Thank you for purchasing this machine. Before using this machine or attempting any maintenance, carefully read the “IMPORTANT SAFETY INSTRUCTIONS” on this page, and then study the Instruction and Reference Guide for the correct operation of the various functions. In addition, after you have finished reading this product safety manual, store it where it can quickly be accessed for future reference. Failure to follow these instructions may result in an increased risk of personal injury or damage to property, including through fire, electrical shock, burns or suffocation.

Please read these safety instructions before attempting to use the machine.

**DANGER** - To reduce the risk of electric shock

1. Always unplug the machine from the electrical outlet immediately after using, when cleaning, when making any user servicing adjustments mentioned in this manual, or if you are leaving the machine unattended.

**WARNING** - To reduce the risk of burns, fire, electric shock, or injury to persons.

2. Always unplug the machine from the electrical outlet when removing covers, or when making any adjustments mentioned in the instruction manual.
   - To unplug the machine, switch the machine to the symbol “O” position to turn it off, then grasp the plug and pull it out of the electrical outlet. Do not pull on the cord.
   - Plug the machine directly into the electrical outlet. Do not use an extension cord.
   - Always unplug your machine if the power is cut.

3. Electrical Hazards:
   - This machine should be connected to an AC power source within the range indicated on the rating label. Do not connect it to a DC power source or inverter. If you are not sure what kind of power source you have, contact a qualified electrician.
   - This machine is approved for use in the country of purchase only.

4. Never operate this machine if it has a damaged cord or plug, if it is not working properly, if it has been dropped or damaged, or water is spilled on the unit. Return the machine to the nearest authorized Baby Lock retailer for examination, repair, electrical or mechanical adjustment.
   - While the machine is stored or in use if you notice anything unusual, such as an odor, heat, discoloration or deformation, stop using the machine immediately and unplug the power cord.
   - When transporting the sewing machine, be sure to carry it by its handle. Lifting the sewing machine by any other part may damage the machine or result in the machine falling, which could cause injuries.
   - When lifting the sewing machine, be careful not to make any sudden or careless movements, otherwise you may injure your back or knees.
5 Always keep your work area clear:

- Never operate the machine with any air openings blocked. Keep ventilation openings of the sewing machine and foot control free from the build up of lint, dust, and loose cloth.
- Do not store objects on the foot controller.
- Do not use extension cords. Plug the machine directly into the electrical outlet.
- Never drop or insert any object into any opening.
- Do not operate where aerosol (spray) products are being used or where oxygen is being administered.
- Do not use the machine near a heat source, such as a stove or iron; otherwise, the machine, power cord or garment being sewn may ignite, resulting in fire or an electric shock.
- Do not place this sewing machine on an unstable surface, such as an unsteady or slanted table, otherwise the sewing machine may fall, resulting in injuries.

6 Special care is required when sewing:

- Always pay close attention to the needle. Do not use bent or damaged needles.
- Keep fingers away from all moving parts. Special care is required around the machine needle.
- Switch the sewing machine to the symbol “O” position to turn it off when making any adjustments in the needle area.
- Do not use a damaged or incorrect needle plate, as it could cause the needle to break.
- Do not push or pull the fabric when sewing, and follow careful instruction when free motion stitching so that you do not deflect the needle and cause it to break.

7 This machine is not a toy:

- Your close attention is necessary when the machine is used by or near children.
- The plastic bag that this sewing machine was supplied in should be kept out of the reach of children or disposed of. Never allow children to play with the bag due to the danger of suffocation.
- Do not use outdoors.

8 For a longer service life:

- When storing this machine, avoid direct sunlight and high humidity locations. Do not use or store the machine near a space heater, iron, halogen lamp, or other hot objects.
- Use only neutral soaps or detergents to clean the case. Benzene, thinner, and scouring powders can damage the case and machine, and should never be used.
- Always consult the Instruction and Reference Guide when replacing or installing any assemblies, the presser feet, needle, or other parts to assure correct installation.

9 For repair or adjustment:

- If the light unit is damaged, it must be replaced by an authorized Baby Lock retailer.
- In the event a malfunction occurs or adjustment is required, first follow the troubleshooting table in the back of the Instruction and Reference Guide to inspect and adjust the machine yourself. If the problem persists, please consult your local authorized Baby Lock retailer.
Use this machine only for its intended use as described in the manual.
Use accessories recommended by the manufacturer as contained in this manual.
Use only the mouse designed specifically for this machine.
The contents of this manual and specifications of this product are subject to change without notice.
For additional product information and updates, visit our website at www.babylock.com

SAVE THESE INSTRUCTIONS
This machine is intended for household use.

FOR USERS IN COUNTRIES EXCEPT EUROPEAN COUNTRIES
This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

FOR USERS IN EUROPEAN COUNTRIES
This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

FOR USERS IN THE UK, EIRE, MALTA AND CYPRUS ONLY

IMPORTANT

• In the event of replacing the plug fuse, use a fuse approved by ASTA to BS 1362, i.e. carrying the mark, rating as marked on plug.
• Always replace the fuse cover. Never use plugs with the fuse cover omitted.
• If the available electrical outlet is not suitable for the plug supplied with this equipment, you should contact your authorized Baby Lock retailer to obtain the correct lead.
Federal Communications Commission (FCC) Declaration of Conformity (For U.S.A. Only)

Responsible Party: Tacony Corporation
1760 Gilsinn Lane, Fenton, Missouri 63026 USA

declares that the product
Product Name: Baby Lock Sewing Machine
Model Number: BLSA

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the authorized Baby Lock retailer or an experienced radio/TV technician for help.
- This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

Important
Changes or modifications not expressly approved by Tacony Corporation could void the user’s authority to operate the equipment.

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment has very low levels of RF energy that it deemed to comply without maximum permissive exposure evaluation (MPE).
For users in Canada

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment has very low levels of RF energy that it deemed to comply without maximum permissive exposure evaluation (MPE).

For users in Mexico

The operation of this equipment is subject to the following two conditions:
(1) it is possible that this equipment or device may not cause harmful interference, and
(2) this equipment or device must accept any interference, including interference that may cause undesired operation.

La operación de este equipo está sujeta a las siguientes dos condiciones:
(1) es posible que este equipo o dispositivo no cause interferencia perjudicial y
(2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.
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All other brands and product names mentioned in this manual are registered trademarks of their respective companies. However, the explanations for markings such as ® and ™ are not clearly described within the text.
The Instruction and Reference Guides for this machine consist of the Instruction and Reference Guide (Sewing) and the Instruction and Reference Guide (Embroidery). Refer to the appropriate Instruction and Reference Guide according to your needs. For basic information about, for example, the included accessories or the settings screen, refer to chapter 1 of the Instruction and Reference Guide (Sewing). In the screens appearing in the step-by-step instructions, the parts referred to in the operations are marked with . Compare the screen in the directions with the actual screen, and carry out the operation. If, while using the machine, you experience something you do not understand, or there is a function you would like to know more about, refer to the index at the back of the Instruction and Reference Guide in conjunction with the table of contents to find the section of the manual you should refer to.
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Chapter 1
Getting Ready
The names of the various parts of the machine and their functions are described below. Before using the machine, carefully read these descriptions to learn the names of the machine parts.

**Machine**

### Front View

1. **Top cover**
   - Open the top cover when threading the machine or winding the bobbin.

2. **Pretension disk**
   - Pass the thread around the pretension disk when winding the bobbin thread. (page 52)

3. **Thread guide for bobbin winding**
   - Pass the thread through this thread guide when winding the bobbin thread. (page 52)

4. **Spool pin**
   - Place a spool of thread on the spool pin. (page 61)

5. **Spool cap**
   - Use the spool cap to hold the spool of thread in place. (page 61)

6. **Supplemental spool pin**
   - Use this spool pin to wind the bobbin thread, or to sew with the twin needle. (page 52, 64)

7. **Bobbin winder**
   - Use the bobbin winder when winding the bobbin. (page 52)

8. **Bobbin winding slider**
   - Adjust the amount of thread wound onto the bobbin. (page 54)

9. **LCD (liquid crystal display)**
   - Settings for the selected stitch and error messages appear in the LCD. (page 27)

10. **Speaker**
    - (page 15)

11. **Needle plate lever**
    - Slide the lever toward you to remove the needle plate. (page 184)

### Right-side/Rear View

1. **Connector for the presser foot**
   - Connect the dual feed foot or embroidery foot with LED pointer (sold separately). (page 74)

2. **Handle**
   - Carry the machine by its handle when transporting the machine.

3. **Presser foot lever**
   - Raise and lower the presser foot lever to raise and lower the presser foot. (page 72)

4. **Air vent**
   - The air vent allows the air surrounding the motor to circulate. Do not cover the air vent while the machine is being used.

5. **Main power switch**
   - Use the main power switch to turn the machine ON and OFF. (page 25)

6. **Foot controller**
   - Use the foot controller to operate the machine.

7. **Power cord receptacle**
   - Insert the power cord into the machine receptacle. (page 25)

8. **Dual purpose stylus holder connector**
   - Connect the included dual purpose stylus holder. (page 95)

9. **Foot controller jack**
   - Insert the foot controller plug into its jack on the machine. (page 78)

---

**CAUTION**

- Do not place any object weighing 1 kg or more on the top cover, otherwise the cover may be damaged.

- Do not touch the camera or projector. Otherwise, it will not display properly.
USB port
In order to send stitch patterns and embroidery patterns from/to USB media, plug the USB media directly into the USB port.

SD card slot
Insert an SD card into the SD card slot in order to import/export stitch patterns and embroidery patterns.

Handwheel
Rotate the handwheel toward you (counterclockwise) to raise and lower the needle. The wheel should be turned toward the front of the machine.
Needle and Presser Foot Section

Needle and Presser Foot Section

1. **Presser foot holder screw**
   Use the presser foot holder screw to hold the presser foot in place. (page 73)

2. **Presser foot holder**
   The presser foot is attached to the presser foot holder. (page 72)

3. **Presser foot**
   The presser foot consistently applies pressure to the fabric as sewing takes place. Attach the appropriate presser foot for the selected stitch. (page 72)

4. **Feed dogs**
   The feed dogs feed the fabric in the sewing direction.

5. **Bobbin cover**
   Open the bobbin cover to set the bobbin. (page 58, 117)

6. **Needle plate**
   The needle plate is marked with guides to help sew straight seams. (page 110)
   Remove the needle plate to clean the race. (page 111, 184)

7. **Needle bar thread guide**
   Pass the upper thread through the needle bar thread guide. (page 61)

8. **Needle clamp screw**
   Use the needle clamp screw to hold the needle in place. (page 73)

---

Measurements on the needle plate and the bobbin cover (with mark)

The measurements on the bobbin cover and needle plate are references for stitch patterns with a left or middle (center) needle position.

1. **For stitches with a middle (center) needle position**
2. **For stitches with a left needle position**
3. **Left needle position on the needle plate <inch>**
4. **Left needle position on the needle plate <cm>**
5. **Middle (center) needle position on the bobbin cover (with mark) <inch>**
6. **Middle (center) needle position on the needle plate <inch>**
NAMES OF MACHINE PARTS AND THEIR FUNCTIONS

Embroidery Unit

1. **Carriage**
The carriage moves the embroidery frame automatically when embroidering.

2. **Release lever (located under the embroidery unit)**
Press the release lever to remove the embroidery unit.

3. **Embroidery frame holder**
Insert the embroidery frame into the embroidery frame holder to hold the frame in place.

4. **Frame-securing lever**
Press the frame-securing lever down to secure the embroidery frame.

5. **Embroidery unit connection**
Insert the embroidery unit connection into the connection port when attaching the embroidery unit.

---

Operation Buttons

1. **“Start/Stop” button**
Press this button and the machine will sew a few stitches at a slow speed and then begin sewing at the speed set by the sewing speed controller. Press the button again to stop the machine. Hold the button in to sew at the machine’s slowest speed. The button changes color according to the machine’s operation mode.
   - **Green:** The machine is ready to sew or is sewing.
   - **Red:** The machine cannot sew.

2. **“Reverse Stitch” button**
For straight, zigzag, and elastic zigzag stitch patterns that take reverse stitches, the machine will sew reverse stitches at low speed only while holding down the “Reverse Stitch” button. The stitches are sewn in the opposite position. For other stitches, use this button to sew reinforcement stitches at the beginning and end of sewing. Press and hold this button, and the machine sews 3 stitches in the same spot and stops automatically. (page 79)

3. **“Reinforcement Stitch” button**
Use this button to sew a single stitch repeatedly and tie-off. For character/decorative stitches, press this button to end with a full stitch instead of at a mid-point. The LED light beside this button lights up while the machine is sewing a full motif, and automatically turns off when the sewing is stopped. (page 79)

4. **“Needle Position” button**
Use this button when changing sewing direction or for detailed sewing in small areas. Press this button to raise or lower the needle position. With this button, you can lower and raise the needle to sew a single stitch.

5. **“Thread Cutter” button**
Press this button after sewing to automatically trim the excess thread.

6. **“Presser Foot Lifter” button**
Press this button to lower the presser foot and apply pressure to the fabric. Press this button again to raise the presser foot.

7. **Sewing Speed controller**
Use this controller to adjust the sewing speed. Move the slide to the left to sew at slower speeds. Move the slide to the right to sew at higher speeds.

8. **“Automatic Threading” button**
Use this button to automatically thread the needle.

---

**CAUTION**

- Before inserting or removing the embroidery unit, turn the main power to off.
- After the embroidery frame is set in the frame holder, be sure the frame-securing lever is correctly lowered.

---

**CAUTION**

- Do not press the thread cutter button after the threads have been cut. The needle may break and threads may become tangled, or damage to the machine may occur.
Using the Flat Bed Attachment
Pull the top of the flat bed attachment to open the accessory compartment.

Using the Accessory Case
■ Opening the Accessory Case
Slide the latches on the front of the accessory case outward to open it.

Using the Accessory Trays
Three presser foot storage trays are stored in the included accessory case. For your convenience, a presser foot storage tray can be stored in the accessory compartment of the flat bed attachment.

1 Presser foot storage space of the flat bed attachment
2 Presser foot storage trays
### Included Accessories

After opening the box, check that the following accessories are included. If any item is missing or damaged, contact your authorized Baby Lock retailer.

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Part Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Zigzag foot “J” (on machine)</td>
<td>XF3022-001</td>
</tr>
<tr>
<td>2. Monogramming foot “N”</td>
<td>X53840-351</td>
</tr>
<tr>
<td>3. Overcasting foot “G”</td>
<td>XC3098-051</td>
</tr>
<tr>
<td>4. Zipper foot “I”</td>
<td>X59370-051</td>
</tr>
<tr>
<td>5. Buttonhole foot “A+”</td>
<td>XH2665-001</td>
</tr>
<tr>
<td>6. Buttonhole foot stabilizer</td>
<td>XH1726-001</td>
</tr>
<tr>
<td>7. Blind stitch foot “R”</td>
<td>X56409-051</td>
</tr>
<tr>
<td>8. Button fitting foot “M”</td>
<td>130489-001</td>
</tr>
<tr>
<td>9. Dual feed foot</td>
<td>XF4068-201</td>
</tr>
<tr>
<td>10. Regular dual feed foot</td>
<td>XF4419-001</td>
</tr>
<tr>
<td>11. Straight stitch foot</td>
<td>XD0826-051</td>
</tr>
<tr>
<td>12. Free motion quilting foot “C”</td>
<td>XF4737-001</td>
</tr>
<tr>
<td>13. Free motion echo quilting foot “E”</td>
<td>XE0766-001</td>
</tr>
<tr>
<td>14. Free motion open toe quilting foot “O”</td>
<td>XF4873-001</td>
</tr>
<tr>
<td>15. Embroidery foot “W”</td>
<td>XF4012-001</td>
</tr>
<tr>
<td>16. 1/4 quilting foot with guide</td>
<td>XC6800-251</td>
</tr>
<tr>
<td>17. Adapter</td>
<td>XF3613-001</td>
</tr>
<tr>
<td>Part Name</td>
<td>Part Code</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>18. Screw (small)</td>
<td>XA4813-051</td>
</tr>
<tr>
<td>19. Needle set</td>
<td></td>
</tr>
<tr>
<td>75/11 2 needles</td>
<td></td>
</tr>
<tr>
<td>90/14 2 needles</td>
<td></td>
</tr>
<tr>
<td>90/14 2 needles: Ball point needle (gold colored)</td>
<td>XE4962-001</td>
</tr>
<tr>
<td>20. Twin needle</td>
<td></td>
</tr>
<tr>
<td>2.0/11 needle</td>
<td>XE4963-001</td>
</tr>
<tr>
<td>21. Ball point needle set</td>
<td></td>
</tr>
<tr>
<td>75/11 2 needles</td>
<td></td>
</tr>
<tr>
<td>Ball point needle for embroidery</td>
<td></td>
</tr>
<tr>
<td>HAX130EBBR</td>
<td>XD0705-151</td>
</tr>
<tr>
<td>22. Bobbin × 10 (One is on machine.)</td>
<td>X52800-150</td>
</tr>
<tr>
<td>23. Seam ripper</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XF4967-001</td>
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<tr>
<td>24. Scissors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XF2052-001</td>
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<tr>
<td>25. Cleaning brush</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X59476-051</td>
</tr>
<tr>
<td>26. Eyelet punch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XZ5051-001</td>
</tr>
<tr>
<td>27. Screwdriver (small)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X55468-051</td>
</tr>
<tr>
<td>28. Screwdriver (large)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XC4237-021</td>
</tr>
<tr>
<td>29. Multi-purpose screwdriver</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BLMPD</td>
</tr>
<tr>
<td>30. Spool cap (small)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>130013-154</td>
</tr>
<tr>
<td>31. Spool cap (medium) × 2 (One is on machine.)</td>
<td>X55260-153</td>
</tr>
<tr>
<td>32. Spool cap (large)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>130012-054</td>
</tr>
<tr>
<td>33. Thread spool insert (mini king spool insert)</td>
<td>XA5752-121</td>
</tr>
<tr>
<td>34. Spool stand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XH1607-001</td>
</tr>
<tr>
<td>Refer to &quot;Using the Spool Stand&quot; on page 23.</td>
<td></td>
</tr>
<tr>
<td>35. Spool felt (on machine)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X57045-051</td>
</tr>
<tr>
<td>36. Spool net × 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XA5523-050</td>
</tr>
<tr>
<td>37. Embroidery needle plate cover</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XE4708-001</td>
</tr>
</tbody>
</table>
### Part Name and Part Code

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Part Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>38. Knee lifter</td>
<td>XE4713-001</td>
</tr>
<tr>
<td>39. Alternate bobbin case (no color on the screw)</td>
<td>XC8167-651</td>
</tr>
<tr>
<td>40. Standard bobbin case (green marking on the screw) (on machine)</td>
<td>XE5342-101</td>
</tr>
<tr>
<td>41. Straight stitch needle plate</td>
<td>XH2513-001</td>
</tr>
<tr>
<td>42. Cord guide bobbin cover (with single hole)</td>
<td>XE0085-101</td>
</tr>
<tr>
<td>43. Bobbin cover (with mark) (on machine)</td>
<td>XH3126-001</td>
</tr>
<tr>
<td>44. Bobbin cover</td>
<td>XF9666-001</td>
</tr>
<tr>
<td>45. Embroidery frame H 100 mm × W 100 mm (H 4 inches × W 4 inches)</td>
<td>EF74</td>
</tr>
<tr>
<td>46. Embroidery frame H 180 mm × W 130 mm (H 7 inches × W 5 inches)</td>
<td>EF75</td>
</tr>
<tr>
<td>47. Embroidery frame H 240 mm x W 240 mm (H 9-1/2 inches x W 9-1/2 inches)</td>
<td>XG5558-001</td>
</tr>
<tr>
<td>48. Embroidery frame H 408 mm × W 272 mm (H 16 inches × W 10-5/8 inches)</td>
<td>XH1466-001</td>
</tr>
<tr>
<td>49. Scanning frame</td>
<td>XF9321-001</td>
</tr>
<tr>
<td>50. Magnet × 6</td>
<td>XF9325-001</td>
</tr>
<tr>
<td>51. Embroidery bobbin thread</td>
<td>BBT-W</td>
</tr>
<tr>
<td>52. Embroidery positioning sticker sheets × 2</td>
<td>XE4912-501</td>
</tr>
<tr>
<td>53. White calibration stickers (solid)</td>
<td>XE7916-001</td>
</tr>
<tr>
<td>54. Stabilizer material</td>
<td>X81176-001</td>
</tr>
<tr>
<td>55. Chalk pencil</td>
<td>XE8568-001</td>
</tr>
<tr>
<td>56. Dual purpose stylus</td>
<td>XH2515-001</td>
</tr>
<tr>
<td>57. Dual purpose stylus holder</td>
<td>XH1805-001</td>
</tr>
</tbody>
</table>
Following documents can be downloaded.
• Instruction and Reference Guide (Sewing)
• Instruction and Reference Guide (Embroidery)
• Embroidery Design Guide
www.babylock.com/

**Memo**
• (For U.S.A. only)
  Foot controller: Model T
  This foot controller can be used on the machine with product code 882-W31. The product code is mentioned on the machine rating plate.
• Always use accessories recommended for this machine.
• The screw for the presser foot holder is available through your authorized Baby Lock retailer (Part code XA4813-051).

### Options

The following are available as optional accessories to be purchased separately from your authorized Baby Lock retailer.

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Part Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessory case</td>
<td>XH2514-001</td>
</tr>
<tr>
<td>Foot controller</td>
<td>XC8816-051</td>
</tr>
<tr>
<td>Bobbin center pin and instruction sheet</td>
<td>XF5048-001</td>
</tr>
<tr>
<td>Power cord</td>
<td>XC6052-151</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Part Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embroidery frame set H 20 mm × W 60 mm (H 1 inch × W 2-1/2 inches)</td>
<td>EF73: Frame EF77: Embroidery sheet</td>
</tr>
<tr>
<td>Embroidery frame set H 150 mm × W 150 mm (H 6 inches × W 6 inches)</td>
<td>BLMA-150</td>
</tr>
<tr>
<td>Embroidery frame set H 200 mm × W 200 mm (H 8 inches × W 8 inches)</td>
<td>EF91: Frame EF93: Embroidery sheet</td>
</tr>
<tr>
<td>Embroidery frame set H 300 mm × W 200 mm (H 12 inches × W 8 inches)</td>
<td>EF92: Frame EF94: Embroidery sheet</td>
</tr>
<tr>
<td>Embroidery frame set H 260 mm × W 160 mm (H 10-1/4 inches × W 6-1/4 inches)</td>
<td>EF81: Frame EF84: Embroidery sheet</td>
</tr>
<tr>
<td>Embroidery frame set H 360 mm × W 240 mm (H 14 inches × W 9-1/2 inches)</td>
<td>EF95: Frame EF96: Embroidery sheet</td>
</tr>
<tr>
<td>Border embroidery frame H 300 mm × W 100 mm (H 12 inches × W 4 inches)</td>
<td>BLMA-CBH</td>
</tr>
<tr>
<td>Border embroidery frame set H 180 mm × W 100 mm (H 7 inches × W 4 inches)</td>
<td>BLSO-BF</td>
</tr>
<tr>
<td>Part Name</td>
<td>Part Code</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>9. Embroidery bobbin thread (white)</td>
<td>BBT-W</td>
</tr>
<tr>
<td>10. Embroidery bobbin thread (black)</td>
<td>BBT-B</td>
</tr>
<tr>
<td>10. 10 spool stand</td>
<td>BLMA-TS</td>
</tr>
<tr>
<td>11. Wide table</td>
<td>BLSA-ET</td>
</tr>
<tr>
<td>12. Seam guide</td>
<td>BLG-SG</td>
</tr>
<tr>
<td>13. Walking foot</td>
<td>BLG-WF</td>
</tr>
<tr>
<td>14. Side cutter foot</td>
<td>BLG-SCF</td>
</tr>
<tr>
<td>15. Quilting guide</td>
<td>BLG-QG</td>
</tr>
<tr>
<td>16. Embroidery foot “W+” with LED pointer</td>
<td>BTY-EF</td>
</tr>
<tr>
<td>17. Free-motion quilting foot</td>
<td>BLG-FM</td>
</tr>
<tr>
<td>18. Couching foot</td>
<td>BLTY-CCF</td>
</tr>
<tr>
<td>19. Multi-Function Foot controller</td>
<td>BLMA-MFC</td>
</tr>
<tr>
<td>20. Circular attachment</td>
<td>BL-CSA</td>
</tr>
<tr>
<td>21. Edge joining foot</td>
<td>ESG-EJF</td>
</tr>
<tr>
<td>22. Vertical spool pin</td>
<td>XC8619-052</td>
</tr>
<tr>
<td>23. Embroidery positioning sticker sheets × 8</td>
<td>BLSO-EPS</td>
</tr>
<tr>
<td>24. Free motion guide grip</td>
<td>XG1921-001</td>
</tr>
<tr>
<td>25. USB mouse</td>
<td>XE4904-101</td>
</tr>
<tr>
<td>Part Name</td>
<td>Part Code</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>26. Vertical stitch alignment foot “V”</td>
<td>BLSO-VF</td>
</tr>
<tr>
<td>27. Open toe sole for dual feed foot</td>
<td>BLTY-OTDF</td>
</tr>
<tr>
<td>28. Stitch in the Ditch Sole for Digital Dual Foot</td>
<td>BLDY-SDDF</td>
</tr>
<tr>
<td>29. 1/4” Sole with Guide for Digital Dual Foot</td>
<td>BLDY-QFDF</td>
</tr>
<tr>
<td>30. Embroidery frame sheet H 100 mm × W 100 mm (H 4 inches × W 4 inches)</td>
<td>EF78</td>
</tr>
<tr>
<td>31. Embroidery frame sheet H 180 mm × W 130 mm (H 7 inches × W 5 inches)</td>
<td>EF79</td>
</tr>
<tr>
<td>32. Embroidery frame sheet H 240 mm × W 240 mm (H 9-1/2 inches × W 9-1/2 inches)</td>
<td>XG5566-001</td>
</tr>
<tr>
<td>33. Embroidery frame sheet H 408 mm × W 272 mm (H 16 inches × W 10-5/8 inches)</td>
<td>XH1825-001</td>
</tr>
<tr>
<td>34. Bobbin Work Kit</td>
<td>BL-BWA</td>
</tr>
</tbody>
</table>

**Memo**
- All specifications are correct at the time of printing. Please be aware that some specifications may change without notice.

**Note**
- Visit your nearest authorized Baby Lock retailer for a complete listing of optional accessories for your machine.
Using the Multi-purpose Screwdriver

Since the screwdriver can be changed to three different positions, it can be extremely useful for the various machine preparations. With this machine, position “1” and position “3” are used.

■ Position “1”

You can install/remove the presser foot holder, needle clamp screw.

■ Position “3”

The multi-purpose screwdriver can be positioned over the screw on the embroidery frame to tighten the screw after hooping the fabric or when removing the fabric.

Note

• When rotating the multi-purpose screwdriver, do not forcefully rotate it in the direction that it does not rotate; otherwise, it may break.

Using the Spool Stand

The included spool stand is useful when using thread spools with a large diameter (cross-wound thread). The spool stand can hold two spools of thread.

<table>
<thead>
<tr>
<th>No.</th>
<th>Part Name</th>
<th>Part Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spool stand</td>
<td>XH1607-001</td>
</tr>
<tr>
<td>2</td>
<td>Spool cap (XL) × 2</td>
<td>XE0779-001</td>
</tr>
<tr>
<td>3</td>
<td>Spool holder × 2</td>
<td>XA0679-050</td>
</tr>
<tr>
<td>4</td>
<td>Spool cap base × 2</td>
<td>XE0780-001</td>
</tr>
<tr>
<td>5</td>
<td>Spool felt × 2</td>
<td>XC7134-051</td>
</tr>
<tr>
<td>6</td>
<td>Ring × 4</td>
<td>026030-136</td>
</tr>
</tbody>
</table>

* No.2 to No.6 are included in a plastic bag.

CAUTION

• Do not lift the handle of the machine while the spool stand is installed.
• Do not push or pull the telescopic thread guide or spool pins with extreme force, otherwise damage may result.
• Do not place any object other than spools of thread on the spool support.
• Do not try to wind thread on the bobbin while sewing using the spool stand.

Warning label

This product contains magnets.

1. Be careful not to pinch your fingers or any objects between the spool stand and the upper cover of the machine.
2. Be sure to keep the magnets away from precision electronics, computer disks, credit cards with a magnetic stripe, etc.
3. Do not use the spool stand if you have a pacemaker.
Assembling the Spool Stand

1. Hold in the tabs on the spool stand and remove the lid.

   ![Tabs](image1)
   - Tabs

2. Raise the telescopic thread guide shaft and the two spool pins.

   ![Spool pins](image2)
   - Spool pins
   - Telescopic thread guide shaft

3. Fully extend the telescopic thread guide shaft until the two internal stoppers snap into place.

4. Turn the thread guide counterclockwise.

5. Open the upper cover of the machine, and then place the spool stand on the upper cover with the notches in the spool stand aligned with the tabs on the upper cover.

   ![Spool stand](image3)

   Note
   - Make sure that the spool stand is firmly secured. Otherwise, the spool stand may fall during sewing.
   - Do not place any object weighing 1 kg or more on the top cover. The weight of the spool stand with its lid removed is about 280 g.

Memo
- For details on winding the bobbin using the spool stand, refer to page 56.
- For details on upper threading using the spool stand, refer to page 66.
TURNING THE MACHINE ON/OFF

⚠️ WARNING

- Use only regular household electricity for the power source. Using other power sources may result in fire, electric shock, or damage to the machine.
- Make sure that the plugs on the power cord are firmly inserted into the electrical outlet and the power cord receptacle on the machine. Otherwise, a fire or electric shock may result.
- Do not insert the plug on the power cord into an electrical outlet that is in poor condition.
- Turn the main power to OFF and remove the plug in the following circumstances:
  - When you are away from the machine
  - After using the machine
  - When the power fails during use
  - When the machine does not operate correctly due to a bad connection or a disconnection
  - During electrical storms

⚠️ CAUTION

- Use only the power cord included with this machine.
- Do not use extension cords or multi-plug adapters with many other appliances plugged in to them. Fire or electric shock may result.
- Do not touch the plug with wet hands. Electric shock may result.
- When unplugging the machine, always turn the main power to OFF first. Always grasp the plug to remove it from the outlet. Pulling on the cord may damage the cord, or lead to fire or electric shock.
- Do not allow the power cord to be cut, damaged, modified, forcefully bent, pulled, twisted, or bundled. Do not place heavy objects on the cord. Do not subject the cord to heat. These things may damage the cord, or cause fire or electric shock. If the cord or plug is damaged, take the machine to your authorized Baby Lock retailer for repairs before continuing use.
- Unplug the power cord if the machine is not to be used for a long period of time. Otherwise, a fire may result.
- When leaving the machine unattended, either the main switch of the machine should be turned to OFF or the plug must be removed from the socket-outlet.
- When servicing the machine or when removing covers, the machine must be unplugged.
- For U.S.A only
  This appliance has a polarized plug (one blade wider than the other). To reduce the risk of electrical shock, this plug is intended to fit in a polarized outlet only one way.
  If the plug does not fit fully in the outlet, reverse the plug. If it still does not fit, contact a qualified electrician to install the proper outlet. Do not modify the plug in any way.
1 Insert the power supply cord into the power cord receptacle, then insert the plug into a wall outlet.

