

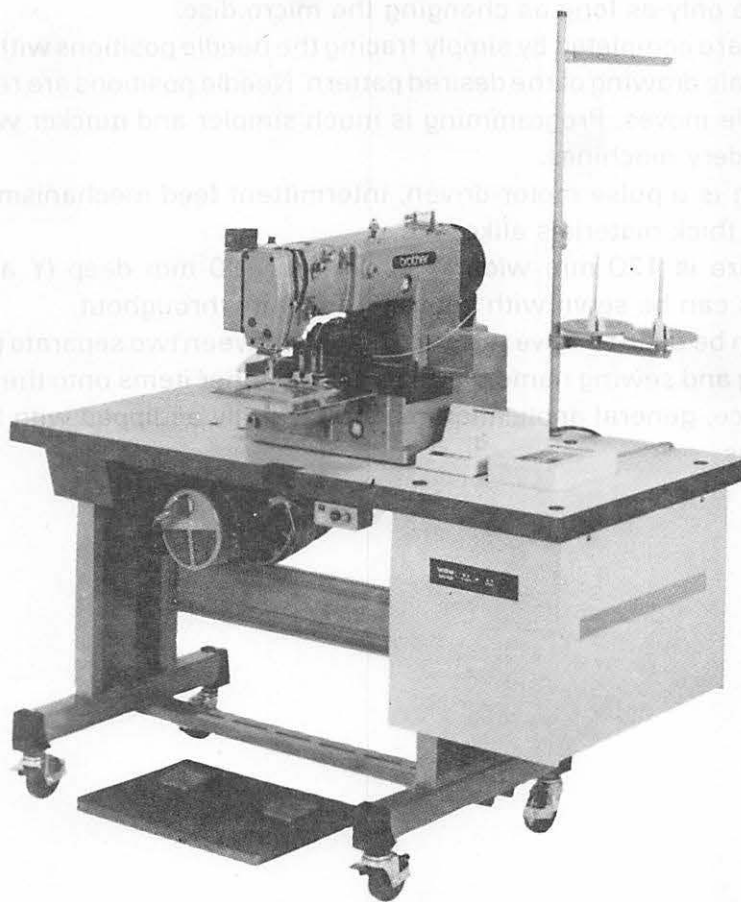
SUMMARY OF MODEL BAS-320

# ELECTRONICALLY PROGRAMMABLE LOCK STITCH MACHINE WITH CYLINDER ARM PROFILE SII

BAS-320

## INSTRUCTION MANUAL

FEATURES



## **SUMMARY OF MODEL BAS-320**

- ★ Model BAS-320 is an automatic sewing machine with a wide variety of practical applications such as has long been desired by the sewing industry. For maximum applicability in a wide range of uses, Brother has incorporated into the BAS-320 carefully selected, in-house developed electronics technologies. One of the most important features of this machine is that its compact, easily operated programmer enables quick accurate input of new pattern data right on the factory floor.
- ★ Electronics have replaced the feed cam used by conventional embroidery machines for reduced energy consumption.
- ★ Stitch patterns can be stored indefinitely by simply recording them onto a micro disc. Furthermore, this same disc can be used again and again for storage of new pattern data. The operator simply sets the material to be sewn under the presser foot, and depresses the pedal for automatic machine-controlled sewing of any pattern.
- ★ Changes in sewing pattern can be simply made by reading the data on the micro disc into the FMC. The BAS-320 is designed to provide the improved productivity and garment quality sought with automatic sewing machines, while rationalizing production with untrained personnel and facilitating quick adaptation in the production line to garment design changes.

## **FEATURES**

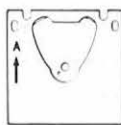
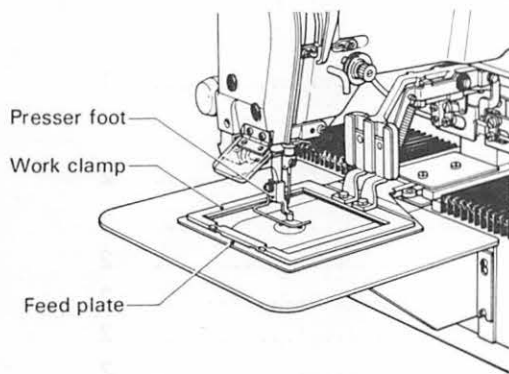
1. All machine functions are electronically controlled for fully automated sewing and finish of stitch patterns. Special operator skills and labor are no longer needed.
2. Pattern changes take only as long as changing the micro disc.
3. Micro disc programs are completed by simply tracing the needle positions with the programmer as indicated on a full-scale drawing of the desired pattern. Needle positions are recorded directly onto the disc as the needle moves. Programming is much simpler and quicker when compared with conventional embroidery machines.
4. The feed mechanism is a pulse motor-driven, intermittent feed mechanism for precise pattern stitching in thin and thick materials alike.
5. Maximum pattern size is 120 mm wide (X axis) and 100 mm deep (Y axis). Even intricate, complicated patterns can be sewn with consistent quality throughout.
6. Treadle operation can be used to move the presser foot between two separate positions. Especially useful for positioning and sewing name tags, labels, and other items onto the main garment body.
7. This high performance, general application machine is fully equipped with functions for a wide variety of applications.

# CONTENTS

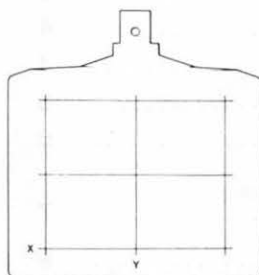
|   |    |
|---|----|
| <b>MAIN PART NAMES</b> .....                        | 1  |
| <b>SPECIFICATIONS</b> .....                         | 1  |
| <b>INSTALLATION</b> .....                           | 2  |
| 1 Positioning .....                                 | 2  |
| 2 Installation of spool stand .....                 | 2  |
| 3 Cord connections .....                            | 2  |
| 4 Installation of eye guard .....                   | 2  |
| 5 Machine head .....                                | 2  |
| 6 Installation of V-belt .....                      | 2  |
| <b>LUBRICATION AND OIL DRAINING</b> .....           | 3  |
| 1 Lubrication .....                                 | 3  |
| 2 Oil draining .....                                | 3  |
| <b>CORRECT OPERATION</b> .....                      | 3  |
| 1 Needle installation .....                         | 3  |
| 2 Upper thread threading .....                      | 4  |
| 3 Bobbin thread winding .....                       | 4  |
| 4 Bobbin case installation and threading .....      | 5  |
| 5 Thread tension .....                              | 6  |
| <b>HOW TO USE THE FMC</b> .....                     | 7  |
| 1 Data switch use .....                             | 8  |
| 2 Step back switch use .....                        | 8  |
| 3 Test switch use .....                             | 9  |
| 4 Emergency stop switch use .....                   | 9  |
| <b>SEWING</b> .....                                 | 10 |
| 1 Micro disc insertion .....                        | 10 |
| 2 Sewing speed adjustment .....                     | 10 |
| 3 Sewing .....                                      | 11 |
| 4 Rotary hook cleaning .....                        | 11 |
| <b>STANDARD ADJUSTMENTS</b> .....                   | 12 |
| 1 Needle bar height adjustment .....                | 12 |
| 2 Needle bar lift stroke adjustment .....           | 12 |
| 3 Needle to shuttle hook point gap adjustment ..... | 12 |
| 4 Shuttle driver needle contact adjustment .....    | 13 |
| 5 Shuttle hook thread guide adjustment .....        | 13 |
| 6 Presser plate lift stroke adjustment .....        | 13 |
| 7 Movable knife adjustment .....                    | 14 |
| 8 Presser foot adjustment .....                     | 15 |
| 9 Thread wiper adjustment .....                     | 15 |
| 10 Needle and feed timing adjustment .....          | 16 |
| 11 Origin adjustment .....                          | 16 |
| 12 2-Step presser foot operation adjustment .....   | 17 |
| 13 Timing belt tension adjustment .....             | 18 |
| <b>OPERATION FLOW CHART</b> .....                   | 19 |



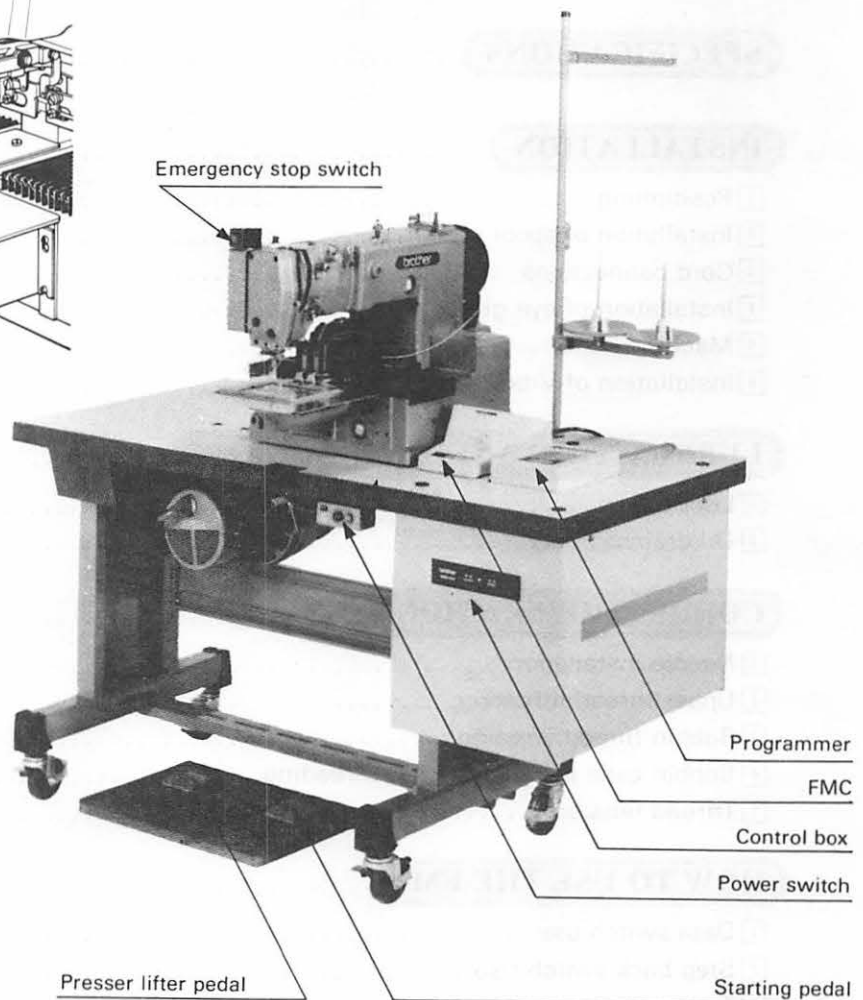
## MAIN PART NAMES



Micro disc



Origin reference plate

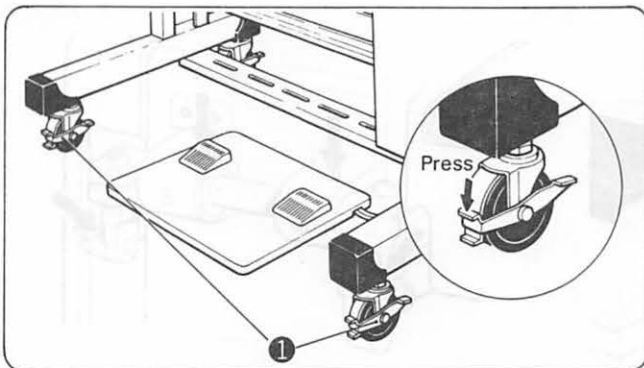


## SPECIFICATIONS

|                                     |   |            |            |
|-------------------------------------|---|------------|------------|
| Stitch type                         | Single needle, lock stitch  |            |            |
| Sewing machine                      | Lock stitch, embroidery sewing machine with 2-step presser lifter   |            |            |
| Stitch length and max. sewing speed | 0.2~3.0 mm  | 3.2~4.4 mm | 4.6~6.2 mm |
|                                     | 2,000 spm   | 1,500 spm  | 1,200 spm  |
| Feed format                         | Intermittent feed, pulse motor drive  |            |            |
| Max. pattern size                   | 120 mm wide (X axis) 100 mm deep (Y axis)   |            |            |
| Number of stitches                  | Max. 2,000 (one side)   |            |            |
| Work clamp lift stroke              | 20 mm   |            |            |
| 2-step presser foot                 | Right/left selectable   |            |            |
| Intermittent feed                   | Max. 7 mm   |            |            |
| Test function                       | Operation test function provided for use with low speed sewing  |            |            |
| Safety devices                      | Automatic stop function for activation in the event of misoperation realized with intermediate stop function and safety circuits. |            |            |
| Machine dimensions                  | 1200 W x 590 D x 1100 H (mm)  |            |            |
| Standard accessories                | Micro discs   |            |            |
| Power requirements (motor)          | 3-phase, 200V, 600W   |            |            |

