brother.

PROGRAMMABLE ELECTRONIC LOCK STITCH SEWING MACHINE PROFILE L PROGRAMMER

BAS-361

INSTRUCTION MANUAL

CONTENTS

X/Y display

This display indicates the amount of presser clamp movement in the X direction or Y direction when the feed key is pressed.

Command indicator

The command indicator will illuminate when the feed key, mirror key. cancel key, or line key is pressed, i. e., only if they are operating properly.

Line key

This key enables the operator to easily program straight-line portions of the pattern design.

Cancel key

This key is to be used to cancel any of the points in the pattern design which have already been programmed.

Number keys

The keys pressed will be indicated in sequential order in the STEP display.

Minus key

- When this key is pressed, the presser clamp will move in the program direction the number of times number of times (i.e., the number of times ⊡ is pressed) indicated on the STEP display.
- If any input command key is pressed accidentally, this key can be used to clear the command.

Plus key

- When this key is pressed, the presser clamp will move in the program direction the number of times (i.e., the number of times ⊡ is pressed) indicated on the STEP display.
- If any input command key is pressed accidentally, this key can be used to clear the command.

Direction keys

Press these keys to move the needle in the direction of the arrow.

However, if command indicator ☐, ☐, or ⊡ is not displayed, the needle will not move more than 6.3 mm.
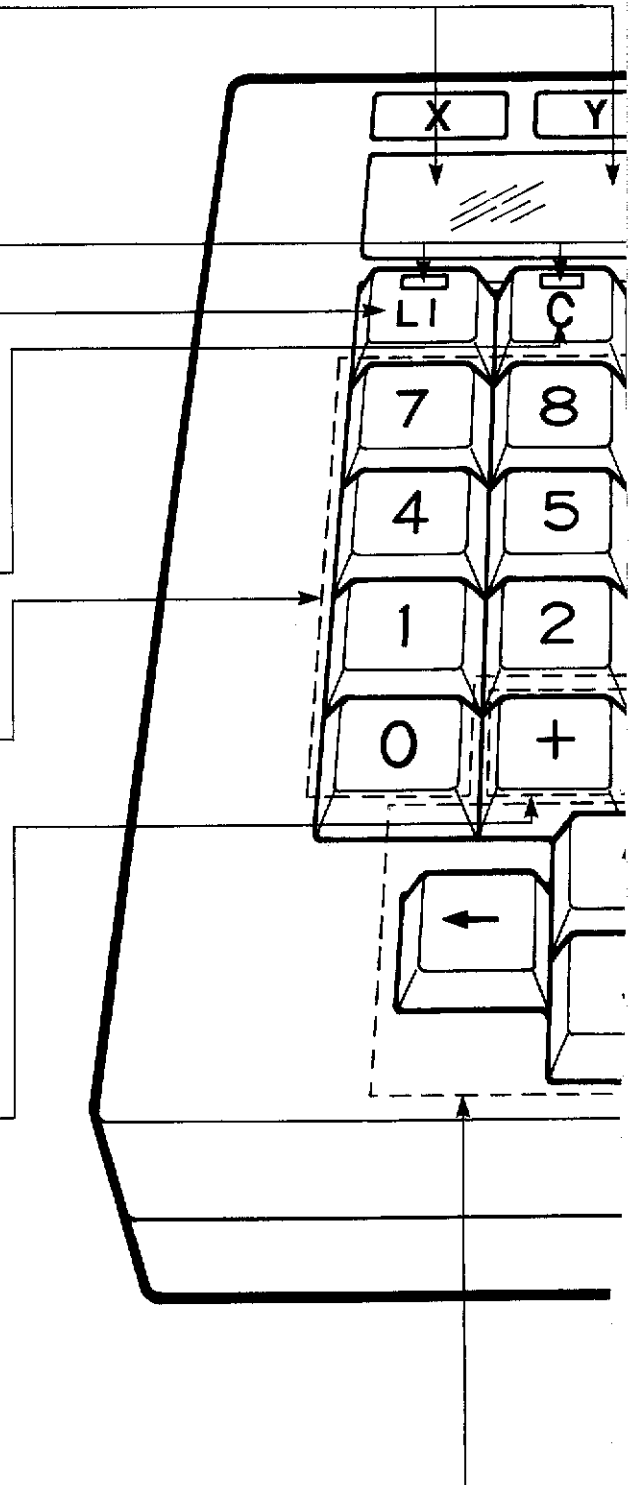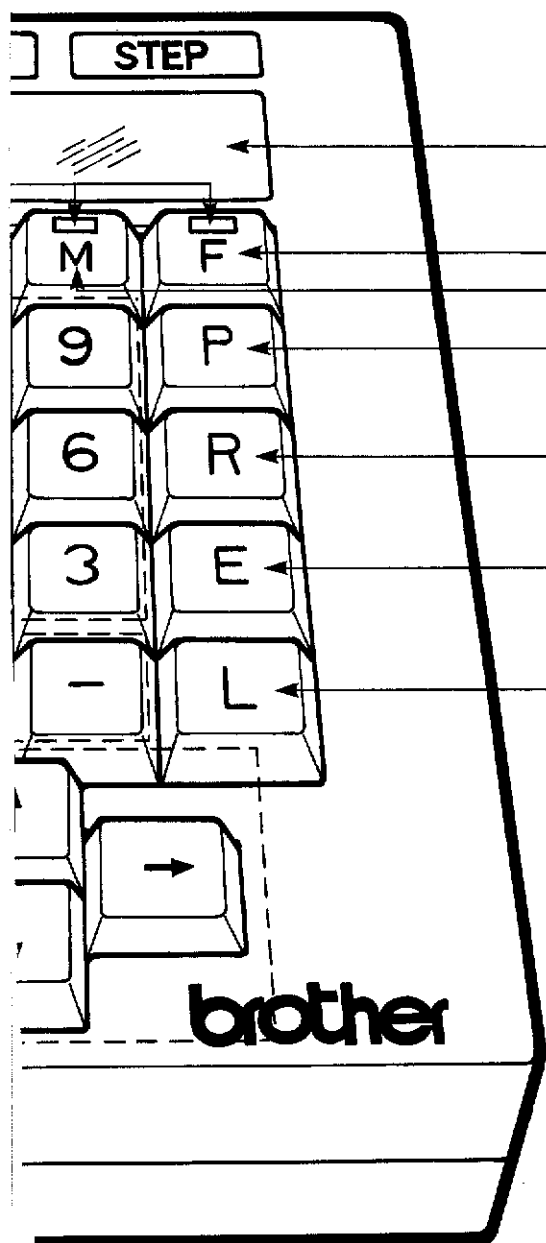
STEP display
- This display indicates the number of steps when the ⊞ key or ⊟ key is used.
- It also indicates the various numerical input commands.
- If the programmable sewing speed becomes less than 500 spm while in the (⃞L) mode, the display will flash on and off up to 100 spm to warn the operator.

Feed key
After the thread trimming operation is completed, this key is used if the sewing operation is not to be restarted immediately following the position at which the thread trimming operation is performed.

Mirror key
This key is used to program a symmetrical mirror image of a pattern which has already been input or to program a turning pattern design. It is also to be used to perform such operations as smoothing, enlarging, reducing, or repeat sewing.

Program key
This switch is to be used to select either the sewing mode or the program mode.

Reset key
If this key is pressed during the program mode, the presser clamp will move to the point of origin. Enter "222" in the STEP display and press the reset key to erase the program.

End key
Enter "111" in the STEP display and press [E] to program the end point of the sewing pattern.

Load key
If this key is pressed, the position of the needle at that time will be programmed. Note that even if this key is pressed more than once while the needle remains in the same position, the input command will be programmed only once.

- This command list is to be used to program an operation.
  Refer to this list to input the program correctly.

111 E	END	
222 R	DATA CLEAR	
333 L	REPEAT	⋎
555 L	TRACE	
666 L	LOW SPEED	
440 L	POINT SYMMETRY	↺
441 L	X SYMMETRY	
442 L	Y SYMMETRY	
443 L	REVERSE	

001 M ◺ORIGINAL
011 M ◹▽ **010** M

□□□ M (PITCH) SMOOTHING   [Example] Pitch 3mm   030M
If not specified: 2mm

789 L SMOOTHING END Push this key at a corner

4□□ M (WIDTH) REPEAT SEWING [Example] width 2mm 420M

5□□ M (NUMBER OF LINES) REPEAT SEWING [Example] 4 lines 504M

3□□ M (DIVISION) TURNING [Example] Divided into 4 portions 304M
MAX. 36 portions (10°)

F **666** SPLIT PROGRAMMING

8□□ M ENLARGEMENT/REDUCTION X RATIO 812M
[Example] Ratio 1.2

9□□ M ENLARGEMENT/REDUCTION Y RATIO 908M
[Example] Ratio 0.8

※ When using TRACE and other commands (for example SMOOTHING)
at the same time, specify TRACE first.

CORRECT HANDLING OF THE PROGRAMMER
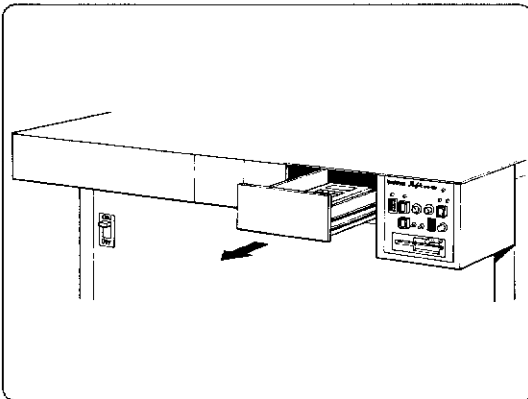
- The programmer of the BAS-361 is set inside a compact drawer.
(1) To bring out the programmer, lightly lift the drawer, and pull.
(2) To operate the programmer, be sure to set the slide switch to the ON position. When a program is completed, press P.

☐ Preliminary procedure

(1) Outline the pattern of the needle movement on a piece of graph paper.
At this time, be sure to use a thin piece of graph paper.

≪Note≫
- Outline the pattern to the actual size.
- Design the pattern so that the stitch pitch does not exceed 6.3 mm in either the X or Y direction.
- The maximum sewing speed is 10,000.
- The maximum pattern size is 600 mm in the X direction and 250 mm in the Y direction.
- There are no limits in establishing the initial stitch position, performing a backstitch operation, or setting the sewing direction.
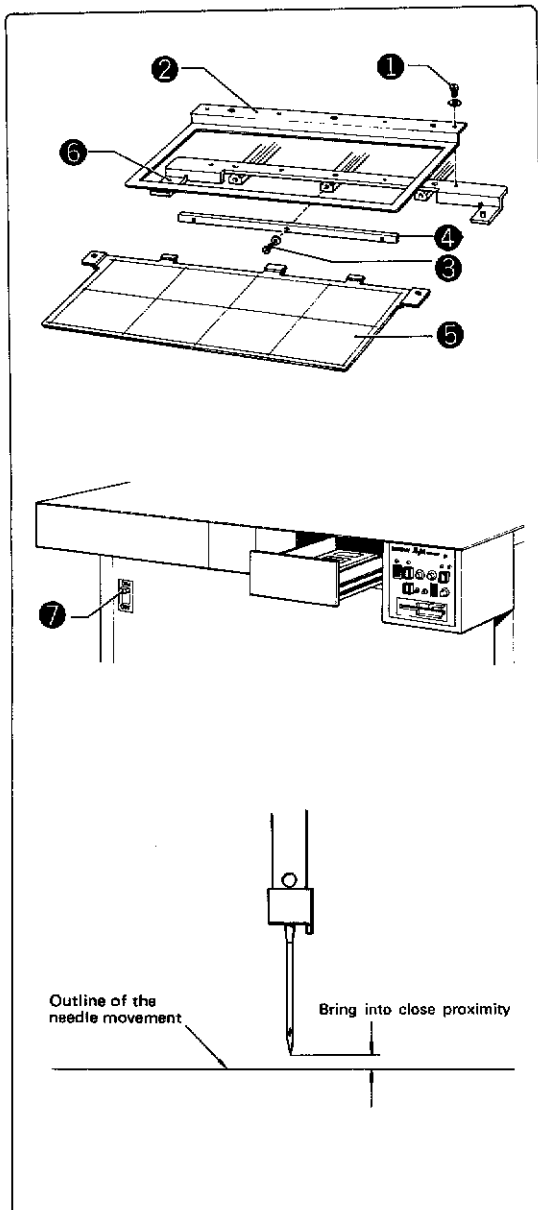
(2) Remove the set screw ❶, and then remove the feed plate ❷.

(3) Remove the set screw ❸, and then remove the slide cover ❹.

(4) Set the base plate ❺ onto the front plate ❻ of the feed guide.

(5) Tape the outline of the needle movement to the base plate ❺.

(6) Lightly lift the drawer containing the programmer, and pull. Set the power switch ❼ on.

(7) Turn the pulley, and bring the tip of the needle as close as possible to the outline of the needle movement.
(For proper operation, refer to page 10 in the Instruction Manual of the BAS-361 sewing machine.)
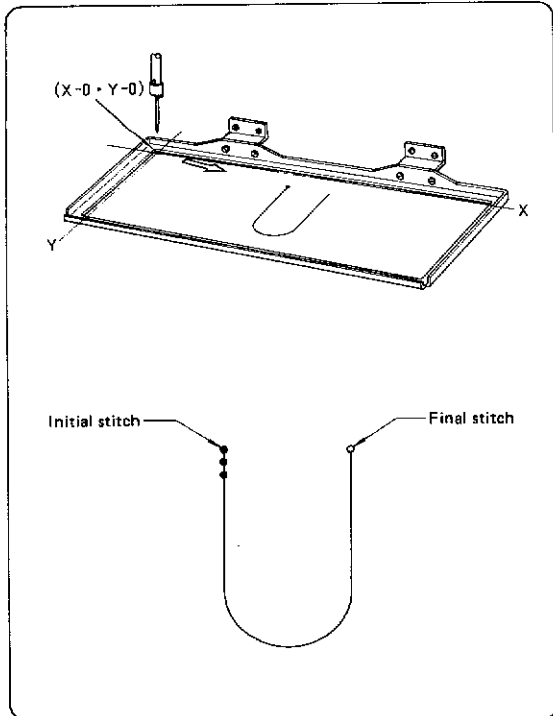
Outline of the needle movement   Bring into close proximity

2 To program the pattern one stitch at a time

Example: To program the pattern in the figure at the left.
(1) Press P. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator F will illuminate.
(2) Use the direction keys to move the presser clamp to the initial stitch position.
(3) When the tip of the needle and the initial stitch position on the outline of the needle movement are aligned, press L. The initial stitch will be programmed.
(4) Repeat the above procedure to program the remaining stitches of the pattern.
(5) After L is pressed to program the final stitch, press the number key 1 3 times to show "111" on the STEP display, and then press E.
(6) The presser clamp will return to the initial stitch position.
(7) Write the program data to the floppy disk. (Refer to page 24.)
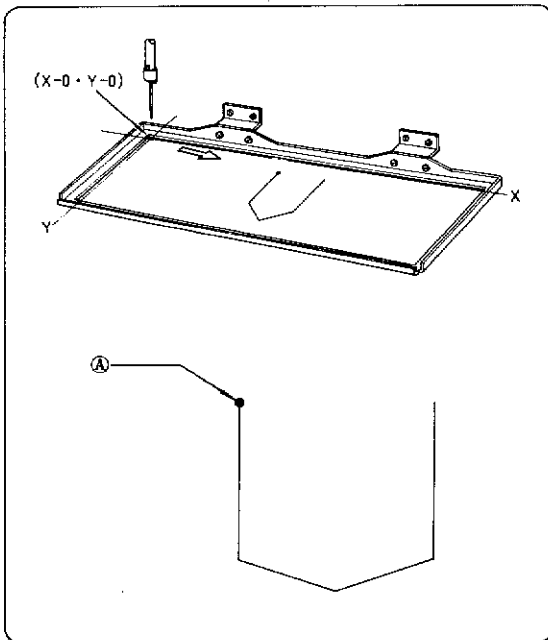
3 To program a stitch pattern containing numerous straight lines in the pattern design.

● Use the L key to facilitate the programming of straight-line portions of the pattern.

Example: To program the pattern in the figure below.
(1) Press P. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and F will illuminate.
(2) Use the direction keys to move the presser clamp to the initial stitch position.
(3) When the tip of the needle and the initial stitch position Ⓐ on the outline of the needle movement are aligned, press L. The initial stitch will be programmed.
(4) Use the number keys to indicate the proper pitch on the STEP display. To set the proper pitch, divide the actual stitch pitch by 1 pulse (i.e., 0.1 mm).
(For example, to set the proper pitch when the actual stitch pitch is 3 mm, press the number keys to indicate [030] in the STEP display.)
※ If the pitch is not indicated on the STEP display, or if it exceeds 6.3 mm (63), it will automatically be set to 2 mm.
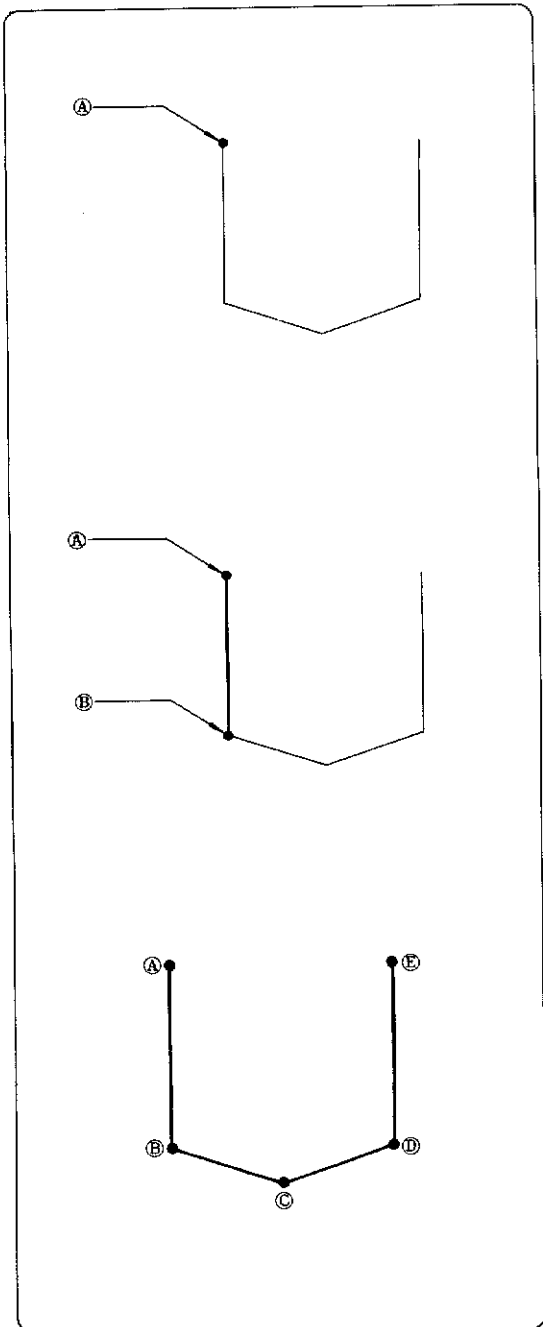
(5) Press ⬛. Indicator ⬛ will illuminate.

