brother

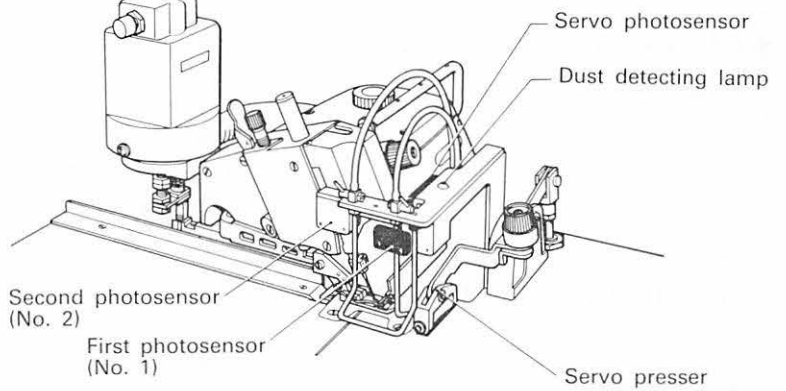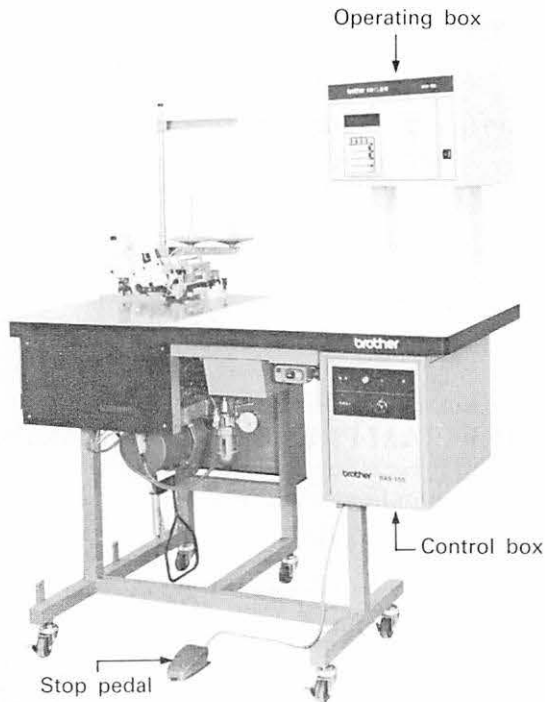# AUTOMATIC SLEEVE EASING MACHINE

BAS-150

INSTRUCTION MANUAL

FEATURES OF THIS MACHINE

★ The servomotor control system of this machine facilitates operation and increases production efficiency.
★ Patterns can be made quickly and easily by keyboard operation.
★ Differences in materials and changes in size are automatically calculated by computer, enabling one-touch selection.
★ Ten proportional sizes (according to 16 size zones) and forty independent sizes can be programmed for patterns.
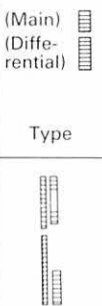★ Because all electronic circuitry is controlled by computer, any abnormality in the circuitry can be self-diagnosed.

Contents

NAMES OF MAIN PARTS

Operating box

Servo photosensor

Dust detecting lamp

Second photosensor (No. 2)

First photosensor (No. 1)

Servo presser

Control box

Stop pedal

SPECIFICATIONS

Stitch form	No. of needle	No. of threads	Stitch width (mm)	Max. Stitch length (mm)	Differential feed ratio	Height of presser foot (mm)	Feed dog Pitch (mm)	Feed dog Type (Main) (Differential)	Needle size DM x 13	Sewing speed (spm)	Use
D12	1	2	4~10	2	1.0~2.4	4	1.6		#14	4000	Sleeve easing

A. SETTING UP

1 Motor Mount Installation
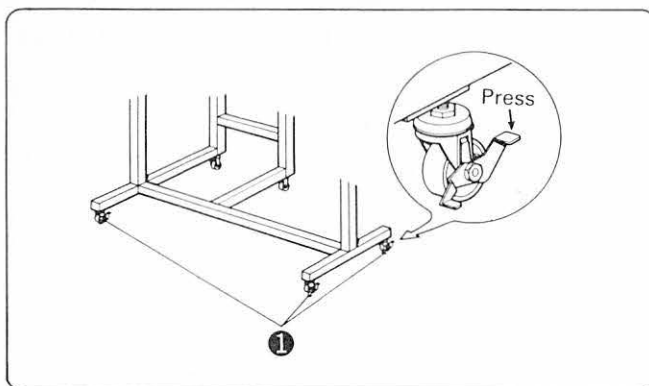
Press

(1) Select a place to install the motor mount, and fix the mount by pressing the levers on casters ❶.

❶

— 1 —

② Machine Head Installation

To raise
To lower
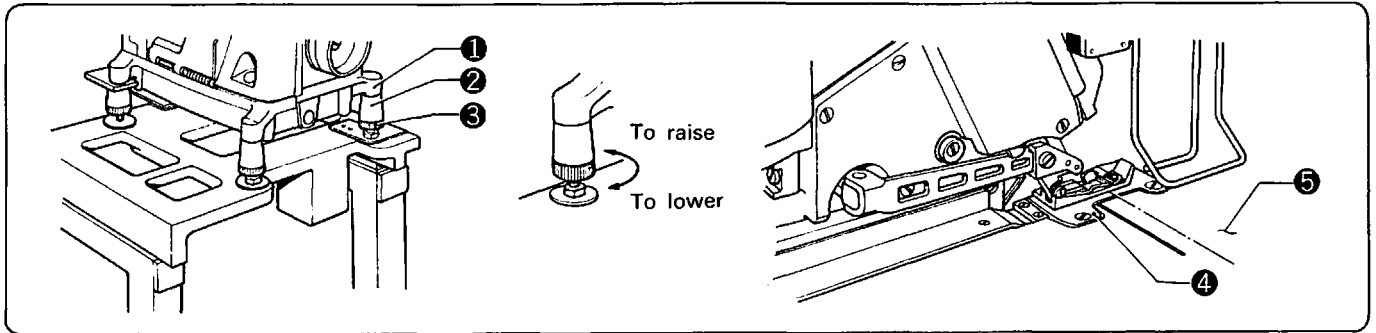
(1) Put machine head ❶ on rubber pads ❷.
(2) Adjust the height of machine head ❶ with adjusting screws ❸.
Make an adjustment so the top of needle plate ❹ is the same as the top of cloth plate ❺.

③ Motor Pulley and Belt

Use on M38 V-belt.

Pulley O.D (mm)		70	80
Sewing speed (spm)	50Hz	—	4000
	60Hz	4000	—

④ Correct Belt Tension

Operating direction
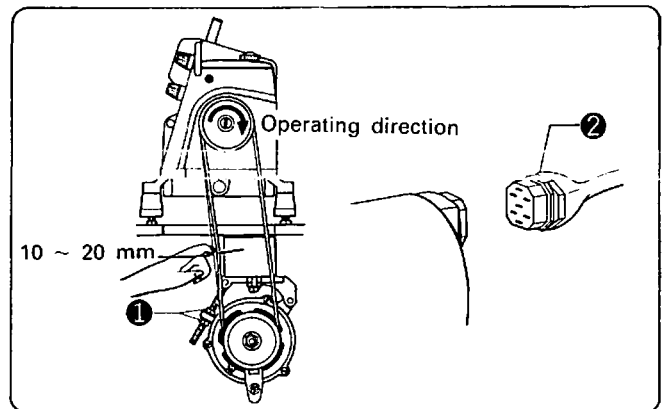
10 ~ 20 mm

(1) Adjust the belt tension with nut ❶ so the belt deflects about 10~20 mm when pressed with a finger.
(2) The machine must run clockwise as viewed from the pulley. If it runs backward, reinsert the motor's connector ❷ upside down.

⑤ Spool Stand Installation
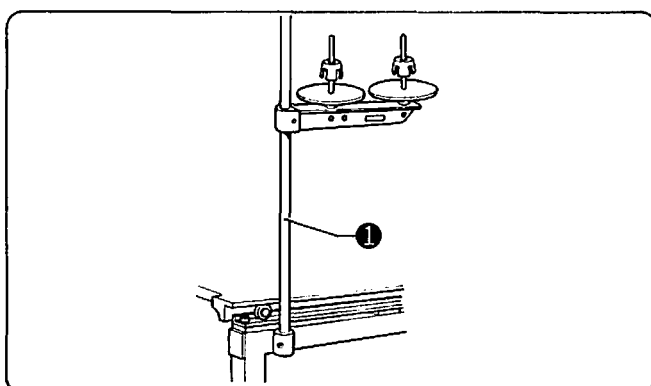
(1) Install spool stand ❶ on spool holder base ❷.

⑥ Stop Pedal Installation
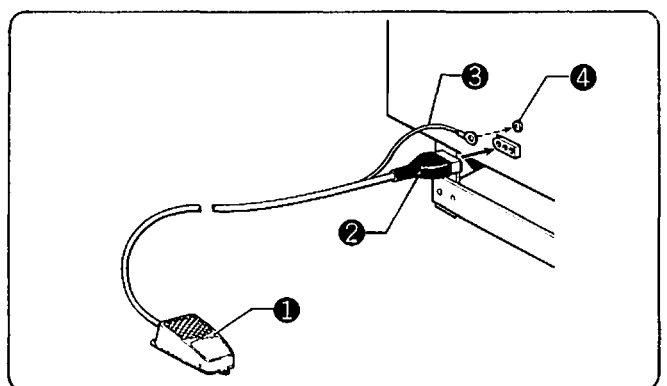
(1) Insert connector (3P) ❷ of stop pedal ❶ to control box.
(2) Fasten ground lead (green) ❸ with control box screw ❹.

B. OILING AND OIL DRAINING

1 Oil to be Used

The Brother oil included with the machine should be used.