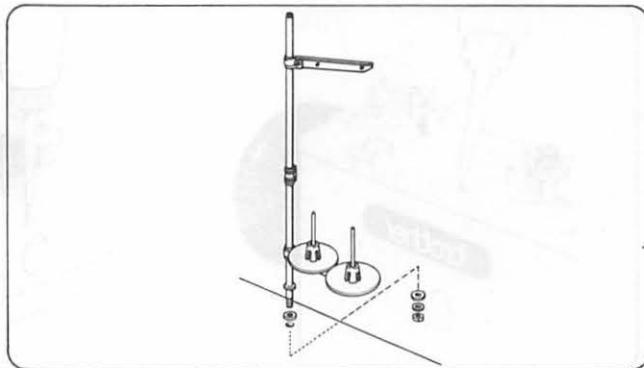
## INSTALLATION

### 1 Positioning



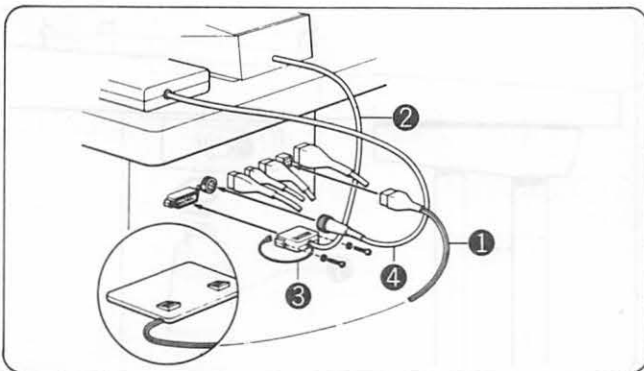
Determine the position for the sewing machine, and then lock the casters ① so that the sewing machine will not move.

### 2 Installation of spool stand



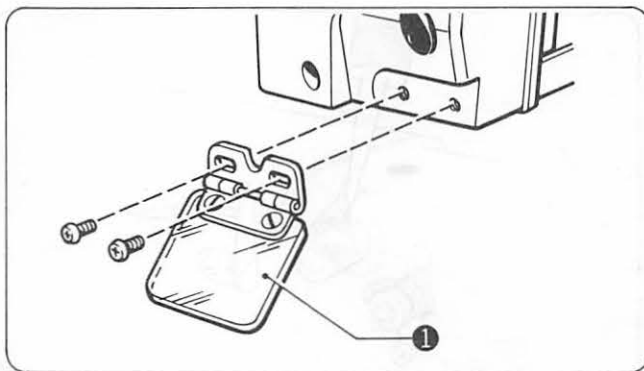
Install the spool stand to the table.

### 3 Cord connections



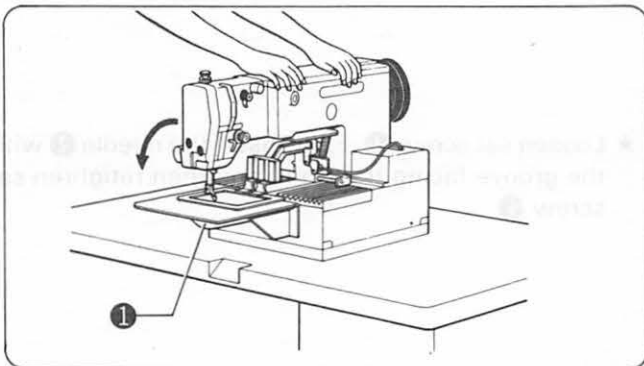
Connect the cords for the treadle ①, FMC unit ②, and FMC ground wire ③, and the programmer ④ to their respective terminals.

### 4 Installation of eye Guard



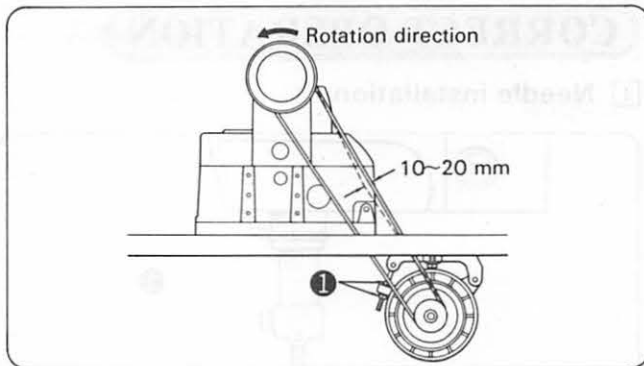
Install the eye guard ① on the machine head.

### 5 Machine head



Move to the left side of the table, and slowly raise the machine head while holding it firmly with both hands. When returning the machine head to its original shipping position, be careful not to strike the shuttle race cover ① and cords.

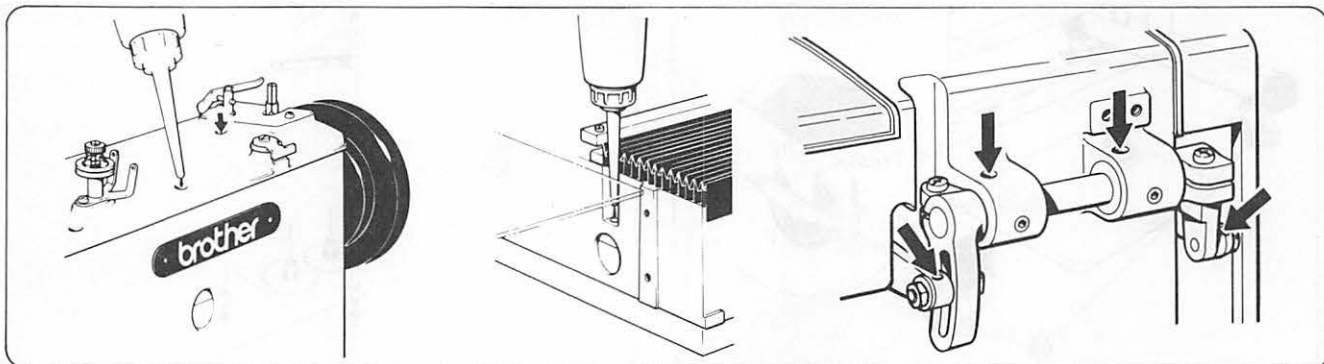
### 6 Installation of V-belt



Adjust the V-belt tension with nut ① so that there is approximately 10~20 mm of slack in the belt when pressed at the center.

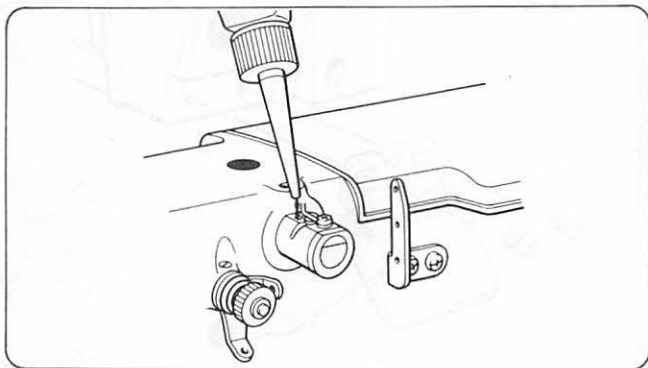
## LUBRICATION AND OIL DRAINING

### 1 Lubrication

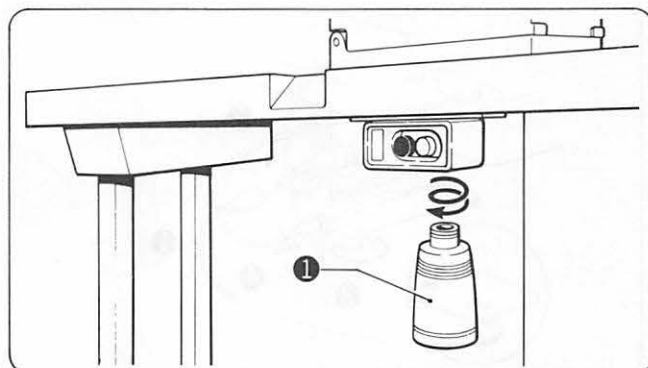


- (1) Fill the oil tank with specified lubrication oil. Apply two or three drops of oil at each of the locations indicated with an arrow.

### 2 Oil draining



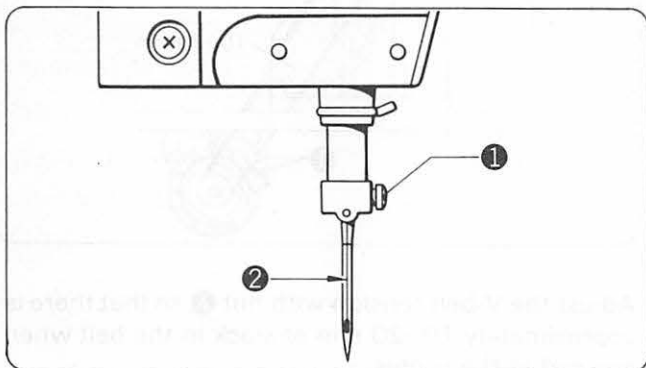
- (2) Fill the coolant tank with silicone oil.



- ★ Remove and empty the drainage poly-oiler ① whenever it is full.

## CORRECT OPERATION

### 1 Needle installation

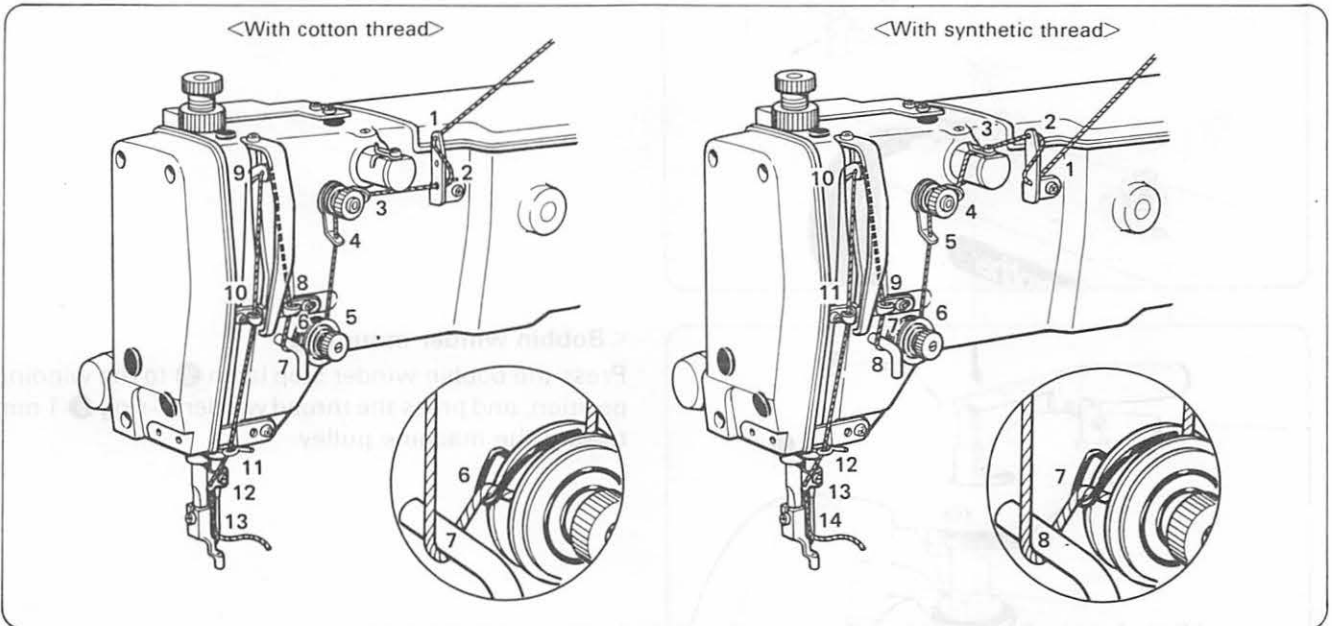


- ★ Loosen set screw ①. Fully insert the needle ② with the groove facing the front, and then retighten set screw ①.