(6) Use the direction keys to move the presser clamp to the final stitch position of Ⓑ on the straight line portion of the pattern design.

Note 1 **When more than 120 stitches are required between point Ⓐ and point Ⓑ, the feed speed will suddenly decrease to warn the operator. Press Ⓛ to reset the pitch and then press ⬛ between point Ⓐ and point Ⓑ to reprogram the remaining stitches on the straight-line portion of the pattern.**

(7) Press Ⓛ when the needle tip is aligned with point Ⓑ on the outline of the needle movement. The straight-line portion from Ⓐ to Ⓑ will be programmed.

(8) Repeat the above procedure to program the remaining straight-line portions from point Ⓑ → Ⓒ, Ⓒ → Ⓓ, Ⓓ → Ⓔ.

Note 2 **For diagonal lines, e.g. Ⓑ → Ⓒ, there are instances in which the line may not turn out to be straight unless the line is subdivided into smaller portions.**

(9) Press Ⓛ at the position indicated by the letter Ⓔ. Then, press number key Ⓘ 3 times to indicate "111" on the STEP display, and then press Ⓔ.

(10) The presser clamp will return to the initial stitch position.

(11) Write the program data to the floppy disk. (Refer to page 24.)

## 4 To program an intermittent stitch sewing operation.

* After the thread trimming operation is completed, if the sewing operation is to be continued without lifting the presser clamp, use F to facilitate the programming operation.

Example: To program the pattern in the figures below.
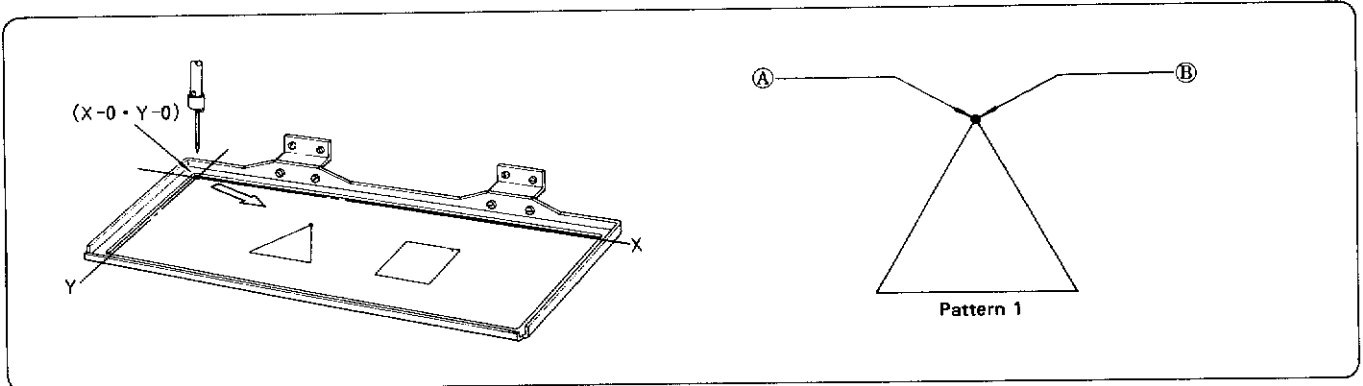
Pattern 1

(1) Press P. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator F will illuminate.

(2) Use the direction keys to move the presser clamp to the initial stitch position.

(3) When the tip of the needle and the initial stitch position Ⓐ on the outline of the needle movement are aligned, press L. Thus, the initial stitch will be programmed.

(4) Repeat the above procedure to program the remaining stitches of pattern 1.

(5) Press L at the final stitch position Ⓑ of pattern 1, and then press F. At this time, indicator F will illuminate.
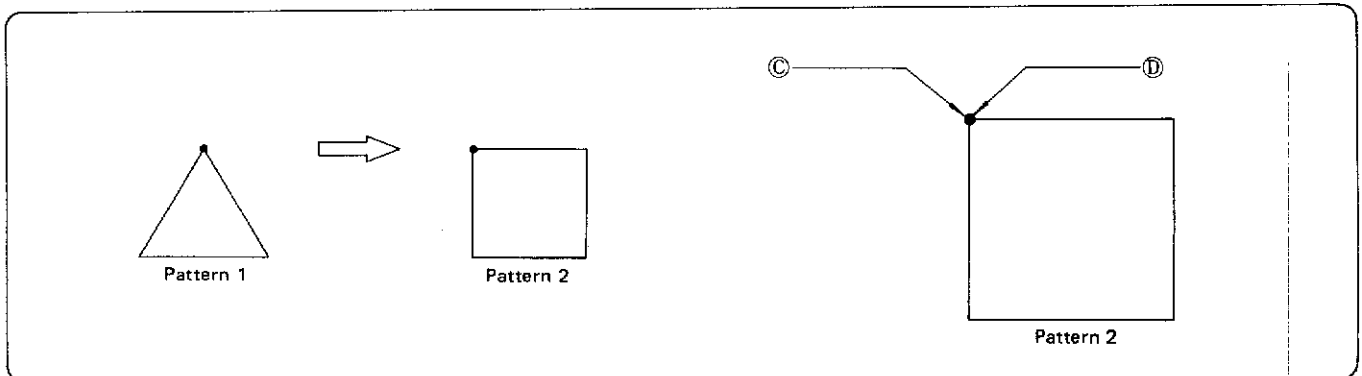
Pattern 1   Pattern 2   Pattern 2

(6) Use the direction keys to move the presser clamp to the initial stitch position of pattern 2.

(7) When the tip of the needle and the initial stitch position Ⓒ of pattern 2 become aligned, press L. The operation will be programmed to restart from point Ⓒ after the thread trimming operation is completed at point Ⓑ.

(8) Repeat the above procedure to program the remaining stitches of pattern 2.

(9) Press L at the final stitch position Ⓓ, and press the number key 1 3 times to indicate "111" on the STEP display. Press E.

(10) The presser clamp will move back to the initial stitch position.

(11) Write the program data to the floppy disk. (Refer to page 24.)

5 To program a symmetrical mirror image of a pattern design

A. Use the M key to program a symmetrical mirror image of a stitch pattern which has already been programmed.

Example: To program a symmetrical mirror image of the pattern in the figures below.
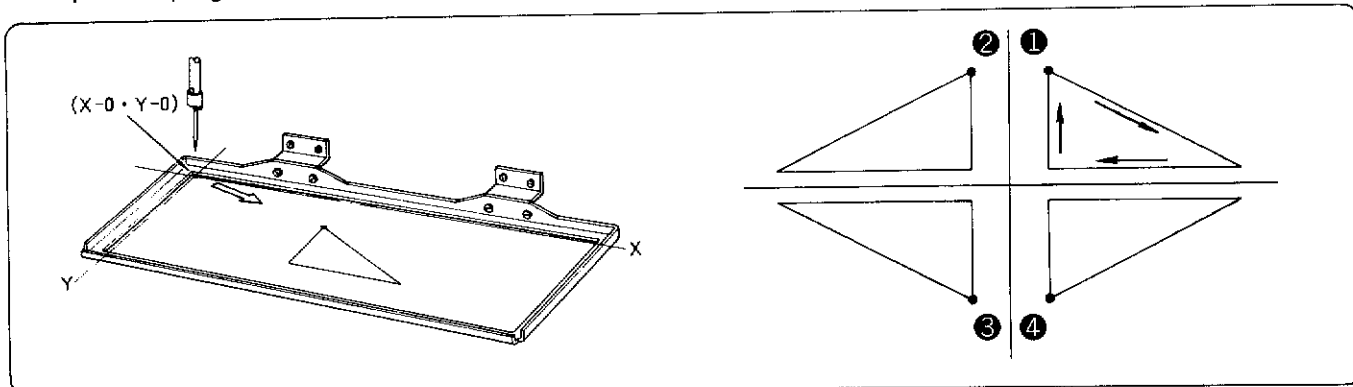
(1) Press P. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator F will illuminate.
(2) Insert the floppy disk containing the stitch pattern into the disk drive.
(3) Press the read switch. The read indicator will illuminate and the program data will be read into the memory.
(4) If the pattern in section ❶ of the figure on the left is the original design, press "001" to program the pattern in section ❷, "011" to program the pattern in section ❸, and "010" to program the pattern in section ❹. Use the number keys to indicate the appropriate numerals on the STEP display.

(5) Press M, and then press L.
(6) Write the program data to the floppy disk. (Refer to page 24.)

Note 1   When M is used to compose a symmetrical mirror image, the program will be input with the initial stitch position as the starting point of the entire symmetrical pattern as shown in the figures below.

Note 2   In the event that the mirror image extends beyond the limits of the presser clamp, or if the entire symmetrical pattern is to be moved to the center of the presser clamp, press R after completing the procedure from 1 ~ 5 mentioned above. Then, press the direction keys to move the presser clamp to the new initial stitch position, and press L. The new initial stitch position will be programmed.

B. To program a symmetrical pattern design, the operator is only required to program one-half of the pattern and use the number keys to program the remaining half of the design

Example: To program, on the Y axis, a symmetrical mirror image of the pattern in the figures below.
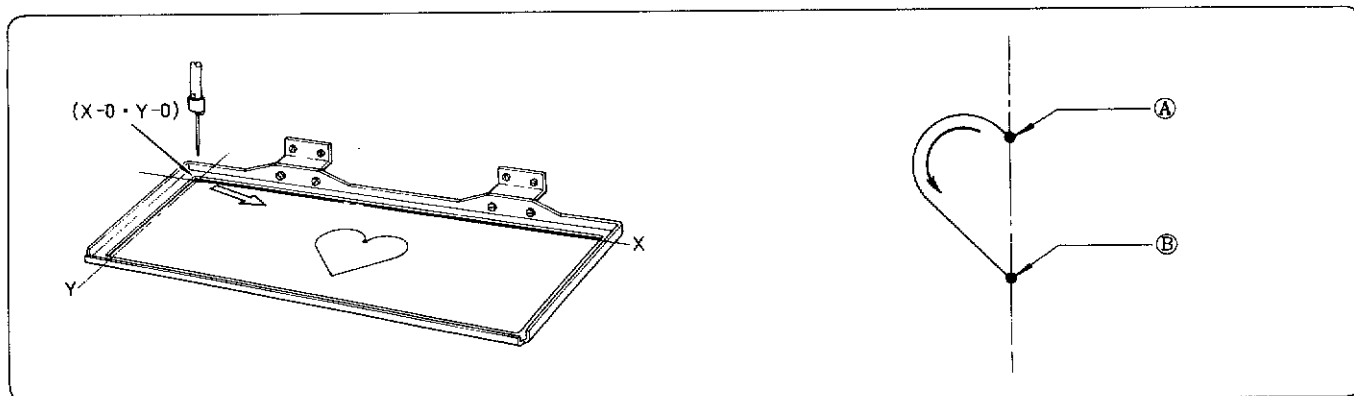
(1) Press ⊡. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the display, and indicator ⊡ will illuminate.
(2) Use the direction keys to move the presser clamp to the initial stitch position.
(3) When the tip of the needle and the initial stitch position Ⓐ on the outline of the needle movement become aligned, press ⊡. The initial stitch will be programmed.
(4) Repeat the above procedure to program the left-side half of the stitch pattern from point Ⓐ to point Ⓑ.
(5) Press ⊡ at point Ⓑ. Use the number keys to indicate "442" on the STEP display, and press ⊡ once again.
※   After completing procedure (5) mentioned above, it is also possible to continue the programming operation from point Ⓐ.

(6) The tip of the needle will slowly move from point Ⓑ to point Ⓐ, and the right side half of the pattern design will be automatically programmed. At this time, if the foot pedal presser-lifter switch is pressed, the presser clamp will be fast forwarded.
(7) When the tip of the needle becomes aligned with point Ⓐ, press ⊡ 3 times to indicate "111" on the STEP display. Press Ⓔ.
(8) The presser clamp will move back to the initial stitch position.
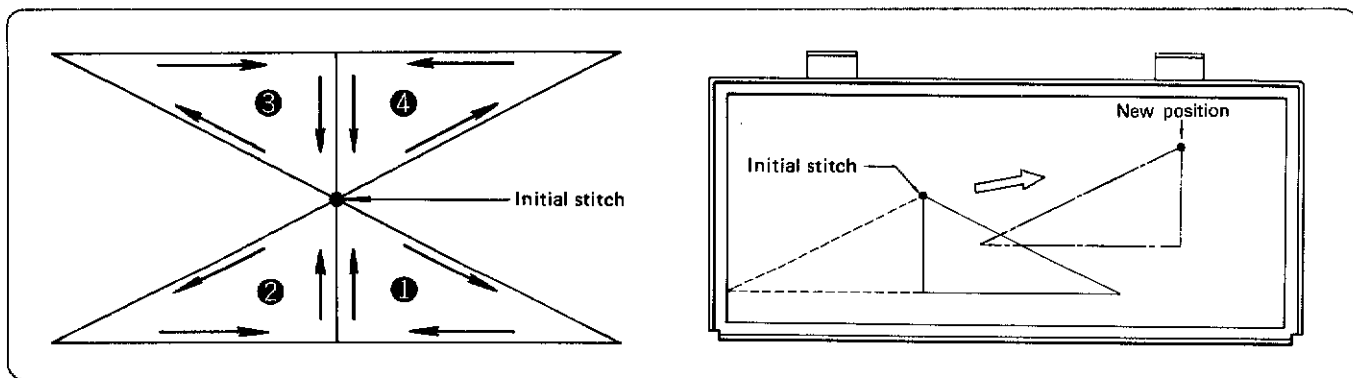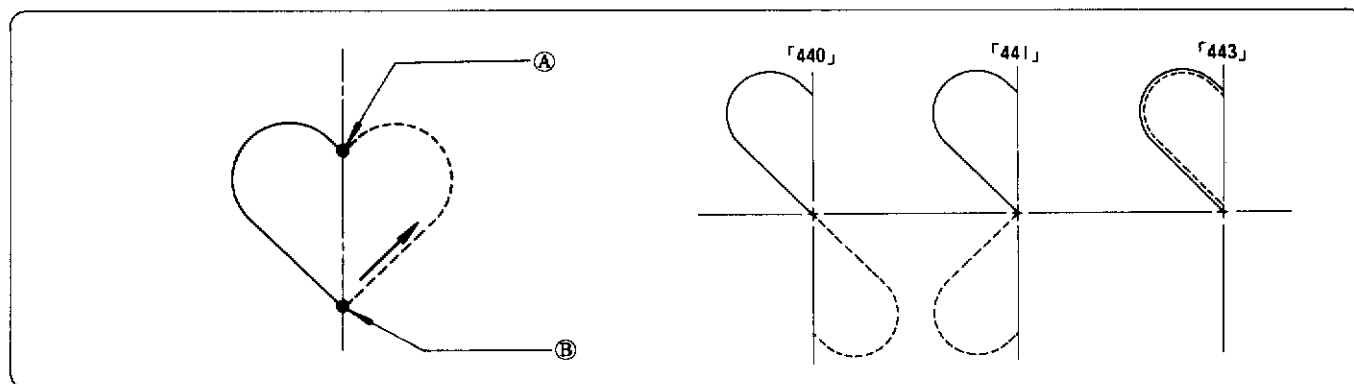(9) Write the program data to the floppy disk. (Refer to page 25.)
※   In addition to programming a symmetrical mirror image on the Y axis, it is also possible to program symmetrically on the X axis on the right side by indicating "440" or to program a hemming operation by indicating "443" on the STEP display.

6 To program a stitch pattern with the smoothing operation

● Use the number keys and Ⓜ to program the main stitch positions, which have been set in the pattern design so as to avoid having to program the pattern one stitch at a time.

Example: To program the pattern in the figures below.

(1) Press Ⓟ. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator Ⓕ will illuminate.

(2) Use the direction keys to move the presser clamp to the initial stitch position.

(3) When the tip of the needle and the initial stitch position ❶ on the outline of the needle movement become aligned, press Ⓛ. The initial stitch will be programmed.

(4) Use the number keys to indicate the proper pitch on the STEP display. To set the proper pitch, divide the actual stitch pitch by 1 pulse (i.e., 0.2 mm).
(For example, to set the proper pitch when the actual stitch pitch is 3 mm, divide 3 mm by 0.2 mm, which equals 15, and use the number keys to indicate "015" on the STEP display.)