2 Oiling and Oil Changes
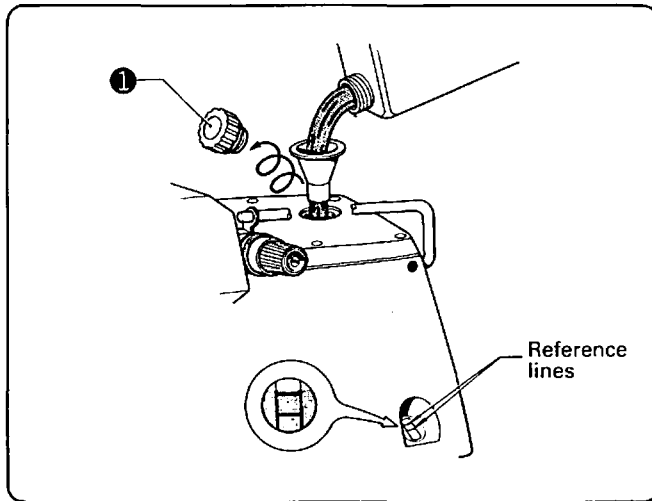
Reference lines

(1) Remove the cap ❶ located on the top of the machine.
(2) Pour the Brother oil included with the machine into the oil tank until the oil level reaches the upper reference line of the oil gauge.
The oil level must be maintained somewhere between the two reference lines.
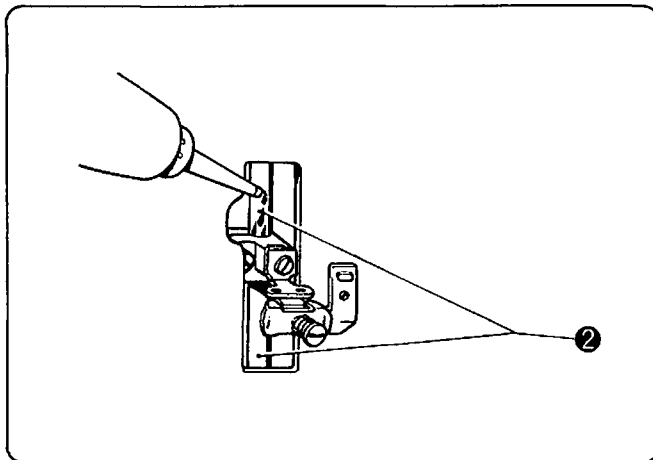
(3) Prior to the initial operation of the new machine, and prior to operating a machine which has not been used for several days, several drops of oil must be applied to both the needle bar.
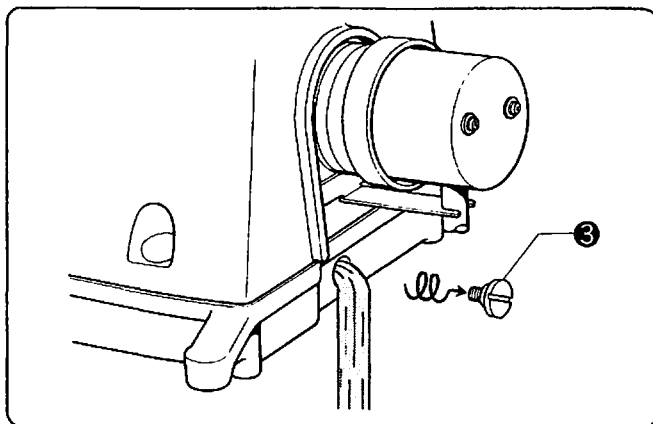
(4) In order to drain the oil of the machine, remove the screw ❸.
The oil should be changed once every month, and the filter and interior of the oil tank should be cleaned on a regular basis.

C. CORRECT OPERATION

1 Air Pressure Adjustment

More pressure
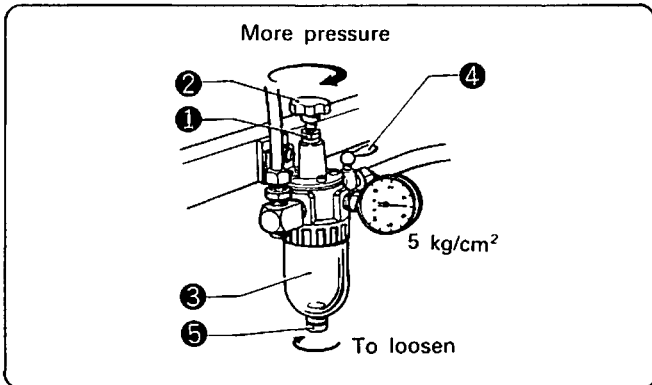
5 kg/cm²

To loosen

(1) An air pressure of 5 kg/cm² is recommended. To adjust it, loosen nut ❶ and turn knob ❷.
(2) If water collects in bottle ❸, close air cock ❹ to lower the air pressure, and turn drain cock ❺ in the arrow direction to discharge the water.

3 ~ 4 mm
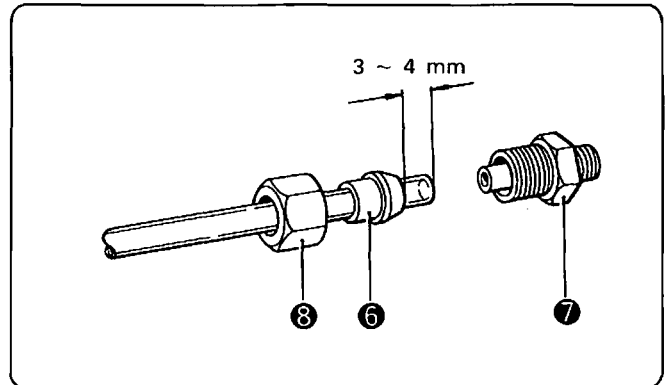
(3) See that the air tube sticks out of sleeve ❻ 3 to 4 mm, fit male connector ❼ on, tighten cap nut ❽ by hand, and then retighten it by turning it once or twice with a spanner.

2 Machine Head Positioning
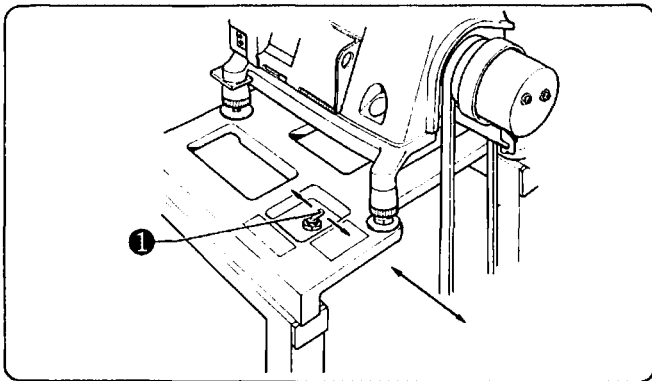
(1) The machine head will move forward or backward when the head movement switch ❶ is pressed towards direction of the arrow.
Move the head backward when threading or making adjustments.

(2) When running the machine without work after moving the head backward, operate clutch pedal ❷ with the foot.

(Caution) 1. When operating the machine, take enough care not to let your hand caught.
2. When moving the head forward, do not forget to close the face plate cover and front cover.

3 Installation of the Needle

Push

DM x 13
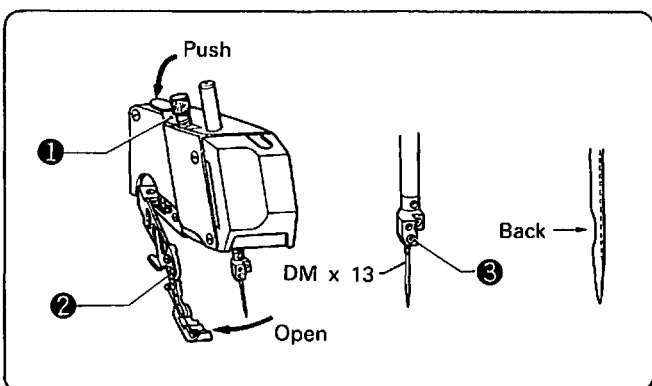
Back →

Open

(1) Turn the pulley in order to raise the needle bar close to its highest position. Then, lower the presser bar lifter ❶, and open the presser arm ❷.
(2) Loosen the needle-clamp screw ❸, hold the needle with the recessed portion of the needle facing back, insert it all the way into the needle clamp hole, and then securely tighten the needle-clamp screw ❸.

– 4 –

④ Threading
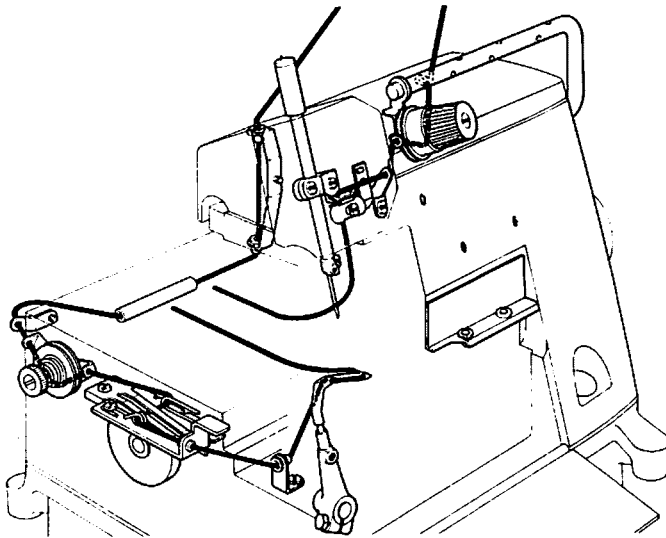
⑤ Thread Tension

★ The thread tension varies according to the type of material, type of thread, position of each thread take-up and thread guide, and other factors. If the tension changes remarkably, it should be adjusted in the following manner.

1. Adjustment of the needle thread guide

Tension increase

Tension decrease
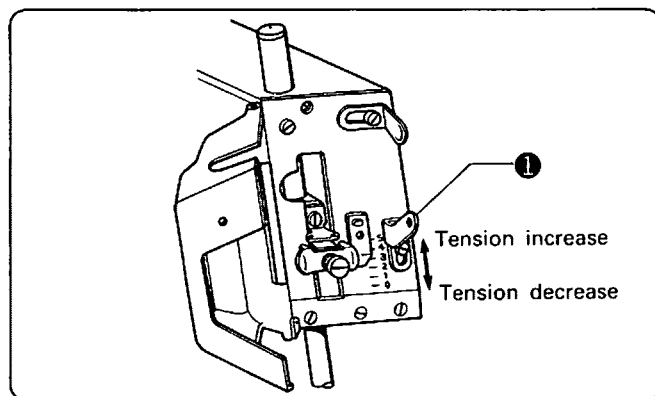
(1) In order to tighten the needle thread tension, lower the needle-thread guide A ❶. In order to loosen the tension, raise the needle-thread guide A ❶.

★ The center of the adjustment range is the standard adjustment position.

2. Adjustment of the double chain-stitch thread take-up

Screw

Approx. 6 mm

Tighten   Loosen
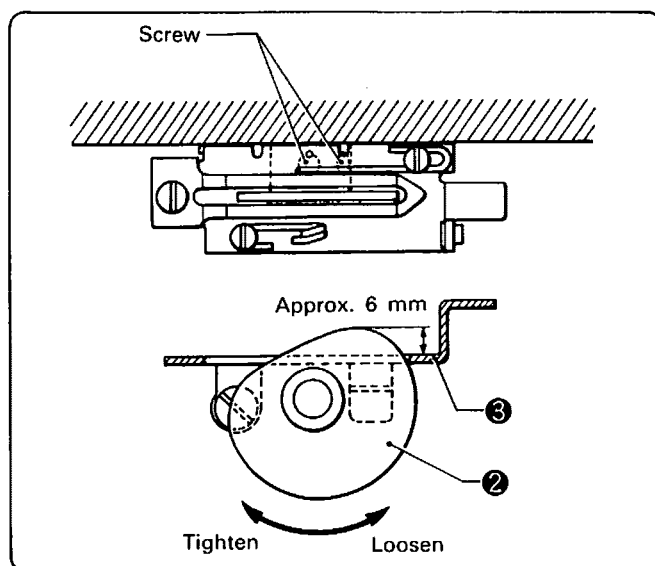
(1) With the needle bar located in its highest position, adjust the timing of the double chain-stitch thread take-up ❷ so that it correctly returns the looper thread.
   ⎰ The distance from the double chain-stitch ⎱
   ⎰ thread take-up ❷ and the thread take-up ⎱
   ⎰ holder ❸ becomes approximately 6 mm. ⎱
(2) The tension of the looper thread will become looser as the double chain-stitch thread take-up ❷ is turned in the counter-clockwise direction, and tighter as it is turned in the clockwise direction.