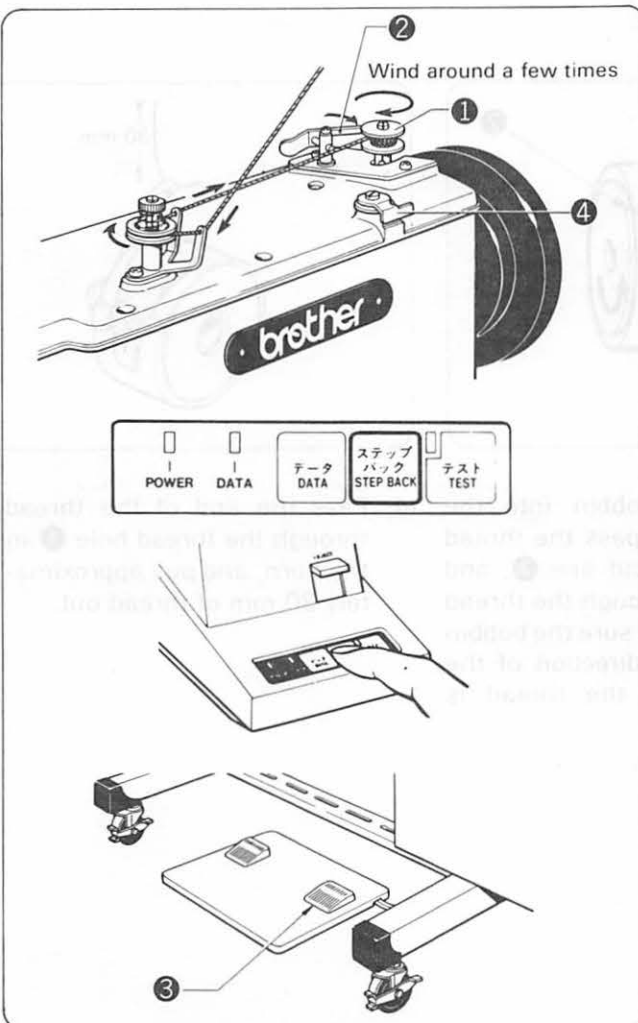


## 2 Upper thread threading

★ Thread the upper thread as shown in the diagrams below.

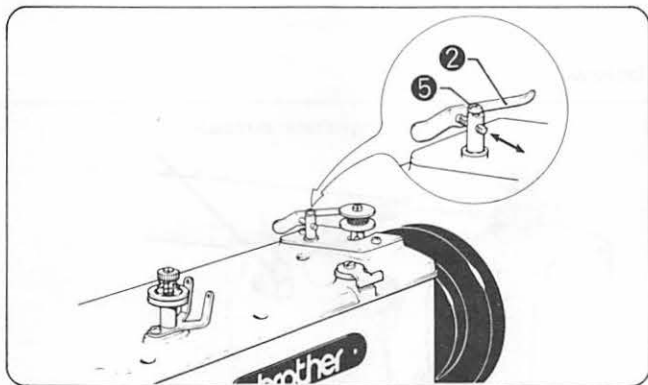


## 3 Bobbin thread winding

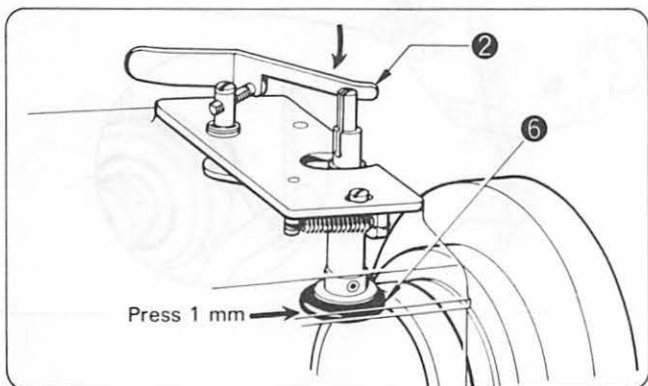


- (1) Slide the bobbin ① all the way onto the spindle.
- (2) Thread the thread as shown in the figures, wind the thread around the bobbin ① several times in the direction of the arrow, and then depress the bobbin winder stop latch ②.

- (3) Turn the power switch on.
- (4) With the step back switch depressed, press the start treadle ③ to wind the thread around the bobbin.  
(Release the step back switch once the machine has started to wind thread.)
- (5) The bobbin winder stop latch ② will automatically release when the bobbin is filled to approximately 80% of capacity.
- (6) Release the start treadle ③.
- (7) Remove the bobbin ①, and cut the thread with the thread cutter ④.



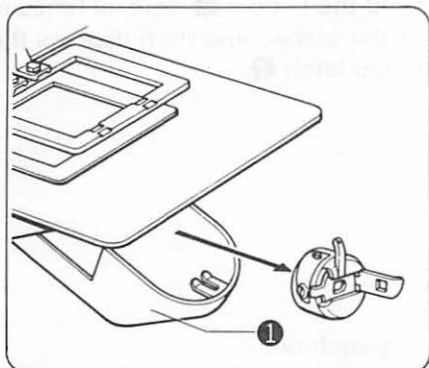
- (8) To wind more thread onto the bobbin ①, loosen set screw ⑤, and adjust the position of the bobbin winder stop latch ②.



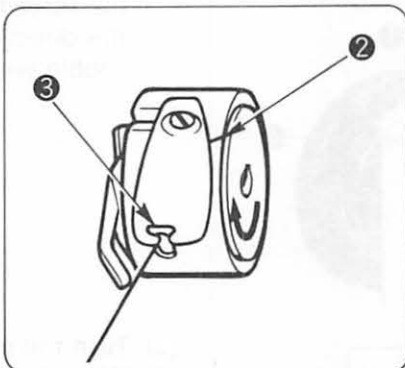
#### <Bobbin winder mounting>

Press the bobbin winder stop latch ② to the winding position, and press the thread winder O-ring ⑥ 1 mm toward the machine pulley.

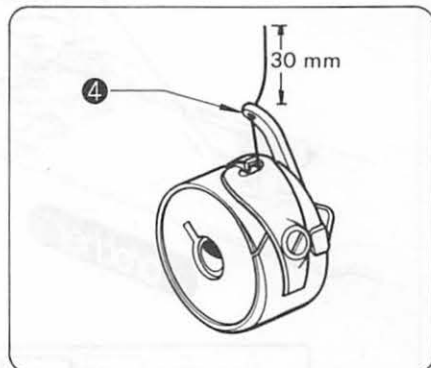
#### 4 Bobbin case installation and threading



- (1) Pull the shuttle race cover ① forward and then open the cover.  
 (2) Lift the bobbin case latch and remove the bobbin case.



- (3) Insert the bobbin into the bobbin case, pass the thread through the cut line ②, and pull it out through the thread hole ③. Make sure the bobbin turns in the direction of the arrow when the thread is pulled.

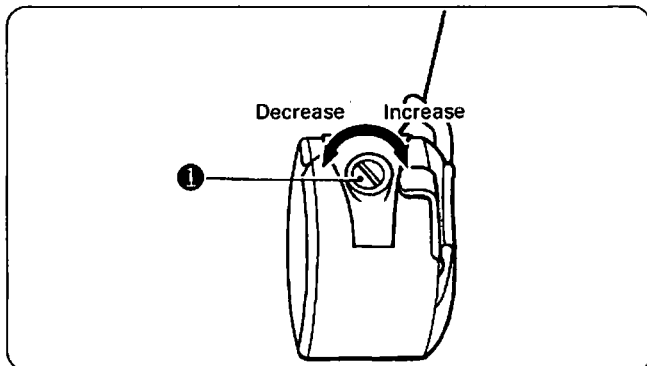


- (4) Pass the end of the thread through the thread hole ④ in the horn, and pull approximately 30 mm of thread out.



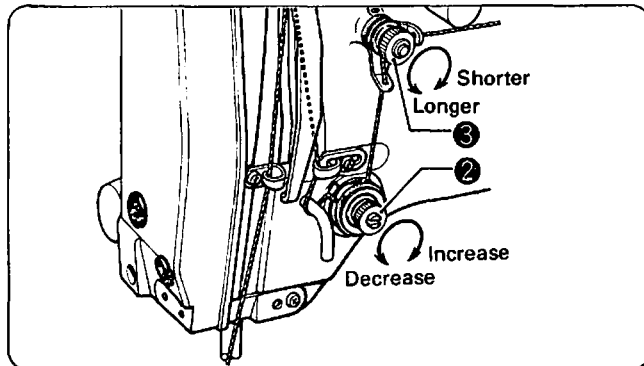
## 5 Thread tension

### 1. Bobbin thread tension



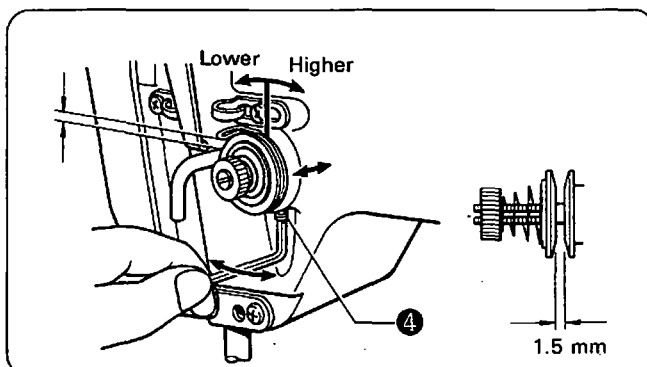
★ The bobbin thread tension should be adjusted so that the bobbin will not descend of its own weight when the suspended by the bobbin thread. Turn adjustment screw ① to adjust.

### 2. Upper thread tension



Turn the thread tension control nut ② to adjust the upper thread tension to the material being sewn. Adjust thread tension control nut ③ so that the thread remainder is between 30 to 40 mm.

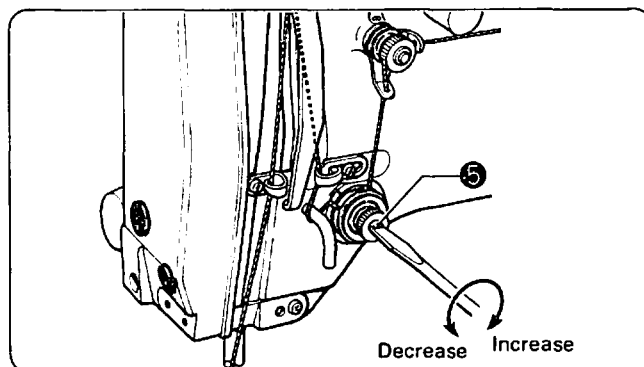
### 3. Thread take-up spring height



To adjust the height of the thread take-up spring, loosen set screw ④ and turn the entire adjustment unit.

