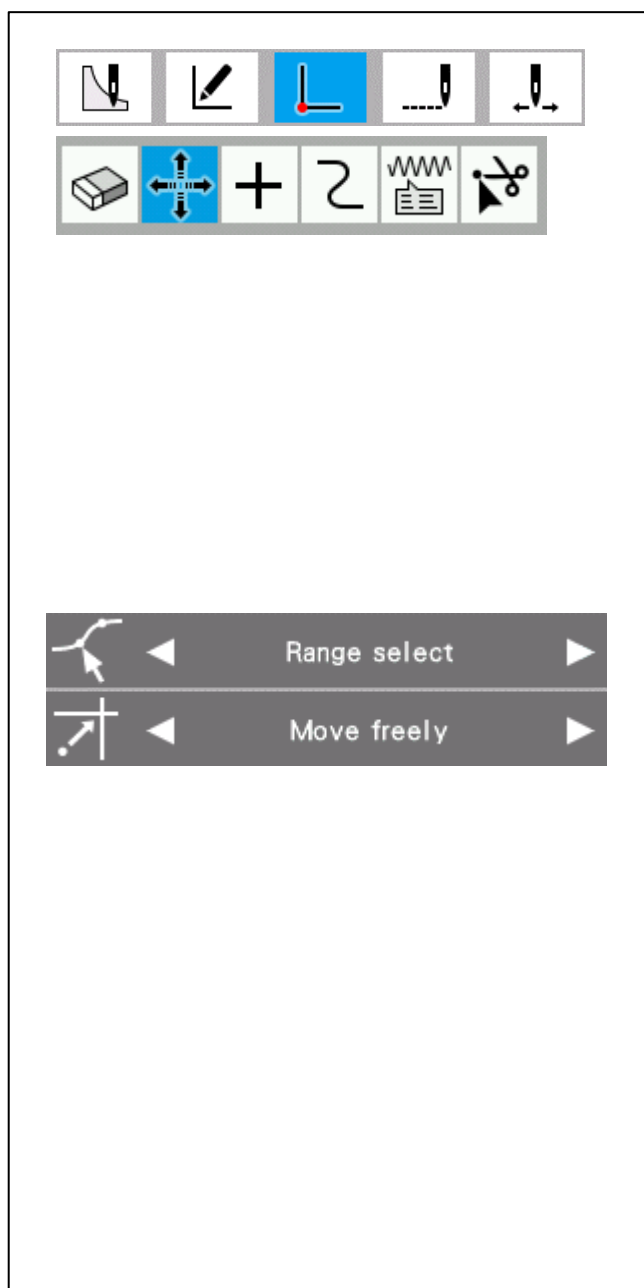
< Selecting continuous component points for editing >





4. Touch   to set the selection method to [Range select].
5. Use  to move the cursor  to the start point for the range that you would like to select.
 - * You can move the cursor continuously by holding down the key.
6. Press .
7. Use  to move the cursor  to the end point of the range that you would like to select. The component points will change to red, and the points from the start point to the end point will be selected.
 - * You can move the cursor continuously by holding down the key.
8. Press .















< Manually selecting component points for editing >

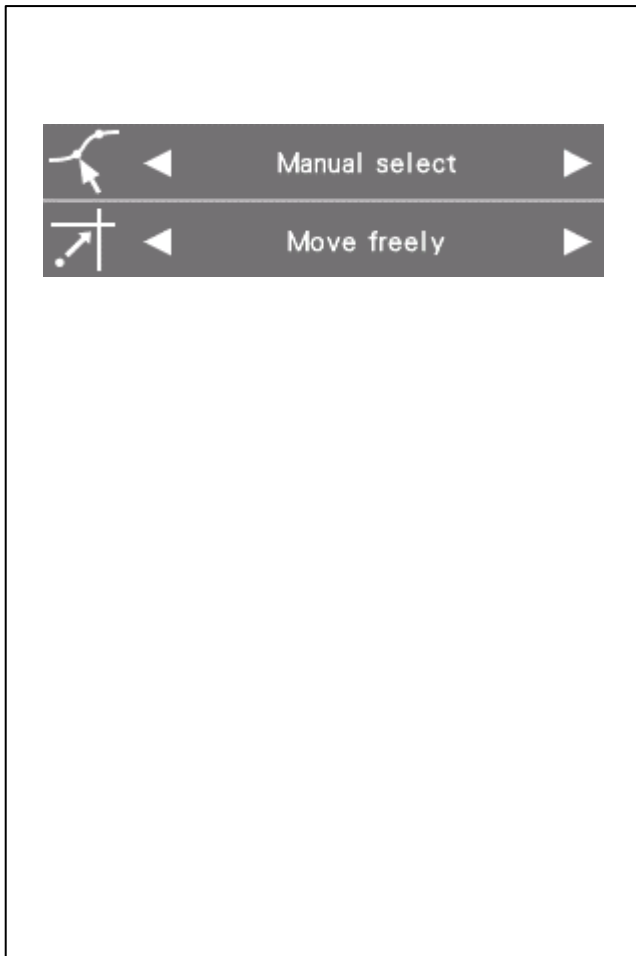
4. Touch   to set the selection method to [Manual select].
5. Use  to move the cursor  to the component point that you would like to delete.
 - * You can move the cursor continuously by holding down the key.
6. When you press the  key once, the component point will change to red and it will be selected. When you press the  key once, the selected component point will be unselected.
7. If there is more than one component point that you would like to delete, repeat steps 5 and 6.
 - * To select all outlines
Hold down  to select all component points in an outline.
 - * To unselect all outlines
Hold down  to unselect all selected component points.
8. Press .

11-5-2.  Moving an outline component point

1. Touch .
2. Touch .
3. Touch   to set the selection method (Manual select, Range select) and method for moving the cursor (Move freely, Snap to needle point).
 - * If the method for moving the cursor is set to [Move freely], the cursor can be moved to any desired position.
 - * If the method for moving the cursor is set to [Snap to needle point], the cursor will move to the sewing point.

< Selecting continuous component points for editing >

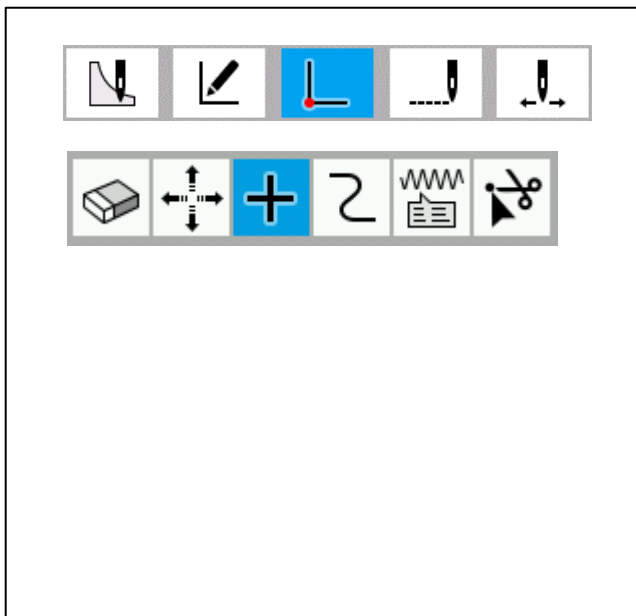
4. Touch   to set the selection method to [Range select].
5. Use   to move the cursor  to the start point for the range that you would like to select.
 - * You can move the cursor continuously by holding down the key.
6. Press .
7. Use   to move the cursor  to the end point of the range that you would like to select. The component points will change to red, and the points from the start point to the end point will be selected.
 - * You can move the cursor continuously by holding down the key.
8. Press  once, and then use the jog key to move the cursor  to the place where you would like to move the component point.
9. Press .



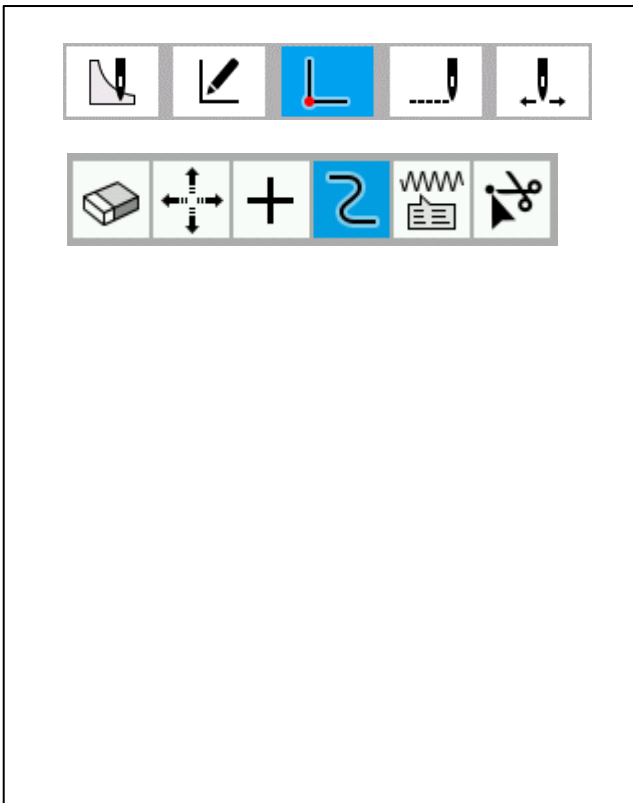
< Manually selecting component points for editing >









4. Touch ◀ ▶ to set the selection method to "Manual select".
5. Use ◀▶ to move the cursor + to the component point that you would like to move.
 - * You can move the cursor continuously by holding down the key.
6. When you press the ▲ key once, the component point will change to red and it will be selected. When you press the ▼ key once, the selected component point will be unselected.
7. If there is more than one component point that you would like to move, repeat steps 5 and 6.
 - * To select all outlines
Hold down ▲ to select all component points in an outline.
 - * To unselect all outlines
Hold down ▼ to unselect all selected component points.
8. Press ↻ once, and then use the jog key to move the cursor + to the place where you would like to move the component point.
9. Press ↻.

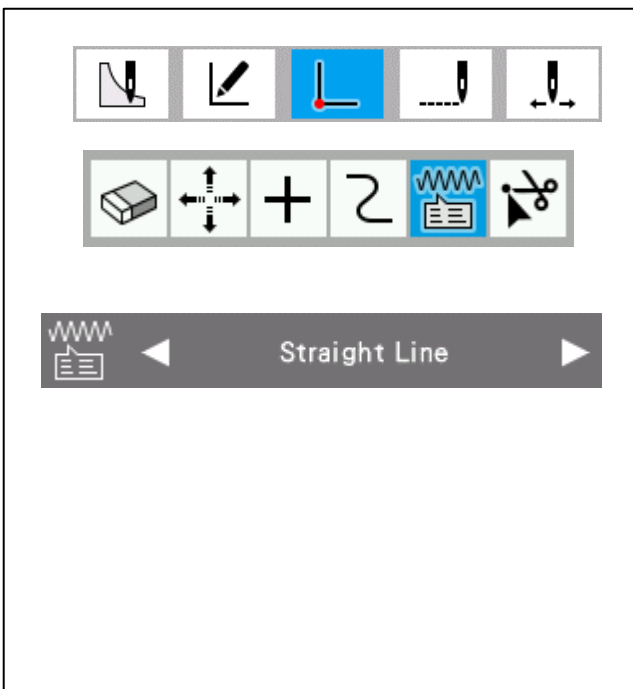
11-5-3. + Adding an outline component point








1. Touch L .
2. Touch + .
3. Use ◀▶ to move the cursor + to the component point where you would like to add a component point.
 - * You can move the cursor continuously by holding down the key.
4. Press ↻ .
 - * The component point will be automatically added between the selected component point and the next component point.
 - * You cannot add component points for circles (circles specified by radius, circles specified by diameter, circles specified by three points) and ellipses.

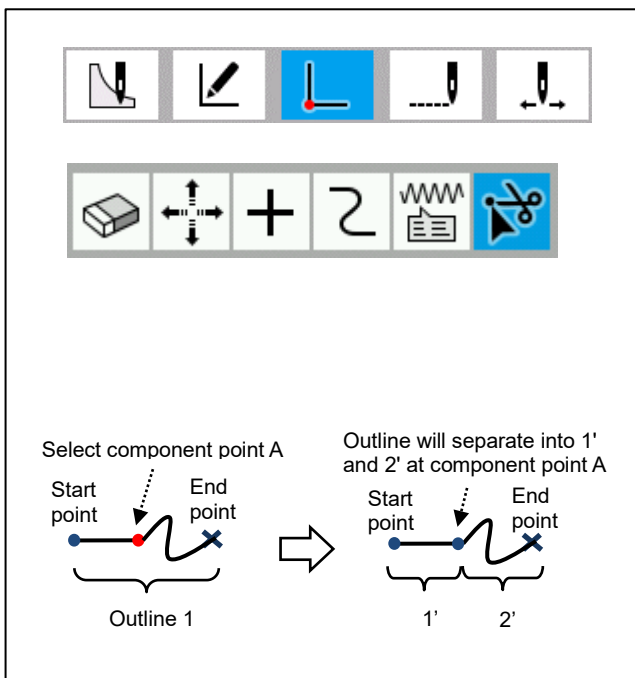
11-5-4.  Changing curve shapes






1. Touch .
2. Touch .
3. Use  to move the cursor  to the component point in the curve that you would like to edit.
 - * You can move the cursor continuously by holding down the key.
4. Press .
 - * You can only change the current component point if it and the component points immediately before and after it are part of a curve.
5. Use the jog key to edit the curve.
 - * To rotate the curve clockwise
Hold down  to rotate the curve clockwise.
 - * To rotate the curve counterclockwise
Hold down  to rotate the curve counterclockwise.
6. Press .

11-5-5.  Changing the attributes of outline component points

1. Touch .
2. Touch .
3. Use  to move the cursor  to the component point that you would like to change the attributes for.
 - * You can move the cursor continuously by holding down the key.
4. Touch  to select the attribute (Straight line, Curve) to change. The attribute of the component point will then be changed.
 - * You cannot change the attributes for component points in circles (circles specified by radius, circles specified by diameter, circles specified by three points) and ellipses.
 - * It is possible to change arcs into straight lines or curves, but straight lines and curves cannot be changed into arcs.

11-5-6. Separating an outline at a component point

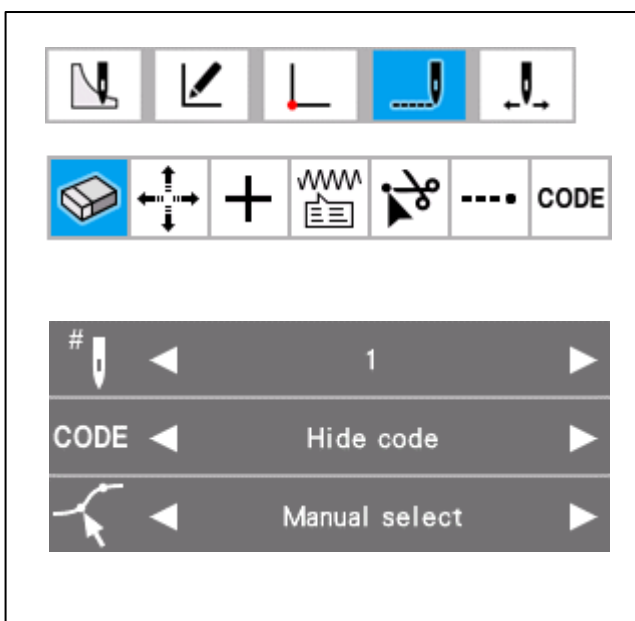





1. Touch .
2. Touch .
3. Use  to move the cursor  to the component point in the outline where you would like to separate the outline.
 - * You can move the cursor continuously by holding down the key.
4. Press .
 - * Circles (circles specified by radius, circles specified by diameter, circles specified by three points), ellipses and outlines which consist of stitches/feeding/basting cannot be separated.
 - * The outline will be separate at the position of the selected component point.
Example: To separate outline 1 at component point A

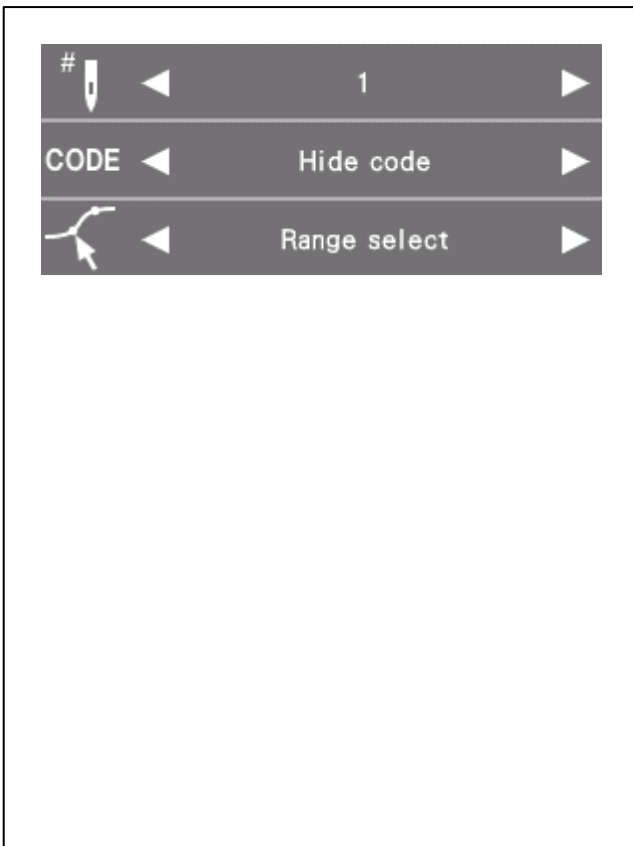
11-6. Editing programs (Editing sewing points)

This section describes the icons which are used when editing sewing points and how to use them.

11-6-1. Deleting a sewing point

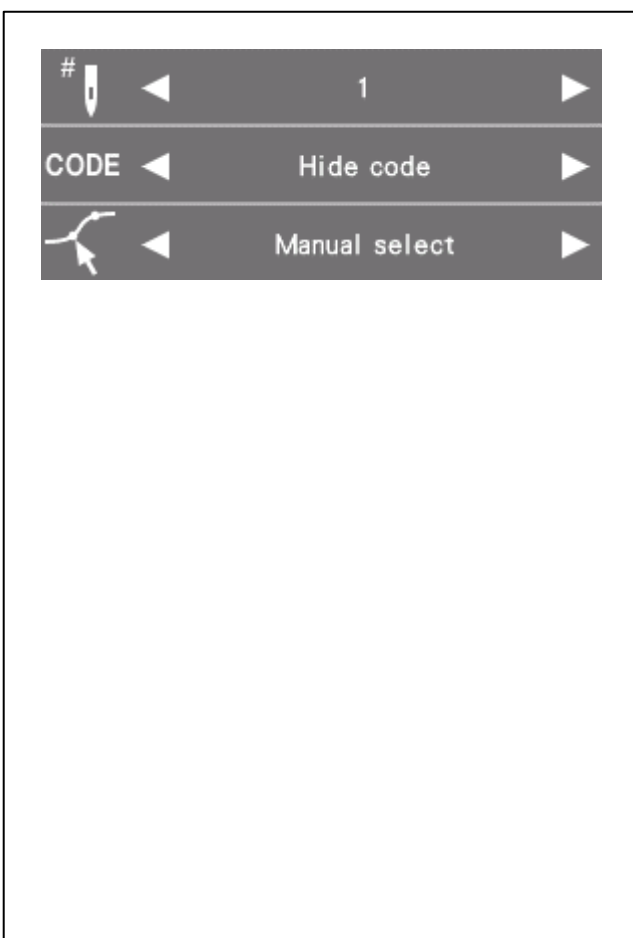


1. Touch .
2. Touch .
3. Touch  to set the skipping units (1, 10, 50, 100, 500, 1000, 5000), code display switching (Hide code, Show code) and the selection method.



< Selecting continuous sewing points for editing >

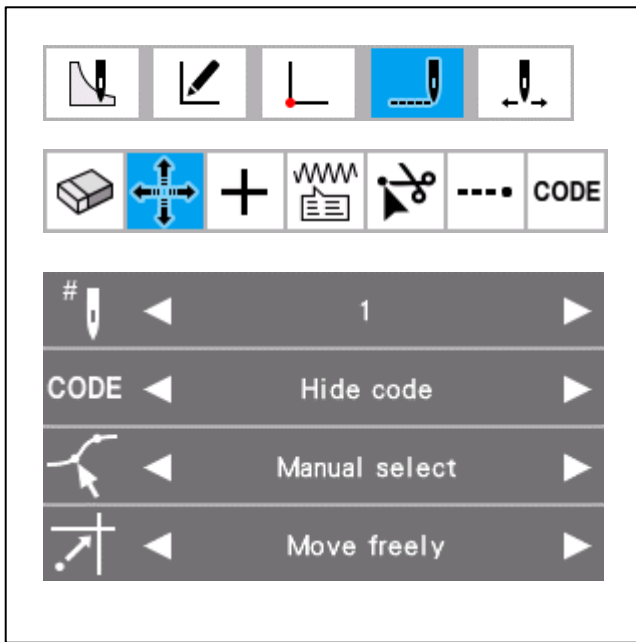
4. Touch ◀ ▶ to set the selection method to [Range select].
5. Use ◀▶ to move the cursor + to the start point for the range that you would like to select.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. Press ↵.
7. Use ◀▶ to move the cursor + to the end point of the range that you would like to select. The sewing points will change to red, and the points from the start point to the end point will be selected.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
8. Press ↵.







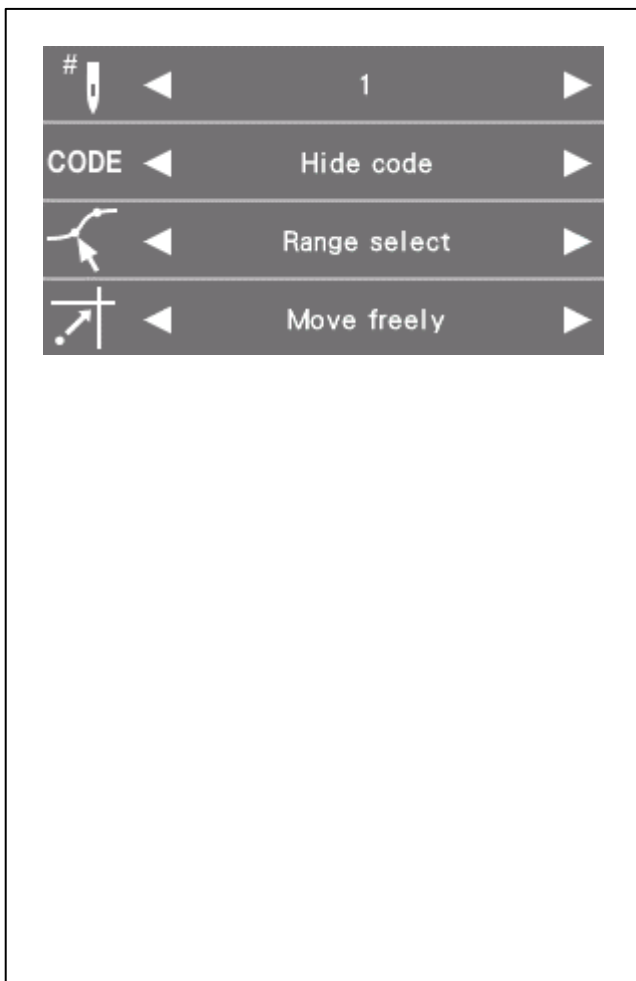
< Manually selecting sewing points for editing >

4. Touch ◀ ▶ to set the selection method to [Manual select].
5. Use ◀▶ to move the cursor + to the sewing point that you would like to delete.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. When you press the ▲ key once, the sewing point will change to red and it will be selected. When you press the ▼ key once, the selected sewing point will be unselected.
7. If there is more than one sewing point that you would like to delete, repeat steps 5 and 6.
 - * To select all outlines
Hold down ▲ to select all sewing points in an outline.
 - * To unselect all outlines
Hold down ▼ to unselect all selected sewing points.
8. Press ↵.











11-6-2.  Moving a sewing point

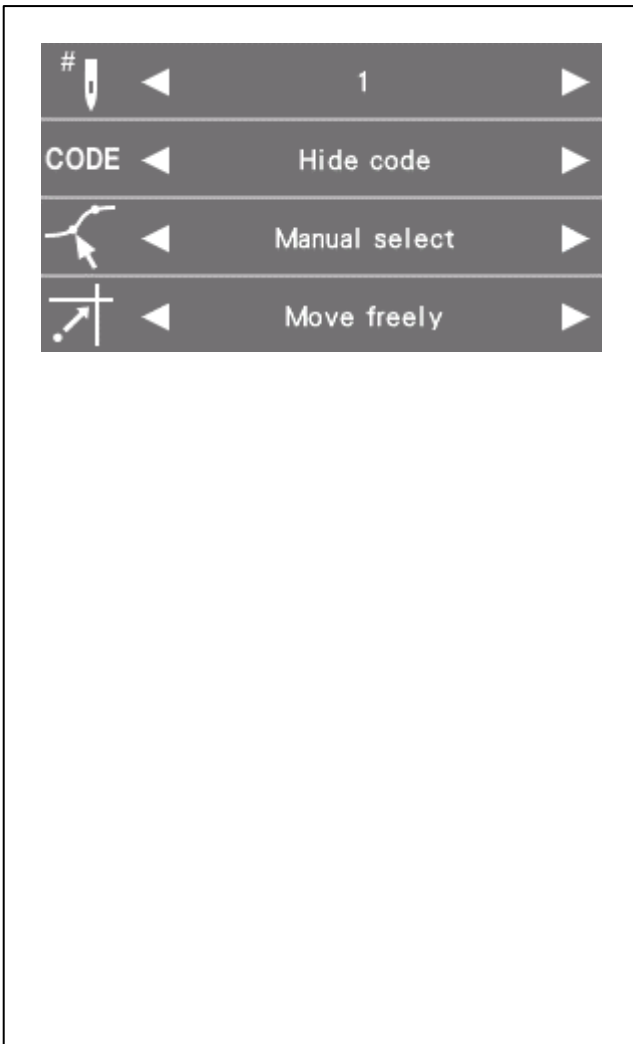


1. Touch .
2. Touch .
3. Touch   to set the skipping units (1, 10, 50, 100, 500, 1000, 5000), code display switching (Hide code, Show code) and method for moving the cursor (Move freely, Snap to needle point).
 - * If the method for moving the cursor is set to [Move freely], the cursor can be moved to any desired position.
 - * If the method for moving the cursor is set to [Snap to needle point], the cursor will move to the sewing point.



< Selecting continuous sewing points for editing >

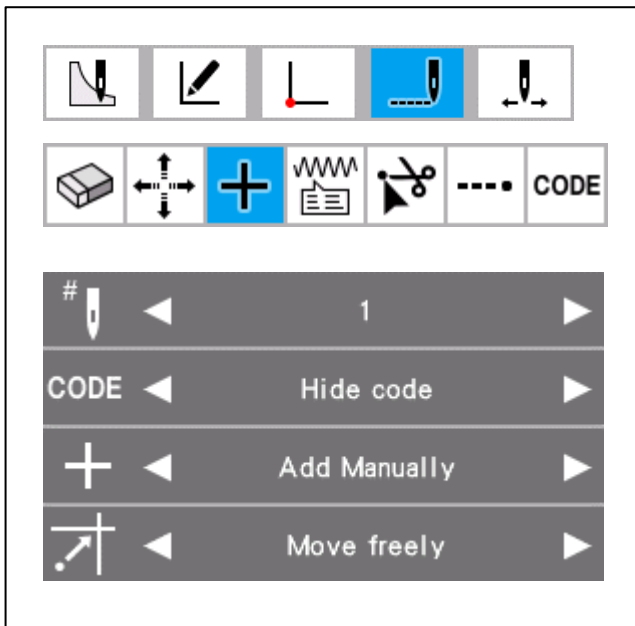
4. Touch   to set the selection method to [Range select].
5. Use  to move the cursor  to the start point for the range that you would like to select.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. Press .
7. Use  to move the cursor  to the end point of the range that you would like to select. The sewing points will change to red, and the points from the start point to the end point will be selected.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
8. Press  once, and then use the JOG key to move the cursor  to the place where you would like to move the component point.
9. Press .






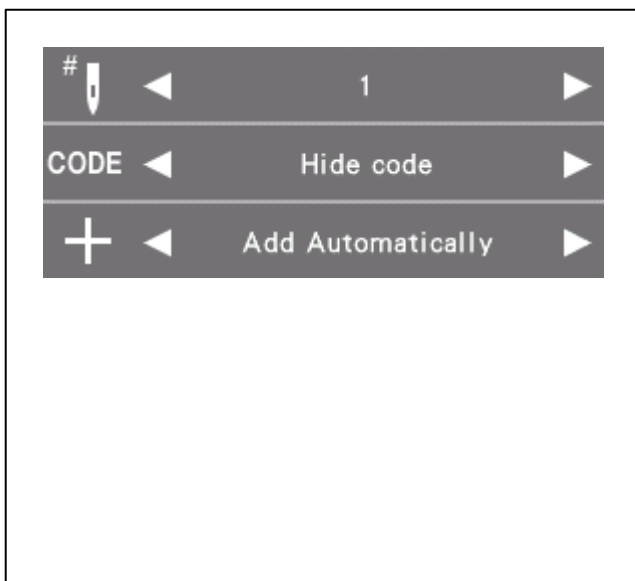
< Manually selecting component points for editing >

4. Touch ◀ ▶ to set the selection method to [Manual select].
5. Use ◀▶ to move the cursor + to the sewing point that you would like to move.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. When you press the ▲ key once, the sewing point will change to red and it will be selected. When you press the ▼ key once, the selected sewing point will be unselected.
7. If there is more than one sewing point that you would like to move, repeat steps 5 and 6.
 - * To select all outlines
Hold down ▲ to select all sewing points in an outline.
 - * To unselect all outlines
Hold down ▼ to unselect all selected sewing points.
8. Press ↻ once, and then use the JOG key to move the cursor + to the place where you would like to move the component point.
9. Press ↻.