※ If the pitch is not indicated on the STEP display, or if it exceeds 6.2 mm (31), it will automatically be set to 2 mm.
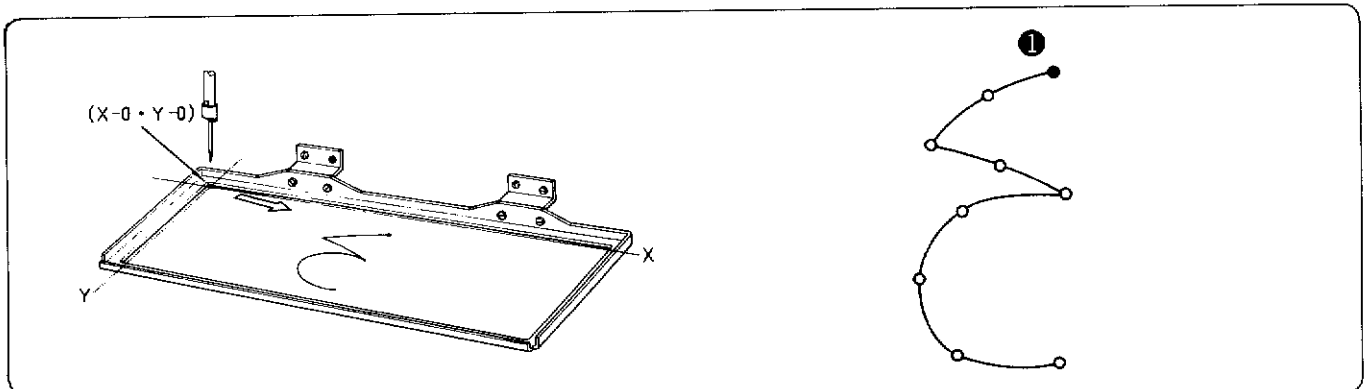
(5) Press Ⓜ. The indicators Ⓕ and Ⓜ will both illuminate.

(6) Use the direction keys to align the tip of the needle with the stitch position ❷, and then press Ⓛ.

(7) Use the direction keys to align the tip of the needle with the stitch position ❸, and then press Ⓛ. Stitch position ❸ will be programmed.

(8) At such angles as shown in stitch position ❸, stop the programming operation temporarily.
Use the number keys to indicate "789" on the STEP display, and press Ⓛ.
The stitch positions ❶ ~ ❸ will be programmed.

(9) Set the program according to procedure 4 mentioned above, and then press Ⓜ.
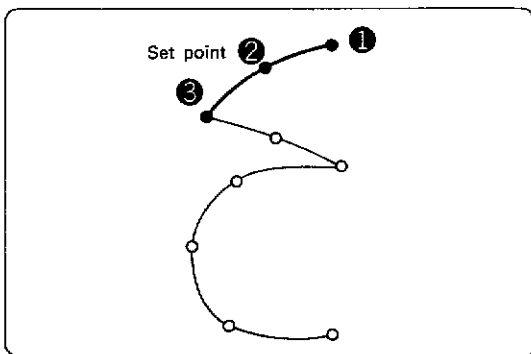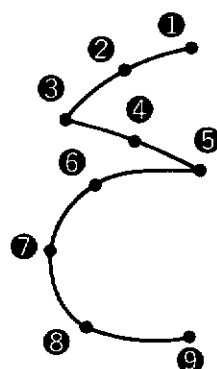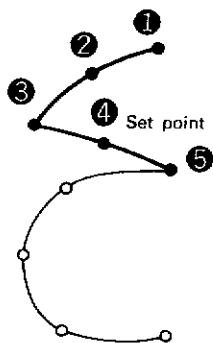
(10) Use the direction keys to align the tip of the needle with the pre-established stitch position ❹, and then press Ⓛ. The stitch position ❹ will be programmed.

(11) Operate the direction keys to align the tip of the needle with the pre-established stitch position ❺, and then press Ⓛ. The stitch position ❺ will be programmed.

(12) Follow procedure 8 mentioned above, and use the number keys to indicate "789" on the STEP display. Then, press Ⓛ. The stitch positions 3 ~ 5 will be programmed.

(13) Set the proper pitch according to procedure 4 mentioned above, and then press Ⓜ.

(14) Use the direction keys to program the stitch positions ❻, ❼, ❽, and ❾.

(15) Follow procedure 8 mentioned above, and use the number keys to indicate "789" on the STEP display. Then press Ⓛ.
The stitch positions ❺ ~ ❾ will be programmed.

※ After procedure 15 is completed, it is also possible to continue the programming operation from stitch position ❾.

(16) Press Ⓘ 3 times to indicate "111" on the STEP display. Then, press Ⓔ.

(17) The presser clamp will move back to the initial stitch position.

(18) Write the program data to the floppy disk. (Refer to page 24.)

Note 1 After pressing Ⓜ, be sure to press Ⓛ at 2 or more stitch positions before inputting the numerals "789".

Note 2 Be sure to stop the programming operation temporarily at such angles as shown at stitch position ❸ and ❺. If the programming operation is continued without a temporary stop, a curve rather than an angle will be performmed.

※ When programming, note the following:

[loop patterns] The machine will not operate if the initial and the final stitch point (the point of 789L) are plotted on the same spot. Make sure there is more than one pulse between the initial and the final stitch point before pressing "789" and L.

[ovals] More stitch points makes smoother curves.

[small size arc] If the ratio between the radius of the arc to be programmed and stitch pitch is 3:1 or less, the stitch pitch wil be automatically finer than the programmed stitch pitch.

[re-plotting] When re-plotting, be sure to add or change data on the same spot. Even one pulse of dislocation will result in sewing a different pattern.

[distance between plotted points] Smoothing will not be performed if the distance between plotted points is less than the stitch pitch. Be sure there is enough distance between plotted points for the stitch pitch.

[number of plotted points] Approximately 360 points including the final stitch point (789L) can be plotted from the beginning of the programming until 111E is depressed.

[stitch pitch] Set the stitch pitch at 0.6 mm or longer.

7 To program a repeat sewing operation

* The pattern design which has been composed by the smoothing operation can be programmed to repeat itself at a constant distance from, and parallel to, the preceding pattern any number of times as required, simply by operating the number keys and [M].
  For the repeat sewing operation, patterns can be repeated only to the left side of the direction of the sewing operation as shown in the figure above.
  Therefore, it is necessary to establish the proper direction of sewing operation according to the requirements of the sewing material.
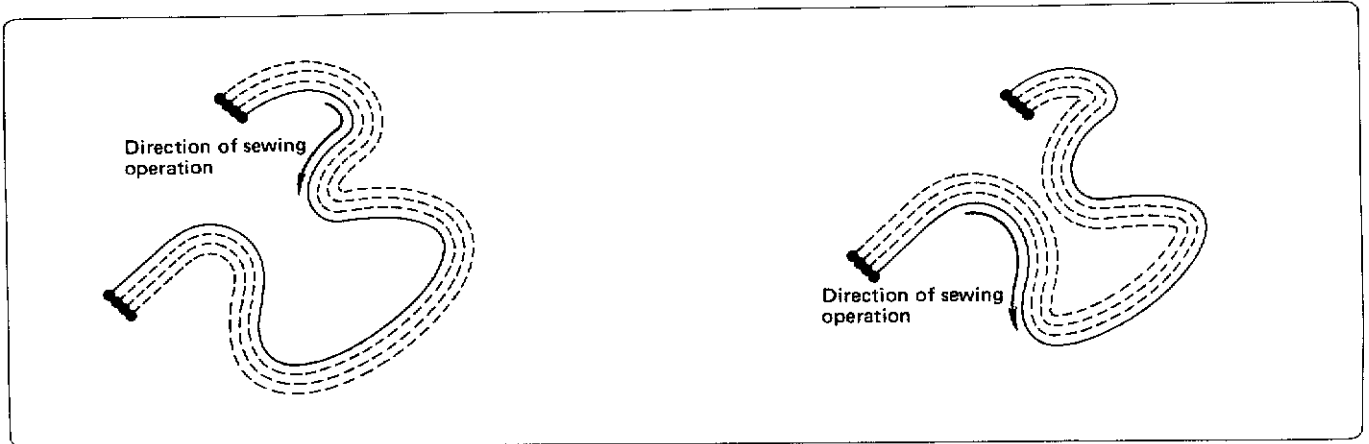
Example: To program the pattern in the figures on the next page.

(1) Program the original pattern from point Ⓐ to point Ⓑ by employing the smoothing operation. (Refer to page 9.)

(2) Press [4] at point Ⓑ, and input the proper distance between the repeating patterns into the STEP display. To set the proper distance between the repeating patterns, divide the actual distance by 1 pulse (i.e., 0.1 mm).
  (For example, to set the proper distance when the actual distance is 2 mm, divide 2 mm by 0.1 mm, which equals 20, and use the number keys to indicate "420" on the STEP display.)

(3) Press [M]. Indicators [F] and [M] will both illuminate.

(4) Press [5], and input the number of times the pattern is to be repeated.
  (For example, to perform a four-fold repeat sewing operation, use the number keys to indicate "504" on the STEP display.)

(5) Press [M].
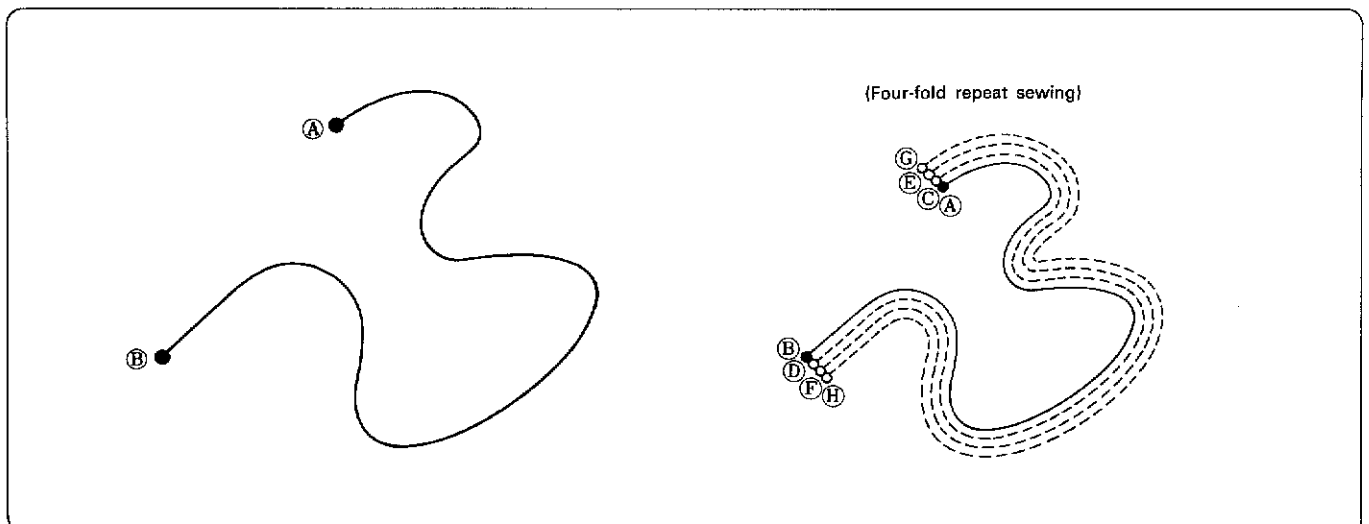
(6) Press ⬜. The last 2 digits of the readout "5 ⬜ ⬜" on the STEP display will decrease one count at a time to indicate that the program is in progress.
(When the program is completed, the tip of the needle will move from point Ⓑ to point Ⓒ, and slowly advance from point Ⓒ → Ⓓ, Ⓔ → Ⓕ, and Ⓖ → Ⓗ. Thus, the programming operation will be automatically performed. At this time, if the foot pedal presser-lifter switch is pressed, the presser clamp will be fast-transported.)
(7) Press ⬜ 3 times at point Ⓗ to indicate "111" on the STEP display. Then press Ⓔ.
(8) The presser clamp will move back to the initial stitch position (point Ⓐ).
(9) Write the program data to the floppy disk. (Refer to page 24.)
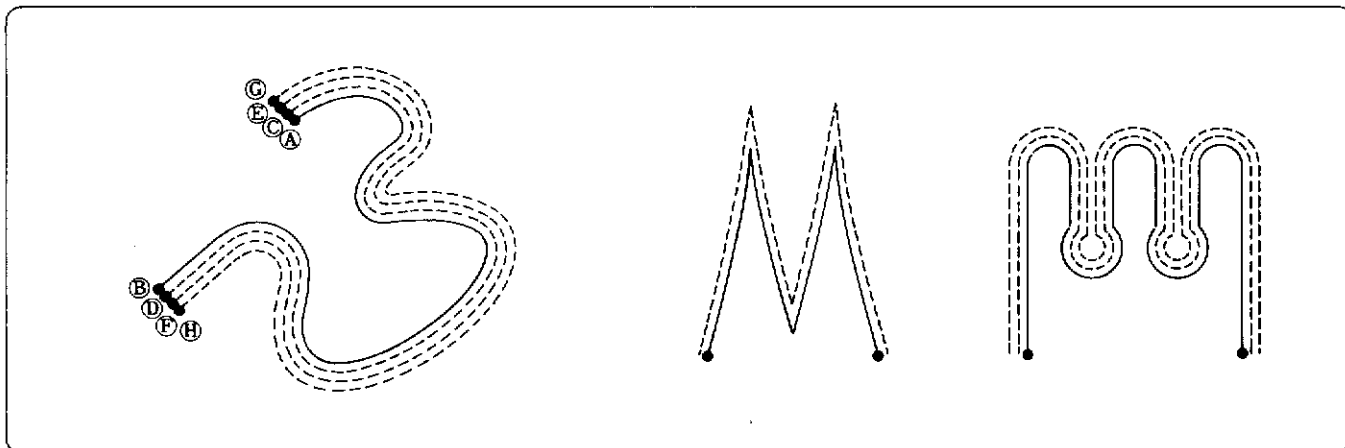
※ When programming, note the following:
To program a repeat sewing operation, be sure to program the original pattern (solid line portion) by employing the smoothing operation. The repeat sewing operation cannot be programmed if it includes a pattern which is programmed one stitch at a time or a symmetrical mirror image pattern.

If the repeat sewing operation is to include an intermittent stitch sewing operation (feed), program the operation at every intermittent stitch position.

Plot the original pattern so that the repeated patterns are always outside the contour of the original. If the repeat pattern is inside the contour of the original, the number of repeat sewings will be limited.

If the original pattern for the repeat sewing operation includes a number of acute angles or delicate curves, the repeat sewing operation may not be possible. (For example, if a four-fold repeat sewing operation has been programmed but found to be impossible according to calculations, only a three-fold or two-fold repeat sewing operation will be performed.)

[re-programming] If the repeat sewing is rejected, press Ⓡ to return the needle to the initial stitch position.

[distance between plotted points] Repeat sewing will not be performed if the distance between plotted points is less than the stitch pitch. Be sure there is enough distance between plotted points for the stitch pitch.

[small size arc] If the ratio between the radius of the arc to be programmed and stitch pitch is 3:1 or less, the actual stitch pitch will be automatically finer than the selected pitch.

⑧ To program a turning pattern design

● A turning design having a recurring pattern at regular intervals can easily be programmed by operating the number keys and Ⓜ after programming a portion of such a design.
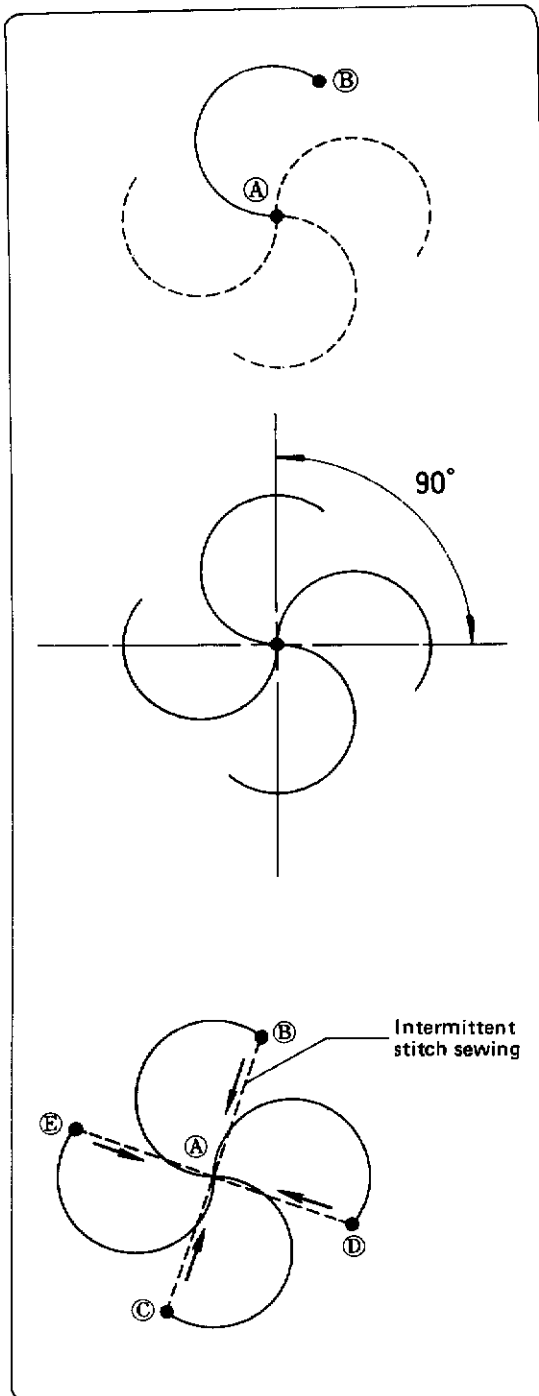
Example: To program the pattern in the figure at the left.
(1) Program the solid line portion extending from point Ⓐ to point Ⓑ.
(Programming will be facilitated if the smoothing operation is employed.)
(2) Press ③ at point Ⓑ. Then, indicate on the STEP display the number of times the original pattern is to be repeated within 360°. (For example, if the original pattern is to be repeated 4 times, indicate "304" on the STEP display. The pattern will be repeated at 90° intervals.)

