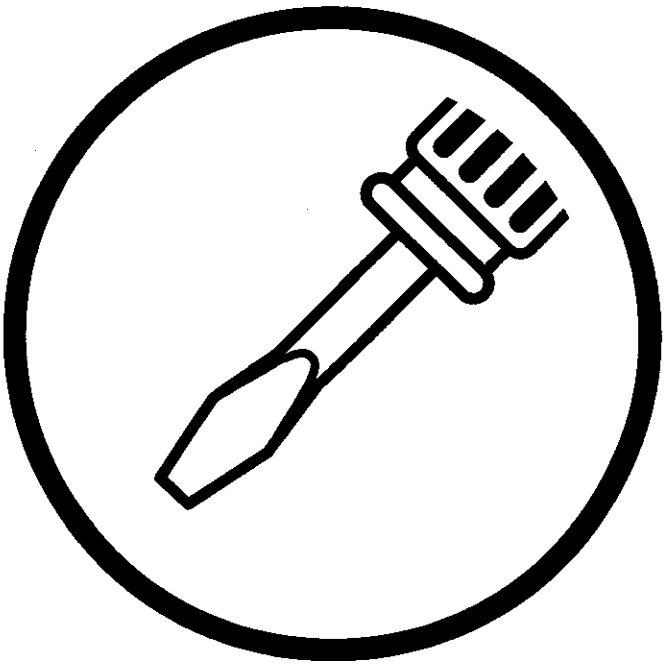
# LK3-B430E

SERVICE MANUAL

Please read this manual before making any adjustments.

## ELECTRONIC LOCKSTITCH BAR TACKER



brother

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

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

# SAFETY INSTRUCTIONS

## 1 Safety indications and their meanings

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

### Indications

| | |
|---|---|
| ⚠ DANGER | The instructions which follow this term indicate situations where failure to follow the instructions will almost certainly result in death or severe injury. |
| ⚠ CAUTION | The instructions which follow this term indicate situations where failure to follow the instructions could cause injury when using the machine or physical damage to equipment and surroundings. |

### Symbols

 ---------- This symbol(△) indicates something that you should be careful of. The picture inside the triangle indicates the nature of the caution that must be taken.
(For example, the symbol at left means "beware of injury".)

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

 ---------- This symbol(●) indicates something that you must do. The picture inside the circle indicates the nature of the thing that must be done.
(For example, the symbol at left means "you must make the ground connection".)

## 2 Notes on safety

# ⚠ DANGER

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

# ⚠ CAUTION

### Installation

- Machine installation should only be carried out by a qualified technician.
- Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.
- The sewing machine weighs more than 47 kg. The installation should be carried out by two or more people.
- Do not connect the power cord until installation is complete, otherwise the machine may operate if the foot switch is depressed by mistake, which could result in injury.
- Hold the machine head with both hands when tilting it back or returning it to its original position.
  Furthermore, after tilting back the machine head, do not push the face plate side or the pulley side from above, as this could cause the machine head to topple over, which may result in personal injury or damage to the machine.
- All cords should be secured at least 25 mm away from any moving parts. Furthermore, do not excessively bend the cable or secure it too firmly staples, otherwise there is the danger that fire or electric shocks could occur.
- Be sure to connect the ground. If the ground connection is not secure, you run the risk of receiving a serious electric shock.
- Install the belt covers to the machine head and motor.
- Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea.
  Keep the oil out of the reach of children.
- Avoid setting up the sewing machine near sources of strong electrical noise such as high-frequency welding equipment.
  If this precaution is not taken, incorrect machine operation may result.

### Sewing

- This sewing machine should only be used by operators who have received the necessary training in safe use beforehand.
- The sewing machine should not be used for any applications other than sewing.
- Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.
- Turn off the power switch at the following times, otherwise the machine may operate if the foot switch is depressed by mistake, which could result in injury.
  - Threading
  - When replacing the bobbin and needle
  - When not using the machine and when leaving the machine unattended
- Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.
- If an error occurs in machine operation, or if abnormal noises or smells are noticed, immediately turn off the power switch. Then contact your nearest Brother dealer or a qualified technician.
- If the machine develops a problem, contact your nearest Brother dealer or a qualified technician.

# ⚠ CAUTION

## Cleaning

- Turn off the power switch before starting any cleaning work, otherwise the machine may operate if the foot switch is depressed by mistake, which could result in injury.

- Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result.
  Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea.
  Keep the oil out of the reach of children.

## Maintenance and inspection

- Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.

- Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.

- Turn off the power switch and disconnect the power cord from the wall outlet at the following times, otherwise the machine may operate if the foot switch is depressed by mistake, which could result in injury.
  - When carrying out inspection, adjustment and maintenance
  - When replacing consumable parts such as the rotary hook and knife

- If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.

- Hold the machine head with both hands when tilting it back or returning it to its original position.
  Furthermore, after tilting back the machine head, do not push the face plate side or the pulley side from above, as this could cause the machine head to topple over, which may result in personal injury or damage to the machine.

- Use only the proper replacement parts as specified by Brother.

- If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.

- Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

# 3 Warning labels

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

1

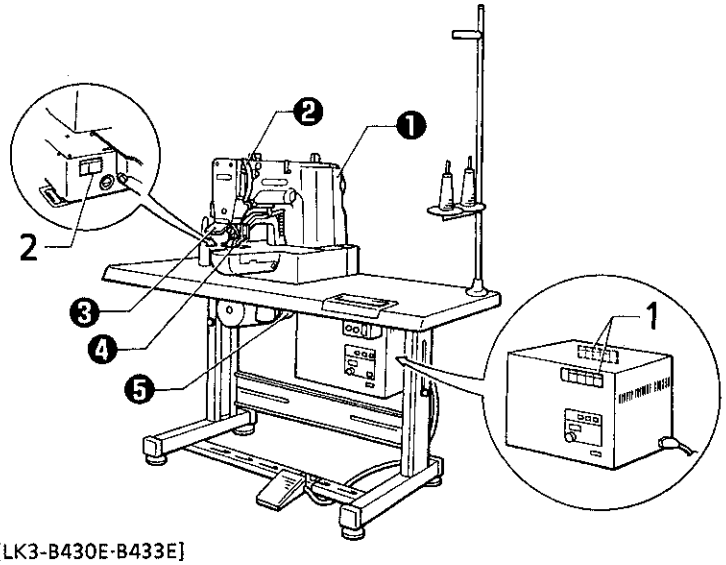
| | ⚠DANGER | ⚠GEFAHR | ⚠DANGER | ⚠PELIGRO |
|---|---|---|---|---|
| | Hazardous voltage will cause injury.<br>Turn off main switch and unplug power cord before opening this cover. | Hochspannung verletzungsgefahr!<br>Vor Öffnen des Gehäuses Hauptschalter ausschalten und Netzstecker ziehen! | Un voltage non adapte provoque des blessures.<br>Pour ouvrir cette plaque, couper le contact general de la machine et debrancher le cable d'alimentation. | Un voltaje inadecuado puede provocar las heridas.<br>Antes de abrir esta tapa, desconecte la máquina y desenchufela de la red. |

2

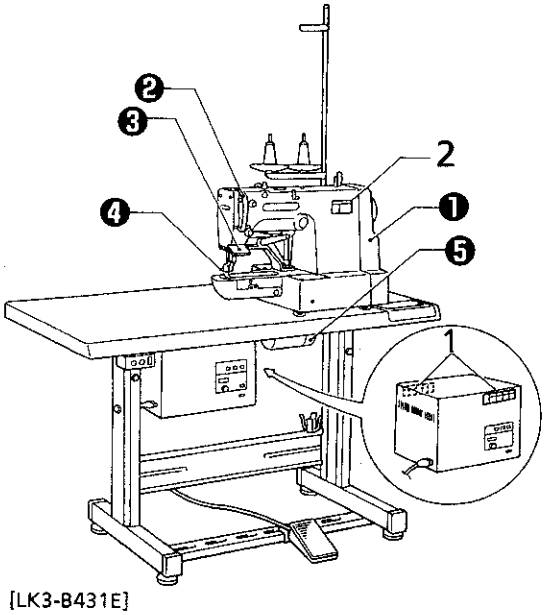
| ⚠ CAUTION |
|---|
| Moving parts may cause injury.<br>Operate with safety devices. Turn off main switch before threading, changing bobbin and needle, cleaning etc. |

Safety devices:

❶ Belt cover,
❷ Thread take-up cover,
❸ Eye guard,
❹ Finger guard,
❺ Motor cover, etc.




[LK3-B430E-B433E]

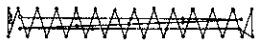
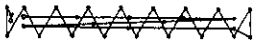
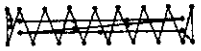
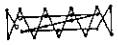
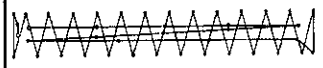
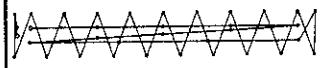
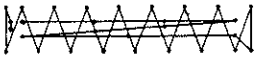
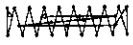
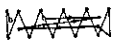



[LK3-B431E]

# CONTENTS

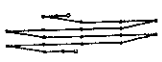
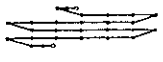
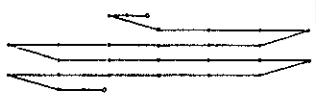
# 1. SPECIFICATIONS

- There are twelve standard sewing patterns.
  For each specification, patterns to be sewn are limited as shown in the table below. (All programs are possible as long as pattern to be sewn is smaller than the work clamp and feed plate.)

| Specification | Application | Program No. | Pattern to be sewn | No. of stitches | Standard bar tacking length | Standard bar tacking width | Sewing speed |
|---|---|---|---|---|---|---|---|
| -1 | For general clothing | 01 |  | 42 | 16 mm | 2 mm | ○◎ 1,700 - 2,000 spm |
| | | 04 |  | 30 | 16 mm | 2 mm | |
| -5 | | 05 |  | 29 | 10 mm | 2 mm | |
| | | 08 |  | 21 | 7 mm | 2 mm | |
| -2 | For denim | 02 |  | 42 | 20 mm | 3 mm | 1,700 - 2,500 spm |
| | | 03 |  | 35 | 20 mm | 3 mm | |
| | | 06 |  | 29 | 16 mm | 3 mm | |
| -7 | For knitwear | 07 |  | 28 | 8 mm | 2 mm | ◎ 1,700 - 2,000 spm |
| | | 09 |  | 21 | 7 mm | 2 mm | |

◎ To prevent thread breakage due to heat, set the sewing speed to a maximum of 2,000 spm for sewing general clothing and knitwear.
○ Standard work clamp and feed plate for specifications -1 and -5 are different from those used on other machines.