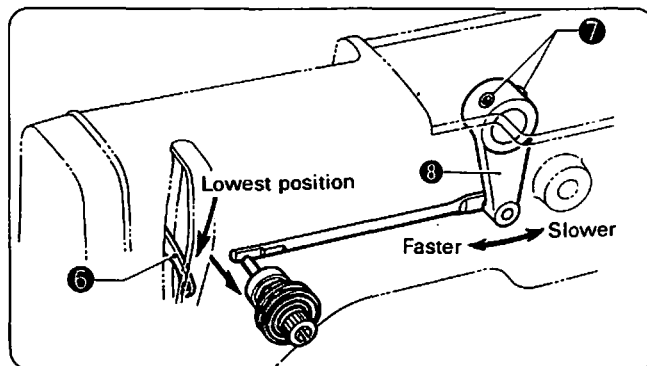
Also, slide the adjustment unit in or out so that the tension disc opens approximately 1.5 mm after the final stitch.

### 4. Thread take-up spring tension



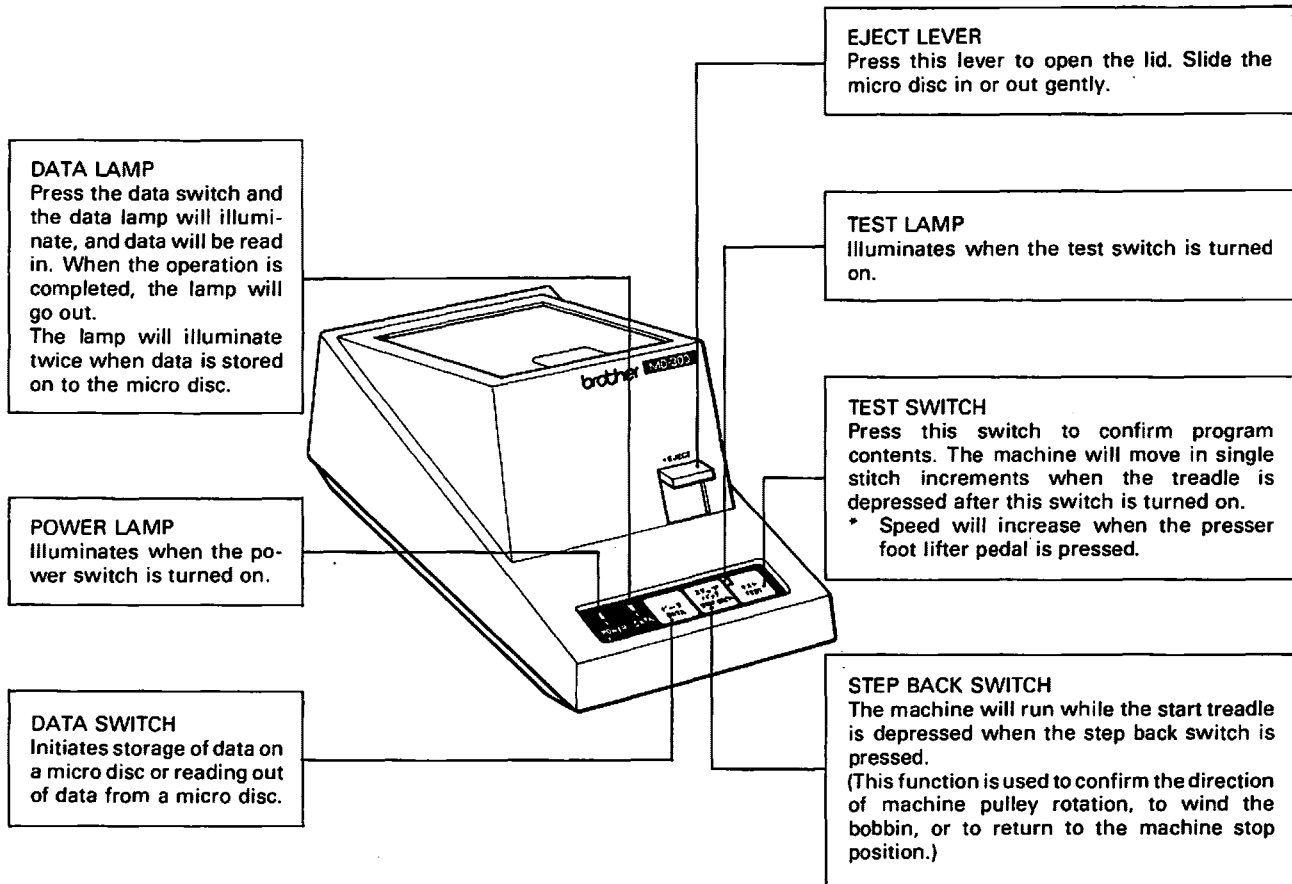
Adjust the thread take-up spring tension by turning the tension stud ⑤ with a screwdriver.

### 5. Upper thread tension release timing



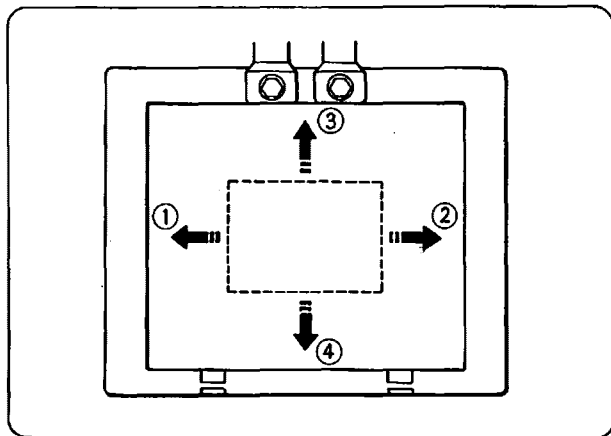
Loosen set screw ⑦ and adjust the position of the upper thread tension release lever ⑧ so that the tension on the upper thread is released when the thread take-up lever ⑥ is completely lowered at the end of a stitch.

## HOW TO USE THE FMC



**Note:** Be sure to stop the machine quickly when checking the direction of pulley rotation.

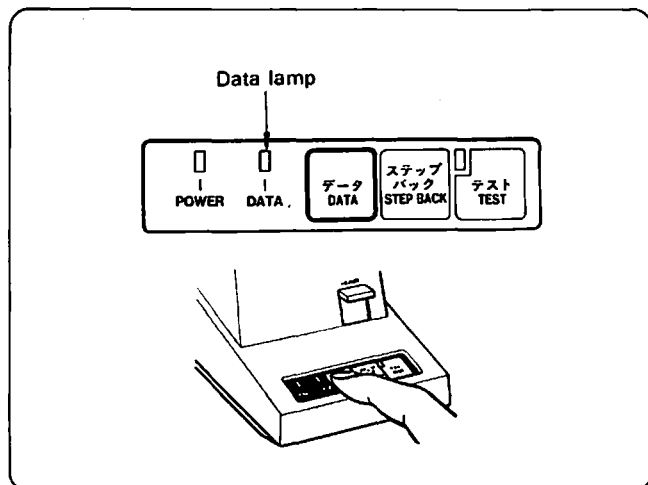
★ A previously programmed pattern can be moved vertically or horizontally.



- (1) Hold the test switch depressed, and then press the data switch. Make sure both the test and data lamps have illuminated, and then release the switches.
- ① Press the data switch twice to move the pattern one pulse (0.2 mm) to the left.
- ② Press the step switch twice to move the pattern one pulse (0.2 mm) to the right.
- ③ Press the step back switch once, and then press the data switch to move the pattern one pulse (0.2 mm) to the back.
- ④ Press the data switch once, and then press the step back switch to move the pattern one pulse (0.2 mm) to the forward.

Press the test switch to cancel the pattern transfer mode once the pattern has been moved to the desired location as described above.

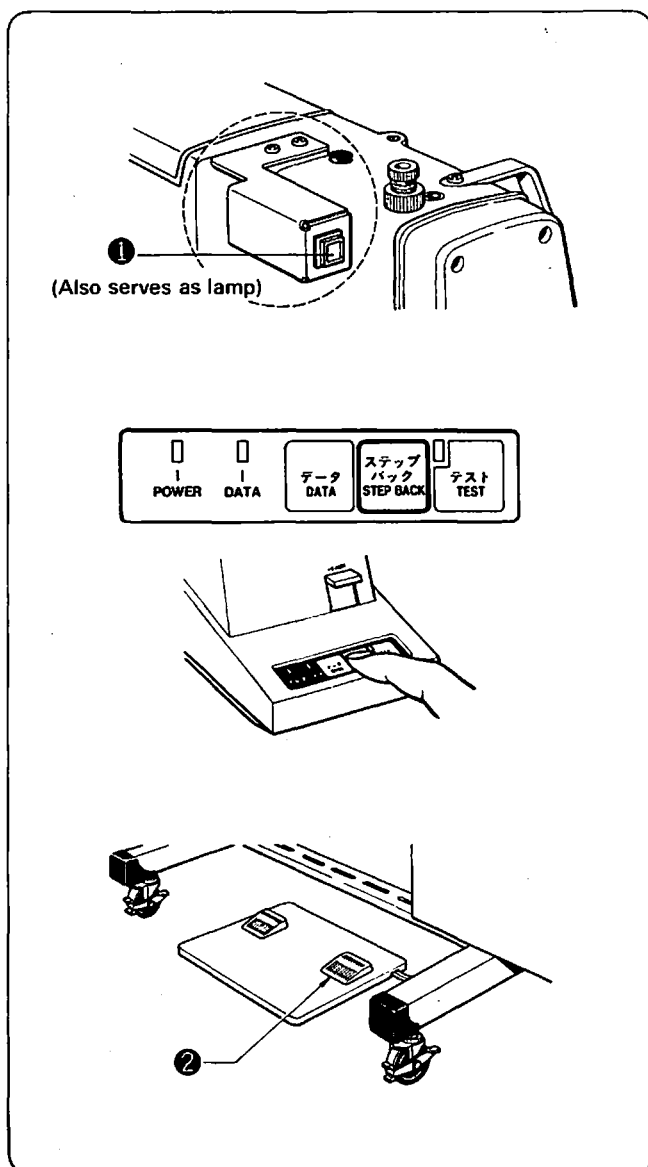
## 1 Data switch use



★ This switch is used to read pattern data recorded on a micro disc into the machine, or to store programmed pattern data onto a micro disc.

- (1) Insert a micro disc on which stitch pattern data has been recorded into the FMC.
- (2) Press the data switch. The data lamp will illuminate to indicate that stitch pattern data is being read out. The data lamp will illuminate once when data is being read out, and twice when data is being stored onto a disc. The emergency stop lamp will illuminate if the disc has bad sectors and data cannot be read or stored.

## 2 Step back switch use



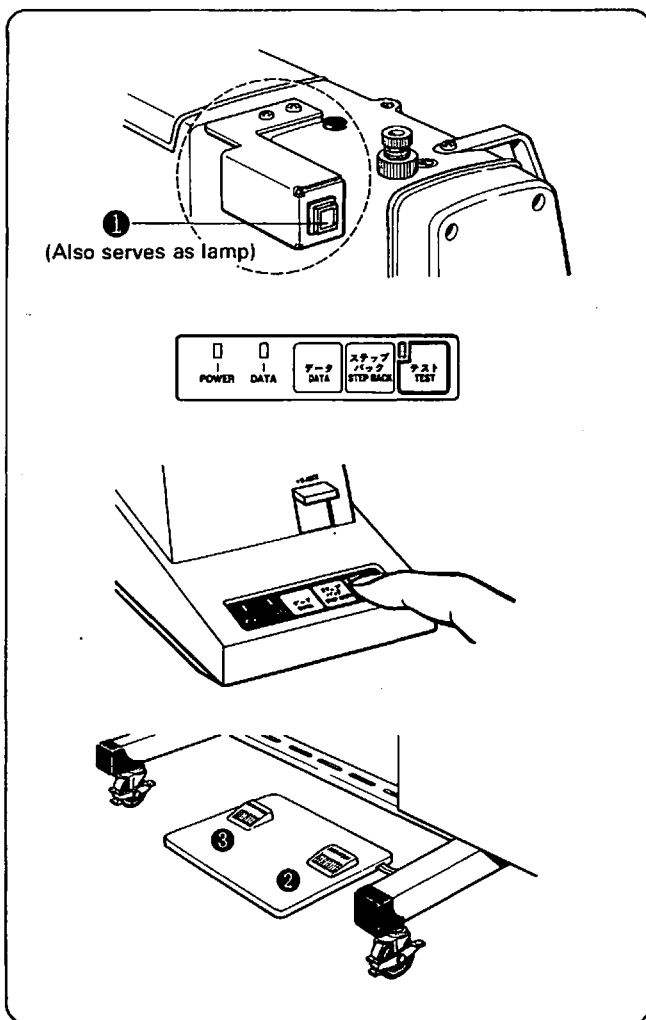
★ This switch is used to move the machine one stitch at a time in the reverse sewing direction to enable resewing in the event the thread breaks or the bobbin thread runs out in mid-pattern. Use this switch to return to the point where the thread broke or ran out. This is especially useful with large patterns.