— 5 —

3. Presser foot pressure adjustment
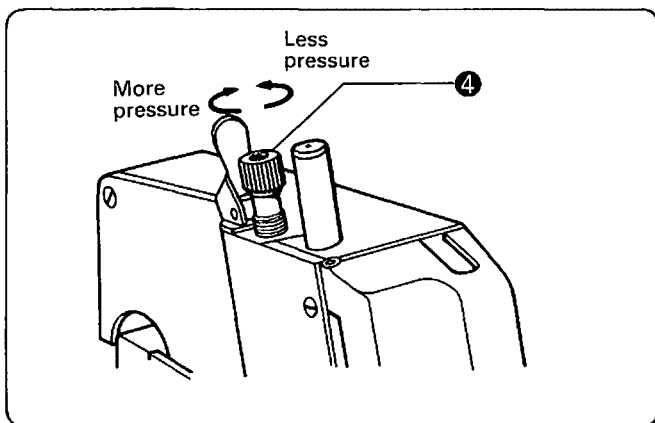
(1) Adjust the presser foot pressure with presser foot adjusting screw **4**.
Turn it clockwise to increase the pressure or counter clockwise to decrease it.

4. Servo presser pressure adjustment
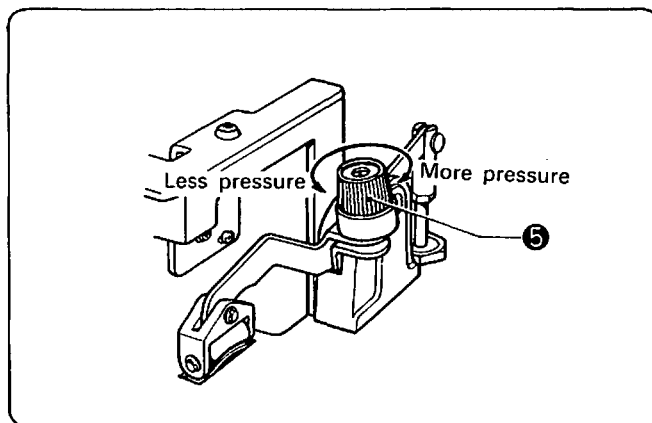
(1) When sewing thin or easy-to-stretch materials, decrease the presser pressure by turning tension nut **5** so the stitches will not come off the work. Increase the presser tension when sewing thick materials.
(The easing method varies with the presser foot pressure.)

5. Air nozzle adjustment

Open the air cock, turn on the power switch in the control box, and then slide the material under first photosensor and servo photosensor.
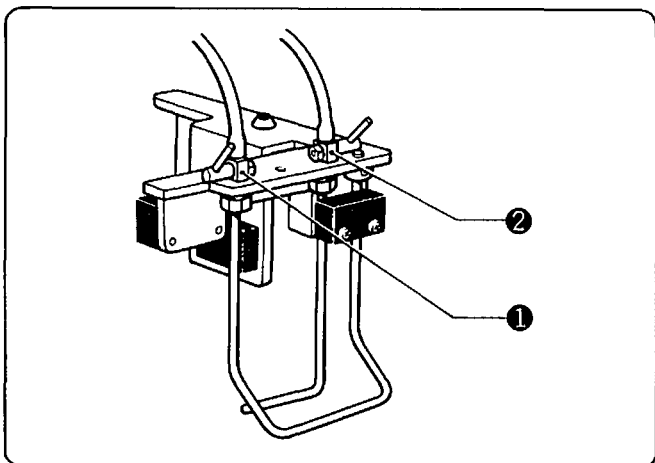
1. **Material-insertion air**
   Flatten out curled cloth edges, and adjust the insertion nozzle **1** to facilitate inserting the material under the presser foot.
2. **Thick-pile-assist air**
   For material with a thick pile, the cloth edge cannot be detected easily and the stitches may run off the material. Adjust the pile-assist air nozzle **2** so that the pile is blown aside and the cloth edge can be easily detected.

6 How to Use the Stop Pedal
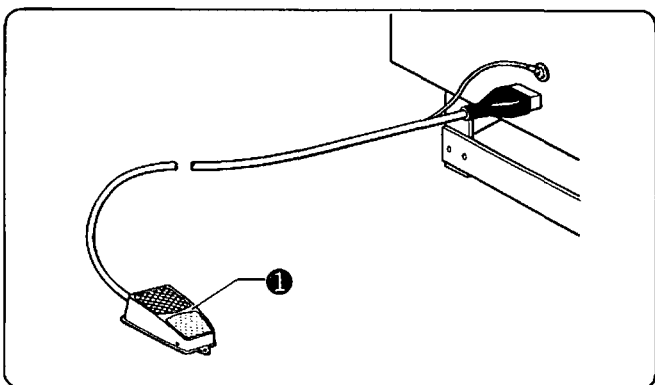
(1) If it is difficult to set the material in place for sewing, depress the stop pedal **1**, and then insert the material under the presser foot. (The machine will start operating when the pedal is released.)
(2) If the stop pedal is depressed during the sewing operation, the machine will stop. It will then start operating again when the stop pedal is released.

D. PROGRAM PREPARATION

Procedure

Prepare several sleeves for trial sewing use. (Refer to item ① of page 8.)
- Sew material together (finish protruding portion.)
- Determine sewing direction, etc.

Prepare original date. (Refer to item ② of page 9.)
- Divide the sleeve sewing length.
- Measure zone lengths (A).
- Determine easing amount (B).
- Measure material angle (C).

Write original data onto data sheet.

Refer to item ③ of page 11 for operation of key functions.

Input original data. (Refer to item ④ of page 13.)
- Zone lengths (A)
- Easing amount (B)
- Material angle (C)

Begin sewing (trial sewing).
(Refer to item ⑤ of page 16.)

Are the easing position and easing amount correct?

Programming is completed

To sew similar items (Refer to item ⑦ of page 18.)

Prepare sleeve of new shape for trial sewing.

Input stitch number and easing rate date.

Automatically calculated inside operating box.

Changed to stitch number and easing rate data.

Stitch number and easing rate data are corrected.

① Prior to Program Preparation

◎ Prepare 2 ~ 3 sleeves for trial sewing.

1. This machine can tack while the material is laid out flat. Sew either the upper sleeve side or lower sleeve side together.

Upper sleeve side

Lower sleeve side
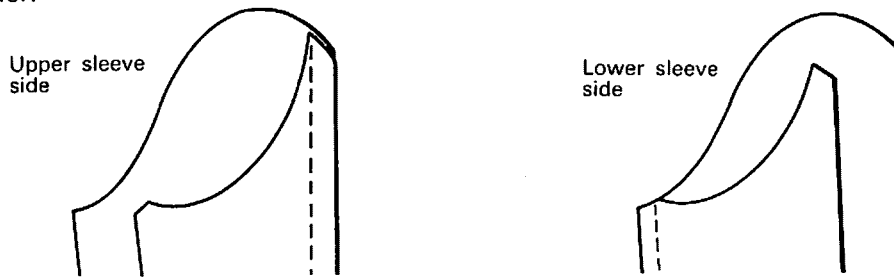
2. As for the sewing direction, select the side which is least likely to disturb the easing position and easing amount as the side for sewing to end.

Sewing direction
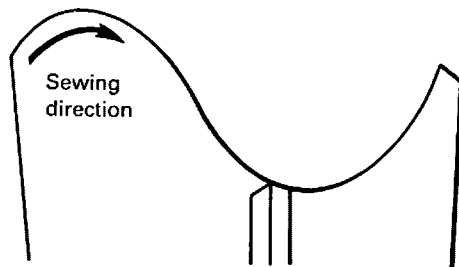
3. When the joined edges are to be tacked or pressed in order to keep them flat, use a heat-sealing adhesive to temporarily secure the side from which sewing will begin.

Temporary stitch

Heat-sealing adhesive
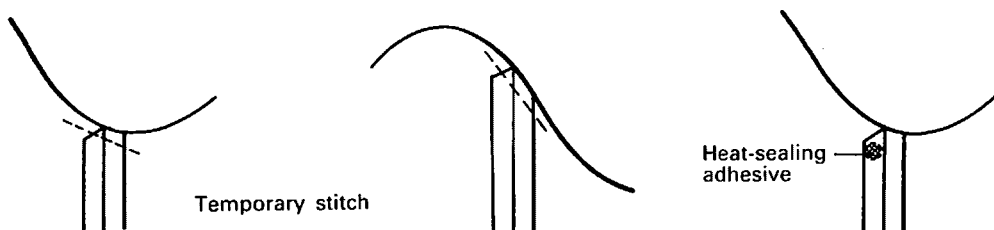
4. Cut off protruding material whenever possible. If it is folded over and tacked, a thick step will result in the material, which will make insertion, under the servo roller and presser foot difficult.

5. Make the left and right sleeves by sewing on the back and front of the material, respectively. Variations between the left and right sleeves can be decreased by making the sewing direction uniform in this way. For materials such as suede, etc., where one surface is raised and difficult to sew, prepare separate programs for the left and right sleeves.

Front

Back

2 Original Data Preparation

1. Prepare a standard size pattern paper.
2. Draw finishing stitch lines for the sleeves and body.
3. Measure the intervals between points, and calculate the easing amount.
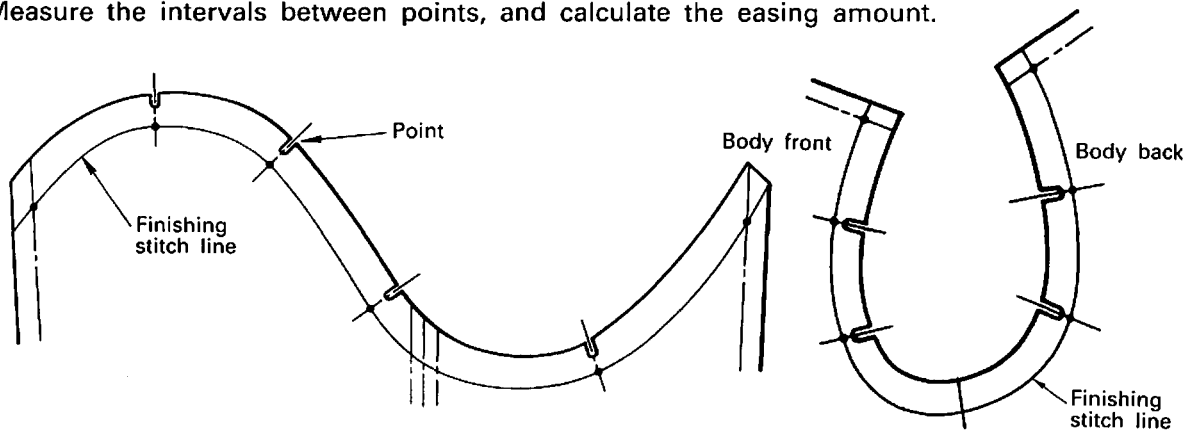
4. Divide the sleeve sewing length, including an allowance for stitching, into a maximum of 16 zones (from 0 to F).
(1) By using points in this way as zone markers, the calculation of the easing position and easing amount is simplified.
(2) Consider each portion which has the same easing amoutn as one zone.
(3) Also, consider portions which have only small changes in angle as one zone.