<Straight stitches>

| Program No. | Pattern to be sewn | No. of stitches | Standard bar tacking length | Standard bar tacking width |
|---|---|---|---|---|
| 10 |  | 21 | 10 mm | — |
| 11 |  | 28 | 10 mm | — |
| 12 |  | 28 | 20 mm | — |

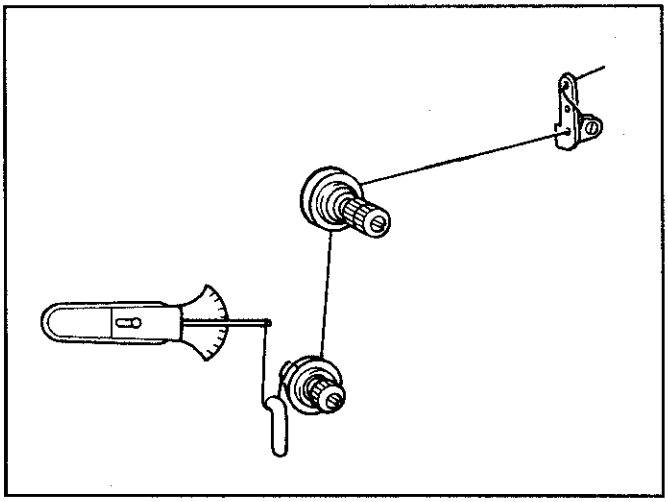
- If you want to sew a pattern other than one of the standard 12 patterns, you can create an original pattern using the BAS-PC/300.
  Consult with your nearest Brother Office for details.

# 2. STANDARD THREAD TENSION

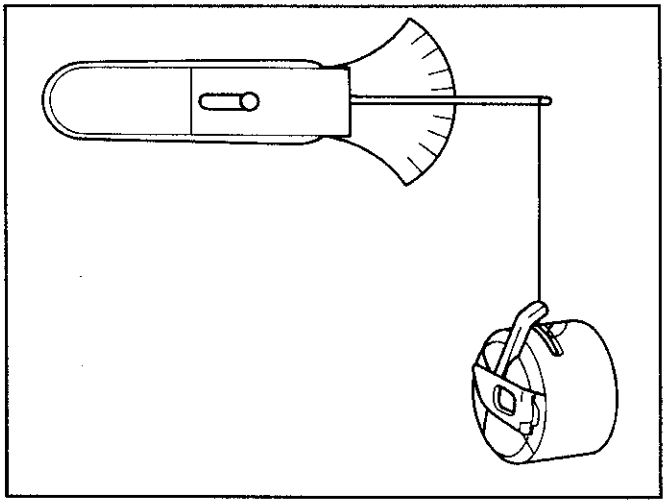
| Specification | | -1, -5 | -2 | | -7 |
|---|---|---|---|---|---|
| Main application | | General clothing | Denim | | Knitwear |
| | | | Needle thread #20 | Needle thread #30 | |
| Needle thread tension | (gf) | 60 - 120 | 170 - 220 | 110 - 150 | 80 - 130 |
| Lower thread tension | (gf) | 20 - 30 | 20 - 30 | 20 - 30 | 20 - 30 |
| Spring height (stroke) | (mm) | 6 - 8 | 8 - 10 | 8 - 10 | 6 - 8 |
| Spring tension | (gf) | 40 - 60 | 150 - 200 | 150 - 200 | 40 - 60 |
| Pretension | (gf) | 10 - 15 | 30 - 50 | 30 - 50 | 15 - 30 |