2 Turn the main power switch to “I” to turn on the machine.

3 Turn the main power switch to “O” to turn off the machine.

Setting Your Machine for the First Time

When you first turn on the machine, set the language and time/date to your language and local time/date. Follow the procedure below when the settings screen appears automatically.

1 Press \( \leftarrow \) and \( \rightarrow \) to set your local language.

2 Press \( \text{OK} \).

3 The message screen, confirming if you want to set time/date, appears. To set the time/date, press \( \text{OK} \); to cancel the setting, press \( \text{Cancel} \).

4 Press \( - \) or \( + \) to set time date.

5 Press \( \text{OK} \) to start using your machine.

Memo
- When the machine is turned on, the needle and the feed dogs will make sound when they move; this is not a malfunction.

Memo
- If the machine is turned off in the middle of sewing in the “Sewing” function, the operation will not be continued after turning the power on again.

Note
- The time/date you set may be cleared, if you don’t turn on the machine for an extended period of time.
- Time setting is also available by pressing clock button/time on the LCD screen.
When the machine is turned on, the opening movie is played. Touch anywhere on the screen for the home page screen to be displayed. Touch the LCD screen or a key with your finger or the included dual purpose stylus to select a machine function.

- **Home Page Screen**

### No. Display Key Name Explanation Page

<table>
<thead>
<tr>
<th>No.</th>
<th>No.</th>
<th>Display</th>
<th>Key Name</th>
<th>Explanation</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>Wireless LAN key</td>
<td>Check the machine’s signal strength. Press this key to specify the wireless settings.</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>Camera view key</td>
<td>Press this key to check the needle location as it is shown on the screen through the built-in camera.</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>Machine setting screen key</td>
<td>Press this key to change the needle stop position, adjust the stitch patterns and embroidery patterns or screen, and change other machine settings.</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>Machine help key</td>
<td>Press this key to see explanations on how to use the machine. You can see the tutorial videos and also the MP4 movie files that you have.</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>Presser foot/Needle exchange key</td>
<td>Press this key before changing the needle, the presser foot, etc. This key locks all key and button functions to prevent operation of the machine.</td>
<td>58, 72</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>Screen lock key</td>
<td>Press this key to lock the screen. When the screen is locked, can still sew, but cannot change any of the screen functions. Press this key again to unlock the settings.</td>
<td>158</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>Home page screen key</td>
<td>Press this key anytime it is displayed to return to the home page screen and select a different category - “Sewing”, “Embroidery” or “IQ Designer”.</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>11</td>
<td>Time/Date key</td>
<td>Press this key to set the clock to your local time.</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>
Using the Machine Setting Mode Key

Press **,** to change the default machine settings (needle stop position, embroidery speed, opening display, etc.). To display the different settings screens, press **,** for “Sewing settings”, **,** for “General settings”, **,** for “Embroidery settings” or **,** for “Wireless LAN settings”.

**Memo**
- Press **,** or **,** to display a different settings screen.

Sewing Settings

**Page 1**

1. Select whether to use the sewing speed controller to determine the zigzag width (page 125).
2. Make adjustments to character or decorative stitch patterns (page 164).
3. Adjust the presser foot height. Select the height of the presser foot when the presser foot is raised.
4. Adjust the presser foot pressure. The higher the number, the greater the pressure will be. Set the pressure at “3” for normal sewing.
5. When set to “ON”, the thickness of the fabric is automatically detected by an internal sensor while sewing. This enables the fabric to be fed smoothly (pages 83 and 91).

**Page 2**

6. Select whether “1-01 Straight stitch (Left)” or “1-03 Straight stitch (Middle)” is the utility stitch that is automatically selected when the machine is turned on.
7. Change the height of the presser foot when sewing is stopped when the pivot setting is selected (page 89). Adjust the presser foot to one of the four heights.
8. Change the height of the presser foot when the machine is set to free motion sewing mode (page 126).
9. Adjust the amount of fabric feeding of the dual feed foot (page 76).
10. Pressing the “Start/Stop” button or depressing the foot controller automatically lowers the presser foot (if it is raised) before starting sewing.
11. Pressing the “Thread Cutter” button automatically lowers the presser foot before cutting the thread. The presser foot will be raised after the thread is cut.
Select whether utility stitches ( ) or quilting stitches ( ) are displayed first in the stitch selection screen.

When set to “ON”, reinforcement stitches are sewn at the beginning and/or end of sewing for a reinforcement stitch pattern, even when the “Reverse Stitch” button is pressed (page 79).

You can activate this setting after connecting the multi-function foot controller (optional). (These settings are not operable unless the multi-function foot controller is attached to the machine.) (page 33)

1. Change the display language.
2. Change the brightness of the needle area and work area lights.
3. If the screen is not very clear in certain environments, you can adjust the brightness of the screen.
4. Turn both the upper and bobbin thread sensor “ON” or “OFF”. If it is turned “OFF”, the machine can be used without thread.
5. Change the speaker volume. Increase the number for louder volume, decrease for softer volume.
6. Select the operation of the “Needle Position - Stitch Placement” button from the following two sequences. (page 92)
Page 5

- Select whether to display the opening screen video when the machine is turned on.
- Select to save the machine power by setting the “Eco Mode” or the “Shutoff Support Mode” (page 34).
- Select the length of time until the screen saver appears.
- Change the image of the screen saver (page 35).
- Change the shape of the pointer when a USB mouse is used. The setting remains selected even after the machine is turned off.

Page 6

- Select the brightness of the projector.
- Select whether to show background color when using projector function.
- Select whether to display outline of the pattern.
- Select the color of the pointer.
- The camera needle drop point can be specified. (page 36)

Page 7

- Display the total number of stitches sewn on this machine, which is a reminder to take your machine in for regular servicing. (Contact your authorized Baby Lock retailer for details.)
- The “No.” is the internal machine number for the machine.
- Display the program version.
Embroidery Settings

For details on embroidering settings, refer to the Instruction and Reference Guide (Embroidery).

Page 8

- Select from among 12 embroidery frame displays.
- Change the center point marker or grid lines.
- Adjust the maximum embroidery speed setting.
- Adjust the upper thread tension for embroidering.
- Select the height of the embroidery foot during embroidering.
- Adjust the needle position for embroidering.

Page 9

- Change the display units (mm/inch).
- Change the thread color display on the “Embroidery” screen; thread number, color name.
- Select the thread brand used to display a pattern when it is opened.
- Change the color of the background for the embroidery display area.
- Change the color of the background for the thumbnail area.
- Press to specify the size of pattern thumbnails.
- Adjust the distance between the pattern and the basting stitching.

Page 10

- Select the quality for displaying the fabric in the screen.
- Erase the scanned image.
- Set to “ON” when positioning the pattern on the thick fabric using the built-in camera.
- Adjust the position and brightness of the embroidery foot “W+” with LED pointer (sold separately). (These settings are not available unless embroidery foot “W+” with LED pointer is installed on the machine.)
Wireless LAN settings

● Page 11

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enable/disable the wireless LAN function.</td>
</tr>
<tr>
<td>2</td>
<td>Display the connected SSID.</td>
</tr>
<tr>
<td>3</td>
<td>Set the machine to connect wireless LAN function.</td>
</tr>
<tr>
<td>4</td>
<td>Display the machine name of wireless LAN function.</td>
</tr>
<tr>
<td>5</td>
<td>Press to change the machine name of wireless LAN function.</td>
</tr>
<tr>
<td>6</td>
<td>Check the wireless LAN status.</td>
</tr>
<tr>
<td>7</td>
<td>Display other menus.</td>
</tr>
<tr>
<td>8</td>
<td>Press to reset network operations.</td>
</tr>
</tbody>
</table>

Setting Functions

Saving a Settings Screen Image to USB Media

An image of the settings screen can be saved as .PNG file.

1. Insert the USB media into the USB port on the right side of the machine.

2. Press .

   → The settings screen appears. Select the settings screen page that you want to save the screen image of.

3. Press .

   → The image file will be saved to the USB media.
Specifying the Multi-Function Foot Controller (Sold Separately)

With the multi-function foot controller, various machine operations in addition to starting/ stopping sewing, such as thread cutting and reverse stitching, can be specified to be performed.

Functions that can be specified

<table>
<thead>
<tr>
<th>Controller</th>
<th>Functions that can be specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Main foot controller</td>
<td>Start/Stop</td>
</tr>
</tbody>
</table>
| ② Heel switch | Select any of the following:  
- Thread Cutting  
- Needle Position – Up/Down  
- Single Stitch  
- Reverse Stitch (Reinforcement Stitch) *  
- Presser Foot Up/Down  
- No Setting |
| ③ Side pedal | |

* If you set the “Reverse Stitch” function on the heel switch, machine operates the same as pressing the “Reverse Button” on the machine.
* Reinforcement stitching may be applied depending on the selected stitch pattern. For the details, refer to “Automatic Reinforcement Stitching” on page 79.

Memo
- If you set “Reverse Stitch” on the side pedal, you can create a darning stitch effect using zigzag stitches. With both feet, keep pressing the main foot controller, and repeat pressing and releasing the side pedal to sew forward and reverse in turn. Machine will reverse at the speed you press the main foot controller.

Specifying the functions
The functions performed by the multi-function foot controller can be specified in the settings screen.

Note
- Before specifying the functions, connect the multi-function foot controller to the machine. The settings screen is activated the first time that the machine detects the multi-function foot controller.
- After the multi-function foot controller is connected to the machine and the functions are specified, the “Start/Stop” button cannot be used. All buttons other than the “Start/Stop” button can continue to be used.
Selecting the "Eco Mode" or "Shutoff Support Mode"

You can save the machine power by setting the eco mode or the shutoff support mode. If you leave the machine without using for a specified period of time, the machine enters in one of these modes.

"Eco Mode";
Machine will enter a sleep mode. Touch the screen or press the "Start/Stop" button to continue sewing.

"Shutoff Support Mode";
Machine will enter the lower power mode after set period of time. Turn machine off and then back on to restart sewing.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Eco Mode</th>
<th>Shutoff Support Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available time</td>
<td>OFF, 10 - 120 (minute)</td>
<td>OFF, 1 - 12 (hour)</td>
</tr>
<tr>
<td>&quot;Start/Stop&quot; button</td>
<td>Green flashing</td>
<td>Green slow flashing</td>
</tr>
<tr>
<td>Suspended function</td>
<td>Machine light, Screen display</td>
<td>All functions</td>
</tr>
<tr>
<td>After recovering</td>
<td>The machine starts from the previous operation.</td>
<td>You need to turn off the machine.</td>
</tr>
</tbody>
</table>

Press the "Start/Stop" button or touch the screen display to recover from these modes.

1. Press   .
→ The settings screen appears.

2. Press   .
→ The General settings screen appears.


4. Press circled area to select the time until entering the mode.
### Changing the Screen Saver Image

Instead of the default image, you can select your own personal images for the screen saver of your machine.

Before changing the screen saver image, prepare the image on your computer or USB media.

#### Compatible image files

<table>
<thead>
<tr>
<th>Format</th>
<th>.bmp, .jpg, .png</th>
</tr>
</thead>
<tbody>
<tr>
<td>File size</td>
<td>Max. 2 MB for each image</td>
</tr>
<tr>
<td>File dimension</td>
<td>800 x 1280 pixels or less. (If the width is more than 800 pixels, the image imported will be reduced to a width of 800 pixels.)</td>
</tr>
<tr>
<td>Number allowed</td>
<td>5 or less</td>
</tr>
</tbody>
</table>

1. **Press**  
   → The settings screen appears.

2. **Press**  
   → The General settings screen appears.

3. **Display page 5 of the General settings screen.**

4. **Press**  

5. **Press**  

6. **Connect the USB media that contains your personal image to the USB port of the machine.**  
   * Refer to page 48 about USB connectivity.

7. **Press**  
   to select the first image.

   * The images will appear in a list in this screen. Select the desired  
   to specify the image.
   * Press  to delete the selected image.
8 Select the device that is connected.

A list of your personal images appear on the screen.

* Press  to view the previous page.

9 Press a file name to select image and then press .

→ The selected image is stored on your machine.

* Press  to view the previous page.

10 Repeat the procedure from step 7 to select the remaining images.

11 Press  to return to the original screen.

**Needle Calibration Using the Built-in Camera**

Setting the camera needle position is essential when you use camera or projector function. It is not necessary to perform this operation each time, but we recommend performing it when the needle is changed. Use the white stickers (solid) included with the machine.

1 Press .

→ The settings screen appears.

2 Press .

→ The General settings screen appears.

3 Display page 6 of the General settings screen.

4 Press .

→ Camera needle position setting screen appears.

5 Follow the on-screen instructions to complete the procedure.

1. Press the needle position button to raise the needle.
2. After removing the needle and the presser foot, affix white sticker on needle dropping point area.

- White sticker

3. Insert the needle (standard size 75/11 or 90/14).

4. Press \( \text{Start} \) to initiate the calibration process. For safety please make sure area around needle is clear prior to pressing \( \text{Start} \).

→ Setting the needle drop point begins.

The operation is finished when “OK” appears. If “NG” appears, affix a new white sticker, and then press \( \text{Retry} \). If multiple attempts to set the position are not successful, contact your nearest authorized Baby Lock retailer.

**Note**

- Use a new sticker. The camera needle position cannot be set correctly if there is a hole in sticker or if it is dirty. If you have no new stickers, contact your nearest authorized Baby Lock retailer.

* Press \( \text{OK} \) to memorize the calibration data.

* Press \( \text{Cancel} \) to back to original screen without memorizing the calibration data.

7. Remove the sticker.
Using the Machine Help Key

Press [?] to open the machine help screen. Six functions are available from the screen shown below.

① Press this key to continue viewing the Instruction and Reference Guide (PDF file) or watching the video that was stopped.
② Press this key to view the Instruction and Reference Guide (PDF file).
③ Press this key to see explanation for upper threading, winding the bobbin, changing the presser foot, preparing to embroider a pattern, and how to use the machine (page 39).
④ Press this key to select utility stitches when you are not sure which stitch to use or how to sew the stitch (page 40).
⑤ Press this key to see an explanation of the selected stitch (page 43).
⑥ Press this key to watch tutorial videos or MPEG-4 (MP4) files from USB media (page 41).
Using the Operation Guide Function

Press “Operation Guide” to open the screen shown below. Six categories are displayed at the top of the screen. Press a key to see more information about that category.

### Principal Parts
- Displays information about the main parts of the machine and their functions. This is the first screen displayed when you press “Operation Guide”.

### Principal Buttons
- Displays information about the operation buttons.

### Troubleshooting
- Displays troubleshooting information.

### Embroidery
- Displays information about attaching the embroidery unit, preparing fabric for embroidering, etc. Some of the functions are described in the movies. Watch these movies for a better understanding of the functions.

### Basic Operation
- Displays information about threading the machine, changing presser feet, etc. Some of the functions are described in the movies. Watch these movies for a better understanding of the functions.

### Maintenance
- Displays information about cleaning the machine, etc. Some of the functions are described in the movies. Watch these movies for a better understanding of the functions.
Example: Displaying information about upper threading

1. Press .
   → The lower half of the screen will change.
4. Press (upper threading).
   → The screen shows instructions for threading the machine.
5. Read the instructions.
   * Press to view the next page.
   * Press to view the previous page.
6. Press Return to return to the original screen.

Using the Sewing Guide Function

The sewing guide function can be used to select stitch patterns from the Utility Stitch screen. Use this function when you are not sure which stitch to use for your application, or to get advice about sewing particular stitches. For example, if you want to sew overcasting, but you do not know which stitch to use or how to sew the stitch, you can use this screen to get advice. We recommend that beginners use this method to select stitches.

1. Enter Utility Stitch category from the home page.
2. Press .
   → The advice screen is displayed.
Press the key of the category whose sewing instructions you wish to view.

* Press \( \text{Return} \) to return to the original screen.

Read the explanations and select the appropriate stitch.

→ The screen displays directions for sewing the selected stitch. Follow the directions to sew the stitch.

### Playing a Tutorial Video

This machine provides tutorial videos on how to use the machine. Together with the help guides, which offer descriptions through text and illustrations, the tutorial videos assist with machine operation.

1. Press \( \text{Home} \).
2. Press \( \text{Video} \).
3. Press the title of the desired tutorial video.

→ The selected tutorial video begins playing.

Play the tutorial video.

1. Number of seconds elapsed/Total number of seconds

**Operation keys**

- Play
- Pause
- Skip back 10 seconds
- Skip forward 10 seconds
- Return to beginning
- Repeat
- Delete video (when playing from the machine’s memory)
- Save to machine (when playing from USB media)

**Memo**

- A frequently viewed tutorial video can be saved to \( \text{Memory} \) (favorites) of the machine, from where it can be played.

After you are finished playing the video, press \( \text{Close} \).
Playing MPEG-4 (MP4) Videos

Your MP4 videos can be played from USB media. In addition, the MP4 video can be saved to the machine so that a tutorial video on creating a project, for example, can be viewed at any time.

Videos that can be played

| MP4 file format: Video - H.264/MPEG-4 AVC, Audio – AAC | Size: 450 (H) × 800 (W) |

Memo
- MP4 file size will be changed to fit the screen. If you view the large MP4 file, the file will be reduced to fit the screen. If you view the smaller MP4 file, the file will be expanded to fit the screen.
- Some type of MP4 file cannot be viewed with the machine.

1. Press [?].

2. Press [Video].

3. Select the device where the video is saved.

   - : Play a tutorial video
   - : Play a video saved on the machine (favorites)
   - : Play a video from USB media plugged into the USB port
   - : Play a video from USB media plugged into the USB port for mouse

   * To return to the previous screen, press [Return].

4. Select the video that you want to play.

   * To return to the previous screen, press [Return].

Note
- Long video file names may be shortened when they are displayed.

5. Play the video.

   * Use the operation keys as described in “Playing a Tutorial Video” on page 41.

Note
- Up to about 1 GB of MP4 videos can be saved on the machine. When the maximum capacity has been reached, delete unnecessary videos.

6. After you are finished playing the video, press [Return].
Using the Stitch Pattern Explanation Function

If you want to know more about the uses of a stitch pattern, select the stitch pattern and press [?] and then [Pattern Explanation] to see an explanation of the stitch selection. Descriptions are displayed for each stitch pattern in the Utility Stitch screen.

**Note**
- With the stitch pattern explanation function, descriptions can be displayed for the stitch patterns available on the Utility Stitch and Character/Decorative Stitch screens.

**Example:** Displaying information about

1. Press [ ].
2. Press [?] .

→ The screen shows information.


**Memo**
- The settings remain displayed to allow you to fine tune the stitch.
Viewing the Instruction and Reference Guide (PDF File) on the Machine

The Instruction and Reference Guide (PDF file) for this machine can be viewed on the machine.

1 Press 

2 Press 

3 Select the document to be viewed.

Memo
- The Instruction and Reference Guide can be viewed in the currently selected display language. For details on selecting the display language, refer to “Page 4” on page 29.

4 Read the Instruction and Reference Guide.

Operation keys

1. Press to select from 100%, 200% and 400%.

2. Search
   1. Press to display a keyboard.
   2. Enter the text to be searched for.
   3. To search from the current page to the beginning of the document, press . To search from the current page to the end of the document, press .

3. Return
   Press to return to the screen before the Instruction and Reference Guide (PDF file) was opened.

4. Press to display the first page.

5. Press to display the previous page.

6. Shows the current page/total number of pages. Press the current page number, and then enter a page number to display the desired page.

7. Press to display the next page.

8. Press to display the last page.

9. Press to close the screen and exit the machine help screen.

Memo
- To zoom in or out on a page, pinch two fingers together or spread them apart. You can also move a page after zooming in by dragging it.
This machine supports a wireless network connection. Using this function, an embroidery pattern or decorative stitch pattern edited in embroidery editing software (Palette 11) with wireless transfer functions can be transferred to the machine from a computer. In addition, embroidery patterns can be transferred from the machine to the embroidery editing software (Palette 11). The machine and computer must be connected to the same network. For detailed procedures, refer to the manual for the application.

### Specifying Wireless Network Connection Settings

The machine can be connected to your wireless network.

1. Press .

2. Set “Wireless LAN Enable” to “ON”.

→ The machine will begin to emit the wireless network signal.

### Requirements for a Wireless Network Connection

The wireless network connection complies with IEEE 802.11 n/g/b standards and uses the 2.4 GHz frequency.

**Memo**

- A wireless network cannot be set up with WPA/WPA2 Enterprise.
Using the Wizard to Set Up the Wireless Network Connection

There are multiple ways to set up the wireless network connection. We recommend the method that uses the wizard on this machine.

1. In order to connect your machine to a wireless network, the security information (SSID and network key) for your home network will be required. The network key may also be called a password, security key or encryption key. First, find your security information and note it.

<table>
<thead>
<tr>
<th>SSID</th>
<th>Network Key (Password)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Memo**
- The wireless network connection cannot be set up if you do not have the security information.
- How to find the security information
  1. Check the manual provided with your home network.
  2. The default SSID may be the manufacturer’s name or the model name.
  3. If you cannot find the security information, contact the manufacturer of the router, your network administrator or your Internet provider.

2. Press > beside “Wireless LAN Setup Wizard”.

3. Select > beside the SSID that was noted.

   ![Screen for entering the network key (password)](image)

   → The screen for entering the network key (password) appears.

**Memo**
- If the desired network SSID does not appear in the list, press Refresh.
- If the desired network SSID is not displayed, specify it as described below.
  1. Select New SSID in the list of SSIDs, and then press OK.
  2. Enter the desired network SSID, and then press OK.
  3. Select the authentication method and encryption mode.
- If the machine had already been connected to the home network, press Saved SSID, and then select the saved SSID.
4 Enter the network key (password) that was noted, and then press .

5 When the following message appears, press .

6 Press OK to exit the setup.

- The number beside “Machine Name” is the name that will be used when registering the machine with embroidery editing software (Palette 11) in order to transfer files.

Memo
- While connected, the signal strength is indicated by the icon in the upper-left corner of the display.
- Once a wireless network connection has been set up, a wireless network connection will be established each time the machine is turned on. However, “Wireless LAN Enable” in the network settings screen must remain set to “ON”.

■ Using the “Others” Menu

The “Others” menu contains the following items.

1 TCP/IP settings can be manually entered.
2 Shows the MAC address.
3 Use when proxy settings are required.
CONNECTING THE ACCESSORY TO THE MACHINE

Using USB Media/SD card (Sold Separately)

When sending or reading stitch patterns using the USB media, connect the device to the USB port. When using SD card, insert the SD card into the SD card slot.

Using a USB Mouse (Sold Separately)

The USB mouse, connected to the machine, can be used to perform a variety of operations in the screens. Connect a USB mouse to the USB port.

Memo
- USB media is widely used, however some USB media may not be usable with this machine. Please visit our website for more details.
- Depending on the type of USB media being used, either directly plug the USB device into the machine’s USB port or plug the USB media Reader/Writer into the machine’s USB port.
- Do not insert anything other than USB media into the USB media port. Otherwise, the machine may be damaged.
- Do not insert anything other than SD card into the SD card slot. Otherwise, the machine may be damaged.

Note
- A USB mouse can be connected or disconnected at any time.
- Only the left mouse button can be used to perform operations. No other buttons can be used.
- The mouse pointer does not appear in the camera view window, the screen saver or opening screen.
■ Clicking a Key
When the mouse is connected, the pointer appears on the screen. Move the mouse to position the pointer over the desired key, and then click the left mouse button.

Memo
- Double-clicking has no effect.

■ Changing Pages
If page numbers and a vertical scroll bar for additional pages are displayed, click the left mouse button with the pointer on ‹ › or ‹ › to display the previous or next page.
Winding the Bobbin

**CAUTION**
- The included bobbin was designed specifically for this machine. If bobbins from other models are used, the machine will not operate correctly. Use only the included bobbin or bobbins of the same type (part code: X52800-150). X52800-150 is Class 15 type bobbin.

**Using the Supplemental Spool Pin**
With this machine, you can wind the bobbin during sewing. While the main spool pin is being used for sewing, you can wind a bobbin by using the supplemental spool pin.

1. **Turn the main power to ON and open the top cover.**
2. **Align the groove in the bobbin with the spring on the bobbin winder shaft, and set the bobbin on the shaft.**
3. **Set the supplemental spool pin in the “up” position.**
4. **Place the spool of thread on the supplemental spool pin, so that thread unrolls from the front. Push the spool cap onto the spool pin as far as possible to secure the thread spool.**

**CAUTION**
- If the thread spool and/or spool cap are set incorrectly, the thread may tangle on the spool pin and cause the needle to break.
- Use the spool cap (large, medium, small or mini king) that is closest in size to the thread spool. If a spool cap smaller than the thread spool is used, the thread may become caught in the slit on the end of the spool and cause the needle to break.
With your right hand, hold the thread near the thread spool. With your left hand, hold the end of the thread, and use both hands to pass the thread through the thread guide.

Pass the thread around the pretension disk making sure that the thread is under the pretension disk.

Wind the thread clockwise around the bobbin 5-6 times.

Memo
- When sewing with fine, cross-wound thread, use the small spool cap, and leave a small space between the cap and the thread spool.
- If a spool of thread whose core is 12 mm (1/2 inch) in diameter and 75 mm (3 inches) high is inserted onto the spool pin, use the mini spool cap.
8 Pass the end of the thread through the guide slit in the bobbin winder seat, and pull the thread to the right to cut the thread with the cutter.

9 Set the bobbin winding switch to the left, until it clicks into place.

CAUTION
- Be sure to follow the process described. If the thread is not cut with the cutter, and the bobbin is wound, when the thread runs low it may tangle around the bobbin and cause the needle to break.

10 Press Start .

Bobbin winding starts. The bobbin stops rotating when bobbin winding is completed. The bobbin winding switch will automatically return to its original position.

Note
- When winding transparent nylon thread on the bobbin, stop bobbin winding when the bobbin is 1/2 to 2/3 full. If the bobbin was fully wound with transparent nylon thread, it may not be wound neatly.

Memo
- Sliding the bobbin winding switch to the left switches the machine into bobbin winding mode.
- Use the bobbin winding slider to adjust the amount of thread wound onto the bobbin to one of five levels.

Note
- Start changes to Stop while the bobbin is winding.
- Stay near the machine while winding the bobbin to make sure the bobbin thread is being wound correctly. If the bobbin thread is wound incorrectly, press Stop immediately to stop the bobbin winding.
- The sound of winding the bobbin with stiff thread, such as nylon thread for quilting, may be different from the one produced when winding normal thread; however, this is not a sign of a malfunction.
Cut the thread with cutter and remove the bobbin.

**Memo**
- When removing the bobbin, do not pull on the bobbin winder seat. Doing so could loosen or remove the bobbin winder seat, and could result in damage to the machine.

**CAUTION**
- Setting the bobbin improperly may cause the thread tension to loosen, breaking the needle and possibly resulting in injury.
4 Push the spool cap onto the spool pin as far as possible, then return the spool pin to its original position.

5 While holding the thread with both hands, pull the thread up from under the thread guide plate.

6 Pass the thread through the thread guide.

7 Pass the thread around the pretension disk making sure that the thread is under the pretension disk.

8 Follow steps 7 through 10 on page 53 through 55.

■ Using the Spool Stand

To wind thread on the bobbin while the spool stand is installed, pass the thread from the spool through the thread guide on the telescopic thread guide, and then wind the bobbin according to steps 5 through 10 of “Using the Supplemental Spool Pin” on page 53 to page 55.

Memo
- Refer to page 24 to assemble the spool stand.
- Refer to page 66 to thread the machine using the spool stand.

CAUTION
- When winding thread on the bobbin, do not cross the bobbin winding thread with the upper thread in the thread guides.

■ Untangling Thread from Beneath the Bobbin Winder Seat

If the bobbin winding starts when the thread is not passed through the pretension disk correctly, the thread may become tangled beneath the bobbin winder seat. Wind off the thread according to the following procedure.

CAUTION
- Do not remove the bobbin winder seat even if the thread becomes tangled under the bobbin winder seat. It may result in injuries.
1 If the thread becomes tangled under the bobbin winder seat, press Stop once to stop the bobbin winding.

2 Cut the thread with scissors near the pretension disk.

3 Push the bobbin winder switch to the right, and then raise the bobbin at least 100 mm (4 inches) from the shaft.

4 Cut the thread near the bobbin and hold the thread end of the spool with your left hand. Unwind the thread clockwise near the bobbin winder seat with your right hand as shown below.

5 Wind the bobbin again.

Note
- Make sure that the thread passes through the pretension disk correctly (page 53).
Setting the Bobbin

**CAUTION**
- Use a bobbin thread that has been correctly wound. Otherwise, the needle may break or the thread tension will be incorrect.
- The included bobbin was designed specifically for this machine. If bobbins from other models are used, the machine will not operate correctly. Use only the included bobbin or bobbins of the same type (part code: X52800-150). X52800-150 is Class 15 type bobbin.
- Before inserting or changing the bobbin, be sure to press in the LCD to lock all keys and buttons, otherwise injuries may occur if the “Start/Stop” button or any other button is pressed and the machine starts sewing.

1. Press to lock all keys and buttons and raise the presser foot.
   * If the message “OK to automatically lower the presser foot?” appears on the LCD screen, press to continue.

2. Slide the bobbin cover latch to the right.

   ① Bobbin cover
   ② Latch
   → The bobbin cover opens.

3. Remove the bobbin cover.

4. Hold the bobbin with your right hand and hold the end of the thread with your left hand.

5. Set the bobbin in the bobbin case so that the thread unwinds to the left.

6. Hold the bobbin lightly with your right hand, and then guide the thread with your left hand.

7. Pass the thread through the guide, and then pull the thread out toward the front.

   ① Cutter
   → The cutter cuts the thread.
Insert the tab in the lower-left corner of the bobbin cover (1), and then lightly press down on the right side to close the cover (2).

Press \( \text{Unlock} \) to unlock all keys and buttons.

---

Pulling Up the Bobbin Thread

There may be some sewing applications where you want to pull up the bobbin thread; for example, when making gathers, darts, or doing free motion quilting or embroidery.

1. Follow steps 1 to 4 in “Setting the Bobbin” on page 58 for installing the bobbin into the bobbin case.
2. Guide the bobbin thread through the groove, following the arrow in the illustration.
   * Do not cut the thread with the cutter.
   * Do not replace the bobbin cover.
3. While holding the upper thread, press the “Needle Position” button to lower the needle.
4. Press the “Needle Position” button to raise the needle.
5. Gently pull the upper thread. A loop of the bobbin thread will come out of the hole in the needle plate.