Zone Order	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Display	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
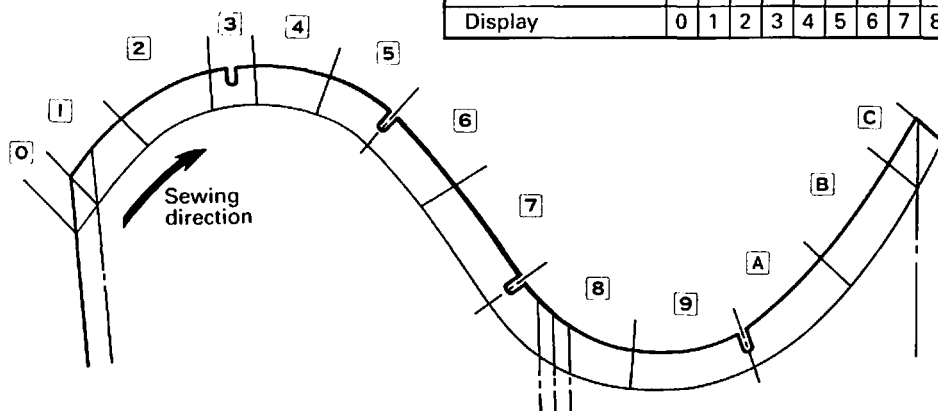
5. Measure each zone length (A).
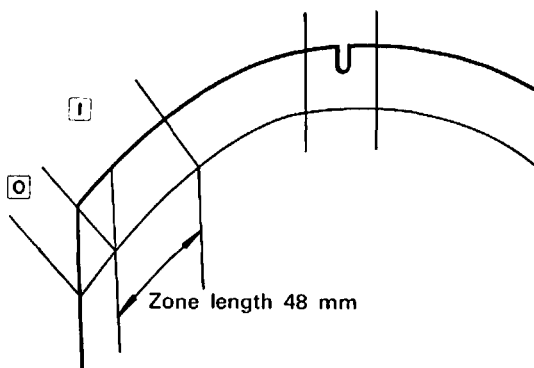
6. Determine the easing amount (B) for each zone.
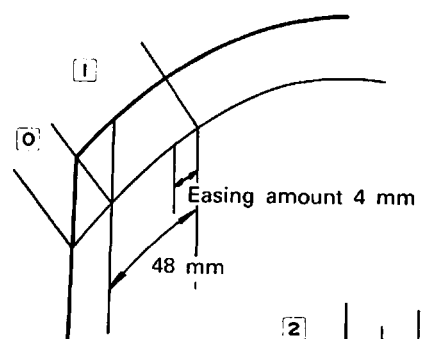
7. Measure the material angle (C) between the finishing stitch line and grain line from each zone. Measure these material angles in 5° intervals.

– 9 –
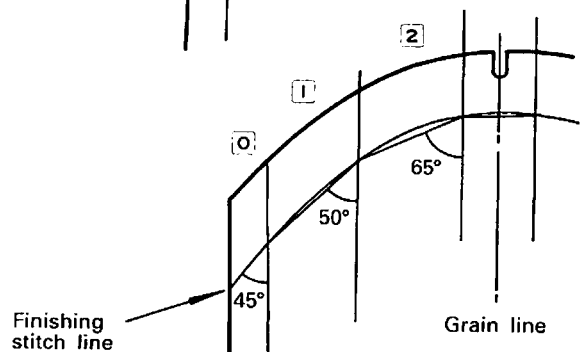
8. Write the original data onto the data sheet.
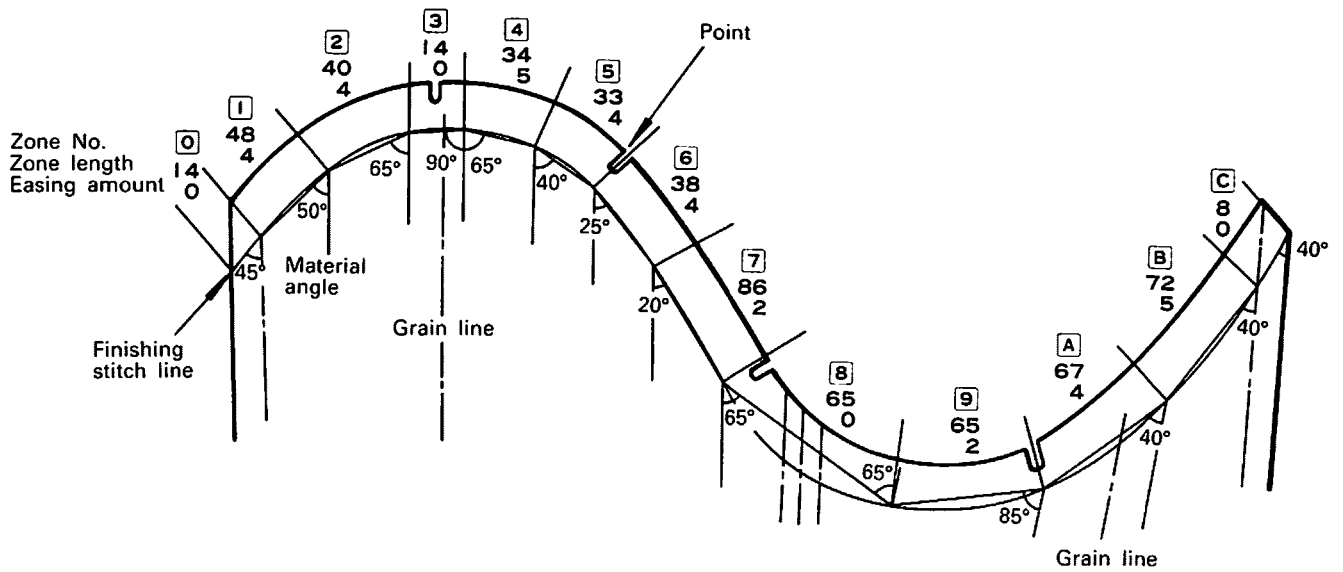
Data Sheet

Zone No.	Original Data			Calculated Data		Modified Data		Remark
	Zone Length A (mm)	Easing Amount B (mm)	Material Angle C (°)	Stitch Number	Easing Rate	Stitch Number	Easing Rate	
0	14	0	45					
1	48	4	50					
2	40	4	65					
3	14	0	90					
4	34	5	65					
5	33	4	40					
6	38	4	25					
7	86	2	20					
8	65	0	65					
9	65	2	85					
A	67	4	40					
B	72	5	40					
C	8	0	40					
D								
E								
F								
TOTAL								

③ Key Functions and Methods of Use

1. Material Key: Used to adjust for the difficulty of easing for each type of material.

| Mat |

Considering the number ③ key to be the standard degree of easing, select a key from ⓪ ~ ⑥.

<div align="center">

O   I   2   ③   4   5   6

</div>

| Materials easily eased | ← | Stan-dard | → | Materials eased with difficulty |
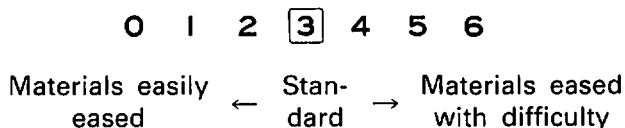
2. Pattern Key: Used to adjust for the design of the sleeve.

| Pat |

Size key: Used to adjust for the size of the sleeve.

| Size |

◎ Relationship of the Pattern Key and Size Key

(1) When patterns from 0 ~ 9 are selected and programmed, size 7 is automatically memorized as the standard pattern size. Centering on this standard size 7, the stitch number for the sewing length is increased or decreased 2% for each succeeding number or letter and each size is automatically calculated. (The sewing pitch is fixed at 2 mm.)

Pattern \ Size	O	I	2	3	4	5	6	7	8	9	A	B	C	D	E	F
O																
I																
2																
3																
4																
5																
6																
7	Stitch number of finished sewing length is decreased 2% per number.						Standard size	Stitch number of finished sewing length is increased 2% per number or letter.								
8																
9																

* The program for size 7 (designated ▨ in the diagram) of each pattern is automatically memorized. The data for sizes other than size 7 [0~6, 8~F] cannot yet be changed.

Example: The following is the result of a program in which the finished sewing length (armhole length) is 50 cm.

$$50 \text{ cm} \times \frac{2}{100} = 1 \text{ cm}$$

(Length is increased or decreased 1 cm for each number or letter.)

Size ⟶	0 ⋯⋯ 5	6	⑦	8	9 ⋯⋯ F
Finished sewing length (corresponding armhole length) ⟶	43⋯⋯48	49	50	51	52⋯⋯58

50 cm
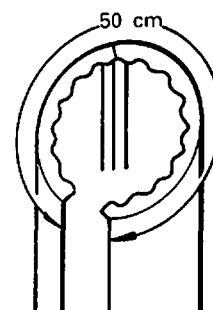
(2) When patterns from A ~ D are to be selected and programmed, they must be programmed for each size (ten sizes from 0 ~ 9). (Totalling 40 kinds of programs are possible to be memorized while it is not automatically done.)

Size / Pattern	0	1	2	3	4	5	6	7	8	9
A										
B		4 × 10 =40 Possible								
C		(Pattern) (Size) programs								
D										

* Programs can be memorized in each of the portions designated ▨.

3. Zone Key: Used to store and display data (stitch number, easing rate) for 16 zones.

[Zone]

4. Number/Letter Keys: Marked with the numbers 0 ~ 9 and letters A ~ F.

[0] ~ [F]

5. Data Mode Key: Used to input, modify, or display original data, stitch number, and easing rate.

[Data]

6. Diagnosis Key: Used for self diagnosis in the event of a circuit malfunction, and for a check of the malfunctioning location. (Refer to page 19.)

[Dia]

7. Input 1 Key: Used to input original data (A, B, C). Press once for each item of input data (once for A, once for B, etc.)

[Inp1]

8. Run Key: Used to change from the data mode to the sewing mode. (GO "GO" is indicated in the data portion of the display.)
Note: If the stitch number data for zone 0 is "00", the unit will not enter the sewing mode. (A warning sound will be produced.)

[Run]

9. Input 2 Key: Used to memorize corrected or input data for stitch number and easing rate. Press once for each item of input data.

[Inp2]

10. Causes for the warning sound:
1. Incorrect key operation.
2. Input value is outside prescribed range.
3. Malfunction found in diagnostic mode.
4. Completion of program during sewing. (Ideally, the completion of sewing and the warning sound are almost simultaneous.)

4 Inputting Original Data

◎ The Number/Letter Keys are displayed as shown below.

Key	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Display	0	1	2	3	4	5	6	7	8	9	A	b	C	d	E	F

Material Pattern Size Zone (Stitch) (Easing rate)

Mat	Pat	Size	Zone	Data
C	D	E	F	Dia
8	9	A	B	Inp1
4	5	6	7	Run
0	1	2	3	Inp2

Power ○
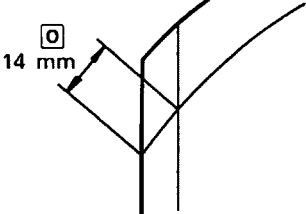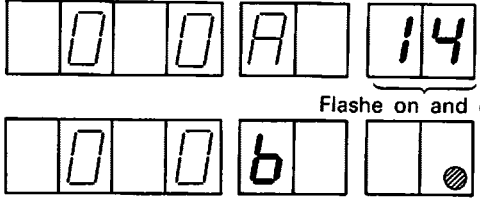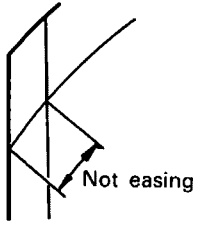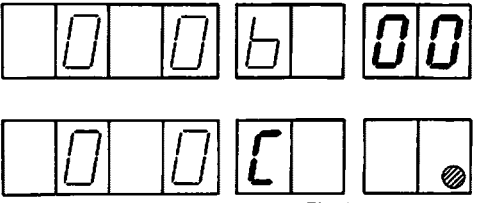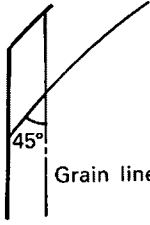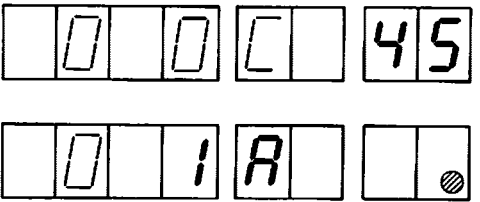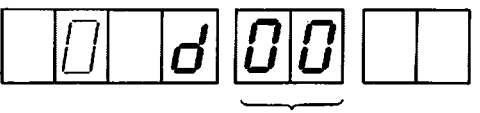
Data Sheet
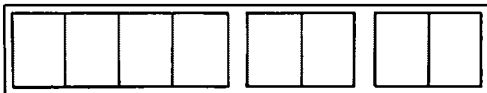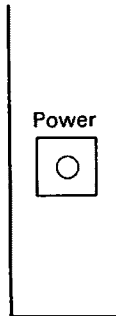
Zone No.	Original Data		
	Zone Length A (mm)	Easing Amount B (mm)	Material Angle C (°)
0	14	0	45
1	48	4	50
2	40	4	65

◎ Input the original data from the data sheet. (For information concerning the data sheet, refer to page 10.)
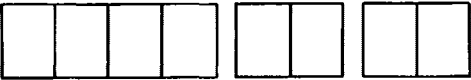
1. When a pattern from 0 ~ 9 is selected: * Portions flashing on and off can be changed.