(3) Press Ⓜ. Indicators Ⓕ and Ⓜ will both illuminate.
(4) Press Ⓛ. (The tip of the needle will move from point Ⓑ to point Ⓐ, and then move slowly from point Ⓐ → Ⓒ → Ⓐ, Ⓐ → Ⓓ → Ⓐ, and Ⓐ → Ⓔ in that order. Thus, the programming operation will be automatically performed. At this time, if the foot pedal presser-lifter switch is pressed, the presser clamp will be fast-forwarded.)

(5) Press ① 3 times at point Ⓔ to indicate "111" on the STEP display. Then press Ⓔ.
(6) The presser clamp will move back to the initial stitch position (point Ⓐ).
(7) Write the program data to the floppy disk. (Refer to page 24.)

Note 1 The feed data will connect point Ⓑ to point Ⓐ which is the center of the turning pattern design.

Note 2 The pattern can only be repeated 2, 3, 4, 6, 8, 12, 16, 24, 32, or 36 times within 360°.

Intermittent stitch sewing

9 To input a split program

- This is a method of programming an independent sewing operation or a sequential sewing operation of a pattern subdivided into smaller portions. Up to 10 different patterns can be programmed by operating the split program switch.

Initial stitch ——— ———Final stitch

Ⓐ

Initial stitch ———

Ⓑ

Ⓐ

Ⓑ

Ⓙ
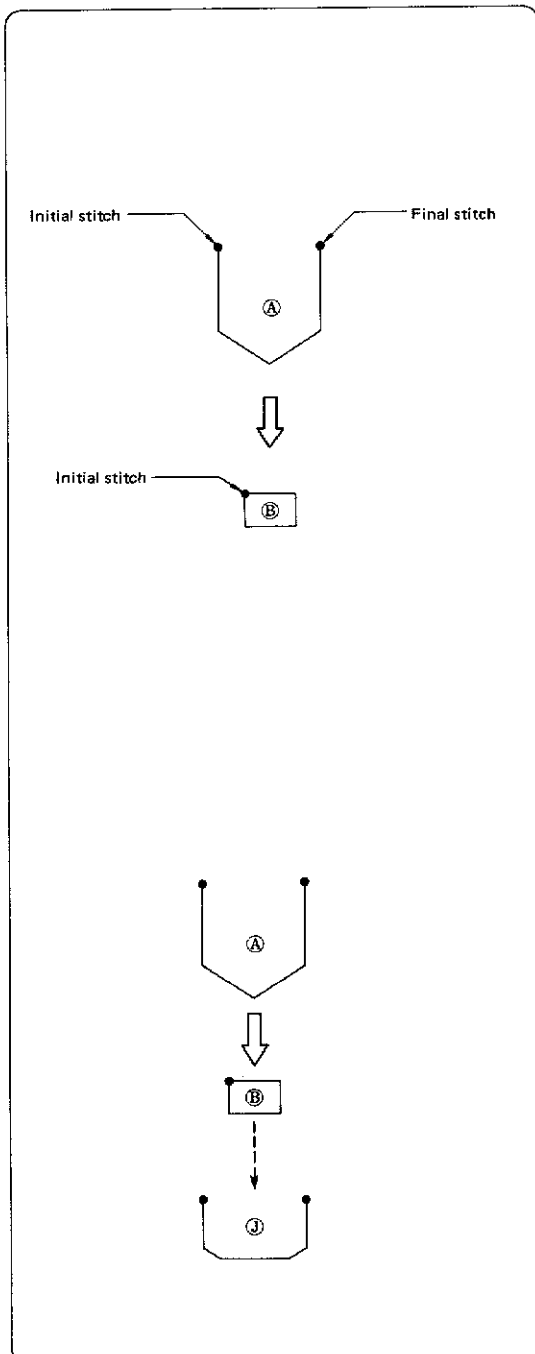
Example: To program the pattern in the figure on the left.

(1) Program pattern Ⓐ
(2) Press L at the final stitch position of pattern Ⓐ.
(3) Press F. Indicator F will illuminate.
(4) Use the direction keys to move the presser clamp to the initial stitch position of pattern Ⓑ.
(5) Align the tip of the needle with the initial stitch position of pattern Ⓑ.
(6) Press 6 3 times to indicate "666" on the STEP display. (Note that the feed data "666" on the STEP display refers to a split program input command.)
(7) Press L.
(8) At this time, press the foot pedal presser-lifter switch if the pattern on the base plate is to be replaced.
(9) Up to 10 patterns, i.e., Ⓐ, Ⓑ to Ⓙ can be programmed in sequential order. (A total of up to 10,000 stitches are possible for programs Ⓐ ~ Ⓙ.)
(10) When the programming operation of the final stitch is completed, press I 3 times to indicate "111" on the STEP display. Then press E.
(11) The presser clamp will move back to the initial stitch position of pattern Ⓐ.
(12) Write the program data to the floppy disk. (Refer to page 24.)

Note **A continuous or split program sewing operation of 10 split program patterns or more can be performed. Moreover, an independent sewing operation can be performed from the 11th pattern onward.**

⑩ To program a low speed sewing operation in subdivided sections

* If the programming operation is performed according to the regular procedure, the first 2 stitches and the last 3 stitches will be automatically performed at low speed.
  If the sewing speed is to be reduced during the sewing operation (e.g., at acute angles), use the ⬜L⬜ key to perform a low speed sewing operation.
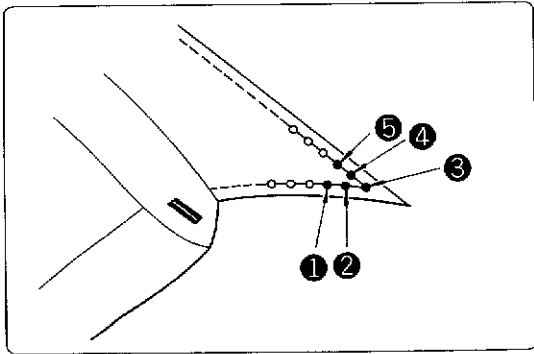
Example: To perform low speed sewing operation from points 1 ~ 5 on the collar of the garment in the figure on the left.

(1) Insert the floppy disk containing the proper pattern into the drive.

(2) Press the read switch. The read indicator will illuminate, and the program data will be read into the memory.

(3) Press ⬜9⬜ 3 times to indicate "999" on the STEP display, and then press ⊞ . The presser clamp will begin to advance one stitch at a time, starting from the initial stitch position.

(4) When the tip of the needle becomes aligned with the position marked ❶, press either ⊞ or ⊟ . The presser clamp movement will stop. (If, however, the presser clamp is accidentally advanced beyond the position marked ❶, use the number keys to indicate on the STEP display the number of stitches past this position and then press ⊟ . The presser clamp will move in the reverse direction as many times as indicated on the STEP display.)

(5) Press ⬜6⬜ 3 times to indicate "666" on the STEP display. Then press ⊞ .

(6) Press ⬜1⬜ to indicate "001" on the STEP display. Then press the ⊞ key.
The tip of the needle will move to the point marked ❷.

(7) Repeat the procedure (5) and (6) to complete the programming operation from position ❷ ~ ❺.

(8) Write the program data to the floppy disk. (Refer to page 24.)

Note **The low speed sewing operation cannot be performed unless the pattern design is complete.**

⑪ To program a stitch pattern by tracing the design

- A stitch pattern can easily be programmed by operating the number keys and the direction keys to trace the pattern design accurately with the tip of the needle.

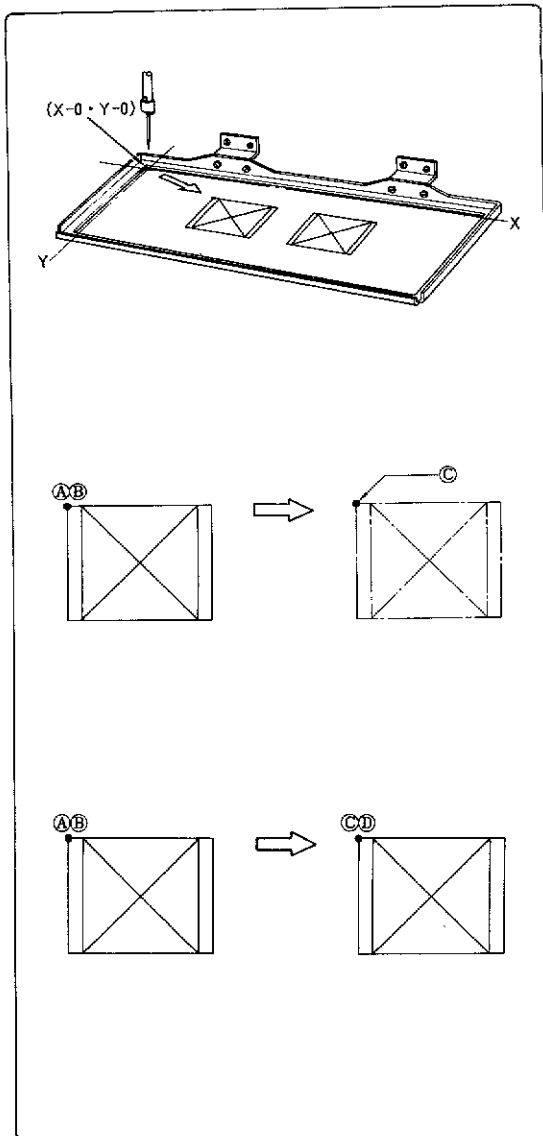Example: To program the pattern in the figures below.
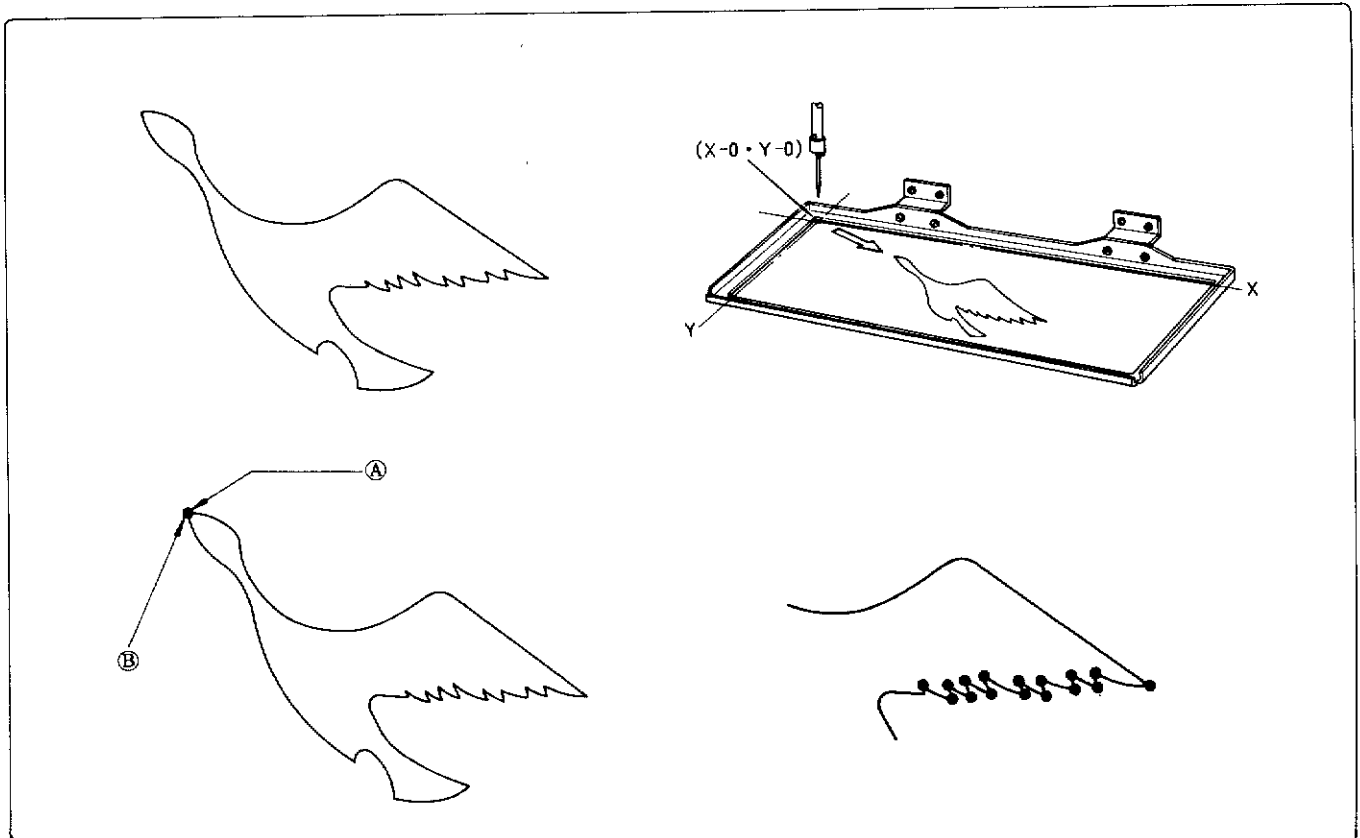
(1) Press ⏍. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator ⏍ will illuminate.
(2) Use the direction keys to move the presser clamp to the initial stitch position.
(3) Align the tip of the needle with the initial stitch position Ⓐ on the outline of the needle movement.
(4) Press ⑤ 3 times to indicate "555" on the STEP display. Then press ⏍.
(5) Use the number keys to indicate the proper pitch on the STEP display. To set the proper pitch, divide the actual stitch pitch by 1 pulse (i.e., 0.1 mm)
    (For example, to set the proper pitch when the actual stitch pitch is 3 mm, divide 3 mm by 0.1 mm, which equals 30, and use the number keys to indicate "030" on the STEP display.)
※ If the pitch is not indicated on the STEP display, or if it exceeds 6.3 mm (63), it will automatically be set to 2 mm.
(6) Use the direction keys to trace the pattern with the needle starting from the initial stitch position Ⓐ.
(7) Press ⏍ at the final stitch position Ⓑ.
(8) Press ① 3 times to indicate "111" on the STEP display. Then press Ⓔ.
(9) The presser clamp will move back to the initial stitch position Ⓐ.
(10) Write the program data to the floppy disk. (Refer to page 24.)

Note 1 To perform the sewing operation carefully at a section where special attention is required (e.g., an acute angle), press ⏍ when programming the section.
The seam will result in a beautiful finish.

Note 2 During the program, the ⏍ or the ⏍ key can be used. If either is to be used, press the ⏍ key at the beginning and end of the feed or the line program.

12 To program a design with recurring patterns

• A pattern which has been programmed can easily be repeated with the number keys.

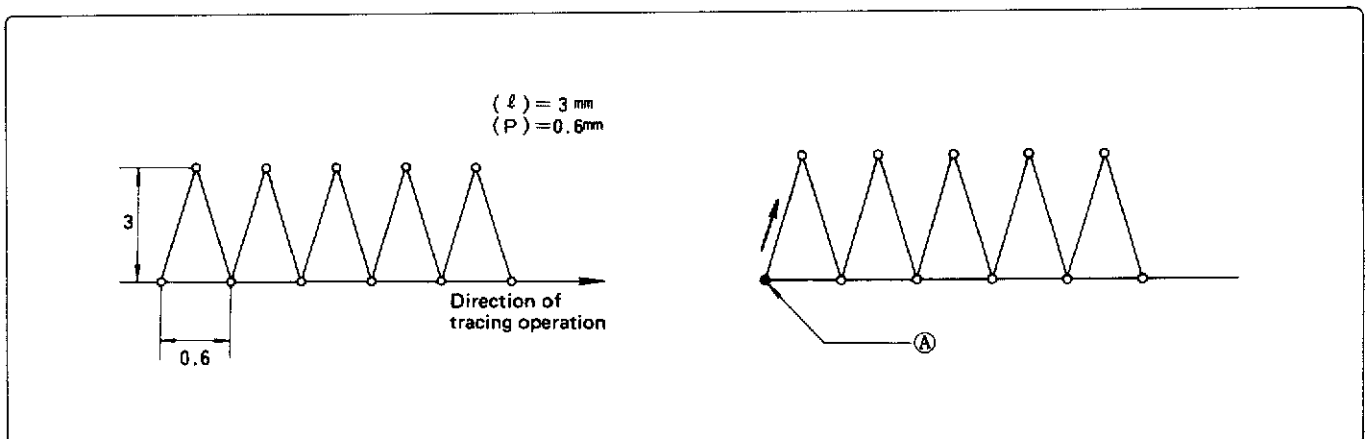Example: To program the pattern in the figure at the left.

(1) Press P. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator F will illuminate.

(2) Use the direction keys to move the presser clamp to the initial stitch position.

(3) When the tip of the needle and the initial stitch position Ⓐ on the outline of the needle movement become aligned, press L. The initial stitch will be programmed.

(4) Repeat the above procedure to program the remaining stitches of the pattern.

(5) Press L at the final stitch position Ⓑ, and then press F. Indicator F will illuminate.

(6) Use the direction keys to move the presser clamp to the proper sewing position.

(7) Align the tip of the needle with the position at which the sewing operation Ⓒ is to be performed. Then press L.

(8) Press 3 3 times to indicate "333" on the STEP display. Then, press L once again.

(9) The tip of the needle will slowly trace the recurring pattern, and the programming operation will be automatically performed. At this time, if the foot pedal presser-lifter switch is pressed, the presser clamp will be fast-forwarded.

(10) Press L at the final stitch position Ⓓ of the recurring pattern.

(11) Press 1 3 times to indicate "111" on the STEP display. Then press E.