■ Measuring tension

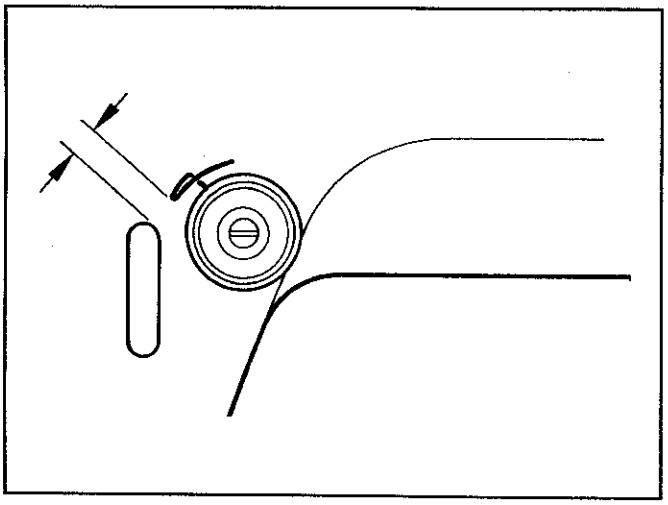
Needle thread tension



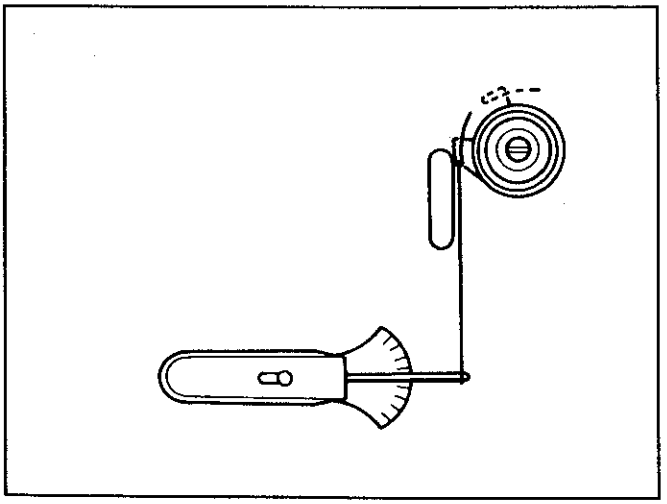
Lower thread tension



Spring height



Spring tension

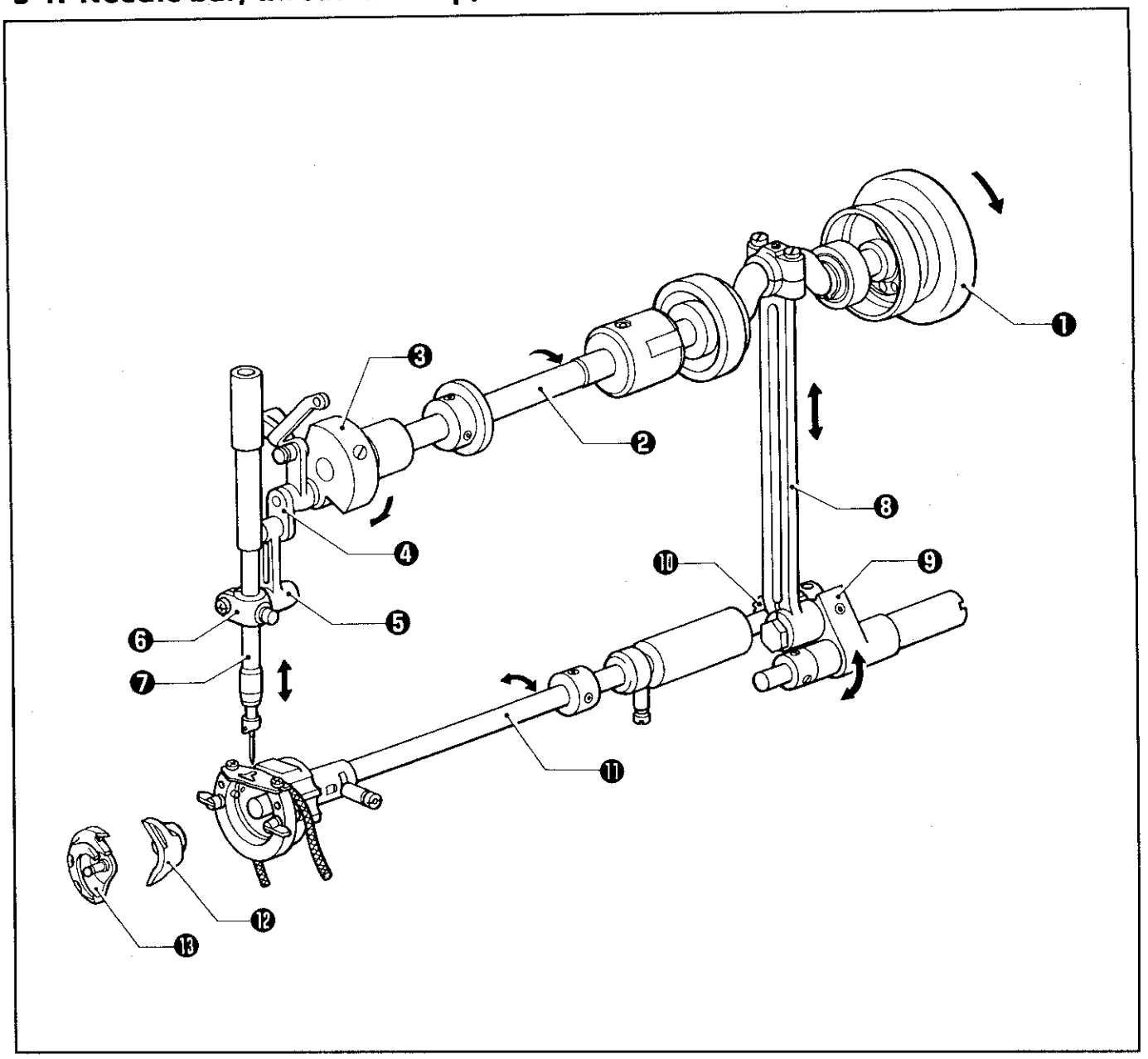


Measure the value when the spring is lowered to the arm thread guide.

※ When the spring height (stroke) is great or the spring tension is insufficient, it may cause the thread end length to vary after thread trimming.