Procedures	Key Operation	Display
① Turn on the power switch of the operating box.		The same information that was displayed before the power switch was last turned off will be displayed. 4 2 9 0 [ ][ ] 0 0
② Press the Pattern Key, and then the Number Key "0".	Pat ↓ 0	4 ▨ 9 0 [ ][ ] 0 0 ⤷ Flashe on and off 4 0 9 0 [ ][ ] 0 0
③ Press the Data Key.	Data	3 0 7 0 ▨ [ ] "Standard" numbers displayed ↑ Data is displayed. Flashe on and off
④ Press the Zone Key, and then the Number Key "0". *The above step is not necessary if "0" is already being displayed in the zone position.	Zone ↓ 0	3 0 7 ▨ [ ][ ] ⤷ Flashe on and off 3 0 7 0 [ ][ ]
⑤ Press the Input 1 Key.	Inp1	3 0 7 0 A [ ]⊘ ↑ Flashe on and off

Procedures	Key Operation	Display
⑥ Input the sewing length "14 mm" in the data A position, and then press the Input 1 Key.	I 4 ↓ Inp1	0 0 A 14 — Flashe on and off 0 0 b — Flashe on and off
⑦ Input the easing amount "0" in the data B position, and then press the Input 1 Key.	O ↓ Inp1	0 0 b 00 0 0 C — Flashe on and off
⑧ Input the material angle "45" in the data C position.	4 5 ↓ Inp1	0 0 C 45 0 1 A — Flashe on and off The next zone (1) is automatically displayed.
⑨ Repeat steps ⑥ through ⑧ for zones 1 ~ C.		
⑩ When data input is completed, the zone D stitch number "00" is automatically displayed.	Zone ↓ D	0 d 00 Indicates that the program has been completed.
⑪ Press the Start Key.	Run	3 0 7 0 G 0

Diagram labels:
- ⑥ : 0 / 14 mm
- ⑦ : Not easing
- ⑧ : 45° / Grain line

2. When a pattern from A ~ D is selected:

Procedures	Key Operation	Display
① Turn on the power switch of the operating box.		The same information that was displayed before the power switch was last turned off will be displayed.
② Press the Pattern Key, and then the Letter Key "A".	Pat ↓ A	└─Flashe on and off
③ Press the Size Key, and then the Number Key "0".	Size ↓ O	└─Flashe on and off
④ Press the Data Key.	Data	↑ Standard numbers displayed ↑ Data is displayed Flashe on and off
⑤ For the following steps, refer to items ④ ~ ⑩ of the "0 ~ 9" procedure on page 13.		Input data A, B, C.
⑥ Press the Run Key.	Run	

For step ③, size selection table:

Size / Pattern	0	1	2
A	▨ (Program here)		
B			

◇ If a mistake is made while inputting data:

1. If data has been input up to data A or data B, press |Data| → |Inp1| and then input once again from data A.

2. If data has been input up to data C, press |Zone| → |Previous Zone Number/Letter Key| → |Data| → |Inp1| , and then input once again from data A.

◇ If a mistake is discovered after all the data has been input:

1. Press |Zone| → |Number/Letter Key of mistaken| → |Data| → |Inp1| .

(Note)
1. If the machine is not used for a long period of time (one month or more), the input data may be lost. To prevent this, the power to the machine should be turned on for 1 ~ 2 hours every month.
2. Input data may be affected by lightning. If lightning occurs in the vicinity, disconnect the power plug of the machine.

5 How to Sew
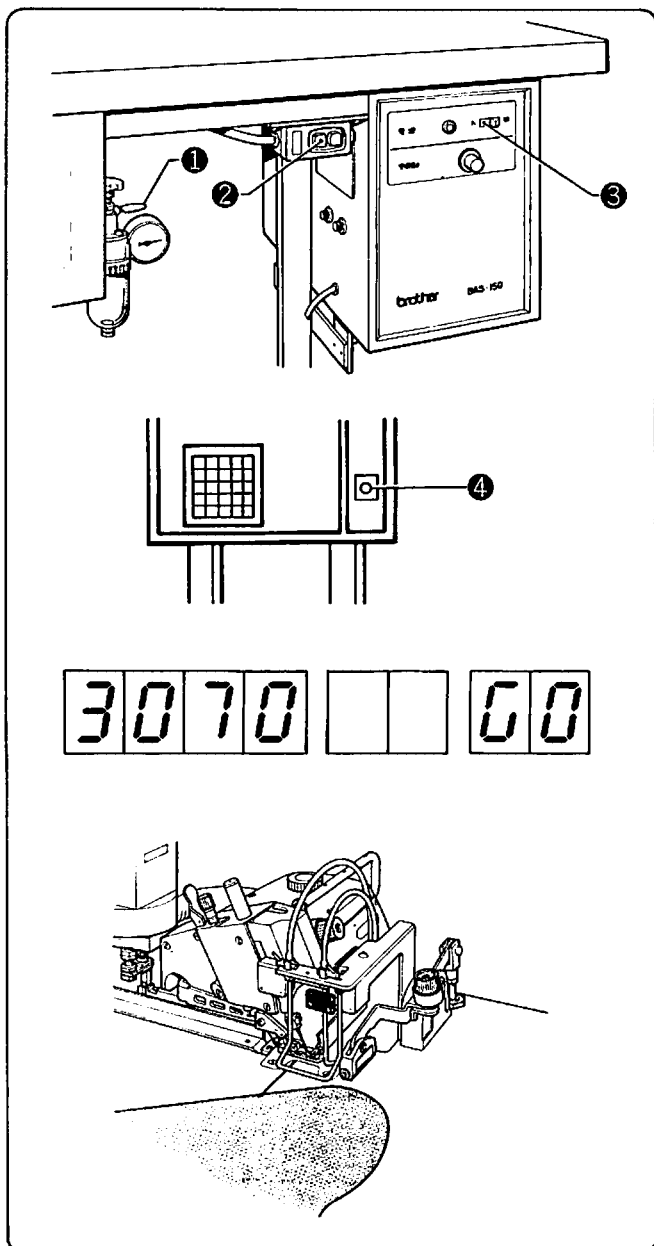
(1) Open air cock ❶, and make sure that the air pressure is 5 kg/cm².
(2) Push the motor's power switch ❷ ON.
(3) Push control box power switch ❸ ON.

(4) Push operating box power switch ❹ ON.

(5) Confirm that the material, pattern, and size are correct.
(6) Put the machine into the sewing mode.

(7) Insert the work smoothly under the presser foot and servo presser. The machine will begin to sew.
   Confirm that the warning sound is produced simultaneously with the end of sewing to indicate that the program has been completed.
(8) The thread cutter will then operate to cut the final chain stitch.
(9) The machine will return to the first program (about one second later) and enter the sewing mode again.

◇ Chain Length Adjustment

POWER	◎	ON ▮▯▮ OFF

CHAIN LENGTH — Shorter stitch / Longer stitch
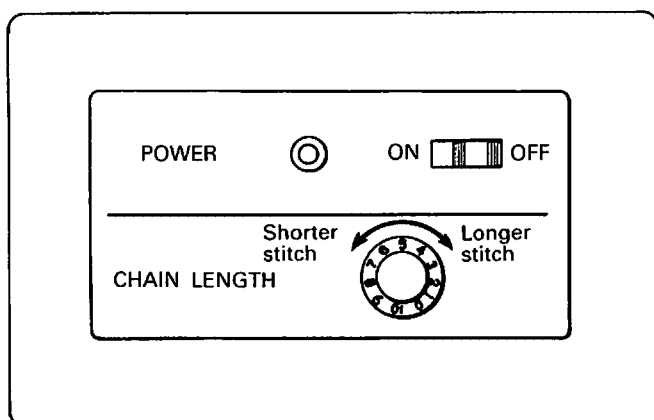
(1) After sewing the work, adjust the chain lengths off the work at the beginning and end.
   Knob is used for adjusting the chain cutter operating timing.
   The larger the number the longer will be the chain length.

6 Program Modification (Easing Position and Amount)

1. Write the stitch number and easing rate data calculated inside the operating box onto the data sheet.

Data Input Operation
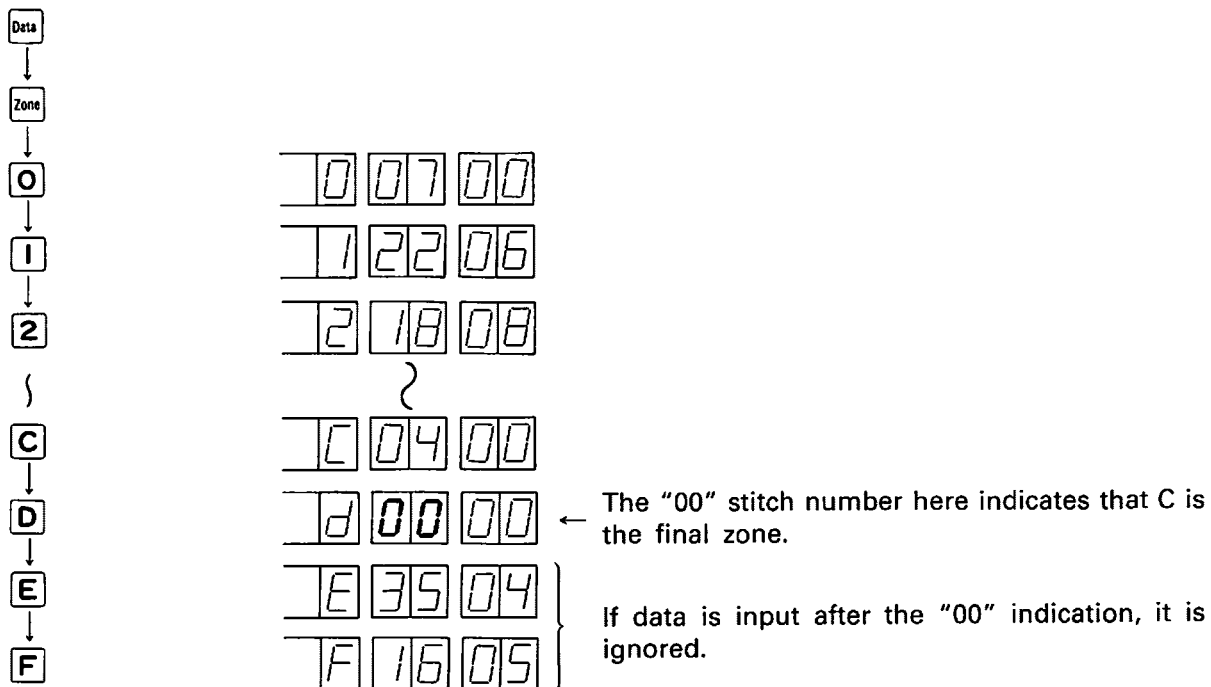
| Data |
| Zone |
| 0 |
| 1 |
| 2 |
| ~ |
| C |
| D |
| E |
| F |

```
_0  07  00
_1  22  06
_2  18  08
    ~
_C  04  00
_d  00  00   ←  The "00" stitch number here indicates that C is
                the final zone.
_E  35  04  ⎫
_F  16  05  ⎭   If data is input after the "00" indication, it is
                ignored.
```

Data Sheet

Zone No.	Original Data			Calculated Data		Modified Data		Remark
	Zone Length A (mm)	Easing Amount B (mm)	Material Angle C (°)	Stitch Number	Easing Rate	Stitch Number	Easing Rate	
0	14	0	45	07	00			
1	48	4	50	22	06			
2	40	4	65	18	08			
3	14	0						
C	0	0	40	04	00			
D				00	00			
E								
F								
TOTAL								

2. Modifying the Easing Position and Amount

(1) If the easing amount is entirely too small or too great, modify the material data.

| Mat | $\Big<$ 2 ~ 0   (Select when easing amount is too great.)