11-6-3. + Adding a sewing point

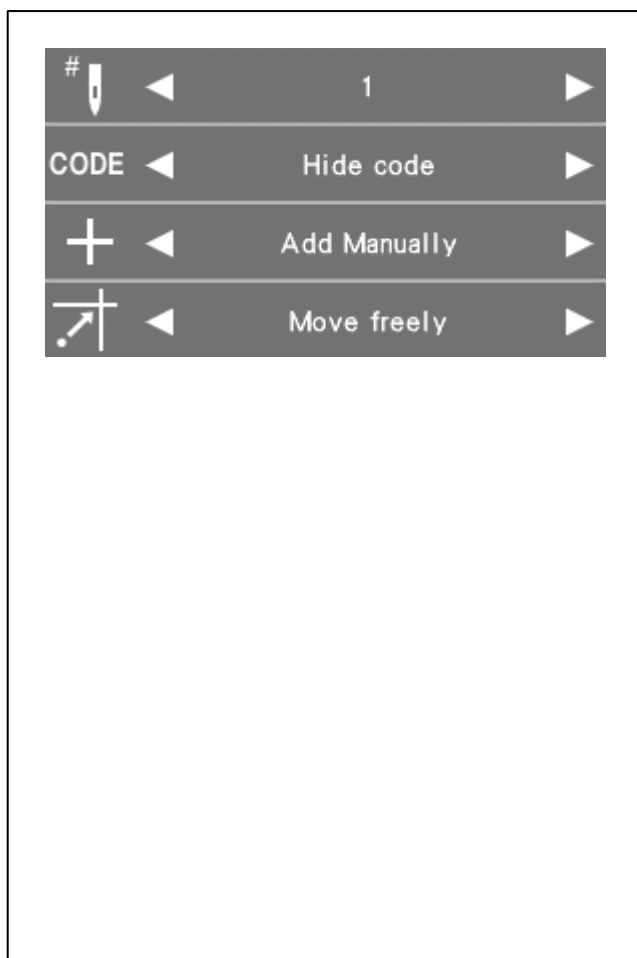


1. Touch .
2. Touch .
3. Touch  to set the skipping units (1, 10, 50, 100, 500, 1000, 5000), code display switching (Hide code, Show code), sewing point method for appending (Add Manually, Add Automatically) and method for moving the cursor (Move freely, Snap to needle point).



< Adding sewing points automatically >

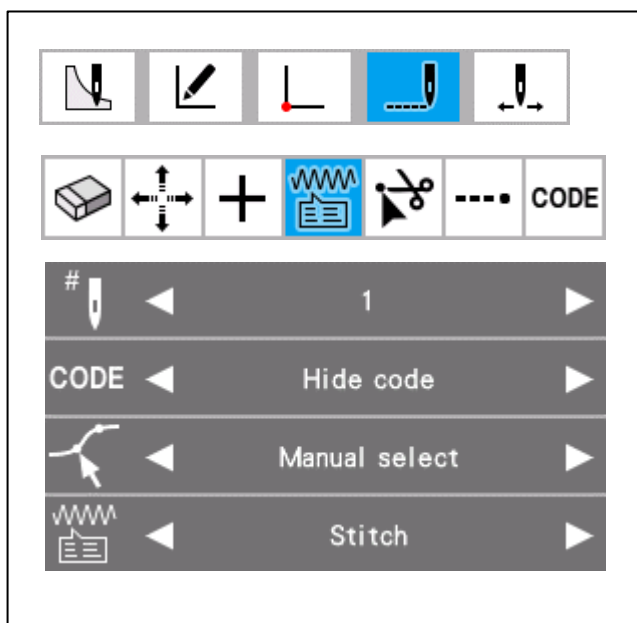
4. Touch  to set the sewing point method for appending to [Add Automatically].
5. Use  to move the cursor  to the sewing point where you would like to add a sewing point.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. Press .
 - * The sewing point will be automatically added between the selected sewing point and the next sewing point.





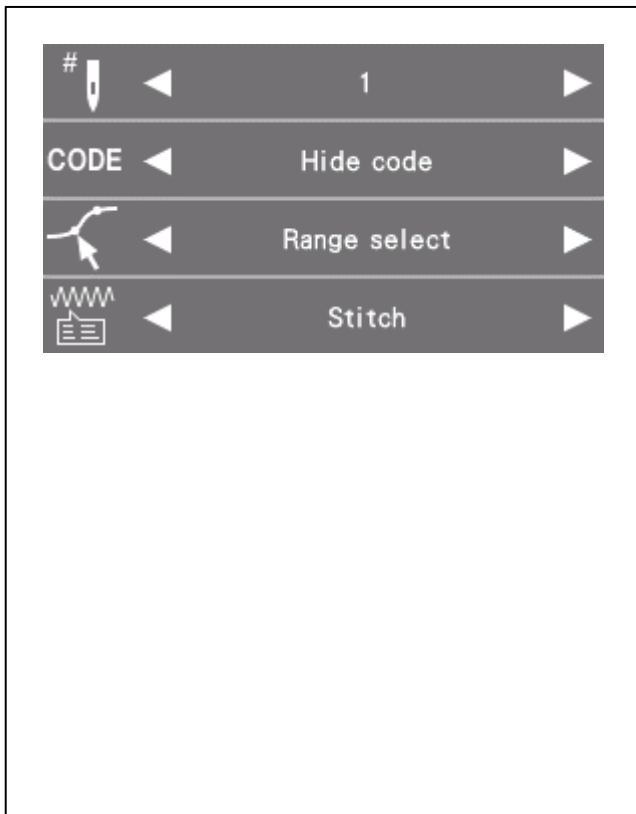
< Adding sewing points manually >

4. Touch ◀ ▶ to set the sewing point method for appending to [Add Manually].
5. Use ◀▶ to move the cursor + to the sewing point where you would like to add a sewing point.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. Press ⏪ once, and then use the jog key to move the cursor + to the place where you would like to add the sewing point.
 - * If the method for moving the cursor is set to [Move freely], the cursor can be moved to any desired position.
 - * If the method for moving the cursor is set to [Snap to needle point], the cursor will move to the sewing point.
7. Press ⏪.
 - * The sewing point will be added in between the selected sewing point and the next sewing point at the position where the cursor was moved to in step 6.

11-6-4. Changing the attributes of sewing points

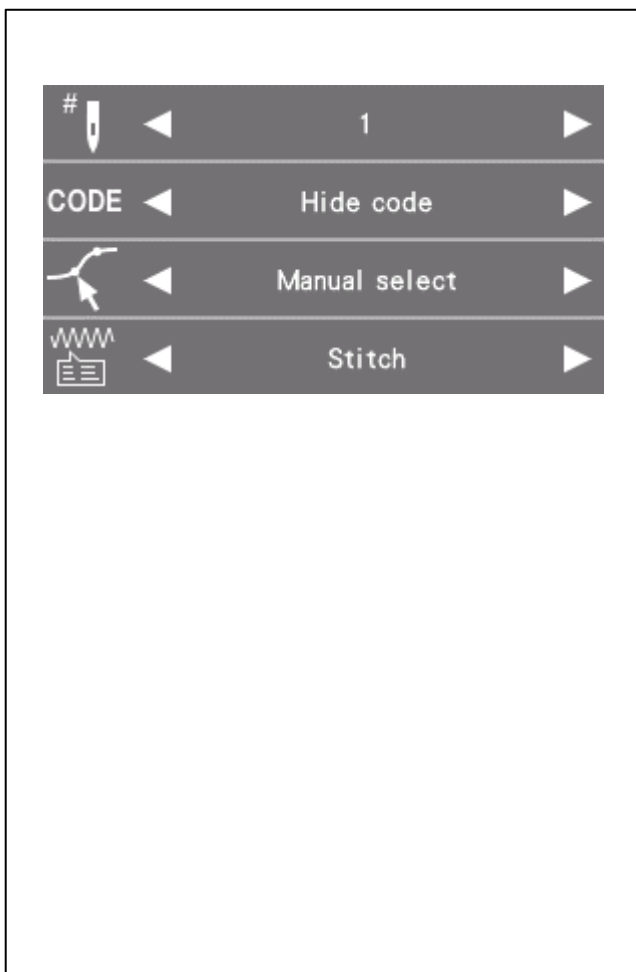


1. Touch .
2. Touch .
3. Touch ◀ ▶ to set the skipping units (1, 10, 50, 100, 500, 1000, 5000) and code display switching (Hide code, Show code).



< Selecting continuous sewing points for editing >

4. Touch ◀ ▶ to set the selection method to [Range select].
5. Use ◀▶ to move the cursor + to the start point for the range that you would like to select.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. Press ↵.
7. Use ◀▶ to move the cursor + to the end point of the range that you would like to select. The sewing points will change to red, and the points from the start point to the end point will be selected.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
8. Touch ◀ ▶ to set the attribute (Stitch, Feed, Baste).
9. Press ↵.

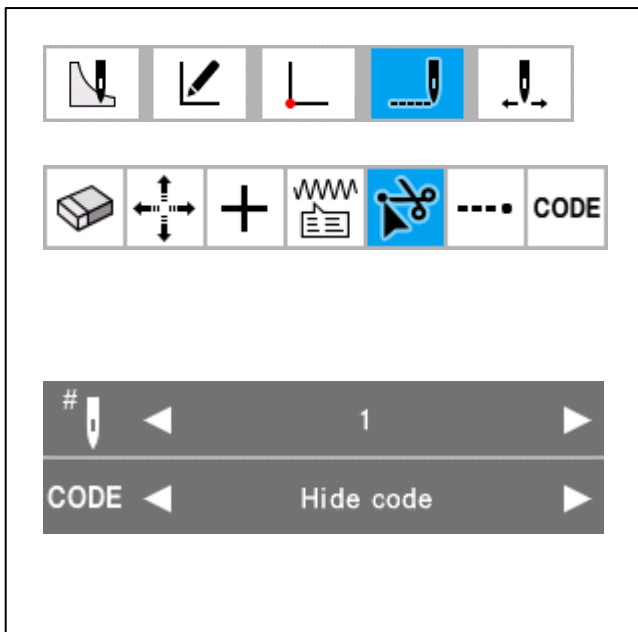








< Manually selecting component points for editing >

4. Touch ◀ ▶ to set the selection method to [Manual select].
5. Use ◀▶ to move the cursor + to the sewing point that you would like to move.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. When you press the ▲ key once, the sewing point will change to red and it will be selected. When you press the ▼ key once, the selected sewing point will be unselected.
7. If there is more than one attribute that you would like to change, repeat steps 5 and 6.
 - * To select all outlines
Hold down ▲ to select all sewing points in an outline.
 - * To unselect all outlines
Hold down ▼ to unselect all selected sewing points.
8. Touch ◀ ▶ to set the attribute (Stitch, Feed, Baste).
9. Press ↵.
 - * When switching from "Feed" to "Stitch" or from "Baste" to "Stitch", the sewing pitch must be 20.0mm or less for both X and Y. If the setting is outside the range, the buzzer will sound twice and processing will stop.

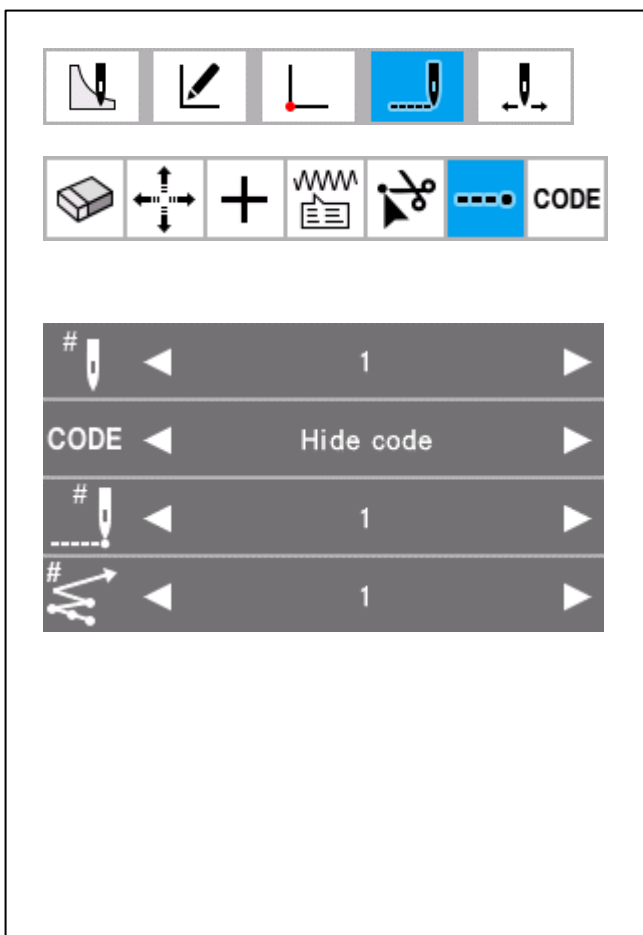
11-6-5. Separating an outline at a sewing point








* When separating outlines at sewing points when the outlines contain component point data, the component point data will be lost.



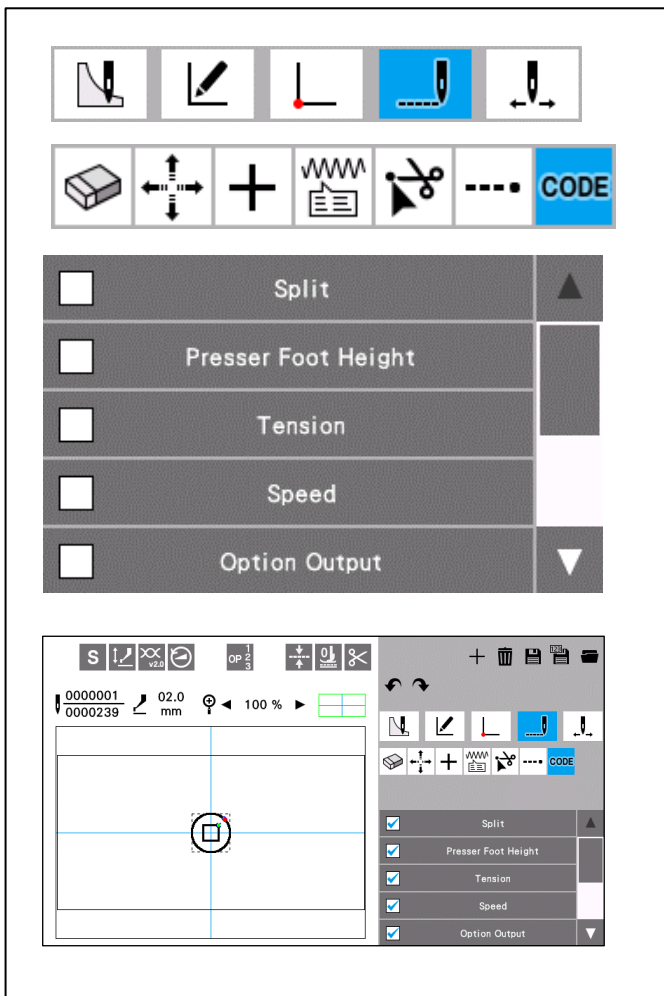
1. Touch .
2. Touch .
3. Touch  to set the skipping units (1, 10, 50, 100, 500, 1000, 5000) and code display switching (Hide code, Show code).
4. Use  to move the cursor  to the sewing point in the outline where you would like to separate the outline.
 - * You can move the cursor continuously by holding down the key.
5. Press .




11-6-6. ----• Setting bar tacking at a sewing point







1. Touch .
2. Touch .
3. Touch  to set the skipping units (1, 10, 50, 100, 500, 1000, 5000) and code display switching (Hide code, Show code).
4. Use  to move the cursor  to the sewing point where you would like to set backtacking.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
5. Touch  to set the number of backtack operations (1 to 9) and the number of backtack stitches (1 to 9).
 - * You cannot set backtacking to cross from one outline to another, or set it at the sewing start point. If you would like to set backtacking at the sewing start point, refer to "11-4-11. Adding and deleting backtack stitches for an outline" on page 35.
6. Press .
 - * Backtacking will be set in the return direction from the current sewing point.

11-6-7. CODE Adding and deleting codes at sewing points

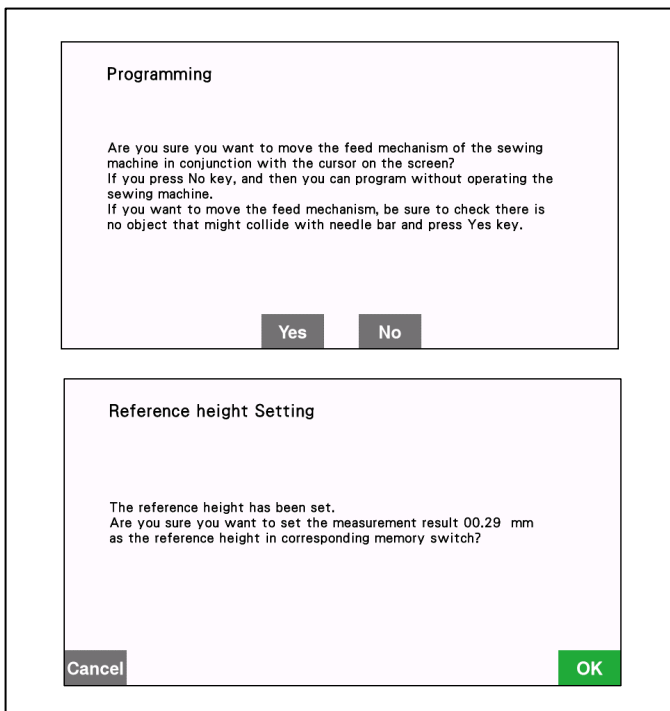





1. Touch .
2. Touch **CODE**
3. Use  to move the cursor  to the sewing point where you would like to add or delete a code.
 - * You can move the cursor continuously by holding down the key.
4. Touch the place where you would like to add or delete a code. The code will be added or deleted.
 - * Depending on the type of code, the selection of codes for adding and deleting may take place in the screen destination.

To return to the previous screen, touch  **Back to Upper Layer**

 - * Refer to "11-6-8. List of code settings" for a list of the codes which can be set.
 - * After touching the code, you can hold down the   keys to move the cursor  to the previous or next applicable point when a code is inserted. The cursor will move in a straight line from the current point to the applicable point.
5. If you touch the icons at the top of the screen, you can check the setting details for the codes.
 - * Sewing points which have a code set will change to green.






11-6-7-1. Set the reference height for material thickness detection











1. Use the JOG keys to move the cursor  to the position where you would like to set the reference height.
2. Press the [Set reference height key ].
 - * When **No** is selected in the screen shown below, the [Set reference height key ] will not be displayed.
3. The following message will be displayed.
4. To set measurement results for memory switch No. 41 (material thickness detection - reference height), touch **Yes**. Touch **No** to return to the programming screen without making the setting.

11-6-7-2. Add a material thickness detection code

The image shows the control panel of a sewing machine. At the top, there are several icons for different functions. Below that, there is a menu with options: Speed, Option Output, Trim, Measure Reference Height, and Thickness Detect. The Thickness Detect option is highlighted with a red box. Below this menu, there is a sub-menu for Thickness Detect with the following options: Back to Upper Layer, Enabled (unchecked), MAX (00.00 mm), and min (00.00 mm). Below the sub-menu, there is a programming warning screen with the text: "Are you sure you want to move the feed mechanism of the sewing machine in conjunction with the cursor on the screen? If you press No key, and then you can program without operating the sewing machine. If you want to move the feed mechanism, be sure to check there is no object that might collide with needle bar and press Yes key." Below the warning screen, there are two buttons: Yes and No. Below the warning screen, there is another sub-menu for Thickness Detect with the following options: Back to Upper Layer, Enabled (checked), MAX (00.00 mm), and min (00.00 mm).

1. Touch .
2. Touch **CODE**.
3. Use  to move the cursor  to the sewing point where you would like to add or delete a material thickness detection code.
 - * You can move the cursor continuously by holding down the key.
4. Touch [Thickness Detection].
5. The parameter input screen for the material thickness detection code will be displayed.
6. Press the [Measure material thickness key ].
 - * When **No** is selected in the screen shown below, the [Measure material thickness key ] will not be displayed.
7. The intermittent presser foot will drop at that point and the measurement result for the material thickness will be displayed.
 - * While the material thickness detection code is being edited, the measurement results are automatically set in [Thickness upper limit] and [Thickness lower limit].
8. Set the [Thickness upper limit] and [Thickness lower limit] based on the displayed value, and then select the [Enable] check box.
 - * Values which are smaller than the [Thickness upper limit] and [Thickness lower limit] values cannot be set.

11-6-8. List of code settings

Name	Setting value	Icons [*2]	Notes
Split	Needle Up/Needle Down		
Intermittent presser foot height	-10.0 - 10.0mm (Setting units: 0.1mm)		
Tension	0 - 500		
Sewing speed	400 - 2700sti/min (Setting units: 100 sti/min) (The maximum sewing speed is limited to the above setting or less)		
Trigger	Option number 1 - 16		Up to 5 codes can be set for one needle. Used in combination with the extended I/O program.
Material thickness detection	Thickness upper limit: -17.00 – 17.00mm Thickness lower limit:-17.00 – 17.00mm (Setting units: 0.04mm)		* Values which are smaller than the "Thickness upper limit" and "Thickness lower limit" values cannot be set.
Measurement of the reference height	Enabled/Disabled		
Thread trimming	Enabled/Disabled		* When the feed has been set, the end point of the stitch is set automatically.

[*1] On when selected, off when not selected.

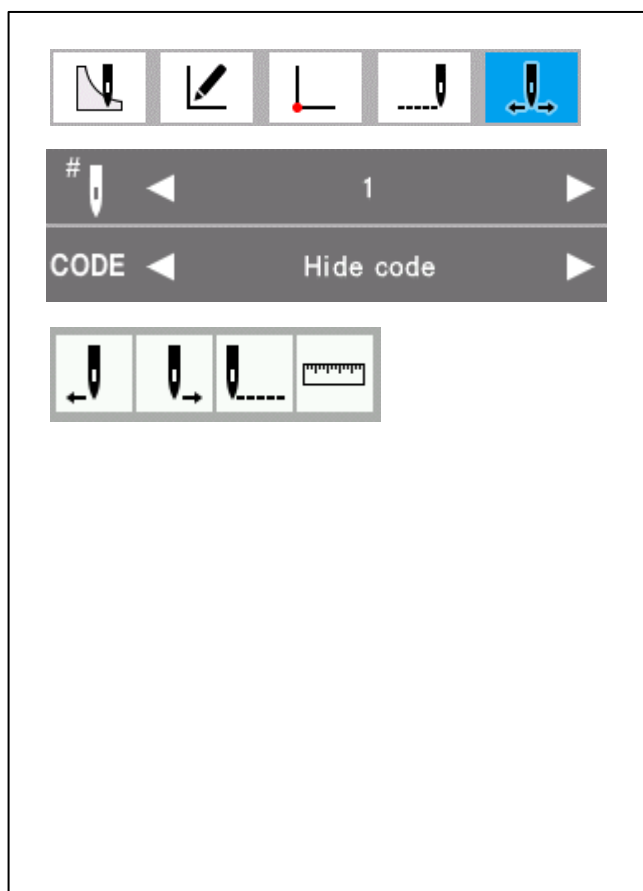
[*2] When code display is set to [Show code] during sewing editing or checking, the icons are displayed in the top-left of the screen.


















The icons are always displayed during code setting.

11-7. Checking programs

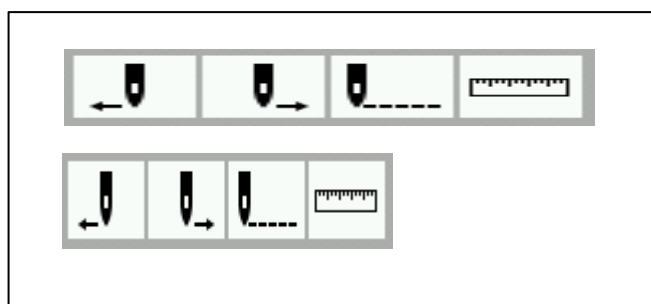
This section describes the icons which are used when checking programs and how to use them.



11-7-1. Checking each stitch



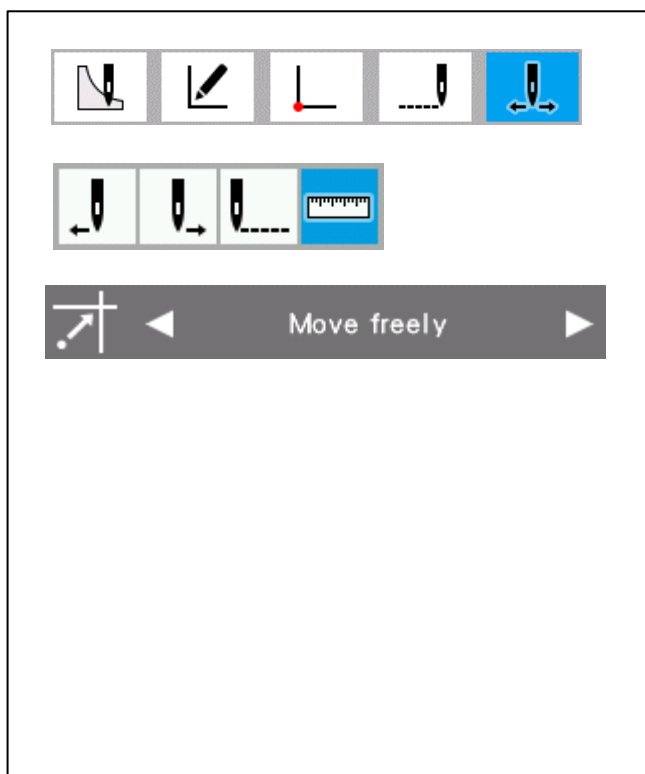
1. Touch  .
 Touch   to set the skipping units (1, 10, 50, 100, 500, 1000, 5000) and code display switching (Hide code, Show code).
 * Refer to the "11-6-8. List of code settings" for a list of the codes which are displayed when code display switching is set to "Show code".
2. Touch  or  . (Or, operation is also possible using   .)
 * To move backward
 Touch  , or use  .
 Hold down  or  . The cursor  will move back by the skipping units while the key is being pressed.
 * To move forward
 Touch  , or use  .
 Hold down  or  . The cursor  will move forward by the skipping units while the key is being pressed.




11-7-2. _____ Moving to the start position



1. Touch  .
2. Touch  _____ .
 The feed will return to the sewing start position.

11-7-3.  Measuring distances



1. Touch .
2. Touch .
3. Touch ◀ ▶ to set the method for moving the cursor (Move freely, Snap to needle point).
4. Use the jog key to move the cursor + to the start point that you would like to measure.
5. Press .
6. Use the jog key to move the cursor + to the position that you would like to measure.
 - * The distance between the measurement start position and the current cursor position is displayed as ΔX and ΔY .
 - * The line linking the measurement start position and the current cursor position is displayed.

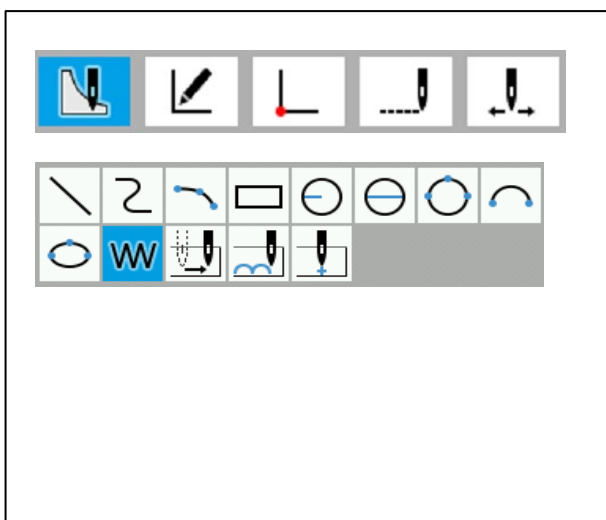
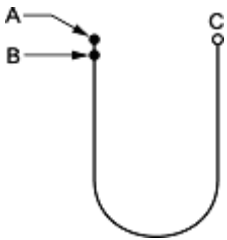
11-8. Programming example




This section describes how to create a program, using an actual program as an example.

- ◆ Programming for each stitch : Page 148
 - ◆ Pattern with lines : Page 149
 - ◆ Pattern with curves : Page 150
 - ◆ Double stitch and multiple stitch: Page 151
 - ◆ Continuous sewing with the work clamp in position after thread trimming(feed): Page 152
 - ◆ Basting : Page 153
 - ◆ Symmetrical pattern : Page 154
 - ◆ Programming while entering splits in different patterns: Page 155
 - ◆ Zigzag stitch : Page 156
- * For function and operating information about each icon, refer to "11-3. Creating programs".
- * In the programming example, point A in the illustration is the first stitch.

11-8-1. WW Programming for each stitch

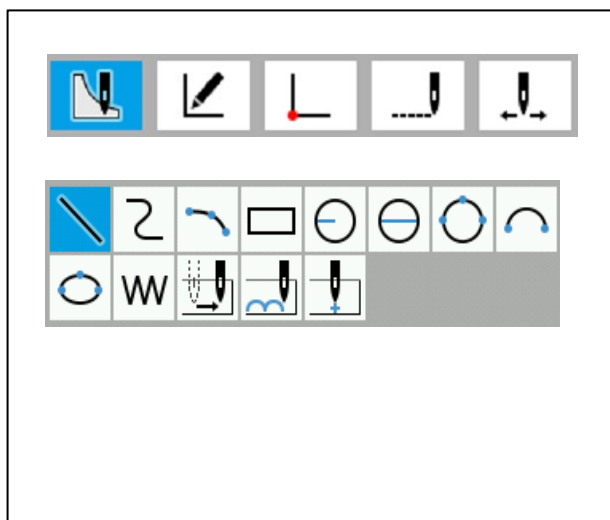
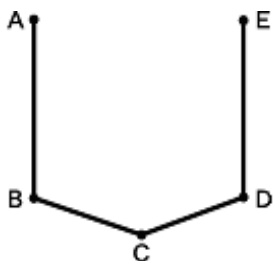
The following describes how to perform programming for each stitch according to the pattern sheet.







1. Carry out steps ■1 to ■3 in "11-2. Programming procedure".
2. Touch .
3. Touch **WW**.
4. Use the JOG key to move the cursor + to B.
5. Press .
6. Repeat steps 4 and 5 to move the cursor to C.
7. Press .
8. Carry out steps ■5 and after in "11-2. Programming procedure".

11-8-2. \ Pattern with lines

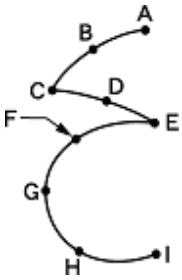
This section describes how to program shapes which include straight lines, using an actual program as an example.