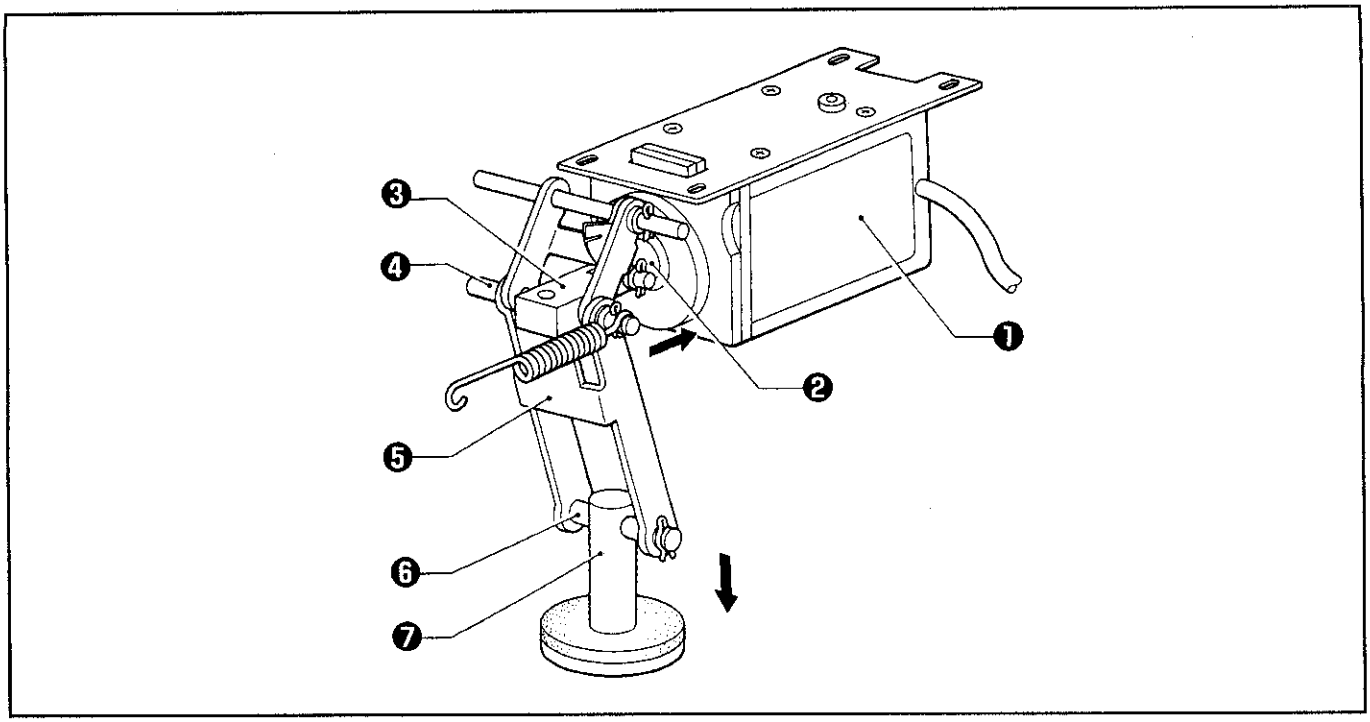
# 3. MECHANICAL DESCRIPTIONS

## 3-1. Needle bar, thread take-up, lower shaft and shuttle race mechanisms



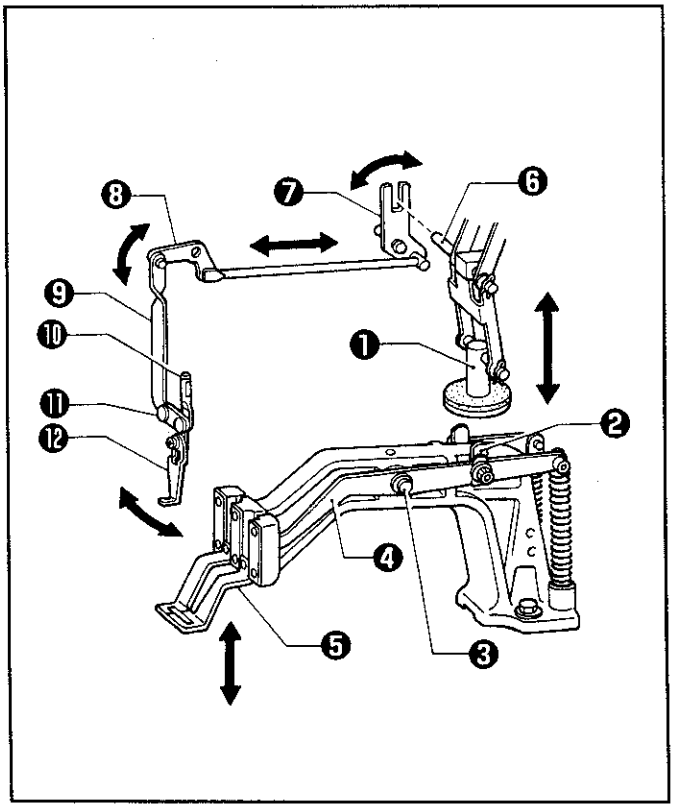

1. When the pulley ❶ rotates in the direction of the arrow, the motion is transmitted to the counter weight ❸ through the upper shaft ❷.
2. The needle bar crank ❹ attached to the counter weight ❸ moves the thread take-up lever ❺.
3. The needle bar crank ❻ moves the needle bar ❼ up and down via the thread take-up lever ❺.
4. When the pulley ❶ rotates in the direction of the arrow, the eccentric portion of the upper shaft ❷ causes the crank rod ❽ to move up and down.
5. The crank rod ❽ moves the rock gear ❾ back and forth.
6. The motion of the rock gear ❾ causes the lower shaft gear ❿ to oscillate. Resultantly, the driver ⓬ and the inner rotary hook ⓭ in the shuttle hook mechanism oscillate.