(12) The presser clamp will move back to the initial stitch position Ⓐ of the original pattern.

(13) Write the program data to the floppy disk. (Refer to page 24.)

13 To program a zigzag sewing operation

• A zigzag sewing operation can be easily programmed by employing the tracing method.

Direction of tracing operation

Direction of tracing operation
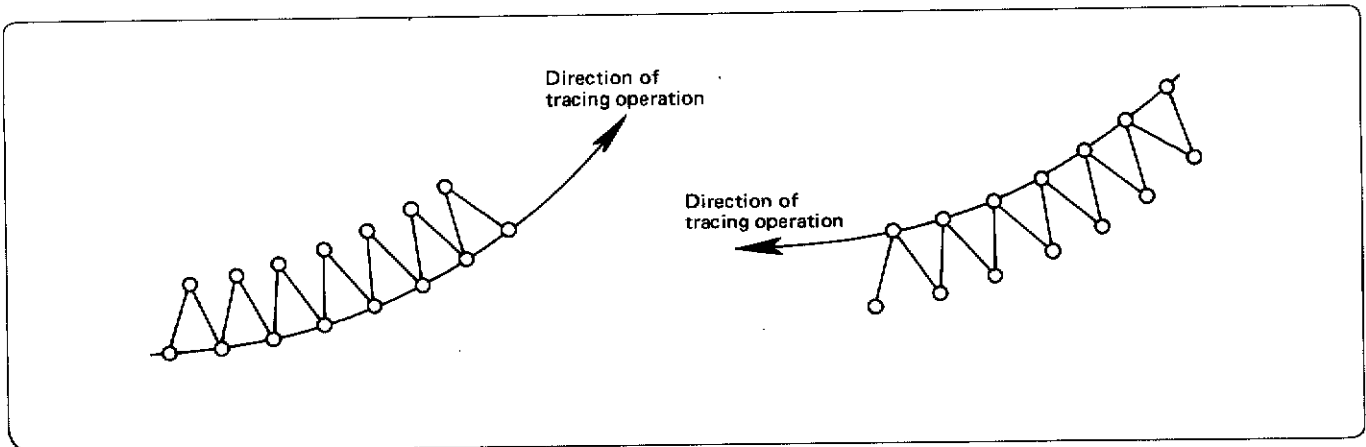
In the zigzag sewing operation, patterns will appear only to the left side of the direction of the tracing operation as shown in the figure above.
Therefore, it is necessary to establish the proper direction of the tracing operation according to the requirements of the sewing material.

(ℓ) = 3 mm
(P) = 0.6mm

3

0.6

Direction of
tracing operation

Ⓐ

A. To program a zigzag operation

Example: To program the pattern in the figures below.
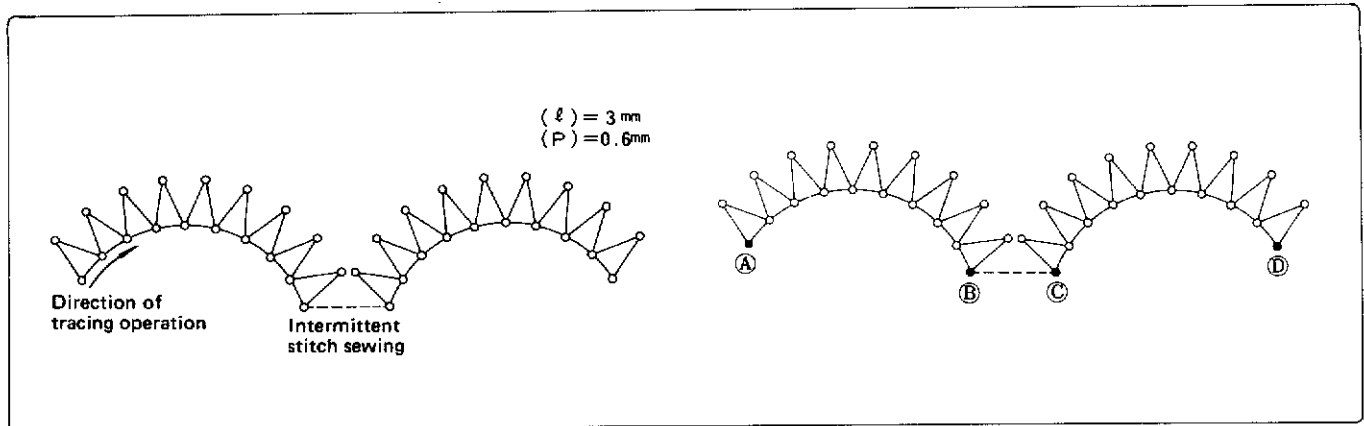
(1) Press P. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator F will illuminate.

(2) Use the direction keys to move the presser clamp to the initial stitch position.

(3) Align the tip of the needle with the initial stitch position Ⓐ on the outline of the needle movement.

(4) Use the number keys to indicate "77□" on the STEP display. The last digit □ is the numeral obtained by dividing the stitch width (l) by the pitch (P) −1. Therefore, (l) ÷ (P) −1. In this instance, 3 mm ÷ 0.6 mm −1 = 4. Therefore, indicate "774" on the STEP display.

(5) Press L.

(6) Establish the proper pitch. To obtain the proper pitch, divide the actual stitch pitch by 1 pulse (0.1 mm). In this instance, 0.6 mm ÷ 0.1 = 6. Therefore, indicate "006" on the STEP display.

(7) Use the direction keys so that the tip of the needle accurately traces the pattern design, starting from the initial stitch position Ⓐ.

(8) Press L at the final stitch position.

(9) Press 1 3 times to indicate "111" on the STEP display. Then press E.

(10) The presser will move back to the initial stitch position.

(11) Write the program data to the floppy disk. (Refer to page 24.)

Note   The L key is to be pressed only at step 5 above. Otherwise, do not press L or R.

B. To program an intermittent stitch sewing operation (feed) during the zigzag sewing operation

[1] If the zigzag sewing pattern preceding or following the intermittent stitch sewing operation remains unchanged

Example: To program the pattern in the figures below.

(ℓ) = 3 mm
(P) = 0.6mm

Direction of
tracing operation

Intermittent
stitch sewing

Ⓐ Ⓑ Ⓒ Ⓓ

(1) Press �{P}. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator ⬚F will illuminate.
(2) Use the direction keys to move the presser clamp to the initial stitch position.
(3) Align the tip of the needle with the initial stitch position Ⓐ on the outline of the needle movement.
(4) Use the numeral keys to indicate "77☐" on the STEP display. The last digit ☐ is the numeral obtained by dividing the stitch width (l) by the pitch (P) −1.
Therefore, (l) ÷ (P) −1. In this instance, 3 mm ÷ 0.6 mm −1 = 4. Therefore, indicate "774" on the STEP display.
(5) Press ⬚L.
(6) Establish the proper pitch. To obtain the proper pitch, divide the actual stitch pitch by 1 pulse (0.1 mm).
In this instance, 0.6 mm ÷ 0.1 = 6.
Therefore, indicate "006" on the STEP display.
(7) Use the direction keys so that the tip of the needle accurately traces the pattern design, starting from the initial stitch position Ⓐ, to position Ⓑ.
(8) Press ⬚F. Indicator ⬚F will illuminate.
(9) Use the direction keys to move the presser clamp to the initial stitch position of the next sewing operation.
(10) Press ⬚L when the tip of the needle becomes aligned with the initial stitch position Ⓒ.
(11) Use the direction keys so that the tip of the needle accurately traces from point Ⓒ → Ⓓ in the pattern.
(12) Press ⬚L at the final stitch position Ⓓ.
(13) Press ⬚I 3 times to indicate "111" on the STEP display.
Then press ⬚E.
(14) The presser clamp will move back to the initial stitch position.
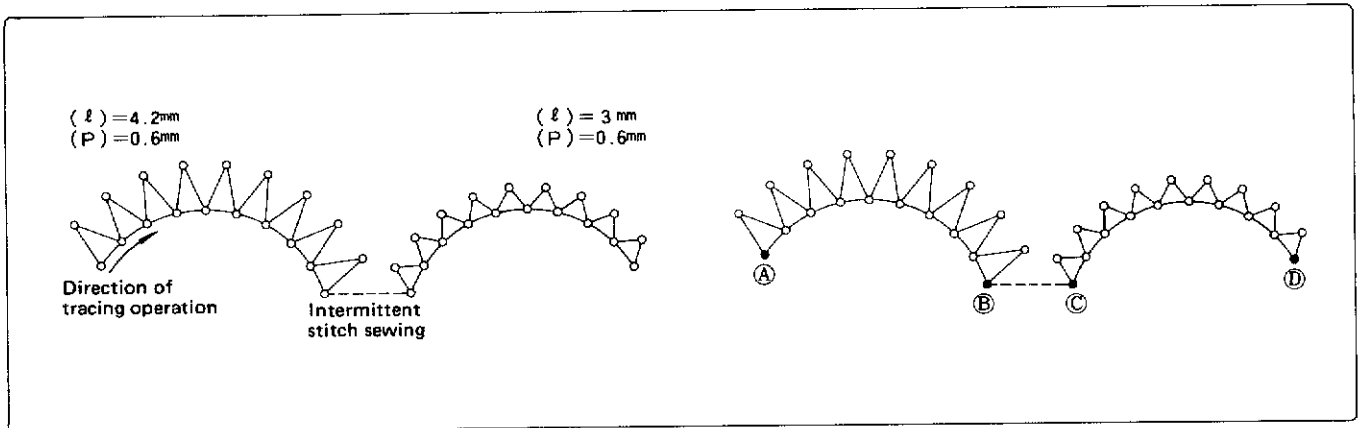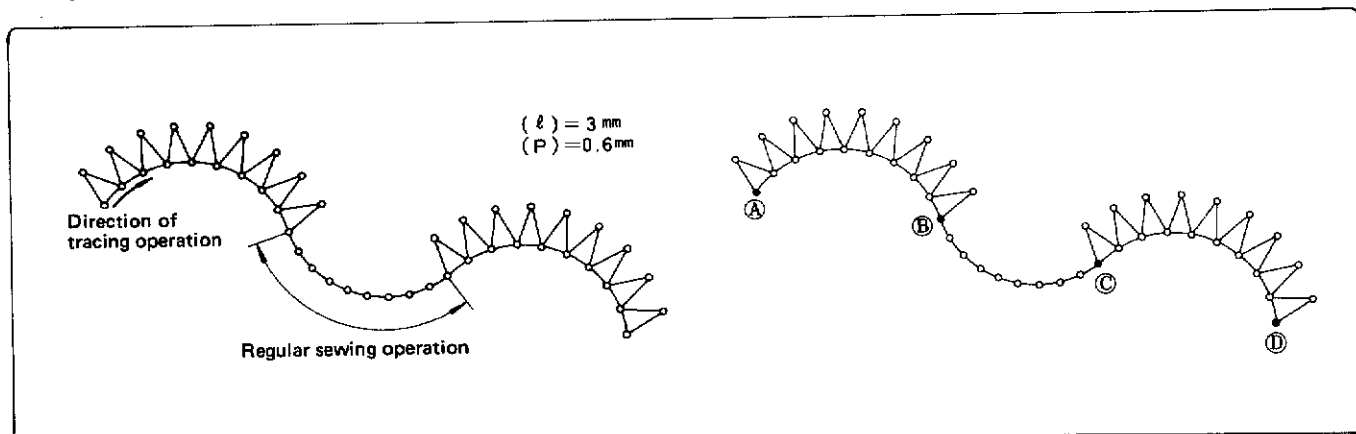(15) Write the program data to the floppy disk. (Refer to page 24.)

[2]   If the zigzag sewing pattern preceding or following the intermittent stitch sewing operation is changed

Example: To program the pattern in the figures below.

$(\ell) = 4.2\text{mm}$
$(P) = 0.6\text{mm}$

$(\ell) = 3\text{ mm}$
$(P) = 0.6\text{mm}$

Direction of
tracing operation

Intermittent
stitch sewing

(1)   Press P. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator F will illuminate.

(2)   Use the direction keys to move the presser clamp to the initial stitch position.

(3)   Align the tip of the needle with the initial stitch position Ⓐ on the outline of the needle movement.

(4)   Use the number keys to indicate "77□" on the STEP display. The last digit □ is the numeral obtained by dividing the stitch width (l) by the pitch (P) −1.
Therefore, (l) ÷ (P) −1. In this instance, 4.2 mm ÷ 0.6 mm −1 = 6.
Therefore, indicate "776" on the STEP display.

(5)   Press L.

(6)   Establish the proper pitch. To obtain the proper pitch, divide the actual stitch pitch by 1 pulse (0.1 mm). In this instance, 0.6 mm ÷ 0.1 = 6.
Therefore, indicate "006" on the STEP display.

(7)   Use the direction keys so that the tip of the needle accurately traces the pattern design, starting from the initial stitch position Ⓐ, to position Ⓑ.

(8)   Press R. The presser clamp will move back to the point of origin.

(9)   Use the direction keys to move the presser clamp to the initial stitch position.

(10)   Align the tip of the needle with the initial stitch position Ⓐ on the outline of the needle movement.

(11)   Follow procedure (4) mentioned above to indicate "77□" on the STEP display. In this instance, 3 mm ÷ 0.6 mm −1 = 4.
Therefore, indicate "774" on the STEP display.

(12)   Press L.

(13)   Press 9 3 times to indicate "999" on the STEP display.

(14)   Press ⊞ to move the tip of the needle to position Ⓑ.

(15)   Press F. Indicator F will illuminate.

(16)   Use the direction keys to move the presser clamp to the initial position of the next sewing operation.

(17)   Press L when the tip of the needle becomes aligned with the initial stitch position Ⓒ.

(18)   Indicate the proper pitch on the STEP display according to procedure (6) mentioned above.

(19)   Use the direction keys so that the tip of the needle accurately traces from Ⓒ→Ⓓ.

(20)   Press L at the final stitch position Ⓓ.

(21)   Press 1 3 times to indicate "111" on the STEP display.
Then press E.

(22)   The presser clamp will move back to the initial stitch position.

(23)   Write the program data to the floppy disk. (Refer to page 24.)

C. To program a regular sewing operation during a zigzag sewing operation

Example: To program the pattern in the figures below.

$(\ell) = 3$ mm
$(P) = 0.6$ mm

Direction of tracing operation

Regular sewing operation

(1) Press $\boxed{P}$. The presser clamp will move to the point of origin (X-0; Y-0), 0 will be indicated on the STEP display, and indicator $\boxed{F}$ will illuminate.

(2) Use the direction keys to move the presser clamp to the initial stitch position.

(3) Align the tip of the needle with the initial stitch position Ⓐ on the outline of the needle movement.

(4) Use the number keys to indicate "77□" on the STEP display. The last digit □ is the numeral obtained by dividing the stitch width (I) by the pitch (P) −1.
Therefore, (I) ÷ (P) −1. In this instance, 3 mm ÷ 0.6 mm −1 = 4.
Therefore, indicate "774" on the STEP display.

(5) Press $\boxed{L}$.

(6) Establish the proper pitch. To obtain the proper pitch, divide the actual stitch pitch by 1 pulse (0.1 mm). In this instance, 0.6 mm ÷ 0.1 mm = 6.
Therefore, indicate "006" on the STEP display.

(7) Use the direction keys so that the tip of the needle accurately traces the pattern design starting from the initial stitch position Ⓐ to position Ⓑ.

(8) Press $\boxed{F}$. Indicator $\boxed{F}$ will illuminate.

(9) Use the direction keys to move the presser clamp to the initial stitch position of the next sewing operation.

(10) Press $\boxed{L}$ when the tip of the needle becomes aligned with the initial stitch position Ⓒ.

(11) Use the direction keys so that the tip of the needle accurately traces form Ⓒ→Ⓓ.

(12) Press $\boxed{L}$ at the final stitch position Ⓓ.

(13) Press $\boxed{1}$ 3 times to indicate "111" on the STEP display.
Then press $\boxed{E}$.

(14) The presser clamp will move back to the initial stitch position.

(15) Press $\boxed{R}$. The presser clamp will move back to the point of origin.

(16) Press $\boxed{9}$ 3 times to indicate "999" on the STEP display.

(17) Press $\boxed{+}$ to move the tip of the needle to position Ⓑ.

(18) Program the stitches from point Ⓑ to point Ⓒ.

(19) Press $\boxed{L}$ at point Ⓒ.

(20) Press $\boxed{C}$, $\boxed{1}$, and $\boxed{+}$ in that order.

(21) Write the program data to the floppy disk. (Refer to page 24.)

[14] To enlarge or reduce the scale of the pattern design

- An enlargement or reduction of the scale of a pattern design in the X direction (horizontal) or Y direction (vertical) can be performed without changing the stitch pitch.

A. If the initial stitch position remains unchanged
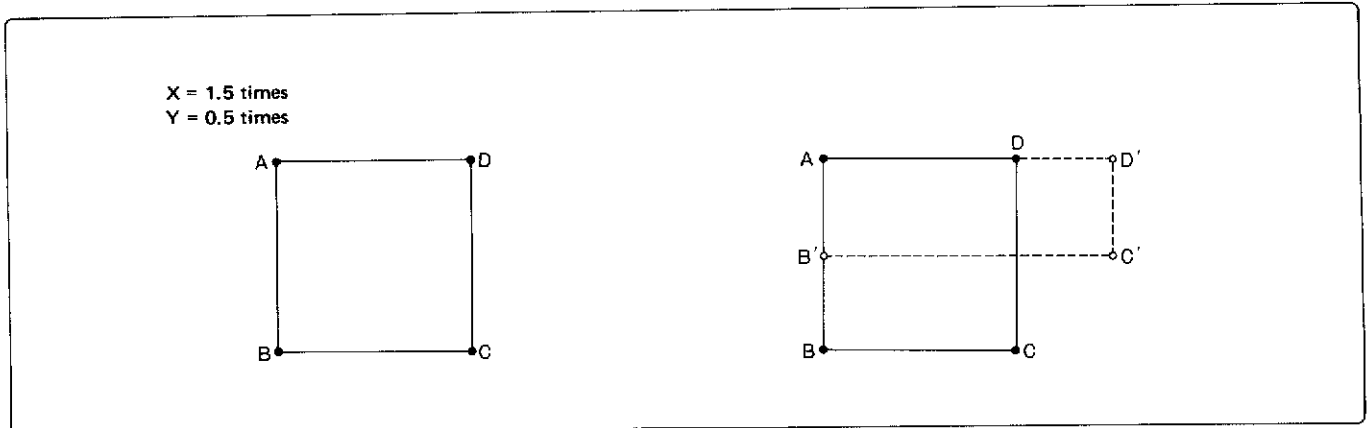
Example: To program the pattern in the figures below.