---

CAUTION

- Be sure to hold down the bobbin with your finger and unwind the bobbin thread correctly. Otherwise, the thread may break or the thread tension will be incorrect.

---

Note

- If the thread is not correctly inserted through the tension spring of the bobbin case, it may cause incorrect thread tension. (page 87)
Pull up the bobbin thread, pass it under the presser foot and pull it about 100 mm (approx. 3-4 inches) toward the back of the machine, making it even with the upper thread.

Replace the bobbin cover.
UPPER THREADING

Upper Threading

CAUTION

- Be sure to thread the machine properly. Improper threading can cause the thread to tangle and break the needle, leading to injury.
- When using the walking foot, the side cutter or accessories not included with this machine, attach the accessory to the machine after threading the machine.

Memo

- The automatic threading function can be used with home sewing machine needle sizes 75/11 through 100/16.
- When threads such as transparent nylon monofilament or speciality threads are used it is not recommended to use the needle threader.
- The automatic threading function cannot be used with the wing needle or the twin needle.

Press the “Needle Position” button to raise the needle.

Pivot the spool pin so that it angles upward. Set the thread spool on the spool pin so that the thread unwinds from the front of the spool.

1. Turn the main power to ON.
2. Press the “Presser Foot Lifter” button to raise the presser foot.

Memo

- This machine is equipped with an upper thread shutter, allowing you to check that the upper threading is performed correctly.

Note

- If you try to thread the needle automatically without raising the needle, the thread may not thread correctly.
5 Push the spool cap onto the spool pin as far as possible, then return the spool pin to its original position.

**CAUTION**
- If the thread spool and/or spool cap are set incorrectly, the thread may tangle on the spool pin and cause the needle to break.
- Use the spool cap (large or medium) or the thread spool insert (mini king spool insert) that is closest in size to the thread spool. If a spool cap smaller than the thread spool is used, the thread may become caught in the slit on the end of the spool and cause the needle to break.

**Memo**
- When sewing with fine, cross-wound thread, use the small spool cap, and leave a small space between the cap and the thread spool.

6 While holding the thread with both hands, pull the thread up from under the thread guide plate.

7 While holding the thread in your right hand, pass the thread through the thread guide in the direction indicated.

8 Guide the thread down, up, then down through the groove, as shown in the illustration.

**Memo**
- Look in the upper groove area to check if the thread catches on the thread take-up lever visible inside the upper groove area.
Pass the thread through the needle bar thread guide (marked “6”) by holding the thread with both hands and guiding it as shown in the illustration.

1. Needle bar thread guide

Press the “Presser Foot Lifter” button to lower presser foot.

1. 80 mm (approx. 3 inches) or more

Pass the thread through the thread guide disks (marked “7”). Make sure that the thread passes through the groove in the thread guide.

1. Groove in thread guide

Pull the thread up through the thread cutter to cut the thread, as shown in the illustration.

1. Thread cutter

Press the “Automatic Threading” button to have the machine automatically thread the needle.

→ The thread passes through the eye of the needle.

Memo

- When the “Automatic Threading” button is pressed, the presser foot will be automatically lowered. After threading is finished, the presser foot moves back to the position before the “Automatic Threading” button was pressed.

Carefully pull the end of the thread that was passed through the eye of the needle.

* If a loop was formed in the thread passed through the eye of the needle, carefully pull on the loop of thread through to the back of the needle.

Note

- Pulling the loop of thread gently will avoid needle breakage.
Pull out about 100-150 mm (approx. 4-6 inches) of the thread, and then pass it under the presser foot toward the rear of the machine.

→ Raise the presser foot lever if the presser foot is lowered.

Using the Twin Needle Mode

The twin needle can only be used for stitch patterns that show \( \text{II} \) after being selected. Before you select a stitch pattern, make sure the stitch can be sewn in the twin needle mode (refer to the “STITCH SETTING CHART” on page 206).

1. Press \( \text{U} \) to lock all keys and buttons and then install the twin needle (“CHANGING THE NEEDLE” on page 69).

* If the message “OK to automatically lower the presser foot?” appears on the LCD screen, press \( \text{OK} \) to continue.
2 Thread the machine for the first needle according to the procedure for threading a single needle (“Upper Threading” on page 61).

3 Pass the thread through the needle bar thread guides on the needle bar, then thread the needle on the left side manually.

4 Pull up the supplemental spool pin and set it in the up position.

5 Place the additional spool of thread on the supplemental spool pin, so that the thread unwinds from the front. Push the spool cap onto the spool pin as far as possible to secure the thread spool.

6 Hold the thread from the spool with both hands, and place the thread in the thread guide.

* Do not place the thread in the pretension disks.

7 While holding the thread from the spool, pull the thread through the lower notch in the thread guide plate, then through the upper notch. Hold the end of the thread with your left hand, and then guide the thread through the groove, following the arrows in the illustration.

Note
- The “Automatic Threading” button cannot be used. Manually thread the twin needle from front to back. Using the “Automatic Threading” button may result in damage to the machine.
Continue threading however do not pass the thread in the needle bar thread guide “6” on the needle bar. Thread the needle on the right side.

Press [UP] to unlock all keys and buttons.

Select a stitch pattern. (Example: )
* Refer to “Sewing a Stitch” on page 77 for selecting the stitch.
* Refer to the “STITCH SETTING CHART” on page 206 for the proper stitch to use with presser foot “J”.
→ The selected stitch is displayed.

Press [ ], and then press [ ] to select the twin needle mode.

→ Twin needle mode is set.

Start sewing.
Sample of Twin Needle Sewing

Memo
• To change direction when sewing with the twin needle, raise the needle from the fabric, raise the presser foot lever, and then turn the fabric.

Using the Spool Stand

The included spool stand is useful when using thread on spools with a large diameter (cross-wound thread). This spool stand can hold two spools of thread.

Memo
• Refer to page 24 to assemble the spool stand.
• Refer to page 56 to wind the bobbin when using the spool stand.

Using the Spool Stand

• Be sure to use a spool cap that is slightly larger than the spool.
  If the spool cap that is used is smaller or much larger than the spool, the thread may catch and sewing performance may suffer.

Note
• If the [ ] key is light gray after selecting the stitch, the selected stitch cannot be sewn in the twin needle mode.

CAUTION
• Be sure to set the twin needle mode when using the twin needle. Using the twin needle while the machine is in single needle mode could cause the needle to break, resulting in damage.
• When using thread on a thin spool, place the included spool felt on the spool pin, place the thread spool on the spool pin so that the center of the spool is aligned with the hole at the center of the spool felt, and then insert the spool cap onto the spool pin.

1. Spool felt

• When using thread on a cone spool, use the spool holder. When using cone shaped thread spool with other than cotton thread, it is not necessary to use spool caps.

2. Spool holder

• Depending on the size of spool or the amount of thread remaining, choose the appropriate sized spool cap (large or medium). Spool cap (small) cannot be used with the spool cap base.

1. Spool cap
2. Spool cap base

1. Attach the spool stand to the machine.

2. Place the spool of thread on the spool pin so that the thread feeds off the spool clockwise. Firmly insert the spool cap onto the spool pin.

**Note**

- When using 2 spools of thread, make sure that both spools are feeding in the same direction.
- Make sure that the spools do not touch each other, otherwise the thread will not feed off smoothly, the needle may break, or the thread may break or become tangled. In addition, make sure that the spools do not touch the telescopic thread guide at the center.
- Make sure that the thread is not caught under the spool.
3 Pull the thread off the spool. Pass the thread from the back to the front through the thread guides at the top.

When using thread that quickly feeds off the spool, such as metallic thread, use the enclosed ring to prevent the thread from becoming entangled.

Threading sequence: Pull the thread from the spool, place the thread through the ring from the bottom up (1), into the thread guide (2) and through the ring from the top down (3). When using the ring, do not use the spool cap base.

4 Pass the thread through the machine’s thread guide from the right to the left.

5 Thread the machine according to the steps 9 to 15 of “Upper Threading” on page 61.

Using Threads that Unwind Quickly

- Using the Spool Net

If using transparent nylon monofilament thread, metallic thread, or other strong thread, place the included spool net over the spool before using it. When using specialty threads, threading must be done manually.

If the spool net is too long, fold it once to match it to the spool size before placing it over the spool.

Note
- Guide the thread so that it does not become entangled with the other thread.
- After feeding the thread as instructed, wind any excess thread back onto the spool, otherwise the excess thread will become tangled.

Memo
- When threading the spool with the spool net on, make sure that 50-60 mm (approx. 2 - 2-1/2 inches) of thread are pulled out.
- It may be necessary to adjust the thread tension when using the spool net.
CHANGING THE NEEDLE

**CAUTION**

- Always press \( \text{UP} \) on the screen to lock all keys and buttons before changing the needle. If \( \text{UP} \) is not pressed and the “Start/Stop” button or another operation button is pressed accidentally, the machine will start and injury may result.
- Use only home sewing machine needles made for home use. Other needles may bend or break and may cause injury.
- Never sew with a bent needle. A bent needle will easily break and may cause injury.

**Memo**

- To check the needle correctly, place the flat side of the needle on a flat surface. Check the needle from the top and the sides. Throw away any bent needles.

1. **Press the “Needle Position” button to raise the needle.**

2. **Press \( \text{UP} \) to lock all keys and buttons.**
   * If the message “OK to automatically lower the presser foot?” appears on the LCD screen, press \( \text{OK} \) to continue.

3. **Use the screwdriver to turn the needle clamp screw toward the front of the machine and loosen the screw. Remove the needle.**

**Note**

- Before replacing the needle, cover the hole in the needle plate with fabric or paper to prevent the needle from falling into the machine.

---

1. Parallel space
2. Level surface (bobbin cover, glass, etc.)

---

Note

- Do not apply pressure to the needle clamp screw. Doing so may damage the needle or machine.
4. With the flat side of the needle facing the back, insert the new needle all the way to the top of the needle stopper (viewing window) in the needle clamp. Use a screwdriver to securely tighten the needle clamp screw.

![Diagram showing needle and needle clamp parts]

- Needle stopper
- Hole for setting the needle
- Flat side of needle

**CAUTION**
- Be sure to push in the needle until it touches the stopper, and securely tighten the needle clamp screw with a screwdriver. If the needle is not completely inserted or the needle clamp screw is loose, the needle may break or the machine may be damaged.

5. Press $\text{UP}$ to unlock all keys and buttons.

**Memo**
- The automatic threading function can be used with home sewing machine needle sizes 75/11 through 100/16.
- When threads such as transparent nylon monofilament or specialty threads are used it is not recommended to use the needle threader.
Fabric/Thread/Needle Combinations

- Needles that can be used with this machine: Home sewing machine needles (size 65/9 - 100/16)
  * The larger the number, the larger the needle. As the numbers decrease, the needles get finer.
- Thread that can be used with this machine: 30 - 90 weight
  * Never use thread of 20 weight or lower. It may cause machine to malfunction.
  * The smaller the number, the heavier the thread. As the numbers increase, the thread gets finer.
- The machine needle and thread that should be used depends on the type and thickness of the fabric. Refer to the following table when choosing the thread and needle appropriate for the fabric that you wish to sew.
  - The combinations shown in the table provide a general guideline. Be sure to sew trial stitches on the actual number of layers and type of fabric to be used in your project.
  - The machine needles are consumables. For safety and best results, we recommend replacing the needle regularly. For details on when to replace the needle, refer to “CHANGING THE NEEDLE” on page 69.
- In principle, use a fine needle and thread with lightweight fabrics, and a larger needle and heavier thread with heavyweight fabrics.
- Select a stitch appropriate for the fabric, and then adjust the stitch length. When sewing lightweight fabrics, make the stitch length finer (shorter). When sewing heavyweight fabrics, make the stitch length coarser (longer). (page 86)
  When sewing stretch fabrics, refer to “Sewing Stretch Fabrics” on page 84.

<table>
<thead>
<tr>
<th>Fabric Type/Application</th>
<th>Thread Type</th>
<th>Size of needle</th>
<th>Stitch length mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightweight fabrics</td>
<td>Polyester thread</td>
<td>60 - 90</td>
<td>65/9 - 75/11</td>
</tr>
<tr>
<td></td>
<td>Cotton thread</td>
<td>50 - 80</td>
<td>1.8-2.5 (1/16-3/32)</td>
</tr>
<tr>
<td>Medium weight fabrics</td>
<td>Polyester thread</td>
<td>60 - 90</td>
<td>75/11 - 90/14</td>
</tr>
<tr>
<td></td>
<td>Cotton thread</td>
<td>50 - 60</td>
<td>2.0-3.0 (1/16-1/8)</td>
</tr>
<tr>
<td>Heavyweight fabrics</td>
<td>Polyester thread</td>
<td>30</td>
<td>100/16</td>
</tr>
<tr>
<td></td>
<td>Cotton thread</td>
<td>90/14 - 100/16</td>
<td>2.5-4.0 (3/32-3/16)</td>
</tr>
<tr>
<td>Stretch fabrics (knit fabrics, etc.)</td>
<td>Polyester thread, Cotton thread</td>
<td>50</td>
<td>Ball point needle 75/11 - 90/14</td>
</tr>
<tr>
<td></td>
<td>Cotton thread</td>
<td>30 - 60</td>
<td>90/14 - 100/16</td>
</tr>
<tr>
<td>For top-stitching</td>
<td>Polyester thread, Cotton thread</td>
<td>30</td>
<td>90/14 - 100/16</td>
</tr>
</tbody>
</table>

- Transparent nylon thread
  Use a home sewing machine topstitching needle, regardless of the fabric or thread.

- Embroidery needles
  Use a 75/11 home sewing machine needle for embroidery.

⚠️ CAUTION

- The appropriate fabric, thread and needle combinations are shown in the preceding table. If the combination of the fabric, thread and needle is not correct, particularly when sewing heavy fabrics (such as denim) with thin needles (such as 65/9 to 75/11), the needle may bend or break. In addition, the stitching may be uneven or puckered or there may be skipped stitches.


**CHANGING THE PRESSER FOOT**

### Removing the Presser Foot

1. Press the “Needle Position” button to raise the needle.

2. Press  to lock all keys and buttons.
   * If the message “OK to automatically lower the presser foot?” appears on the LCD screen, press  to continue.

3. Raise the presser foot lever.

4. Press the black button on the presser foot holder and remove the presser foot.

### Attaching the Presser Foot

1. Place the new presser foot under the holder, aligning the foot pin with the notch in the holder. Lower the presser foot lever so that the presser foot pin snaps into the notch in the holder.

2. Press  to unlock all keys and buttons.

3. Raise the presser foot lever.

---

**CAUTION**

- Always press  on the screen to lock all keys and buttons before changing the presser foot. If  is not pressed and the “Start/Stop” button or another button is pressed, the machine will start and may cause injury.
- Always use the correct presser foot for the selected stitch pattern. If the wrong presser foot is used, the needle may strike the presser foot and bend or break, and may cause injury.
- Only use presser feet made for this machine. Using other presser feet may lead to accident or injury.

**CAUTION**

- Make sure that the presser foot is installed in the correct direction, otherwise the needle may strike the presser foot, breaking the needle and causing injuries.
Attaching the Presser Foot with the Included Adapter

You can attach the presser feet using the included adapter and small screw. For example, the walking foot, the free motion echo quilting foot “E”, the free motion quilting foot “C” and so on. Following procedure shows how to attach the walking foot as an example.

Attaching the Walking Foot

The walking foot holds the fabric between the presser foot and the feed dogs to feed the fabric. This enables you to have better fabric control when sewing difficult fabrics (such as quilted fabrics or velvet) or fabrics that slip easily (such as vinyl, leather, or synthetic leather).

Note

- Thread the needle manually when using the walking foot, or only attach the walking foot after threading the needle using the “Automatic Threading” button.
- When sewing with the walking foot, sew at medium to low speeds.

Memo

- The walking foot can only be used with straight or zigzag stitch patterns. Reverse stitches cannot be sewn with the walking foot. Only select straight or zigzag stitch patterns with reinforcement stitches. (page 79.)

Follow the steps in “Removing the Presser Foot” on page 72.

Loosen the screw of the presser foot holder to remove the presser foot holder.

Remove the screw of the presser foot completely from the presser foot shaft.

Set the adapter on the presser foot bar, aligning the flat side of the adapter opening with the flat side of the presser bar. Push it up as far as possible, and then tighten the screw securely with the screwdriver.

Turn a supplied small screw 2 or 3 times with your hand.

1 Follow the steps in “Removing the Presser Foot” on page 72.

2 Loosen the screw of the presser foot holder to remove the presser foot holder.

3 Remove the screw of the presser foot completely from the presser foot shaft.

4 Set the adapter on the presser foot bar, aligning the flat side of the adapter opening with the flat side of the presser bar. Push it up as far as possible, and then tighten the screw securely with the screwdriver.

5 Turn a supplied small screw 2 or 3 times with your hand.
6. Set the operation lever of the walking foot so that the needle clamp screw is set in the fork. Position the shank of the walking foot on the presser foot bar.

7. Lower the presser foot lever. Insert the screw, and tighten the screw securely with the screwdriver.

**CAUTION**
- Use the included screwdriver to tighten the screw securely. If the screw is loose, the needle may strike the presser foot and cause injury.
- Be sure to rotate the handwheel toward you (counterclockwise) to check that the needle does not strike the presser foot. If the needle strikes the presser foot, injury may result.

---

**Using the Dual Feed Foot**

Dual feed foot enables you to have best fabric control when sewing difficult fabrics that slip easily, such as quilted fabrics or fabrics that tend to stick to the bottom of a presser foot, such as vinyl, leather or synthetic leather.

**Note**
- When sewing with the dual feed foot, sew at medium to low speeds.

**Memo**
- When selecting stitches to be used with the dual feed foot, only the stitches that can be used will be activated on the display.
- When sewing fabric that easily sticks together, a more attractive finish can be achieved by basting the beginning of sewing.

---

**Attaching the Dual Feed Foot**

1. Follow the steps in “Removing the Presser Foot” on page 72.

2. Loosen the screw of the presser foot holder to remove the presser foot holder.

3. Position the dual feed foot to the presser foot bar by aligning the notch of the dual feed foot to the large screw.
4 Hold the dual feed foot in place with your right hand, then using the included screwdriver securely tighten the large screw.

5 Plug the connector of the dual feed foot into the jack on the back of your machine.

6 Press \[ \text{ Unlock Button} \] to unlock all keys and buttons.

   → All keys and operation buttons are unlocked, and the previous screen is displayed.

\[ \text{ CAUTION } \]

- Use the included screwdriver to firmly tighten the screw. If the screw is loose, the needle may strike the presser foot and possibly cause injury.

\[ \text{ Attaching/Detaching toe} \]

Attach the toe by aligning the pins with the notches and snap it into place.

\[ \text{ Pins} \]

\[ \text{ Notches} \]

If you push down on the front and back part of the dual feed foot, the toe of the dual feed foot will snap off.
Using the Dual Feed Position Lever

When the feed position lever is up, the black roller belt on the dual feed is not engaged.

When the feed position lever is down, the black roller belt on the dual feed is engaged.

Note
• Do not operate the lever while sewing.

Adjusting the Amount of Fabric Feeding of the Dual Feed Foot

The dual feed mechanism pulls the top fabric according to the set stitch length. With troublesome fabrics, fine tune the set length, by changing the dual feed feed adjustment in the settings screen.

Note
• As a default, some keys mentioned in the following procedures appear in light gray and are not available. To enable the keys for specifying the settings, attach the dual feed foot to the machine. The keys are enabled after the dual feed foot is detected.

1 Press .
→ The settings screen appears.

2 Press .
→ The Sewing settings screen appears.

3 Display page 2 of the Sewing settings screen.

4 Touch the number to select the feeding of the top fabric.
* Select “00” for sewing in most cases.
* If the feed amount for the top fabric is too little, causing the fabric to be longer than the bottom fabric, touch a higher number to increase the feed amount for the top fabric.
* If the feed amount for the top fabric is too much, causing the fabric to be shorter than the bottom fabric, touch a lower number to decrease the feed amount for the top fabric.

5 Press OK to return to the original screen.
Sewing a Stitch

1. Turn the main power to ON and press to display the utility stitches, and push the “Needle Position” button to raise the needle.

2. Select the category, and then press the key of the stitch you want to sew.

3. Install the presser foot ("CHANGING THE PRESSER FOOT" on page 72).

4. Set the fabric under the presser foot. Hold the fabric and thread in your left hand, and push the “Needle Position” button to set the needle in the sewing start position.

CAUTION
- To avoid injury, pay special attention to the needle while the machine is in operation. Keep your hands away from moving parts while the machine is in operation.
- Do not stretch or pull the fabric during sewing. Doing so may lead to injury.
- Do not use bent or broken needles. Doing so may lead to injury.
- Do not attempt to sew over basting pins or other objects during sewing. Otherwise, the needle may break and cause injury.
- If stitches become bunched, lengthen the stitch length setting before continuing sewing. Otherwise, the needle may break and cause injury.

CAUTION
- Always use the correct presser foot. If the wrong presser foot is used, the needle may strike the presser foot and bend or break, possibly resulting in injury. Refer to “STITCH SETTING CHART” on page 206 for presser foot recommendations.

Memo
- The black button on the left side of presser foot “J” should be pressed only if the fabric does not feed or when sewing thick seams (page 83). Normally, you can sew without pressing the black button.

5. Lower the presser foot.

* You do not have to pull up the bobbin thread.
6 Adjust the sewing speed with the speed control slide.
   * You can use this slide to adjust sewing speed during sewing.

   ① Slow
   ② Fast

7 Press the “Start/Stop” button to start sewing.
   * Guide the fabric lightly by hand.

8 Press the “Start/Stop” button again to stop sewing.

9 Press the “Thread Cutter” button to trim the upper and lower threads.
   → The needle will return to the up position automatically.

CAUTION
- Do not press the “Thread Cutter” button after the threads have been cut. Doing so could tangle the thread or break the needle and damage the machine.
- Do not press the “Thread Cutter” button when there is no fabric set in the machine or during machine operation. The thread may tangle, possibly resulting in damage.

Note
- When cutting thread thicker than #30, nylon monofilament thread, or other decorative threads, use the thread cutter on the side of the machine.

10 When the needle has stopped moving, raise the presser foot and remove the fabric.

Using the Foot Controller
You can also use the foot controller to start and stop sewing.

CAUTION
- Do not allow fabric pieces and dust to collect in the foot controller. Doing so could cause a fire or an electric shock.

Memo
- When the foot controller is being used, you cannot start sewing by pressing the “Start/Stop” button.
- The foot controller cannot be used when embroidering.
- The foot controller can be used for sewing utility and decorative stitches when the embroidery unit is attached.
1 Insert the foot controller plug into its jack on the machine.

Slowly depress the foot controller to start sewing.

Pressing down on the foot controller increases the sewing speed; releasing the pressure on the foot controller decreases the sewing speed.

Release the foot controller to stop the machine.

Sewing Reinforcement Stitches

Reverse/reinforcement stitches are generally necessary at the beginning and end of sewing. You can use the “Reverse Stitch” button to sew reverse/reinforcement stitches. When you keep pressing “Reinforcement Stitch” button, the machine will sew reinforcement stitch at that point 3 to 5 stitches, and then stop. (page 15)

If the automatic reinforcement stitch is selected on the screen, reverse stitches (or reinforcement stitches) will be sewn automatically at the beginning of sewing when the “Start/Stop” button is pressed. Press “Reverse Stitch” button or “Reinforcement Stitch” button to sew reverse stitches (or reinforcement stitches) automatically at the end of sewing (Refer to the next procedure “Automatic Reinforcement Stitching”).

The operation performed when the button is pressed differs depending on the selected stitch pattern. (Refer to “STITCH SETTING CHART” on page 206.)

Memo
- The speed that is set using the sewing speed controller is the foot controller’s maximum sewing speed.
- When you press the “Reinforcement Stitch” button while sewing character/decorative stitch pattern, you can end sewing with a full stitch instead of at a mid-point.
- The green light on the right of the “Reinforcement Stitch” button lights up while the machine is sewing a full motif, and it automatically turns off when the sewing is stopped.

Automatic Reinforcement Stitching

After selecting a stitch motif, turn on the automatic reinforcement stitching function before sewing, and the machine will automatically sew reinforcement stitches (or reverse stitches, depending on the stitch motif) at the beginning and end of sewing.

Memo
- "Reverse Stitch" button
- "Reinforcement Stitch" button
1. Select a stitch pattern.

2. Press  to set the automatic reinforcement stitching function.

→ The key will display as .

Memo
- Some stitches, such as buttonholes and bartacks, require reinforcement stitches at the beginning of sewing. If you select one of these stitches, the machine will automatically turn on this function (the key appears as  when the stitch is selected).

3. Set the fabric in the start position and begin sewing.

① Reverse stitches (or reinforcement stitches)
→ The machine will automatically sew reverse stitches (or reinforcement stitches) and then continue sewing.

If you press the Start/Stop button to pause sewing, press it again to continue. The machine will not sew reverse/reinforcement stitches again.

4. Press “Reverse Stitch” button or “Reinforcement Stitch” button.

① Reverse stitches (or reinforcement stitches)
→ The machine will sew reverse stitches (or reinforcement stitches) and stop.

Memo
- To turn off the automatic reinforcement stitching function, press  again, so it appears as  .

The operation performed when the button is pressed differs depending on the selected stitch pattern. Refer to the following table for details on the operation that is performed when the button is pressed.

<table>
<thead>
<tr>
<th>“Reverse Stitch” button</th>
<th>“Reinforcement Stitch” button</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Stitch +</td>
<td>Machine starts sewing the stitches and sews 3 – 5 reinforcement stitches while holding the “Reinforcement Stitch” button.</td>
</tr>
<tr>
<td>1.01 1.02 1.03</td>
<td>Machine starts sewing the stitches and sews 3 – 5 reinforcement stitches while holding the “Reinforcement Stitch” button.</td>
</tr>
<tr>
<td>1.04 1.05 1.06</td>
<td>Machine starts sewing the stitches and sews 3 – 5 reinforcement stitches while holding the “Reinforcement Stitch” button.</td>
</tr>
<tr>
<td>1.07 1.08 1.09</td>
<td>Machine starts sewing the stitches and sews 3 – 5 reinforcement stitches while holding the “Reinforcement Stitch” button.</td>
</tr>
</tbody>
</table>
Sewing Basics

If “Reinforcement Priority” of the settings screen is set to “ON” (page 29), reinforcement stitches are sewn instead of reverse stitches.

Automatic Presser Foot Lowering Function and Thread Cutting Function

By setting the machine to automatically raise and lower the presser foot, sewing operations can be performed more smoothly.

Changing Sewing Direction

Stop the machine. Leave the needle in the fabric, and press the “Presser Foot Lifter” button to raise the presser foot. Using the needle as a pivot, turn the fabric so that you can sew in the new direction. Press the “Presser Foot Lifter” button to lower the presser foot and start sewing.

The pivot setting is useful when changing the sewing direction. When the machine is stopped at the corner of the fabric, the machine stops with the needle in the fabric and the presser foot is automatically raised so the fabric can easily be rotated (“Pivoting” on page 89).
Sewing a Seam Allowance of 0.5 cm or Less

Baste the corner before sewing, and then, after changing the sewing direction at the corner, pull the basting thread toward the back while sewing.

![Diagram](image)

5 mm (approx. 3/16 inch)

Sewing Heavyweight Fabrics

The machine can sew fabrics up to 6 mm (approx. 1/4 inch) thick. If the thickness of a seam causes sewing to occur at an angle, help guide the fabric by hand and sew on the downward slope.

![Diagram](image)

⚠️ CAUTION

- Do not forcefully push fabrics more than 6 mm (approx. 1/4 inch) thick through the machine. This may cause the needle to break and cause injury.
- Thicker fabrics require a larger needle. (page 71)
If the Fabric does not Fit under the Presser Foot

If the presser foot is in the up position, and you are sewing heavyweight or multiple layers of fabric which do not fit easily under the presser foot, use the presser foot lever to raise the presser foot to its highest position. The fabric will now fit under the presser foot.

Memo

- You cannot use the presser foot lever after the presser foot has been raised using the “Presser Foot Lifter” button.

If the Fabric does not Feed

If the fabric does not feed when starting to sew or when sewing thick seams, press the black button on the left side of presser foot “J”.

1 Raise the presser foot.

2 While keeping the black button on the left side of presser foot “J” pressed in, press the “Presser Foot Lifter” button to lower the presser foot.

3 Release the black button.

→ The presser foot remains level, enabling the fabric to be fed.

Memo

- Once the trouble spot has been passed, the foot will return to its normal position.
- When “Automatic Fabric Sensor System” (Automatic Presser Foot Pressure) in the machine settings screen is set to “ON”, the thickness of the fabric is automatically detected by the internal sensor so the fabric can be fed smoothly for best sewing results. (page 91.)

Sewing Hook-and-Loop Fastener Tape

⚠️ CAUTION

- Do not use adhesive backed hook-and-loop fastener tape designed for sewing. When glue adheres to the needle or the bobbin hook race, it may cause malfunction.
- If the hook-and-loop fastener tape is sewn with a fine needle (65/9-75/11), the needle may bend or break.

Note

- Before starting to sew, baste the fabric and hook-and-loop fastener tape together.
Make sure that the needle passes through the hook-and-loop fastener tape by rotating the handwheel and lower the needle into the hook-and-loop fastener tape before sewing. Sew the edge of the hook-and-loop fastener tape at a slow speed. If the needle does not pass through the hook-and-loop fastener tape, replace the needle size with the needle for thick fabrics (page 71).

Sewing Lightweight Fabrics

Place thin paper or tear away embroidery stabilizer under thin fabrics to make sewing easier. Gently tear off the paper or the stabilizer after sewing.

Sewing Stretch Fabrics

First, baste together the pieces of fabric, and then sew without stretching the fabric. In addition, a better result can be achieved by using thread for knits or a stretch stitch.

- For best results when sewing stretch fabrics, decrease the pressure of the presser foot ("Using the Machine Setting Mode Key" on page 28).
When you select a stitch, your machine automatically selects the appropriate stitch width, stitch length, and upper thread tension. However, if needed, you can change any of the individual settings.

**Note**
- Settings for some stitches cannot be changed (refer to “STITCH SETTING CHART” on page 206).
- If you turn off the machine or select another stitch without saving stitch setting changes (“Saving Your Stitch Settings” on page 107), the stitch settings will return to their default settings.

### Setting the Stitch Width

Follow the steps below when you want to change the zigzag stitch pattern width.

**Memo**
- For an alternate method of changing the stitch width using the speed controller, refer to page 125.

**Example:**
Press \( \uparrow \) to narrow the zigzag stitch pattern width.

Press \( \downarrow \) to widen the zigzag stitch pattern width.

\( \rightarrow \) The value in the display gets bigger.