## 3-2. Work clamp lifter mechanism



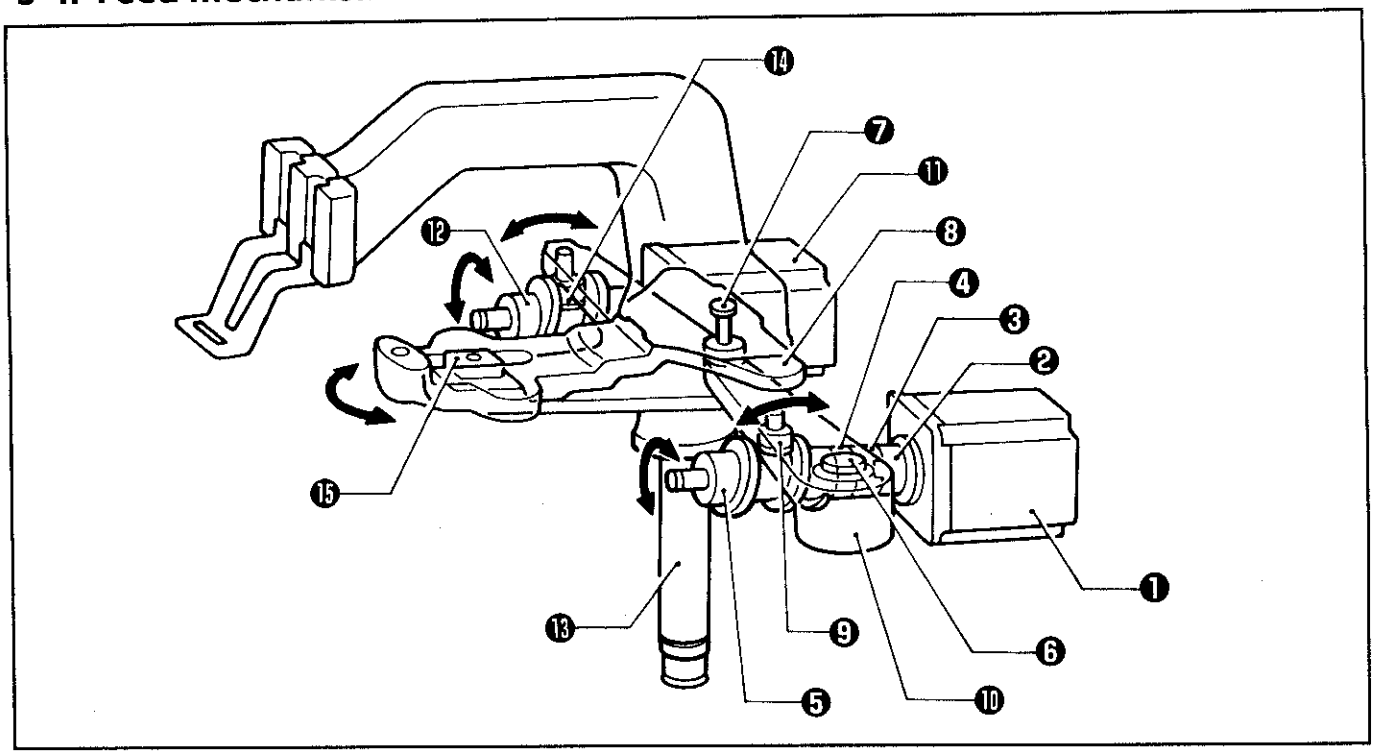

1. When the presser signal is on, the presser solenoid ❶ operates.
2. The plunger ❷ moves in the direction of the arrow, and consequently link C ❸, link shaft B ❹, and link B ❺ move.
3. Link B ❺ presses the presser plate ❼ down via link shaft C ❻.

## 3-3. Work clamp lifter and thread wiper mechanisms




1. When the presser plate ❶ lowers, the presser arm lever plate ❷ is pressed down, presser arm levers R and L ❹ pivot on the presser arm lever shaft ❸, and work clamps R and L ❺ rise.
2. When the presser plate ❶ lowers, the motion is transmitted to the thread wiper driving lever ❼, the thread wiper rod assembly ❽, and the thread wiper link ❾ via link shaft B ❻, and the thread wiper arm ⓫ and the thread wiper ⓬ operate via the thread wiper arm support ❿.
3. When the presser solenoid is turned off, the presser plate ❶ rises, and work clamps R and L ❺ lower. Simultaneously, the thread wiper ⓬ operates in the opposite direction.

## 3-4. Feed mechanism




(Y direction)