- (1) Press the emergency stop switch ① while the machine is running. All operations will stop and the emergency stop lamp will illuminate.
- (2) Press the emergency stop switch ① once again. The emergency stop lamp will go out.
- (3) Press the step back switch. The presser foot will reverse one stitch at a time as long as the step back switch is depressed.
- (4) When the presser foot has returned to the desired position, release the step back switch. If the presser foot is stopped too soon, simply press the step back switch again to resume reverse presser foot movement.
- (5) The machine will start sewing when the start treadle ② is pressed.

※ Turn the test switch on and press the start treadle ② to move the presser foot one stitch at a time forward. The presser foot will advance in 100 stitch units if the step back switch is pressed at this time.



### 3 Test switch use

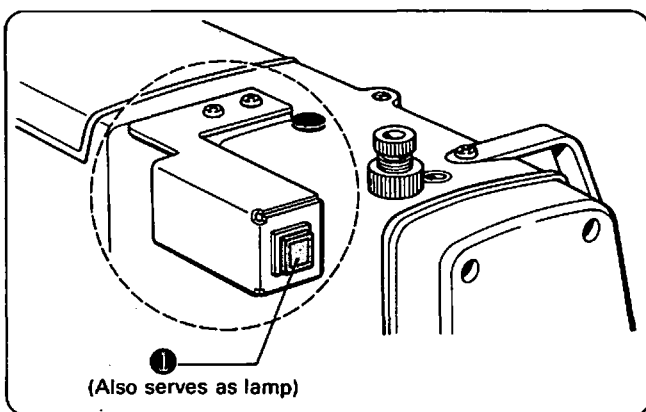


★ This switch is used to recommence sewing from any position in the pattern in the event the thread breaks or the bobbin thread runs out in mid-pattern.

- (1) Press the emergency stop switch ① while the machine is running. All operations will stop and the emergency stop lamp will illuminate.
- (2) Press the emergency stop switch ① once again. The emergency stop lamp will go out.
- (3) Press the start treadle ②. The presser foot will automatically return to the sewing start position.
- (4) Press the test switch. The test lamp will illuminate.
- (5) Press the start treadle ②. The work clamp will not move but the presser foot will begin advancing one stitch at a time at low speed. Press the presser foot lifter pedal ③ to increase the speed.
- (6) When the presser foot has reached the desired position, press the test switch again. The presser foot will stop, and the test lamp will go out. If the presser foot was stopped too soon, simply press the test switch again; the presser foot will start advancing again.
- (7) Press the start treadle ③ to begin sewing again.

※ The presser foot will advance in 100 stitch units if the step back switch is pressed while the test switch is on. If the step back switch is pressed after the test switch has been turned off, the presser foot will reverse one stitch at a time as long as the step back switch is depressed. The speed will increase if the presser foot lifter pedal ③ is pressed.

### 4 Emergency stop switch use



★ The machine will stop immediately if this switch is pressed while sewing or test switch operation.

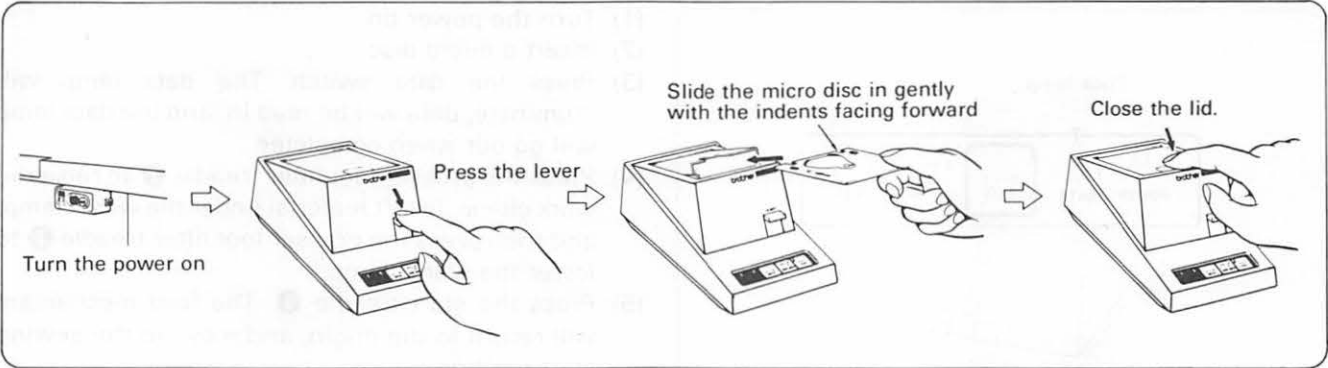
- (1) If the emergency stop switch ① is turned ON during sewing.  
All machine functions will stop, and the emergency stop switch lamp will go on. Once the problem has been solved, press the emergency stop switch ① again; the thread cutter will operate, the emergency stop function will be cancelled, and the lamp will go out.

※ Neither treadle will work while the emergency stop lamp is on.

- (2) If the emergency stop switch ① is turned ON during test switch operation  
All machine functions will stop and the emergency lamp will go on. Press the emergency stop switch ① again to cancel the emergency stop mode.
- (3) Abnormal machine operation  
The emergency stop function will automatically engage, all machine operations will stop, and the emergency lamp will illuminate if an abnormal load is applied or a malfunction is detected during machine operation. The emergency stop mode will be cancelled when the emergency stop switch is pressed.

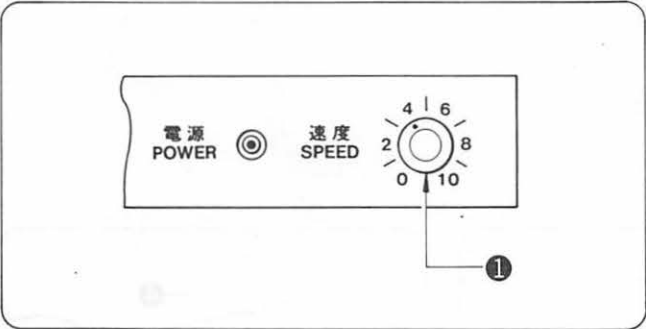
# SEWING

## 1 Micro disc insertion



- (1) Two patterns, one per side, can be recorded on each micro disc.  
 Each pattern can be up to a maximum 2000 stitches.
- Note:** Micro discs should be stored away from magnets, radios, televisions, and other electronic products producing a magnetic field. Magnetic fields may erase or damage disc contents.  
 Also be careful of dust, oil, and other foreign matter.

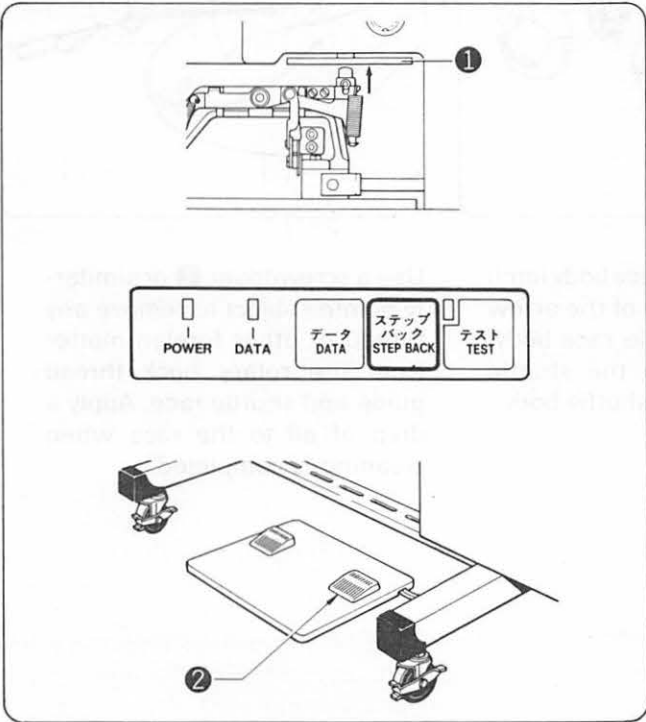
## 2 Sewing speed adjustment



- (1) Turn the stepless speed control ❶ to any desired sewing speed.
- (2) Sewing speeds vary as shown in the below table for different stitch lengths.

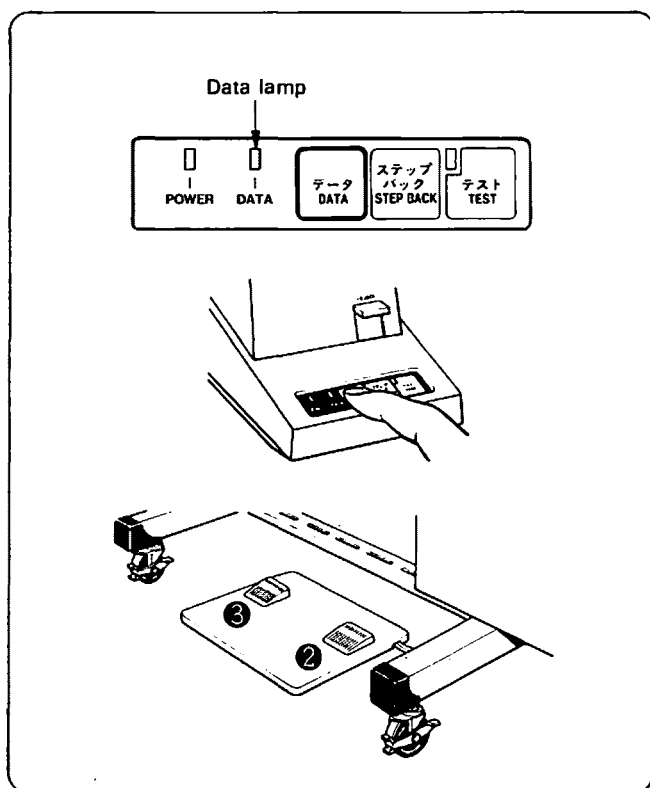
| Stitch length (mm) | 0.2~3.0   | 3.2~4.4   | 4.6~6.2   |
|--------------------|-----------|-----------|-----------|
| Sewing speed (spm) | 850~2,000 | 550~1,500 | 400~1,200 |

## ★ Before Sewing



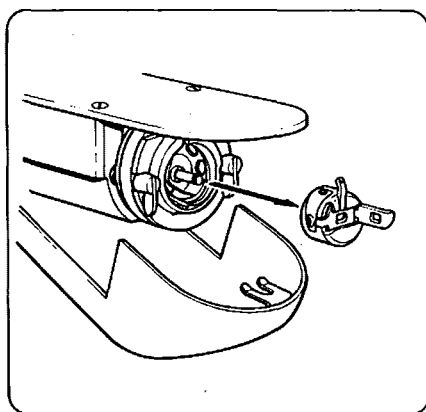
- (1) With the presser bar lifter plate ❶ raised, hold the step back switch depressed, press the start treadle ❷ and start sewing.
- (2) The machine will stop when the start treadle ❷ is released, and the presser foot lifter plate ❶ will descend.