**Memo**
- Press \( \text{Memory} \) to save the stitch settings.
- Press \( \text{Check} \) to check changes made to the stitch.
- Press \( \text{Reset} \) to return the stitch width to the original setting.

**Note**
- After adjusting the stitch width, slowly rotate the handwheel toward you (counterclockwise) and check that the needle does not touch the presser foot. If the needle hits the presser foot, the needle may bend or break.
**Setting the Stitch Length**

Follow the steps below when you want to change the stitch pattern length.

**Example:**
Press \( \uparrow \) to shorten the stitch length.

![Shorten Stitch Length]

→ The value in the display gets smaller.
Press \( \downarrow \) to lengthen the stitch length.

![Lengthen Stitch Length]

→ The value in the display gets bigger.

**Memo**
- Press \( \text{Memory} \) to save the stitch settings.
- Press \( \text{Check} \) to check changes made to the stitch.
- Press \( \text{Reset} \) to return the stitch length to the original setting.

**CAUTION**
- If the stitches get bunched together, lengthen the stitch length and continue sewing. Do not continue sewing without lengthening the stitch length. Otherwise, the needle may break and cause injury.

---

**Setting the “L/R Shift”**

Follow the steps below when you want to change the placement of the zigzag stitch pattern by moving it left and right.

**Example:**
Press \( \uparrow \) to shift the stitch pattern to the left.

![Shift Stitch Pattern Left]

→ The value in the display appears with a minus sign.
Press \( \downarrow \) to shift the stitch pattern to the right side of the left needle position.

![Shift Stitch Pattern Right]

→ The value in the display appears with a plus sign.

**Memo**
- Press \( \text{Memory} \) to save the stitch settings.
- Press \( \text{Check} \) to check changes made to the stitch.
- Press \( \text{Reset} \) to return to the original setting.

**Note**
- After adjusting the “L/R Shift”, slowly rotate the handwheel toward you (counterclockwise) and check that the needle does not touch the presser foot. If the needle hits the presser foot, the needle may bend or break.
Setting the Thread Tension

You may need to change the thread tension, depending on the fabric and thread being used. Follow the steps below to make any necessary changes.

■ Proper Thread Tension

The upper thread and the bobbin thread should cross near the center of the fabric. Only the upper thread should be visible from the right side of the fabric, and only the bobbin thread should be visible from the wrong side of the fabric.

■ Upper Thread is Too Tight

If the bobbin thread is visible from the right side of the fabric, the upper thread is too tight.

Note

- If the upper thread was incorrectly threaded, the upper thread may be too tight. In this case, refer to “Setting the Bobbin” on page 58 and rethread the bobbin thread.

Memo

- Press , to loosen the upper thread.

■ Upper Thread is Too Loose

If the upper thread is visible from the wrong side of the fabric, the upper thread is too loose.

Note

- If the upper thread was incorrectly threaded, the upper thread may be too loose. In this case, refer to “Upper Threading” on page 61 and rethread the upper thread.

Memo

- Press , to return the thread tension to the original setting.
**USEFUL FUNCTIONS**

### Automatic Thread Cutting

After selecting a stitch pattern, turn on the automatic thread cutting function before sewing, and the machine will automatically sew reinforcement stitches (or reverse stitches, depending on the stitch pattern) at the beginning and end of sewing, and trim the threads at the end of sewing. This function is useful when sewing buttonholes and bar tacks.

1. **Select a stitch pattern.**
2. **Press `>` to set the automatic thread cutting function.**

   ![Image](image1.png)

   → You get ![image2.png](image2.png), and the machine is set for automatic thread cutting function and automatic reverse/reinforcement stitching.

**Memo**

- To turn off the automatic thread cutting function, press `>` again, so it appears as ![image3.png](image3.png).
- This function is set automatically when doing embroidery.

3. **Set the fabric in the start position and start sewing.**

   ![Image](image4.png)

   ① Reverse stitches (or reinforcement stitches)
   → The machine will automatically sew reverse stitches (or reinforcement stitches) and then continue sewing.

**Memo**

- If you press the “Start/Stop” button to pause sewing, press the same button again to continue. The beginning reverse/reinforcement stitches will not be sewn again.

4. **Once you have reached the end of the stitching, press “Reverse Stitch” button or “Reinforcement Stitch” button once.**

   If stitching, such as buttonholes and bar tacking, that includes reinforcement stitching has been selected, this operation is unnecessary.

   ![Image](image5.png)

   ① The point where the “Start/Stop” button was pressed.
   ② The point where the “Reverse Stitch” button or the “Reinforcement Stitch” button was pressed.
   ③ The thread is cut here.

**Memo**

- The automatic thread cutting function will not be performed if the “Start/Stop” button is pressed while sewing. Press the “Reverse Stitch” button or the “Reinforcement Stitch” button at the end of the stitching.
Pivoting

If the pivot function is selected, the machine stops with the needle lowered (in the fabric) and the presser foot is automatically raised to an appropriate height when the “Start/Stop” button is pressed. When the “Start/Stop” button is pressed again, the presser foot is automatically lowered and sewing continues. This function is useful for stopping the machine to rotate the fabric.

⚠️ CAUTION

- When the pivot setting is selected, the machine starts when the “Start/Stop” button is pressed or the foot controller is pressed down even if the presser foot has been raised. Be sure to keep your hands and other items away from the needle, otherwise injuries may occur.

Memo

- When the pivot setting is selected, the height of the presser foot when sewing is stopped can be changed according to the type of fabric being sewn. Press "Pivoting Height" of the settings screen. Touch the number to select the height. To raise the presser foot further, increase the setting. (Normally, 3.2 mm is set.)

Note

- The pivot function can only be used with stitches where presser foot “J”, “N” or “X” (Couching foot) is indicated in the upper-left corner of the screen. If any other stitch is selected, appears as light gray and is not available.
- If the pivot function is selected, “Presser Foot Height” in the settings screen are not available and the setting cannot be changed.

1. Select a stitch.

2. Press to select the pivot setting.

→ The key appears as

Note

- To use the pivot function, the needle position should be set to . When the needle position is set to , the presser foot is raised automatically.

3. Place the fabric under the presser foot with the needle at the starting point of the stitching, and then press the “Start/Stop” button. The machine will begin sewing.
**USEFUL FUNCTIONS**

4 Press the “Start/Stop” button to stop the machine at the point where the sewing direction changes.

→ The machine stops with the needle in the fabric, and the presser foot is raised.

**Memo**
- If you press the “Start/Stop” button to pause sewing, press it again to continue, reverse stitches (or reinforcement stitches) will not be sewn.

5 Rotate the fabric, and then press the “Start/Stop” button.

→ The presser foot is automatically lowered, and sewing continues.

**Memo**
- If “Automatic Presser Foot Lift” in the machine settings screen is set to “ON”, the needle and the presser foot are raised when the machine is stopped.

**Using the Knee Lifter**

Using the knee lifter, you can raise and lower the presser foot with your knee, leaving both hands free to handle the fabric.

1 Change the operating position of the knee lifter handle before inserting into the machine. Slide up the knee lifter handle slightly and rotate it while releasing pressure so handle will click into position.

* The knee lifter can be adjusted to three different angles.

*Knee lifter handle*

→ Rotate knee lifter handle till it clicks into the selected position that is most comfortable for you.

- 1
- 2
- 3

**Memo**
- If you press the “Start/Stop” button to pause sewing, press it again to continue, reverse stitches (or reinforcement stitches) will not be sewn.

- If “Automatic Presser Foot Lift” in the machine settings screen is set to “ON”, the needle and the presser foot are raised when the machine is stopped.
**USEFUL FUNCTIONS**

**Sewing Basics**

2 Align the tabs on the knee lifter with the notches in the knee lifter slot on the front of the machine. Insert the knee lifter bar as far as possible.

![Diagram of knee lifter alignment](image)

**Automatic Fabric Sensor System (Automatic Presser Foot Pressure)**

The thickness of the fabric is automatically detected and the presser foot pressure is automatically adjusted with an internal sensor while sewing, to ensure that your fabric is fed smoothly. The fabric sensor system works continuously while sewing. This function is useful for sewing over thick seams (page 82), or quilting (page 123).

1 Press 📲. → The settings screen appears.

2 Set “Automatic Fabric Sensor System” to “ON”.

![Settings screen](image)

3 Press OK to return to the original screen.

**CAUTION**

- Only change position of the knee lifter handle when knee lifter is not on the machine, otherwise the knee lifter may damage the mounting slot on front of the machine.

**CAUTION**

- Be sure to keep your knee away from the knee lifter during sewing. If the knee lifter is pushed during machine operation, the needle may break or the thread tension may loosen.

**Note**

- If the knee lifter bar is not pushed into the mounting slot as far as possible, it may come out during use.

**Memo**

- When the presser foot is in the up position, move the knee lifter to the far right and then release to return the presser foot to the down position.

**Note**

- If the knee lifter bar is not pushed into the mounting slot as far as possible, it may come out during use.

**Memo**

- When the presser foot is in the up position, move the knee lifter to the far right and then release to return the presser foot to the down position.
Needle Position - Stitch Placement

When the “Needle Position - Stitch Placement” is “ON”, the needle will be partially lowered for precise stitch placement and then press the “Needle Position” button to lower the needle completely. Each press of the “Needle Position” button changes the needle to the next position. When the “Needle Position - Stitch Placement” is “OFF”, each press of the “Needle Position” button simply raises and then lowers the needle.

“Needle Position - Stitch Placement” is “ON”

* When the needle is nearly lowered by pressing the “Needle Position” button, the feed dogs are lowered. At this time, the fabric can be shifted to finely adjust the needle drop position.

“Needle Position - Stitch Placement” is “OFF”

1. Press .

2. Set “Needle Position - Stitch Placement” to “ON” or “OFF”.

3. Press OK to return to the original screen.

Checking the Needle Location in the Screen

You can check the stitch image with actual fabric image on the screen.

1. Select a stitch.

2. Press .

   → An image of the selected stitch and the actual fabric image are displayed.

3. Press on the fabric image or on the screen.

   → The camera view window appears.

   → Press again to turn off the camera view.
### Using the Camera View Window

1. **CAMERA IMAGE**
2. **GRID VIEW**
3. **NEEDLE DROP POSITION**
4. **OK**
5. **ZOOM**

→ The camera view window appears.

**CAMERA IMAGE**
Press this key to save a camera image to the USB media.
Insert the USB media to the machine to save a camera image (Refer to “Saving a Settings Screen Image to USB Media” on page 32). The files for camera images are saved as “.PNG”. A maximum of 100 camera images can be saved in one USB media.

**GRID VIEW**
Press this key to display a grid.

Press **OK** to close the screen.

### NEEDLE DROP POSITION

Press **needle drop position** to show the needle drop position in the screen as “+”.
Lower the presser foot before pressing **needle drop position**. Once the needle drop position appears on the screen, you can raise the presser foot and change the needle drop position by moving the fabric.

**ZOOM**
Press **to enlarge the image in the screen.**
Press **again to return the image to its original display size.**

**Note**
- The camera view window disappears when you start sewing.
- When sewing thick fabrics, the needle drop position indicated in the screen may differ from the actual position.
USING THE PROJECTOR

Convenient Sewing Features by Using the Projector

Operations that can use the projector
- Setting the guideline as a reference for your sewing position.
- Selecting a stitch pattern
- Editing the selected stitch pattern
- Displaying the needle drop point (when embroidering)
- Displaying the edited embroidery pattern (when embroidering)

⚠️ CAUTION
- Do not stare directly at the projector light. Otherwise, blindness may result.

About the Dual Purpose Stylus

The included dual purpose stylus has two points. Use the soft point to operate the LCD screen and the hard point to operate the projector.

Installing a Battery in the Dual Purpose Stylus

A battery for the dual purpose stylus is not included with your machine. Use a new AAA alkaline battery (LR03).

⚠️ WARNING
- Do not disassemble or modify the dual purpose stylus.
- Do not use metallic objects, such as tweezers or a metallic pen, when changing the battery.
- Do not throw the battery into fire or expose to heat.
- Remove battery immediately and stop using the machine if you notice abnormal odor, heat, discoloration, deformation or anything unusual while using or storing it.

⚠️ CAUTION
- Remove the battery if you do not intend to use the dual purpose stylus for an extended period of time.
- Do not set the positive and negative ends of the battery in the wrong direction.

1 Slide the lid with your finger to remove it.

2 Install a new AAA alkaline battery (LR03) in the dual purpose stylus with the negative end (-) pointing up.
3 Close the lid.

Operating the Projector with the Dual Purpose Stylus

Press the button to light the hard point of the dual purpose stylus. After the built-in camera detects the light, you can operate the projector with the dual purpose stylus.

IMPORTANT
• Do not put your hand, fabric or any object between the built-in camera and the light-emitting part of the dual purpose stylus, otherwise the built-in camera cannot detect the light from the dual purpose stylus.

CAUTION
• Do not insert any object into the light-emitting part of the dual purpose stylus, otherwise the stylus may be damaged.

Using the Dual Purpose Stylus Holder

Attach the dual purpose stylus holder to keep the dual purpose stylus with the machine. The right side of the holder can be used to hold the dual purpose stylus.

1 Firmly insert the dual purpose stylus holder into the hole.

2 With the flat part of the dual purpose stylus facing to the machine, insert it into the dual purpose stylus holder.
**PROJECTOR FUNCTIONS (UTILITY STITCHES AND CHARACTER/DECORATIVE STITCHES)**

**Projection Area of Projector**

When the machine is sewing utility stitches or character/decorative stitches, the projection area of the projector is as shown below.

- Needle drop point
- Projection area
- 7.6 cm (3 inches)
- 12.7 cm (5 inches)

**Note**

- A stitch pattern cannot be selected from the LCD while a stitch pattern is being projected by the projector. In order to select a stitch pattern from the LCD, press in the screen.

---

**Projecting the Stitch Pattern with the Projector**

Using the projector, the selected stitch pattern can be projected onto the fabric.

1. Select a stitch pattern.
2. Press .

→ The selected stitch pattern and the adjustment keys are projected onto the fabric.
Selecting a Stitch Pattern with the Dual Purpose Stylus

1. When the stitch pattern is projected onto the fabric, press \( \text{Pattern} \) with the dual purpose stylus.

   \( \text{Pattern} \)

   → A stitch pattern can be selected.

2. Press \( \text{< >} \) with the dual purpose stylus until the desired stitch pattern is displayed, and then press \( \text{Set} \).

   \( \text{< >} \text{Set} \)

   Editing a Stitch Pattern Selected with the Dual Purpose Stylus

The stitch width, stitch length and “L/R Shift” can be changed for the stitch pattern projected by the projector.

1. Use the dual purpose stylus to adjust the stitch width, stitch length and sewing position.

   \( \text{Pattern} \)

   ① Stitch width setting
   ② Stitch length setting
   ③ “L/R Shift” setting
   ④ Press to select a different stitch pattern.

   → The specified settings are applied to the projected stitch pattern.

Memo

- When the stitch selection screen appears again in the LCD, the settings change to those specified with the dual purpose stylus.
- With twin needle sewing, the stitch width is specified based on the left needle.
Projecting the Guidelines with the Projector

With the guideline function, sewing can easily be done by following the lines and marks projected onto the fabric.

1. Press .

   → The guideline settings screen appears.

2. Specify the guideline settings.

   **Main guideline**

   ① If the guidelines will not be used, select “OFF”.
   ② Select the guideline whose settings are to be specified.
   ③ Select the length of the main guideline.
   ④ Select the color of the main guideline.
   ⑤ Specify the position of the main guideline.
   ⑥ Press to finish specifying the guideline settings.

   **Sub guideline**

   ① Select the color of the sub guideline.
   ② Specify the position of the sub guideline.

   **Memo**

   - When or is selected, the position of the sub guideline is based on the position of the main guideline. When the position of the sub guideline is changed, change the position of the main guideline.

3. Press to finish specifying the guideline settings.

   **Sub guideline**

   ① Select the color of the sub guideline.
   ② Specify the grid size of the sub guideline.
Sub guideline

① Select the color of the sub guideline.
② Specify the angle of the sub guideline.
③ Specify the seam allowance of the sub guideline.
Chapter 3

Utility Stitches
**SELECTING UTILITY STITCHES**

### Utility Stitch LCD Screen

Press a key with your finger to select the stitch pattern, to select a machine function, or to select an operation indicated on the key.

![Utility Stitch LCD Screen Diagram]

<table>
<thead>
<tr>
<th>No.</th>
<th>Display</th>
<th>Key Name</th>
<th>Explanation</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100%</td>
<td>Stitch pattern display</td>
<td>Shows the approximate size of the stitch pattern selected.</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>size</td>
<td>See the size of the stitch pattern.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>100%</strong>: Nearly the same size as the sewn stitch pattern</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* The actual size of the sewn stitch pattern may differ depending on the</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>type of fabric and thread that is used.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Presser foot display</td>
<td>Shows the presser foot code. Attach the presser foot indicated in this</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>display before sewing.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1-01</td>
<td>Selected stitch display</td>
<td>Shows the name and code number of the selected stitch.</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>Straight</td>
<td>Left</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Stitch preview</td>
<td>Shows a preview of the selected stitch. When shown at 100%, the stitch</td>
<td>92,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>appears in the screen at nearly its actual size. Press to display the</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>stitch preview and the camera view together to check how the stitch will be</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sewn on the actual fabric.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Stitch selection screen</td>
<td>Press the key for the stitch pattern you want to sew. Use</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] [ ] [ ] [ ] [ ] [ ] to change to different stitch groups.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Scroll bar</td>
<td>Slide the scroll bar to move the pages of stitch selection screen.</td>
<td>104</td>
</tr>
</tbody>
</table>

* All key functions of the LCD are explained in the “Key Functions” table on the following page.
# Key Functions

**Note**

- Editing function keys are found after pressing \( \text{EDIT} \).

## Utility Stitches

<table>
<thead>
<tr>
<th>No.</th>
<th>Display</th>
<th>Key Name</th>
<th>Explanation</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image" alt="Image key" /></td>
<td>Image key</td>
<td>Press this key to display an enlarged image of the selected stitch pattern.</td>
<td>106</td>
</tr>
<tr>
<td>2</td>
<td><img src="image" alt="Projector key" /></td>
<td>Projector key</td>
<td>Press this key to use projector functions.</td>
<td>96</td>
</tr>
<tr>
<td>3</td>
<td><img src="image" alt="Guideline marker key" /></td>
<td>Guideline marker key</td>
<td>Press this key to display or set the guideline marker for the sewing line. The guideline marker makes quilt piecing or aligning stitching on the fabric edge easier.</td>
<td>98</td>
</tr>
<tr>
<td>4</td>
<td><img src="image" alt="Utility stitch key" /></td>
<td>Utility stitch key</td>
<td>Press this key to select a straight stitch, zigzag stitch, buttonhole, blind hem stitch, or other stitches commonly used in garment construction.</td>
<td>105</td>
</tr>
<tr>
<td>5</td>
<td><img src="image" alt="Character/Decorative stitch key" /></td>
<td>Character/Decorative stitch key</td>
<td>Press this key to select character or decorative stitch patterns.</td>
<td>158</td>
</tr>
<tr>
<td>6</td>
<td><img src="image" alt="Edit key" /></td>
<td>Edit key</td>
<td>Press this key to display editing function keys on the screen.</td>
<td>166</td>
</tr>
<tr>
<td>7</td>
<td><img src="image" alt="Free motion mode key" /></td>
<td>Free motion mode key</td>
<td>Press this key to enter free motion sewing mode. The presser foot is raised to an appropriate height and the feed dog is lowered for free motion quilting.</td>
<td>126</td>
</tr>
<tr>
<td>8</td>
<td><img src="image" alt="Back to beginning key" /></td>
<td>Back to beginning key</td>
<td>When sewing is stopped, press this key to return to the beginning of the stitch.</td>
<td>106</td>
</tr>
<tr>
<td>9</td>
<td><img src="image" alt="Single/Repeat sewing key" /></td>
<td>Single/Repeat sewing key</td>
<td>Press this key to choose single stitches or continuous stitches.</td>
<td>106</td>
</tr>
<tr>
<td>10</td>
<td><img src="image" alt="Mirror image key" /></td>
<td>Mirror image key</td>
<td>Press this key to create a mirror image of the selected stitch pattern. If the key display is light gray, a mirror image of the selected stitch pattern cannot be sewn.</td>
<td>105</td>
</tr>
<tr>
<td>11</td>
<td><img src="image" alt="Needle mode selection key (single/double)" /></td>
<td>Needle mode selection key (single/double)</td>
<td>Press this key to select twin needle sewing mode. The sewing mode changes between single needle mode and twin needle mode each time you press the key. If the key display is light gray, the selected stitch pattern cannot be sewn in the twin needle mode.</td>
<td>64</td>
</tr>
<tr>
<td>12</td>
<td><img src="image" alt="Slit length key" /></td>
<td>Slit length key</td>
<td>Press this key to manually set the buttonhole length when a buttonhole stitch is selected.</td>
<td>144</td>
</tr>
<tr>
<td>13</td>
<td><img src="image" alt="Retrieve key" /></td>
<td>Retrieve key</td>
<td>Press this key to retrieve a saved stitch pattern.</td>
<td>107</td>
</tr>
<tr>
<td>14</td>
<td><img src="image" alt="Manual memory key" /></td>
<td>Manual memory key</td>
<td>Change the stitch pattern settings (zigzag width and stitch length, thread tension, automatic thread cutting or automatic reinforcement stitching, etc.), then save them by pressing this key. Five sets of settings can be saved for a single stitch pattern.</td>
<td>107</td>
</tr>
<tr>
<td>15</td>
<td><img src="image" alt="Reset key" /></td>
<td>Reset key</td>
<td>Press this key to return the selected stitch pattern saved settings to the default settings.</td>
<td>85–87</td>
</tr>
</tbody>
</table>
### Stitch Selection Screens

There are seven categories of Utility Stitches.

<table>
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<tr>
<th>No.</th>
<th>Display</th>
<th>Key Name</th>
<th>Explanation</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Thread tension key</td>
<td>Shows the automatic thread tension setting of the currently selected stitch pattern. You can use ▲ and ▼ to change the thread tension settings.</td>
<td>87</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>“L/R Shift” key</td>
<td>Press ▲ to shift the stitch pattern to the right or press ▼ to shift the stitch pattern to the left. This feature is not available for all stitch patterns. Only those applicable will be shifted. The machine default setting is highlighted.</td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Stitch width and stitch length key</td>
<td>Shows the zigzag width and stitch length settings of the currently selected stitch pattern. You can use ▲ and ▼ to adjust the zigzag width and stitch length settings.</td>
<td>85, 86</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Automatic reinforcement stitch key</td>
<td>Press this key to use the automatic reinforcement stitching (reverse stitching) setting. If you select this setting before sewing, the machine will automatically sew reinforcement stitches at the beginning and end of sewing (depending on the stitch pattern, the machine may sew reverse stitches).</td>
<td>79</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Automatic thread cutting key</td>
<td>Press this key to set the automatic thread cutting function. Set the automatic thread cutting function before sewing to have the machine automatically sew reinforcement stitches at the beginning and end of sewing (depending on the stitch pattern, the machine may sew reverse stitches) and trim the threads after sewing.</td>
<td>88</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Needle position setting key</td>
<td>Press this key to select the needle stop position to be up or down. You can also check the needle mode setting (single or twin).</td>
<td>64, 89</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Pivot key / Auto Up key</td>
<td>Press this key to select the pivot function. When the pivot function is selected, stopping the machine lowers the needle and slightly raises the presser foot automatically. In addition, when sewing is restarted, the presser foot is automatically lowered.</td>
<td>89</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>Thread color change key</td>
<td>Press this key to change the thread color displayed on the screen.</td>
<td>106</td>
</tr>
</tbody>
</table>

## Straight/Overcasting

![Straight/Overcasting](image)

## Decorative Stitches

![Decorative Stitches](image)

## Heirloom Stitches

![Heirloom Stitches](image)

## Buttonholes/Bar tacks

![Buttonholes/Bar tacks](image)

## Multi-directional Sewing

![Multi-directional Sewing](image)

## Quilting Stitches

![Quilting Stitches](image)

## Other stitches

![Other stitches](image)
Selecting a Stitch

1 Turn the main power to ON and press to display the utility stitches.

→ Either “1-01 Straight stitch (Left)” or “1-03 Straight stitch (Middle)” is selected, depending on the setting selected in the settings screen.

2 Use to select the category you want.

Memo
• Swipe the key of a category or stitch pattern sideways to display hidden categories.

3 Press the key of the stitch you want to sew.

Memo
• For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

Using the Mirror Image Key

Depending on the type of utility stitch you select, you may be able to sew a horizontal mirror image of the stitch.

If is lit when you select a stitch, it will be possible to make a mirror image of the stitch.

Note
• If is light gray after you select a stitch, you cannot create a horizontal mirror image of the selected stitch due to the type of stitch or type of presser foot recommended (this is true of buttonholes, multi-directional sewing, and others).

Press to create a horizontal mirror image of the selected stitch.

The key will display as .
SELECTING UTILITY STITCHES

■ Returning to the Beginning of the Stitch

Even if you stopped stitching while sewing, you can return to the beginning of the stitch pattern. This function is useful after trial sewing or when the stitching is sewn incorrectly.

Press \( \text{I} \) before start sewing, to return to the beginning of the stitch.

1. Stop stitching
2. Re-start stitching

■ Sewing Continuous/Single Stitch Sewing

Press \( \text{III } \) to select continuous sewing or single stitch sewing.

■ Using the Image Key

You can display an image of the selected stitch. You can check and change the colors of the image of the screen.

1. Press \( \text{ } \) .
   \( \rightarrow \) An image of the selected stitch is displayed.

2. Press \( \) to change the thread color of the stitch on the screen.

   * Press \( \) to display an enlarged image of the stitch.

   \( \) Stitch screen

Memo

- The color changes every time you press \( \) .

3. Press \( \text{Close} \) to go back to the original screen.
Saving Your Stitch Settings

The settings for the zigzag stitch width, stitch length, thread tension, automatic thread cutting, automatic reinforcement stitching, etc., are preset in the machine for each stitch. However, if you have specific settings that you wish to reuse later for a stitch, you can change the settings so that they can be saved for that stitch. Five sets of settings can be saved for a single stitch.

■ Saving Settings

1. Select a stitch. (Example: )
2. Specify your preferred settings.
3. Press Memory.

Memo
- If you try to save settings when there are already 5 sets of settings saved for a stitch, the message “The pockets are full. Delete a pattern” will appear. Close the message and delete a setting referring to page 107.

■ Retrieving Saved Settings

1. Select a stitch.
2. Press Retrieve.
3. Press the numbered key of the settings to be retrieved.

* Press Cancel to return to the original screen without retrieving settings.

Memo
- When a stitch is selected, the last settings retrieved are displayed. The last settings retrieved are retained even if the machine was turned off or a different stitch was selected.

4. Press Retrieve.

→ The selected settings are retrieved, and the original screen automatically appears.

Memo
- To save new settings when there are already 5 sets of settings saved for a stitch, press Retrieve. Press the numbered key of the setting to be deleted. Press Delete, press OK and then Memory. The new setting will be saved in place of the recently deleted setting.

- You can delete all the saved settings by pressing All Delete.
SEWING THE STITCHES

Straight Stitches

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-01</td>
<td>Straight stitch (Left)</td>
<td></td>
</tr>
<tr>
<td>1-02</td>
<td>Straight stitch (Left)</td>
<td></td>
</tr>
<tr>
<td>1-03</td>
<td>Straight stitch (Middle)</td>
<td></td>
</tr>
<tr>
<td>1-04</td>
<td>Straight stitch (Middle)</td>
<td></td>
</tr>
<tr>
<td>1-05</td>
<td>Triple stretch stitch</td>
<td></td>
</tr>
<tr>
<td>1-06</td>
<td>Stem stitch</td>
<td></td>
</tr>
<tr>
<td>1-07</td>
<td>Decorative stitch</td>
<td></td>
</tr>
<tr>
<td>1-08</td>
<td>Basting stitch</td>
<td></td>
</tr>
</tbody>
</table>

① Reverse stitch
② Reinforcement stitch

Memo
- If the selected stitch has a double mark “ ” at the top of the key display, you can sew reverse stitches holding the “Reverse Stitch” button (page 79).
- If the selected stitch has a dot mark “ ” at the top of the key display, you can sew reinforcement stitches holding the “Reinforcement Stitch” button.

1. Select a stitch.

2. Attach presser foot “J”.

* Attach presser foot “N” when you select .

① Left needle position
② Middle needle position
3 Hold the thread tail and fabric with your left hand, and push the “Needle Position” button with your right hand to insert the needle into the fabric.

4 Lower the presser foot, and hold the “Reverse Stitch” button or the “Reinforcement Stitch” button to sew 3-4 stitches.
   → The machine sews reverse stitches or reinforcement stitches.

5 Press the “Start/Stop” button to sew forward.

6 When sewing is completed, hold the “Reverse Stitch” button or the “Reinforcement Stitch” button to sew 3-4 reverse stitches or reinforcement stitches at the end of the seam.

7 After sewing, press the “Thread Cutter” button to trim the threads.

Memo
   • When the automatic thread cutting and automatic reinforcement stitch keys on the screen are selected, reverse stitches or reinforcement stitches will be sewn automatically at the beginning of sewing when the “Start/Stop” button is pressed. Press the “Reverse Stitch” button or the “Reinforcement Stitch” button to sew reverse stitches or reinforcement stitches and trim the thread automatically at the end of sewing.

CAUTION
   • Be sure the needle does not strike a basting pin, or any other objects, during sewing. The thread could tangle or the needle could break, causing injury.
■ Changing the Needle Position (Left or Middle Needle Position Stitches Only)

When you select left or middle needle position stitches, you can use ▼ and ▲ in the L/R Shift display to change the position of the needle. Match the distance from the right edge of the presser foot to the needle with the stitch width, then align the edge of the presser foot with the edge of the fabric during sewing for an attractive finish.

Example: Left/Middle needle position stitches

![Diagram of sewing]

1. Stitch width

■ Aligning the Fabric with a Mark on the Needle Plate or Bobbin Cover (with Mark)

While sewing, align the edge of the fabric with the 16 mm (approx. 5/8 inch) mark on the needle plate or bobbin cover (with mark) depending on the needle position (left or middle (center) needle position stitches only).

For stitches with a left needle position (Stitch width: 0.0 mm)

![Diagram of sewing]

1. Seam
2. Presser foot
3. Centimeters
4. Inches
5. Needle plate
6. 16 mm (5/8 inch)

For stitches with a middle (center) needle position (Stitch width: 3.5 mm)

![Diagram of sewing]

1. Seam
2. Presser foot
3. Inches
4. Bobbin cover (with mark)
5. 16 mm (5/8 inch)
■ Using the Straight Stitch Needle Plate and the Straight Stitch Foot

The straight stitch needle plate and the straight stitch foot can only be used for straight stitches (middle needle position stitches). Use the straight stitch needle plate and the straight stitch foot when sewing thin fabrics or when sewing small pieces which tend to sink into the hole of the regular needle plate during sewing. The straight stitch foot is perfect to reduce puckering on lightweight fabrics. The small opening on the foot provides support for the fabric as the needle travels through the fabric.