4 ~ 6   (Select when easing amount is too small.)
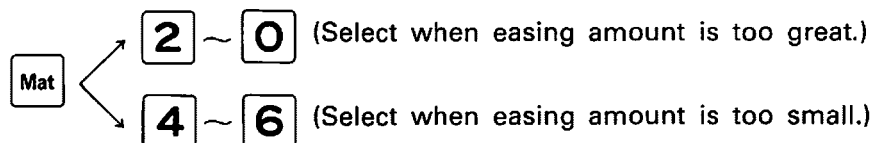
(2) If the easing amount is partially too small or too great, correct the easing rate.
  * The easing amount will increase as the easing rate number is increased.
    The maximum easing rate number is 28.

Example: Changing the easing rate in zone 4 from 10 to 13.

$$\boxed{\text{Data}} \rightarrow \boxed{\text{Zone}} \rightarrow \boxed{\mathbf{4}} \rightarrow \boxed{\text{Data}} \rightarrow \boxed{\text{Inp2}} \rightarrow \boxed{\mathbf{1}\ \mathbf{3}} \rightarrow \boxed{\text{Inp2}}$$

Data Sheet

Zone No.	Calculated Data		Modified Data	
	Stitch Number	Easing Rate	Stitch Number	Easing Rate
4	15	10	18	13
5	15	08	12	08
6	17	08	17	08

(3) If the easing position is not correct, modify the stitch number data.

Zone 4 stitch number : 15 → 18
18 stitch

(After modification)
(Before modification)
15 stitch

Zone 5 stitch number : 15 → 12
12 stitch

15 stitch

→ Changes to the next zone

$$\boxed{\text{Data}} \rightarrow \boxed{\text{Zone}} \rightarrow \boxed{\mathbf{4}} \rightarrow \boxed{\text{Data}} \rightarrow \boxed{\mathbf{1}\ \mathbf{8}} \rightarrow \boxed{\text{Inp2}} \rightarrow \boxed{\mathbf{1}\ \mathbf{3}} \rightarrow \boxed{\text{Inp2}} \rightarrow \boxed{\mathbf{1}\ \mathbf{2}} \rightarrow \boxed{\text{Inp2}}$$

(Stitch number)   (Easing rate)   (Stitch number)
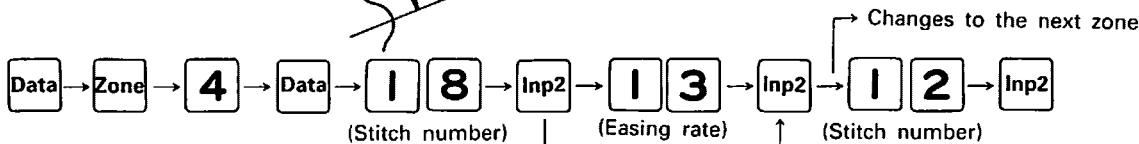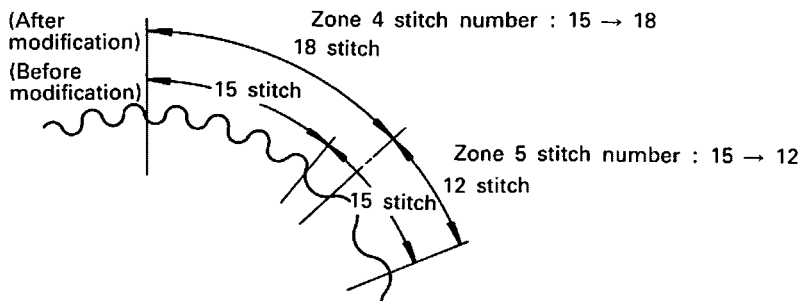
If this data is not to be changed, press the Input 2 Key.
  * The display changes successively each time the Input 2 Key is pressed.

7 Preparing Data for Similar Items

◎ If a program is to be made for a pattern which is only slightly different from one which has already been prepared, it can be easily done by using the program for the previous pattern as a base.

1. Select the program that is closest to the new pattern in material, size, etc., and use it to sew a sample.
2. Write the data of the new program into the data calculation column of the data sheet.

Example: Display for sample-sewn program

↓

$\boxed{\text{Data}}$

↓

$\boxed{\text{Mat}}\ \boxed{\mathbf{4}}$

↓

$\boxed{\text{Size}}\ \boxed{\mathbf{9}}$

↓
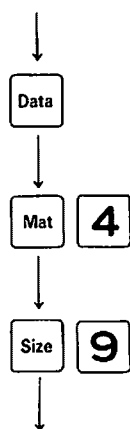
$\boxed{4\ 1\ 9\ 0}$

$\boxed{3\ 1\ 7\ 0}$

$\boxed{4\ 1\ 7\ 0}$

$\boxed{4\ 1\ 9\ 0}$

Because the machine has been put into the data mode, the material and size become standard.

Return to original program

Write data contents onto data sheet

3. Modify the stitch number and easing rate data as required, and write this in the modified data column of the data sheet. (Refer to page 18.)
4. Input the new program into an unused pattern, or input it into a previously used pattern and write in the changes.

(Number key from 0 ~ 9)   Input stitch data   Input easing rate data   (Stitch data of next zone)
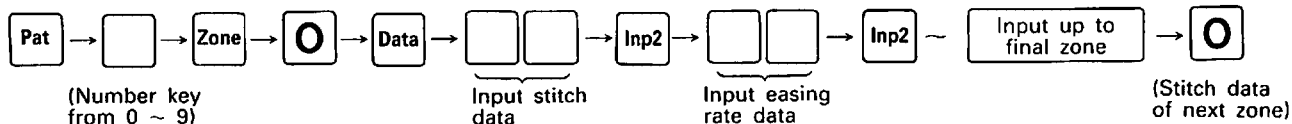
8 Self Diagnosis

◎ Investigates the problem area if something abnormal occurs in the control circuitry.
1. Move the machine head backward from the table.
2. Turn off the power switch of the operating box, disconnect the operating lever ❶ from the power switch, and then turn on the power switch again.
3. Close the air cock, and then turn off the power switch of the control box.
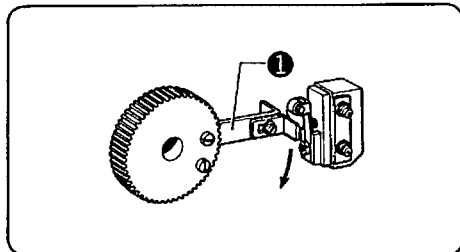
Display during correct operation	Display during abnormality	Malfunction location
Data ↓ Dia ↓ CHEC rA (CHECK) ↓ PASS rA (PASS) (RAM) ↓ PASS rO (PASS) (ROM) ↓ The operating lever moves and the power switch turns on. ↓ S4nC (SYNCHRONIZER) ↓ 0123 45 67 (0 ~ 7 is successively displayed, one digit at a time, each time the pulley is rotated.) ↓ PASS ALL (PASS) (ALL) ↓ Display returns to original condition	Err rA (ERROR) Warning sound is produced. Err rO (ERROR) Warning sound is produced. 1. The pulse motor does not operate. 2. The pulse motor will not stop operating. (No display)	Memory (RAM-TC5516) and circuit board Memory (ROM-2532) and circuit board 1. Origin switch, cord and connector 2. Origin switch Synchronizer and cord

-19-

E. OPERATION FLOW CHART

START

| Open the air cock | → | The servo presser rises | → | Confirm that the air pressure is 5 kg/cm^2 |

| Motor power switch ON | → | The clutch motor rotates |

| Control box power switch ON | → | The power lamp of the control box illuminates | → | The presser foot rises |

| Operating box power switch ON | → | The power lamp and display of the operating box illuminates | → | Confirm that the machine is in the sewing mode (Press the Run Key.) |

| Insert the material under the No.1 photosensor | → | The material-insertion air is emitted |

| Insert the material under the servo photosensor |

| The servo presser and presser foot lowers | → | The material insertion air stops |

| The servo roller rotates |

| The machine operates | → | The synchronizer begins stitch number detection |

| The program begins | → | The pile-assist air is emitted |

* If a long period of time passes before the material moves below the No.2 photosensor, the chain cutter operates and the material insertion air is emitted.

| Insert the material under the No.2 photosensor |

| The material moves away from the No.1 photosensor | → | The servo presser rises | → | The servo roller stops |

| The material moves away from the servo photosensor |

| The material moves away from the No.2 photosensor | → | The machine stops | → | The synchronizer finishes stitch number detection |

| The sewing program completion signal sounds at the same time that the program finishes |

* The sewing program compeltion signal should ideally sound simultaneously with the end of sewing.

The time before the chain cutter operates varies according to the adjustment of the chain stitch length control.

| The chain cutter operates |

| The presser foot rises | → | The material insertion air is emitted |

END

– 20 –

① Adjustment of the Needle Bar

(1) Adjust the distance between the tip of the needle and the top surface of the needle plate should be 9 mm when the needle is located at its highest position.
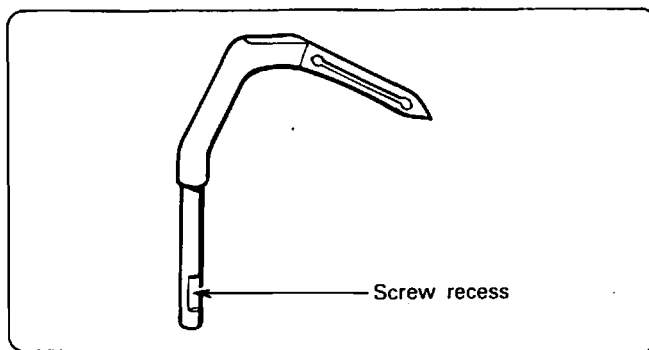Adjust by rotating the needle bar around the double chain-stitch needle is located directly above the center of the hole in the needle plate.

② Adjustment of the Double Chain-stitch Looper

Screw recess

(1) Install the double chain-stitch looper by inserting it all the way into the double chain-stitch looper holder.
The angle of inclination is determined by the contact point on the shaft.