1. Carry out steps ■1 to ■3 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Use the JOG key to move the cursor + to B.
5. Press .
6. Carry out the same operation in steps 4 and 5 for C, D and E.
7. Press .
8. Carry out steps ■5 and after in “11-2. Programming procedure”.

11-8-3. 2 Pattern with curves

This section describes how to program shapes which include curved lines, using an actual program as an example.



Be sure to press  twice to make a split at corner points C or E. If a split is not made, the corner will be rounded.
















When a split is made









When a split is not made



Making more intermediate points such as points B, D, F, G, and H creates smoother curves.

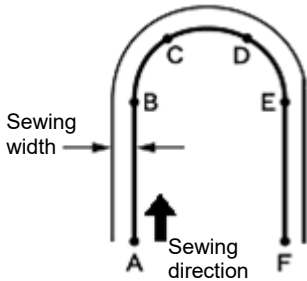
				
				
				


1. Carry out steps ■1 to ■3 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Use the JOG key to move the cursor + to B.
5. Press .
6. Repeat steps 4 and 5 to move the cursor + to C.
7. Press  twice to insert a split.
8. Move the cursor + to E.
9. Press  twice to insert a split.
10. Move the cursor + to I.
11. Press  twice.
12. Carry out steps ■5 and after in “11-2. Programming procedure”.

11-8-4. Double stitch and multiple stitch

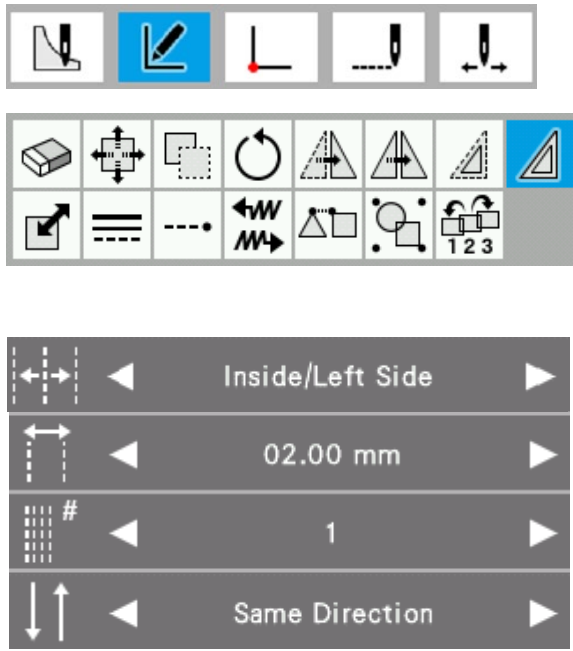
If you would like to program multiple lines at a constant width away from another line, you can create the lines using offset copying.




This section describes how to program double stitches on the left side of another line in the sewing direction, using an actual program as an example.



Be sure to press  twice to make a split at a point B or E where the line changes to the curve.

Placing more intermediate points such as points C and D creates smoother curves.

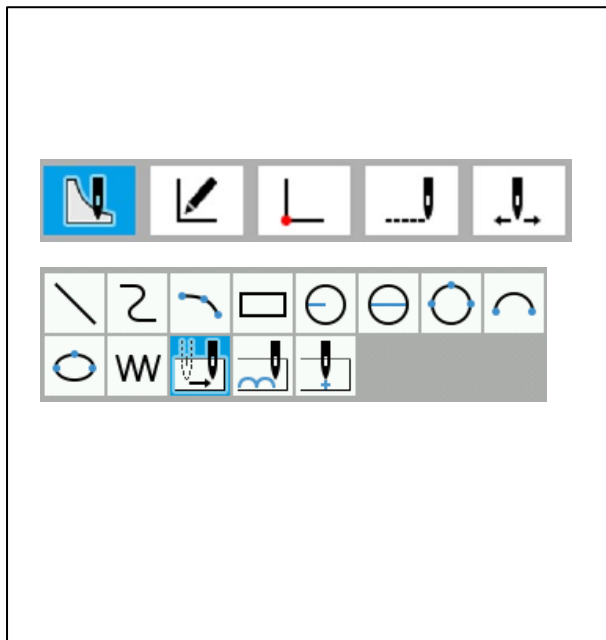
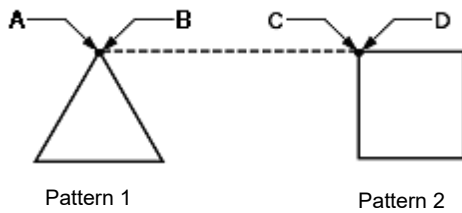





1. Carry out steps ■1 to ■3 in “11-2. Programming procedure”.
2. Use the functions for creating straight or curved lines to create an outline from A to F.
* Refer to "11-8-2. Pattern with lines" or "11-8-3. Pattern with curves".
3. Touch .
4. Touch .
5. Touch ◀ ▶ to set whether the double stitch will be created to the left or the right of the sewing direction.
To create the line to the left of the sewing direction:
To create the line to the right of the sewing direction:
6. Touch ◀ ▶ to set the sewing width and the number of copies.
Example: To sew a double stitch at a sewing width of 3.0 mm, set the sewing width to [03.00mm] and the number of copies to [1].
* To sew multiple stitches, set the number of copies to the number of additional lines to be sewn.
7. Touch ◀ ▶ to set the offset method (Same Direction, Return, Return + Stitch Connection).
Example: To copy in the same direction as the sewing direction, set the offset creation method to [Same Direction].
8. Use the JOG key to select the whole of the outline which was created in step 2.
* The outline which is selected will be displayed in red.
9. Press .
10. The selected outline will be copied in the specified sewing direction.
11. Carry out steps ■5 and after in “11-2. Programming procedure”.


11-8-5. Continuous sewing with the work clamp in position after thread trimming (feed)

Set "feed" to continue sewing with the work clamp in position after thread trimming.

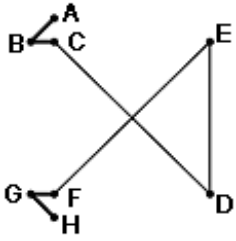
The following describes how to program pattern 2 with a feed after pattern 1.







1. Carry out steps ■1 to ■3 in "11-2. Programming procedure".
2. Create the outline for pattern 1.
* Refer to "Pattern with lines" (page 148).
3. Touch .
4. Touch .
5. Use the JOG key to move the cursor + to C.
6. Press  twice.
7. Create the outline for pattern 2.
* Refer to "11-8-2. Pattern with lines".
8. Carry out steps ■5 and after in "11-2. Programming procedure".

11-8-6.  Basting

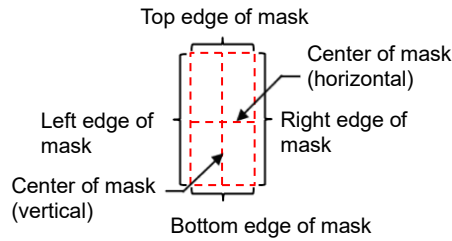
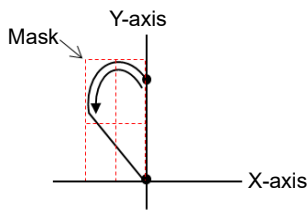
The following describes how to program basting from point C to point F.



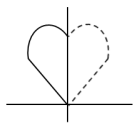
1. Carry out steps ■1 to ■3 in “11-2. Programming procedure”.
2. Use the function for creating straight lines to create an outline from A to C.
* Refer to "11-8-2. Pattern with lines".
3. Touch .
4. Touch .
5. Use the JOG key to move the cursor + to D.
6. Press .
7. Repeat steps 5 and 6 to move the cursor + to F.
8. Press  twice.
9. Repeat step 2 to create the outline from F to H.
* Refer to "11-8-2. Pattern with lines".
10. Carry out steps ■5 and after in “11-2. Programming procedure”.

11-8-7. Symmetrical pattern

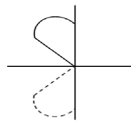
When programming a symmetrical pattern, program a target pattern and then select a symmetrical pattern type. This section describes how to program shapes which are symmetrical along the Y axis, using an actual program as an example.



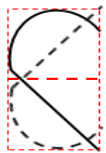
Symmetrical pattern type



Symmetrical to Y-axis
Select [Symmetrical along Y axis].



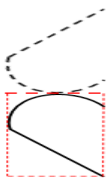
Symmetrical to X-axis
Select [Symmetrical along X axis].



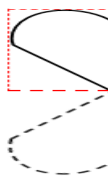
Center of mask (horizontal)
Select [Center of Mask (Horizontal)].



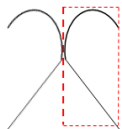
Center of mask (vertical)
Select [Center of Mask (Vertical)].



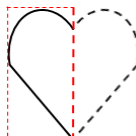
Top edge of mask
Select [Mask top edge].



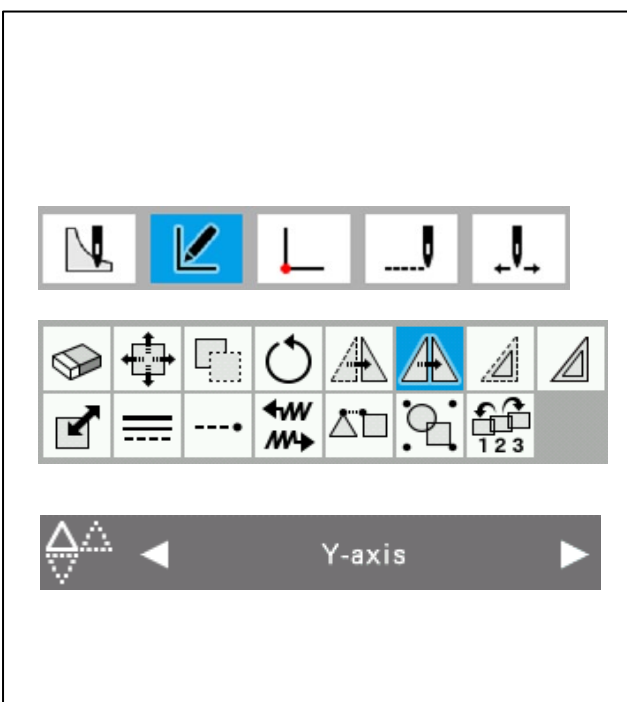
Bottom edge of mask
Select [Mask Right Edge].







Left edge of mask
Select [Mask Left Edge].



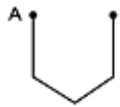
Right edge of mask
Select [Mask Right Edge].



1. Carry out steps ■1 to ■3 in “11-2. Programming procedure”.
2. Use the functions for creating feed data or curved lines to create an outline from A to B.
Refer to "11-8-1. Programming for each stitch" or "11-8-3. Pattern with curves".
3. Touch .
4. Touch .
5. Touch  to select the symmetry mode.
In the example, "Symmetrical along Y axis" is selected.
6. Use the JOG key to select the whole of the outline which was created in step 2.
The outline which is selected will be displayed in red.
7. Press .
8. Carry out steps ■5 and after in “11-2. Programming procedure”.

11-8-8. Programming while entering splits in different patterns

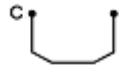
Multiple patterns are programmed splitting each pattern in sequence.
The following describes how to program 3 patterns in sequence.



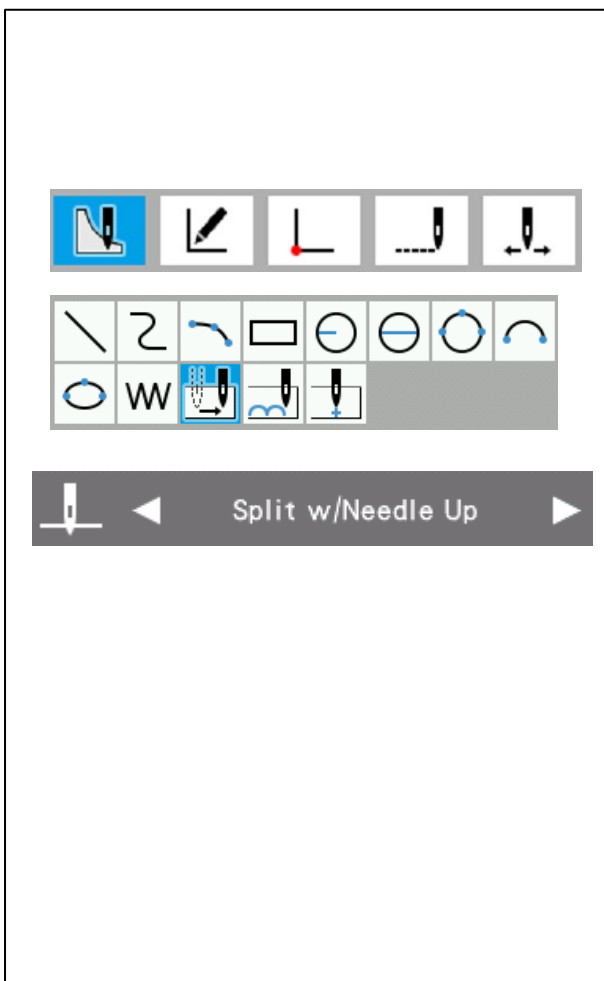
Pattern 1







Pattern 2



Pattern 3



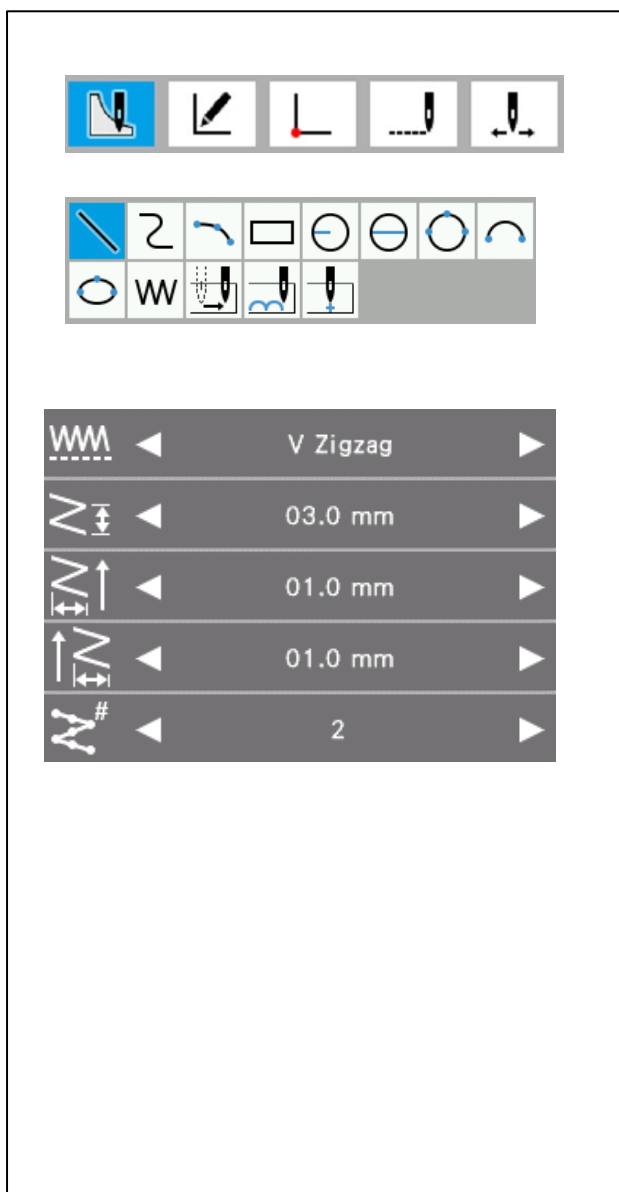
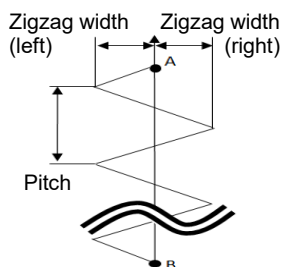
1. Carry out steps ■1 to ■3 in “11-2. Programming procedure”.
2. Create the outline for pattern 1.
* Refer to "11-8-2. Pattern with lines".
3. Touch .
4. Touch .
5. Touch ◀ ▶ to set a split.
6. Use the JOG key to move the cursor + to B.
7. Press  twice.
8. Create the outline for pattern 2.
* Refer to "11-8-2. Pattern with lines".
9. Carry out steps 3 to 5 once more.
10. Use the JOG key to move the cursor + to C.
11. Press  twice.
12. Create the outline for pattern 3.
* Refer to "11-8-2. Pattern with lines".
13. Carry out steps ■5 and after in “11-2. Programming procedure”.










11-8-9. Zigzag stitch

This section describes how to program a zigzag stitch which moves to the left and right while centered on the sewing start point (A), using an actual program as an example.

Two types of zigzag sewing can be selected: V-type zigzag and N-type zigzag. The left and right zigzag widths can also be set separately for each type. In addition, zigzag stitches with curved lines can also be programmed.

(A description of the programming method using V-type zigzag sewing is given as an example.)



1. Carry out steps ■1 to ■3 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
 - * To program curved-line zigzag stitches, touch .
4. Touch  to change to "V-type zigzag".
5. Set the running pitch and zigzag width for V-type zigzag stitches.
 - Example) To set the running pitch to 3.0 mm: Touch  to set the running pitch to "03.0mm".
6. Set the zigzag width (right) for V-type zigzag stitches.
 - Example) To set the zigzag width (right) to 1.0 mm: Touch  to set the zigzag width (right) to "01.0mm".
7. Set the zigzag width (left) for V-type zigzag stitches.
 - Example) To set the zigzag width (left) to 1.0 mm: Touch  to set the zigzag width (left) to "01.0mm".
8. Set the number of zigzags for V-type zigzag stitches.
 - Example) To set the number of zigzag stitches to 2: Touch  to set the number of zigzags to "2".
9. Use the JOG key to move the cursor + to B.
10. Press  twice.
 - * To program curved-line zigzag stitches, repeat this procedure.
11. Carry out steps ■5 and after in “11-2. Programming procedure”.

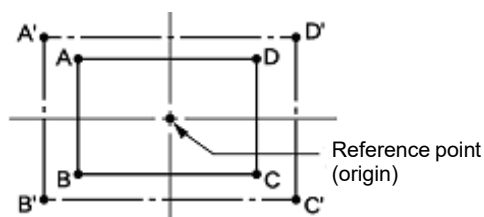
11-9. Example of modified program

This section describes the program modification methods using specific examples.

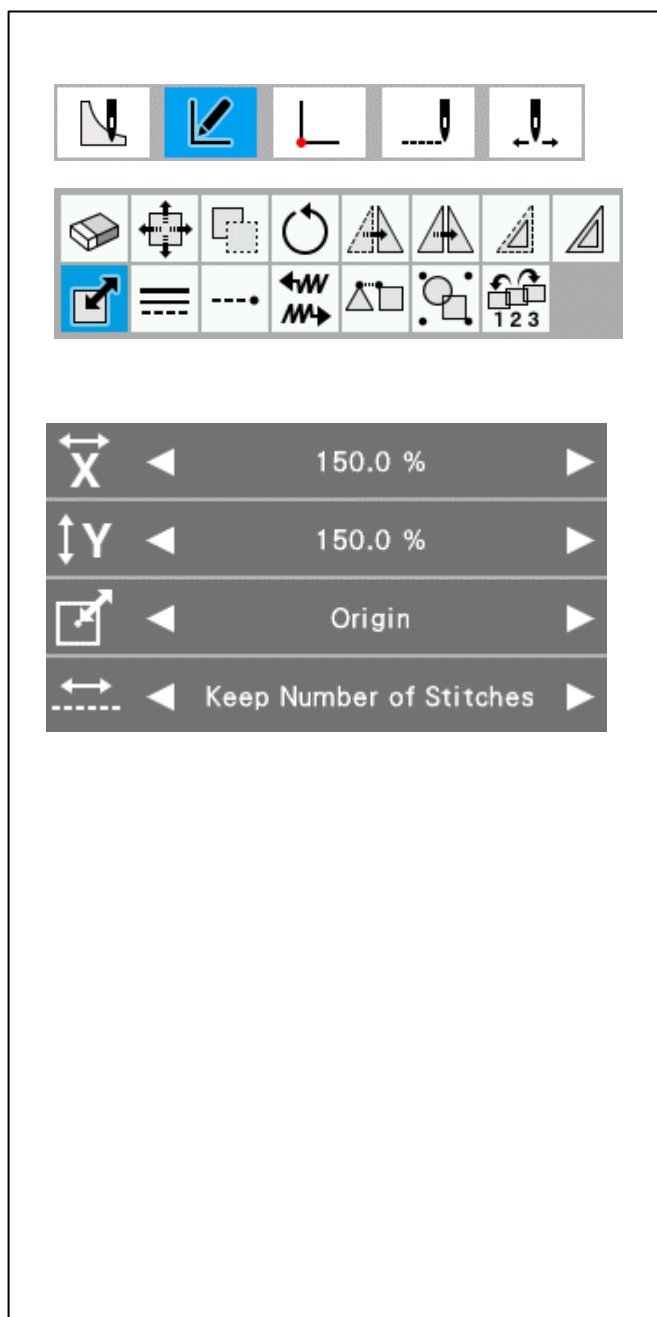
- ◆ Resizing a pattern: Page 158
- ◆ Modifying a part of pattern: Page 159
- ◆ Deleting the first stitch to change the sewing start point to the second stitch: Page 160
- ◆ Moving the sewing start point: Page 161
- ◆ Adding a new sewing start point before the first stitch: Page 162
- ◆ Adding an escape point before the sewing start point: Page 163
- ◆ Modifying a pattern by moving a component point: Page 164
- ◆ Modifying a pattern by adding a component point: Page 165
- ◆ Modifying a pattern by deleting a component point: Page 166
- ◆ Moving the pattern in parallel (when the first stitch is the sewing start point): Page 167
- ◆ Deleting a part of data during programming: Page 168
- ◆ Moving a part of a continuous program in parallel: Page 169
- ◆ Moving a part of a continuous program in parallel partially: Page 170
- ◆ Inserting a straight line into a pattern: Page 171 – 173

11-9-1. Resizing a pattern

The following describes how to resize a programmed pattern.



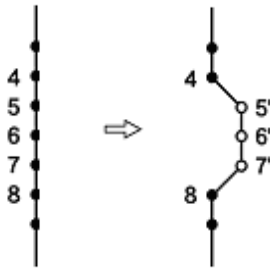
The reference point for resizing patterns is the center point for enlarging or reducing the pattern size.



1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Use to select the pattern which you would like to resize.
5. When you press the key once, the pattern will change to red lines and it will be selected.
6. Touch and enter the resizing ratios for the X direction and Y direction.
Example) To enlarge by 150%:
Change the resize setting to [150.0%].
7. Touch to set the resize center.
Example) To resize centering on the origin:
Set the resize center to [Origin].
8. Touch to set the hold element.
Example) To resize while maintaining the same number of stitches as in the original data:
Set the hold element to [Keep Number of Stitches].
9. Press .
The pattern will be resized.
* If the resize center was set to [Specified point] in step 7, you can use the JOG key to move the cursor so that the outline can be resized with the current cursor position as the resize center.
In this case, after moving the cursor , press once more.
10. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-2. Modifying a part of pattern

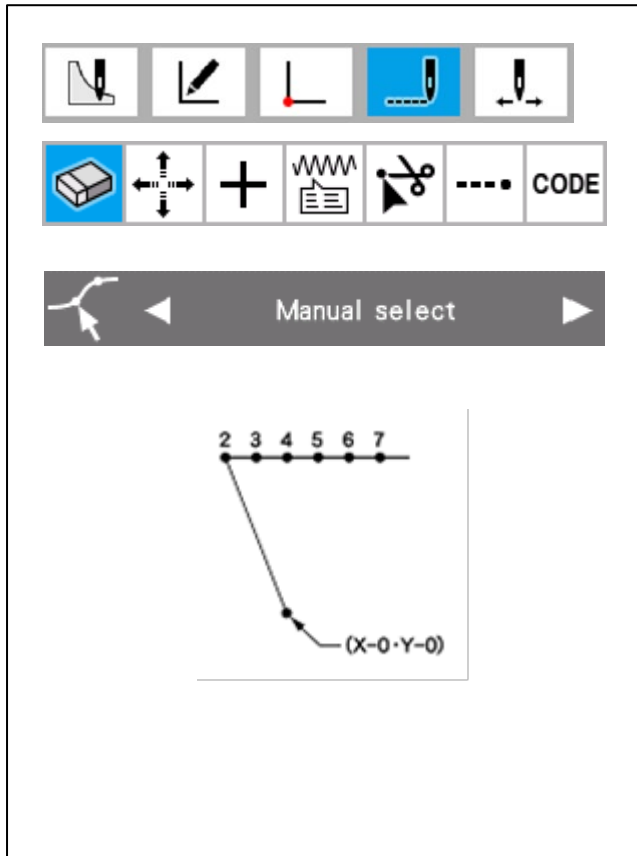
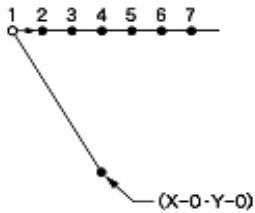
The part of the programmed pattern is changed. The following describes how to modify 5, 6 and 7 to 5', 6' and 7'.












1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch
3. Touch
4. Touch to select [Range select].
5. Use to move the cursor + to 5.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. Press
7. Use to move the cursor + to 7. Sewing points 5 to 7 will all now be selected.
8. Press
9. Use the JOG key to move the cursor + to 5', 6' and 7'.
10. Press .
The sewing points will move to the 5', 6' and 7' positions.
11. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-3. Deleting the first stitch to change the sewing start point to the second stitch

The following describes how to delete the sewing start point of a programmed pattern to make the second stitch as the sewing start point.

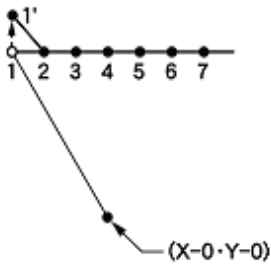


1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Touch   to select [Manual select].
5. Use   to move the cursor  to 1.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. When you press the  key once, the sewing point will change to red and it will be selected.
7. Press .








The 1 at the white circle for the 1st stitch will be deleted, and the needle position for the sewing start point will move to the 2 for the 2nd stitch.
8. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-4. Moving the sewing start point

The following describes how to move the sewing start point from 1 to 1'.



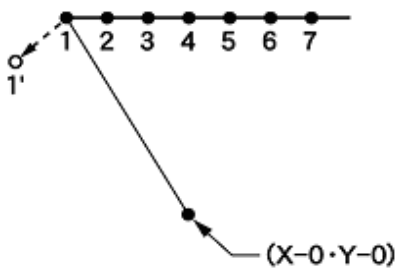
The screenshot shows the control panel with two rows of buttons. The top row includes icons for a needle, a pen, a red dot, a blue needle icon, and a needle with a red dot. The second row includes icons for a box, a blue four-way arrow, a plus sign, a zigzag line, a scissors icon, a dashed line, and a 'CODE' button. Below the buttons is a 'Manual select' menu with left and right arrow buttons. At the bottom is a smaller version of the sewing path diagram from the previous block, where point 1' is highlighted in red.

1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Touch  to select [Manual select].
5. Use  to move the cursor + to 1.
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key.
6. When you press the  key once, the sewing point will change to red and it will be selected.
7. Press .
8. Use the JOG key to move the cursor + to 1'.
9. Press .















The 1 at the white circle for the 1st stitch will move, and the needle position for the sewing start point will move to 1'.
10. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-5. Adding a new sewing start point before the first stitch

A point is added before the current sewing start point to make it as the sewing start point. The following describes how to change the sewing start point from 1 to 1'.



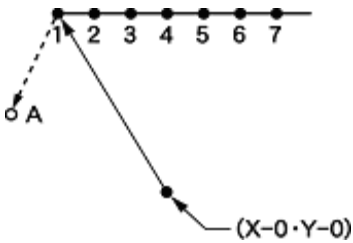
The screenshot shows the control panel in two states. In the top state, the 'Add Automatically' button is active, and a point is added between points 1 and 2, labeled 'Added point'. In the bottom state, the 'Manual select' button is active, and the cursor is moved to point 1'.

1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Touch  to select [Add Automatically].
5. Use  to move the cursor  to 1.
6. Press .
 - * You can move the cursor according to the skipping units.
 - * You can move the cursor continuously by holding down the key. A sewing point will be added to the outline between sewing points 1 and 2.
7. Touch .
8. Touch  to select [Manual select].
9. Use  to move the cursor  to 1.
10. When you press the  key once, the sewing point will change to red and it will be selected.
11. Press .
12. Use the JOG key to move the cursor  to 1'.
13. Press .

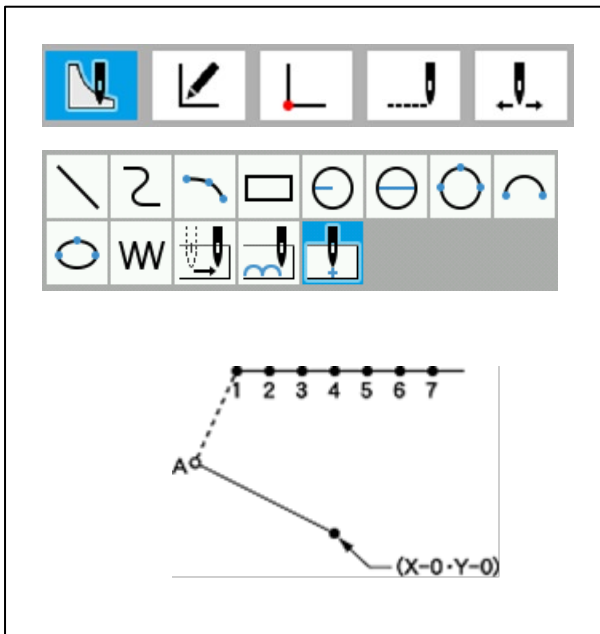
The 1 at the 1st stitch will move, and the needle position for the sewing start point will move to 1'.
14. Repeat steps 9 to 13 to move the sewing point which was added in step 6 to position 1.
15. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-6. Adding an escape point before the sewing start point


The following describes how to set the escape point A before the sewing start point.




The escape point is a provisional point provided to preventing the work clamp from interfering with the needle or the presser foot when the work clamp is lifted at the start point.