### 3 Sewing

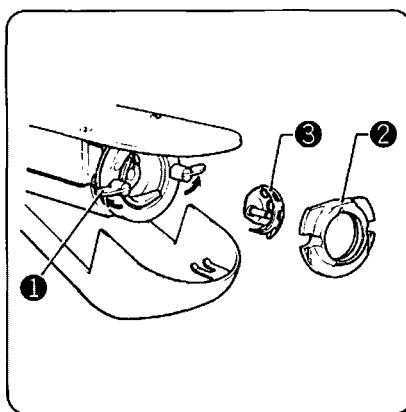


- (1) Turn the power on.
- (2) Insert a micro disc.
- (3) Press the data switch. The data lamp will illuminate, data will be read in, and the data lamp will go out when completed.
- (4) Press the presser foot lifter treadle ② to raise the work clamp, insert material under the work clamp, and then press the presser foot lifter treadle ② to lower the work clamp.
- (5) Press the start treadle ③. The feed mechanism will return to the origin, and move to the sewing start position.
- (6) Press the start treadle ③ once again, and the machine will begin sewing.

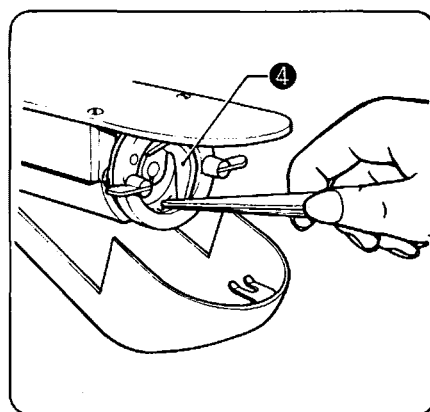
### 4 Rotary hook cleaning



Open the shuttle race cover, and remove the bobbin case.



Slide the shuttle race body latch ① in the direction of the arrow to open the shuttle race body, and then remove the shuttle race body ② and shuttle body ③.



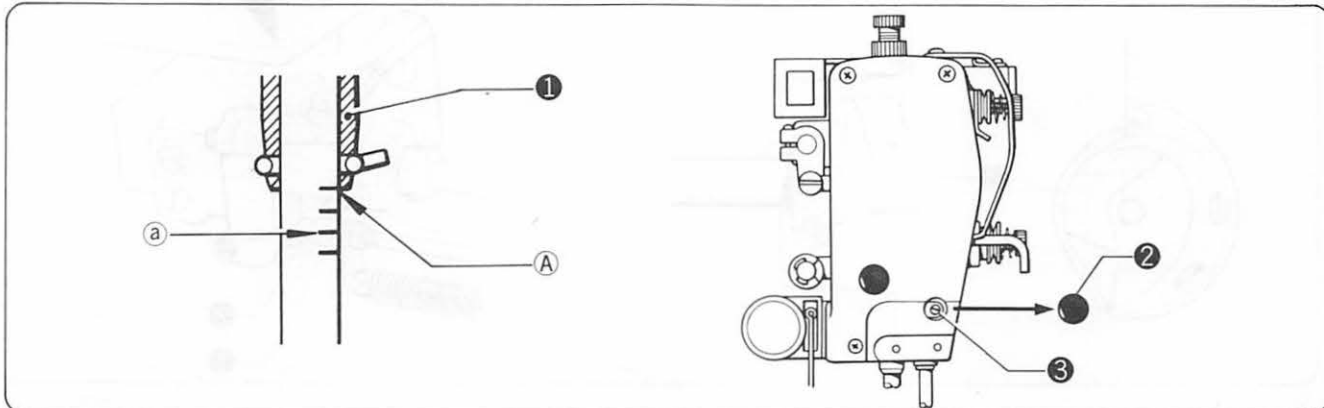
Use a screwdriver ④ or similarly pointed object to remove any thread or other foreign matter from the rotary hook thread guide and shuttle race. Apply a drop of oil to the race when cleaning is completed.



## STANDARD ADJUSTMENTS

★ Turn the machine pulley by hand when making any adjustments

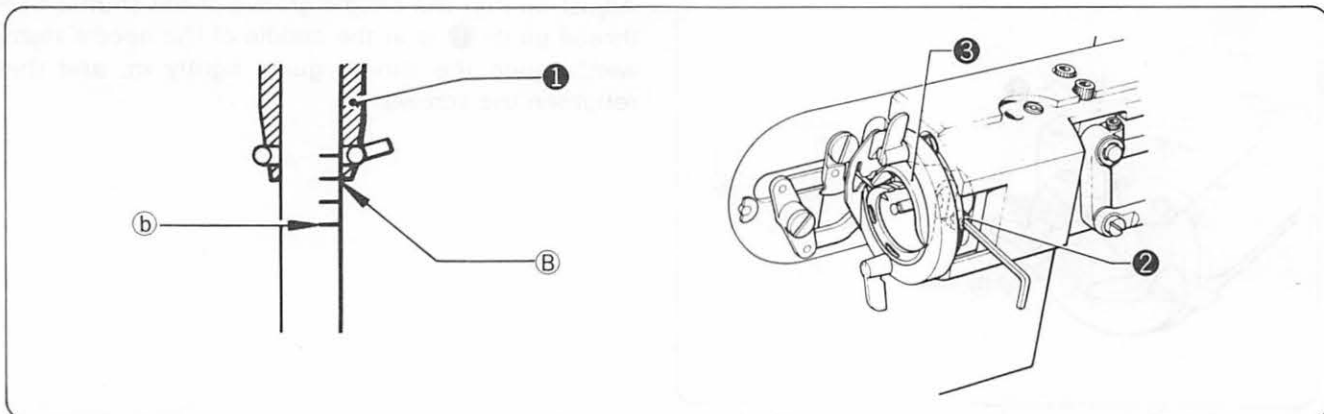
### 1 Needle bar height adjustment



Turn the pulley to completely lower the needle bar. Remove cap ②, loosen set screw ③, and vertically adjust the needle bar so that reference line ④, the top reference line on the needle bar, is aligned with the bottom of the needle bar bushing ①.

※ Align the second reference line, ⑤, with the bottom of the needle bar bushing when using needle DP x 17.

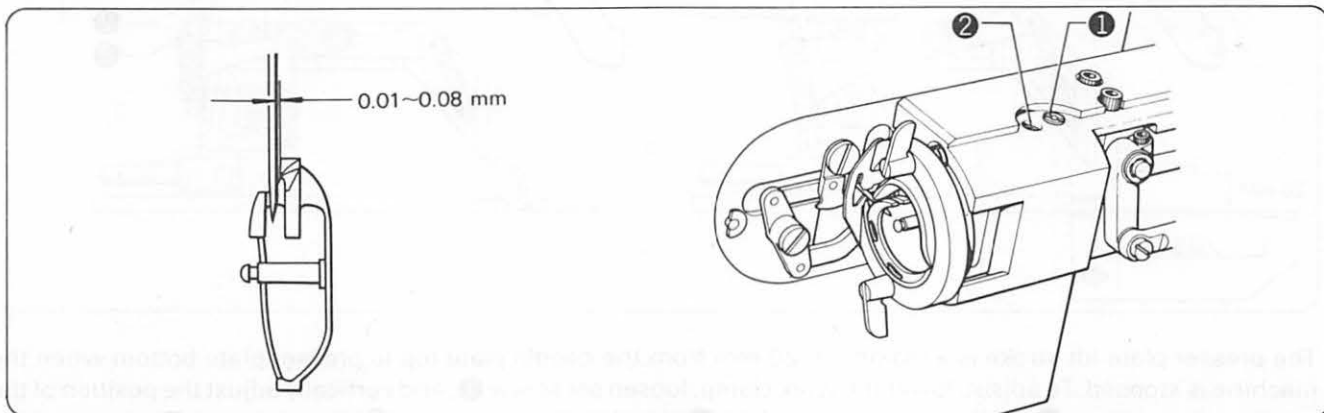
### 2 Needle bar lift stroke adjustment



Turn the pulley to raise the needle bar from the needle lowest position and align reference line ⑥, second from top, with the bottom of the needle bar bushing ①. Now, loosen Allen screw ② and turn the shuttle driver so that the shuttle hook point is aligned with the needle center.

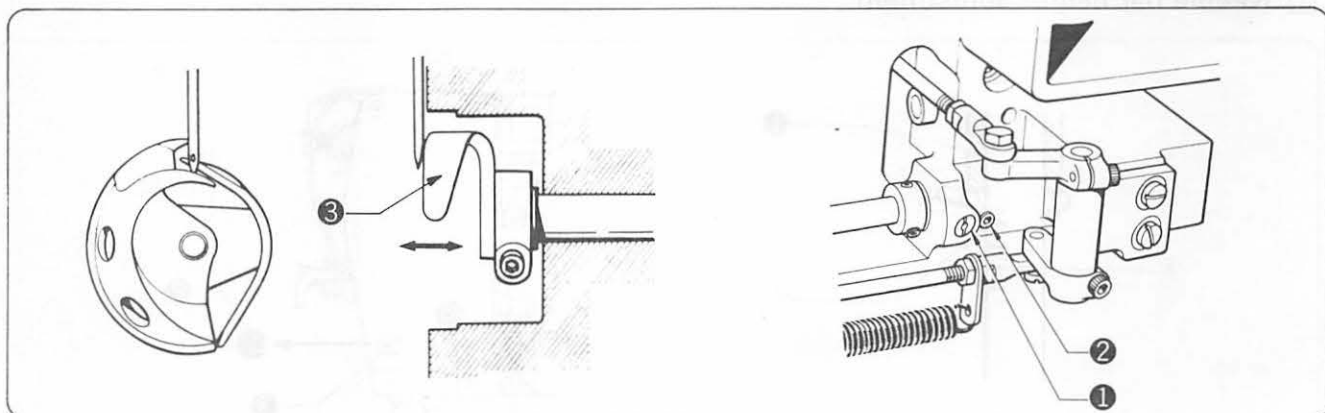
※ Align the bottom reference line, ⑦, with the bottom of the needle bar bushing when using needle DP x 17.

### 3 Needle to shuttle hook point gap adjustment



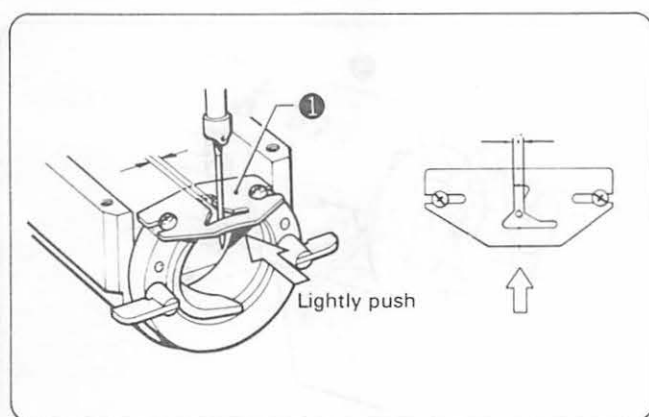
Turn the pulley and align the shuttle hook point with needle center. Loosen set screw ① and turn the eccentric connecting link stud ② to adjust the needle to shuttle hook point gap to 0.01~0.08 mm.

#### 4 Shuttle driver needle contact adjustment



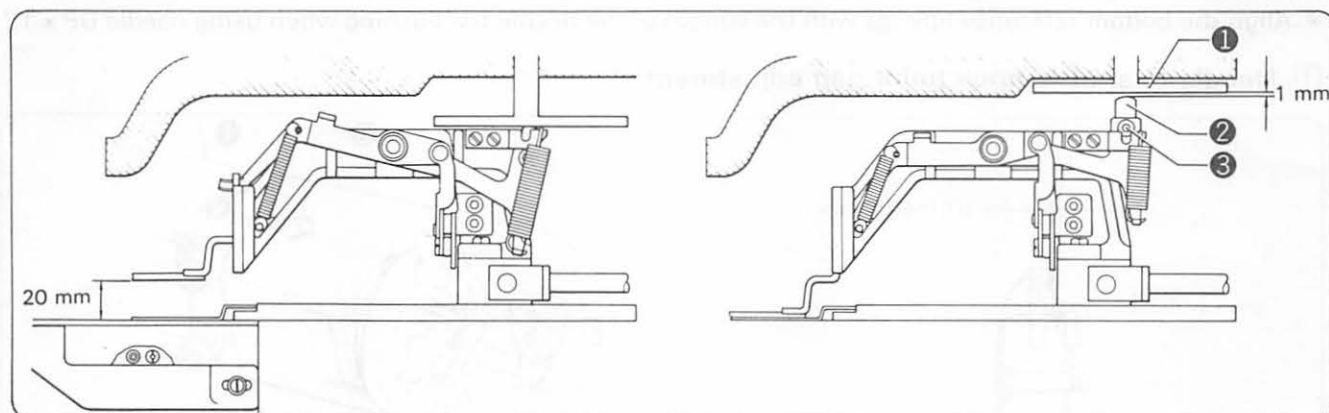
Turn the pulley and align the rotary hook point with the needle center. Loosen set screw ① and turn the eccentric connecting link stud ② so that the needle meets the shuttle driver. Note that excessive needle to driver contact will result in skipped stitches. Also, if the needle does not sufficiently contact the shuttle driver, the rotary hook point will interrupt the needle, resulting in abnormal abrasion.