2 mm
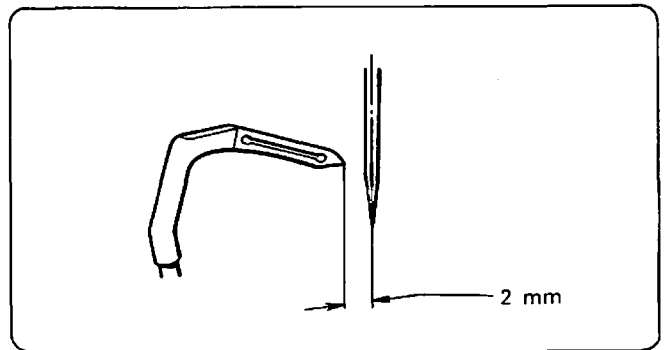
(2) Adjust as necessary so that, when the double chain-stitch looper is at its farthest left position, there is 2 mm between the tip of the double chain-stitch looper and the center of the double chain-stitch needle.

0 ~ 0.05 mm
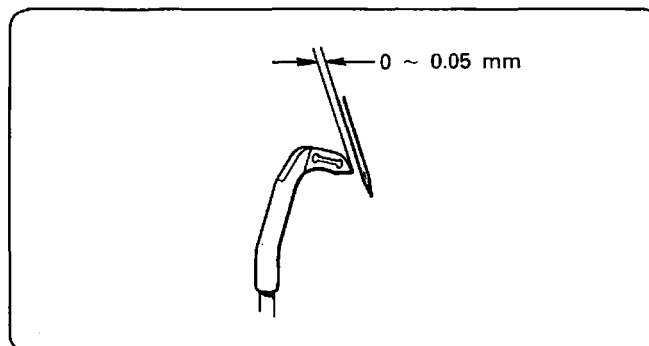
(3) Set the machine so that the tip of the double chain-stitch looper is aligned with the double chain-stitch needle as the needle travels upward, and then make the necessary adjustment so that the clearance between the tip of the double chain-stitch looper and the double chain-stitch needle is 0 ~ 0.05 mm.

If the machine skips stitches, adjust it so that the tip of the double chain-stitch looper contacts the double chain-stitch needle and pushes it 0.05 ~ 0.1 mm.
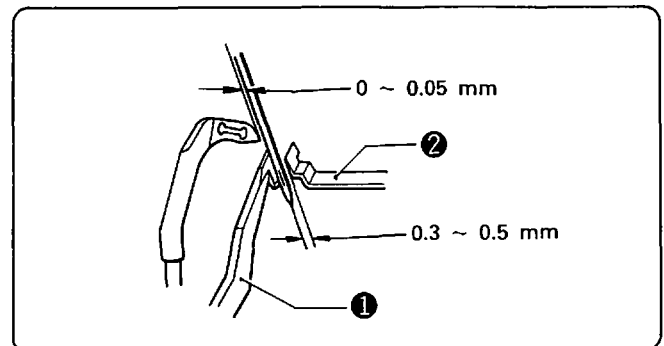
0 ~ 0.05 mm
❷
0.3 ~ 0.5 mm
❶

(4) With the machine set in the condition described in item (3), push the double chain-stitch needle with the back double chain-stitch needle guard ❶, and provide a clearance of 0 ~ 0.05 mm between the double chain-stitch needle and the tip of the double chain-stitch looper.
Also provide a clearance of 0.3 ~ 0.5 mm between the double chain-stitch needle and the front double chain-stitch needle guard ❷.

③ Adjustment of the Feed Dogs
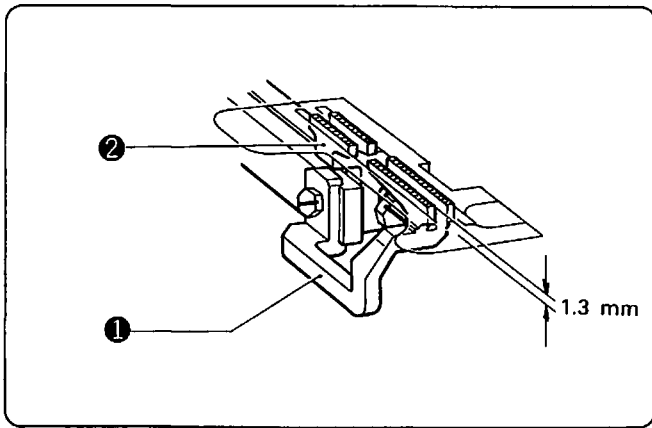
1.3 mm

(1) Turn the pulley to raise the feed dog to its uppermost position.
   Then, adjust the front of the differential feed dog ❶ to be 1.3 mm (for medium-thick materials) above the upper surface of the needle plate, and then secure.
(2) Adjust the height of the main feed dog ❷ so that the teeth are at the same height as the teeth of the differential feed dog ❶.

④ Stitch Width Adjustment

◎ Close the air cock before making this adjustment.

Needle center ❸

Stitch width
4~10 mm
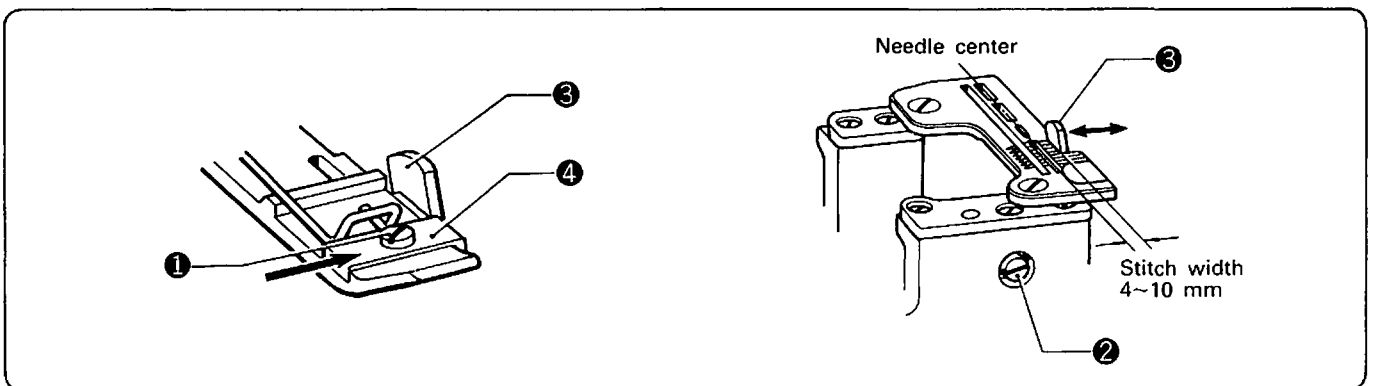
(1) Loosen the screw ❶.
(2) Loosen the screw ❷, move the lower knife ❸ to a suitable position, and then tighten the screw ❷.
(3) Position the presser foot F ❹ so that it lightly contacts the lower knife ❸, and then tighten the screw ❶.

Move forward or backward

Reflecting tape ❼

Approx. 0.5 mm

Side A
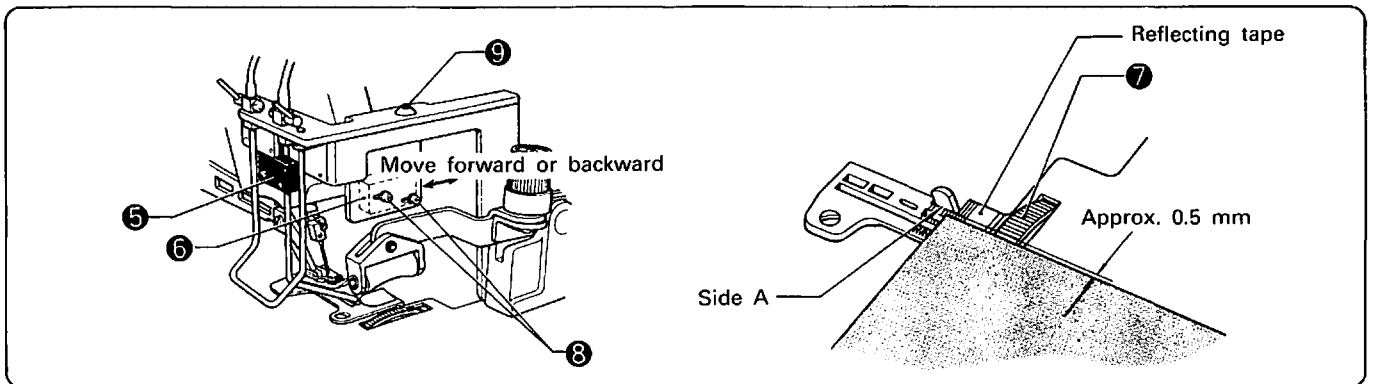
(4) Insert the material under the first ❺ and servo photosensors ❻, and put the servo roller ❼ into the position where it stops. Then, loosen the adjusting screws ❽ and adjust by moving the servo photosensor ❻ back and forth until the edge of the material is approximately 0.5 mm from side A of the lower knife.
   If the servo photosensor ❻ is positioned closer to the pulley side than mentioned above, the work will be sewn curled or with an increase in the cutting margin. If it is positioned closer to the front, the stitches may become loose or even come off the work.
(5) If the dust detection lamp ❾ illuminates, clean the glass above the reflecting tape with a cloth.

5 Adjustment of Cloth Detector

Turn from one-half to one full position from the lighted position

Extinguishes ← 4 5 6 → Lights
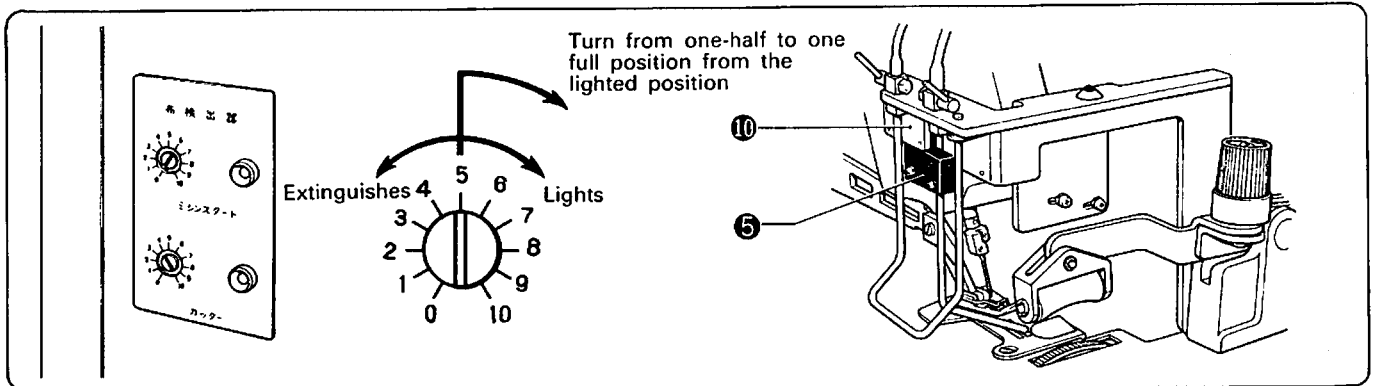
(1) The cloth detector detects whether there is a cloth under the first photo sensor ❺ (for machine start) and second photo sensor ❿ (for the cutter). (The cloth detector is located on the side of the control box.) The first and second photo sensors can be adjusted in the same way as follows:

(a) Turn the screw counterclockwise with a screwdriver until the light emitting diode (LED) on the right goes out.

(b) Then turn the screw clockwise until the light emitting diode lights.

(c) In case of thick materials, turn the screw clockwise 2 degrees further from the position where the light emitting diode has lit. In case of very thin materials, turn the screw clockwise about 1 degree further from the position where the light emitting diode has lit.