1. Carry out step ■8 in “11-2. Programming procedure”.

2. Touch .

3. Touch .

4. Use the JOG key to move the cursor + to A.

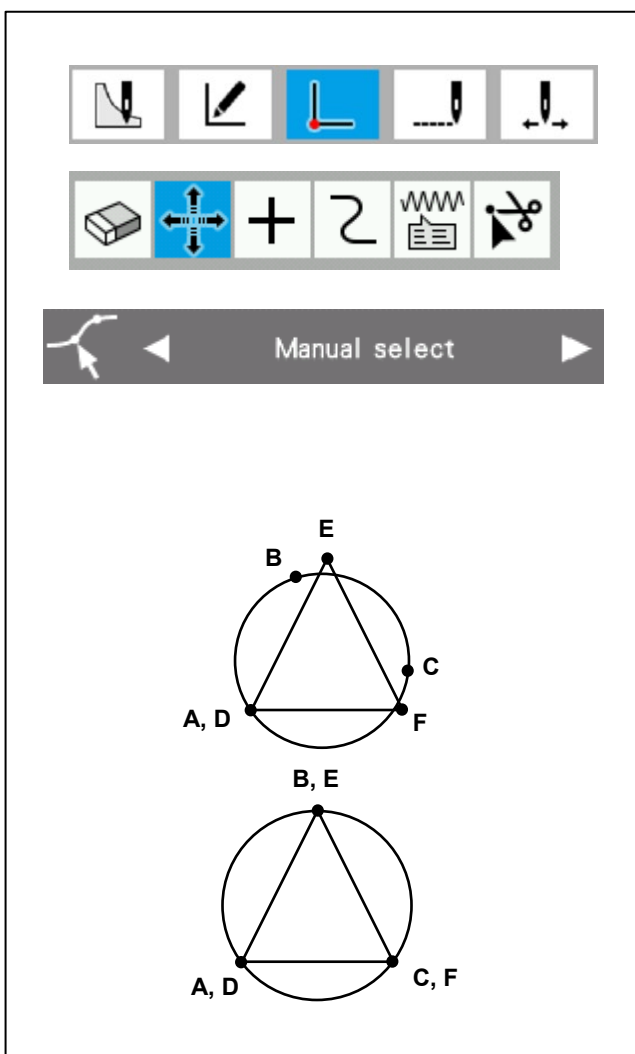
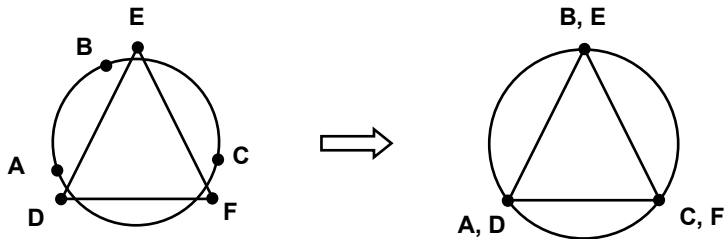
5. Press .








The sewing start point at position 1 will be moved to position A. By shifting the position of the sewing start point, the point can be used as an escape point.

6. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-7. Modifying a pattern by moving a component point

This section describes how to change the outline component points in a pattern which has already been programmed. This section describes how to modify a circle (A, B and C) so that it passes through the vertices of a triangle (D, E and F), using an actual program as an example.

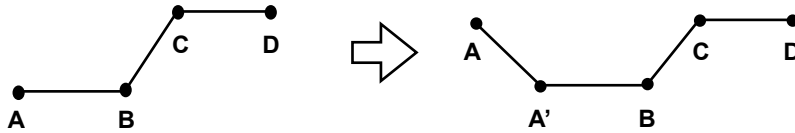


1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Touch  to select [Manual select].
5. Use  to move the cursor + to A.
* You can move the cursor continuously by holding down the key.
6. When you press the  key once, the component point will change to red and it will be selected.
7. Press .
8. Use the JOG key to move the cursor + to D.
9. Press .
Point A will move to position D.
10. Repeat steps 8 and 9 to move B to E and C to F.
11. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.


11-9-8. Modifying a pattern by adding a component point


This section describes how to add outline component points to a pattern which has already been programmed.



This section describes how to modify a pattern by adding component point A' and adjusting the positions of A and A', using an actual program as an example.



1. Carry out step ■8 in “11-2. Programming procedure”.

2. Touch .

3. Touch .


4. Use  to move the cursor  to A.



5. Press .

* You can move the cursor continuously by holding down the key.


A component point A' will be added to the outline between component points A and B.

6. Touch .


7. Touch  to select [Manual select].

8. Use  to move the cursor  to A.

* You can move the cursor continuously by holding down the key.

9. When you press the  key once, the component point will change to red and it will be selected.

10. Press .

11. Use the JOG key to move the cursor  to A.

12. Press .

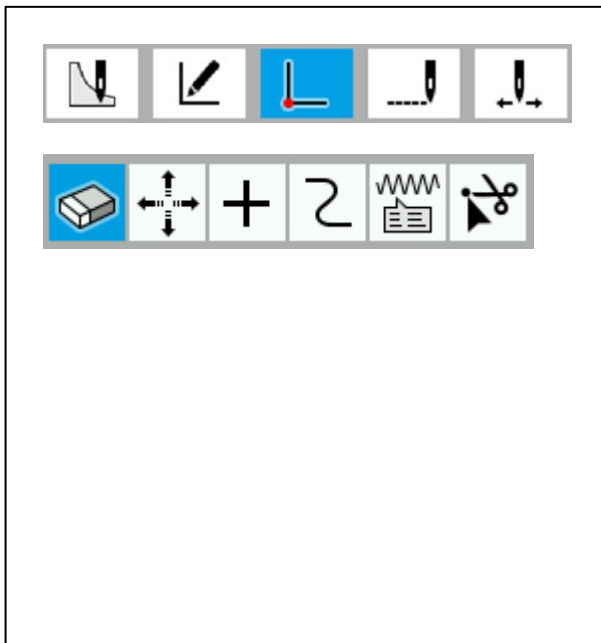
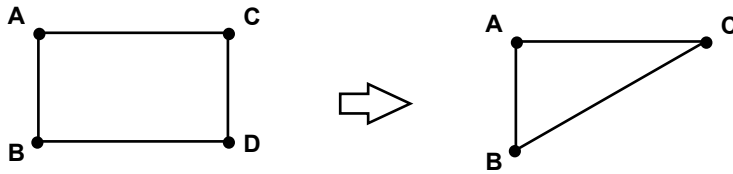
13. Repeat steps 8 to 11 to move component point A' which was added in step 5.

14. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.


11-9-9. Modifying a pattern by deleting a component point


This section describes how to delete outline component points from a pattern which has already been programmed.


This section describes how to modify a pattern by deleting component point D, using the following program as an example.




1. Carry out step ■8 in “11-2. Programming procedure”.

2. Touch .

3. Touch .

4. Use  to move the cursor + to D.

* You can move the cursor continuously by holding down the key.

5. When you press the  key once, the component point will change to red and it will be selected.

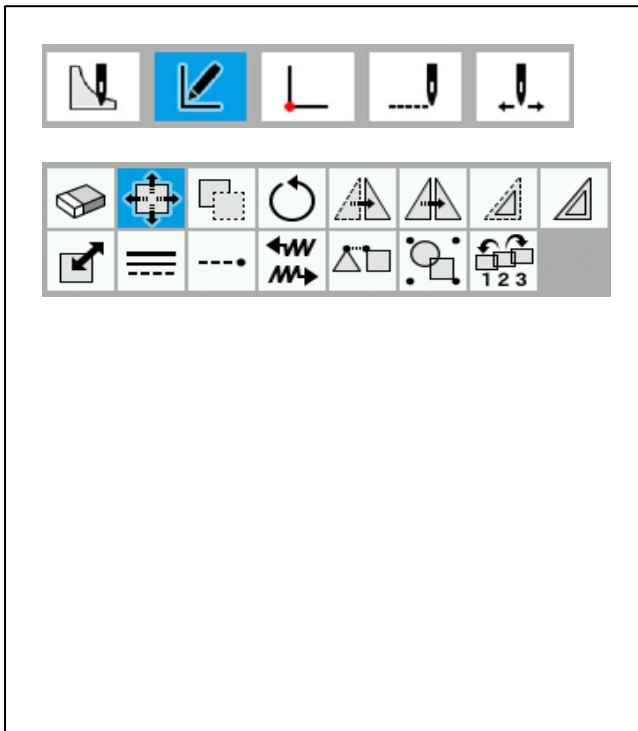
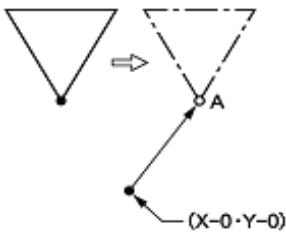
6. Press .







The selected component point will be deleted. The outline will be reconstructed so that the component points before and after the selected component point are joined together.

7. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-10. Moving the pattern in parallel

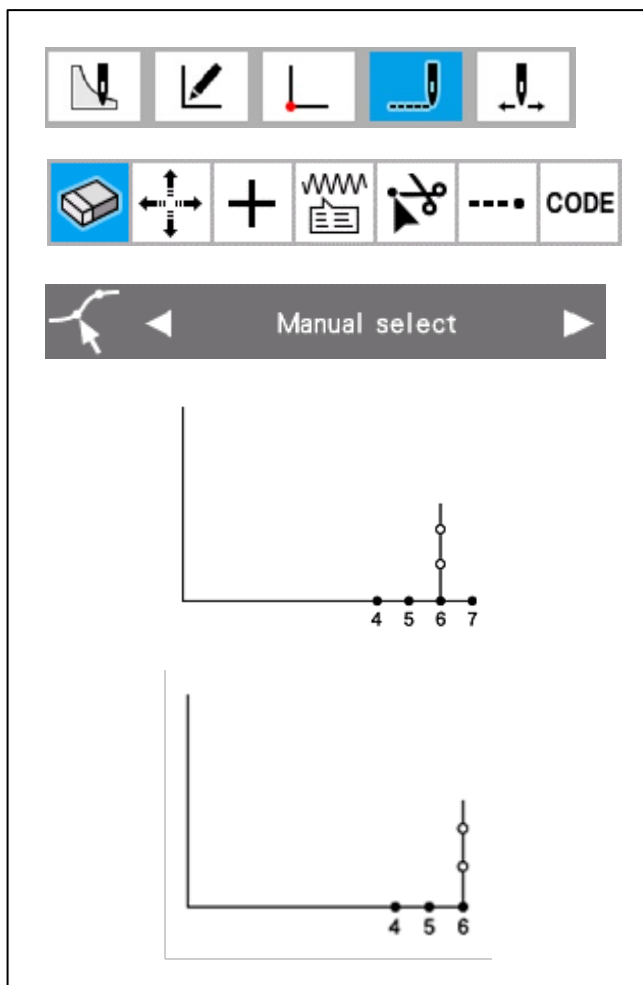
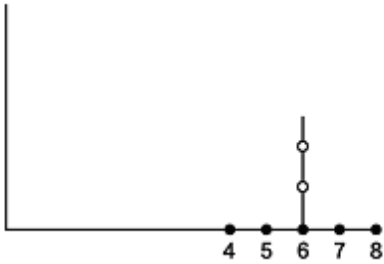
The following describes how to move the pattern in parallel when the first stitch is the sewing start point.










1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch  .
3. Touch  .
4. Use  to position the cursor + at the outline which you would like to edit.
5. When you press the  key once, the outline will change to red lines and it will be selected.
6. Press  .
7. Use the JOG key to move the cursor + along the X-axis to position A.
8. Press  .
The 1st stitch will move to position A.
9. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-11. Deleting a part of data during programming

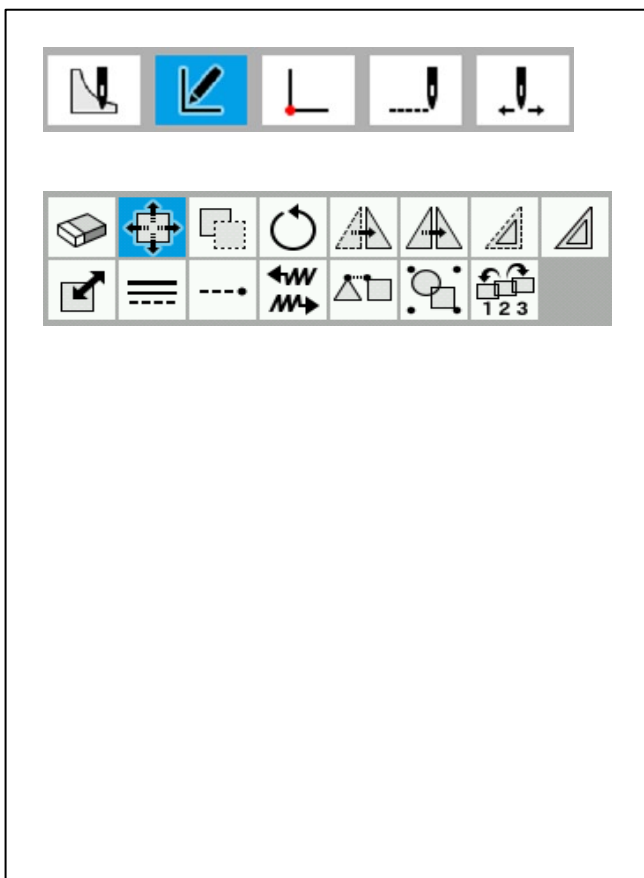
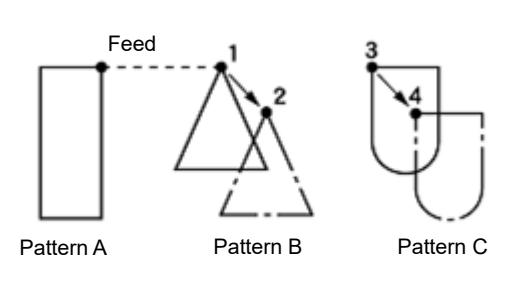
The following describes how to delete 2 stitches (7 and 8) at point 8 and creating a new program.









1. Touch  while programming.
2. Touch .
3. Touch  to select [Manual select].
4. Use  to move the cursor  to 8.
5. When you press the  key once, the sewing point will change to red and it will be selected.
6. Press .
The sewing point at 8 will be deleted.
7. Repeat steps 4 to 6 to delete the sewing point at 7 also.
The sewing point at 7 will be deleted and the cursor will move to 6.
8. Continue programming.

11-9-12. Moving a part of a continuous program in parallel

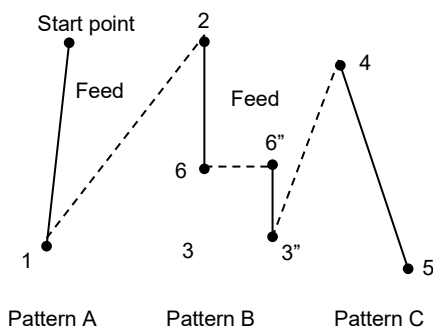
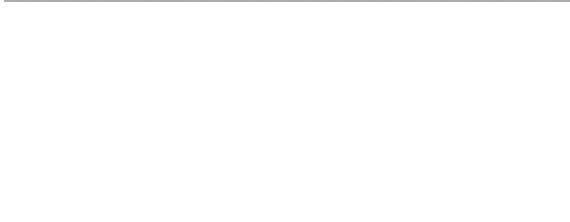
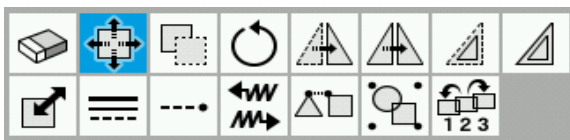
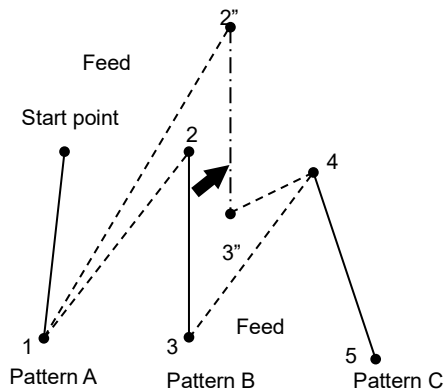
This section describes how to move part of a continuous program (patterns B and C) in parallel at the same time, using an actual program as an example.











1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Use  to position the cursor + at the outline of pattern B.
5. When you press the  key once, the outline will change to red lines and it will be selected.
6. Repeat steps 4 and 5 to select pattern C as well. Patterns B and C will now be selected.
7. Press .
8. Use the JOG key to move the cursor + to 2.
9. Press . Pattern B will move to 2, and the pattern C will move to 4 in the same way.
10. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.

11-9-13. Moving a part of a continuous program in parallel partially

Move a part of a continuous program in parallel to the position before the next feed is started. The following describes how to move only pattern B in parallel.



1. Carry out step ■8 in “11-2. Programming procedure”.
2. Touch .
3. Touch .
4. Use  to position the cursor + at the outline of pattern B.
5. When you press the  key once, the outline will change to red lines and it will be selected.
6. Press .
7. Use the JOG key to move the cursor + to 2”.
8. Press .
Pattern B will move to 2”.
9. Carry out steps ■6 and ■7 in “11-2. Programming procedure”.
To set parallel movement in the middle of stitch data, touch , and then touch , select the sewing points to move in parallel, and then move the sewing points.

The sewing points which are moved are connected by feeding.

(In the example on the left, 6-3 which are in between 2 and 4 are moved to 6"-3".)

11-9-14. Inserting a straight line into a pattern

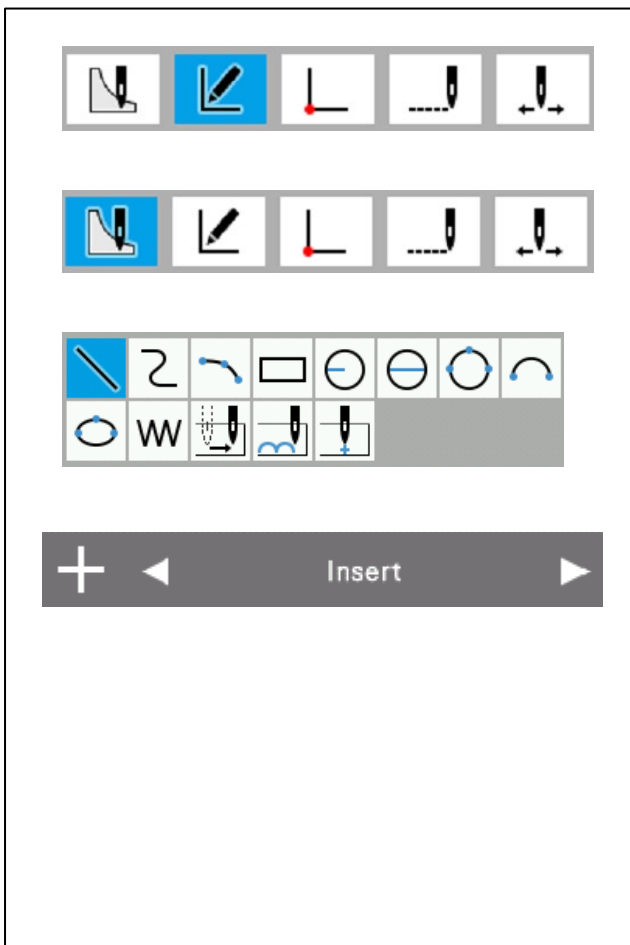
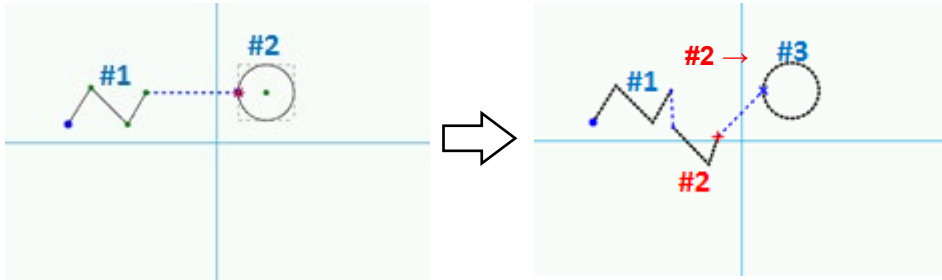
This describes how to add a new pattern to an existing program or pattern which has already been created.









- * The procedure introduced here is the procedure when "Settings" -> "Programmer" -> "Consecutive Data Input" is set to "OFF".

1) When inserting a straight line before the selected pattern

[Before inserting straight line]

[After inserting straight line]

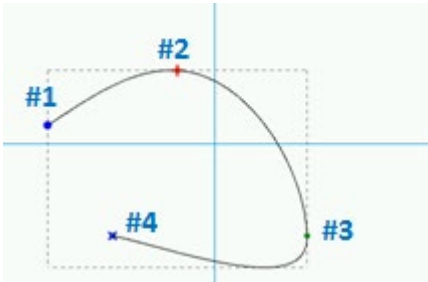


1. Touch .
2. Use  to move the cursor + to outline #2.
3. Touch .
4. Touch .
5. Touch  to select [Insert].
6. Use the JOG key to move the cursor to the position where you would like to insert the pattern.
7. Press  to provisionally set the start point.
8. Use the JOG key to move the cursor + to the position for the end point of the new pattern to be created.
9. Press  to provisionally set the sewing points.
 - * Repeat steps 8 and 9 until the shape of the pattern has been created.
10. Press  to confirm the pattern.

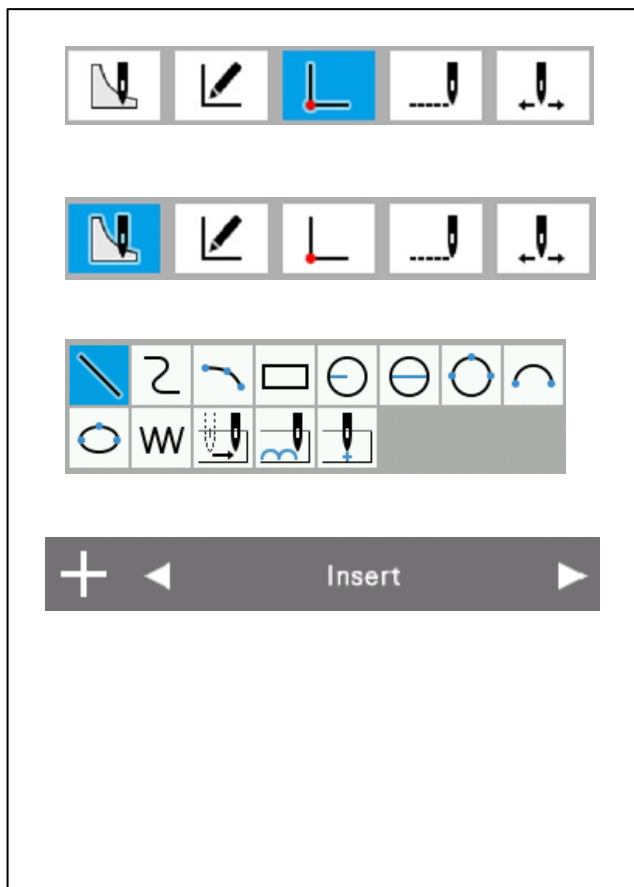
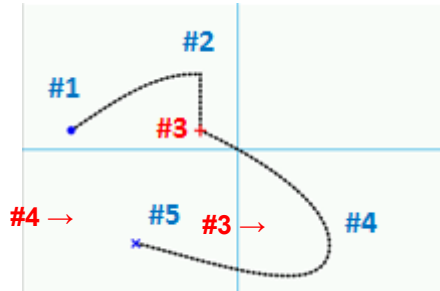
2) When inserting a straight line after a selected component point








* The above operation is only enabled for straight lines, curves and arcs.

[Before inserting straight line]



[After inserting straight line]

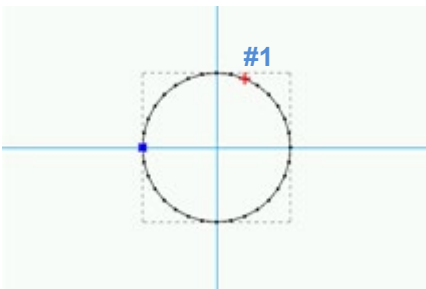


1. Touch .
2. Use  to move the cursor + to #2.
* You can move the cursor continuously by holding down the key.
3. Touch .
4. Touch .
5. Touch  to select [Insert].
6. Use the JOG key to move the cursor to the position where you would like to insert the pattern.
7. Press  to provisionally set the start point.
8. Use the JOG key to move the cursor + to the end point.
9. Press  to confirm the pattern.

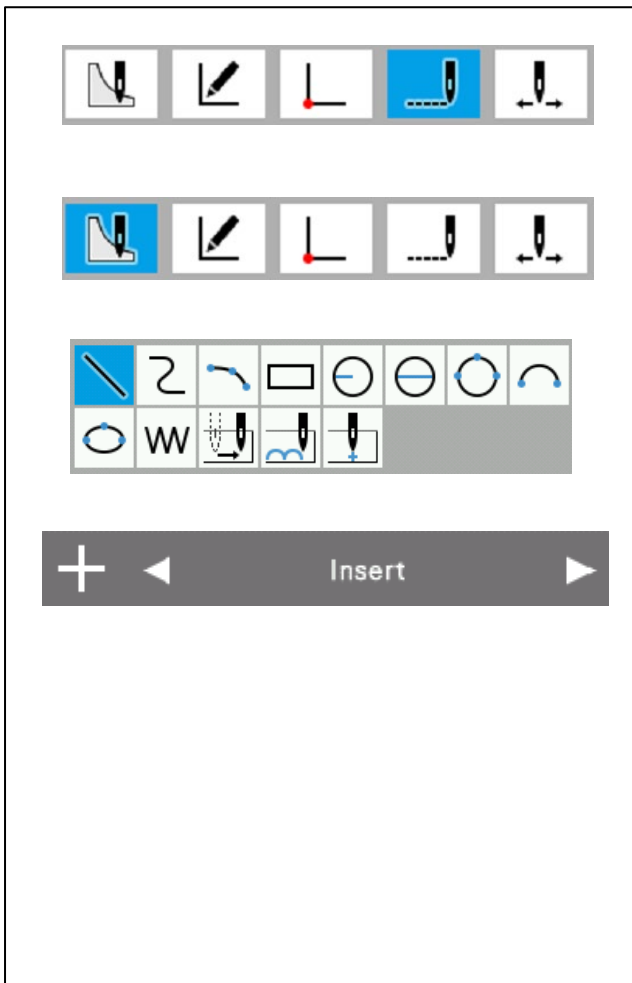
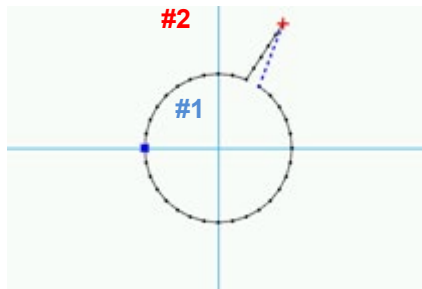
11. Program Creation









3) When inserting a line while drawing a circle

[Before inserting straight line]



[After inserting straight line]



1. Touch .
2. Use  to move the cursor + to C.
* You can move the cursor continuously by holding down the key.
3. Touch .
4. Touch .
5. Touch  to select [Insert].
6. Use the jog key to move the cursor to #1.
7. Press  to provisionally set the start point.
8. Use the jog key to move the cursor + to the position for the end point of the new pattern to be created.
9. Press  to provisionally set the sewing points.
* Repeat steps 8 and 9 until the shape of the pattern has been created.
10. Press  to confirm the pattern.

12. File management

12-1. About how to operate the file manager

12-1-1. Tasks that can be carried out using the File Manager

This chapter describes how to use the File Manager.

The File Manager can be used to carry out the following tasks for files which are saved in the panel internal memory or on storage media.

- Checking file information
- File operations such as loading, deleting and copying files and changing filenames
- Reading files from and writing files to storage media

Furthermore, the following file formats (extensions) can be handled by the programmer.

(Files other than those given below can be displayed and selected, but operations on these files are restricted to changing filenames, copying and moving.)

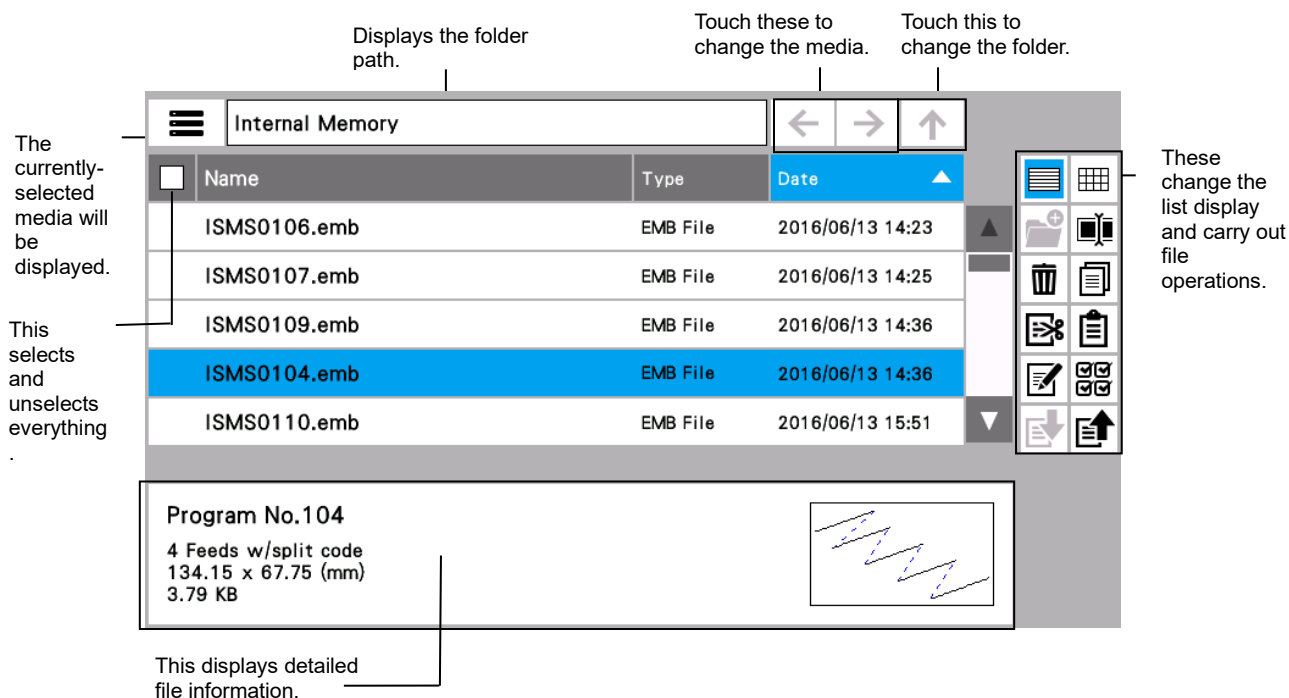
emb : Sewing data

sew : Sewing data, cycle programs and user parameters

For details on the folder structure of the USB media, refer to "10-2. Folder Structure".