#### 5 Shuttle hook thread guide adjustment



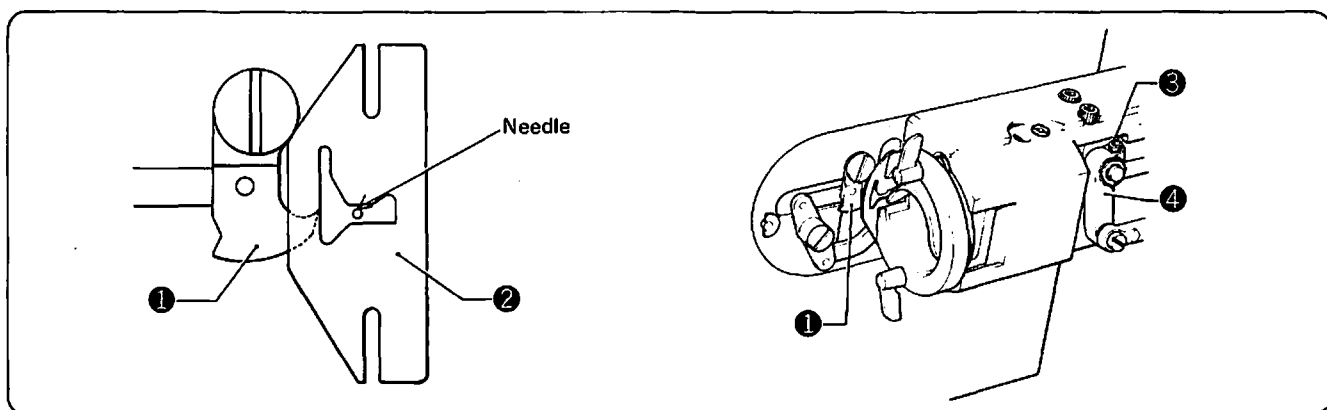
Adjust so that the needle groove of the shuttle hook thread guide ① is at the middle of the needle zigzag width, slide the thread guide lightly in, and then retighten the screws.

#### 6 Presser plate lift stroke adjustment



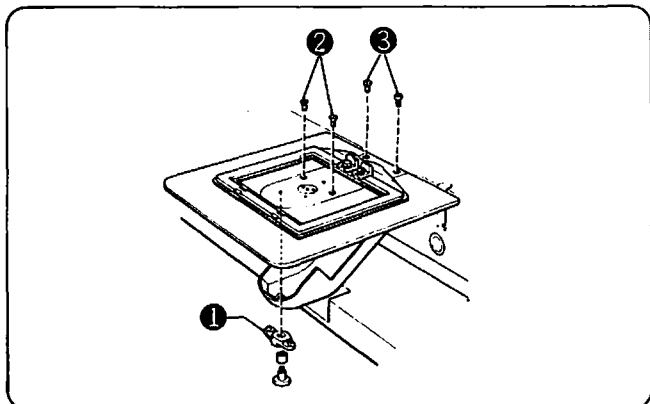
The presser plate lift stroke is a maximum 20 mm from the needle plate top to presser plate bottom when the machine is stopped. To adjust, lower the work clamp, loosen set screw ③, and vertically adjust the position of the presser arm stopper ② so that the presser plate ① to presser arm stopper ② gap is 1 mm. To decrease the presser plate lift stroke, increase the presser plate ① to presser arm stopper ② gap.

## 7 Movable knife adjustment

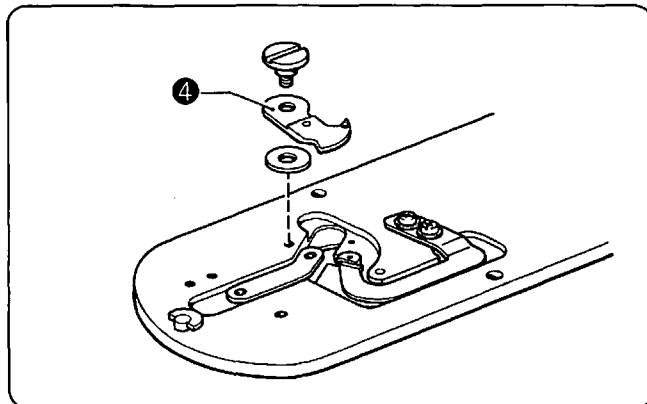


Loosen set screw ③ and adjust the thread cutter lever ④ so that the movable knife ① tip aligns with the needle groove of the shuttle hook thread guide ② when the machine is stopped.

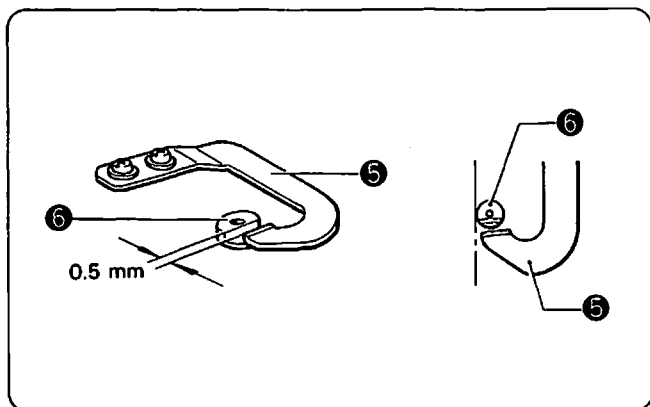
### <Movable and fixed knife replacement>



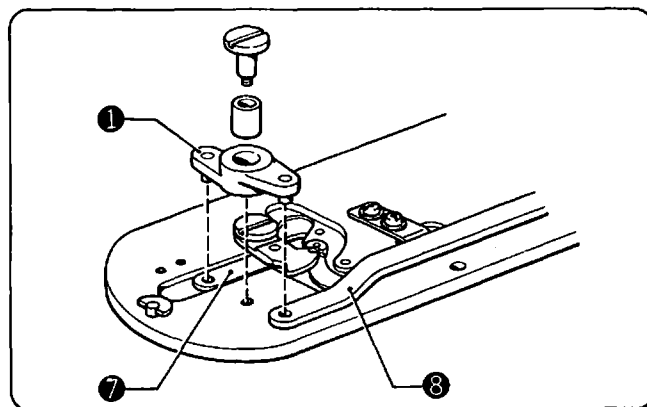
- (1) Open the shuttle race cover.
- (2) Remove the thread cutter connecting rod ①.
- (3) Remove set screws ② and flat screws ③, and remove the needle plate.



- (4) Remove the movable knife ④ and replace with a new movable knife.



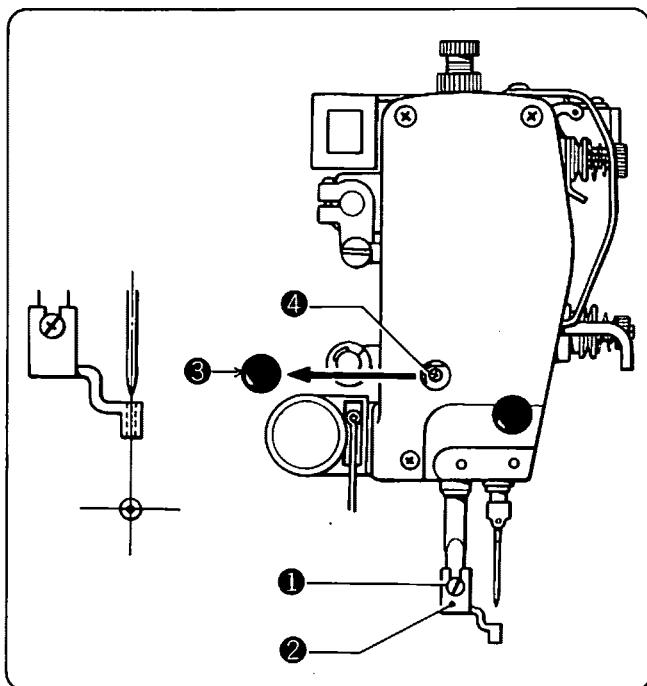
- (5) Remove the fixed knife ⑤, and replace with a new fixed knife. Adjust so the needle plate ⑥ to fixed knife ⑤ gap is 0.5 mm. Be sure the left side of the fixed knife ⑤ does not extend beyond the left side of the needle plate.



- (6) Set the thread cutter connecting rod ① pin into the movable knife link ⑦ and thread cutter connecting rod ⑧.
- ★ Make sure the movable knife is properly aligned after installing the needle plate.



## 8 Presser foot adjustment

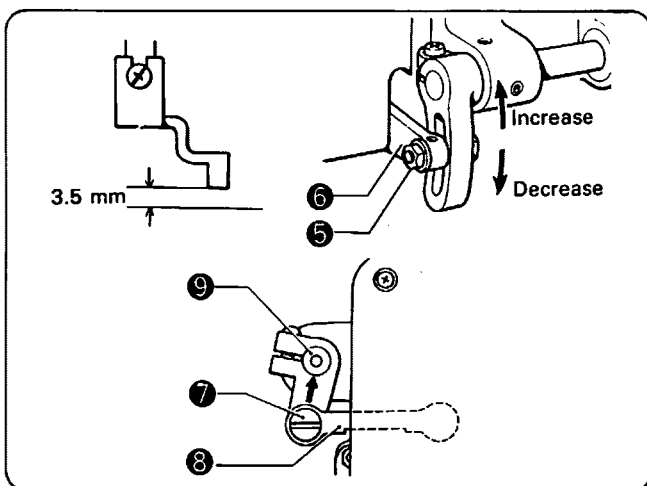


★ Turn the pulley and lower the presser foot to the down position before making the below adjustment.

- (1) Loosen set screw ①, and then retighten it so that the presser foot ② bottom lightly touches the material.

※ The material will be improperly fed if the presser foot is too low, and stitches may skip if the presser foot is too high.

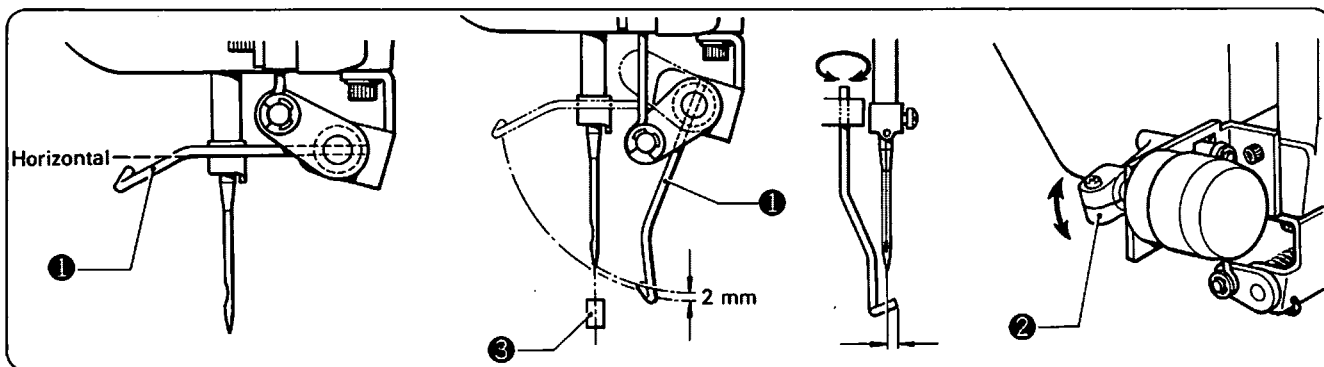
- (2) Turn the pulley by hand and make sure the needle enters the center of the hole in the presser foot ②. If it does not come to the center, remove cap ③, loosen screw ④, and move the presser foot to adjust.