6 Installation of the Knife
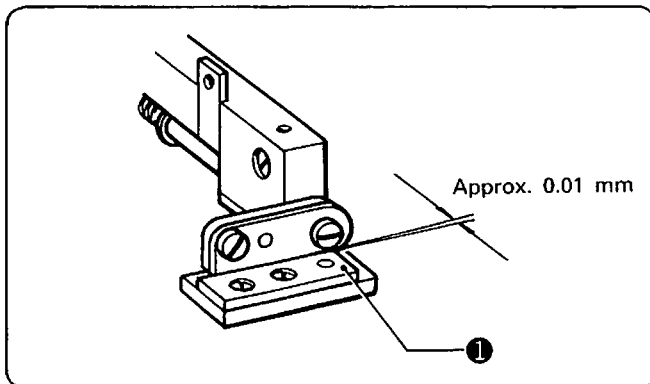
Approx. 0.01 mm

(1) When the knives have been replaced, adjust the lower knife ❶ to make a clearance of approximately 0.01 mm with the upper knife shaft.

Approx. 1 mm
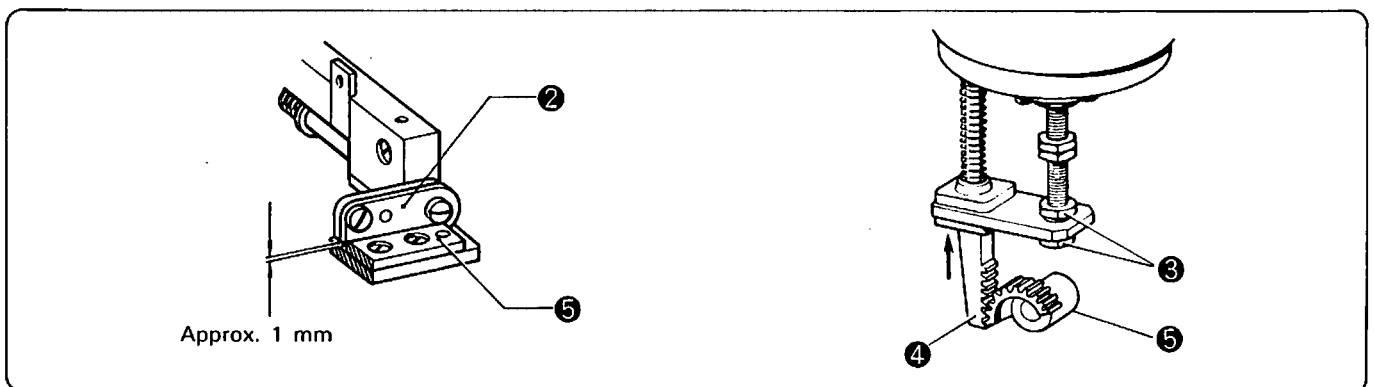
(2) Adjust rack ❹ with nuts ❸ so upper knife ❷ engages lower knife ❶ by approximately 1 mm.
   * Make sure that upper knife ❷ has a vertical play of less than approximately 0.3 mm at the tip and that rack ❹ and pinion ❺ freely move in proper engagement.

- 23 -

TROUBLESHOOTING GUIDE

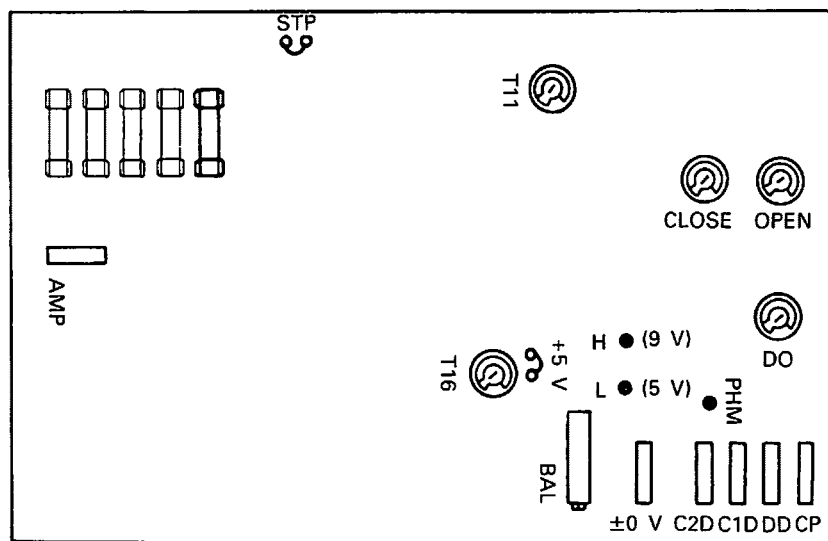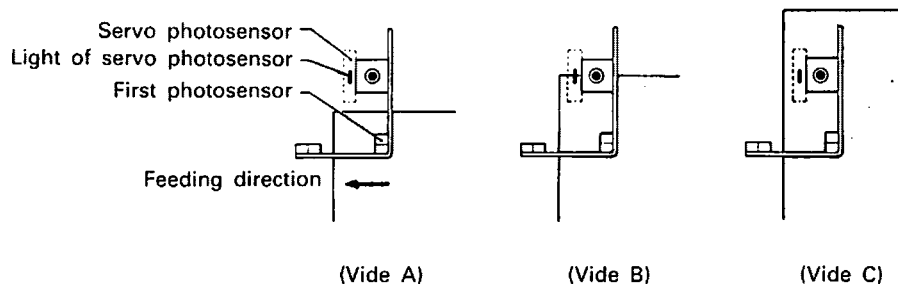| Trouble	Cause	Inspection	Remedy	Page
Thread break	Wrong threading.	Threading.	See paragraph on threading.	5
	Excessive tension disc pressure.	Tension disc pressure.	Adjust to proper pressure.	
	Poor-quality thread.	Thread quality.	Use thread of good quality.	
	Thread is too thick for needle eyelet.	Needle size.	Use needle of correct size of thread of correct count.	4
	Needle installed incorrectly.	Direction and height of needle.	See paragraph on needle installing.	4
	Needle groove and needle eyelet finished poorly.	Needle groove and needle eyelet.	Replace with good needle.	4
	Needle, loopers and thread takeups not positioned properly to one another.	Clearance between needle and looper; position of thread takeups.	See paragraphs on adjustment of needle bar, double chain-stitch looper and thread tension.	21 5
	Needle, loopers, needle plate, thread passage have flaws.	Flaws of needle, loopers, needle plate, thread passage.	Smooth will oil stone or buff.	
Stitches skip	Wrong threading.	Threading.	See paragraph on threading.	5
	Excessive tension disc pressure.	Tension disc pressure.	Adjust to proper pressure.	
	Needle installed incorrectly.	Direction and height of needle.	See paragraph on needle installing.	4
	Needle point blunt or bent.	Needle point and bend.	Replace with new needle.	4
	Needle, loopers and thread takeups not positioned properly to one another, or have incorrect clearance.	Clearance between needle and loopers. Timing. Thread takeup position.	See paragraphs on adjustment of needle bar and double chain-stitch looper.	21 5
	Needle and needle guard not positioned properly to one another.	Clearance between needle and needle guard.	See paragraphs on adjustment of double chain-stitch looper.	21
	Looper point hangs down.	Looper point.	Correct with oil stone, or replace with new looper.	

-24-

Trouble	Cause	Inspection	Remedy	Page
Needle break	Needle installed incorrectly.	Direction and height of needle.	See paragraph on needle installing.	4
	Needle bent.	Needle bend.	Replace with new needle.	4
	Needle and loopers positioned improperly to one another.	Clearance between needle and loopers, their timing.	See paragraphs on adjustment of needle bar and double chain-stitch looper.	21
	Needle and needle guard positioned improperly to one another.	Clearance between needle and needle guard.	See paragraphs on adjustment of needle bar and double chain-stitch looper.	21
Doesn't work well without cloth. (Double-chain stitch sewing)	Wrong threading.	Threading.	See paragraph on threading.	5
	Tension of needle and looper threads are too great or too small.	Tension disc pressure.	Adjust to correct tensions.	
	Needle thread guide positioned incorrectly.	Thread guide position.	See paragraph on adjustment of double-chain stitch needle thread guide.	5
	Wrong timing of double-chain stitch thread takeup assembly.	Thread takeup timing.	See paragraph on adjustment of double-chain stitch thread takeup and thread guide.	5
	Main and differential feed dogs are not level with one another.	Feed dog height.	See paragraph on feed adjustment.	22
When the power switch is turned on, "0" is indicated in the Material, Pattern, Size, and Zone displays.	The power has been turned off midway through self-diagnosis, and the " 5٤ոէ (Sync.)" indication is displayed.		Press the Data Key.	19
	The data back-up battery is depleted.	Check data.	Replace the circuit board.	
No response when keys are pressed.			Turn on the power switch again. Press the Diagnosis Key for self-diagnosis.	19
	A key has not returned to its original position.	Return key.	Fix on correct position.	

— 25 —

Trouble	Cause	Inspection	Remedy	Page
Machine won't start.	First photosensor's light is too strong.	First photosensor's light intensity.	Adjust cloth detector.	23
Servo motor won't start.	Fuse is blown.	Fuse.	Replace the fuse in the circuit panel.	/
The machine starts as soon as the power is turned on.	Either the material plate surface under the first photosensor is dusty or the sensor light is too weak.	Dust on the material-plate surface or strength of first photo-sensor light.	Clean the material-plate surface. Adjust the cloth detector.	23
Servo motor runs one way only.	Fuse is blown.	Fuse.	Replace the fuse in the circuit panel.	/
Machine won't stop.	First photosensor and second photosensor's light are too weak.	First photosensor and second photosensor's light are intensity.	Adjust cloth detector.	23
Cutter won't operate.	First photosensor's light is too weak.	Second photosensor's light intensity.	Adjust cloth detector.	23
Cutter operates where it should not.	Cutter operating timing is wrong.	Cutter timing.	Adjust control box screw.	16
	Second photosensor's light is too strong.	Second photosensor's light intensity.	Adjust cloth detector.	23

ADJUSTMENT OF CIRCUIT BOARD

◎ **Close the air cock and push the control box power switch ON.**

Servo photosensor
Light of servo photosensor
First photosensor

Feeding direction

(Vide A)   (Vide B)   (Vide C)

STP

T11

CLOSE   OPEN

AMP

T16   +5 V

H ● (9 V)
DO

L ● (5 V)   PHM

BAL

±0 V C2D C1D DD CP

1. Right/Left Balance & Output Adjustment of Servo Motor [Please remove the fuse on circuit board (right end in above figure) beforehand].

(1) Put the edge of material in the midst of light of photo sensor (vide B) and turn the servo balance "BAL" and set it at the position where LED "PHM" just illuminates or just puts off.

(2) Take measure of the voltage between ±0 V terminal and ANP terminal by AC 50 V range of tester and adjust in such a way that it will be 5 V by turning volume "CLOSE" when inserting the material forward (vide C).
Also, when removing the material out (vide A), turning volume "OPEN" and adjust it to be 9 V.

2. Adjustment of Dust Sensor

(1) Take measure (0.4~1 V) of the voltage between ±0 V terminal and CP terminal (+) by DC 1 V range of tester.

(2) Make adjustment by turning volume DD so that the amount of voltage will be half of above amount between ±0 V terminal and DD terminal (−).

– 27 –

BROTHER INDUSTRIES, LTD. NAGOYA, JAPAN