12-1-2. Description of icons

File Manager screen





12. File management











Media selection, file selection, addresses, sorting

	Selecting media for browsing (Panel internal memory, SD card, USB media)
	Changing media
	Moving to a higher folder
	Selecting/unselecting all items

Changing the display

	Switching to list display
	Switching to icon display

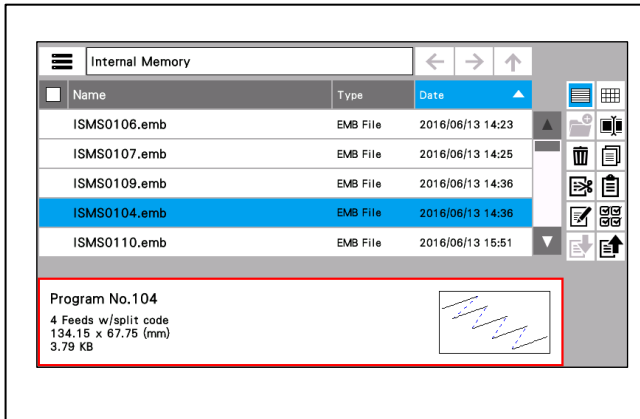
File and folder operations

	Adding folders
	Editing filenames and folder names
	Deleting files and folders
	Copying files and folders
	Cutting files and folders
	Pasting files and folders
	Editing files
	Switching between multiple select and single select mode
	Writing from the panel internal memory to other media (storage media)
	Reading from other media (storage media) to the panel internal memory

12-2. Displaying file lists

12-2-1. Checking file information

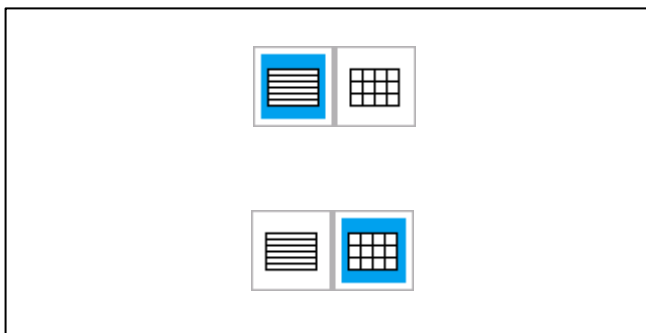
This displays the details of files and folders which are stored on the various media (panel internal memory and storage media).



1. Connect the media containing the files which you would like to check to the programmer.
2. At the screen, touch to display the File Manager.
3. Touch the icon in the top-left corner of the screen to switch to the media which contains the files you would like to check.
4. Select the file you would like to check. The detailed file information will be displayed at the bottom of the screen.

12-2-2. Changing the content display method to list format or icon format

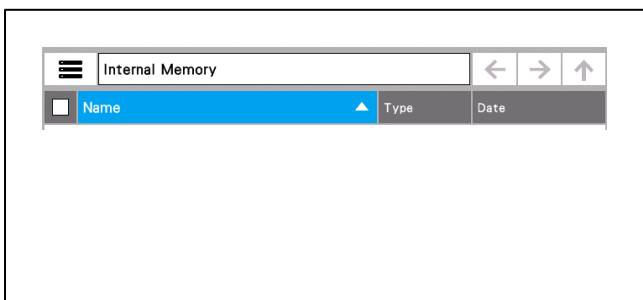
This switches the method used for displaying file contents.



1. At the screen, touch to display the File Manager.
2. Touch .
3. The file contents will be displayed in list format.
4. Touch .
5. The file contents will be displayed in icon format.

12-2-3. Sorting the display (applying sorting conditions)

You can sort the file content display according to a specified sort order.



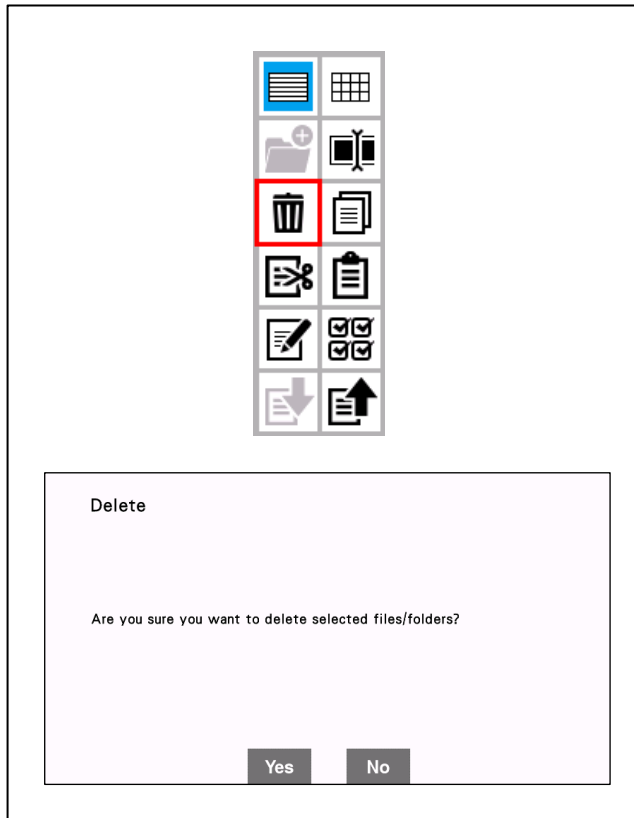
1. At the screen, touch to display the File Manager.
2. Touch the "Name", "Type" or "Date" tab at the top of the list.
3. The file contents will be sorted in ascending or descending order based on the item which you touched. (The order switches between ascending and descending each time you touch the same item.)






12-3. File operations

12-3-1. Deleting files and folders

This deletes files which are stored on the various media (panel internal memory and storage media).

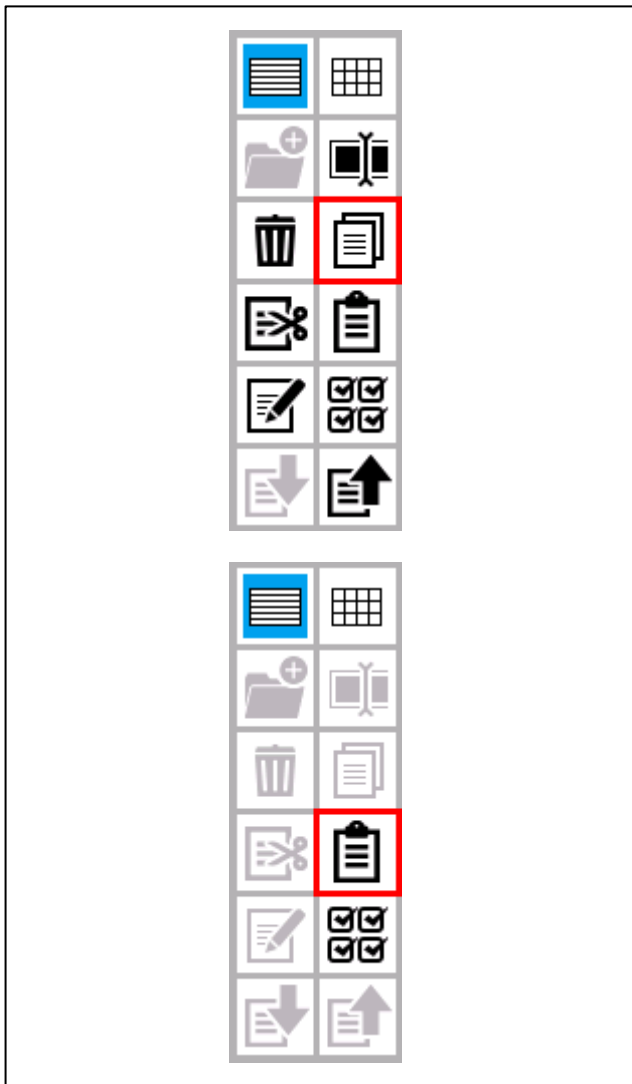
It is possible to select more than one file for deleting at the same time.







1. At the  screen, touch  to display the File Manager.
2. Select the file(s) or folder(s) which you would like to delete.
(To delete more than one file or folder, use multiple select mode to select the files or folders which you would like to delete.)
3. Touch  .
4. The delete confirmation dialog screen is displayed, so touch  .
Touch  to return to the file list screen.
5. The selected file(s) or folder(s) will be deleted.

12-3-2. Copying files and folders

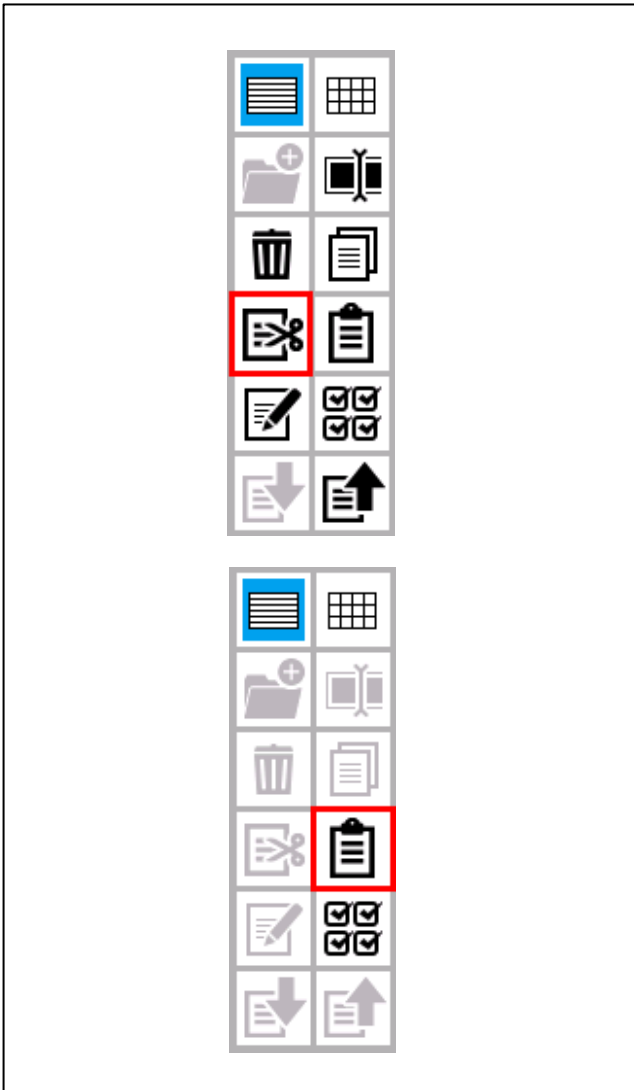
Files and folders which have been saved on media (panel internal memory and storage media) can be copied to the displayed folder. It is possible to select more than one file for copying at the same time.







1. At the  screen, touch  to display the File Manager.
2. Select the file(s) or folder(s) which you would like to copy. (To copy more than one file or folder, use multiple select mode to select the files or folders which you would like to copy.)
3. Touch .
4. Navigate to the destination folder for copying.
5. Touch .

12-3-3. Moving files and folders

Files and folders which have been saved on media (panel internal memory and storage media) can be moved to the displayed folder. It is possible to select more than one file for moving at the same time.

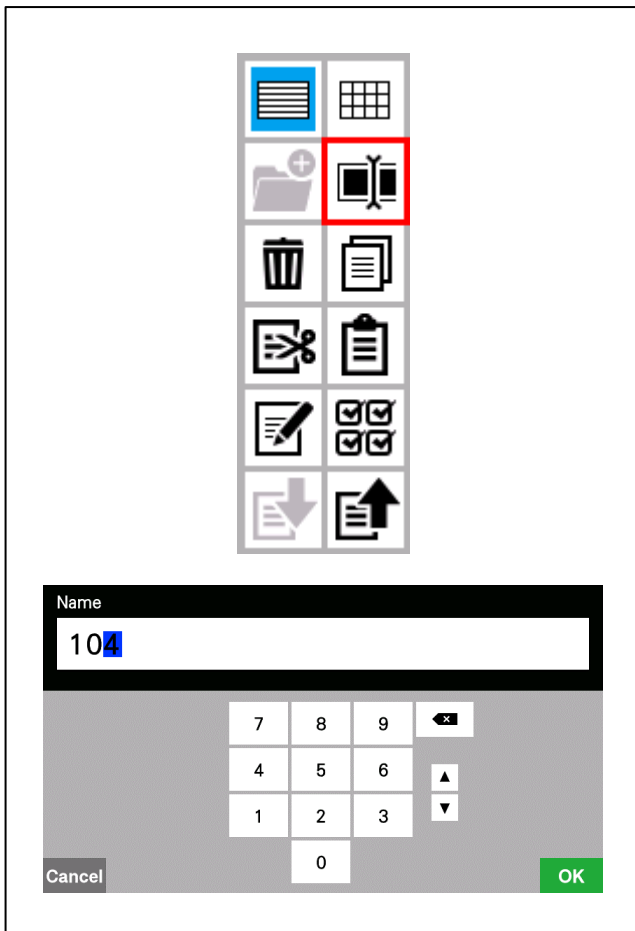






1. At the  screen, touch  to display the File Manager.
2. Select the file(s) or folder(s) which you would like to move.
(To move more than one file or folder, use multiple select mode to select the files or folders which you would like to move.)
3. Touch .
4. Navigate to the destination folder for moving.
5. Touch .
6. The selected file(s) or folder(s) will be moved to the displayed folder.

12-3-4. Changing the names of files and folders

This changes the names of files and folders which are stored on the various media (panel internal memory and storage media).

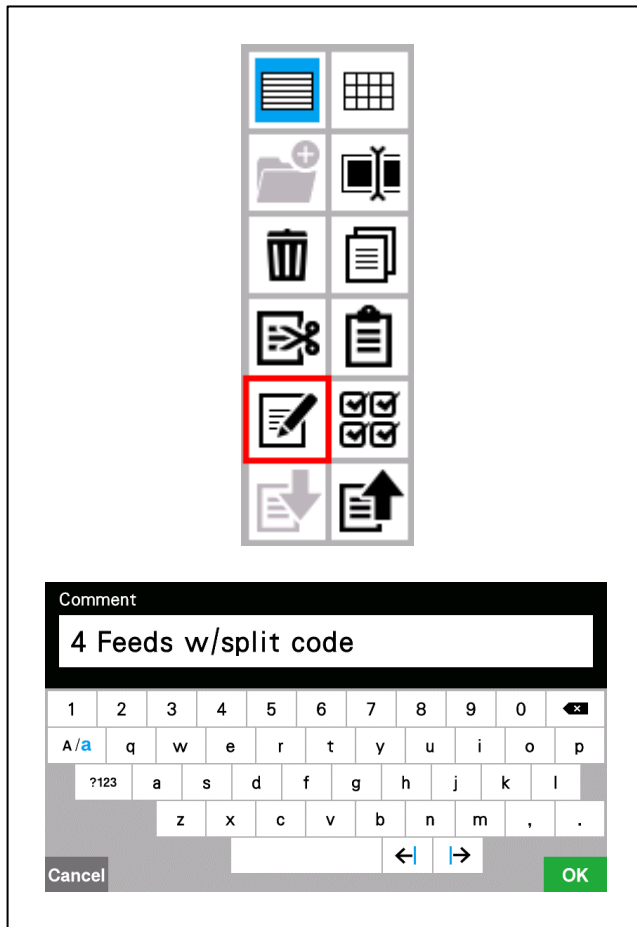
Comments which are attached to files can be changed at the same time.







1. At the  screen, touch  to display the File Manager.
2. Select the file or folders which you would like to change the name of.
3. Touch .
4. The display will change to the filename/folder name editing screen so that you can edit the filename or folder name.
5. Touch .
6. The filename, folder name and/or comment will be changed to the contents which were edited in step 4.

12-3-5. Editing comments

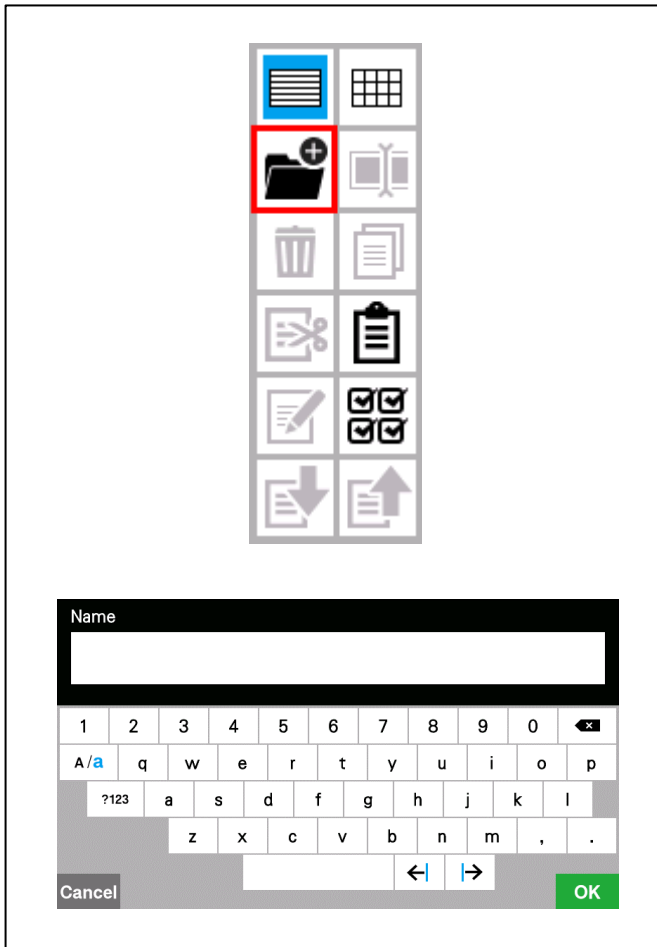
The comments which have been added to sewing data files which have been saved in media (panel internal memory or storage media) can be changed.







1. Touch  on the  screen to display the File Manager..
2. Select the file containing the comment that you would like to change.
3. Touch  .
4. The screen will change to the comment editing screen where you can edit the comment.
5. Touch  .
6. The comment will be changed to that which was edited in step 4.

12-3-6. Creating folders

You can create new folders in the storage media.



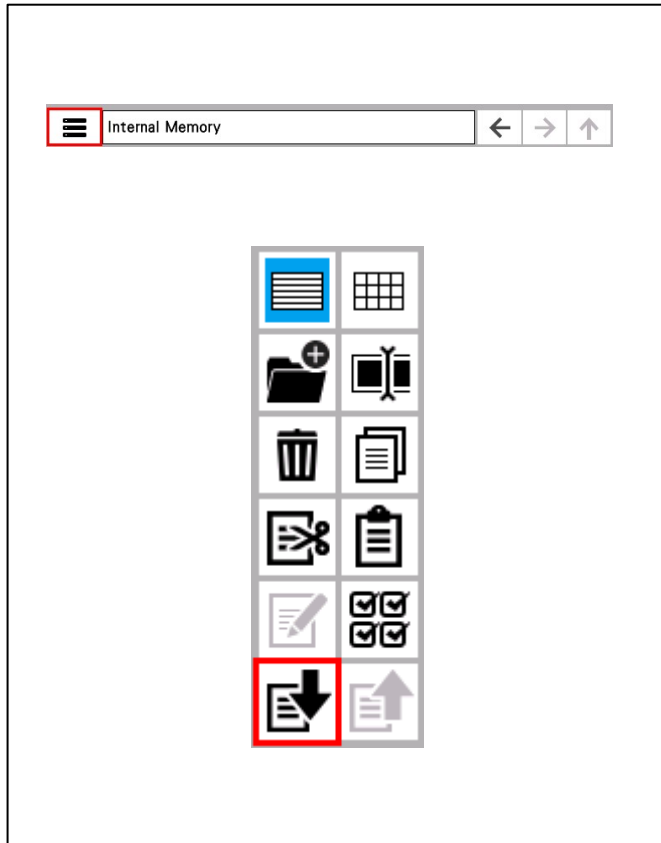
1. At the  screen, touch  to display the File Manager.
2. Touch the icon in the top-left corner of the screen to switch to the storage media.
3. Navigate to the folder where you would like to create a new sub-folder.
4. Touch .
5. The display will change to the folder name entry screen, so that you can enter the name of the folder.
6. Touch .
7. The folder will be created.




12-4. File operations using storage media

12-4-1. Importing files from storage media into the panel internal memory

Files which have been saved on storage media can be imported into the panel internal memory.

It is possible to select more than one file for importing at the same time.



1. Insert the storage media containing the file that you wish to import into the programmer.
2. At the  screen, touch  to display the File Manager.
3. Touch the icon in the top-left of the screen to select the storage media which contains the file that you would like to import.
4. Touch the file which you would like to import in order to select it.
(To import more than one file or folder, use multiple select mode to select the files or folders which you would like to import.)
5. Touch .
6. The selected file(s) will be imported into the panel internal memory.






13. Setting






13-1. Setting the programming functions

You can change the settings which relate to programming functions.

The changed settings will be applied when programming.

The procedure for changing the programming settings and the items which can be set are explained below.

1. At the  screen, touch .
2. Touch   to display the programming settings.
3. Touch the setting value for the setting item which you would like to change, and then change the setting value.
* Refer to the following table for the setting items.
4. Touch  at the bottom of the screen to apply the changed settings.






Setting item	Summary	Setting value
Continuous data input	ON: When entering data, it is automatically connected to the end point of the previous outline. OFF: When entering data, an outline start point is entered each time.	ON / OFF
X coordinate initial value (mm)	Changes the initial value for the cursor's X coordinate.	-999 - 999
Y coordinate initial value (mm)	Changes the initial value for the cursor's Y coordinate.	-999 - 999
Switching the home key and enter key	ON: The roles of the  key and the  key are switched, only when the Programmer screen is displayed. OFF: The roles of the  key and the  key are not switched.	ON / OFF
Marker display	ON: A marker is displayed at a fixed distance from the cursor  in the Programmer screen. OFF: A marker is not displayed.	ON / OFF
Marker X display position (movement amount from cursor) (mm)	Changes the X coordinate of the marker's display position.	-999 - 999
Marker Y display position (movement amount from cursor) (mm)	Changes the Y coordinate of the marker's display position.	-999 - 999
Preview area enlarged display	When turned on, the program image on the left side of the programming screen appears larger on the screen.	ON / OFF

13-2. Setting the display

You can change settings which relate to the display.

After a setting is changed, it is applied once it is confirmed.

The procedure for changing the display settings and the items which can be set are explained below.

1. At the  screen, touch .
2. Use   to display the display settings, and then touch the desired setting item.
3. Touch the setting value for the setting item which you would like to change, and then change the setting value.
* Refer to the following table for the setting items.
4. Touch  at the bottom of the screen to apply the changed settings.





Setting item	Summary	Setting value
Brightness	This changes the brightness of the LCD backlight.	1 – 6 Dark ... Bright

13-3. Setting the date and time


You can change settings which relate to the date and time.

After a setting is changed, it is applied once it is confirmed.

The procedure for changing the date and time settings and the items which can be set are explained below.

1. At the  screen, touch  .
2. Use   to display the date and time settings, and then touch the desired setting item.
3. Touch the setting value for the setting item which you would like to change, and then change the setting value.

* Refer to the following table for the setting items.

4. Touch  at the bottom of the screen to apply the changed settings.






Setting item	Summary	Setting value
Year	This changes the year setting.	2024 – 2099
Month	This changes the month setting.	1 - 12
Day	This changes the day setting.	1 - 31
Hour	This changes the hour setting.	1 - 24
Minute	This changes the minute setting.	0 - 59
Date display format	This changes the date display format. Example: When set to YYYY/MM/DD , the date is displayed as [2015/01/01].	YYYY/MM/DD DD/MM/YYYY MM/DD/YYYY
Time display format	This changes the time display format.	12 hours/ 24 hours

13-4. Setting the language

You can change settings which relate to the language.

After a setting is changed, it is applied once it is confirmed.

The procedure for changing the language is explained below.





1. At the  screen, touch .
2. Use   to scroll the screen, and select [Language setting] from the list.
3. Touch the language which you would like to select.
4. Touch  at the bottom of the screen to apply the changed settings.

13-5. Checking information

13-5-1. Viewing information

You can check information relating to the sewing machine and LCD panel.

The steps required in order to check the information are explained below.





1. At the  screen, touch .
2. Use   to scroll the screen, and select [Information] from the list.
3. Touch [Information].

Item No.	Summary
18-digit code	Displays an 18-digit code.
Sewing machine serial number	This displays the serial number of the sewing machine.
Boot software version	This displays the version of the boot software.
Main software version	This displays the version of the main sewing machine software.
Extension microcomputer 0 software version	Displays the version number for the software for expansion microprocessor 0.
Extension microcomputer 1 software version	Displays the version number for the software for expansion microprocessor 1.
Maintenance information list	This displays the maintenance information for the sewing machine.
Error log list	This displays the error information for the sewing machine.

13-6. Checking the software license

The programmer can be used to update the software for the software license.

The steps required in order to check the software license information are explained below.

1. At the  screen, touch  .
2. Use   to scroll the screen, and select [Open source license] from the list.
3. Touch [Open source license].

Item No.	Summary
Open source license	This displays the license for the open source software. * If you touch "Open source license", the license will be displayed.

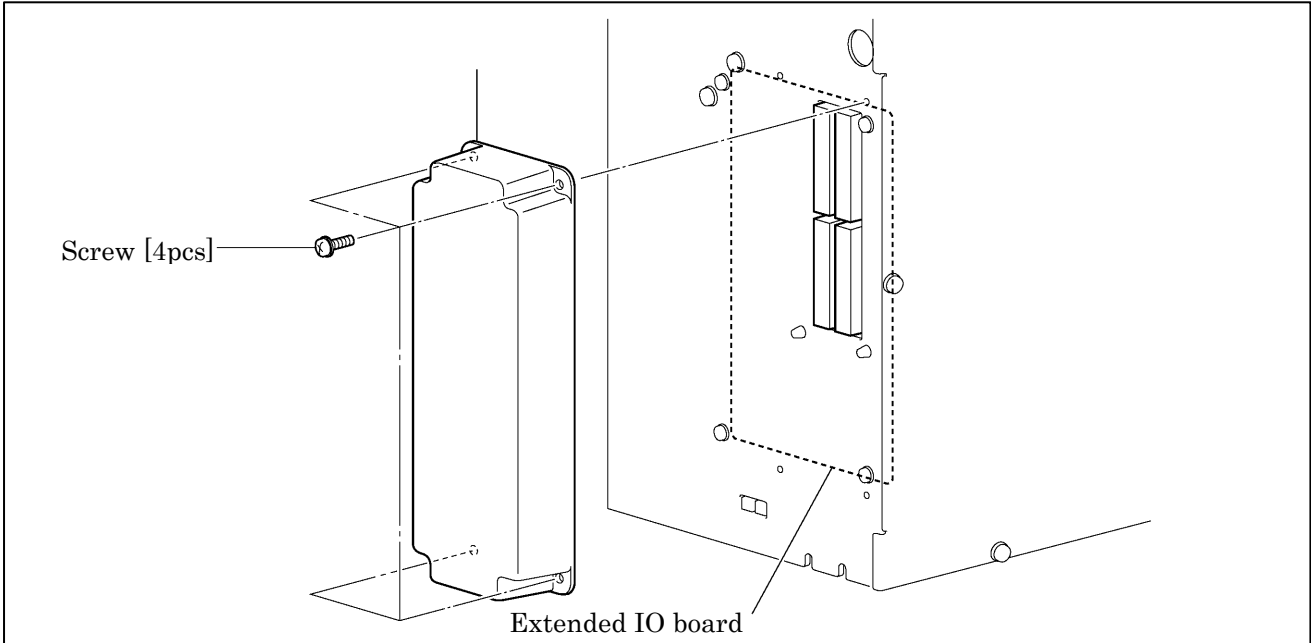
14. Extended IO

Depending on the purpose, you can use extended input and extended output signals.

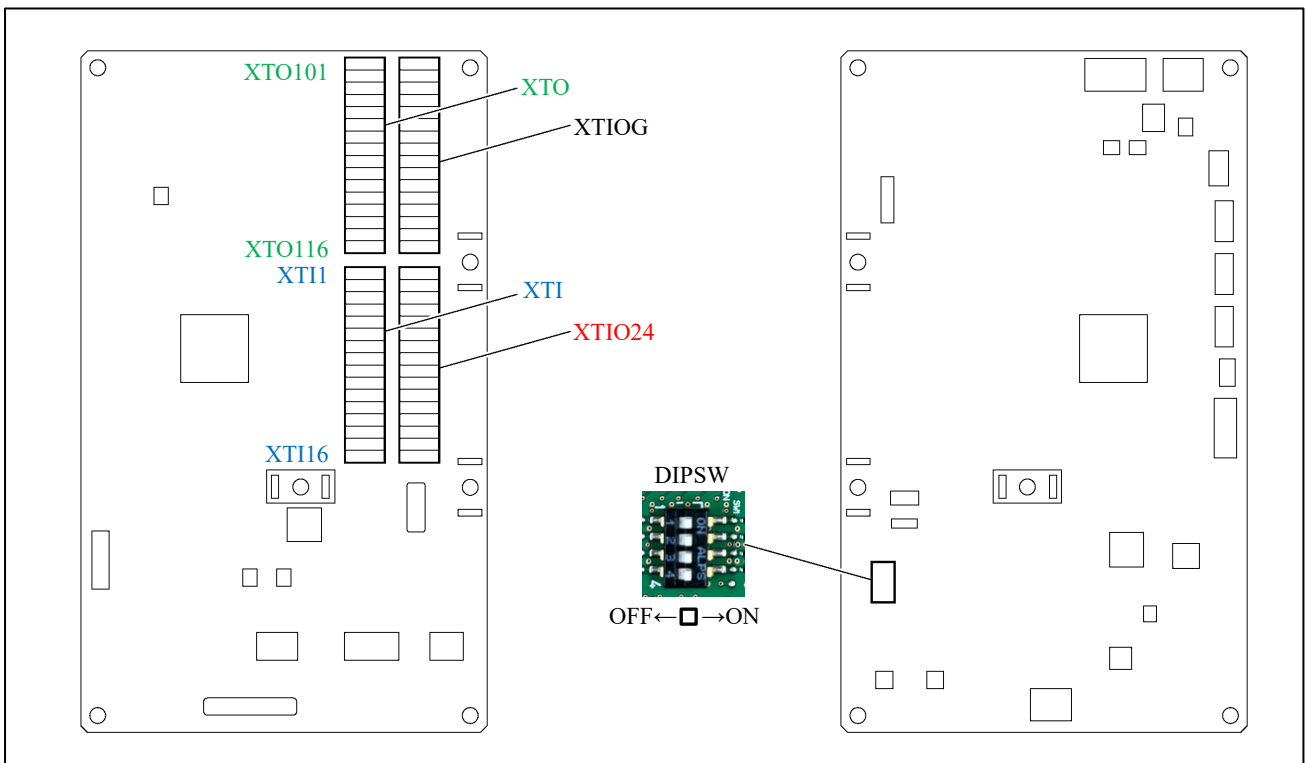
14-1. Hardware Specifications

14-1-1. Configuration

When you remove the cover on the side of the control box, you will find the extended IO board.