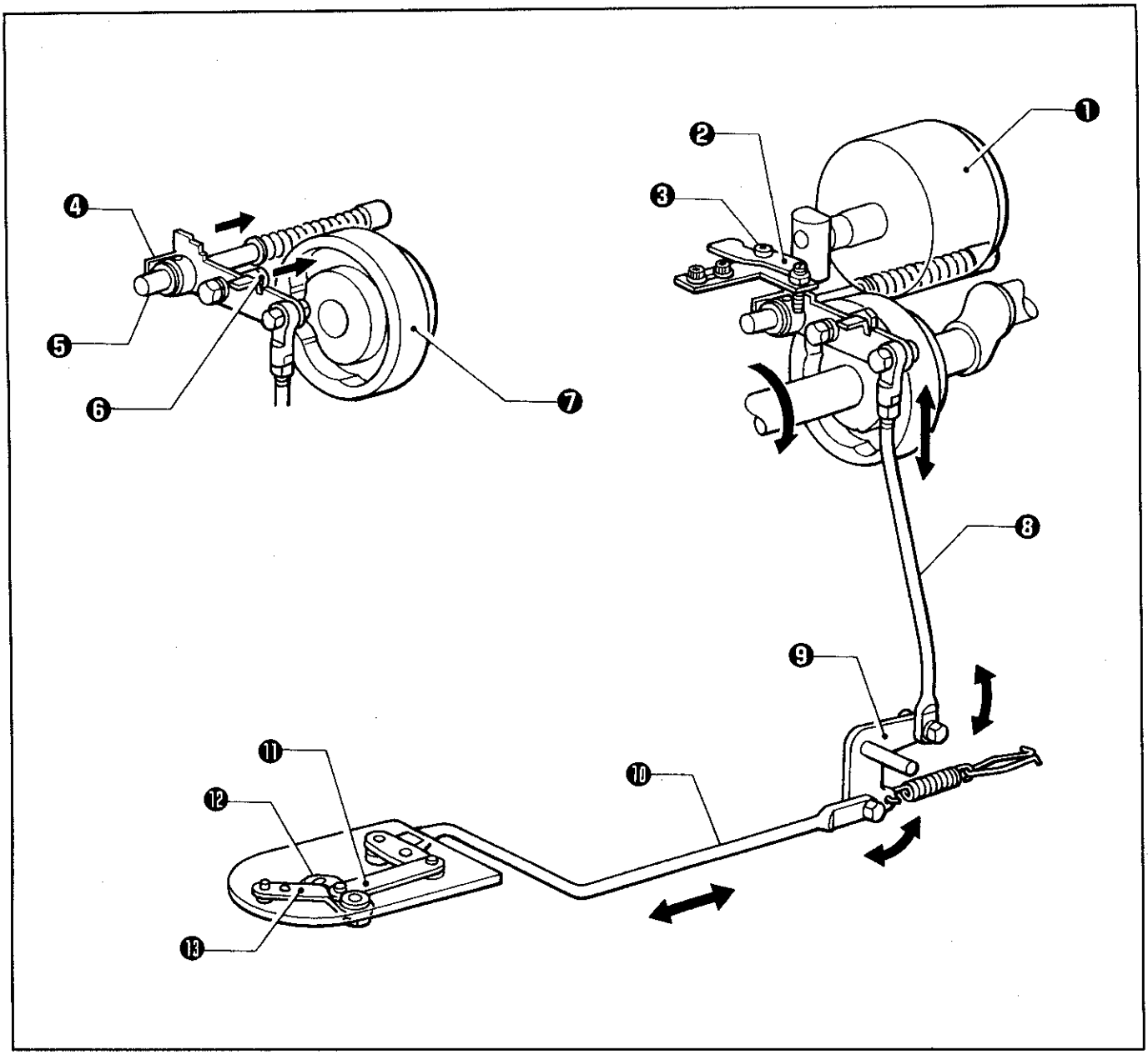
1. When the Y-pulse motor ❶ operates, coupling hub 6.35 ❷, the coupling spacer ❸, and coupling hub 8 ❹ transmit the motion to feed cam Y ❺.
2. Feed cam Y ❺ is connected to the Y-feed lever ⓾ pivoting on the tack width lever shaft ❻, which is connected to the feed bracket ❽ with the tack width lever ❼, via the feed cam roller ❾.
3. The motion of the Y feed lever ⓾ is transmitted to the feed bracket ❽ via the tack width lever shaft ❻.

(X direction)

1. The motion of the X-pulse motor ⓫ is transmitted to feed cam X ⓬ with the same couplings as for Y direction.
2. One end of the X feed lever ⓭ is positioned on feed cam X ⓬ along with the feed cam roller ⓮, and the other is attached to the feed bracket ❽ along with the slide block ⓯. When feed cam X ⓬ moves, the feed bracket ❽ oscillates, pivoting on the tack width lever shaft ❼.

Sewing patterns are created through combinations of X and Y movements shown above.