1 Press the “Needle Position” button to raise the needle and turn the main power to OFF or press \ to lock all keys and buttons.

2 Remove the needle and the presser foot holder (refer to page 69, 73).

3 Remove the flat bed attachment or the embroidery unit if either are attached.

4 Slide the needle plate lever toward you.

\  Slide toward you.
→ The needle plate opens.

5 Slide out the regular needle plate with your right hand to remove it.

6 Insert the tabs on the straight stitch needle plate into the notches in the machine.

7 Press down on the right side of the straight stitch needle plate to secure it.

8 Select any of the straight stitches.

Note
- Selecting other stitches will cause an error message to be displayed.
- After installing straight stitch needle plate, you must turn the machine OFF, then back to ON to reset the straight stitch settings.

CAUTION
- Always use the straight stitch foot in combination with the straight stitch needle plate.
**Memo**
- When using the straight stitch needle plate, many straight stitches become middle needle position stitches. If a straight stitch is selected that is not applicable for use when the straight stitch needle plate is attached, an error message will be displayed to prevent the use of this stitch. You cannot change the needle position using the L/R Shift.

**CAUTION**
- Slowly rotate the handwheel toward you (counterclockwise) before sewing and make sure that the needle is not contacting the straight stitch foot and straight stitch needle plate.

9 Insert needle and attach the straight stitch foot.

10 Press  to unlock all keys and buttons, and then start sewing.
   * After sewing, make sure to remove the straight stitch needle plate and the straight stitch foot, and reinstall the regular needle plate and the presser foot “J”.

**Memo**
- To prevent puckering on fine fabrics, use a fine needle, size 75/11, and a short stitch length. For heavier fabrics, use a heavier needle, size 90/14, and longer stitches.

---

**Dart Seam**

1 Select  and attach presser foot “J”.

2 Sew a reverse stitch at the beginning of the dart and then sew from the wide end to the other end without stretching the fabric.

3 Cut the thread at the end leaving 50 mm (approx. 1-15/16 inches), and then tie both ends together.
   * Do not sew a reverse stitch at the end.

4 Insert the ends of the thread into the dart with a hand sewing needle.

5 Iron the dart to one side so that it is flat.
**Gathering**

Use on waists of skirts, sleeves of shirts, etc.

1. Select a straight stitch and attach presser foot “J”.

2. Set the stitch length to 4.0 mm (approx. 5/32 inch) and the thread tension to approximately 2.0 (weaker tension).

3. Pull the bobbin and upper threads out by 50 mm (approx. 1-15/16 inches) (page 59).

4. Sew two rows of straight stitches parallel to the seam line, then trim excess thread leaving 50 mm (approx. 1-15/16 inches).

5. Pull the bobbin threads to obtain the desired amount of gather, then tie the threads.

6. Smooth the gathers by ironing them.

7. Sew on the seam line and remove the basting stitch.

**Flat Fell Seam**

Use for reinforcing seams and finishing edges neatly.

1. Select and attach presser foot “J”.

2. Sew the finish line, then cut half of the seam allowance from the side on which the flat fell seam will lie.

* When the automatic thread cutting and automatic reinforcement stitching are preset, reverse stitches will be sewn automatically at the beginning of sewing. Press the “Reinforcement Stitch” button to sew a reinforcement stitch and trim the thread automatically at the end of sewing.
1. About 12 mm (approx. 1/2 inch)
2. Wrong side

3. Spread the fabric out along the finish line.

4. Lay both seam allowances on the side of the shorter seam (cut seam) and iron them.

5. Fold the longer seam allowance around the shorter one, and sew the edge of the fold.

---

Finished flat fell seam

---

Pintuck

1. Mark along the folds on the wrong side of the fabric.

2. Turn the fabric and iron the folded parts only.

3. Select and attach presser foot “I”.

---

Mark along the folds on the wrong side of the fabric.

---

Select and attach presser foot “I”.
4 Sew a straight stitch along the fold.

* When the automatic thread cutting and automatic reinforcement stitching are preset, reverse stitches will be sewn automatically at the beginning of sewing. Press the “Reinforcement Stitch” button to sew a reinforcement stitch and trim the thread automatically at the end of sewing.

5 Iron the folds in the same direction.
Zigzag Stitches

Zigzag stitches are useful for overcasting, appliqué, patchwork, and many other applications.

Select a stitch, and attach presser foot “J”. If the stitch which you select has a double mark “∥” at the top of the key display, you can sew reverse stitches by holding the “Reverse Stitch” button. (page 79) If the stitch which you select has a dot mark “․” at the top of the key display, you can sew reinforcement stitches by holding the “Reinforcement Stitch” button (page 79).

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-01</td>
<td>Zigzag stitch</td>
<td></td>
</tr>
<tr>
<td>1-02</td>
<td>Zigzag stitch</td>
<td></td>
</tr>
<tr>
<td>1-03</td>
<td>Zigzag stitch (Right)</td>
<td></td>
</tr>
<tr>
<td>1-04</td>
<td>Zigzag stitch (Left)</td>
<td></td>
</tr>
</tbody>
</table>

1 Select a stitch.

2 Attach presser foot “J”.

■ Overcasting (Using a Zigzag Stitch)

Sew the overcasting along the edge of the fabric while positioning the right-hand side needle drop point just outside the edge of the fabric.

■ Appliqué (Using a Zigzag Stitch)

Attach the appliqué material using a temporary spray adhesive or basting, and then sew it.

* Sew a zigzag stitch while positioning the right-hand side needle drop point just outside the edge of the fabric.

■ Patchwork (for Crazy Quilt)

Turn back the desired width of fabric and position it over the lower fabric, then sew so that the stitch bridges both pieces of fabric.

■ Sewing Curves (Using a Zigzag Stitch)

Shorten the stitch length setting to obtain a fine stitch. Sew slowly, keeping the seams parallel with the fabric edge as you guide the fabric around the curve.
Cord Guide Bobbin Cover (Using a Zigzag Stitch)

1. Remove the bobbin cover from the machine (page 58).

2. Thread the gimp thread through the hole in the cord guide bobbin cover from bottom to top. Position the thread in the notch at the back of the cord guide bobbin cover.

   ![Diagram](image)

   - Notch
   - Gimp thread

3. Snap the cord guide bobbin cover into place, making sure that the gimp thread can be fed freely.

   * Make sure there are no restrictions when feeding the thread.

4. Set the zigzag width from 2.0-2.5 mm (approx. 1/16 - 3/32 inch).

5. Attach presser foot “N”.

6. Position the fabric right side up on top of the cord and place the cord to the rear of the machine under the presser foot.

   ![Diagram](image)

   - Fabric (right side)
   - Gimp thread

7. Lower the presser foot and start sewing to make a decorative finish.

Elastic Zigzag Stitches

Use elastic zigzag stitches for tape attaching, overcasting, darning, or a wide variety of other uses.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 steps elastic zigzag</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 steps elastic zigzag</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 steps elastic zigzag</td>
<td></td>
</tr>
</tbody>
</table>

1. Select a stitch.

2. Attach presser foot “J”.

Tape Attaching

While stretching the tape flat, sew it to the fabric.

![Diagram](image)

- Tape
SeWing the sTitches

Overcasting

Use this stitch to sew overcasting on the edge of stretch fabrics. Sew the overcasting along the edge of the fabric while positioning the right-hand side needle drop point just outside the edge of the fabric.

Overcasting

Use for the edge of seams in skirts or trousers, and the edge of all cuttings. Use presser foot “G”, presser foot “J”, or the side cutter attachment depending on the kind of overcasting stitch you select.

Overcasting Using Presser Foot “G”

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>Overcasting stitch</td>
<td>G</td>
</tr>
<tr>
<td>□</td>
<td>Overcasting stitch</td>
<td>G</td>
</tr>
<tr>
<td>□</td>
<td>Overcasting stitch</td>
<td>G</td>
</tr>
</tbody>
</table>

1. Select a stitch and attach presser foot “G”.
2. Lower the presser foot so that the presser foot guide is set flush against the edge of the fabric.
3. Sew along the presser foot guide.

⚠️ CAUTION

• After the stitch width is adjusted, rotate the handwheel toward you (counterclockwise). Check that the needle does not touch the presser foot. If the needle hits the presser foot, the needle may break and cause injury.

5. Press the “Start/Stop” button to stop sewing when you are finished, and raise the presser foot and needle to remove the fabric by pulling it back.

⚠️ CAUTION

• Pull the fabric to the back of the machine after finished sewing. By pulling the fabric to the front or side, the center bar of the presser foot “G” may break.
Overcasting Using Presser Foot “J”

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overcasting stitch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overcasting stitch</td>
<td></td>
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<td></td>
<td>Overcasting stitch</td>
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<tr>
<td></td>
<td>Overcasting stitch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single diamond overcast</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single diamond overcast</td>
<td></td>
</tr>
</tbody>
</table>

1. Select a stitch and attach presser foot “J”.
2. Sew with the needle dropping slightly off the edge of the fabric.

Note
- Fine adjustment of the stitching on the fabric can be done with “L/R Shift”. Before sewing your project, be sure to sew trial stitches using the same conditions as in the actual project.

Memo
- For best results when sewing stretch fabrics, decrease the pressure of the presser foot.

Overcasting Using the Side Cutter (Sold Separately)

By using the side cutter, you can do overcasting while cutting the fabric.

⚠️ CAUTION
- Recommended stitches are noted “S” in the lower right corner, therefore sure to only select one of these stitches listed below. Using another stitch may cause the needle to hit the presser foot and break, possibly causing injury.

Note
- Thread the needle manually when using the side cutter, or only attach the side cutter after threading the needle using the “Automatic Threading” button.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With side cutter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With side cutter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With side cutter</td>
<td></td>
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<tr>
<td></td>
<td>With side cutter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With side cutter</td>
<td></td>
</tr>
</tbody>
</table>

1. Select a stitch.
2. Follow the steps on page 72 to remove the presser foot.
3. Thread the needle (page 61).
4. Position the fork on the side cutter’s operating lever onto the needle clamp screw.

5. Position the side cutter so that the side cutter pin is aligned with the notch in the presser foot holder, and then lower the presser foot.

6. Raise the presser foot and pull out a long section of the upper thread. Pass it below the presser foot and pull it out in the fabric feed direction.

7. Make a cut of approximately 20 mm (approx. 3/4 inch) in the fabric.

8. Position the fabric so that the right side of the cut is on top of the guide plate and the left side of the cut is underneath the presser foot.

9. Lower the presser foot and start.

Memo
- Make sure that the fork of the operating lever is set onto the needle screw firmly.
- If the fabric is not positioned correctly, the fabric will not be cut.

→ A seam allowance is cut while the stitching is sewn.
Sewing Straight Stitches While Using the Side Cutter (Sold Separately)

The seam margin should be approximately 5 mm (approx. 3/16 inch).

Memo
- One layer of 13 oz. denim can be cut.
- Clean the side cutter after use to avoid having dust and scraps of thread build up in the cutter area.
- Add a small amount of oil as required to the cutting edge of the cutter.

Quilting
You can make beautiful quilts quickly and easily with this machine. When making a quilt, you will find it convenient to use the knee lifter and foot controller to free your hands for other tasks (“Using the Foot Controller” on page 78 and /or “Using the Knee Lifter” on page 90).

The 30 quilting stitches Q-01 through Q-30 and the utility stitches with “P” or “Q” indicated on their key are useful for quilting.

The “P” or “Q” at the bottom of the key display indicates that these stitches are intended for (“Q”) quilting and (“P”) piecing.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Piecing stitch (Middle)</td>
<td></td>
</tr>
<tr>
<td>012</td>
<td>Piecing stitch (Right)</td>
<td></td>
</tr>
<tr>
<td>023</td>
<td>Piecing stitch (Left)</td>
<td></td>
</tr>
<tr>
<td>034</td>
<td>Hand-look quilting (Middle)</td>
<td></td>
</tr>
<tr>
<td>045</td>
<td>Basting stitch</td>
<td></td>
</tr>
<tr>
<td>Stitch</td>
<td>Stitch name</td>
<td>Presser foot</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>04</td>
<td>Stem stitch</td>
<td></td>
</tr>
<tr>
<td>027</td>
<td>Quilting appliqué zigzag stitch</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>Zigzag stitch (Right)</td>
<td></td>
</tr>
<tr>
<td>029</td>
<td>Zigzag stitch (Left)</td>
<td></td>
</tr>
<tr>
<td>019</td>
<td>2 steps elastic zigzag</td>
<td></td>
</tr>
<tr>
<td>011</td>
<td>3 steps elastic zigzag</td>
<td></td>
</tr>
<tr>
<td>018</td>
<td>Quilting appliqué stitch</td>
<td></td>
</tr>
<tr>
<td>013</td>
<td>Shell tuck edge</td>
<td></td>
</tr>
<tr>
<td>014</td>
<td>Blanket stitch</td>
<td></td>
</tr>
<tr>
<td>015</td>
<td>Quilting stippling</td>
<td></td>
</tr>
<tr>
<td>016</td>
<td>Overcasting stitch</td>
<td></td>
</tr>
<tr>
<td>017</td>
<td>Tape attaching</td>
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</tr>
<tr>
<td>018</td>
<td>Serpentine stitch</td>
<td></td>
</tr>
<tr>
<td>019</td>
<td>Feather stitch</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Fagoting cross stitch</td>
<td></td>
</tr>
<tr>
<td>021</td>
<td>Couching stitch</td>
<td></td>
</tr>
<tr>
<td>022</td>
<td>Patchwork double overlock stitch</td>
<td></td>
</tr>
<tr>
<td>023</td>
<td>Smocking stitch</td>
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</tr>
<tr>
<td>024</td>
<td>Rick-rack stitch</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>025</td>
<td>Decorative stitch</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>Decorative stitch</td>
<td></td>
</tr>
<tr>
<td>027</td>
<td>Hemstitching</td>
<td></td>
</tr>
<tr>
<td>029</td>
<td>Hemstitching</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Single diamond overcast</td>
<td></td>
</tr>
<tr>
<td>029</td>
<td>Overcasting stitch</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Piecing stitch (Right)</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Piecing stitch (Middle)</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Piecing stitch (Left)</td>
<td></td>
</tr>
<tr>
<td>024</td>
<td>Hand-look quilting</td>
<td></td>
</tr>
<tr>
<td>024</td>
<td>Quilting appliqué zigzag stitch</td>
<td></td>
</tr>
<tr>
<td>024</td>
<td>Quilting appliqué stitch</td>
<td></td>
</tr>
<tr>
<td>024</td>
<td>Quilting stippling</td>
<td></td>
</tr>
</tbody>
</table>

**Memo**

- When a stitch pattern in the quilting stitches category (only quilting stitches marked with “Q”) is selected, a finer stitch width can be set than that available with stitch patterns in other categories.
Piecing

Sewing two pieces of fabric together is called piecing. When cutting pieces for quilt blocks, make sure the seam allowance is 6.5 mm (approx. 1/4 inch).

1. Select \( \text{ or } \) and attach presser foot “J”.

2. Align the edge of the fabric with the edge of the presser foot, and start sewing.
   * To sew a 6.5 mm (approx. 1/4 inch) seam allowance along the right edge of the presser foot with selected, the width should be set to 5.50 mm (approx. 7/32 inch).
   * To sew a 6.5 mm (approx. 1/4 inch) seam allowance along the left edge of the presser foot with selected, the width should be set to 1.50 mm (approx. 1/32 inch).

Quilting

Sewing the quilt top, batting, and backing together is called quilting. You can sew the quilt with the dual feed foot to keep the quilt top, batting, and backing from sliding. The dual feed foot has a motorized belt that moves together with the feed dogs in the needle plate during sewing.

For straight line quilting, use the dual feed foot and the straight stitch needle plate. Always select a straight stitch (middle needle position) when using the straight stitch needle plate.

1. Select \( \), \( \), or \( \).

2. Attach the dual feed foot (page 74).

3. Place one hand on each side of the presser foot to hold the fabric secure while sewing.

Memo
- Using a straight stitch (middle needle position) makes it easier to sew smoothly (page 108).
- In the case Q-01(center, at L/R Shift 3.5 mm) is selected, if the guideline marker is set at 10.0 mm (3.5 mm plus 6.5 mm, close to 1/4 inch), you can sew piecing by referring to the guideline marker.
**Appliqué**

1. Trace the pattern onto the appliqué fabric and then cut around it, leaving a 3 to 5 mm (approx. 1/8 to 3/16 inch) seam allowance.

2. Place a piece of stabilizer cut to the finished size of the appliqué design onto the fabric, and then fold over the seam margin using an iron. Clip curves when necessary.

3. Turn the appliqué over, and attach the stabilizer with basting pins or a basting stitch.

4. Select and attach presser foot “J”.

5. Use the quilting appliqué stitch to attach the appliqué. Sew around the edge while dropping the needle as close to the edge as possible.

**CAUTION**

- Be careful that the needle does not strike a basting pin during sewing. Striking a pin can cause the needle to break, resulting in injury.

You can use the appliqué technique to attach appliqué designs like the three pictured below.

1. Dresden plate
2. Stained glass
3. Sunbonnet sue
Quilting with Satin Stitches

For better fabric control, use the foot controller to sew with satin stitches. Set the speed control slide to control the stitch width to make subtle changes in the stitch width during sewing.

1. Attach the foot controller (page 78).

2. Select and attach presser foot “J”.

3. Press in the length display to shorten the stitch length.

4. Press to use the speed control slide to control the stitch width.

5. Set the “Width Control” to “ON”.

6. Press .

   → The display will return to the original screen.

7. Start sewing.

   * You can adjust the stitch width during sewing by moving the sewing speed controller. Slide the lever to the left, and the stitch width becomes narrower. Slide it to the right, the stitch width becomes wider. The size of the width changes equally on both sides of the middle needle position.

8. When you are finished sewing, set the “Width Control” back to “OFF”.

Memo

- The setting will vary according to the kind of fabric and the thickness of the thread, but a length of 0.3 to 0.5 mm (approx. 1/64 to 1/32 inch) is best for satin stitches.
Free Motion Quilting

With free motion quilting, the feed dogs can be lowered by pressing , so that the fabric can be moved freely in any direction.

For free motion quilting, use free motion quilting foot “C” or free motion open toe quilting foot “O” depending on the stitch that is selected, and set the machine to free motion sewing mode. In this mode, the presser foot is raised to the necessary height for free motion sewing.

We recommend attaching the foot controller and sewing at a consistent speed. You can adjust the sewing speed with the speed control slide on the machine.

Using Free motion Quilting Foot “C”

Use the free motion quilting foot “C” with straight stitch needle plate for free motion sewing.

CAUTION

• With free motion quilting, control the feeding speed of the fabric to match the sewing speed. If the fabric is moved faster than the sewing speed, the needle may break or other damage may result.

• When using free motion quilting foot “C”, be sure to use the straight stitch needle plate and sew with the needle in middle (center) needle position. If the needle is moved to any position other than the middle (center) needle position, the needle may break, which may result in injuries.

Memo

• When starting to sew, the internal sensor detects the thickness of the fabric, and the quilting foot is raised to the height specified in the machine settings screen. Press to display “Free Motion Foot Height” of the settings screen. Touch the number to select the height that the quilting foot is raised above the fabric. Increase the setting, for example, when sewing very stretchy fabric, so that it is easier to sew.

• In order to sew with a balanced tension, it may be necessary to adjust the upper thread tension. Test with a sample piece of fabric that is similar to your chosen fabric.

1 Attach the straight stitch needle plate (page 111).

2 Select , or .

Memo

• Notice this needle plate has a round hole for the needle.
3 Press 📊 to set the machine to free motion sewing mode.

→ The key appears as 📊, the quilting foot is raised to the necessary height, and then the feed dogs are lowered for free motion sewing.

4 Remove the presser foot holder (page 73).

5 Attach free motion quilting foot “C” at the front with the presser foot holder screw aligned with the notch in the quilting foot.

→ Free motion quilting foot “C”

→ When stitch Q-01 or 1-31 is selected, free motion quilting foot “C” is indicated in the upper-left corner of the screen.

6 Hold the quilting foot in place with your right hand, and tighten the presser foot holder screw using the multi-purpose screwdriver with your left hand.

7 Use both hands to stretch the fabric taut, and then move the fabric at a consistent pace in order to sew uniform stitches roughly 2.0-2.5 mm (approx. 1/16 - 3/32 inch) in length.

Note

• Make sure that the quilting foot is attached properly and not slanted.

CAUTION

• Be sure to securely tighten the screws with the included multi-purpose screwdriver. Otherwise, the needle may touch the quilting foot, causing it to bend or break.

• Presser foot holder screw

• Notch

• Presser foot holder screw

• Stitch
SEWING THE STITCHES

1. Press \( \mathbb{C} \) to set the machine to free motion sewing mode.
   - The key appears as \( \mathbb{C} \), the quilting foot is raised to the necessary height, and then the feed dogs are lowered for free motion sewing.

2. Select a stitch.

3. Remove the presser foot holder (page 73).

4. Attach free motion open toe quilting foot “O” by positioning the pin of the quilting foot above the needle clamp screw and aligning the lower-left of the quilting foot and the presser bar.

5. Hold the quilting foot in place with your right hand, and tighten the presser foot holder screw using the multi-purpose screwdriver with your left hand.
   - Use the multi-purpose screwdriver setting the position to “1”. (page 23)

   \( \mathbb{C} \) Presser foot holder screw

Note
- Make sure that the quilting foot is not slanted.

Using free motion Open Toe Quilting Foot “O”

The free motion open toe quilting foot “O” is used for free motion quilting with zigzag or decorative stitches or for free motion quilting of straight lines on fabric with an uneven thickness. Various stitches can be sewn using free motion open toe quilting foot “O”. For details on the stitches that can be used, refer to “STITCH SETTING CHART” on page 206.

Memo
- Normally, the feed dogs are raised for regular sewing.
- Do not be discouraged with your initial results. The technique requires practice.

Memo
- In order to sew with a balanced tension, it may be necessary to adjust the upper thread tension (page 87). Test with a sample piece of quilting fabric.

Note
- Free motion open toe quilting foot “O” can also be used with the straight stitch needle plate. We recommend using free motion open toe quilting foot “O” with free motion sewing of fabrics of uneven thicknesses.
- When using the straight stitch needle plate, all straight stitches become middle needle position stitches. You cannot change the needle position using the L/R Shift.

Memo
- Make sure that the quilting foot is not slanted.

CAUTION
- Be sure to securely tighten the screws with the included multi-purpose screwdriver. Otherwise, the needle may touch the quilting foot, causing it to bend or break.
6 Use both hands to stretch the fabric taut, and then move the fabric at a consistent pace in order to sew uniform stitches roughly 2.0-2.5 mm (approx. 1/16 - 3/32 inch) in length.

Memo
- Do not be discouraged with your initial results. The technique requires practice.

7 Press to cancel the free motion sewing mode.

→ Rotate the handwheel toward you (counterclockwise) to raise the feed dogs.

Memo
- When starting to sew, the internal sensor detects the thickness of the fabric, and the quilting foot is raised to the height specified in the machine settings screen. Press to display “Free Motion Foot Height” of the settings screen (page 28). Touch the number to select the height that the quilting foot is raised above the fabric. Increase the setting, for example, when sewing very soft fabric, so that it is easier to sew.

Echo Quilting Using the Free Motion Echo Quilting Foot “E”

Sewing quilting lines at equal distances around a motif is called echo quilting. The quilting lines, which appear as ripples echoing away from the motif, are the distinguishing characteristic of this quilting style. Use the free motion echo quilting foot “E” for echo quilting. Using the measurement on the presser foot as a guide, sew around the motif at a fixed interval. We recommend attaching the foot controller and sewing at a consistent speed.

Free motion echo quilting foot “E” measurement

① 6.4 mm (approx. 1/4 inch)
② 9.5 mm (approx. 3/8 inch)

CAUTION
- With free motion quilting, control the feeding speed of the fabric to match the sewing speed. If the fabric is moved faster than the sewing speed, the needle may break or other damage may result.

Memo
- In order to sew with a balanced tension, it may be necessary to adjust the upper thread tension (page 87). Test with a sample piece of quilting fabric.
5 Position the free motion echo quilting foot “E” on the left side of the presser bar with the holes in the quilting foot and presser bar aligned.

6 Tighten the screw with the included screwdriver (large).

7 Using the measurement on the quilting foot as a guide, sew around the motif.

8 Press 🆘 to cancel the free motion sewing mode.

- Rotate the handwheel toward you (counterclockwise) to raise the feed dogs.

**CAUTION**
- Be sure to securely tighten the screws with the included screwdriver (large). Otherwise, the needle may touch the quilting foot, causing it to bend or break.
Blind Hem Stitches

Secure the bottoms of skirts and pants with a blind hem. Two stitches are available for blind hem stitching.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Blind hem stitch</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blind hem stitch stretch</td>
<td></td>
</tr>
</tbody>
</table>

Memo
- When the size of cylindrical pieces is too small to slide onto the arm or the length is too short, the fabric will not feed and desired results may not be achieved.

1. **Turn the skirt or pants wrong side out.**

   1. Wrong side of fabric
   2. Right side of fabric
   3. Edge of fabric
   4. Bottom side

2. **Fold the fabric along the desired edge of the hem, and press.**

   1. Wrong side of fabric
   2. Right side of fabric
   3. Edge of fabric
   4. Desired edge of hem

3. **Use a chalk to mark on the fabric about 5 mm (3/16 inch) from the edge of the fabric, and then baste it.**

   1. Wrong side of fabric
   2. Right side of fabric
   3. Edge of fabric
   4. Desired edge of hem
   5. 5 mm (3/16 inch)
   6. Basting

4. **Fold back the fabric inside along the basting.**

   1. Wrong side of fabric
   2. Right side of fabric
   3. Edge of fabric
   4. Desired edge of hem
   5. 5 mm (3/16 inch)
   6. Basting
   7. Basting point

5. **Unfold the edge of fabric, and position the fabric with the wrong side facing up.**

   1. Wrong side of fabric
   2. Right side of fabric
   3. Edge of fabric
   4. Desired edge of hem
   5. Basting
   6. Basting point

6. **Attach blind stitch foot “R”.**

7. **Select  or  .**
8 Remove the flat bed attachment to use the free-arm.

9 Slide the item that you wish to sew onto the free arm, make sure that the fabric feeds correctly, and then start sewing.

Position the fabric with the edge of the folded hem against the guide of the presser foot, and then lower the presser foot lever.

Adjust the stitch width until the needle slightly catches the fold of the hem.

If the Needle Catches Too Much of the Hem Fold

The needle is too far to the left. Press \( \uparrow \) to decrease the stitch width so that the needle slightly catches the fold of the hem.

If the Needle does not Catch the Hem Fold

The needle is too far to the right. Press \( \downarrow \) to increase the stitch width so that the needle slightly catches the fold of the hem.

Memo

- Blind hem stitches cannot be sewn if the left needle drop point does not catch the fold. If the needle catches too much of the fold, the fabric cannot be unfolded and the seam appearing on the right side of the fabric will be very large, leaving an unattractive finish. If you experience either of these cases, follow the instructions below to solve the problem.

If the Needle Catches Too Much of the Hem Fold

The needle is too far to the left. Press \( \uparrow \) to decrease the stitch width so that the needle slightly catches the fold of the hem.

If the Needle does not Catch the Hem Fold

The needle is too far to the right. Press \( \downarrow \) to increase the stitch width so that the needle slightly catches the fold of the hem.

Memo

- Blind hem stitches cannot be sewn if the left needle drop point does not catch the fold. If the needle catches too much of the fold, the fabric cannot be unfolded and the seam appearing on the right side of the fabric will be very large, leaving an unattractive finish. If you experience either of these cases, follow the instructions below to solve the problem.

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Memo

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Memo

- Blind hem stitches cannot be sewn if the left needle drop point does not catch the fold. If the needle catches too much of the fold, the fabric cannot be unfolded and the seam appearing on the right side of the fabric will be very large, leaving an unattractive finish. If you experience either of these cases, follow the instructions below to solve the problem.
SEWING THE STITCHES

Utility Stitches

12 Sew with the fold of the hem against the presser foot guide.

13 Remove the basting stitching and reverse the fabric.

Appliqué

1 Use a temporary spray adhesive, fabric glue or a basting stitch to attach the appliqué to the fabric.

* This will keep the fabric from moving during sewing.

2 Select or .

* Adjust the stitch length and width to correspond to the appliqué shape, size, and quality of material (page 85).

Memo

- For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

3 Attach presser foot “J”. Check that the needle drops slightly off the edge of the appliqué, then start sewing.

Memo

- For details on each stitch, refer to “STITCH SETTING CHART” on page 206.
**Appliqué Sharp Curves**

Stop the machine with the needle in the fabric outside the appliqué. Raise the presser foot and turn the fabric a little bit at a time while sewing for an attractive finish to the seam.

**Appliqué Corners**

Stop the machine with the needle in the right position of the outside (or inside) corner of the appliqué. Raise the presser foot and pivot the fabric to align the fabric edge. Lower the presser foot and continue stitching.

---

**Shelltuck Stitches**

Shelltuck stitches give an attractive appearance of shells along the curve of a collar. This stitch pattern can be used for edging the neckline or sleeves of dresses and blouses.

1. **Select .**

   - **Memo**
     - For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

2. **Increase the upper thread tension for an attractive scallop finish to the shelltuck stitches (page 87).**

   - **Memo**
     - If the upper thread tension is too weak, the shelltuck stitches will not scallop.

3. **To make rows of shell tuck stitches, fold the fabric in half along the bias.**

   - **Memo**
     - Use a thin fabric.

4. **Attach presser foot “J”. Set the needle drop point slightly off the edge of the fabric, and start sewing.**

   - **Memo**
     - Placing a lightweight tear away stabilizer beneath the stitching area will improve the stitch placement along the edge of the appliqué fabric.
Unfold the fabric, and iron the tucks to one side.

Scallop Stitches

This wave-shaped satin stitch is called the scallop stitch. Use this stitch to decorate the edges of blouse collars and handkerchiefs or use it as a hem accent.

Memo
- To make shell tucks at the edge of a collar or neckline, follow the stitch pattern’s instructions and then use this stitch to make a decorative finish on the collar or neckline.

Crazy Quilting

For a decorative look called “Crazy Quilting”, the following stitches can be sewn on top of a pressed seam allowance.

1. Select a straight stitch and attach presser foot “N”.

2. With the right sides facing each other, sew two pieces of fabric together, and then press open the seam allowance.

Memo
- A temporary spray adhesive may be necessary for lightweight fabrics. Test sew the fabric before sewing a project.

Memo
- Use a seam sealant to secure the edges of the scallop stitches.