The extended IO board is equipped with external input/output signals that can be switched between sink (NPN) and source (PNP) using the DIP switches on the board.



This section describes the terminal blocks XTI, XTO, XTIO24, and XTIOG on the extended IO board.

XTI is an external input terminal block, XTO is an external output terminal block, and XTIO24 and XTIOG are general-purpose power terminal blocks.

Please connect the input/output devices prepared by the customer.

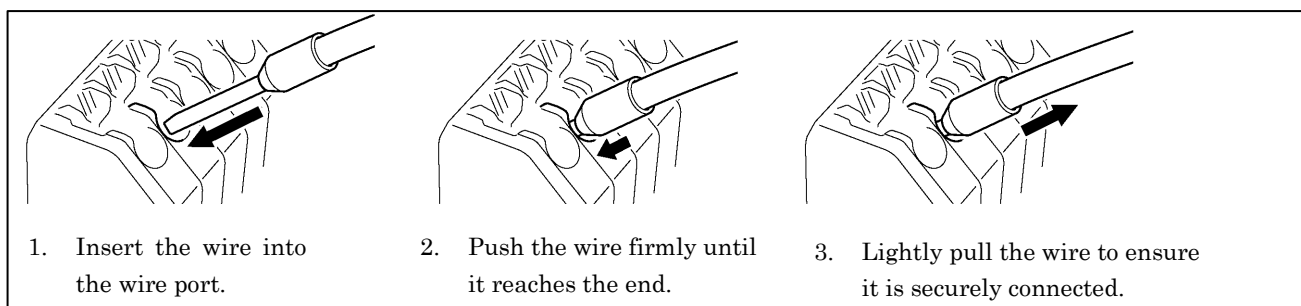
Terminal Block Name	Symbol	Function
XTI1-XTI16	EXIN1-EXIN16	Used as a free-mapping input signal terminal block. Free-mapping allows you to freely assign NC internal function signals on the operation panel.
XTO101-XTO116	EXOUT1-EXOUT16	Used as a free-mapping output signal terminal block. Free-mapping allows you to freely assign NC internal function signals on the operation panel.
XTIO24	IO24	This is the COM terminal for the +24V DC power supply (24V) on the expansion IO board. It is used as the 24V power supply for any input/output devices. Please adhere to the maximum output current of 100mA per point and a total output current of 1000mA for all ports for external output, 24V power COM, and IOG power COM.
XTIOG	IOG	This is the COM terminal for the GND (0V) of the DC24V on the IO board. It is used as the GND power supply for any input/output devices. Please adhere to the maximum output current of 100mA per point and a total output current of 1000mA for all ports for external output, 24V power COM, and IOG power COM.

14-1-2. How to connect terminal blocks

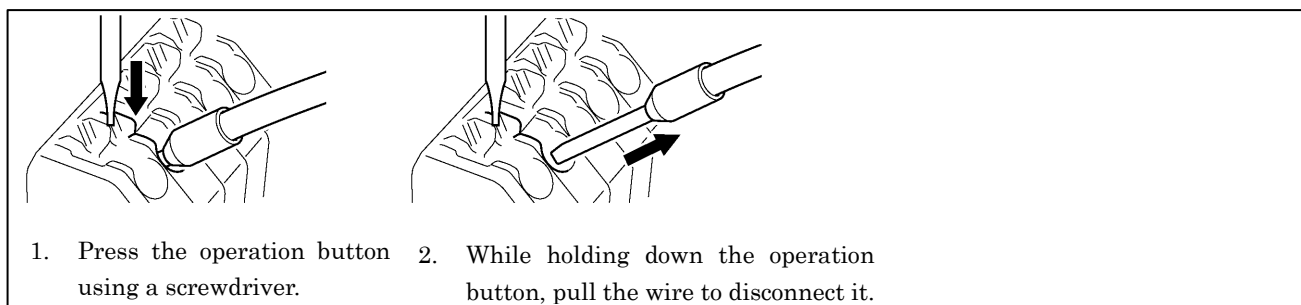
Use the crimp terminals NF0.5-8 (Nichif) or FE-0.5-8N-WH (WAGO) for connection of the terminal blocks.

The wires that can be connected to the crimp terminals are 0.5 mm² (20 AWG) and the outer diameter size of $\phi 2.4$ mm.

[Wiring work]



[Removing the Wire]



14-1-3. Switching Input/Output Circuit Type

External input and external output can be switched between sink (NPN) and source (PNP) using SW1 on the expansion IO board. Please set it according to the connected device.

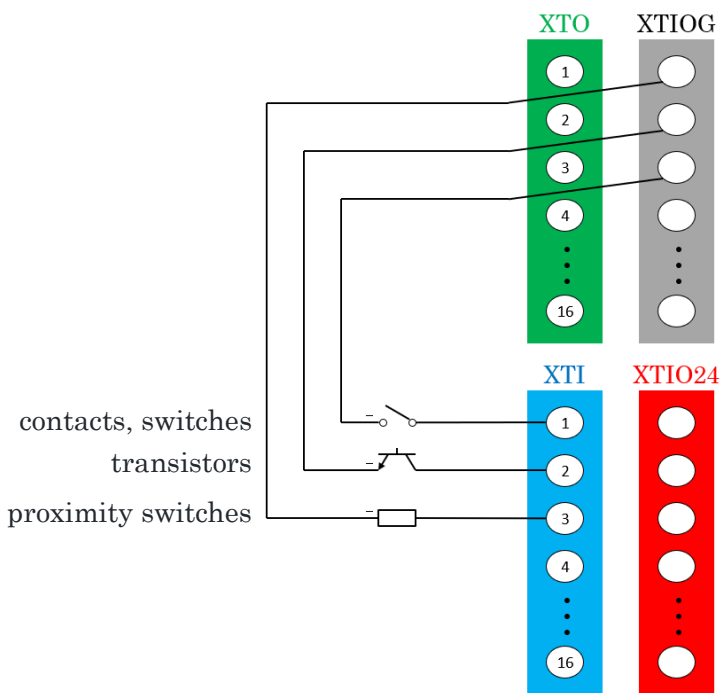
SW No.	Contents	ON	OFF
1	External Input Signal XTI 1-8	Sink (NPN)	Source (PNP)
2	External Input Signal XTI 9-16	Sink (NPN)	Source (PNP)
3	External Output Signal XTO 101-108	Sink (NPN)	Source (PNP)
4	External Output Signal XTO 109-116	Sink (NPN)	Source (PNP)

* All DIP switches are set to ON at the time of shipment.

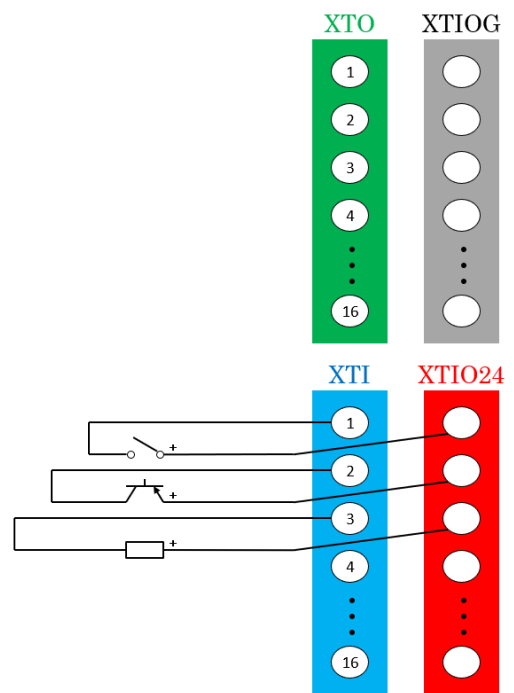
Notes for Sink (NPN) / Source (PNP) Input Circuits

1. The input contact current is DC24V 5mA. Please use devices that are suitable for this small current value. The input filter time constant for external input is 1ms (TYP) (CR filter only).
2. For the input circuit, connect contact inputs and NPN open-collector transistors in the sink (NPN) setting. For the source (PNP) setting, connect contact inputs and PNP open-collector transistors.
3. Use the power supply of the connected device with the COM (24V) of XTIO24 and the COM (IOG) of XTIOG.
4. Do not use an external power supply. It can cause malfunctions of the board and connected devices.
5. The off-state leakage current of a 2-wire proximity switch should be 1.3mA or less.

【Example of Sink (NPN) Input Connection】



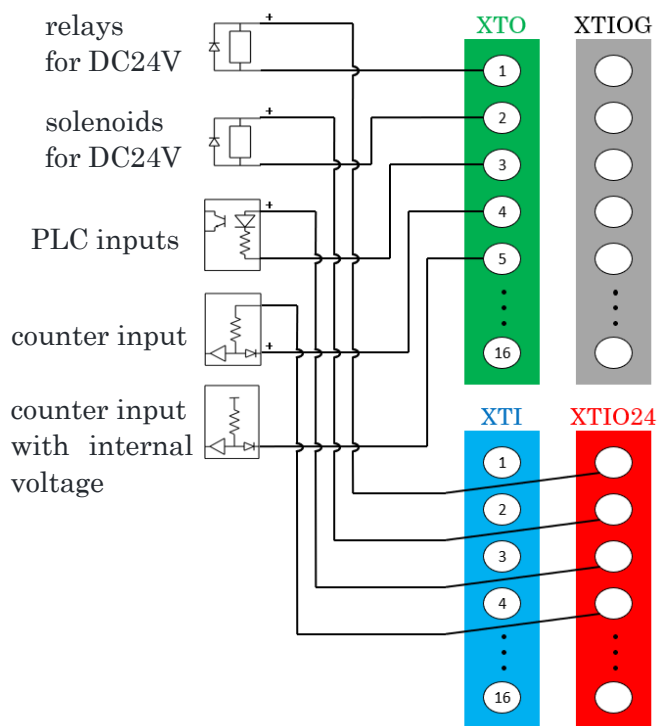
【Example of Source (PNP) Input Connection】



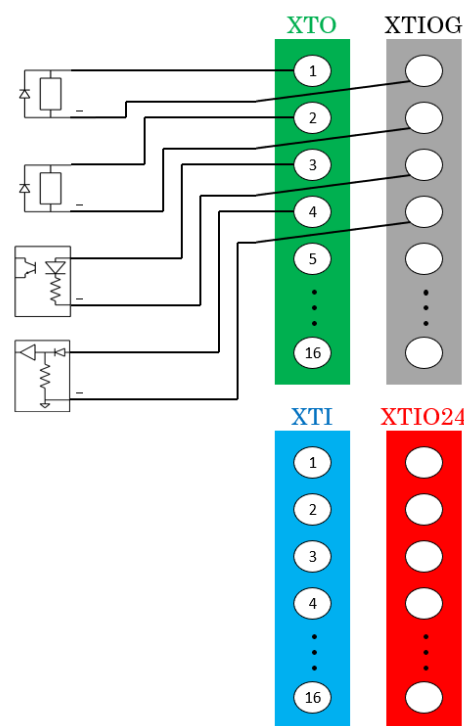
Notes for Sink (NPN) / Source (PNP) Output Circuits

1. The output terminal voltage is DC24V. For external output, 24V power COM, and IOG power COM, strictly adhere to the output current limit of 100mA per point and a total output current of 1000mA for all ports.
2. When connecting an inductive load to the output circuit, connect a surge suppression diode near the load.
3. In the sink (NPN) setting, do not connect the external output terminal directly to +24V. In the source (PNP) setting, do not connect the external output terminal directly to 0V. Doing so may short-circuit and damage the board.
4. The inrush current of the connected device occurring simultaneously should be 10A for 20μs or less.
5. Do not use an external power supply. It can cause malfunctions of the board and connected devices.

【Example of Sink (NPN) Output Connection】

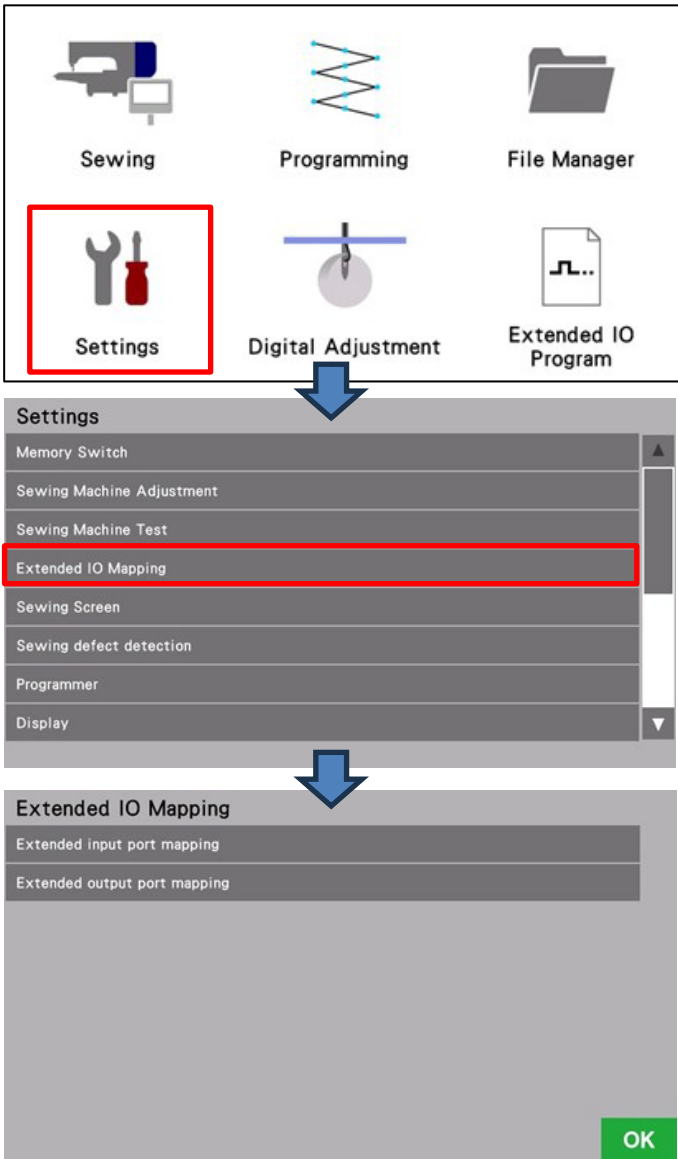


【Example of Source (PNP) Output Connection】



14-2. Extended IO Mapping

You can assign the extended input and extended output ports to any function. When you enter the settings screen, the extended IO program and functions using the extended IO will be temporarily disabled, and all signals from the extended output ports will be turned OFF.



14-2-1. Extended Input Port Mapping

You can configure which functions to assign to each of the extended input ports (EXIN_1 to EXIN_16).

The configurable items are as follows:

Name	Description
Extended IO program	The port will be used in the extended IO program.
MSW354 Program No./split No. (bit 0)	In the sewing screen, you can change the program number or split number using the extended input. Bit 0 is the least significant bit, and bit 6 is the most significant bit, using 7 bits to represent values from 00 to 99. The entered number is reflected in real-time while waiting on the sewing screen.
MSW354 Program No./split No. (bit 1)	
MSW354 Program No./split No. (bit 2)	
MSW354 Program No./split No. (bit 3)	
MSW354 Program No./split No. (bit 4)	
MSW354 Program No./split No. (bit 5)	
MSW354 Program No./split No. (bit 6)	When Memory Switch No. 354 is set to 1, you can set the program number. The value of the hundreds place of the program number is determined by Memory Switch No. 355. When Memory Switch No. 354 is set to 2, you can set the split number.
MSW253 Start point move method (extended input)	When the program number is flashing on the sewing screen and the extended input is turned ON, the starting point will be moved. This is only valid when Memory Switch No. 253 is set to 3.
MSW650 Error stop state release method (extended input)	When an error screen is displayed and the extended input is turned ON, the error can be cleared. This is only valid when Memory Switch No. 650 is set to 1.

14-2-2. Extended Output Port Mapping

Specify which function each extended output port (EXOUT_1–EXOUT_16) is assigned to. The items that can be set are as follows.

Name	Description
Extended IO program	The port will be used in the extended IO program.

14-3. Extended IO Programs

You can program the extended output signals by combining conditions such as extended input, extended output, and the state of the sewing machine.

The extended IO program consists of the following elements:

- Settings of virtual outputs (VOUT_1 to VOUT_32)
 - Input signal configuration (what triggers the change in output signal)
 - Output signal configuration (how the signal is output when triggered)
- Assignment of virtual outputs to extended outputs, operation instructions, and internal signals

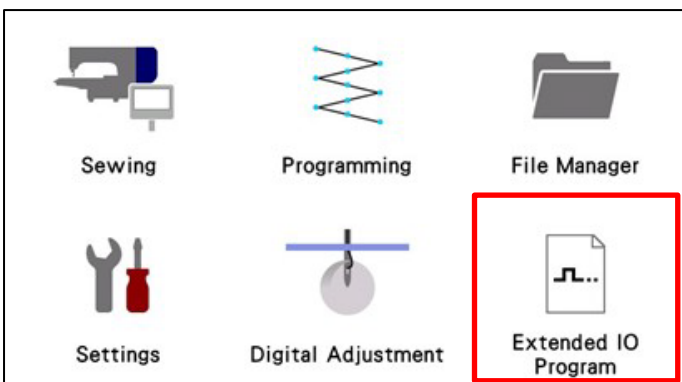
Virtual outputs are internal software output signals that are not directly output as actual electrical signals. By assigning these to the extended output ports, you can obtain actual electrical signals. Additionally, by assigning virtual outputs to operation instructions, you can automatically perform actions such as starting sewing or raising/lowering the presser foot when certain conditions are met. Furthermore, by assigning virtual outputs to sewing permission signals, you can ensure that sewing does not start unless the specified conditions are met, even if the start switch is pressed.

Only one extended IO program can be stored in the sewing machine.

14-3-1. How to program

On the home screen, touch the extended IO program key.

When you enter the program screen, the extended IO program and functions using the extended IO are temporarily disabled, and all signals from the extended output ports are turned OFF.

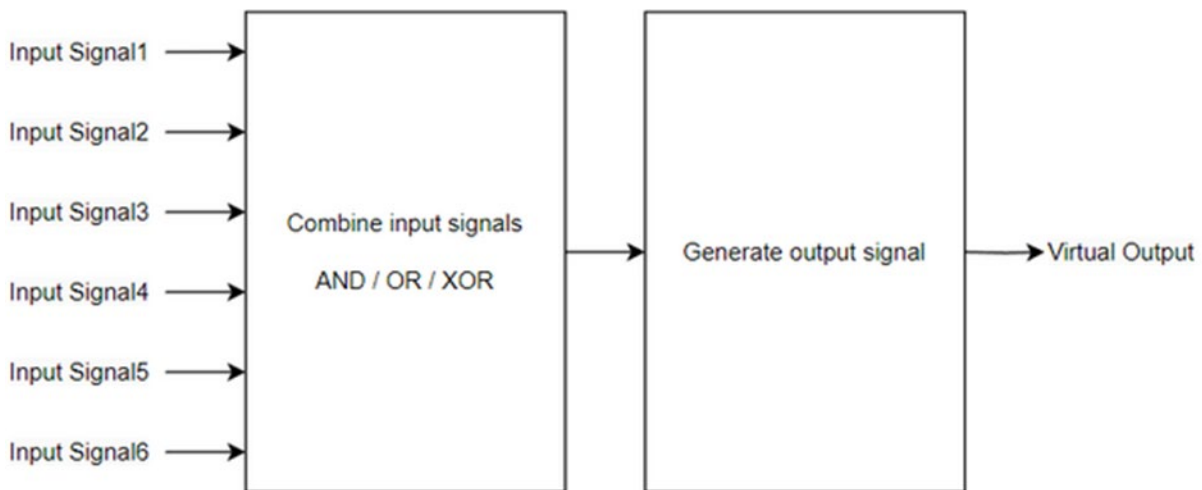


[Program Screen (Output Signal Type: Direct, OneShot, Periodic)]

The screenshot shows a software interface for programming a PLC. It features several panels and components:

- 1**: Program tab
- 2**: Mapping icon
- 3**: Virtual Output table
- 4**: Mapping icon
- 5-8**: Action icons (delete, save, folder, refresh)
- 9-11**: Input Signal list (EXIN_1, EXIN_4, HP_DET, TRIGGER_1, VOUT_6)
- 12-13**: Logic gates (+, AND)
- 14**: NOT gate
- 15**: Output Signal configuration (Type: Direct, Mode: Pass-through)

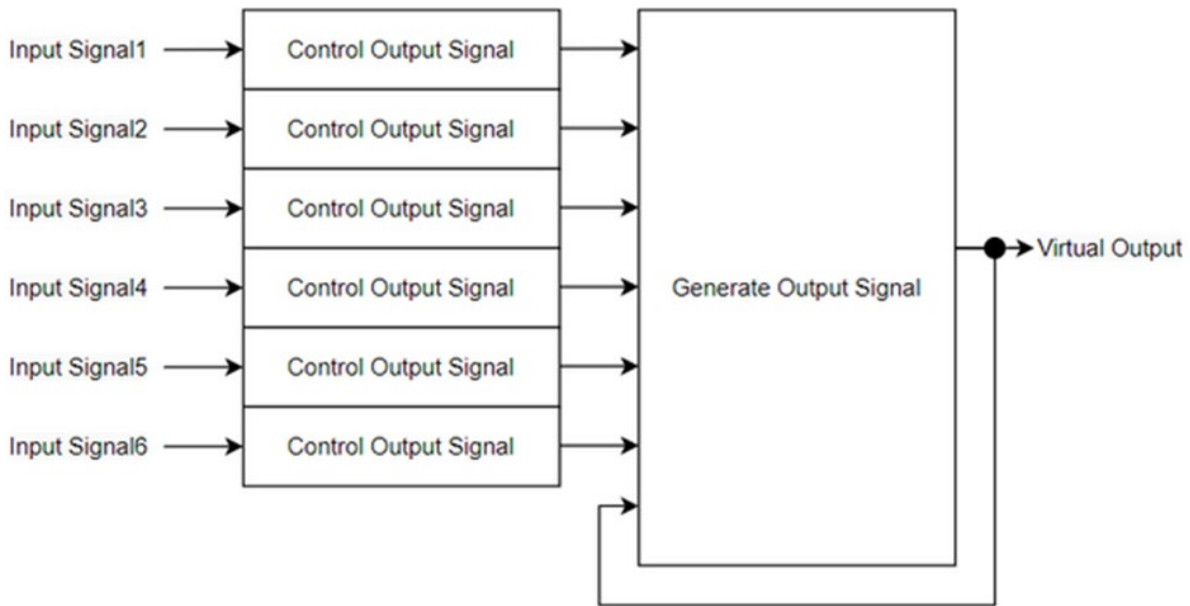
Virtual Out	9	17	25
1	9	17	25
2	10	18	26
3	11	19	27
4	12	20	28
5	13	21	29
6	14	22	30
7	15	23	31
8	16	24	32






14. Extended IO

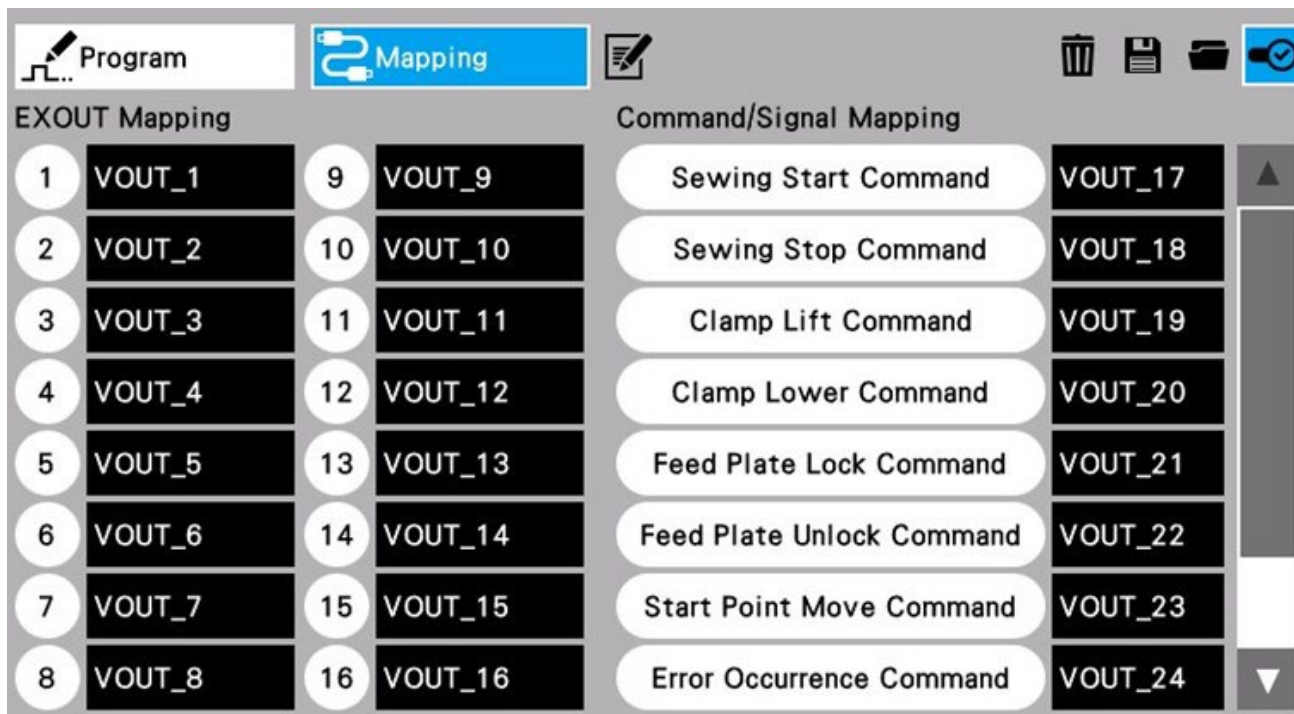
[Program Screen (Output Signal Type: Switch)]

Virtual Output				Input Signal	Mode	Trigger	Delay
1	9	17	25	10 EXIN_1	15 Off	Rising Edge	0ms
2	10	18	26	EXIN_1	On	Rising Edge	0ms
3	11	19	27	EXIN_1	On	Rising Edge	0ms
4	12	20	28	EXIN_1	On	Rising Edge	0ms
5	13	21	29	EXIN_1	On	Rising Edge	0ms
6	14	22	30	EXIN_1	On	Rising Edge	0ms
7	15	23	31	EXIN_1	On	Rising Edge	0ms
8	16	24	32	+ Output Signal Type		Switch	



(1) Program button	Displays the extended IO program screen.
(2) Assignment button	Displays the virtual output assignment screen.
(3) Virtual output	<p>Selects the virtual output to be programmed. Programmed virtual outputs are marked as shown below.</p> 
(4) Comment button	Inputs comments for the extended IO program.
(5) Delete button	<p>Deletes all extended IO programs and initializes them. * The program will not be deleted unless the save button is pressed after deletion.</p>
(6) Save button	Saves the extended IO program.
(7) Open button	Opens the extended IO program file from external media.
(8) Enable program button	<p>Toggles whether to enable the saved extended IO program.</p> <p>Enabled  Disabled </p>
(9) NOT button	Selects whether to use the NOT operator. Input signals with NOT displayed will have their ON/OFF states inverted.
(10) Input signal	Displays the input signals to be used. Touch the signal name to select an input signal.
(11) Delete signal button	Deletes an input signal.
(12) Add signal button	Adds an input signal.
(13) Combination method button	Selects how to combine multiple signals. AND, OR, and XOR can be selected.
(14) Expand input signal area button	Expands the input signal display area.
(15) Output signal	Displays the output signal settings.

Virtual Output Mapping Screen



* For details, please refer to "14-3-4. Assigning Virtual Outputs."

14-3-2. Input Signal

Set the signals that trigger changes in the virtual output. You can combine multiple signals. You can set up to 6 different input signals for each virtual output.

Input signal list

Sewing machine status

Abbreviation	Name	Description
HP_DET	Home position detected	It turns ON when the home position detection operation is completed. It will turn OFF when home position detection is required again due to changes in memory switch settings, etc.
SP_DONE	Start point move completed	It turns ON when moving to the start point or split start point after changing the program number is completed.
SEW_STANDBY	Sewing standby state	It turns OFF when the feed moves from the start point during test feed, sewing, etc.
SPLIT	Split stop state	It turns ON when moving to the start point or split start point is completed. It turns OFF when entering modes such as test feed or threading, but turns ON again when returning to the sewing mode.
SEW_RESEW	Waiting for re sew	It turns ON when in the re-sewing standby state after pausing during sewing.
CYCPRG_MODE	Cycle program mode	It turns ON in cycle program mode. It turns OFF when displaying screens other than the sewing screen.
TEST_MODE	Test mode	It turns ON in test mode. It turns OFF when displaying screens other than the sewing screen.
CLAMP_UP	Clamp up state	It turns ON when the clamp is raised. It turns OFF when lowered.
PFOOT_UP	Intermittent presser foot up state	It turns ON when the presser foot is raised. It turns OFF when lowered.
NDLBASE_UP	Needle bar base up state	It turns ON when the needle bar base is raised. It turns OFF when lowered. (BAS370K only)
SEW_MODE	Sewing mode	It turns ON when the sewing screen is displayed.
THREAD_MODE	Threading mode	It turns ON when the threading screen is displayed.
PRG_MODE	Programming mode	It turns ON when the program creation screen is displayed.
ADJUST_MODE	Adjustment mode	It turns ON when the adjustment screen in the settings menu is displayed.
HP_DETECTING	Detecting home position	It turns ON during the home position detection operation. It turns OFF after the operation is completed.
SP_MOVING	Moving to start point	It turns ON during the start point movement operation. It turns OFF after the operation is completed.
TEST_MOVING	Feeding during test mode	It turns ON during test feed operation.
PRG_MOVING	Feeding during programming mode	It turns ON during feed operation on the program creation screen.
SEWING	Sewing	It turns ON during sewing. It turns OFF when sewing is completed.
STITCH	Sewing (only during stitching)	It turns ON only during stitch operation while sewing. It turns OFF during feed.
TRIMMING	Thread trimming	It turns ON only during thread trimming operation while sewing.
WIPING	Thread wiping	It turns ON only during thread wiping operation while sewing.
SEW_DONE	Sewing complete	It turns ON for about 50ms after sewing is completed.