X = 1.5 times
Y = 0.5 times

(1)   Program the original pattern by employing the smoothing operation. (Refer to page 9.)

Note 1   The enlarging or reducing operation cannot be performed unless the smoothing operation has been employed to program the original pattern design.

(2)   To confirm that the pattern is accurately programmed, press the R key to move the presser clamp to the point of origin, and press 9 3 times to indicate "999" on the STEP display.
Then press ⊞ . The tip of the needle will move one stitch at a time according to the program.

(3)   Press 1 3 times at position Ⓐ to indicate "111" on the STEP display.
Then press E.

(4)   The presser clamp will move back to the initial stitch position (point Ⓐ).

(5)   If the original pattern is to be written to the floppy disk, do so at this time.

※   Note that if R is pressed after E, the enlarging or reducing operation will not be performed.

(6)   Press 3, and indicate on the STEP display the amount of enlargement or reduction in the X direction.
(For example, to enlarge the scale of the pattern 1.5 times in the X direction, indicate "815" on the STEP display.)

(7)   Press M.

(8)   Press 9, and indicate on the STEP display the amount of enlargement or reduction in the Y direction.
(For example, to reduce the scale of the pattern 0.5 times in the Y direction, indicate "905" on the STEP display.)

(9)   Press M.

(10) Press L.

(11) Press R. The presser clamp will move back to the point of origin.

(12) Press 9 3 times to indicate "999" on the STEP display, and then press ⊞ . The tip of the needle will move one stitch at a time from point A→B'→C'→D'→A.

(13) When the tip of the needle returns to position A, press 1 3 times to indicate "111" on the STEP display. Then press E.
The presser clamp will move back to the initial stitch position (point A).

(14) Write the program data to the floppy disk. (Refer to page 24.)
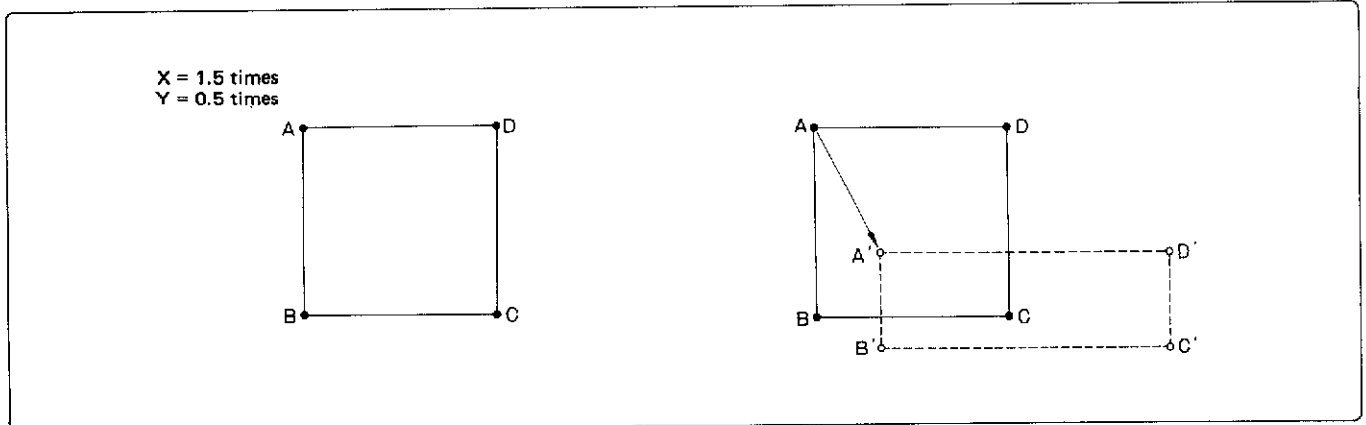
Note 2   Perform the enlarging or reducing operation immediately after programming the original pattern. If the pattern has been written to the floppy disk and then read again, the program cannot be enlarged or reduced.

Note 3   If an intermittent stitch sewing operation is included in the program, the enlarging or reduction operation cannot be performed.

Note 4   If the program exceeds the maximum dimensions (600 mm in the X direction and 250 mm in the Y direction) of the presser clamp, program data will be erased. Use care when enlarging a pattern.

B. To change the position of the initial stitch

Example: To program the pattern in the figures below.

X = 1.5 times
Y = 0.5 times

(1)   Program the original pattern by employing the smoothing operation. (Refer to page 9.)

Note 1   The enlarging or reducing operation cannot be performed unless the smoothing operation has been employed to program the original pattern design.

(2)   To confirm that the pattern is accurately programmed, press P to move the presser clamp to the point of origin, and press 9 3 times to indicate "999" on the STEP display.
Then press ⊞ . The tip of the needle will move one stitch at a time according to the program.

(3)   Press 1 3 times at position A to indicate "111" on the STEP display.
Then press E.

(4)   The presser clamp will move back to the initial stitch position (point Ⓐ).

(5)   If the original pattern is to be written to the floppy disk, do so at this time.

※   Note that if R is pressed after pressing E, the enlarging or reducing operation cannot be performed.

(6)   Press 8, and indicate on the STEP display the amount of enlargement or reduction in the X direction.
(For example to enlarge the scale of the pattern 1.5 times in the X direction, indicate "815" on the STEP display.)

(7)   Press M.

(8)   Press 9, and indicate on the STEP display the amount of enlargement or reduction in the Y direction.
(For example, to reduce the scale of the pattern 0.5 times in the Y direction, indicate "905" on the STEP display.)

(9)   Press M.

(10) Press L.

(11) Press R. The presser clamp will move back to the point of origin.

(12) Use the direction keys to move the tip of the needle to the position at which the sewing operation is to begin (point A').

(13) Press L.

(14) Follow procedure 2 to confirm that the pattern is accurately programmed. The tip of the needle will move one stitch at a time from point A'→B'→C'→D'→A'.

(15) When the tip of the needle returns to position A, press 1 3 times to indicate "111" on the STEP display. Then press E. The presser clamp will move back to the initial stitch position (point A').

(16) Write the program data to the floppy disk. (Refer to page 24.)

Note 2   Perform the enlarging or reducing operation immediately after programming the original pattern. If the pattern has been written to the floppy disk and then read again, the program cannot be enlarged or reduced.

Note 3   If an intermittent stitch sewing operation is included in the program, the enlarging or reducing operation cannot be performed.

Note 4   If the program exceeds the maximum dimensions (600 mm in the X direction and 250 mm in the Y direction) of the presser clamp, program data will be erased. Use care when enlarging a pattern.

Note 2 Perform the enlarging or reducing operation immediately after programming the original pattern. If the pattern has been written onto the memory of a memory disc and then read out again, this program cannot be enlarged or reduced in scale.

Note 3 If an intermitten stitch sewing operation is included in the program, the enlarging or reduction operation cannot be performed.

Note 4 If the program exceeds the maximum dimensions (600 mm in the X direction and 250 mm in the Y direction) of the presser clamp, the program data will be cancelled. Therefore, pay careful attention in programming the enlarging operation.

15 When a command key is pressed incorrectly

- The program will remain unchanged even if the command keys are pressed incorrectly. To clear a command which has been input incorrectly, simply press ⊞ or ⊟ .

16 How to write the program data onto the memory of the floppy disk.

- Follow the procedure below to write program data to a floppy disk.
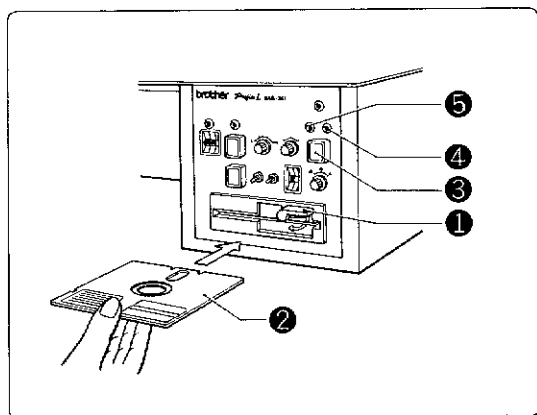
(1) Turn the lever ① left to open.
(2) With the label side facing up, insert the floppy disk ❷ containing the stitch pattern program.
(3) Turn the lever right to close.
(4) Press the write switch ❸.
(5) After the write indicator ❹ lights, program data will be written to the floppy disk, and the read indicator ❺ will light.

## 17 Sewing speed and stitch pitch during the sewing operation.

- The sewing speed of the BAS-361 is automatically controlled by the stitch pitch. The relationship between the sewing speed and the stitch pitch is listed in the table below.

Stitch pitch	Maximum sewing speed
0.2 ~ 2.4 mm	2,000 spm
2.5 ~ 4.4 mm	1,400 spm
4.5 ~ 6.3 mm	800 spm

HOW TO REVISE THE PROGRAM

- Use the C key to revise a program according to alterations made in the pattern design or to correct a program which was input incorrectly.

[1] To revise a section of the stitch pattern program from points 5, 6, and 7 to points 5', 6', and 7' according to alterations made in the stitch pattern design.
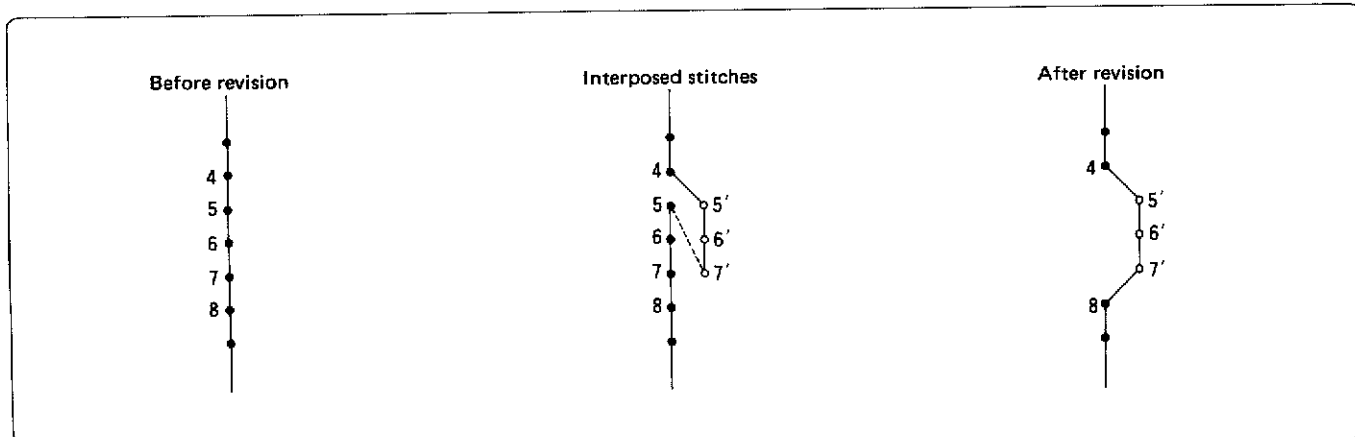
Before revision   Interposed stitches   After revision

(1) Set the power switch ON.
(2) Press P. The presser clamp will move to the point of origin (X-0; Y-0), "0" will be indicated on the STEP display, and F indicator will illuminate.
(3) Insert the memory card containing the stitch pattern program to perform the read operation.
(4) Press 9 3 times to indicate "999" on the STEP display, and then press ⊞ . The presser clamp will move one stitch at a time from the initial stitch position.
(5) When the tip of the needle becomes aligned with point 4, press either ⊞ or ⊟ . The presser clamp will stop. (If however, the presser clamp is accidentally moved beyond point 4, indicate on the STEP display the number of stitches past point 4, and then press ⊟ . The presser clamp will move as many times as indicated on the STEP display in the reverse direction.)
(6) Operate the direction keys to align the tip of the needle with point 5', and then press L. Point 5' will be programmed.
(7) Follow the above procedure to program points 6' and 7'.
(8) Use the number keys to indicate "001" on the STEP display, and then press ⊞ . The tip of the needle will move to point 5. Points 5', 6', and 7' will be interposed bewteen points 4 and 5.
(9) Press C. The indicator C will illuminate.
(10) Use the number keys to indicate on the STEP display the number of stitches to be cancelled. (In this instance, indicate "003" on the STEP display to cancel points 5, 6, and 7.)
(11) Press ⊞ . The tip of the needle will move to points 6, 7 and 8.
The 3 points 5, 6, and 7 will be cancelled and the program will be revised so that the needle will move from point 4→5'→6'→7'→8.
(12) Write the program data to the floppy disk.
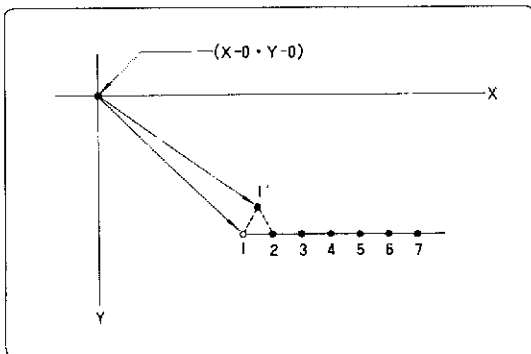(13) Press P. The indicator will go out.

2 To cancel the initial stitch of a stitch pattern which has already been programmed.
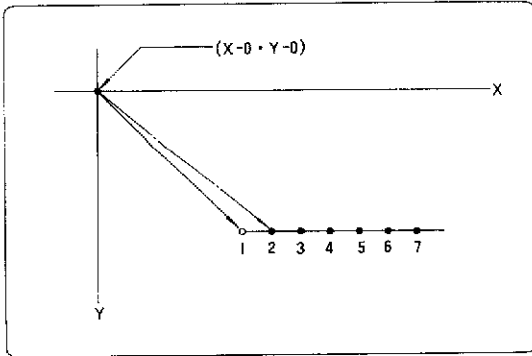
(1) Set the power switch ON.
(2) Press P. The presser clamp will move to the point of origin (X-0; Y-0), "0" will be indicated on the STEP display, and indicator F will illuminate.
(3) Insert the memory card containing the stitch pattern program to perform the read operation.
(4) Press key 1 and ⊞ . The tip of the needle will move to the initial stitch position of the program.
(5) Press C , 1, and ⊞ in that order. The initial stitch will be cancelled, and the tip of the needle will move to the second stitch position.

(6) Write the program data to the floppy disk.
(7) Press P . The indicator will go out.

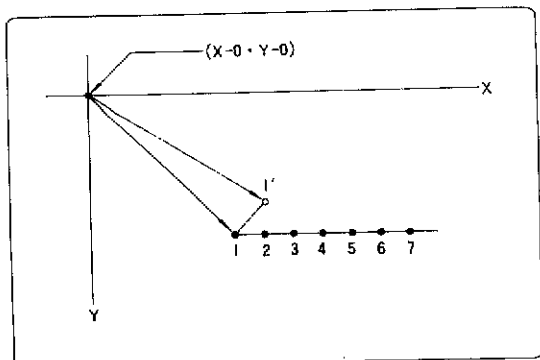**3 To cancel the initial stitch of a pattern and reprogram the new initial stitch position.**

(1) Set the power switch ON.
(2) Press P . The presser clamp will move to the point of origin (X-0; Y-0), "0" will be indicated on the STEP display, and indicator F will illuminate.
(3) Insert the memory card containing the stitch pattern program to perform the read operation.
(4) Press 1 and ⊞ . The tip of the needle will move to the initial stitch position.
(5) Use the direction keys to move the tip of the needle from the initial stitch position 1 to the new initial stitch position 1'. Then, press L .

Note If the distance between the original initial stitch position 1 and the new initial stitch position 1' is greater than 6.2 mm, press either F or L , and then use the direction keys to move the tip of the needle to the new initial stitch position 1'. Then, press L .

(6) Press 1 and ⊟ . The tip of the needle will move to the original initial stitch position 1.
(7) Press the C, 1, and ⊞ keys in that order. The original initial stitch position 1 will be cancelled, and the tip of the needle will move to the second stitch position 2.
(8) Write the program data to the floppy disk.
(9) Press P . The indicator will go out.

4 To program a sewing operation prior to the initial stitch position of a pattern which has already been programmed.

(1) Set the power switch ON.

(2) Press $\boxed{P}$. The presser clamp will move to the point of origin (X-0; Y-0), "0" will be indicated on the STEP display, and indicator $\boxed{F}$ will illuminate.

(3) Insert the memory card containing the stitch pattern program to perform the read operation.

(4) Press $\boxed{I}$ and $\boxed{+}$. The tip of the needle will move to the initial stitch position.

(5) Press either $\boxed{L}$ or $\boxed{F}$, and then use the direction keys to move the tip of the needle to the initial stitch position. Then, write down the coordinates (the X and Y values) on a piece of paper, and press $\boxed{L}$.
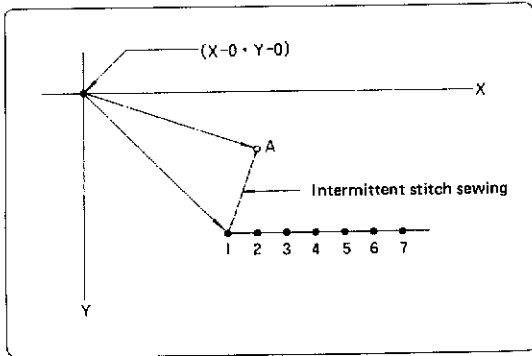
(6) Use the direction keys and $\boxed{L}$ between the new stitch position 1' and the initial stitch position 1 to program the additional sewing position.