Memo
- For details on each stitch, refer to “STITCH SETTING CHART” on page 206.
Select a stitch for top stitching.

Place the fabric right side up in the machine, and center the presser foot over the seam when sewing.

Smocking Stitches

Use smocking stitches for decorative sewing on clothes, etc.

Select a straight stitch and attach presser foot “J”.

Set the stitch length to 4.0 mm (approx. 5/32 inch) and loosen the upper thread tension to approximately 2.0 (“Setting the Stitch Length” on page 86 and “Setting the Thread Tension” on page 87).

Pull the bobbin and upper threads out by 50 mm (approx. 2 inches).

Sew the seams, leaving approximately 10 mm (approx. 3/8 inch) between the seams, then trim excess thread, leaving 50 mm (approx. 2 inches).

Pull the bobbin threads to obtain the desired amount of gather, and then smooth the gathers by ironing them.

Select or .

Memo

- For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

Sew the spaces between the straight seams.

Pull out the straight stitch threads.

Approximately 10 mm (approx. 3/8 inch)
**Fagoting**

When there is a space between two fabrics with thread sewn over the space to join the fabrics together, it is called fagoting. Use this stitch when sewing blouses or children’s clothes.

1. Baste two pieces of fabric onto thin paper, leaving a space of 4 mm (approx. 3/16 inch) between the fabrics.
   
   * If you draw a line down the middle of the thin paper or water soluble stabilizer, sewing is easier.

2. Select or .

3. Attach presser foot “J”. Align the center of the presser foot with the middle of the space between the fabrics and begin sewing.

4. When sewing is finished, gently tear the paper away.

**Tape or Elastic Attaching**

1. Select a straight stitch and attach presser foot “J”.

2. Set the stitch length to 4.0 mm (approx. 3/16 inch), and loosen the upper thread tension to 2.0 (“Setting the Stitch Length” on page 86 and “Setting the Thread Tension” on page 87).

   - Be sure that neither automatic reinforcement nor automatic thread cutting is selected.

3. Sew two rows of straight stitches on the right side of the fabric, then pull the bobbin thread to create the necessary gather.

4. Place the tape over the gather, and hold it in place with basting pins.

   - Before sewing the straight stitch, rotate the handwheel toward you (counterclockwise) and pull up the bobbin thread. Holding the top and bobbin thread, pull a length of thread out from the rear of the machine. (Be sure that the presser foot is raised.)

---

**Memo**

- Use a thick thread.
- For details on each stitch, refer to “STITCH SETTING CHART” on page 206.
Select  or .

Memo
• For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

Sew over the tape (or elastic).

Memo
• For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

Heirloom

Hemstitching (1) (Daisy Stitch)

Use for sewing tablecloths, decorative hems, and decorative stitching on shirt fronts.

Memo
• Use a light to medium weight homespun fabric with a little stiffness.

1 Insert a type 130/705H, size 100/16 Wing needle.
  * This specialty sewing needle is not furnished with your machine. Must be purchased separately.

CAUTION
• The “Automatic Threading” button cannot be used. Thread the wing needle by hand, from front to back. Using the “Automatic Threading” button may result in damage to the machine.
• A more attractive finish can be obtained if you use a “130/705H Wing” needle when sewing these stitch patterns. If using a wing needle and the stitch width has been set manually, check that the needle will not touch the presser foot by carefully rotating the handwheel toward you (counterclockwise) before starting to sew.

2 Select a stitch and attach presser foot “N”.
  * Select any stitch between 3-01 and 3-25.

Memo
• For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

3 Start sewing.

Example: Illustration of finished product

Memo
• For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

CAUTION
• Be sure the needle does not strike a basting pin, or any other objects, during sewing. The thread could tangle or the needle could break, causing injury.

7 Pull out the straight stitch threads.
**Hemstitching (2) (Drawn Work (1))**

1. Pull out several threads from one area on a piece of fabric to open the area.
   * Pull out 5 or 6 threads to leave a 3 mm (approx. 1/8 inch) area open.

2. Select .

3. Attach presser foot “N”. With the right side of the fabric facing up, sew one edge of the open area.

4. Press \( \text{△} \) to create a mirror image of the stitch.

5. Match beginning needle drop points on the opposite edge of the open area to keep the stitching symmetrical.

**Memo**

- Loosely woven fabrics work best for this.

**Hemstitching (3) (Drawn Work (2))**

1. Pull out several threads from both sides of the 4 mm (approx. 3/16 inch) area which are not yet open.
   * Pull out four threads, leave five threads, and then pull out four threads. The width of five threads is approximately 4 mm (approx. 3/16 inch) or less.

2. Select .

3. Sew the decorative stitch in the center of the five threads created above.

**Memo**

- For details on each stitch, refer to “STITCH SETTING CHART” on page 206.
Basting

1. Select and attach presser foot “J”.

2. Keep pressing the “Reverse Stitch” button or the “Reinforcement Stitch” button to sew 4 stitches of reinforcement stitches, then press “Start/Stop” button to continue sewing.

Memo
- When you use the basting stitch for gathering, do not use a reinforcement stitch at the beginning; you should lift the presser foot, rotate the handwheel toward you (counterclockwise), pull up the bobbin thread and pull a length of top and bobbin thread out from the rear of the machine.
- Stitching will be sewn with a length of 5 mm (approx. 3/16 inch).

3. Sew while keeping the fabric straight.

4. End the basting with reinforcement stitches.

Free-Motion Basting
When the feed dogs are lowered, basting can be sewn while freely moving the fabric.
One-step Buttonholes

With one-step buttonholes, you can make buttonholes appropriate to the size of your button.

⚠️ CAUTION

- When attaching and removing buttonhole foot “A+”, do not apply excessive force to the presser foot, otherwise it may be damaged. In addition, be careful not to hit the needle when attaching and removing buttonhole foot “A+”, otherwise the needle may break.

Note

- Before attaching the presser foot, check that there is enough thread in the bobbin.
- When the presser foot is attached, the compartment of the flat bed attachment cannot be opened. Be sure to first remove any necessary accessories.
- Sew trial stitches on fabric that is the same as that used in your project, referring to “Fabric/Thread/Needle Combinations” on page 71.
- The built-in camera detects the position of buttonhole foot “A+”. Do not touch the camera. (Refer to “NAMES OF MACHINE PARTS AND THEIR FUNCTIONS” on page 12.)
- Do not peel the “A+” sticker off buttonhole foot “A+” or cover the sticker with the upper thread, etc., otherwise the camera cannot detect the presser foot or buttonholes cannot be sewn.

One-step buttonholes are sewn from the front of the presser foot to the back, as shown below.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>#05</td>
<td>Narrow rounded buttonhole</td>
<td>A+</td>
</tr>
<tr>
<td>#08</td>
<td>Wide round ended buttonhole</td>
<td>A+</td>
</tr>
<tr>
<td>#10</td>
<td>Tapered round ended buttonhole</td>
<td>A+</td>
</tr>
<tr>
<td>#11</td>
<td>Round ended buttonhole</td>
<td>A+</td>
</tr>
<tr>
<td>#12</td>
<td>Round ended buttonhole</td>
<td>A+</td>
</tr>
<tr>
<td>#15</td>
<td>Round double ended buttonhole</td>
<td>A+</td>
</tr>
<tr>
<td>#17</td>
<td>Narrow squared buttonhole</td>
<td>A+</td>
</tr>
</tbody>
</table>

1. Select a buttonhole stitch, and attach buttonhole foot “A+”.

Reinforcement stitching

1
2 Mark the position and length of the buttonhole on the fabric.

3 Pull out the button holder plate on the presser foot, and insert the button that will be put through the buttonhole. Then tighten the button holder plate around the button.

4 Align the presser foot with the mark on the fabric, and lower the presser foot.

5 Gently hold the end of the upper thread, and then start sewing.

- Pass the thread underneath the presser foot.
- Slide the outside frame of the buttonhole foot backward as far as possible as shown in the illustration, making sure that there is no gap behind the part of the foot marked “A+”. If the buttonhole foot is not slid back as far as possible, the buttonhole will not be sewn at the correct size.

- Feed the fabric carefully by hand while the buttonhole is sewn.

- Once sewing is completed, the machine automatically sews reinforcement stitches, and then stops.

- If automatic thread cutting is turned on before you start sewing, both threads are automatically cut after the reinforcement stitches are sewn. If the fabric does not feed (for example, because it is too thick), increase the stitch length setting.

Memo
- The maximum buttonhole length is about 47 mm (approx. 1-3/4 inches) (diameter + thickness of the button).
- The size of the buttonhole is determined by the size of the button in the button holder plate.

Note
- Pass the thread underneath the presser foot.
- Slide the outside frame of the buttonhole foot backward as far as possible as shown in the illustration, making sure that there is no gap behind the part of the foot marked “A+”. If the buttonhole foot is not slid back as far as possible, the buttonhole will not be sewn at the correct size.

Memo
- If automatic thread cutting is turned on before you start sewing, both threads are automatically cut after the reinforcement stitches are sewn. If the fabric does not feed (for example, because it is too thick), increase the stitch length setting.
6 Insert a pin along the inside of one of the bar tacks, and then insert the seam ripper into the center of the buttonhole and cut towards the pin.

**CAUTION**
- When using the seam ripper to open the buttonhole, do not put your hand or finger in the path of the ripper. The ripper may slip and cause injury. Do not use the seam ripper in any other way than how it is intended.

**Memo**
- For keyhole buttonholes, use the eyelet punch to make a hole in the rounded end of the buttonhole. Then insert a pin along the inside of one of the bar tacks, insert a seam ripper into the hole made with the eyelet punch, and cut towards the pin.

---

**Sewing Stretch Fabrics**

**Note**
- Attach stabilizer material to the back of stretch fabrics to prevent them from stretching.

When sewing on stretch fabric with \ or \, sew the buttonhole stitches over a gimp thread.

1 Hook the gimp thread onto the back of presser foot “A+”. Insert the ends into the grooves at the front of the presser foot, and then temporarily tie them there.

2 Lower the presser foot and start sewing.

**Memo**
- Set the width of the satin stitches to the width of the gimp thread, and set the buttonhole width to be 2-3 times the width of the gimp thread.
Once sewing is completed, gently pull the gimp thread to remove any slack, and trim off any excess.

**Memo**
- After using the seam ripper to cut open the threads over the buttonhole, trim off the threads.

■ Odd Shaped Buttons/Buttons that do Not Fit into the Button Holder Plate

Use the markings on the presser foot scale to set the size of the buttonhole. One mark on the presser foot scale equals 5 mm (approx. 3/16 inch). Add the button diameter and thickness together, and then set the plate at the calculated value.

- Presser foot scale
- Button holder plate
- Completed measurement of diameter + thickness
- 5 mm (approx. 3/16 inch)

**Memo**
- Example) For a button with a diameter of 15 mm (about 9/16 inch) and thickness of 10 mm (about 3/8 inch), align the scale with 25 mm (about 1 inch), or specify 25 mm in the screen.

  1. 10 mm (approx. 3/8 inch)
  2. 15 mm (approx. 9/16 inch)

■ Sewing Thick Fabrics

Place a piece of folded fabric or cardboard beside the fabric being sewn to level the buttonhole foot and allow for easier and even feeding.

- Presser foot
- Thick paper
- Fabric

**Memo**
- If automatic thread cutting is turned on before you start sewing, both threads are automatically cut after the reinforcement stitches are sewn. If the fabric does not feed (for example, because it is too thick), increase the stitch length setting.
Sewing Thick Seams or Fabric That Cannot Be Correctly Fed

Attach the buttonhole stabilizer, and then feed the fabric between the stabilizer and the presser foot.

Four-step Buttonholes

You can sew 4-step buttonholes using the following 4 stitches together. You can sew any desired length for the buttonhole when using 4-step buttonholes. 4-step buttonholes are a good option when attaching oversize buttons.

**Note**
- When changing the stitch settings, make sure that all stitch settings are changed to match.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/16</td>
<td>4 steps buttonhole 1</td>
<td>![Presser foot image]</td>
</tr>
<tr>
<td>4/17</td>
<td>4 steps buttonhole 2</td>
<td>![Presser foot image]</td>
</tr>
<tr>
<td>4/18</td>
<td>4 steps buttonhole 3</td>
<td>![Presser foot image]</td>
</tr>
<tr>
<td>4/19</td>
<td>4 steps buttonhole 4</td>
<td>![Presser foot image]</td>
</tr>
</tbody>
</table>

Four-step buttonholes are sewn as shown below.

1. Mark the position and length of the buttonhole on the fabric.

2. Attach monogramming foot “N”, and select stitch 4 to sew the left side of the buttonhole.

3. Press the “Start/Stop” button to start sewing.

4. Sew the desired length for the buttonhole and press the “Start/Stop” button again.

5. Select stitch 4 to sew the bar tack and press the “Start/Stop” button.
   → The machine will automatically stop after sewing the bar tack.

6. Select stitch 4 to sew the right side of the buttonhole, and press the “Start/Stop” button to begin sewing.
7 Sew the right side of the buttonhole and press the “Start/Stop” button again.
   * Sew the right side of the buttonhole the same length as the left.

8 Select stitch [3] to sew the bar tack and then press the “Start/Stop” button.
   → The machine will automatically sew off the bar tack tie and stop when the bar tack is complete.

9 Raise the presser foot and remove the fabric.

10 Refer to page 143 to open the buttonhole.
## Darning

Use darning stitches for mending and other applications.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Darning</td>
<td>A+</td>
</tr>
<tr>
<td>3</td>
<td>Darning</td>
<td>A+</td>
</tr>
</tbody>
</table>

Darning is performed by sewing from the front of the presser foot to the back as shown below.

1. Select a stitch, and attach buttonhole foot “A+”.
2. Set the scale to the desired length of the darning.

- Reinforcement stitches

3. Check that the needle drops at the desired position and lower the presser foot, making sure the upper thread passes underneath the buttonhole foot.

4. Gently hold the end of the upper thread, and then press the “Start/Stop” button to start the machine.

→ Once sewing is completed, the machine automatically sews reinforcement stitches, and then stops.

**Memo**
- The maximum length for darning is 50 mm (approx. 1-31/32 inches).

**Note**
- Pass the thread underneath the presser foot.
- Set the presser foot so that there is no gap behind the section marked with an “A+” (the shaded area in the illustration below). If there is a gap, the size of the darning will not be correct.

**Memo**
- If automatic thread cutting is turned on before you start sewing, both threads are automatically cut after the reinforcement stitches are sewn. If the fabric does not feed (for example, because it is too thick), increase the stitch length setting.
Bar Tacks

Use bar tacks to reinforce areas that will be subject to strain, such as pocket corners.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Bar tack</td>
<td>A+</td>
</tr>
</tbody>
</table>

1. Select 22.

2. Attach buttonhole foot “A+” and set the scale to the length of the bar tack you wish to sew.

![Diagram of presser foot scale and completed length measurement]

- Presser foot scale
- Completed length measurement
- 5 mm (approx. 3/16 inch)

**Memo**
- Bar tacks can be between 10 mm (approx. 25/64 inch) and 50 mm (approx. 1-31/32 inches).

3. Set the fabric so that the pocket moves toward you during sewing.

![Diagram of sewing process]

**Note**
- Pass the thread underneath the presser foot.
- Slide the outside frame of the buttonhole foot backward as far as possible as shown in the illustration, making sure that there is no gap behind the part of the foot marked “A+.” If the buttonhole foot is not slid back as far as possible, the bar tack will not be sewn to the correct size.

4. Check the first needle drop point and lower the presser foot.

![Diagram of first needle drop point]

- 2 mm (approx. 1/16 inch)

5. Gently hold the end of the upper thread and begin sewing.

![Diagram of sewing process]

→ When sewing is completed, the machine will sew reinforcement stitches and stop automatically.
**Button Sewing**

Buttons with 2 or 4 holes can be attached, using the machine.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>420</td>
<td>Button sewing</td>
<td>M</td>
</tr>
</tbody>
</table>

**Note**
- Do not use the automatic thread cutting function when sewing buttons. Otherwise, you will lose the thread ends.

1. **Select** .
   → The feed dogs are lowered automatically.

2. **Raise the presser foot.**

3. **Attach button sewing foot “M”, slide the button along the metal plate and into the presser foot, and lower the presser foot.**

4. **Rotate the handwheel toward you (counterclockwise) to check that the needle goes into each hole correctly.**
   - If the needle does not reach the holes on the left side, adjust the stitch width.
   - To attach the button more securely, repeat the process.

5. **Gently hold the end of the upper thread and start sewing.**
   → The machine stops automatically when sewing is finished.

**CAUTION**
- Make sure the needle does not strike the button during sewing. The needle may break and cause injury.
Attaching 4 Hole Buttons
Sew the two holes closest to you. Then raise the presser foot and move the fabric so that the needle goes into the next two holes, and sew them in the same way.

Attaching a Shank to the Button
1. Pull the shank lever toward you before sewing.

Shank lever

2. Pull the two ends of the upper thread between the button and the fabric, wind them around the shank, and then tie them firmly together.

3. Tie the ends of the bobbin thread from the beginning and end of sewing together on the wrong side of the fabric.

Note
• When sewing is completed, be sure to select the other stitch and rotate the handwheel toward you (counterclockwise) to raise the feed dogs.

Cut off any excess thread.

Eyelet
Use this stitch for making belt holes and other similar applications.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyelet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Star eyelet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Select or .

2. Use in either the stitch width display or the stitch length display to choose the size of the eyelet.

3. Attach monogramming foot “N”, then rotate the handwheel toward you (counterclockwise) to check the needle drop position.

Note
• Only one size is available for .
4 Lower the presser foot and start sewing.
   → When sewing is finished, the machine sews reinforcement stitches and stops automatically.

Note
   • If the stitch pattern comes out poorly, make adjustments to “SEWING STITCH PATTERNS” on page 163.

5 Use the eyelet punch to make a hole in the center of the stitching.

Multidirectional Sewing
(Straight Stitch and Zigzag Stitch)

Use these stitch patterns to attach patches or emblems to pant legs, shirt sleeves, etc.

1 Remove the flat bed attachment to use the free-arm.

Memo
   • Insert the tubular piece of fabric onto the free-arm, and then sew in the order shown in the illustration.

2 Select and attach monogramming foot “N”.

Memo
   • For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

3 Set the needle in the fabric at the sewing start point, and sew seam “1” as shown.

4 Select and sew seam “2” as shown.

   * The fabric will move sideways, guide the fabric by hand to keep sewing straight.

5 Select and sew seam “3” as shown.

   → The fabric feeds forward while stitching backward.
6 Select and sew seam “4” as shown.

The seam will be connected to the starting point of seam 1.

**Zipper Insertion**

**Centered Zipper**
Use for bags and other such applications.

1 Select .

**Memo**
- For details on each stitch, refer to “STITCH SETTING CHART” on page 206.

**Note**
- Make sure you sew using the middle needle position.

2 Attach presser foot “J” and sew straight stitches up to the zipper opening. Change to a basting stitch (page 140) and sew to the top of the fabric.

3 Press the seam allowance open and attach the zipper with a basting stitch in the middle of each side of the zipper tape.

4 Remove presser foot “J”. Align the right side of the pin in zipper foot “I” with the presser foot holder, and attach the zipper foot.

**CAUTION**
- When using zipper foot “I”, make sure the straight stitch, middle needle position is selected. Rotate the handwheel toward you (counterclockwise) to make sure the needle does not strike the presser foot. If another stitch is selected, the needle will strike the presser foot, causing the needle to break and possibly causing injury.
Topstitch 7 to 10 mm (approx. 1/4 to 3/8 inch) from the seamed edge of the fabric, then remove the basting.

**CAUTION**
- Make sure the needle does not strike the zipper during sewing. If the needle strikes the zipper, the needle may break, leading to injury.

**Inserting a Side Zipper**

Use for side zippers in skirts or dresses.

1. **Select**.

   **Note**
   - Make sure you sew using the middle needle position.

2. Attach presser foot “J” and sew straight stitches up to the zipper opening. Change to a basting stitch and sew to the top of the fabric.

3. Press the seam allowance open and align the folded hem along the teeth of the zipper, while maintaining 3 mm (approx. 1/8 inch) of sewing space.

4. Remove presser foot “J”.

   ① Reverse stitches
   ② Wrong side of fabric
   ③ Basting stitches
   ④ End of zipper opening

   ① Zipper pull tab
   ② Wrong side of fabric
   ③ Zipper teeth
   ④ End of zipper opening
   ⑤ 3 mm (approx. 1/8 inch)
Align the right side of the pin in zipper foot “I” with the presser foot holder, and attach the presser foot.

Set the presser foot in the 3 mm (approx. 1/8 inch) margin.

Starting from the end of the zipper opening, sew to a point about 50 mm (approx. 2 inches) from the edge of the fabric, then stop the machine.

Pull down the zipper slider, then continue sewing to the edge of the fabric.

Close the zipper, turn the fabric over, and sew a basting stitch.

Remove the presser foot, and reattach it so that the left side of the pin is attached to the presser foot holder.

* When sewing the left side of the zipper, the needle should drop on the right side of the presser foot. When sewing the right side of the zipper, the needle should drop on the left side of the presser foot.

Set the fabric so that the left edge of the presser foot touches the edge of the zipper teeth.

Sew reverse stitches at the top of the zipper, then continue sewing.

Stop sewing about 50 mm (approx. 2 inches) from the edge of the fabric, leave the needle in the fabric, and remove the basting stitches.

CAUTION • When using zipper foot “I”, make sure the straight stitch, middle needle position is selected. Rotate the handwheel toward you (counterclockwise) to make sure the needle does not strike the presser foot. If another stitch is selected, the needle will strike the presser foot, causing the needle to break and possibly causing injury.

CAUTION • Make sure the needle does not strike the zipper during sewing. If the needle strikes the zipper, the needle may break, leading to injury.
14 Open the zipper and sew the rest of the seam.

- Basting stitches
- 7 to 10 mm (approx. 1/4 inch to 3/8 inch)
- Reverse stitches
- 50 mm (approx. 2 inches)
Chapter 4
Character/Decorative Stitches
SELECTING STITCH PATTERNS

Press [ ], then [ ] to display the screen below.

1. Wide and Various
2. Wide Botanical
3. Wide Motifs and Messages
4. Narrow and Various
5. Narrow Botanical
6. Candlewicking
7. Large Satin
8. Satin
9. Cross Stitches
10. Combinable Utility
11. Alphabet characters (gothic font)
12. Alphabet characters (handwriting font)
13. Alphabet characters (outline)
14. Cyrillic font
15. Pocket

Note
• If the screen is locked ( ), unlock the screen by pressing [ ]. While the screen is locked, no other key can be operated.
## Stitch Selection Screens

There are 14 categories of Character/Decorative stitch patterns.

<table>
<thead>
<tr>
<th>Wide and Various</th>
<th>Wide Botanical</th>
<th>Wide Motifs and Messages</th>
<th>Narrow and Various</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Wide and Various Patterns" /></td>
<td><img src="image2" alt="Wide Botanical Patterns" /></td>
<td><img src="image3" alt="Wide Motifs and Messages Patterns" /></td>
<td><img src="image4" alt="Narrow and Various Patterns" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Narrow Botanical</th>
<th>Candlewicking</th>
<th>Large Satin</th>
<th>Satin</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Narrow Botanical Patterns" /></td>
<td><img src="image6" alt="Candlewicking Patterns" /></td>
<td><img src="image7" alt="Large Satin Patterns" /></td>
<td><img src="image8" alt="Satin Patterns" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cross Stitches</th>
<th>Combinable Utility</th>
<th>Alphabet characters (gothic font)</th>
<th>Alphabet characters (handwriting font)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image9" alt="Cross Stitches Patterns" /></td>
<td><img src="image10" alt="Combinable Utility Patterns" /></td>
<td><img src="image11" alt="Alphabet characters (gothic font) Patterns" /></td>
<td><img src="image12" alt="Alphabet characters (handwriting font) Patterns" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alphabet characters (outline)</th>
<th>Cyrillic font</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image13" alt="Alphabet characters (outline) Patterns" /></td>
<td><img src="image14" alt="Cyrillic font Patterns" /></td>
</tr>
</tbody>
</table>
Selecting Decorative Stitch Patterns

1. Select the category of the stitch pattern you want to sew.
2. Press the key of the stitch pattern you want to sew.

→ The selected stitch pattern is displayed.

Selecting Character Stitch Patterns

Entering characters from the groups shown below, for example “Blue Sky”.

1. Press $\texttt{AB}$, $\texttt{ABC}$, $\texttt{Aa}$ or $\texttt{AB}$ to select a font.

2. Press $\texttt{ABC}$ and then enter “B”.

3. Press $\texttt{ABC}$ and then enter “lue”.

4. Press $\texttt{ABC}$ and then enter “Blue Sky”.

Entering characters from the groups shown below, for example “Blue Sky”.

1. Press $\texttt{ABC}$, $\texttt{ABC}$, $\texttt{ABC}$ or $\texttt{ABC}$ to select a font.

2. Press $\texttt{ABC}$ and then enter “B”.

3. Press $\texttt{ABC}$ and then enter “lue”.

4. Press $\texttt{ABC}$ and then enter “Blue Sky”.

Entering characters from the groups shown below, for example “Blue Sky”.

1. Press $\texttt{ABC}$, $\texttt{ABC}$, $\texttt{ABC}$ or $\texttt{ABC}$ to select a font.

2. Press $\texttt{ABC}$ and then enter “B”.

3. Press $\texttt{ABC}$ and then enter “lue”.

4. Press $\texttt{ABC}$ and then enter “Blue Sky”.

Entering characters from the groups shown below, for example “Blue Sky”.

1. Press $\texttt{ABC}$, $\texttt{ABC}$, $\texttt{ABC}$ or $\texttt{ABC}$ to select a font.

2. Press $\texttt{ABC}$ and then enter “B”.

3. Press $\texttt{ABC}$ and then enter “lue”.

4. Press $\texttt{ABC}$ and then enter “Blue Sky”.
SELECTING STITCH PATTERNS

Character/Decorative Stitches

Press to enter a space.

Press and then enter “ky”.

Press ABC again and enter “S”.

Press , and then press to delete the last character.

Select the correct character.

Adding Characters

Press so that screen displays +.

Press or to move the cursor in front of the character where you want to add characters.

Select the character you want to add.

Adjusting the Character Spacing

The space between the characters can be adjusted.

Press , and then press Spacing.

→ The character spacing window appears.

Jump stitch
* Remove the jump stitches after sewing.
* To continue entering characters in a different font, select the other font, and then repeat the procedure from step 1.
2 Press - + to adjust character spacing.

* Press + to increase the character spacing and press - to decrease the character spacing.

Memo
- The default setting is “0”. No number less than “0” can be set.
- Changing character spacing by this method, pertains to all characters. Spacing changes are valid not only while entering characters but also before and after the entering of characters.
SEWING STITCH PATTERNS

Sewing Attractive Finishes

To achieve attractive results when sewing character/decorative stitches, check the table below for the proper fabric/needle/thread combinations.

**Note**
- Other factors, such as fabric thickness, stabilizer material, etc., also have an effect on the stitch, so you should always sew a few trial stitches before beginning your project.
- When sewing satin stitch patterns, there may be shrinking or bunching of stitches, so be sure to attach a stabilizer material.
- Guide the fabric with your hand to keep the fabric feeding straight and even during sewing.

<table>
<thead>
<tr>
<th>Fabric</th>
<th>When sewing on stretch fabrics, lightweight fabrics, or fabrics with coarse weaves, attach stabilizer on the wrong side of the fabric. If you do not wish to do so, place the fabric on a thin paper such as tracing paper.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread</td>
<td>#50 - #60</td>
</tr>
</tbody>
</table>
| Needle | With lightweight, regular, or stretch fabrics: the Ball point needle (golden colored)  
With heavyweight fabrics: home sewing machine needle 90/14 |
| Presser foot | Monogramming foot “N”. Using another presser foot may give inferior results. |

**Basic Sewing**

1. Select a stitch pattern.
2. Attach monogramming foot “N”.
3. Place the fabric under the presser foot, pull the upper thread out to the side, and then lower the presser foot.

4. Press the “Start/Stop” button to start sewing.

**CAUTION**
- When sewing 7 mm satin stitch patterns and the stitches are bunched, lengthen the stitch length. If you continue sewing when the stitches are bunched, the needle may bend or break (“Setting the Stitch Length” on page 86).

**Memo**
- If the fabric is pulled or pushed during sewing, the stitch pattern may not turn out correctly. Also, depending on the stitch pattern, there may be movement to the left and right as well as front and back. Guide the fabric with your hand to keep the fabric feeding straight and even during sewing.
Press the “Start/Stop” button to stop sewing.

Keep pressing the “Reverse Stitch” button or the “Reinforcement Stitch” button to sew 4 stitches of reinforcement stitches.

**Memo**
- When sewing character stitches, the machine automatically sews reinforcement stitches at the beginning and end of each character.
- After sewing is finished, use a seam ripper to trim any excess thread (jump stitches).

**Making Adjustments**

Your stitch pattern may sometimes turn out poorly, depending on the type or thickness of fabric, the stabilizer material used, sewing speed, etc. If your sewing does not turn out well, sew trial stitches using the same conditions as the real sewing, and adjust the stitch pattern as explained below. If the stitch pattern does not turn out well even after making adjustments based on the stitch pattern, make adjustments for each stitch pattern individually.

1. Press and select .

2. Attach monogramming foot “N” and sew the stitch pattern.

3. Compare the finished stitch pattern to the illustration of the correct stitch pattern below.
4 Press , and then adjust the stitch pattern with the “Fine Adjust Verti.” or “Fine Adjust Horiz.” displays.

* If the stitch pattern is bunched:
Touch to increase the number in the “Fine Adjust Verti.” display.
→ The displayed value increases each time the button is pressed and the stitch pattern will lengthen.

* If the stitch pattern has gaps:
Touch to decrease the number in the “Fine Adjust Verti.” display.
→ The displayed value decreases each time the button is pressed and the stitch pattern will shorten.

* If the stitch pattern is skewed to the left:
Touch to increase the number in the “Fine Adjust Horiz.” display.
→ The displayed value increases each time the button is pressed and the stitch pattern will slide to the right.

* If the stitch pattern is skewed to the right:
Touch to decrease the number in the “Fine Adjust Horiz.” display.
→ The displayed value decreases each time the button is pressed and the stitch pattern will slide to the left.

5 Sew the stitch pattern again.
* If the stitch pattern still comes out poorly, make adjustments again. Adjust until the stitch pattern comes out correctly.

Memo
• You can sew with the setting screen on the display.

6 Press to return to the original screen.
EDITING STITCH PATTERNS

Key Functions
You can create just the finish you want using the editing functions. Make stitch patterns larger or smaller, make mirror images, etc.