TEST_DONE	Test feeding complete	It turns ON for about 50ms after the test is completed.
ERR	Error occurred	It turns ON when the error screen is displayed.
ERR_FATAL	Fatal error occurred	It turns ON when the error screen for errors that cannot be reset is displayed.
SUSPEND	Sewing suspended	It turns ON when the error screen for temporary stop errors (E011, E071, E081, E390, E393, E610) is displayed.
BBN_WARN	Bobbin warning	It turns ON when the bobbin thread warning screen is displayed.

Extended Input

Abbreviation	Name	Description
EXIN_1-EXIN_16	Extended Input 1-16	Input from extended input ports 1 to 16.

Virtual Output

Abbreviation	Name	Description
VOUT_1-VOUT_32	Virtual Output 1-32	Output from virtual outputs 1 to 32.

Extended Output

Abbreviation	Name	Description
EXOUT_1-EXOUT_16	Extended Output 1-16	Output from extended output ports 1 to 16.

Trigger Code Option No.

Abbreviation	Name	Description
TRIGGER_1-TRIGGER_16	Trigger Code Option No. 1-16	It turns ON when the sewing point with the trigger code set is reached during sewing or test feeding. Regardless of the sewing speed, it turns ON for approximately 50ms and then turns OFF.

Error Number

Abbreviation	Name	Description
ERR_NO_BIT0-ERR_NO_BIT9	Error No.: bit 0-bit9	<p>The error number is represented in binary when an error occurs. Bit 0 is the least significant bit, and bit 9 is the most significant bit. When no error occurs, all bits are OFF.</p> <p>Example: When E011 occurs</p> bit 9: OFF bit 8: OFF bit 7: OFF bit 6: OFF bit 5: OFF bit 4: OFF bit 3: ON bit 2: OFF bit 1: ON bit 0: ON

14. Extended IO

Program No.

Abbreviation	Name	Description
PRG_NO_BIT0- PRG_NO_BIT9	Program No.: bit 0-bit9	The program number displayed on the sewing screen is represented in binary. Bit 0 is the least significant bit, and bit 9 is the most significant bit. When a screen other than the sewing screen is displayed, all bits are OFF. Example: When program number 100 is selected bit 9: OFF bit 8: OFF bit 7: OFF bit 6: ON bit 5: ON bit 4: OFF bit 3: OFF bit 2: ON bit 1: OFF bit 0: OFF

Split No.

Abbreviation	Name	Description
SPLIT_NO_BIT0- SPLIT_NO_BIT6	Split No.: bit 0-bit6	The split number displayed on the sewing screen is represented in binary. Bit 0 is the least significant bit, and bit 9 is the most significant bit. When a screen other than the sewing screen is displayed, all bits are OFF.

Cycle Program No.

Abbreviation	Name	Description
CYCPRG_NO_BIT0- CYCPRG_NO_BIT4	Cycle program No.: bit 0-bit4	The cycle program number displayed on the sewing screen is represented in binary. Bit 0 is the least significant bit, and bit 9 is the most significant bit. When not in cycle program mode or when a screen other than the sewing screen is displayed, all bits are OFF.

Cycle Program Step No.

Abbreviation	Name	Description
CYCPRG_STEP_BIT0- CYCPRG_STEP_BIT5	Cycle Program Step No.: bit 0-bit5	The cycle program step number displayed on the sewing screen is represented in binary. Bit 0 is the least significant bit, and bit 9 is the most significant bit. When not in cycle program mode or when a screen other than the sewing screen is displayed, all bits are OFF.

Combine Input Signals

When the output type is Direct, Oneshot, or Periodic signal, multiple input signals can be combined into a single signal. The combination method can be selected from the following three options.

- ✓ AND: Only when all inputs are ON, otherwise OFF
- ✓ OR: ON when one or more of all inputs are ON, otherwise OFF
- ✓ XOR: ON only when an odd number of inputs are ON, otherwise OFF

Additionally, by setting NOT for each input signal, the ON/OFF state can be inverted during combination.

14-3-3. Output Signal

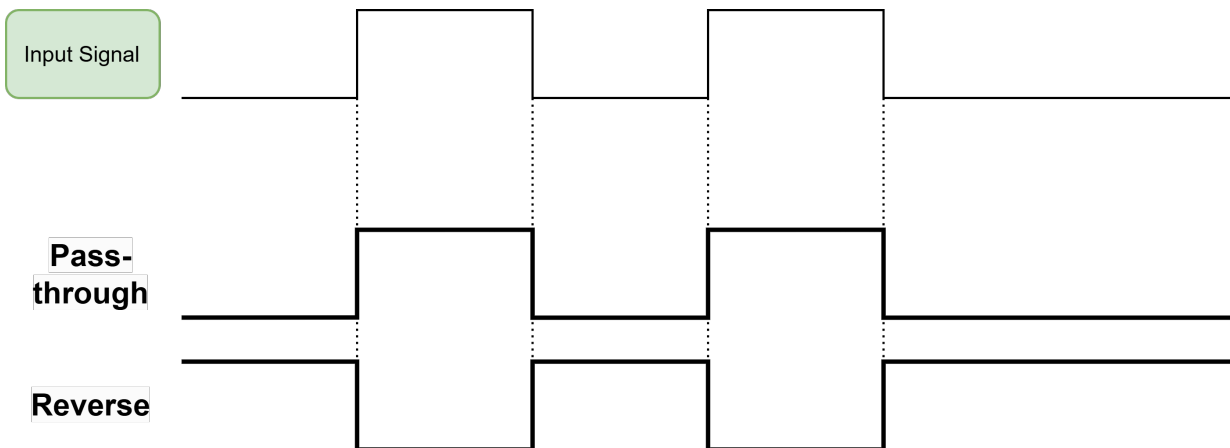
This section describes how to configure the behavior of the virtual output when a trigger is given by an input signal.

Output Signal Type List

Direct

The input signal can be output directly or inverted.

Item	Description
Mode	Pass-through: Outputs the input signal directly. Reverse: Outputs the input signal with ON/OFF inverted.



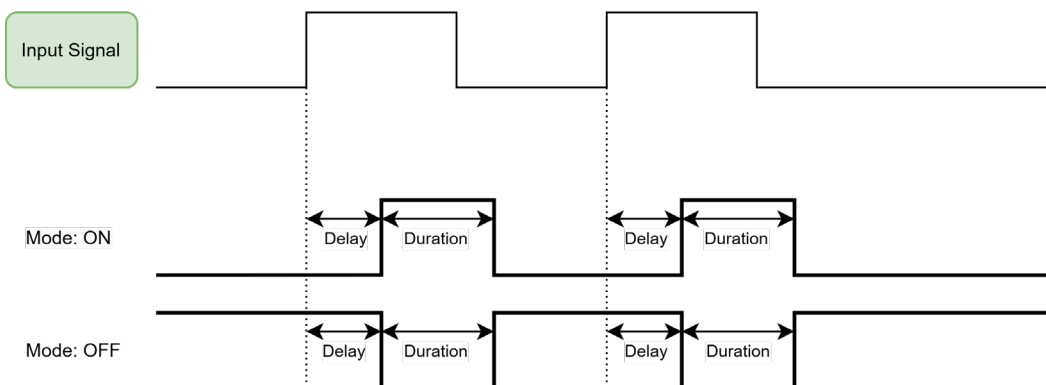
14. Extended IO

Oneshot

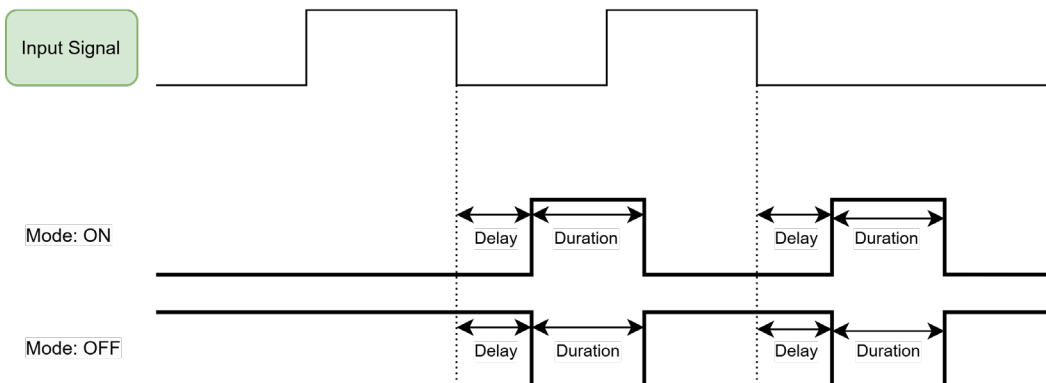
The signal is output only once after the trigger condition is met.

Item	Description
Mode	On: The normal output is OFF. When a trigger is given, the output is turned ON for a certain period and then turned OFF. Off: The normal output is ON. When a trigger is given, the signal is turned OFF for a certain period and then turned ON.
Trigger	Rising Edge: A trigger is given when the input changes from OFF to ON. Falling Edge: A trigger is given when the input changes from ON to OFF.
Delay	Delay time before changing the output signal after a trigger is given. Setting range: 0-5000ms Setting unit: 50ms
Duration	Time to maintain the output signal change after the delay time has elapsed following a trigger. Setting range: 0-5000ms Setting unit: 50ms

Trigger: Rising Edge



Trigger: Falling Edge

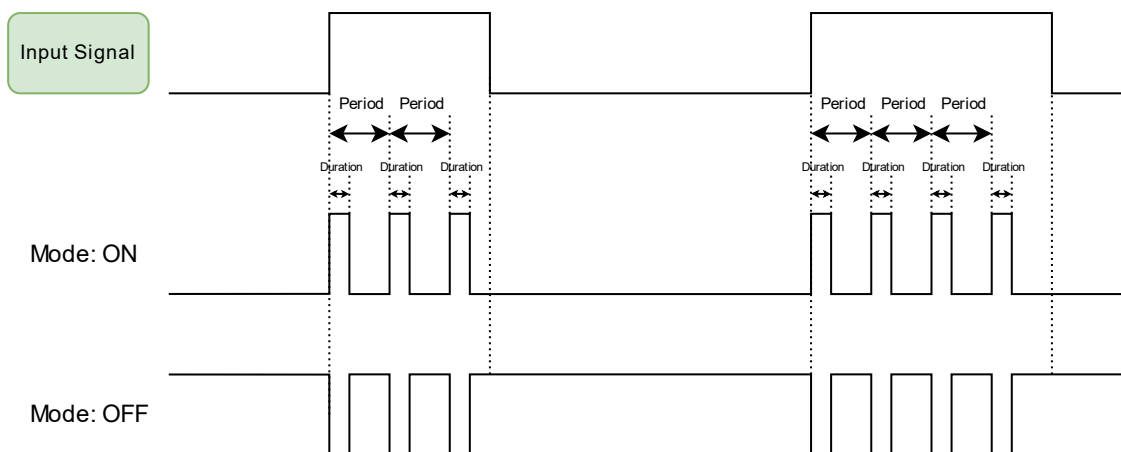


Periodic

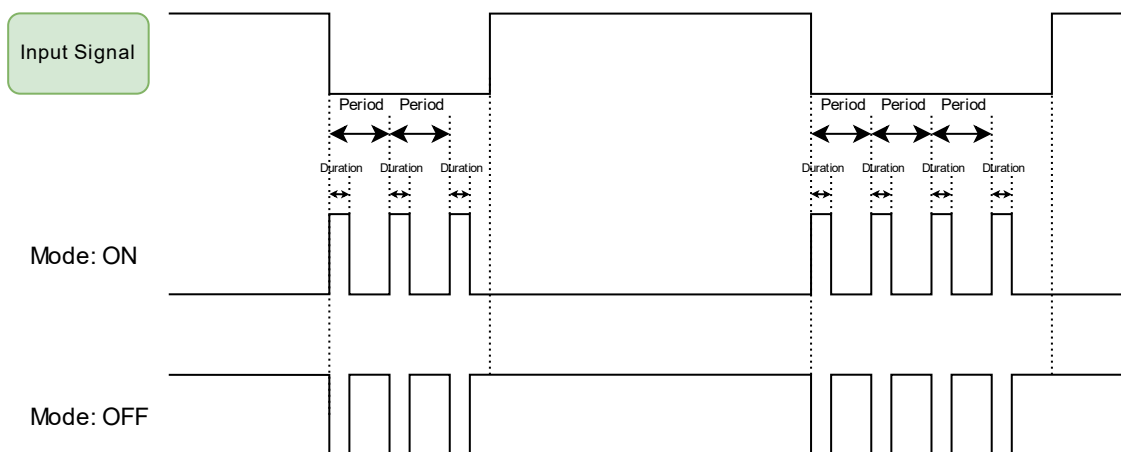
After the trigger condition is met, a periodic signal is output.

Item	Description
Mode	On: The normal output is OFF. When a start trigger is given, the output is turned ON for a certain period and then turned OFF, repeating this cycle. When an end trigger is given, the output is turned OFF. Off: The normal output is ON. When a start trigger is given, the output is turned OFF for a certain period and then turned ON, repeating this cycle. When an end trigger is given, the output is turned ON.
Trigger	Rising Edge: A start trigger is given when the input changes from OFF to ON, and an end trigger is given when the input changes from ON to OFF. Falling Edge: A start trigger is given when the input changes from ON to OFF, and an end trigger is given when the input changes from OFF to ON.
Period	The period of the output signal change after the start trigger is given. Setting range: 0-5000ms Setting unit: 50ms
Duration	The duration of the output signal change at the beginning of each cycle after the start trigger is given. This duration must be set shorter than the cycle period. Setting range: 50-5000ms Setting unit: 50ms

Trigger: Rising Edge



Trigger: Falling Edge



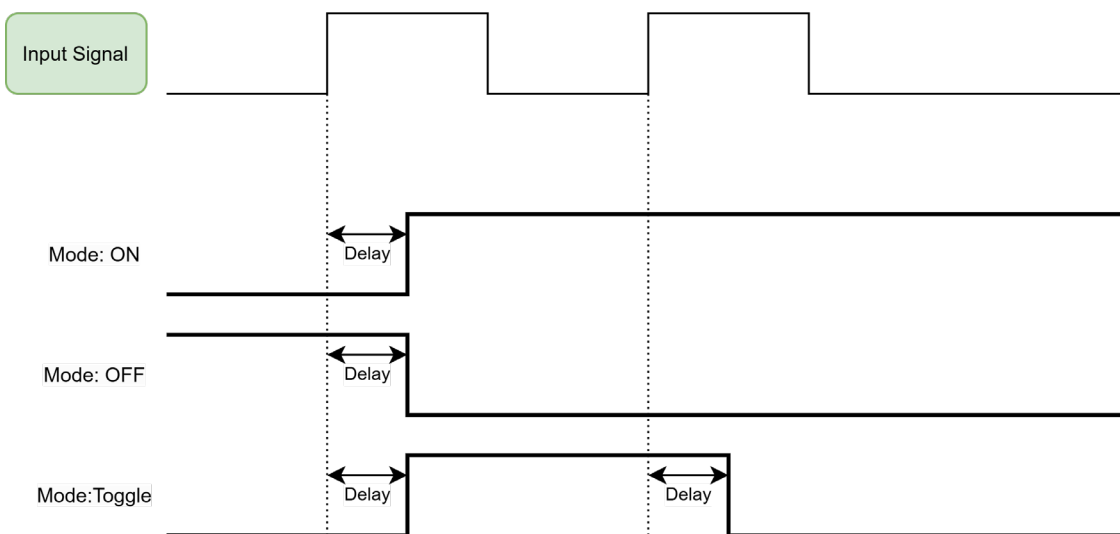
14. Extended IO

Switch

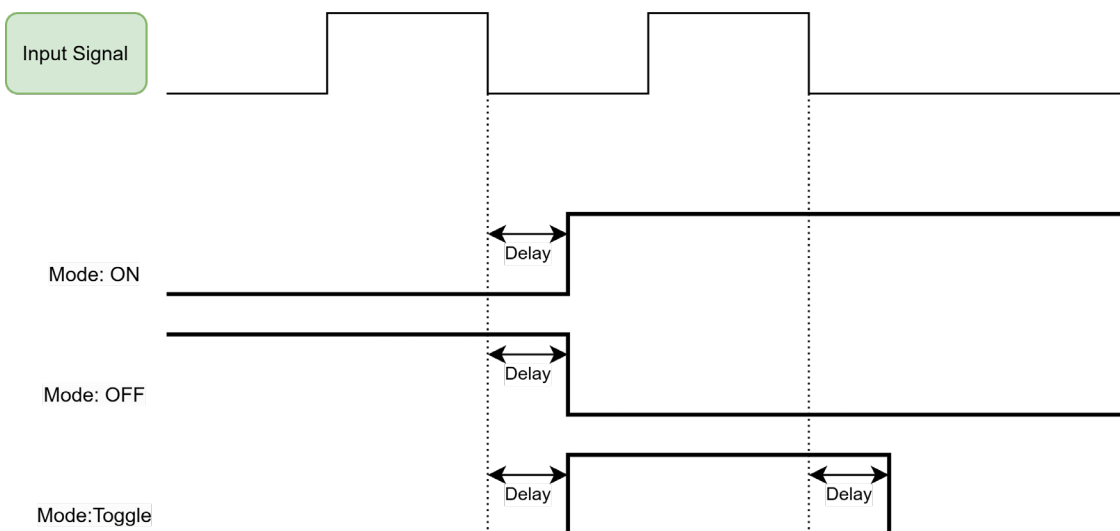
When a trigger is given, the output signal is turned OFF or ON. Unlike other output types, this can be set for individual input signals before synthesis.

Item	Description
Mode	On: When a trigger is given, the output is turned ON. Off: When a trigger is given, the output is turned OFF. Toggle: When a trigger is given, the output is turned ON if it is OFF, and turned OFF if it is ON. * Within a single virtual output, On/Off and Toggle cannot be mixed.
Trigger	Rising Edge: A trigger is given when the input changes from OFF to ON. Falling Edge: A trigger is given when the input changes from ON to OFF.
Delay	The time until the output signal changes after a trigger is given. Setting range: 0-5000ms Setting unit: 50ms

Trigger: Rising Edge

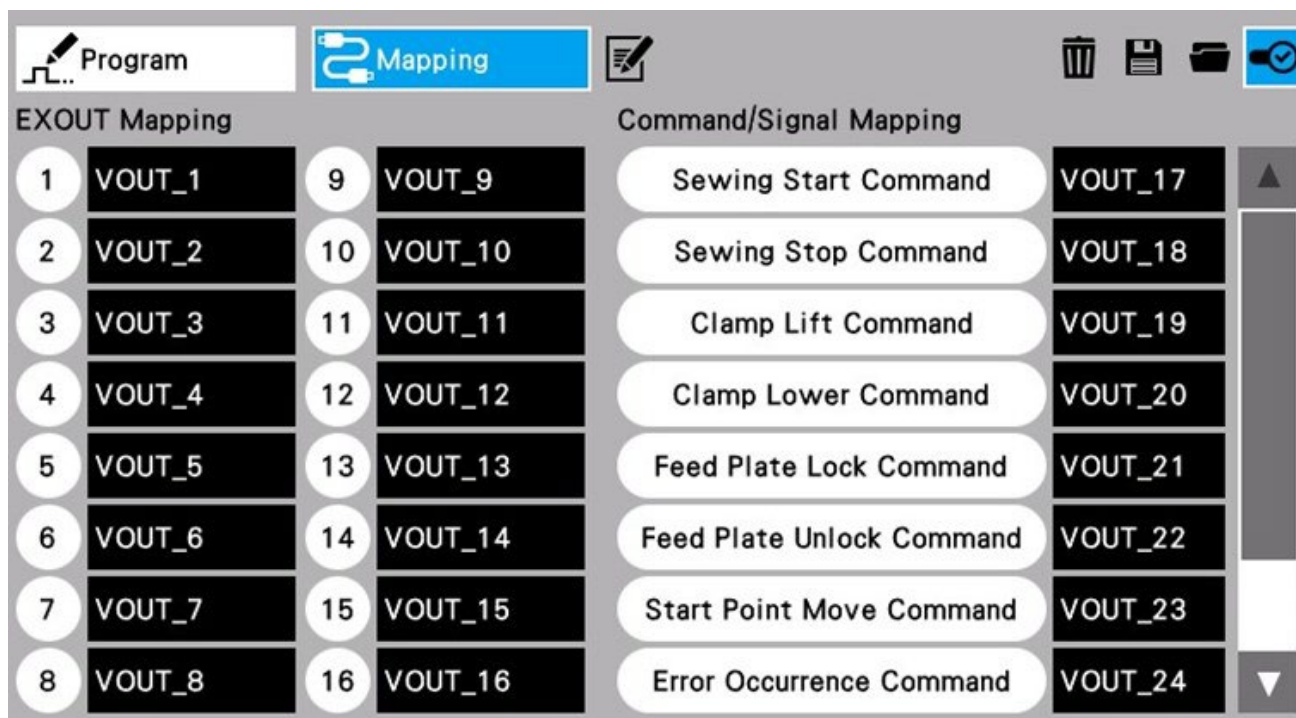


Trigger: Falling Edge



14-3-4. Virtual Output Mapping

Set how to assign the programmed virtual output to extended outputs, operation commands, and internal signals.



Operation Command / Internal Signal List

Name	Description
Sewing Start Command	Sewing starts when it changes from OFF to ON. If sewing cannot be started, it is ignored.
Sewing Stop Command	Sewing stops when it changes from OFF to ON. If not currently sewing, it is ignored.
Clamp Lift Command	The clamp lifts when it changes from OFF to ON. If the clamp is already lifted or cannot be lifted, it is ignored.
Clamp Lower Command	The clamp lowers when it changes from OFF to ON. If the clamp is already lowered or cannot be lowered, it is ignored.
Feed Plate Lock Command	The feed plate is locked when it changes from OFF to ON. If the feed plate is already locked or cannot be locked, it is ignored.
Feed Plate Unlock Command	The feed plate lock is released when it changes from OFF to ON. If the feed plate lock is already released or cannot be released, it is ignored.
Start Point Move Command	The starting point moves when it changes from OFF to ON. If the home position detection is incomplete, the program number is not selected, or sewing is in progress, it is ignored.
Error Occurrence Command	When switched from OFF to ON, the sewing machine operation stops and the error screen (E530) is displayed.
Error Reset Command	The error is cleared when it changes from OFF to ON. If no error is displayed or the error cannot be cleared, it is ignored.
Sewing Permission Signal	When OFF, sewing cannot be started even if the start switch is pressed.

14-3-5. Example Programs

Stacker control

Program the operation to extract the material and stack it simultaneously with the clamp lifting at the end of sewing.

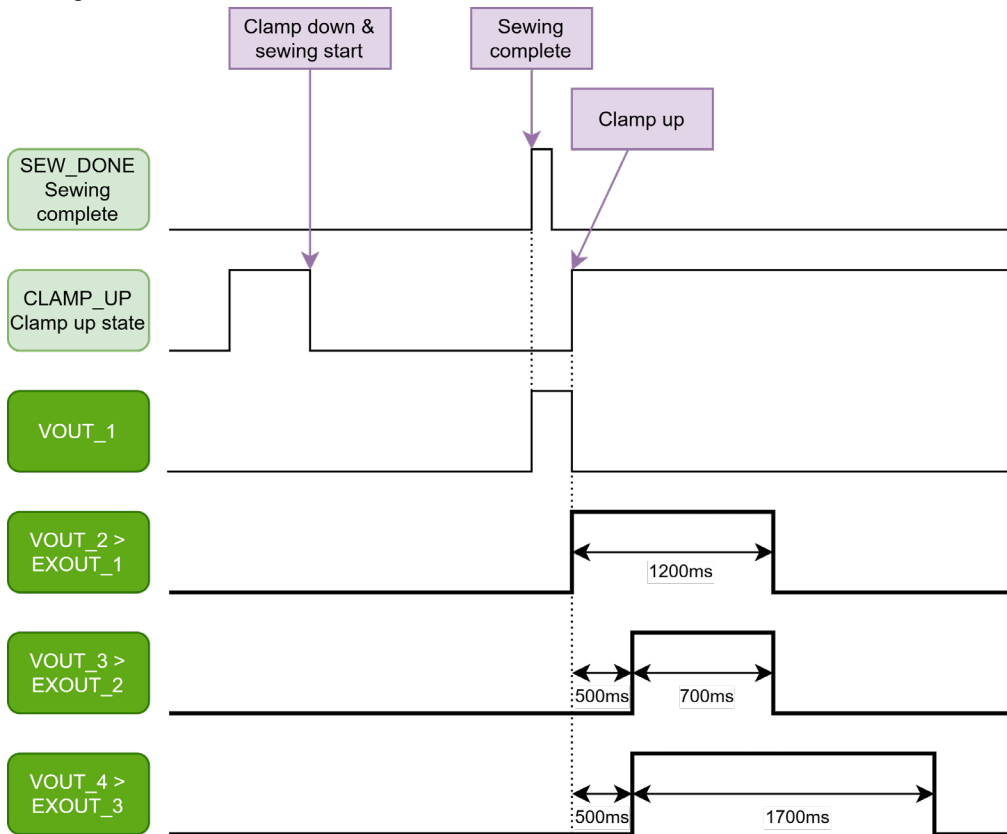
Mapping and Usage of Extended Outputs

Extended Output Port	Usage	Virtual Output
EXOUT 1	Material Presser	VOUT 2
EXOUT 2	Material Transport	VOUT 3
EXOUT 3	Air Blow	VOUT 4

Setting of Program

Virtual Output	Input Signal	Output Signal
VOUT_1	SEW_DONE: Sewing Complete	Type: Switch Mode: On Trigger: Rising edge Delay: 0ms
	CLAMP_UP: Clamp Up State	Type: Switch Mode: Off Trigger: Rising edge Delay: 0ms
VOUT_2	VOUT_1	Type: Oneshot Mode: On Trigger: Falling edge Delay: 0ms Duration: 1200ms
VOUT_3	VOUT_1	Type: Oneshot Mode: On Trigger: Falling edge Delay: 500ms Duration: 700ms
VOUT_4	VOUT_1	Type: Oneshot Mode: On Trigger: Falling edge Delay: 500ms Duration: 1700ms

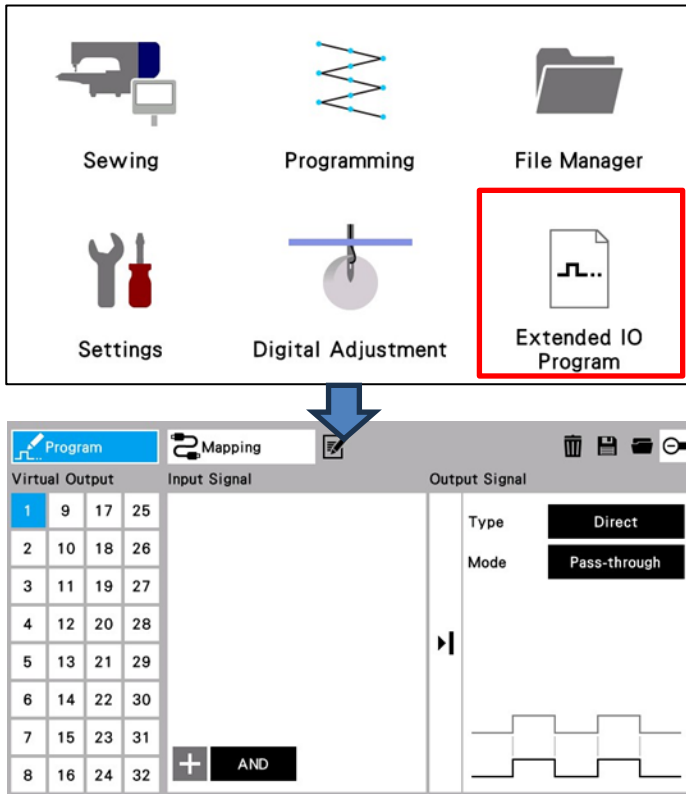
Timing Chart



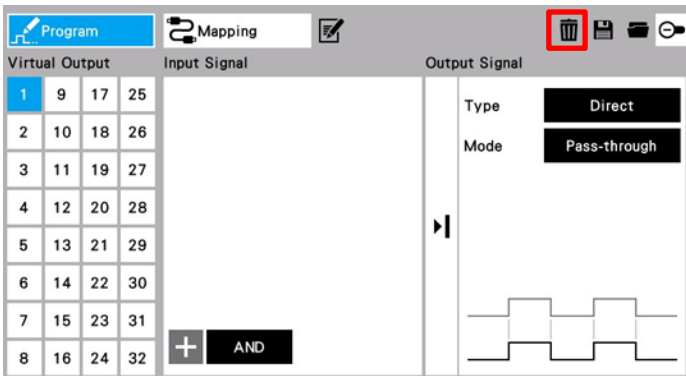
14. Extended IO

Program Steps

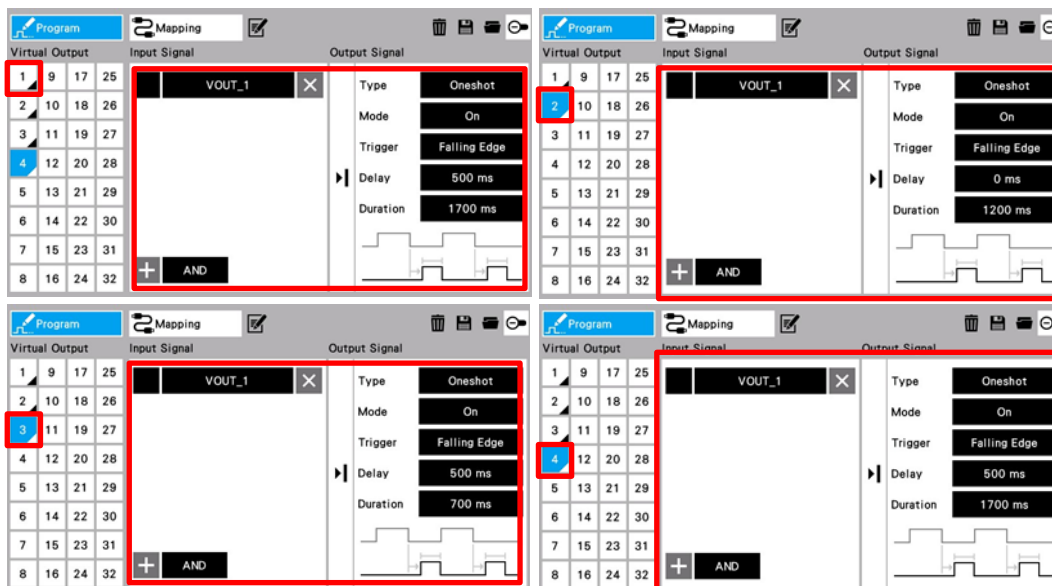
1. Displays the extended IO program screen.