- (3) Standard vertical presser foot stroke is 3.5 mm. If the stroke is excessive, loosen nut ⑤ and raise the feed link ⑥. Lower the feed link to decrease the stroke.

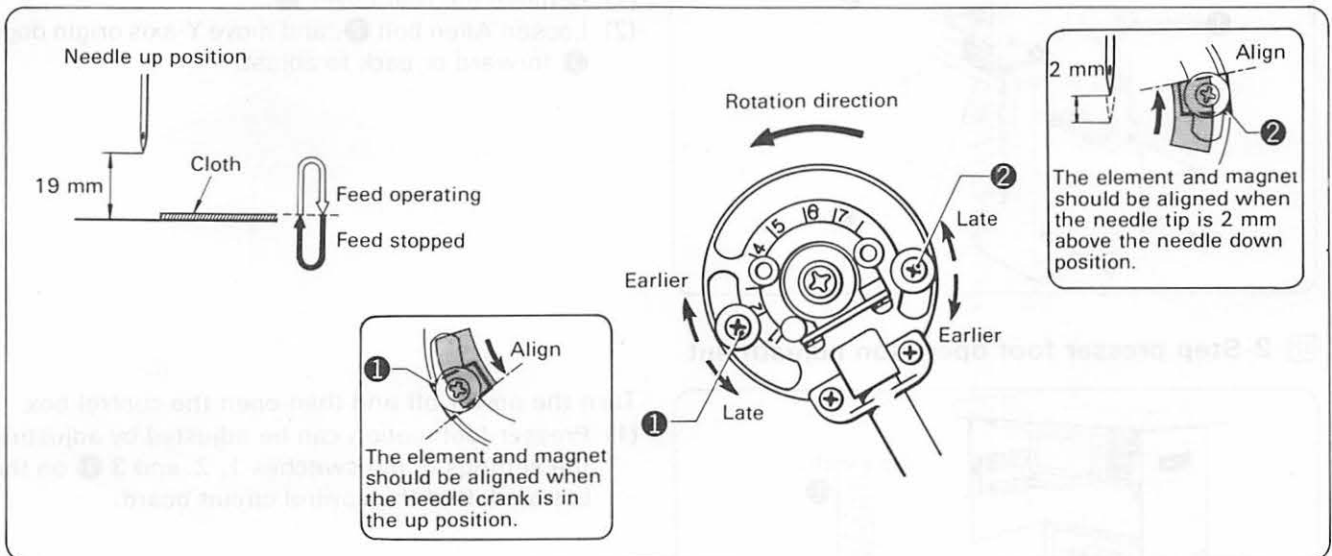
- (4) If vertical presser foot movement is not necessary, loosen step screw ⑦, and secure link L ⑧ to the intermittent feed shaft ⑨.

## 9 Thread wiper adjustment



- (1) Adjust the solenoid lever ② so that the thread wiper ① is level when the machine is stopped.
- (2) Work the thread wiper ① so that it is aligned with the center of the needle bar. Slide the wiper ① in or out so that the wiper ① to needle point gap is approximately 2 mm. Be sure the wiper ① does not strike the presser foot ③.

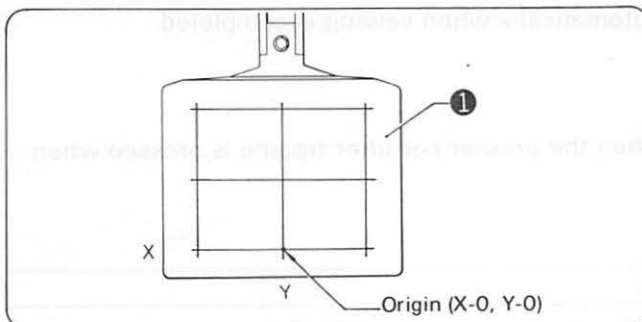
## 10 Needle and feed timing adjustment



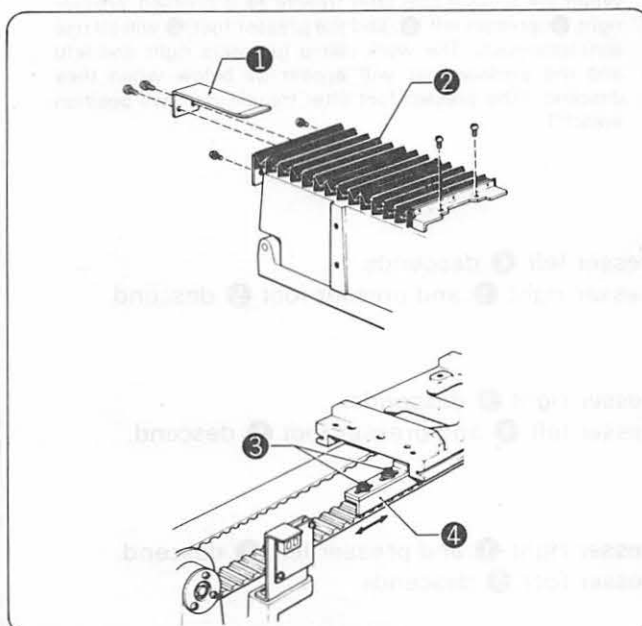
- (1) Adjust element ① so that the needle tip is 19 mm above the needle plate when the needle is in the up position.
- (2) Adjust the needle and feed timing with element ② so that the feed mechanism begins to operate after the needle has been removed from the material, and so that the feed mechanism stops before the needle enters the material.

※ The feed timing should be increased when sewing heavy materials. This will decrease needle sidewise movement and improve sewing efficiency.

## 11 Origin adjustment

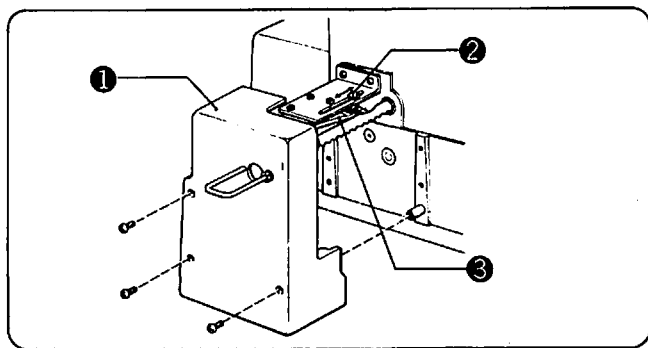


★ The origin is at the middle front. Replace the feed plate with the origin reference plate ① to adjust the origin.



### <X axis>

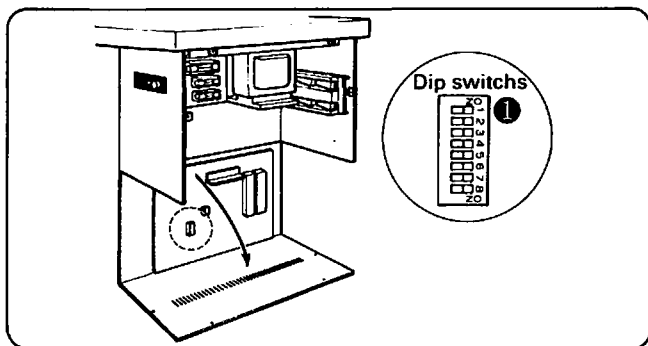
- (1) Remove swatooth presser foot L ① and sawtooth L ②.
- (2) Loosen set screw ③, and move X-axis origin dog ④ laterally to adjust.



#### <Y axis>

- (1) Remove the rear cover ①.
- (2) Loosen Allen bolt ②, and move Y-axis origin dog ③ forward or back to adjust.

### 12 2-Step presser foot operation adjustment



Turn the power off and then open the control box.

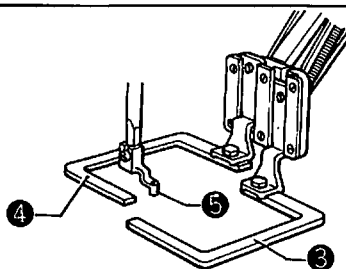
- (1) Presser foot motion can be adjusted by adjusting the settings of dip switches 1, 2, and 3 ① on the bottom left of the control circuit board.

|   | OFF | ON |
|---|-----|----|
| 1 |     |    |
| 2 |     |    |
| 3 |     |    |

The presser foot will rise automatically when sewing is completed.

|   | OFF | ON |
|---|-----|----|
| 1 |     |    |
| 2 |     |    |
| 3 |     |    |

The presser foot will rise when the presser bar lifter treadle is pressed when sewing is completed.



When the presser foot lifter treadle ② is pressed, presser right ③, presser left ④, and the presser foot ⑤ will all rise simultaneously. The work clamp (pressers right and left) and the presser foot will appear as below when they descend. (The presser foot lifter treadle is a two position switch.)

|   | OFF | ON |
|---|-----|----|
| 1 |     |    |
| 2 |     |    |
| 3 |     |    |

First switch ON: ————— Presser left ④ descends.

Second switch ON: ————— Presser right ③ and presser foot ⑤ descend.

|   | OFF | ON |
|---|-----|----|
| 1 |     |    |
| 2 |     |    |
| 3 |     |    |

First switch ON: ————— Presser right ③ descends.

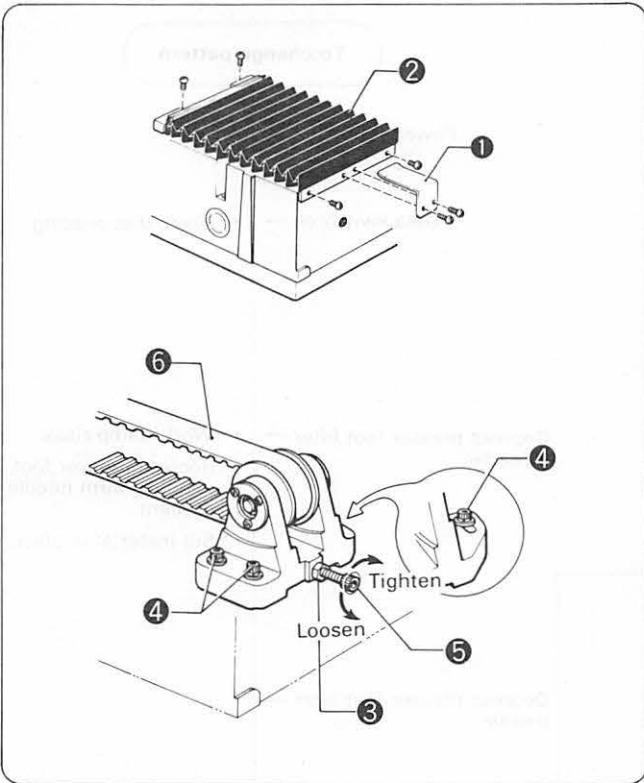
Second switch ON: ————— Presser left ④ and presser foot ⑤ descend.

|   | OFF | ON |
|---|-----|----|
| 1 |     |    |
| 2 |     |    |
| 3 |     |    |

First switch ON: ————— Presser right ③ and presser left ④ descend.

Second switch ON: ————— Presser foot ⑤ descends.

**13 Timing belt tension adjustment**



- (1) Remove sawtooth presser R ① and sawtooth presser L ②.
- (2) Loosen nut ③ and screw ④, and turn the adjustment screw ⑤ to adjust.  
The timing belt ⑥ should be adjusted so that there is no give when pressed firmly by hand.



# OPERATION FLOW CHART