Note
- Some editing functions cannot be used with certain stitch patterns. Only the functions for the displayed keys are available when a stitch pattern is selected.
<table>
<thead>
<tr>
<th>No.</th>
<th>Display</th>
<th>Key Name</th>
<th>Explanation</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>!</td>
<td>Image key</td>
<td>Press this key to display an enlarged image of the selected stitch pattern.</td>
<td>171</td>
</tr>
<tr>
<td>2</td>
<td>▲</td>
<td>Projector key</td>
<td>Press this key to use projector functions.</td>
<td>96</td>
</tr>
<tr>
<td>3</td>
<td>□</td>
<td>Guideline marker key</td>
<td>Press this key to display or set the guideline marker for the sewing line. The guideline marker makes quilt piecing or aligning stitching on the fabric edge easier.</td>
<td>98</td>
</tr>
<tr>
<td>4</td>
<td>✡</td>
<td>Stitch pattern editing key</td>
<td>Press this key to display editing function keys on the screen.</td>
<td>103</td>
</tr>
<tr>
<td>5</td>
<td>⌃</td>
<td>Free motion mode key</td>
<td>Press this key to enter free motion sewing mode. The feed dog is lowered and presser foot is raised to a height appropriate for free motion quilting.</td>
<td>126</td>
</tr>
<tr>
<td>6</td>
<td>🔧</td>
<td>Back to beginning key</td>
<td>When sewing is stopped, press this key to return to the beginning of the stitch pattern.</td>
<td>170</td>
</tr>
<tr>
<td>7</td>
<td>📀</td>
<td>Single/Repeat sewing key</td>
<td>Press this key to choose single stitches or continuous stitches.</td>
<td>169</td>
</tr>
<tr>
<td>8</td>
<td>📀</td>
<td>Horizontal mirror image key</td>
<td>After selecting the stitch pattern, use this key to create a horizontal mirror image of the stitch pattern.</td>
<td>169</td>
</tr>
<tr>
<td>9</td>
<td>📀</td>
<td>Vertical mirror image key</td>
<td>After selecting the stitch pattern, use this key to create a vertical mirror image of the stitch pattern.</td>
<td>169</td>
</tr>
<tr>
<td>10</td>
<td>📀</td>
<td>Needle mode selection key (single/double)</td>
<td>Press this key to select twin needle sewing mode. The sewing mode changes between single needle mode and twin needle mode each time you press the key.</td>
<td>64</td>
</tr>
<tr>
<td>11</td>
<td>Delete</td>
<td>Delete key</td>
<td>When you make a mistake selecting a stitch pattern, use this key to delete the mistake. When you make a mistake in combining stitch patterns, use this key to delete stitch patterns.</td>
<td>161</td>
</tr>
<tr>
<td>12</td>
<td>📀</td>
<td>Elongation key</td>
<td>When 7mm satin stitch patterns are selected, press this key to choose from 5 automatic length settings, without changing the stitch zigzag width or stitch length settings.</td>
<td>169</td>
</tr>
<tr>
<td>13</td>
<td>Step</td>
<td>Step effect key</td>
<td>Press this key to make step stitch patterns.</td>
<td>175</td>
</tr>
<tr>
<td>14</td>
<td>Memory</td>
<td>Memory key</td>
<td>Use this key to save stitch pattern combinations.</td>
<td>179</td>
</tr>
<tr>
<td>15</td>
<td>📀</td>
<td>Thread tension key</td>
<td>Shows the automatic thread tension setting of the currently selected stitch pattern. You can use 📀 and 📀 to change the thread tension settings.</td>
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<td>Press this key to use the automatic reinforcement stitching (reverse stitching) setting.</td>
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## Editing Stitch Patterns

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<td></td>
<td>100% : Nearly the same size as the sewn stitch pattern</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td>* The actual size of the sewn stitch pattern may differ depending on the type of fabric and thread that is used.</td>
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EDITING STITCH PATTERNS

**Changing the Size**

Select a stitch pattern, then press \( \wedge \) or \( \vee \) to change the size of the stitch pattern.

![Stitch Pattern Size](image)

*The size differs depending on the fabric and threads.*

**Memo**
- When the select all on/off key appears as \( \wedge \) or \( \vee \), the size of all stitch patterns can be changed.
- When the maintain aspect ratio key appears as \( \wedge \) or \( \vee \), the stitch pattern size can be changed while maintaining the aspect ratio.

**Creating a Vertical Mirror Image**

To create a vertical mirror image, select a stitch pattern, press \( \leftarrow \), and then press \( \rightarrow \).

![Vertical Mirror Image](image)

**Creating a Horizontal Mirror Image**

To create a horizontal mirror image, select a stitch pattern, press \( \rightarrow \), and then press \( \leftarrow \).

![Horizontal Mirror Image](image)

**Changing the Length (for 7mm Satin Stitch Patterns Only)**

When 7mm satin stitch patterns are selected, press \( \left\downarrow \) and then press \( \rightarrow \) to choose from 5 automatic length settings, without changing the stitch zigzag width or stitch length settings.

![Changing the Length](image)

**Sewing a Stitch Pattern Continuously**

Press \( \left\uparrow \) and then press \( \rightarrow \) to select continuous sewing or single stitch sewing.

![Sewing a Stitch Pattern](image)

**Memo**
- To finish a complete motif while sewing the stitch pattern continuously, you can press the \( \rightarrow \) key while sewing. The machine will automatically stop when the motif is finished.
Changing Thread Density (for Large Satin Only)

After selecting a satin stitch pattern, press \[1\] and then press \[\] to select your preferred thread density.

![Stitch patterns](image1)

### CAUTION
- If the stitches bunch when thread density is changed to \[\], return the thread density to \[\]. If you continue sewing when the stitches are bunched, the needle may bend or break.

### Memo
- When the select all on/off key appears as \[\], the thread density of all stitch patterns can be changed.

Returning to the Beginning of the Stitch Pattern

When sewing character/decorative stitches, you can return to the beginning of the stitch pattern after trial sewing or when the stitching is sewn incorrectly.

1. Press the “Start/Stop” button to stop the machine, press \[1\] and then press \[\] .

![Stitch pattern selection](image2)

→ Sewing returns to the beginning of the selected stitch pattern (“W”) from the point where sewing was stopped.

### Memo
- If this key is pressed while sewing is stopped, stitch patterns can be added at the end of a combined stitch pattern. (In this example, “!” is added.) Press \[\] or \[\] to add the stitch pattern at the desired location.

2. Press the “Start/Stop” button to continue sewing.
Checking the Image

You can display an approximate size image of the selected stitch pattern. You can also check and change the colors of the image on the screen.

1. Press .
   → An image of the selected stitch pattern is displayed.

2. Press ▼ to change the thread color in the image to red, blue, black or yellow.
   → The color changes every time you press the button.

3. Press ▼ to display the enlarged image.

4. Scroll with your finger to view any part of the image that extends out of the viewable display area.

5. Press ▼ to return to the original screen.
COMBINING STITCH PATTERNS

You can combine many varieties of stitch patterns, such as character stitches, cross stitches or satin stitches. You can also combine stitch patterns of different sizes, mirror image stitch patterns, and others.

Before Combining

Single stitch sewing is automatically selected for sewing combined stitch patterns. If you want to sew the stitch pattern continuously, press after finishing the stitch pattern combination.

Combining Various Stitch Patterns

Example:

1. Press .

2. Select .

3. Press .
COMBINING STITCH PATTERNS

Combining Large and Small Stitch Patterns

Example:

1. Press ×
   → The large size stitch will be selected.

2. Press + so that it displays +.

3. Press again, and then press  to change the size.
   → The size of the stitch pattern changes.

Memo
• To change the size of the stitch pattern while maintaining the aspect ratio, press the maintain aspect ratio key ( ).
4 Press \( \text{①} \), and then press \( \text{②} \) to sew continuously.

\[ \rightarrow \text{The entered stitch pattern is repeated.} \]

**Combining Horizontal Mirror Image Stitch Patterns**

**Example:**

1. Press \( \text{①} \).
2. Press \( \text{②} \).
3. Press \( \text{③} \) again, press \( \text{④} \), and then press \( \text{⑤} \).

\[ \rightarrow \text{The stitch pattern is flipped along a vertical axis.} \]

4. Press \( \text{⑥} \).

\[ \rightarrow \text{The entered stitch pattern is repeated.} \]
Combining Stitch Patterns of Different Length

Example:

1. Press \( \uparrow \), then press \( \downarrow \) once.
   The length of the image is set to \( \downarrow \).

2. Press \( \uparrow \).

3. Select \( \uparrow \) again, press \( \downarrow \), and then press \( \downarrow \) 3 times.
   \( \rightarrow \) The length of the image is set to \( \downarrow \).

4. Press \( \uparrow \).
   \( \rightarrow \) The entered stitch pattern is repeated.

Making Step Stitch Patterns

You can use the \( \uparrow, \downarrow \) keys to create a step effect, also called step stitch patterns.

* Press \( \uparrow \) to move the stitch pattern a distance equal to half of the stitch pattern’s size to the left.
* Press \( \downarrow \) to move the stitch pattern a distance equal to half of the stitch pattern’s size to the right.
Example:

1. Press .

2. Press .

→ The next stitch pattern will move to the right.

3. Press again.

4. Press .

→ The next stitch pattern will move to the left.

5. Press , and then press .

→ The entered stitch pattern is repeated.

■ More Examples

Press → → → → .
Stitch Data Precautions

Observe the following precautions when using stitch data other than that created and saved in this machine.

- **Types of Stitch Data that can be Used**
  - In the Character/Decorative Stitch memory, `.pmv`, `.pmx`, `.pmu` and `.pmp` stitch data files can be used with this machine. When the machine is used to save a file with any extension, it is saved as a `.pmp` data file.
  - Using data other than that created using this machine or the machine which create `.pmu` data file, may cause the machine to malfunction.

- **Types of USB Devices/Media that can be Used**
  - Stitch data can be saved to or recalled from USB external media. Use external media that meets the following specifications.
    - USB Flash drive (USB Flash memory)
  - Stitch data can be recalled only from:
    - USB CD-ROM, CD-R, CD-RW drives
  - You can also use the following types of USB media with the USB Memory Card Reader/USB card writer module.
    - Secure Digital (SD) Card
    - CompactFlash
    - Memory Stick
    - Smart Media
    - Multi Media Card (MMC)
    - xD-Picture Card

**Note**
- Some USB media may not be usable with this machine. Please visit our website for more details.
- The access lamp will begin blinking after inserting USB devices/media, and it will take about 5 to 6 seconds to recognize the devices/media. (Time will differ depending on the USB device/media).
- To create file folders, use a computer.

- **Precautions on Using the Computer to Create and Save Data**
  - If the name of the stitch data file/folder cannot be identified, for example, because the name contains special characters, the file/folder is not displayed. If this occurs, change the name of the file/folder. We recommend using the 26 letters of the alphabet (uppercase and lowercase), the numbers 0 through 9, “-”, and “_”.
  - Stitch data in a folder created in USB media can be retrieved.
Saving Stitch Patterns in the Machine’s Memory

You can save often used stitch patterns in the machine’s memory. A total of about 1 MB of stitch patterns can be saved in the machine’s memory.

Note
• Do not turn the main power to OFF while the “Saving…” screen is displayed. You will lose the stitch pattern you are saving.

Memo
• It takes a few seconds to save a stitch pattern.
• Refer to page 180 for information on retrieving a saved stitch pattern.

1 Press Memory.

2 Press OK.

* Press Cancel to return to the original screen without saving.

→ The “Saving…” screen is displayed. When the stitch pattern is saved, the display returns to the original screen automatically.

If the Memory is Full

If the following screen appears while you are trying to save a stitch pattern, the memory is too full to hold the currently selected stitch pattern. To save the stitch pattern in the machine’s memory, you have to delete a previously saved stitch pattern.

Press OK, and then refer to “Retrieving Stitch Patterns from the Machine’s Memory” on page 180.

Saving Stitch Patterns to USB Media

When sending stitch patterns from the machine to USB media, plug the USB media into the machine’s USB port.

Memo
• USB media is commercially available, but some USB media may not be usable with this machine. Please visit our website for more details.
• Depending on the type of USB media being used, either directly plug the USB device into the machine's USB port or plug the USB media Reader/Writer into the machine’s USB port.
• The USB media can be inserted or removed at any time.

1 Press Memory.
1. **Insert the USB media into the USB port on the machine.**

![USB port](image)

2. **Press **USB port**.**

* Press ** when connecting the USB media to the USB port for mouse.
* Press ** to return to the original screen without saving.

→ The “Saving…” screen is displayed. When the stitch pattern is saved, the display returns to the original screen automatically.

**Note**
- Do not insert or remove USB media while “Saving…” screen is displayed. You will lose some or all of the stitch pattern you are saving.

**Retrieving Stitch Patterns from the Machine’s Memory**

1. **Press **.

→ The pocket selection screen appears.

2. **Choose a stitch pattern to retrieve.**

* If the entire saved stitch pattern is not displayed, press the thumbnail.

→ The selected stitch pattern is retrieved and the sewing screen will be displayed.
Recalling from USB Media

You can recall a specific stitch pattern from either direct USB media or a folder in the USB media. If the stitch pattern is in a folder, check each folder to find the stitch pattern.

1. Insert the USB media into the USB port on the machine. (page 179)

2. Press .

   * Press \(\text{복사}\) when connecting the USB media to the USB port for mouse.

   → Stitch patterns and a folder in a top folder are displayed.

3. Press \(\text{주소}\) when there is a subfolder to sort two or more stitch patterns to USB media, the stitch pattern in the subfolder is displayed.

   * Press \(\text{복사}\) to return to the original screen without recalling.

   ① USB port

   ② Folder name

   ③ Stitch patterns in a folder show only the first stitch pattern of any combined stitch patterns.

   ④ Path

   → The path shows the current folder at the top of the list.

   Stitch patterns and a subfolder within a folder are displayed.

   * Press \(\text{복사}\) to return to the previous folder.

   * Use the computer to create folders. Folders cannot be created with the machine.
4 Press the key of the stitch pattern you want to recall.

The selected stitch pattern is recalled and the sewing screen will be displayed.

Managing Saved File
You can delete the saved file, or save to machine’s memory from USB media.

1 In the retrieving screen from USB, press \( \text{ recalled stitch pattern } \), and touch the stitch pattern you want to manage.

2 Choose the command.

- Press to select all displayed stitch patterns.
- Press to deselect all selected stitch patterns.
- Press to delete the selected stitch patterns.
- Press to save the selected stitch patterns in the machine’s memory.
Chapter 5
Appendix
Restrictions on oiling

In order to prevent damaging this machine, it must not be oiled by the user. This machine was manufactured with the necessary amount of oil applied to ensure correct operation, making periodic oiling unnecessary. If problems occur, such as difficulty turning the handwheel or an unusual noise, immediately stop using the machine, and contact your authorized Baby Lock retailer.

Precautions on storing the machine

Do not store the machine in any of the locations described below, otherwise damage to the machine may result, for example, rust caused by condensation.
* Exposed to extremely high temperatures
* Exposed to extremely low temperatures
* Exposed to extreme temperature changes
* Exposed to high humidity or steam
* Near a flame, heater or air conditioner
* Outdoors or exposed to direct sunlight
* Exposed to extremely dusty or oily environments

Cleaning the LCD Screen

If the screen is dirty, gently wipe it with a soft, dry cloth. Do not use organic solvents or detergents.

Cleaning the Machine Casing

If the surface of the machine is dirty, lightly soak a cloth in a neutral detergent, squeeze it out firmly, and then wipe the surface. Then wipe again with a dry cloth.

Cleaning the Race

1. Press the “Needle Position” button to raise the needle.
2. Turn the main power to OFF.
3. Remove the needle and the presser foot holder (page 69, 72).
4. Remove the flat bed attachment or the embroidery unit if either is attached.
5. Slide the needle plate lever toward you.
6. Slide out the needle plate with your right hand to remove it.

Memo

- Occasionally, condensation may form on the LCD screen or it may become fogged up; however, this is not a malfunction. After a while, the cloudiness will disappear.
7 Grasp the bobbin case, and then gently lift out.

8 Use the cleaning brush or a vacuum cleaner to remove any lint and dust from the race and bobbin thread sensor and the surrounding area.

9 Insert the bobbin case so that the ▲ mark on the bobbin case aligns with the ● mark on the machine.

Note
- Do not apply oil to the bobbin case.
- If lint or dust collects on the bobbin thread sensor, the sensor may not operate correctly.

10 Insert the tabs on the needle plate into the notches in the machine.

11 Press down on the right side of the needle plate to secure it.

* Align the ▲ and ● marks.

** CAUTION **
- Never use a bobbin case that is scratched; otherwise, the upper thread may become tangled, the needle may break, or sewing performance may suffer. For a new bobbin case (part code: XE5342-101 (green marking on the screw), XC8167-551 (no color on the screw)), contact your nearest authorized Baby Lock retailer.
- Make sure that you fit the bobbin case properly, otherwise the needle may break.
**Cleaning the Bobbin Case**

Thread wax and dust easily collect around the notch in the tension spring on the bobbin case, resulting in an incorrect thread tension. Therefore, the bobbin case should be cleaned as necessary when tension problems arise. When cleaning the bobbin case, use card stock or another type of paper of similar thickness and sturdiness in order to prevent pieces of paper tearing off and getting lodged in the bobbin case.

1. Follow steps 1 to 7 in “Cleaning the Race” to remove the bobbin case.

2. Using a piece of paper of adequate thickness and sturdiness, slide the paper between the tension plate base and the tension spring and also slide the paper behind the notch of the spring to remove any dirt or dust.

3. Use the cleaning brush to remove any lint and dust from inside the bobbin case.

4. Replace the bobbin case and needle plate.

**Cleaning the Cutter in the Bobbin Case Area**

The cutter below the needle plate should be cleaned. If dust or lint accumulate on the cutter, it will be difficult to cut the thread when the “Thread Cutter” button is pressed or the automatic thread cutting function is used. Clean the cutter when the thread is not easily cut.

1. Follow steps 1 through 7 in “Cleaning the Race” to remove the needle plate.

2. Use the cleaning brush or a vacuum cleaner to remove any lint and dust from the cutter in the bobbin case area.

3. Attach the needle plate.

**Memo**
- Do not bend the tension spring. In addition, do not use anything other than recommended paper to clean the bobbin case.

**CAUTION**
- Do not touch the cutter, otherwise injuries may result.
About the Maintenance Message

Once this message appears, it is recommended to take your machine to an authorized Baby Lock retailer for a regular maintenance check. Although this message will disappear and the machine will continue to function once you press OK, the message will display several more times until the appropriate maintenance is performed.

Please take the time to arrange for the maintenance your machine requires once this message appears. Such steps will help to ensure you receive continued, uninterrupted hours of machine operation for the future.
If the machine stops operating correctly, check the following possible problems before requesting service. You can solve most problems by yourself. Visit us at “www.babylock.com”.

If the problem persists, contact your authorized Baby Lock retailer.

Frequent Troubleshooting Topics

Detailed causes and remedies for common troubleshooting topics are described below. Be sure to refer to this before contacting your authorized Baby Lock retailer.

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Upper Thread is Too Tight

**Symptom**

* The upper thread appears as a single continuous line.
* The lower thread is visible from the upper side of the fabric. (Refer to the illustration below.)
* The upper thread has tightened up, and comes out when pulled.
* The upper thread has tightened up, and wrinkles appear in the fabric.
* The upper thread tension is tight, and the results do not change even after the thread tension is adjusted.

**Cause**

*Incorrect lower threading*  
If the lower thread is incorrectly threaded, instead of the appropriate tension being applied to the lower thread, it is pulled through the fabric when the upper thread is pulled up. For this reason, the thread is visible from the upper side of the fabric.

**Remedy**

Correctly install the lower thread.

1. **Turn off the machine.**
2. **Remove the bobbin from the bobbin case.**
3. **Place the bobbin in the bobbin case so that the thread unwinds in the correct direction.**

   * Hold the bobbin with your right hand with the thread unwinding to the left, and hold the end of the thread with your left hand. Then, with your right hand, place the bobbin in the bobbin case.

   If the bobbin is inserted with the thread unwinding in the wrong direction, sewing will be done with an incorrect thread tension.
4 While holding the bobbin in place with your finger, pass the thread through the slit in the needle plate.

* Hold down the bobbin with your right hand, and then pull the end of the thread around the tab with your left hand.

![Diagram showing bobbin and thread passage]

Pull the thread to pass it through the slit in the needle plate, then cut it with the cutter.

![Diagram showing slit and cutter]

Sewing with the correct thread tension is possible after the bobbin has been correctly installed in the bobbin case.

Tangled Thread on Wrong Side of Fabric

**Symptom**

* The thread becomes tangled on the lower side of the fabric.

* After starting sewing, a rattling noise is made and sewing cannot continue.
* Looking under the fabric, there is tangled thread in the bobbin case.

**Cause**

Incorrect upper threading

If the upper thread is incorrectly threaded, the upper thread passed through the fabric cannot be firmly pulled up and the upper thread becomes tangled in the bobbin case, causing a rattling noise.

**Remedy**

Remove the tangled thread, and then correct the upper threading.

1. **Remove the tangled thread. If it cannot be removed, cut the thread with scissors.**
   * Refer to “Cleaning the Race” in “CARE AND MAINTENANCE” on page 184.

2. **Remove the upper thread from the machine.**

3. **Refer to the following steps to correct the upper threading.**
   * If the bobbin was removed from the bobbin case, refer to “Setting the Bobbin” on page 58 and “Remedy” in the section “Upper Thread is Too Tight” on page 188 to correctly install the bobbin.
4 Raise the presser foot using the presser foot lever.

* If the presser foot is not raised, the machine cannot be threaded correctly.

5 Raise the needle by turning the handwheel toward you (counterclockwise) so that the mark on the wheel points up, or press “Needle Position” button once or twice to raise the needle.

6 While holding the thread with both hands, pull the thread up from under the thread guide plate.

7 While holding the thread in your right hand, pass the thread through the thread guide in the direction indicated.

8 Guide the thread down, up, then down through the groove, as shown in the illustration.

Memo • Look in the upper groove area to check if the thread catches on the thread take-up lever visible inside the upper groove area.

9 Pass the thread through the needle bar thread guide (marked “6”) by holding the thread with both hands and guiding it as shown in the illustration.

10 Thread the needle according to steps 10 and 11 in “UPPER THREADING” on page 61.
Incorrect Thread Tension

Symptoms
- Symptom 1: The lower thread is visible from the upper side of the fabric.
- Symptom 2: The upper thread appears as a straight line on the upper side of the fabric.
- Symptom 3: The upper thread is visible from the lower side of the fabric.
- Symptom 4: The lower thread appears as a straight line on the lower side of the fabric.
- Symptom 5: The stitching on the lower side of the fabric is loose or has slack.

Cause/remedy

Cause 1
The machine is not correctly threaded.
With symptoms 1 and 2 described above
The lower threading is incorrect.
Adjust the upper thread tension and then refer to “Upper Thread is Too Tight” on page 87.

With symptoms 3 through 5 described above
The upper threading is incorrect.
Adjust the upper thread tension and then refer to “Tangled Thread on Wrong Side of Fabric” on page 189 to correct the upper threading.

Cause 2
A needle and thread appropriate for the fabric are not being used.
The machine needle that should be used depends on the type of fabric sewn and the thread thickness.
If a needle and thread appropriate for the fabric are not being used, the thread tension will not be adjusted correctly, causing wrinkles in the fabric or skipped stitches.
* Refer to “Fabric/Thread/Needle Combinations” on page 71 to check that a needle and thread appropriate for the fabric are being used.

Cause 3
An appropriate upper tension is not selected.
Adjust the upper thread tension to select an appropriate thread tension.
The appropriate thread tension differs according to the type of fabric and thread being used.
* Adjust the thread tension while test sewing on a piece of scrap fabric that is the same as that used in your project.

Note
* If the upper threading and lower threading are incorrect, the thread tension cannot be adjusted correctly, even by adjusting the upper thread tension. Check the upper threading and lower threading first, and then adjust the thread tension.

- When the lower thread is visible on the upper side of the fabric. Set the upper thread tension to a lower number. (Loosen the thread tension.)
- When the upper thread is visible on the lower side of the fabric. Set the upper thread tension to a higher number. (Tighten the thread tension.)
Fabric is Caught in the Machine and Cannot be Removed

If the fabric is caught in the machine and cannot be removed, the thread may have become tangled under the needle plate. Follow the procedure described below to remove the fabric from the machine. If the operation could not be completed according to the procedure, instead of attempting to complete it forcefully, contact your authorized Baby Lock retailer.

**Removing the fabric from the machine**

1. **Immediately stop the machine.**

2. **Turn off the machine.**

3. **Remove the needle.**
   - If the needle is lowered into the fabric, turn the handwheel away from you (clockwise) to raise the needle out of the fabric, and then remove the needle.
   - * Refer to “CHANGING THE NEEDLE” on page 69.

4. **Remove the presser foot and presser foot holder.**
   - * Refer to “CHANGING THE PRESSER FOOT” on page 72.

5. **Lift up the fabric and cut the threads below it.**
   - If the fabric can be removed, remove it. Continue with the following steps to clean the race.

6. **Slide the needle plate lever toward you.**
   - * Slide toward you.
   - → The needle plate opens.

7. **Slide out the needle plate with your right hand to remove it.**

8. **Grasp the bobbin case, and then gently lift out.**
   - If threads remain in the bobbin case, remove them.

9. **Use the cleaning brush or a vacuum cleaner to remove any dust or loose threads from the race and its surrounding area.**
   - * Cleaning brush
   - Race

10. **Insert the bobbin case so that the ▲ mark on the bobbin case aligns with the ● mark on the machine.**

① Bobbin case
② Race
③ Cleaning brush
**Align the ▲ and ● marks.**

1. ▲ mark
2. ● mark
3. Bobbin case

* Make sure that the indicated points are aligned before installing the bobbin case.

---

**CAUTION**

- Never use a bobbin case that is scratched; otherwise, the upper thread may become tangled, the needle may break, or sewing performance may suffer. For a new bobbin case (part code: XE5342-101 (green marking on the screw), XC8167-551 (no color on the screw)), contact your nearest authorized Baby Lock retailer.
- Make sure that you fit the bobbin case properly, otherwise the needle may break.

**Insert the tabs on the needle plate into the notches in the machine.**

1. Tabs
2. Notches

**Press down on the right side of the needle plate to secure it.**

**Check the condition of the needle, and then install it.**

If the needle is in a poor condition, for example, if it is bent, be sure to install a new needle.

* Refer to “CHANGING THE NEEDLE” on page 69.

---

**Checking machine operations**

If the needle plate has been removed, check machine operations to confirm that installation has been completed correctly.

1. **Turn on the machine.**
2. **Select .**

**Slowly turn the handwheel toward you (counterclockwise), and look from all sides to check that the needle falls at the center of the hole in the needle plate.**

If the needle contacts the needle plate, remove the needle plate, and then install it again.

**CAUTION**

- Never use bent needles. Bent needles can easily break, possibly resulting in injuries.

**Note**

- After completing this procedure, continue with the following procedure in “Checking machine operations” to check that the machine is operating correctly.

**Memo**

- Since the needle may have been damaged when the fabric was caught in the machine, we recommend replacing it with a new one.

**CAUTION**

- Never use bent needles. Bent needles can easily break, possibly resulting in injuries.

**Note**

- Do not yet install the presser foot and thread.

**CAUTION**

- Never use bent needles. Bent needles can easily break, possibly resulting in injuries.

**Note**

- Do not yet install the presser foot and thread.

---

**CAUTION**

- Never use bent needles. Bent needles can easily break, possibly resulting in injuries.

**Note**

- After completing this procedure, continue with the following procedure in “Checking machine operations” to check that the machine is operating correctly.

**Memo**

- Since the needle may have been damaged when the fabric was caught in the machine, we recommend replacing it with a new one.
4. Select zigzag stitch [ ]. At this time, increase the stitch length and width to their maximum settings.

5. Slowly turn the handwheel toward you (counterclockwise) and check that the needle bar and feed dogs operate correctly.
   If the needle or feed dogs contact the needle plate, the machine may be malfunctioning; therefore, contact your authorized Baby Lock retailer.

6. Turn off the machine, and then install the bobbin and presser foot.
   * Refer to “Setting the Bobbin” on page 58 and “CHANGING THE PRESSER FOOT” on page 72.

7. Correctly thread the machine.
   * For details on the machine, refer to “UPPER THREADING” on page 61.

   **Note**
   - The thread may have become tangled as a result of incorrect upper threading. Make sure that the machine is correctly threaded.