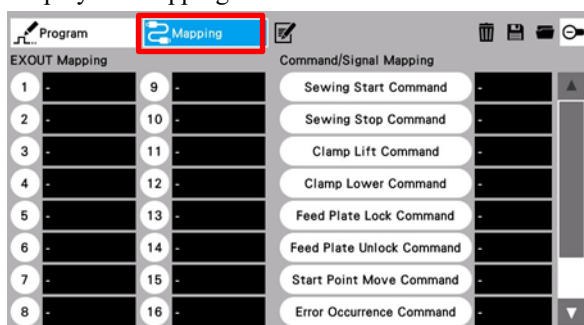
2. If there are already saved programs, press the delete button to initialize.



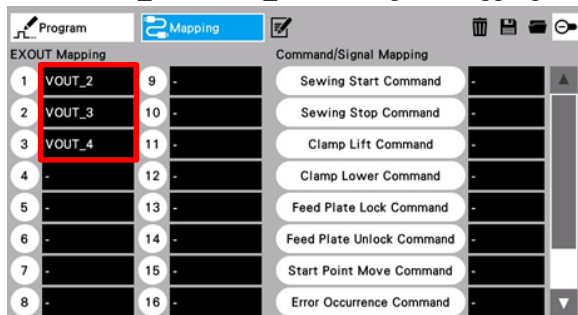
3. On the program screen, set the VOUT_1-VOUT_4 according to "Program Settings".



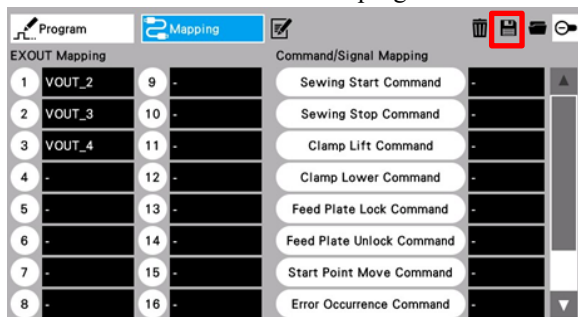
4. Display the mapping screen.



5. Set EXOUT_1-EXOUT_3 according to "Mapping and Usage of Extended Outputs".

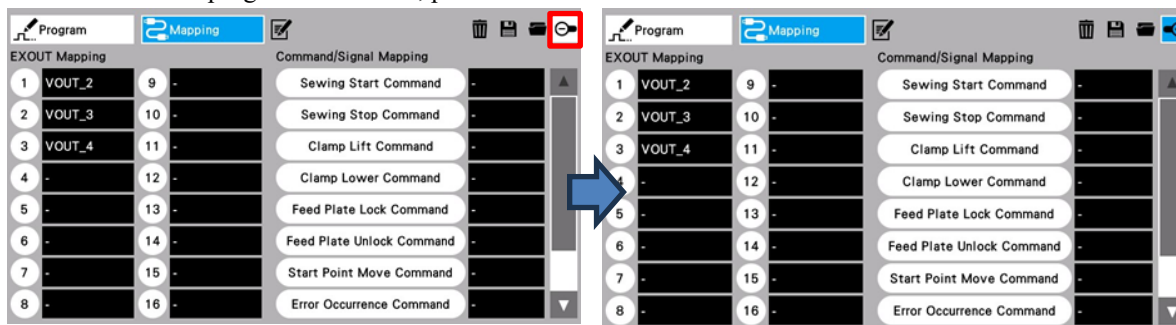


6. Press the save button to save the program.



14. Extended IO

7. If the extended IO program is disabled, press the button to enable it.



8. Press the  key to exit.

14-3-6. Extended IO Check Mode

You can perform a simple operation check of the extended IO on the sewing screen.

Note: Signals that switch quickly may not be displayed correctly.

Extended IO Check Mode

EXIN	EXOUT	VOUT	Command, Signal
1 9	1 9	1 9 17 25	Sewing Start Command
2 10	2 10	2 10 18 26	Sewing Stop Command
3 11	3 11	3 11 19 27	Clamp Lift Command
4 12	4 12	4 12 20 28	Clamp Lower Command
5 13	5 13	5 13 21 29	Feed Plate Lock Command
6 14	6 14	6 14 22 30	Feed Plate Unlock Command
7 15	7 15	7 15 23 31	Start Point Move Command
8 16	8 16	8 16 24 32	Error Occurrence Command

OK



15. LIST OF ERROR CODES




DANGER



Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the control box cover. Touching areas where high voltages are present can result in severe injury.

If a malfunction occurs with the sewing machine, a buzzer will sound and an error code will appear on the screen. Follow the remedy procedure to eliminate the cause of the problem.

Switch-related errors

Code	Cause of error and remedy
E010	The STOP switch was pressed. Press the Reset key to clear the error.
E011	The STOP switch was pressed. Press the Reset key to clear the error. You can press the    keys on the LCD panel to move the feed in order to continue sewing.
E012	The STOP switch was pressed. Press the Reset key to clear the error, and then depress the start switch or press both the left and right switches to move the feed mechanism to the home position.
E013	The STOP switch was pressed. Turn off the power, and then turn it back on again.
E015	Either the STOP switch is being pressed when the power is turned on or there is a connection failure with the pause switch. Turn off the power, Please check that connector X03 on the side of the control box, LX1, LX2, LX4, LX5, LX6, CN12 on the relay PCB SC7954 are plugged in.
E016	There is a connection failure with the STOP switch. Turn off the power, Please check that connector X03 on the side of the control box, LX1, LX2, LX4, LX5, LX6, CN12 on the relay PCB SC7954 are plugged in.
E020	The start switch was pressed or the left and right switches were pressed at the same time without the work clamp being lowered. First lower the work clamp.
E025	The right switch was being depressed (for 2, 3 pedal, start switch was being depressed) when power was turned on. Release the pedal or switch.
E035	Work clamp switch was depressed or left switch was pressed when power was turned on. Release the pedal or switch.
E042	The cassette sensors have turned off. Press the Reset key to clear the error, and then depress the start switch or both the left and right switches to move the feed mechanism to the home position.
E050	Machine head tilting was detected after the power was turned on. Turn off the power, and then return the machine head to its original position. Check that the connector P14 on the main board is properly inserted.
E051	Machine head tilting was detected while the sewing machine was operating. Turn off the power, and then check that the connector P14 on the main board is properly inserted.
E055	Machine head tilting was detected when the power was turned on. Turn off the power, and then return the machine head to its original position. Check that the connector P14 on the main board is properly inserted.
E064	Touch panel was being touched when power was turned on. Turn off the power and then turn it back on again without touching the panel.
E065	A key on the LCD panel was still being pressed when the power was turned on, or key is defective. Turn off the power and then turn it back on again without touching panel.
E070	Front cover was opened. After front cover closed, press the Reset key to clear the error.
E071	Front cover was opened. After front cover closed, press the Reset key to clear the error. You can press the keys on the LCD panel to move the feed in order to continue sewing.
E072	Front cover was opened. After front cover closed, press the Reset key to clear the error, then press both left and right switch at the same time, and conduct the home position detection.

15. LIST OF ERROR CODES

Code	Cause of error and remedy
E073	Front cover was opened. Turn off the power, and then turn it back on again.
E075	Power was turned on with the front cover open. Close the front cover.
E080	Slide cover was opened. After closing the slide cover, press the Reset key to clear the error.
E081	Slide cover was opened. After closing the slide cover, press the Reset key to clear the error. You can press the keys on the LCD panel to move the feed in order to continue sewing.
E082	Slide cover was opened. After closing the slide cover, press the Reset key to clear the error. Then press both left and right switch at the same time, and conduct the home position detection.
E083	Slide cover was opened. Turn off the power, and then turn it back on again.
E085	Slide cover was opened when power was turned on. Close the front cover.
E086	The bobbin winder SW is turned ON. Please turn it off.

15. LIST OF ERROR CODES

Motor-related errors

Code	Cause of error and remedy
E100	It is time for grease up. Apply grease on needle bar and presser foot bar after turning off the power. After that, please reset the grease counter (Refer to "6-8. Applying grease")
E101	Time for grease up is approaching. Apply grease on needle bar and presser foot bar after turning off the power. After that, please reset the grease counter. To continue sewing without adding grease, press Reset key. (Refer to "6-8. Applying grease")
E102	It is time for oil replenishment. Add the lubricating oil after turning off the power of the sewing machine. After that, operate the prescribed reset procedure. (Refer to "6-9. Adding gearbox lubricating oil")
E103	Oil replenishment period has approached. Apply the lubricating oil after turning off the power of the sewing machine. After that, operate the prescribed reset procedure. To continue sewing without adding oil, press Reset key. (Refer to "6-9. Adding gearbox lubricating oil")
E104	It is time for grease up and oil replenishment. Apply grease on needle bar and presser foot bar and add oil after turning off the power. After that, please reset the oil counter. (Refer to "6-8. Applying grease" and "6-9. Adding gearbox lubricating oil")
E105	Time for both grease up and oil replenishment is approaching. Apply grease on needle bar and presser foot bar and add oil after turning off the power. After that, please reset the grease and oil counters. To continue sewing without adding grease or oil, press Reset key. (Refer to "6-8. Applying grease" and "6-9. Adding gearbox lubricating oil")
E106	The remaining oil in the hook oil tank is low. Press the Reset key to cancel the error. Move the hook base to the maintenance position and add oil up to the upper line. (Refer to "3-5. Lubrication")
E107	The remaining oil in the hook oil tank is low. Press the Reset key to cancel the error. Move the hook base to the maintenance position and add oil up to the upper line. (Refer to "3-5. Lubrication")
E110	The needle bar is not stopped in the needle up stop position. Turn the hand pulley until the point where the error display disappears.
E111	The upper shaft did not stop at the needle up stop position when the sewing machine stopped. Turn off the power and please check that connectors X11 and X13 on the side of the control box are plugged in.
E120	Return the index plunger to the original position.
E130	The main motor has stopped abnormally, or the main shaft encoder is defective. Turn off the power and turn the hand pulley to check if the sewing machine is locked. Please check that connectors X11 and X13 on the side of the control box are plugged in.
E131	There is a connection failure with the main shaft encoder. Turn off the power and please check that connector X13 on the side of the control box are plugged in.
E132	Abnormal rotation of the main motor was detected. Turn off the power and please check that connectors X11 and X13 on the side of the control box are plugged in.
E133	The stop position of the main motor is incorrect. Turn off the power and Please check that connectors X11 and X13 on the side of the control box are plugged in.
E136	The current sensor of the main motor has detected an error. Please turn off the power and then turn it back on. If the same error occurs again, please replace the motor PCB SC7942.
E150	Main motor is overheating, or temperature sensor is defective. Turn off the power, and then check the main motor. (When sewing data with a small number of stitches (15 stitches or less) is sewn repeatedly, the main motor may overheat and the this error code may be generated.)
E151	The main motor temperature sensor is defective. Turn off the power, and then check the main motor.
E161	The main motor has detected an overload. Please turn off the power and check for any abnormalities in the movement of the main motor.

Feed mechanism-related errors

Code	Cause of error and remedy
E200	The home position of the X feed motor cannot be detected. There is a problem with the X feed motor, or there is a connection failure with the home position sensor. Turn off the power and please check that connectors X03, X21, X23 on the side of the control box, connectors LX7, CN12 on the relay board SC7954 are plugged in.
E201	The X feed motor has stopped abnormally. Turn off the power and check if there is any abnormality in the X feed direction. Turn off the power and please check that connectors X21 and X23 on the side of the control box are plugged in.
E202	X-feed motor stopped abnormally due to encoder signal problem. Turn off the power, and then check that connectors X23 on the side of the control box are properly plugged in.
E206	The current sensor of the X-feed motor has detected an error. Please turn off the power and then turn it back on. If the same error occurs again, please replace the motor PCB SC7944.
E210	The home position of the Y feed motor cannot be detected. Either the Y feed motor is abnormal or there is a connection failure with the Y home position sensor. Turn off the power and please check that connectors X03, X22, and X24 on the side of the control box, and connectors LX10, CN12 on relay PCB SC7954 are plugged in.
E211	Y feed motor stopped abnormally. Turn off the power and check if there is any abnormality in the Y feed direction. Turn off the power and check that connectors X22 and X24 on the side of the control box are plugged in.
E212	Y-feed motor stopped abnormally due to encoder signal problem. Turn off the power, and then check that connectors X24 on the side of the control box are properly plugged in.
E216	The current sensor of the Y-feed motor has detected an error. Please turn off the power and then turn it back on. If the same error occurs again, please replace the motor PCB SC7944.
E250	X-feed motor is overheating. Turn off the power, and then check the X-feed motor.
E251	X-feed motor temperature sensor is defective. Turn off the power, and then check the X-feed motor.
E260	Y-feed motor is overheating. Turn off the power, and then check the Y-feed motor.
E261	Y-feed motor temperature sensor is defective. Turn off the power, and then check the Y-feed motor.

15. LIST OF ERROR CODES

Work clamp-related errors

Code	Cause of error and remedy
E300	Presser foot home position cannot be detected. Problem with work clamp motor or there is a connection failure with the work clamp home position sensor. Turn off the power, and then check that connectors X12 and X14 on the side of the control box are plugged in.
E301	Work clamp raised or lowered position cannot be detected. Turn off the power, and then check if there is any problems in the work clamp vertical direction. Turn off the power, and then check that connectors X12 and X14 on the side of the control box are plugged in.
E306	The current sensor of the presser foot motor has detected an error. Please turn off the power and then turn it back on. If the same error occurs again, please replace the motor PCB SC7942.
E307	The presser foot home position adjustment may not have been performed, or the position may have shifted from the last adjustment. Please perform the presser foot home position adjustment again.
E390	The thickness is out of setting range of thickness detect code. Press the Reset key to clear the error. And then confirm that the material is set properly.
E391	Thickness detection code has been reached without obtaining reference height. Press the Reset key to clear the error, and then depress the start switch to move the feed mechanism to the home position. If the error occurs again, check the sewing data.
E392	The setting range of thickness detection exceeds the maximum presser foot height. Press the Reset key to clear the error, and then check the reference height and settings of thickness detection code.
E393	Thickness exceeds the maximum presser foot height. Press the Reset key to clear the error. And then confirm that the material is set properly.
E394	Thickness exceeds the maximum presser foot height. Press the Reset key to clear the error. And then confirm that the material is set properly.

Communication and memory-related errors

Code	Cause of error and remedy
E400	Communication error between the main PCB and the panel was detected when the power was turned on. Turn off the power, and then check that the connector CN4 on the main PCB inside the LCD panel, the connector X06 on the side of the control box are plugged in.
E402	Communication error detected between CPUs. Turn off the power, and then turn it back on again.
E415	Communication error detected between main PCB and the sewing defect detector PCB. Please check connection between main PCB and sewing defect detector PCB, after that please restart the sewing machine.
E416	Communication error detected between the main PCB and the sewing defect detector PCB. Press the Reset key to clear the error.
E420	No external media is inserted. Press the Reset key to clear the error. Insert the external media and then try again.
E421	The program number is invalid or it has no corresponding data. Press the Reset key to clear the error. Check that data for this program number is present.
E424	Error occurred while reading data. Press the Reset key to clear the error. Check the data.
E425	Error occurred while writing data. Press the Reset key to clear the error.
E426	Error occurred while initializing data. Press the Reset key to clear the error.
E427	A program included in the cycle program does not exist. Press the Reset key to clear the error.
E430	Cannot access to the main PCB (flash memory). Turn off the power, and then turn it back on again.

Code	Cause of error and remedy
E440	Cannot access to the main PCB (EEPROM). Turn off the power, and then turn it back on again.
E445	Cannot access to the programmer main PCB (EEPROM). Turn off the power, and then turn it back on again.
E450	Unable to read the model selection from head detector. Turn off the power and please check that connector X05 on the side of the control box is plugged in.
E452	Head detector is not connected. Turn off the power and check that connector X05 on the side of the control box is plugged in. Pressing the Reset key will clear the error and start the machine using the backup data in the head detector.
E453	Problem with data in head detector. Turn off the power, and then turn it back on again.
E454	Problem with data in head detector. Turn off the power, and then turn it back on again.
E460	Communication error detected between the main CPU and the expansion microcontroller. Turn off the power, and then turn it back on again.
E461	Communication error detected between the main CPU and the expansion microcontroller. Turn off the power, and then turn it back on again.
E465	Communication error detected between the main CPU and the expansion microcontroller. Turn off the power, and then turn it back on again.
E466	Communication error detected between the main CPU and the expansion microcontroller. Turn off the power, and then turn it back on again.
E471	The program number is invalid or it has no corresponding data. Check that data for this program number is present on the internal memory.
E474	External media is full and copying is not possible. Press the Reset key to clear the error. Please ensure that the external media has enough capacity.
E475	SD card inside control box cannot be recognized. Turn off the power and check that the SD card is plugged in.
E480	No storage media is inserted. Press the Reset key to clear the error. Insert the storage media into sewing defect detector and then try again.

15. LIST OF ERROR CODES

Data editing-related errors

Code	Cause of error and remedy
E500	The enlargement ratio setting or the offset setting caused the sewing data to extend outside the sewing area. Set the enlargement ratio or the offset again. Press the Reset key to clear the error.
E502	The enlargement ratio caused the stitch length to exceed the maximum stitch length of 20.0mm. Press the Reset key to clear the error. Set the enlargement ratio again.
E510	Error in data. Press the Reset key to clear the error. Please try again. If an error occurs while reading the data, revise the data.
E512	Number of stitches exceeds allowed maximum. Press the Reset key to clear the error.
E520	Extended option output number already exists. Change the expansion option output number. If not using the expansion option output, initialize the data to clear the expansion option program.
E521	Failed to load the extended IO program. Starting with initial settings. Please reconfigure the extended IO program.
E522	The extended IO program contains invalid data. Discarding the loaded data.
E530	Stopped due to an error instructed by the extended IO program.
E582	Memory switch file cannot be read correctly. Press the Reset key to clear the error.
E583	User parameter file cannot be read correctly. Press the Reset key to clear the error.

Device-related errors

Code	Cause of error and remedy
E601	The needle bar base lock sensor cannot be detected. Either the needle bar base movement is abnormal or there is a connection failure with the needle bar base lock sensor. Turn off the power and please check that connectors X32 and X33 on the side of the control box are plugged in.
E602	The needle bar base lock sensor cannot be detected. Either the needle bar base movement is abnormal or there is a connection failure with the needle bar base lock sensor. Turn off the power and please check that connectors X32 and X33 on the side of the control box are plugged in.
E603	The needle bar base position sensor cannot be detected. Either the needle bar base movement is abnormal or there is a connection failure with the needle bar base position sensor. Turn off the power and please check that connectors X32 and X33 on the side of the control box are plugged in.
E604	The needle bar base down position sensor cannot be detected. Either the needle bar base movement is abnormal or there is a connection failure with the needle bar base lock sensor. Turn off the power and please check that connectors X32 and X33 on the side of the control box are plugged in.
E610	Sewing defect has occurred. Press the Reset key to clear the error After that detail of the defect will appear. Re-sewing is possible.
E630	The needle bar position cannot be detected. Needle bar position sensor is defective or has a connection failure. Turn off the power, and then check that connector X04 on the side of the control box and connector UX6 on relay PCB SC7952 are plugged in.
E632	Driver rotation cannot be detected. Turn off the power and check if the hook timing is correct or not. Please check that the connector X02 on the side of the control box and the connector DX2 of relay PCB SC7956 are plugged in.
E634	The needle guard has exceeded the threshold. Please adjust the needle guard and needle clearance. Alternatively, turn off the power and please check that connector X34 on the side of the control box is plugged in. If you have replaced the main board, driver board, or VR board, please perform the adjustments in the order of the needle guard sensor step A and the needle guard sensor step B. Please refer to the service manual for details.
E635	The needle guard sensing cannot be conducted. Please perform the adjustments in the order of the needle guard sensor step A and the needle guard sensor step B. Please refer to the service manual for details.
E636	The needle clearance has exceeded the threshold. Please adjust the needle clearance. Alternatively, turn off the power and please check that connector X44 on the side of the control box is plugged in. If you have replaced the main board, driver board, or VR board, please perform the adjustments in the order of the needle clearance sensor step A and the needle clearance sensor step B. Please refer to the service manual for details.
E637	Needle clearance sensing cannot be conducted. Please perform the adjustments in the order of the needle clearance sensor step A and the needle clearance sensor step B. Please refer to the service manual for details.
E670	Bobbin thread is running out. Press the Reset key to clear the error.
E673	Auto bobbin changer error occurred. Press the Reset key to clear the error. After clearing the error, the bobbin changer chuck is released. Take care of bobbin case dropping.
E674	Auto bobbin changer error (arm A failed to move forward) occurred. Press the Reset key to clear the error. After clearing the error, the bobbin changer chuck is released. Take care of bobbin case dropping.
E675	Auto bobbin changer error (arm A failed to move backward) occurred. Press the Reset key to clear the error. After clearing the error, the bobbin changer chuck is released. Take care of bobbin case dropping.
E676	Auto bobbin changer error (arm B failed to move forward) occurred. Press the Reset key to clear the error. After clearing the error, the bobbin changer chuck is released. Take care of bobbin case dropping.
E677	Auto bobbin changer error (arm B failed to move backward) occurred. Press the Reset key to clear the error. After clearing the error, the bobbin changer chuck is released. Take care of bobbin case dropping.
E678	Auto bobbin changer error (arm A bobbin detect sensor) occurred. Press the Reset key to clear the error, then check the hook. After clearing the error, the bobbin changer chuck is released. Take care of bobbin case dropping.
E679	Auto bobbin changer error (arm B bobbin detect sensor) occurred. Press the Reset key to clear the error, then check the hook. After clearing the error, the bobbin changer chuck is released. Take care of bobbin case dropping.
E680	Auto bobbin changer door was closed during magazine exchange. Press the Reset key to clear the error then redo magazine exchange.

15. LIST OF ERROR CODES

Code	Cause of error and remedy
E681	Auto bobbin changer error (alarm signal) occurred. Turn off the power, and then check the condition of the auto bobbin changer. Please refer to the instruction manual for details.
E682	Error occurred while magazine is unlocked. Press the Reset key to clear the error. Check if the magazine is locked or not.
E683	Auto bobbin changer error occurred. Turn off the power, and then check the condition of the auto bobbin changer.
E684	Magazine is not detected in lock position. Set the magazine into the correct position and close the cover to clear the error.
E685	Magazine is not detected in lock position. Press the Reset key to clear the error.
E690	The home position of the thread trimming motor cannot be detected. The thread trimming motor is defective or there is a connection failure. Turn off the power and check that there is no lint tangled behind the throat plate. Please check that connectors X42 and X45 on the side of the control box are plugged in.
E691	Thread trimming and releasing was not completed. Turn off the power, and then check if the cutting edges of the fixed knife and movable knife are not damaged or worn.
E692	The thread trimming motor has stopped abnormally. The thread trimming motor is defective or there is a connection failure. Turn off the power and check that there is no lint tangled below the needle plate. Please check that connectors X42 and X45 on the side of the control box are plugged in.
E695	The home position of the bobbin winder motor cannot be detected. The bobbin winder motor is defective or there is a connection failure. Turn off the power, and then check that connectors X31 and X35 on the side of the control box are properly plugged in. To continue using the machine, press the Reset key to clear the error. Pressing the Reset key will disable the bobbin winder device (MSW596: OFF).
E696	The bobbin winder motor has stopped abnormally. The bobbin winder motor is defective or there is a connection failure. Turn off the power, and then check that connectors X31 and X35 on the side of the control box are properly plugged in.

P.C. board-related errors

Code	Cause of error and remedy
E700	Abnormal rise in power supply voltage. Turn off the power, and then check the input voltage.
E701	Abnormal rise in main motor drive voltage. Turn off the power, and then check the voltage.
E705	Abnormal drop in power supply voltage. Turn off the power, and then check the input voltage.
E710	Abnormal current in the main motor was detected. Turn off the power and check for any abnormality in the sewing machine. Turn off the power and please check that connectors X11 and X13 on the side of the control box are plugged in.
E711	Abnormal current detected in X-feed motor. Turn off the power, and then check if there are any problem with the X-feed movement.
E712	Abnormal current detected in Y-feed motor. Turn off the power, and then check if there are any problem with the Y-feed movement.
E713	Abnormal current detected in X-feed or Y-feed motor. Turn off the power, and then check if there are any problem with the X-feed or Y-feed movement.
E714	Abnormal current detected in presser foot motor. Turn off the power, and then check if there are any problems with the presser foot operation.
E715	Abnormal current detected in thread trimming motor. Turn off the power, and then check if there are any problem with the thread trimmer movement.
E716	Abnormal current detected in bobbin winder motor. Turn off the power, and then check if there are any problem with the bobbin winder movement.

Code	Cause of error and remedy
E720	Abnormal drop in power supply voltage was detected. Turn off the power, and then turn it back on again.
E721	Abnormal drop in power supply voltage was detected. Turn off the power, and please check that connector X06, X13, X14, X23, X24, X34, X35, X44, X45 on the side of the control box are plugged in.
E722	Abnormal drop in power supply voltage was detected. Turn off the power and check for any abnormality in the analog pedal or any sensor. Please check that connector X01, X02, X04, X34, X44 on the side of the control box are plugged in.
E723	Abnormal drop in power supply voltage was detected. Turn off the power and check for any abnormality in the needle clearance sensor. Please check that connector X46 on the side of the control box is plugged in.
E724	Abnormal drop in power supply voltage was detected. Turn off the power and check that connector X06 on the side of the control box is plugged in.
E725	Abnormal drop in power supply voltage was detected. Turn off the power and check that connector CN30, CN31, CN32, CN34 of main PCB are plugged in.
E726	Abnormal drop in power supply voltage was detected. Turn off the power and check for any abnormality in cable harness of connector X02, X03, X04 on the side of the control box.
E727	Abnormal drop in power supply voltage was detected. Turn off the power and check for any abnormality in cable harness of connector X02, X03, X04, X05 on the side of the control box.
E728	Abnormal drop in power supply voltage was detected. Turn off the power and check for any abnormality in the connection to the external general purpose IO PCB on the side of the control box.
E730	External error input (AIRSW) detected. Turn off the power, and then check the air pressure.
E740	The control box cooling fan is not working. Turn off the power and check that there is no tangled lint, etc. Please check that connector CN16 on the main PCB is plugged in.
E741	X-feed motor cooling fan does not operate. Turn off the power, and then check if the cooling fan is blocked with scraps of thread. Check that the connector P7 on the main board is properly inserted.
E742	Y-feed motor cooling fan does not operate. Turn off the power, and then check if the cooling fan is blocked with scraps of thread. Check that the connector P7 on the main board is properly inserted.
E743	The cooling fan for the main motor is not working. Turn off the power and check that there is no tangled lint, etc. Please check that connector X03 on the side of the control box, connector LX13 of relay PCB SC7954 are plugged in.
E744	The cooling fan for the presser foot motor is not working. Turn off the power and check that there is no tangled lint, etc. Please check that connector X04 on the side of the control box, connector UX1 of relay PCB SC7952 are plugged in.
E750	Abnormal drop in power supply voltage for internal clock backup power was detected. Please correct the date in the Date and Time Setting menu.
E751	Internal clock has become abnormal. Turn off the power and check for any abnormality in cable harness of connector X06 on the side of the control box.
E752	Panel has been replaced. Please set the date in the Date and Time Setting menu.

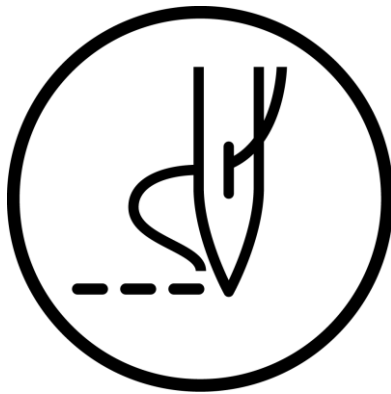
15. LIST OF ERROR CODES

Version updating-related errors

Code	Cause of error and remedy
E800	FPGA error
E882	Updating from the current version to an earlier version is not supported. Please stay with the latest version or update to a newer version.
E883	Software data is not present in the storage media. Check that the software data has been saved into the correct folder.
E884	There is a problem with the software data. Write the correct file into the storage media.
E885	Software data is not present in the storage media. Check that the software data has been saved into the correct folder in the storage media inserted into the sewing defect detector device.
E886	There is a problem with the software data. Write the correct data into the storage media inserted into the sewing defect detector device.
E887	Software updating was not completed. Turn off the power, and then turn it back on again.
E890	Software updating was not completed. Please try again.
E910	The combination of boot software and main software is incorrect. Please update to the correct version of the software.
E920	Failed to read bar-code. Press the Reset key to clear the error.
E930	Interface version of sewing defect detector is not supported. Please check the sewing defect detector software version.
E931	No user software is installed in sewing defect detector. Please install user software.
E932	Error is detected on the sewing defect detector. Please refer to the instruction manual for details.
E933	The accumulated data capacity has reached the limit of the sewing defect detector. Press Reset key to clear the error and delete unnecessary data from the data accumulation in the sewing defect detector settings.
E995	Failure was detected in the control program. Turn off the power, and then turn it back on again.

If an error code that is not listed above appears or if carrying out the specified remedy does not solve the problem, contact the place of purchase.

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INSTRUCTION MANUAL

* Please note that the contents of this manual may differ slightly from the actual product purchased as a result of product improvements.

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This is the original instructions.

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