Note Set the number of additional sewing positions according to the distance and the stitch pitch between the new stitch position 1' and the initial stitch position 1.

(7) Program the value of each of the coordinates in the X and Y directions.

(8) Press $\boxed{R}$. The presser clamp will move back to the point of origin.

(9) Press $\boxed{I}$ and $\boxed{+}$. The tip of the needle will move to the initial stitch position.

(10) Press $\boxed{C}$, $\boxed{I}$, and $\boxed{+}$ in that order. The tip of the needle will move to the new stitch position 1', and a stitch position prior to the initial stitch position 1 will be programmed.

(11) Write the program data to the floppy disk.

(12) Press $\boxed{P}$. The indicator will go out.

5 To program a shunting point prior to the initial stitch position of a pattern which has already been programmed.

※ If the presser clamp contacts the needle or the presser foot when it is lifted at the initial stitch position a shounting point is used as an alternative point where the presser clamp is be lifted.

(1) Set the power switch ON.

(2) Press P. The presser clamp will move to the point of origin (X-0; Y-0), "0" will be indicated on the STEP display, and indicator F will illuminate.

(3) Insert the memory card containing the stitch pattern program to perform the read operation.

(4) Press 1 and ⊞ . The tip of the needle will move to the initial stitch position of the program.

(5) Press F, and then use the direction keys to move the tip of the needle to point A (the shunting point.) Write down the coordinates (the X and Y values) on a piece of paper, and press L.

(6) Press F, and then use the direction keys according to the value of the coordinates in the X and Y directions. Press L.

(7) Press 2 and ⊟ . The tip of the needle will move from the initial stitch position to point A and then back to the initial stitch position.

(8) Press C, 1, and ⊞ in that order. The tip of the needle will move to point A, and the shunting point will be added to the program prior to the initial stitch position.

(9) Write the program data to the floppy disk.

(10) Press P. The indicator will go out.

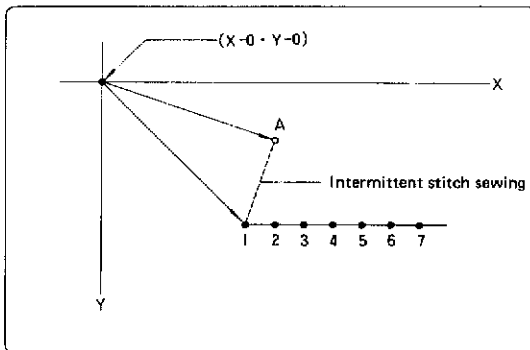## 6 To shift the shunting point from point A to point B.
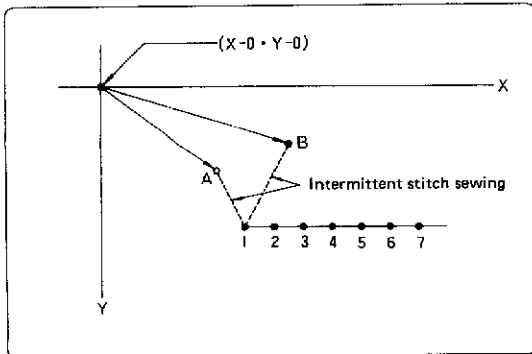
(1) Set the power switch ON.
(2) Press P. The presser clamp will move to the point of origin (X-O; Y-O), "O" will be indicated on the STEP display, and indicator F will illuminate.
(3) Insert the memory card containing the stitch pattern program to perform the read operation.
(4) Press 1 and ⊞ . The tip of the needle will move to shunting point A.
(5) Press L, and then use the direction keys to move the tip of the needle to the new shunting point B. Press L.

(6) Press 1 and ⊞ . The tip of the needle will move to shunting point A.
(7) Press C, 1, and ⊞ in that order. Shunting point A will be cancelled, and the tip of the needle will move to the new shunting point B.
(8) Write the program data to the floppy disk.
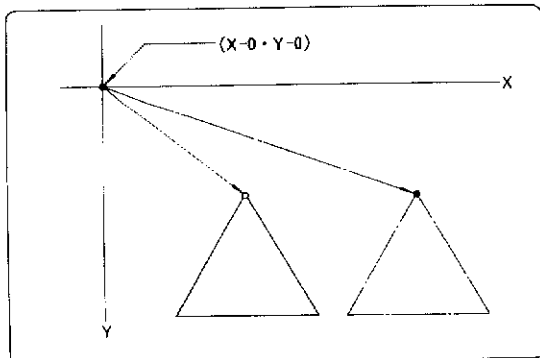(9) Press P. The indicator will go out.

7 To cancel shunting point A.

(1) Set the power switch On.
(2) Press P. The presser clamp will move to the point of origin (X-O; Y-O), "O" will be indicated on the STEP display, and indicator F will illuminate.
(3) Insert the memory card containing the stitch pattern program to perform the read operation.
(4) Press 1 and ⊞ . The tip of the needle will move to shunting point A.
(5) Press C, 1, and ⊞ in that order.
Shunting point A will be cancelled, and the tip of the needle will move to the initial stitch position.

(6) Write the program data to the floppy disk.
(7) Press P. The indicator will go out.

8 To parallel-shift a programmed stitch pattern in the X direction or Y direction.

### A. When the initial stitch is the beginning of the sewing operation.

(1) Set the power switch ON.
(2) Press P. The presser clamp will move to the point of origin (X-0; Y-0), "0" will be indicated on the STEP display, and indicator F will illuminate.
(3) Insert the memory card containing the stitch pattern program to perform the read operation.
(4) Use the direction keys to move the tip of the needle to the new starting position of the sewing operation. Press L.
(5) Write the program data to the floppy disk.
(6) Press P. The indicator will go out.

B. When the initial stitch is the shunting point of the sewing operation.
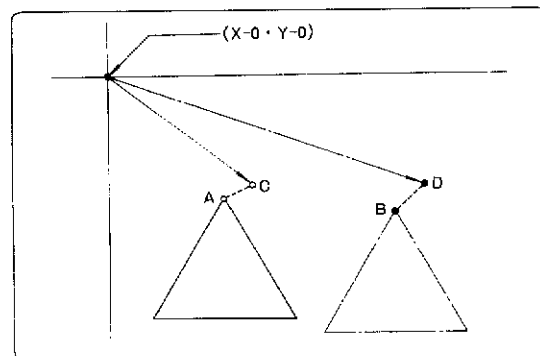
(1) Set the power switch ON.
(2) Press P. The presser clamp will move to the point of origin (X-0; Y-0), "0" will be indicated on the STEP display, and indicator F will illuminate.
(3) Insert the memory card containing the stitch pattern program to perform the read operation.
(4) Press 2 and ⊞ . The tip of the needle will move to point A.
(5) Use the direction keys to move the tip of the needle to point B. (At this time, do not press L.)

Note When the distance from point A to point B exceeds 6.2 mm, press either U or F, and then use the direction keys to move the tip of the needle to point B.

(6) Write down the coordinates (the X and Y values) on a piece of paper.
(7) Press R. The presser clamp will move back to the point of origin.
(8) Press 1 and ⊞ . The tip of the needle will move to point C.
(9) Use the direction keys according to the value of the coordinates in the X and Y direction to move the tip of the needle to point D.
(10) Make a mark at point D so that the tip of the needle can easily be brought to this position when the pulley is turned manually.
(11) Turn the pulley manually to raise the needle to the highest position.
(12) Press R. The presser clamp will move back to the point of origin.
(13) Use the direction keys to move the tip of the needle to point D (i.e., to where the mark was made.) Press L.
(14) Write the program data to the floppy disk.
(15) Press P. The indicator will go out.

9 To cancel points 7 and 8 after locating an error in the program.
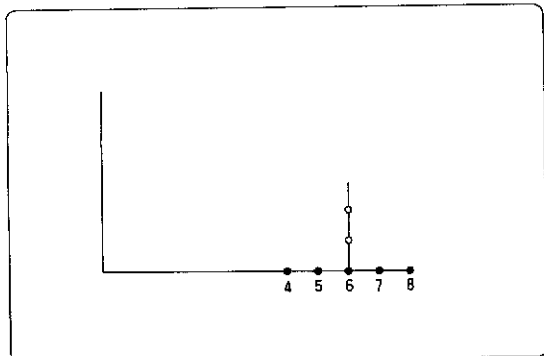
(1) Press ⓒ. Indicator ⓒ will illuminate.
(2) Use the direction keys to indicate on the STEP display the number of steps to be cancelled. In this instance, points 7 and 8 are to be cancelled. Therefore, indicate "002" on the STEP display.
(3) Press ⊟ . The tip of the needle will move from point 8 to point 7 and then to point 6. Points 8 and 7 will be cancelled.
(4) Reprogram the stitch pattern from point 6 onward.

10 Shifting of a pattern B that is in the middle of consecutively programmed patterns
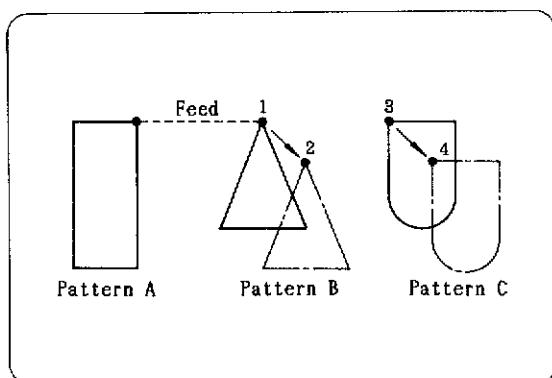
(1) Turn the power ON.
(2) Press Ⓟ. The presser foot will move to the point of origin (X-0; Y-0), 0 will appear in the X, Y, and STEP indicators and Ⓕ will illuminate.
(3) Insert a floppy disk into the floppy disk drive.
(4) Press 9 three times until [999] appears in the STEP indicator, and then press ⊞ . The needle tip should now trace pattern A one stitch at a time.

(5) Press ⊞ and/or ⊟ so that the needle tip aligns with the first stitch of pattern B. The presser foot will stop. (If the presser foot moves past the first stitch of pattern B, use the number keys to display that number of stitches in the STEP indicator and then press ⊟ . The presser foot will now return the number of stitches displayed in the indicator.)
(6) Press the number keys to display [777] in the STEP indicator and then press Ⓕ.
(7) Use the feed key to move the needle tip from point 1 to point 2, and then press Ⓛ.

Note If a third pattern "C" follows pattern B, pattern C will automatically follow pattern B and shift as shown in the diagram. If this is undesirable, follow the same procedure as in steps (4) ~ (7) above to move the needle tip to point 3, and use the "777 Ⓕ" code to return pattern C to its original position.

Ⅱ Reprogramming an embroidery pattern

- If an embroidery pattern cannot be sewn as programmed, or if the stitch length or width commands are to be changed, the data recorded in the smoothing process can be used as is for reprogramming.

(1) Press Ⓡ.
(2) Press Ⓘ and ⊞ . The presser foot will move to the sewing start position.
    ※ If a side point has been programmed, cancel it and restart at the sewing start position. (See page 29 of the operating manual.)
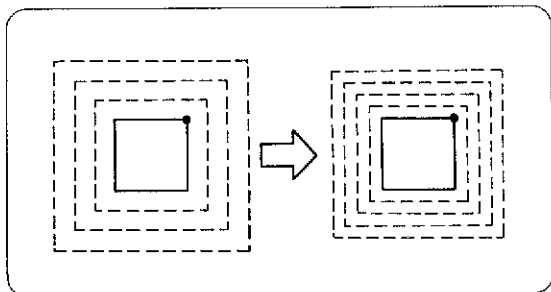
(3) Use the number keys to set the pitch, and then press Ⓜ.
(4) Use the number keys to set the width, and then press Ⓜ.
(5) Use the number keys to indicate how many rows are to be sewn, and then press Ⓜ.
(6) Press Ⓛ.

Note 1 Corrections of multiple sewing patterns cannot be made with data stored in the floppy disk.

Note 2 If the same pattern is to be sewn repeatedly but not necessarily as programmed, set the pitch and width somewhat smaller to simplify sewing.

Note 3 When Ⓛ is pressed, the STEP indicator will display [5 □ □] and the final two digits will decrease consecutively while a distinctive audible indicator sounds, notifying the operator that a pattern is being programmed. When the indicator ceases to sound, the needle tip will begin to move slowly.

## 12 Lower thread warning split

If it is certain that the thread will disappear in the middle of a pattern (e.g. when the pattern is longer than 10,000 stitches), the bobbin thread replacement position can also be pre-programmed. To do this, turn the No. 8 DIP switch ON as shown in the figure in the page at the right.

Note When this position is programmed, split sewing cannot be done without thread trimming.

Example: Replace the bobbin at point 1 in pattern A below.

(1) Turn the power ON.

(2) Press [P]. The presser foot will move to the point of origin (X-0, Y-0), 0 will be displayed in the X, Y and STEP indicators, and indicator [F] will illuminate.

(3) Insert the floppy disk in the floppy disk drive and read this program.

(4) Press [9] three times to display "999" in the STEP indicator, and then press [+] . The needle tip will now trace pattern A stitch by stitch. If the pattern has an extremely large number of stitches, repeat these steps as many times as necessary. (Depress the presser foot lifter switch to increase the needle feed speed.)

(5) Use [+] or [−] as necessary to align the needle with position 1. The presser foot will stop. (If the presser foot moves too far, use the number keys to indicate the exact number of stitches in the STEP indicator, and then press [−] . The presser foot will return the indicated number of stitches.)

(6) Press number key [8] three times and then press [F].

(7) Use the feed key to bring the needle tip to point 2 (select this position yourself), and then press [L].

(8) Use the feed key to bring the needle tip back to point 1 and then press [L] again.

Note If an intermittent feed (e.g. from 3 to 4 above) is programmed near the bobbin replacement position (point 1), it is usually more convenient to use that feed position for bobbin replacement by programming "888 [F]".
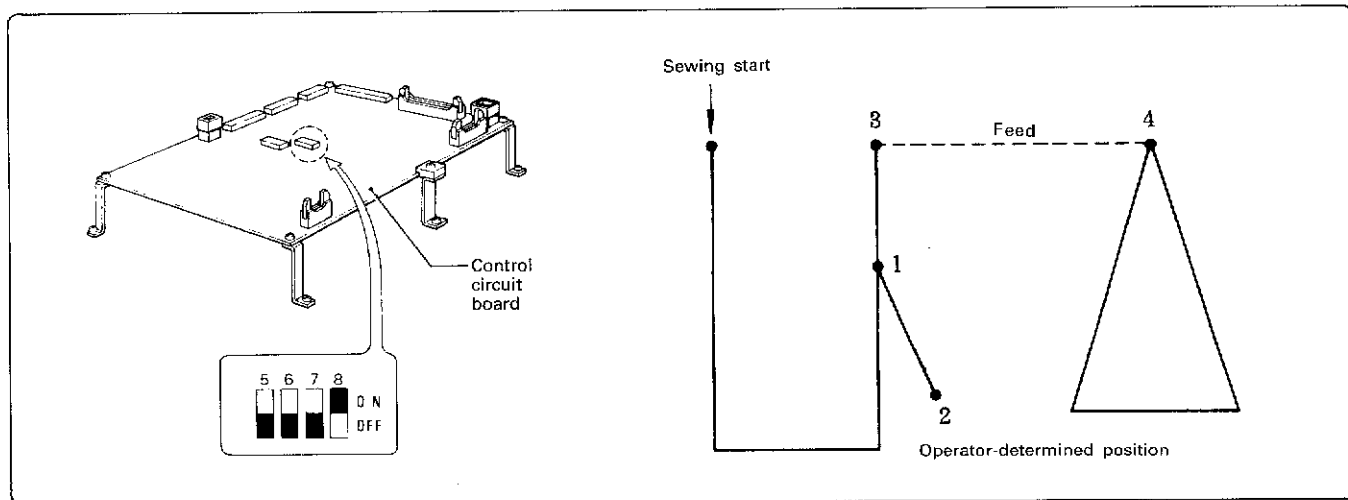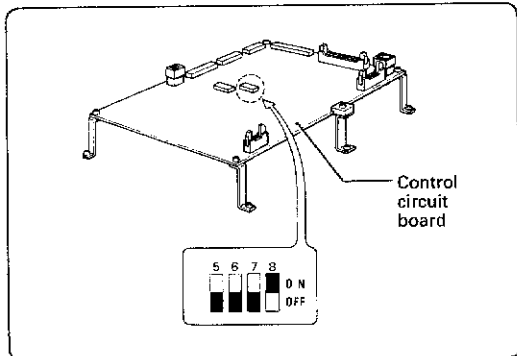

★ Operation

(1) Sew as usual.

(2) Cut the thread at point 1, feed to point 2 and then return to point 1 and stop. (The bobbin winder counter lamp will flash at this time, indicating that the bobbin needs to be replaced.)

(3) Replace the bobbin.

(4) Press the emergency stop button. (The bobbin winder counter lamp will cease flashing.)