   **Note**
   - Remember when sewing thin fabrics, select a center stitch that is shorter in length and use the straight stitch needle plate for straight sewing stitches. A lightweight paper stabilizer can also be placed on the underside of the fabric.
List of Symptoms

If you have a minor problem with your machine, check the following solutions. If the solutions suggested do not correct the problem, contact your authorized Baby Lock retailer. Press for advice about minor sewing problems during sewing. Press at any time to return to the original screen.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
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<th>Page</th>
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</thead>
<tbody>
<tr>
<td>Cannot thread the needle.</td>
<td>Needle is not in the correct position.</td>
<td>Press the “Needle Position” button to raise the needle.</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Needle is installed incorrectly.</td>
<td>Reinstall the needle correctly.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Upper threading is incorrect.</td>
<td>Check the steps for threading the machine and rethread the machine.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>The needle threader hook is bent and does not pass through the eye of the needle.</td>
<td>Contact your authorized Baby Lock retailer.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>The needle threader lever cannot be moved or returned to its original position.</td>
<td>Contact your authorized Baby Lock retailer.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>A size 65/9 needle is being used.</td>
<td>The needle is incompatible with the needle threader. Manually pass the thread through the eye of the needle.</td>
<td>64</td>
</tr>
<tr>
<td>Cannot lower the presser foot with the presser foot lever.</td>
<td>Presser foot was raised using the “Presser Foot Lifter” button.</td>
<td>Press the “Presser Foot Lifter” button to lower the presser foot.</td>
<td>15</td>
</tr>
<tr>
<td>Bobbin thread does not wind neatly on the bobbin.</td>
<td>The thread is not passed through the bobbin winding thread guide correctly.</td>
<td>Correctly pass the thread through the bobbin winding thread guide.</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Bobbin spins slowly.</td>
<td>Press + in the bobbin winding window to increase the bobbin winding speed.</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>The thread that was pulled out was not wound onto the bobbin correctly.</td>
<td>Wind the thread that was pulled off around the bobbin 5 or 6 times clockwise.</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>The empty bobbin was not set on the pin properly.</td>
<td>Set the empty bobbin on the pin and slowly turn the bobbin until you hear it click in place.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>While winding the bobbin, the bobbin thread was wound below the bobbin winder seat.</td>
<td>You have not wound the bobbin thread properly when you are initially winding thread on the bobbin as well as being sure that the bobbin thread is set in the guides.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>The bobbin thread cannot be pulled up.</td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bobbin is set incorrectly.</td>
<td>Reset the bobbin thread correctly.</td>
</tr>
<tr>
<td></td>
<td>Machine does not operate</td>
<td>All keys and buttons have been locked by .</td>
<td>Press to unlock all keys and buttons.</td>
</tr>
<tr>
<td>Nothing appears in the LCD.</td>
<td>Main power switch is not turned on.</td>
<td>Turn the main power to ON.</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>The plug of the power cord is not inserted into an electrical outlet.</td>
<td>Insert the plug of the power cord into an electrical outlet.</td>
<td>26</td>
</tr>
<tr>
<td>The LCD screen does not look very clear.</td>
<td>The brightness of the screen is not adjusted.</td>
<td>Adjust the “Screen Display Brightness” in the settings screen.</td>
<td>29</td>
</tr>
<tr>
<td>Nothing happens, even if the LCD display is pressed</td>
<td>The screen has been locked.</td>
<td>Press either of the following keys to unlock the screen.</td>
<td>—</td>
</tr>
<tr>
<td>The LCD screen is fogged up.</td>
<td>Condensation has formed on the LCD screen.</td>
<td>After a while, the cloudiness will disappear.</td>
<td>—</td>
</tr>
<tr>
<td>The dual purpose stylus cannot be operated.</td>
<td>The dual purpose stylus is dirty.</td>
<td>Clean the light-emitting part of the dual purpose stylus.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>The battery is dead.</td>
<td>Replace the battery with a new one.</td>
<td>94</td>
</tr>
</tbody>
</table>
## Troubleshooting

<table>
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<th>Cause</th>
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<tbody>
<tr>
<td>Machine does not operate.</td>
<td>“Start/Stop” button was not pressed.</td>
<td>Press the “Start/Stop” button.</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>There is no stitch pattern selected.</td>
<td>Select a stitch pattern.</td>
<td>105, 158</td>
</tr>
<tr>
<td></td>
<td>Presser foot is not lowered.</td>
<td>Lower the presser foot.</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>“Start/Stop” button was pressed with the foot controller attached.</td>
<td>Remove the foot controller, or use the foot controller to operate the machine.</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>The “Start/Stop” button was pressed while the machine is set for the sewing speed controller to control the zigzag stitch width.</td>
<td>Use the foot controller instead of the “Start/Stop” button to operate the machine, or set the “Width Control” to “OFF” in the settings screen.</td>
<td>28, 78</td>
</tr>
<tr>
<td>Needle breaks.</td>
<td>Needle is installed incorrectly.</td>
<td>Reinstall the needle correctly.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Needle clamp screw is not tightened.</td>
<td>Tighten the needle clamp screw.</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Needle is turned or bent.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Using improper needle or thread for the selected fabric.</td>
<td>Check the “Fabric/Thread/Needle Combinations” chart.</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Wrong presser foot was used.</td>
<td>Use the recommended presser foot.</td>
<td>206</td>
</tr>
<tr>
<td></td>
<td>Upper thread tension is too tight.</td>
<td>Adjust the thread tension.</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Fabric is pulled during sewing.</td>
<td>Do not pull the fabric during sewing.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Spool cap is set incorrectly.</td>
<td>Check the method for attaching the spool cap, then reattach the spool cap.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>There are scratches around the opening in the needle plate.</td>
<td>Replace the needle plate, or consult your authorized Baby Lock retailer.</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>There are scratches around the opening in the presser foot.</td>
<td>Replace the presser foot, or consult your authorized Baby Lock retailer.</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>There are scratches on the bobbin case.</td>
<td>Replace the bobbin case, or consult your authorized Baby Lock retailer.</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>Needle is defective.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>A bobbin designed specifically for this machine is not used.</td>
<td>Incorrect bobbins will not work properly. Only use a bobbin designed specifically for this machine.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Upper threading is incorrect.</td>
<td>Check the steps for threading the machine and rethread the machine.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Bobbin is set incorrectly.</td>
<td>Reset the bobbin thread correctly.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Presser foot is attached incorrectly.</td>
<td>Attach the presser foot correctly.</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Screw of the presser foot holder is loose.</td>
<td>Securely tighten the screw of the presser foot.</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>Fabric is too thick.</td>
<td>Use fabric that the needle can pierce when the handwheel is turned.</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>Fabric is fed forcefully when sewing thick fabric or thick seams.</td>
<td>Allow the fabric to be fed without being forcefully pushed.</td>
<td>71, 82</td>
</tr>
<tr>
<td></td>
<td>Stitch length is too short.</td>
<td>Adjust the stitch length.</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Bobbin thread is incorrectly wound.</td>
<td>Use a correctly wound bobbin.</td>
<td>52</td>
</tr>
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<td>Problem</td>
<td>Cause</td>
<td>Solution</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>Upper thread breaks.</td>
<td>Machine is not threaded correctly (used the wrong spool cap, spool cap is loose, the thread did not catch the needle bar threader, etc.)</td>
<td>Rethread the machine correctly.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Knotted or tangled thread is being used.</td>
<td>Remove any knots or tangles.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>The selected needle is not appropriate for the thread being used.</td>
<td>Select a needle that is appropriate for the type of thread being used.</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Upper thread tension is too tight.</td>
<td>Adjust the thread tension.</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Thread is twisted.</td>
<td>Use scissors, etc., to cut the twisted thread and remove it from the race, etc.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Needle is installed incorrectly.</td>
<td>Reinstall the needle correctly.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>There are scratches around the opening of the needle plate.</td>
<td>Replace the needle plate, or consult your authorized Baby Lock retailer.</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>There are scratches around the opening in the presser foot.</td>
<td>Replace the presser foot, or consult your authorized Baby Lock retailer.</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>There are scratches on the bobbin case.</td>
<td>Replace the bobbin case, or consult your authorized Baby Lock retailer.</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>Using improper needle or thread for the selected fabric.</td>
<td>Check the “Fabric/Thread/Needle Combinations” chart.</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>While sewing, the thread became knotted or tangled.</td>
<td>Rethread upper and lower thread.</td>
<td>58, 61</td>
</tr>
<tr>
<td></td>
<td>A bobbin designed specifically for this machine is not used.</td>
<td>Incorrect bobbins will not work properly. Only use a bobbin designed specifically for this machine.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>The thread is tangled on the wrong side of the fabric.</td>
<td>Upper threading is incorrect.</td>
<td>Check the steps for threading the machine and rethread the machine. Be sure that the presser foot is in the raised position when threading the machine so that the upper thread sets properly in the upper tension.</td>
</tr>
<tr>
<td></td>
<td>Using improper needle or thread for the selected fabric.</td>
<td>Check the “Fabric/Thread/Needle Combinations” chart.</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>The upper thread is too tight.</td>
<td>The bobbin thread is incorrectly installed.</td>
<td>Correctly install the bobbin thread.</td>
</tr>
<tr>
<td>Bobbin thread breaks.</td>
<td>Bobbin is set incorrectly.</td>
<td>Reset the bobbin thread correctly.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Bobbin thread is incorrectly wound.</td>
<td>Use a correctly wound bobbin.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>There are scratches on the bobbin or it doesn’t rotate properly.</td>
<td>Replace the bobbin.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Thread is twisted.</td>
<td>Use scissors, etc., to cut the twisted thread and remove it from the race, etc.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>A bobbin designed specifically for this machine is not used.</td>
<td>Incorrect bobbins will not work properly. Only use a bobbin designed specifically for this machine.</td>
<td>58</td>
</tr>
<tr>
<td>Fabric puckers.</td>
<td>There is a mistake in the upper or bobbin threading.</td>
<td>Check the steps for threading the machine and rethread it correctly.</td>
<td>58, 61</td>
</tr>
<tr>
<td></td>
<td>Spool cap is set incorrectly.</td>
<td>Check the method for attaching the spool cap, then reattach the spool cap.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Using improper needle or thread for the selected fabric.</td>
<td>Check the “Fabric/Thread/Needle Combinations” chart.</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Stitches are too long when sewing thin fabrics.</td>
<td>Shorten the stitch length.</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Thread tension is set incorrectly.</td>
<td>Adjust the thread tension.</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Wrong presser foot.</td>
<td>Use the correct presser foot.</td>
<td>206</td>
</tr>
<tr>
<td>The stitch is not sewn correctly.</td>
<td>The presser foot that is used is not appropriate for the type of stitch that you wish to sew.</td>
<td>Attach the presser foot that is appropriate for the type of stitch that you wish to sew.</td>
<td>206</td>
</tr>
<tr>
<td></td>
<td>The thread tension is incorrect.</td>
<td>Adjust the tension of the upper thread.</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>The thread is tangled, for example, in the bobbin case.</td>
<td>Remove the tangle thread. If the thread is tangled in the bobbin case, clean the race.</td>
<td>184</td>
</tr>
<tr>
<td>Skipped stitches</td>
<td>Machine is threaded incorrectly.</td>
<td>Check the steps for threading the machine and rethread it correctly.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Using improper needle or thread for the selected fabric.</td>
<td>Check the “Fabric/Thread/Needle Combinations” chart.</td>
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</tr>
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<td>------</td>
</tr>
<tr>
<td>Skipped stitches</td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Needle is installed incorrectly.</td>
<td>Reinstall the needle correctly.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Needle is defective.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Dust or lint has collected under the needle plate.</td>
<td>Remove the dust or lint with the brush.</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>Thin or stretch fabrics are being sewn.</td>
<td>Sew with one sheet of thin paper under the fabric.</td>
<td>84</td>
</tr>
<tr>
<td>No stitching</td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Bobbin is set incorrectly.</td>
<td>Reset the bobbin thread correctly.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Upper threading is incorrect.</td>
<td>Check the steps for threading the machine and rethread the machine.</td>
<td>61</td>
</tr>
<tr>
<td>High-pitched sound while sewing</td>
<td>Dust or lint is caught in the feed dogs.</td>
<td>Remove the dust or lint.</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>Pieces of thread are caught in the race.</td>
<td>Clean the race.</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>Upper threading is incorrect.</td>
<td>Check the steps for threading the machine and rethread the machine.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>A bobbin designed specifically for this machine is not used.</td>
<td>Incorrect bobbins will not work properly. Only use a bobbin designed specifically for this machine.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>There are needle holes or friction scratches in the bobbin case.</td>
<td>Replace the bobbin case, or consult your authorized Baby Lock retailer.</td>
<td>184</td>
</tr>
<tr>
<td>Fabric does not feed through the machine.</td>
<td>Feed dogs are set in the down position.</td>
<td>Press [\text{\textendash}] and then turn the handwheel to raise the feed dogs.</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>Stitches are too close together.</td>
<td>Lengthen the stitch length setting.</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Wrong presser foot was used.</td>
<td>Use the correct presser foot.</td>
<td>206</td>
</tr>
<tr>
<td></td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Thread is entangled.</td>
<td>Cut the entangled thread and remove it from the race.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Zigzag foot “J” is slanted on a thick seam at the beginning of stitching.</td>
<td>Use the presser foot locking pin (black button on the left side) on zigzag foot “J” to keep the presser foot level while sewing.</td>
<td>83</td>
</tr>
<tr>
<td>The fabric feeds in the opposite direction.</td>
<td>The feed mechanism is damaged.</td>
<td>Contact your authorized Baby Lock retailer.</td>
<td>—</td>
</tr>
<tr>
<td>The needle contacts the needle plate.</td>
<td>The needle clamp screw is loose.</td>
<td>Firmly tighten the needle clamp screw. If the needle is bent or blunt, replace it with a new one.</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td>Fabric being sewn with the machine cannot be removed.</td>
<td>Thread is tangled below the needle plate.</td>
<td>Lift up the fabric and cut the threads below it, and clean the race.</td>
<td>189</td>
</tr>
<tr>
<td>A broken needle has fallen into the machine.</td>
<td></td>
<td>Turn off the machine, and then remove the needle plate. If the needle that fell into the machine can be seen, use tweezers to remove it. After removing the needle, return the needle plate to its original position. Before turning on the machine, slowly turn the handwheel toward you to check that it turns smoothly. If the handwheel does not turn smoothly or the needle that fell into the machine cannot be removed, consult your authorized Baby Lock retailer.</td>
<td>—</td>
</tr>
<tr>
<td>The handwheel feels sluggish when it is turned.</td>
<td>Thread is tangled in the bobbin case.</td>
<td>Remove the tangled thread from the bobbin case. Re-install the bobbin case so it is correctly positioned.</td>
<td>189</td>
</tr>
<tr>
<td>The built-in camera cannot detect the buttonhole foot.</td>
<td>The buttonhole foot is dirty.</td>
<td>Clean the area of the buttonhole foot to be detected.</td>
<td>141</td>
</tr>
<tr>
<td></td>
<td>Mark “A+” or 3 dots on the presser foot is shaded.</td>
<td>Keep these area clean.</td>
<td>141</td>
</tr>
</tbody>
</table>
## After sewing

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread tension is incorrect.</td>
<td>Upper threading is incorrect.</td>
<td>Check the steps for threading the machine and rethread the machine.</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Bobbin is set incorrectly.</td>
<td>Reset the bobbin. (If needle plate was removed, reinstall needle plate and tighten screws prior to installing bobbin case.)</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Using improper needle or thread for the selected fabric.</td>
<td>Check the “Fabric/Thread/Needle Combinations” chart.</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Presser foot holder is not attached correctly.</td>
<td>Reattach the presser foot holder correctly.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Thread tension is set incorrectly.</td>
<td>Adjust the thread tension.</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Bobbin thread is incorrectly wound.</td>
<td>Use a correctly wound bobbin.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Needle is turned, bent or the point is dull.</td>
<td>Replace the needle.</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>A bobbin designed specifically for this machine is not used.</td>
<td>Incorrect bobbins will not work properly. Only use a bobbin designed specifically for this machine.</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Character or decorative stitch patterns are misaligned.</td>
<td>Stitch pattern adjustment settings were set incorrectly.</td>
<td>Revise the stitch pattern adjustment settings.</td>
</tr>
<tr>
<td></td>
<td>Stitch pattern does not turn out.</td>
<td>Wrong presser foot was used.</td>
<td>Attach the correct presser foot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Did not use a stabilizer material on thin fabrics or stretch fabrics.</td>
<td>Attach a stabilizer material.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thread tension is set incorrectly.</td>
<td>Adjust the thread tension.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fabric was pulled, pushed or fed at an angle while it was being sewn.</td>
<td>Sew while guiding the fabric with your hands so that the fabric is fed in a straight line.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The thread is tangled, for example, in the bobbin case.</td>
<td>Remove the tangle thread. If the thread is tangled in the bobbin case, clean the race.</td>
</tr>
</tbody>
</table>

⚠️ **CAUTION**

- This machine is equipped with a thread detection device. If the “Start/Stop” button is pushed before the upper threading is done, the machine will not operate properly.
- If the power is disconnected during sewing:
  - Turn the main power to OFF and unplug the machine.
  - If you restart the machine, follow the Instruction and Reference Guide for operating the machine correctly.
ERROR MESSAGES

If the machine is not properly set and the “Start/Stop” button or the “Reverse/Reinforcement Stitch” button is pressed, or if the operation procedure is incorrect, the machine does not start. An alarm sounds and an error message is displayed on the LCD. If an error message displays, follow the instructions in the message.

Below is an explanation of error messages. Refer to these when necessary (if you press OK or do the operation correctly while the error message is displayed, the message disappears).

⚠️ CAUTION

- Be sure to rethread the machine. If you press the “Start/Stop” button without rethreading the machine, the thread tension may be wrong or the needle may break and cause injury.

This message is displayed when the motor locks due to tangled thread or for other reasons related to thread delivery.

This message is displayed when the motor locks due to tangled thread or for other reasons related to thread delivery.

This message is displayed when the speed control lever is set to control the zigzag stitch width, and the “Start/Stop” button is pushed. Use the foot controller to operate the machine.

This message is displayed when the automatic needle threading button is pushed while twin needle sewing is set.

This message appears when you try to save more than 100 camera image or settings screen image files in the USB media. In this case, delete a file from the USB media or use different USB media. (page 32)

This message appears when Delete or All Delete is pressed to delete the settings for a utility stitch. To delete the selected settings, press OK.

This message is displayed when the stitch patterns you are editing take up too much memory, or if you are editing too many stitch patterns for the memory.

This message is displayed when the speed control lever is set to control the zigzag stitch width, and the “Start/Stop” button does not operate.

This message is displayed when you try to sew with a stitch other than a middle needle position stitch while the single-hole needle plate is installed.

This message is displayed when you try to combine more than 71 stitch patterns.

This message is displayed when the needle plate is removed with the machine on or when the machine is turned on and embroidery or embroidery edit mode is selected.

This message is displayed when the machine needs to be maintained. (page 187)

This message appears when  or  is pressed to delete the settings for a utility stitch. To delete the selected settings, press OK.

This message is displayed when you try to combine more than 71 stitch patterns.

This message is displayed when the automatic needle threading button cannot be used.

This message appears when you try to save more than 100 camera image or settings screen image files in the USB media. In this case, delete a file from the USB media or use different USB media. (page 32)

This message appears when Delete or All Delete is pressed to delete the settings for a utility stitch. To delete the selected settings, press OK.

This message is displayed when you try to combine more than 71 stitch patterns.

This message is displayed when the automatic needle threading button cannot be used.

This message appears when you try to save more than 100 camera image or settings screen image files in the USB media. In this case, delete a file from the USB media or use different USB media. (page 32)

This message appears when Delete or All Delete is pressed to delete the settings for a utility stitch. To delete the selected settings, press OK.

This message is displayed when you try to combine more than 71 stitch patterns.
This message is displayed when a key on the LCD display is touched while the needle is in the down position.

This message is displayed when there are too many characters and the curved character configuration is impossible.

This message is displayed when the upper thread is broken or not threaded correctly, and the “Start/Stop” button or the “Reverse/Reinforcement Stitch” button is pressed.

This message is displayed when the “Presser Foot Lifter” button is pushed while the presser foot lever is raised/the needle is lowered.

This message is displayed when the “Start/Stop” button does not operate with the foot controller attached. Remove the foot controller.

This message is displayed when there is no stitch pattern selected and the “Start/Stop” button or the “Reverse/Reinforcement Stitch” button is pressed.

This message is displayed when the bobbin thread is almost empty.

This message is displayed when the memory is full and the stitch pattern or embroidery pattern cannot be saved.

This message is displayed when there is no stitch pattern selected and the “Start/Stop” button or the “Reverse/Reinforcement Stitch” button is pressed.

This message is displayed when the bobbin is being wound, and the motor locks because the thread is tangled, etc.

This message is displayed when there is a possibility that the data for the selected stitch pattern is corrupted.

This message is displayed when you try to use incompatible media.

This message is displayed when the memory is full and a stitch pattern must be deleted.

This message is displayed when an error occurs with the USB media.
This message is displayed when a button, such as the “Start/Stop” button, is pushed while the presser foot is raised.

This message is displayed when it seems that the upper thread has not been threaded correctly.

This message is displayed when the file size exceeds the data capacity of the machine. Confirm the file size and format. (page 35.)

This message appears if the file format is incompatible with this machine. Check the list of compatible file formats. (page 35.)

This message is displayed when the image is deleted.

This message is displayed when you press sewing guide in the screen other than the utility stitch, or press in the screen other than the utility stitch or character/decorative stitch.

This message appears when you try to start sewing utility stitches or character/decorative stitches with the embroidery foot with the LED pointer attached to the machine. Remove the embroidery foot with the LED pointer before entering the sewing mode.

This message appears when the dual feed foot cannot be used with the current stitch. Select other stitch.

This message appears when start sewing buttonhole stitches without attaching buttonhole foot “A+”.

This message appears when a button, such as the “Start/Stop” button, is pushed while the presser foot is raised.

This message is displayed when the upper thread has not been threaded correctly.

This message is displayed when the file size exceeds the data capacity of the machine. Confirm the file size and format. (page 35.)

This message appears if the file format is incompatible with this machine. Check the list of compatible file formats. (page 35.)

This message is displayed when the image is deleted.

This message is displayed when you press sewing guide in the screen other than the utility stitch, or press in the screen other than the utility stitch or character/decorative stitch.

This message appears when you try to start sewing utility stitches or character/decorative stitches with the embroidery foot with the LED pointer attached to the machine. Remove the embroidery foot with the LED pointer before entering the sewing mode.

This message appears when the dual feed foot cannot be used with the current stitch. Select other stitch.

This message appears when start sewing buttonhole stitches without attaching buttonhole foot “A+”.

**Alarm Sounds**

If the operation was performed incorrectly, an alarm sounds to indicate that an error occurred. If the operation was performed correctly, the machine beeps to confirm the operation.

**Memo**

- To cancel the operation beep or to change the volume, press , display page 4 of the General settings screen, and then change the setting for “Machine Speaker Volume”. Refer to page 29 for more details.
**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Machine (Box 1 of 2)</strong></td>
<td></td>
</tr>
<tr>
<td>Dimensions of machine</td>
<td>Approx. 690 mm (W) × 349 mm (H) × 322 mm (D) (approx. 27-11/64 inches (W) × 13-47/64 inches (H) × 12-43/64 inches (D))</td>
</tr>
<tr>
<td>Dimensions of box</td>
<td>Approx. 805 mm (W) × 510 mm (H) × 405 mm (D) (approx. 31-11/16 inches (W) × 20-5/64 inches (H) × 15-15/16 inches (D))</td>
</tr>
<tr>
<td>Weight of machine</td>
<td>Approx. 19.6 kg (approx. 43.2 lb)</td>
</tr>
<tr>
<td>Weight of box (for shipping)</td>
<td>Approx. 23.0 kg (approx. 50.7 lb)</td>
</tr>
<tr>
<td>Sewing speed</td>
<td>70 to 1050 stitches per minute</td>
</tr>
<tr>
<td>Needles</td>
<td>Home sewing machine needles (HA × 130)</td>
</tr>
<tr>
<td><strong>Embroidery Unit (Box 2 of 2)</strong></td>
<td></td>
</tr>
<tr>
<td>Dimensions of embroidery unit</td>
<td>Approx. 637 mm (W) × 150 mm (H) × 576 mm (D) (approx. 25-5/64 inches (W) × 5-29/32 inches (H) × 22-43/64 inches (D))</td>
</tr>
<tr>
<td>Dimensions of machine with embroidery unit attached</td>
<td>Approx. 973 mm (W) × 349 mm (H) × 576 mm (D) (approx. 38-5/16 inches (W) × 13-47/64 inches (H) × 22-43/64 inches (D))</td>
</tr>
<tr>
<td>Dimensions of box</td>
<td>Approx. 800 mm (W) × 695 mm (H) × 205 mm (D) (approx. 31-1/2 inches (W) × 27-23/64 inches (H) × 8-5/64 inches (D))</td>
</tr>
<tr>
<td>Weight of embroidery unit</td>
<td>Approx. 5.6 kg (approx. 12.3 lb)</td>
</tr>
<tr>
<td>Weight of box (for shipping)</td>
<td>Approx. 9.2 kg (approx. 20.3 lb)</td>
</tr>
<tr>
<td><strong>Total Shipping Weight (Combination of all 2 boxes complete)</strong></td>
<td>Approx. 43.4 kg (approx. 95.7 lb)</td>
</tr>
<tr>
<td><strong>Data storage</strong></td>
<td>USB media/SD card (SD and SDHC)</td>
</tr>
</tbody>
</table>

* Please be aware that some specifications may change without notice.
UPGRADING YOUR MACHINE’S SOFTWARE

You can use USB media to upgrade software for your machine. When an upgrade program is available on “www.babylock.com”, please download the files following the instructions on the website and steps below.

**Note**
- When using USB media to upgrade the software, check that no data other than the upgrade file is saved on the USB media being used before starting to upgrade.
- Compatible operating systems:
  - Windows 7, Windows 8.1, Windows 10

## Upgrade Procedure Using USB Media

1. **While pressing the “Automatic Threading” button, turn the main power to ON.**
   - The following screen will appear on the LCD.

2. **Press** or **.**

3. **Insert the USB media into the USB port corresponding to the button pressed in step 2.** USB port on the machine. The media device should only contain the upgrade file.

4. **Press** .
   - The upgrade file is loaded.

5. **Remove the USB media, and turn the machine off and on again.**

### Note
- If an error occurs, a red text error message will appear. When the installation is performed successfully, the following message will appear.

---

1. USB media
2. USB port

---

The access lamp will begin blinking after inserting USB media, and it will take about 5 to 6 seconds to recognize the media. (Time will differ depending on the USB media).
The following chart shows information for each utility stitch concerning applications, stitch lengths, stitch widths, and whether or not the twin needle mode can be used.

Note
• Quilting foot “C” is used when the straight stitch needle plate is attached to the machine. Refer to “Using Free motion Quilting Foot “C”” on page 126.

<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
<th>Applications</th>
<th>Stitch width [mm (inch)]</th>
<th>Stitch length [mm (inch)]</th>
<th>Twin needle mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-08</td>
<td>Straight stitch (Left)</td>
<td></td>
<td>General sewing, gather, pintuck, etc. Reverse stitch is sewn while pressing “Reverse/Reinforcement Stitch” button.</td>
<td>0.0 (0)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.5 (3/32)</td>
</tr>
<tr>
<td>1-09</td>
<td>Straight stitch (Left)</td>
<td></td>
<td>General sewing, gather, pintuck, etc. Reinforcement stitch is sewn while pressing “Reverse/Reinforcement Stitch” button.</td>
<td>0.0 (0)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.5 (3/32)</td>
</tr>
<tr>
<td>1-10</td>
<td>Straight stitch (Middle)</td>
<td></td>
<td>General sewing, gather, pintuck, etc. Reverse stitch is sewn while pressing “Reverse/Reinforcement Stitch” button.</td>
<td>3.5 (9/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.5 (3/32)</td>
</tr>
<tr>
<td>1-11</td>
<td>Straight stitch (Middle)</td>
<td></td>
<td>General sewing, gather, pintuck, etc. Reinforcement stitch is sewn while pressing “Reverse/Reinforcement Stitch” button.</td>
<td>3.5 (9/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.5 (3/32)</td>
</tr>
<tr>
<td>1-12</td>
<td>Triple stretch stitch</td>
<td></td>
<td>General sewing for reinforcement and decorative topstitching</td>
<td>0.0 (0)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.5 (3/32)</td>
</tr>
<tr>
<td>1-13</td>
<td>Stem stitch</td>
<td></td>
<td>Reinforced stitching, sewing and decorative applications</td>
<td>1.0 (3/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.5 (3/32)</td>
</tr>
<tr>
<td>1-14</td>
<td>Decorative stitch</td>
<td></td>
<td>Decorative stitching, top stitching</td>
<td>0.0 (0)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.5 (3/32)</td>
</tr>
<tr>
<td>1-15</td>
<td>Basting stitch</td>
<td></td>
<td>Basting</td>
<td>0.0 (0)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>0.2 (1/8)</td>
</tr>
<tr>
<td>1-16</td>
<td>Zigzag stitch</td>
<td></td>
<td>For overcasting, mending. Reverse stitch is sewn while pressing “Reverse/Reinforcement Stitch” button.</td>
<td>3.5 (9/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.4 (1/16)</td>
</tr>
<tr>
<td>1-17</td>
<td>Zigzag stitch</td>
<td></td>
<td>For overcasting, mending. Reinforcement stitch is sewn while pressing “Reverse/Reinforcement Stitch” button.</td>
<td>3.5 (9/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.4 (1/16)</td>
</tr>
<tr>
<td>1-18</td>
<td>Zigzag stitch (Right)</td>
<td></td>
<td>Start from right needle position, zigzag sew at left.</td>
<td>3.5 (9/64)</td>
<td>2.5 - 5.0 (3/32 - 13/64)</td>
<td>1.4 (1/16)</td>
</tr>
<tr>
<td>1-19</td>
<td>Zigzag stitch (Left)</td>
<td></td>
<td>Start from left needle position, zigzag sew at right.</td>
<td>3.5 (9/64)</td>
<td>2.5 - 5.0 (3/32 - 13/64)</td>
<td>1.4 (1/16)</td>
</tr>
<tr>
<td>1-20</td>
<td>2 steps elastic zigzag</td>
<td></td>
<td>Overcasting (medium weight and stretch fabrics), tape and elastic</td>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
</tr>
<tr>
<td>Stitch width [mm (inch)]</td>
<td>Stitch length [mm (inch)]</td>
<td>Twin needle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stitch Width</strong></td>
<td><strong>Stitch Length</strong></td>
<td><strong>Needle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>NO (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5 (9/64)</td>
<td>2.5 - 5.0 (3/32 - 13/64)</td>
<td>2.0 (5/64)</td>
<td>0.4 - 5.0 (1/64 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0 (5/32)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.0 (5/64)</td>
<td>0.4 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.0 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 (15/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>3.0 (1/8)</td>
<td>0.4 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 (15/64)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>1.8 (1/16)</td>
<td>0.4 - 5.0 (1/64 - 13/64)</td>
<td>OK (J)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0 (0)</td>
<td>0.0 - 2.5 (0 - 3/32)</td>
<td>2.5 (3/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5 (9/64)</td>
<td>3.5 - 5.0 (9/64 - 13/64)</td>
<td>1.4 (1/16)</td>
<td>0.0 - 5.0 (0 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5 (9/64)</td>
<td>3.5 - 5.0 (9/64 - 13/64)</td>
<td>2.0 (5/64)</td>
<td>0.4 - 5.0 (1/64 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>3.5 - 5.0 (9/64 - 13/64)</td>
<td>2.5 (3/32)</td>
<td>0.4 - 5.0 (1/64 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 (13/64)</td>
<td>3.5 - 5.0 (9/64 - 13/64)</td>
<td>2.5 (3/32)</td>
<td>0.4 - 5.0 (1/64 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.5 (7/32)</td>
<td>0.0 - 7.0 (0 - 9/32)</td>
<td>2.0 (5/64)</td>
<td>0.2 - 5.0 (1/64 - 13/64)</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Applications**

- **Overcasting** (medium weight and stretch fabrics), tape and elastic
- **Piecing stitch** (Right) (approx. 1/4 inch) right seam allowance
- **Piecing stitch** (Middle)
<table>
<thead>
<tr>
<th>Stitch</th>
<th>Stitch name</th>
<th>Presser foot</th>
<th>Applications</th>
<th>Stitch width [mm (inch)]</th>
<th>Stitch length [mm (inch)]</th>
<th>Twin needle</th>
</tr>
</thead>
<tbody>
<tr>
<td>#20-1</td>
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<td>0, 5</td>
<td>Piecework/patchwork 6.5 mm (approx. 1/4 inch) left seam allowance</td>
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<td>0.0 - 7.0 (0 - 9/32)</td>
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<td>Quilting stitch made to look like hand quilting stitch</td>
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<td>0.0 - 7.0 (0 - 9/32)</td>
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<td>Zigzag stitch for quilting and sewing on appliqué quilt pieces</td>
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<td>0.4 (1/64)</td>
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<th>Applications</th>
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<td>7.0 6.0 5.0 (9/32 15/64 13/64)</td>
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<td>Heirloom, decorative hems</td>
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