(5) Press the start switch again. Sewing will restart from point 1. (If an intermittent feed gap is being used for bobbin replacement, the needle will stop at point 4. Replace the bobbin there.)
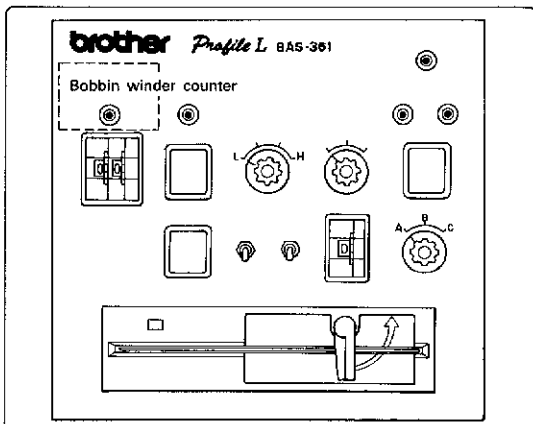
13 Unification of machine speed regardless of stitch length

This machine automatically regulates machine speed according to stitch length. However, it is now possible to use a uniform speed for all stitch lengths with this new program, thus making final stitching of zigzag patterns and in extremely thick materials easier and prettier than before.


Control circuit board

Speed selector switch	Machine speed
1 speed	800 rpm
2 speed	700 rpm
3 speed	600 rpm
4 speed	500 rpm

(1) When programming is completed, press [112 E] instead of [111 E]. This simple operation automatically sets a uniform sewing speed for all stitch lengths.

Note 1 **Floppy disks for 500 — 800 rpm will retain the previous machine speeds if programmed with [111 E].]**

Note 2 **If DIP switch 7 is ON, machine speed will be 500 — 800 rpm regardless of the data stored in the floppy disk.**

14 Split sewing without intermediate thread trimming

This unit was designed to cut the thread at the division in split sewing. However, continuous sewing of split patterns and garments in which intermediate thread trimming is undesirable is now possible with the new program for full circumference sewing by using special work clamps (inner clamps).
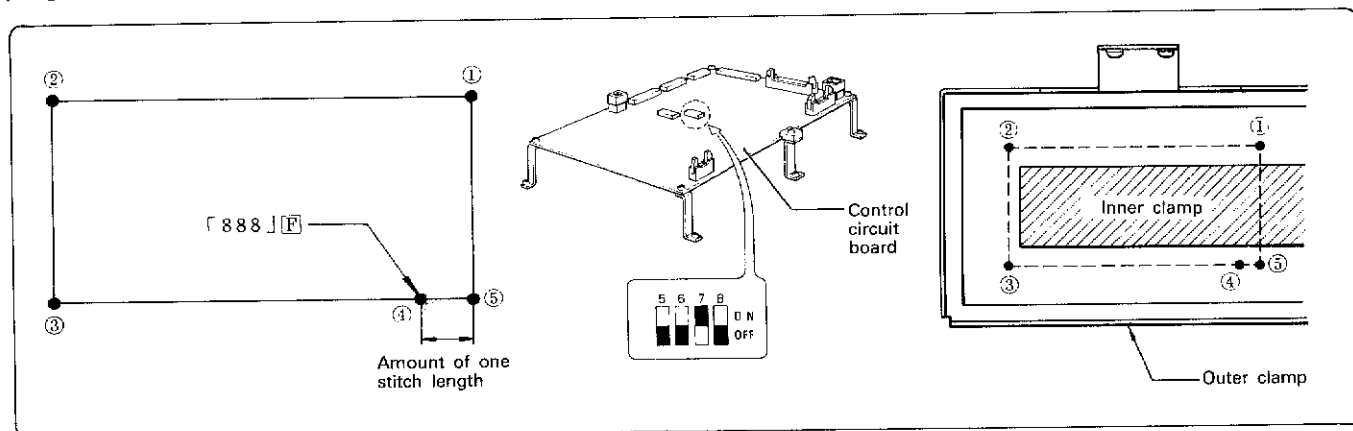
Example: Sewing with a special purpose work clamp (inner clamp).

[Programmed method]

(1)   Turn the power ON.

(2)   Press ⬚P. The presser foot will move to the point of origin (X-0, Y-0), 0 will be displayed in the X, Y, and STEP indicators and indicator ⬚F will illuminate.

(3)   Use the feed key and program from ❶ to ❹.

(4)   At position ❹, use the number keys to display [888] in the STEP indicator, and then press ⬚F.

(5)   Use the feed key to move the needle tip to position ❺.

※   The distance from position ❹ to ❺ is one stitch length.

(6)   Program from position ❺ to position ❶.

Note 1   [888] was used as the bobbin thread alarm for the split, but has been changed as follows.

666 ⬚F → splits similar to those used until now.

**888 ⬚F → splits without thread trimming**

Note 2   To use the bobbin thread alarm, turn DIP switch 8 ON and program as usual.

[Operation]

(1)   Set the garment to be sewn as shown in the figure at left, and press the start switch.

(2)   The machine will sew from ❶ to ❹ and then stop in position ❺ in the needle up position without cutting the thread.

(3)   Remove the work clamp (inner clamp) and then press the start switch again.

(4)   The machine will sew from ❺ to ❶.

15 Embroidery progrmming (new embroidery)

※ The programming method described below improves on the embroidery method used until now. The previous embroidery method can still be used.

Space as evenly as possible

Outer line

Inner line

Fig. 1

Fig. 2
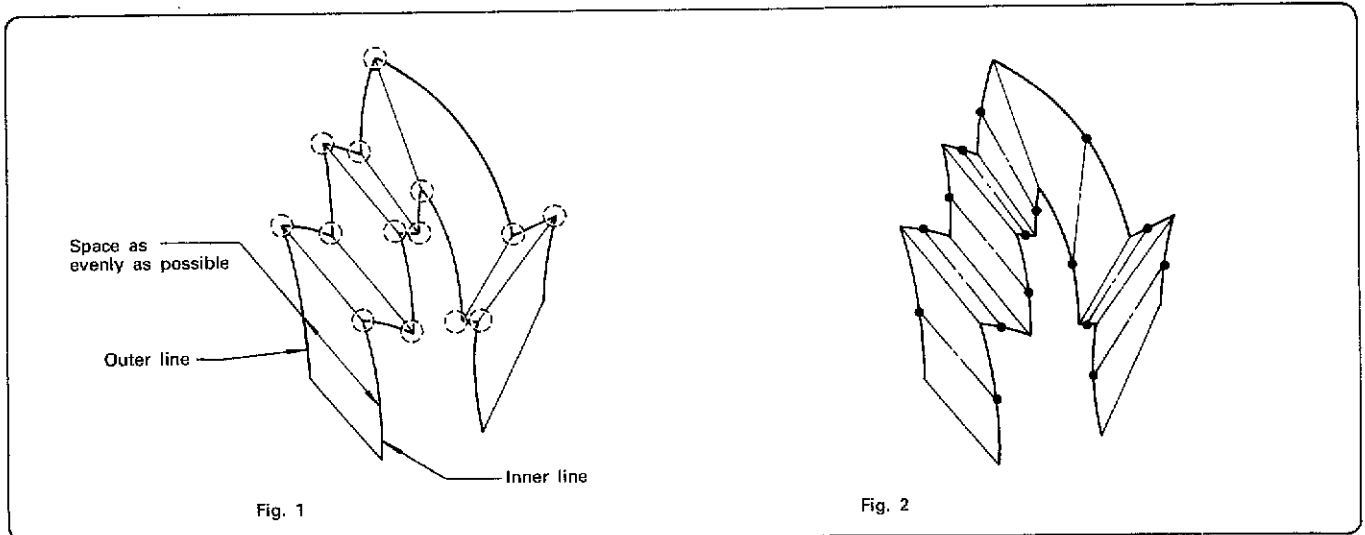
[Programming]
(1) Estimate and draw the inner and outermost lines of the pattern. When drawing these lines, keep the spacing as even as possible.
(2) Connect the pivot points on the inner line with the corresponding pivot points on the outer line as shown in Fig. 1.
(3) Select a minimum of one other point between each of these pivot points and connect them as shown in Fig. 2.
※ Select these points according to the same "smoothing" method used previously.
※ Be sure to space the intermediate points evenly between the pivot points on both the inner and outer lines.
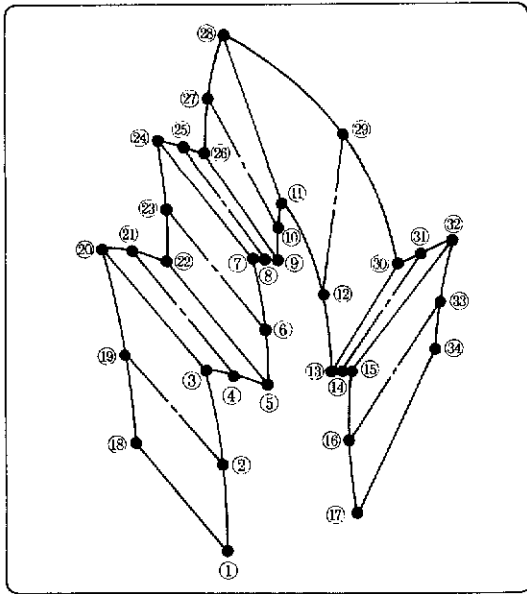
Example:

Note 1 Either the inner line or the outer line may be programmed first but sewing will start from the line programmed first.

Note 2 The "forward" direction (sewing direction) is determined by the programming order.

(1) Turn the power ON.

(2) Press P. The presser foot will move to the point of origin (X-0, Y-0), 0 will be displayed in the X, Y and STEP indicators, and indicator C F will illuminate.

(3) Use the feed key to move the needle tip to position ❶. Now press key 8 three times to display "888" in the STEP indicator, and then press L.

※ Set the stitch length last. Note, also, that it is not necessary to press M as before.

(4) Use the feed key to bring the needle tip to position ❷ and then press L.

(5) Again, use the feed key to bring the needle tip to position ❸. Next, display [789] in the STEP indicator, and press L. Be sure to program "789" L" at every pivot point.

(6) Continue programming in this way through position ❿.

※ If a certain interval is to be joined with a straight line, move the needle tip from one pivot point directly to the next, and then program the same [789] L. Furthermore, if a certain interval is programmed as a straight line, for example, from ❼ to ❾ above, be sure to program the corresponding interval, ㉔ to ㉖ above, as a straight line, too.

(7) After position ⑰ is programmed, press F, and then use the feed key to move the needle tip to position ⑱.

(8) Program as above through position ㉞.

※ Be sure to program so that the same L and "789" L commands are entered at corresponding positions on both the inner and outer lines. If points are not correspondingly programmed on the inner and outer lines, the machine will automatically back-up to the previous point. Reprogram from there.

(9) Use the number keys to indicate the desired stitch length in the STEP indicator. Stitch length indication is the desired stitch length divided by one pulse (0.1 mm). For example, a stitch length of 1.6 mm is indicated as 1.6 ÷ 0.1 = 16, or a STEP indication of [016].

(10) Press M.

(11) Press 5, and then indicate whether the pattern is to be sewn in multiple rows or not. For instance, if four rows of the pattern are desired, display [504] in the STEP indicator.

(12) Press M.

※ Either the stitch length or the row number can be programmed first.

(13) Press L.

※ If either the stitch length or row number commands are forgotten, an alarm will sound. If the alarm sounds, reprogram from step 9 through 13.

(14) The machine will now calculate the programmed pattern step. The display will indicate the row number being calculated until the final row number is calculated and stored.

※ An audible indicator will sound while the machine is calculating.

(15) When both calculations and programming are ended, press ☐ three times and display [111] in the STEP indicator. Press ☐.

※ Note that it is possible to continue from position ⓔ to another pattern, or program another entirely different pattern.

Note 3   The presser foot will not operate after calculations are finished.
Perform the following steps to check the program.

(1) Press ☐. The presser foot will move to the point of origin.

(2) Press ☐ and ☐ . The needle tip will move to the sewing start position.

(3) Press ☐ three times to display [999] in the STEP indicator, and then press the ☐ key.

(4) The needle tip will begin to trace the pattern one stitch at a time.

※ It is also possible to press ☐ three times to display [999] in the STEP indicator and then press ☐ to trace the pattern in reverse when programming is completed.

⓰ Resetting a programmed pattern (new embroidery)

It is possible to adjust previously programmed data composed by the "smoothing" method in order to change to the stitch length or width. Perform the following steps.
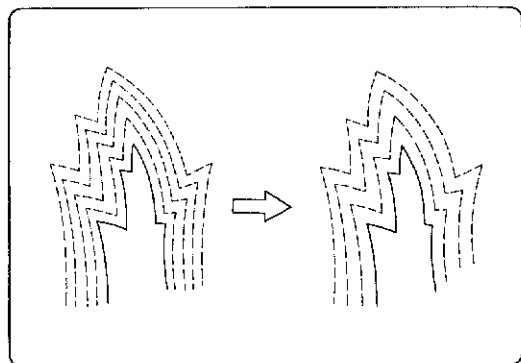
(1) Press ☐ three times. The presser foot will move to the point of origin.

(2) Press ☐ and ☐ . The needle tip will move to the sewing start position.

※ Cancel any side points, and start as usual from the sewing start position.
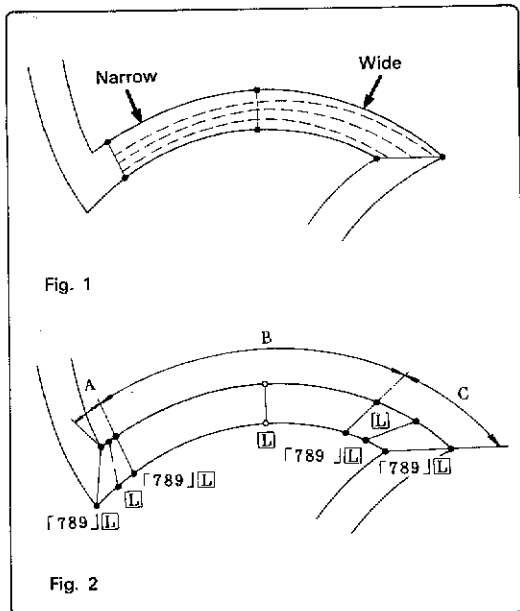(See page 29 of the operating manual.)

(3) Use the number keys to reset the stitch length and then press ☐.

(4) Use the number keys to indicate how many rows are to be sewn, and then press ☐.

(5) Press ☐.

Note   Embroidery patterns stored in a floppy disk cannot be adjusted.
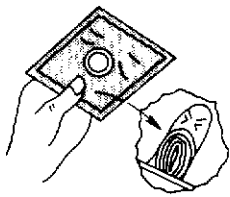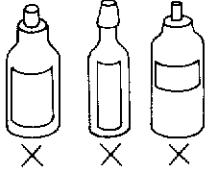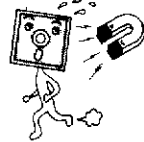
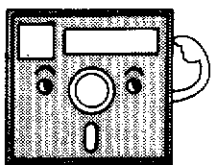## ● Cautions during programming
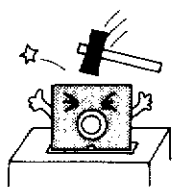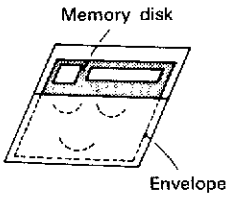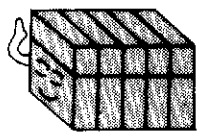

Fig. 1

Fig. 2
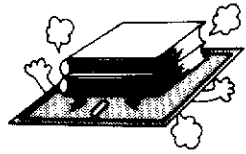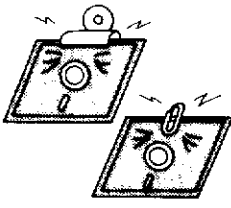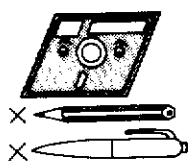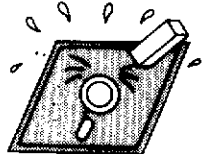
◎   If the sewing angle changes suddenly and sharply, embroidery lines will become erratically narrow and wide as shown in Fig. 1 at left. To avoid this, select several points near the pivot points and curve points and "smooth" the lines.

※   Figure 2 at left shows the pattern divided into three sections, A, B, and C.

Note   **A maximum of 200 points can be plotted on one side; the machine will automatically back-up one point. If this happens, use F to proceed to the outer line and program points on it, or replot the points along the inner line by using fewer points.**

※ Follow the suggestions below to obtain the maximum useful life of the floppy disk.

1. Do not touch the magnetic surface of the floppy disk. Fingerprints will result in disk failure.	2. Do not bring solvents into contact with the magnetic surface. Avoid the use of paint thinner, alcohol, or sprays.	3. Do not bring magnets near the disk. Exposure to magnetic fields may result in erasure of the program contents.	4. Do not bend or fold the disk. The disk is highly flexible but if bent or folded, the read operation or write operation will fail.
5. Do not place any objects on top of the disk. If heavy objects are placed on top of the disk, the disk may damaged and become unusable.	6. Do not use paper clips as disk failure may result.	7. Do not use a pencil or ball point pen. Use soft-tip pens such as felt-tip markers, etc.	8. Do not rub the disk with an eraser. Disk failure may result.
9. Place the index sheet in the proper position (i.e., to the right side of the label.) When a new index sheet is to be used, be sure to remove the old one first.	10. Be sure to insert the disk gently. If the disc is not handled carefully, it will not be set properly in the drive.	11. Be sure to use the envelope. The envelope will protect the disk from dust. Be sure to store the disks in their envelopes. Memory disk Envelope	12. Store disks vertically in their storage boxes. If they are left out or stacked horizontally, they can become dusty or warped and consequently become unusable.
13. Do not expose the disk to direct sunlight or bring it in the vicinity of a heating appliance.	14. The disk should be used under the following conditions: Temperature: 10°~15°C Humidity: 20%~80% r/h Wet-bulb temperature: less than 29°C (Avoid the use of the disk when abrupt changes in temperture occur.)	15. The disk should be stored under the following conditions: Temperature: 4°~53°C Humidity: 8%~80% r/h	16. The disk should be transported under the following conditions: Temperature: 40°~53°C Humidity: 8%~90% r/h Be sure to keep the disks stored in an appropriate box during transportation.