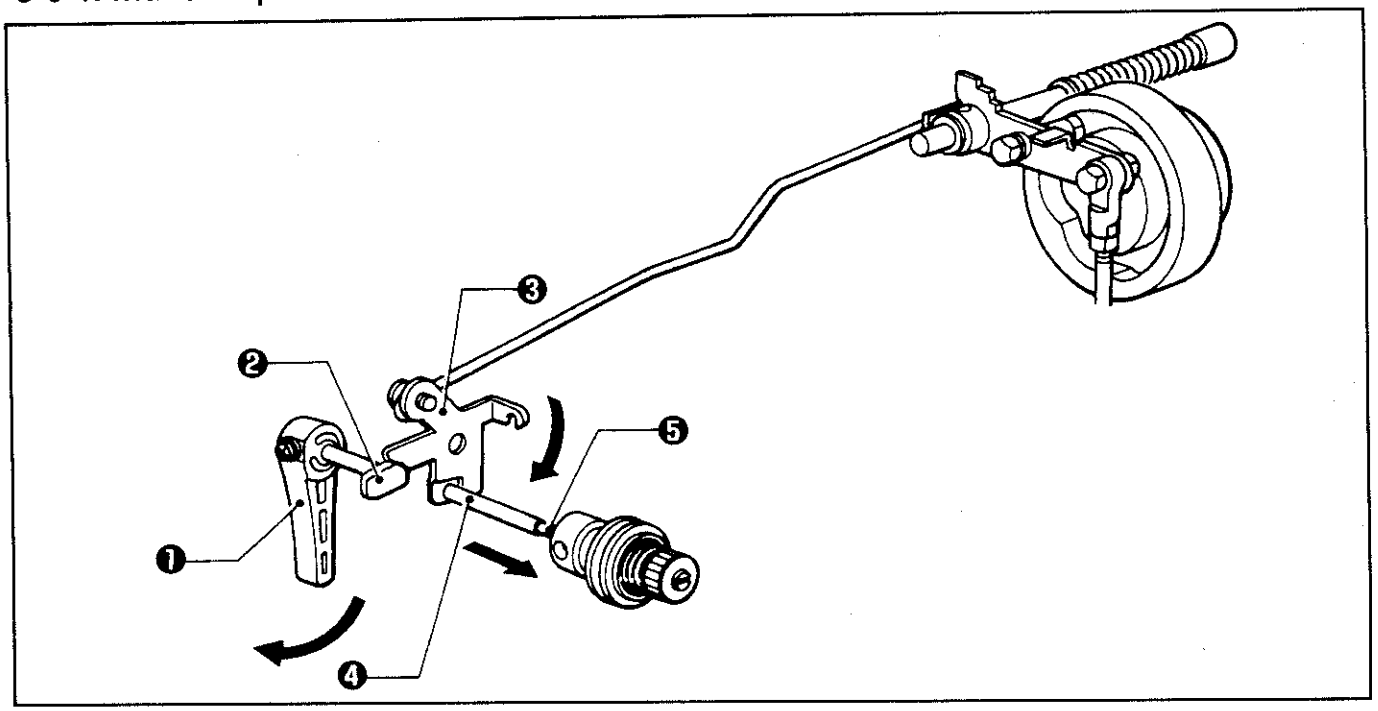
## 3-5. Thread trimmer mechanism




1. When the thread trimming signal is on, the thread trimming solenoid ❶ pushes the pushing lever driving lever ❷.
2. The pushing lever driving lever ❷ which pivots on the shoulder screw ❸, pushes the thread trimmer driving lever ❹ in the direction of the arrow, and slides on the driving lever shaft ❺.
3. The roller ❻ attached to the thread trimmer driving lever ❹ is inserted into the groove of the thread trimmer cam ❼, and the thread trimmer rod ❽ operates.
4. The thread trimmer rod ❽ moves the connecting rod lever ❿ via the thread trimmer lever ❾.
5. The thread trimmer connecting rod ⓫ attached to the connecting rod lever ❿ operates, and the movable knife ⓬ slides on the fixed knife ⓭ to trim the thread.

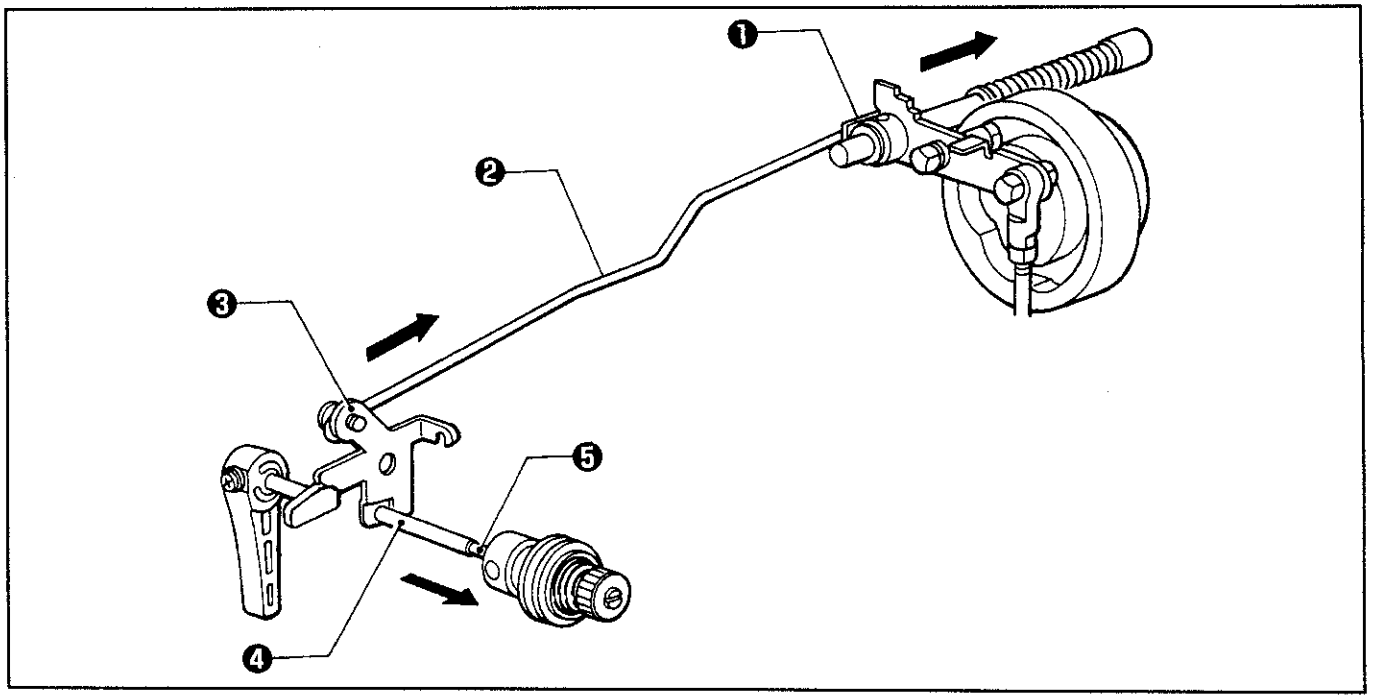
## 3-6. Thread nipper mechanism

### 3-6-1. Manual operation




1. When the presser bar lifter lever ❶ is turned in the direction of the arrow, the presser bar lifter crank ❷ makes contact with the tension release lever ❸, pushing the tension release bar ❹.
2. The end of the tension release bar ❹ pushes the pin ❺.

### 3-6-2. In thread trimming



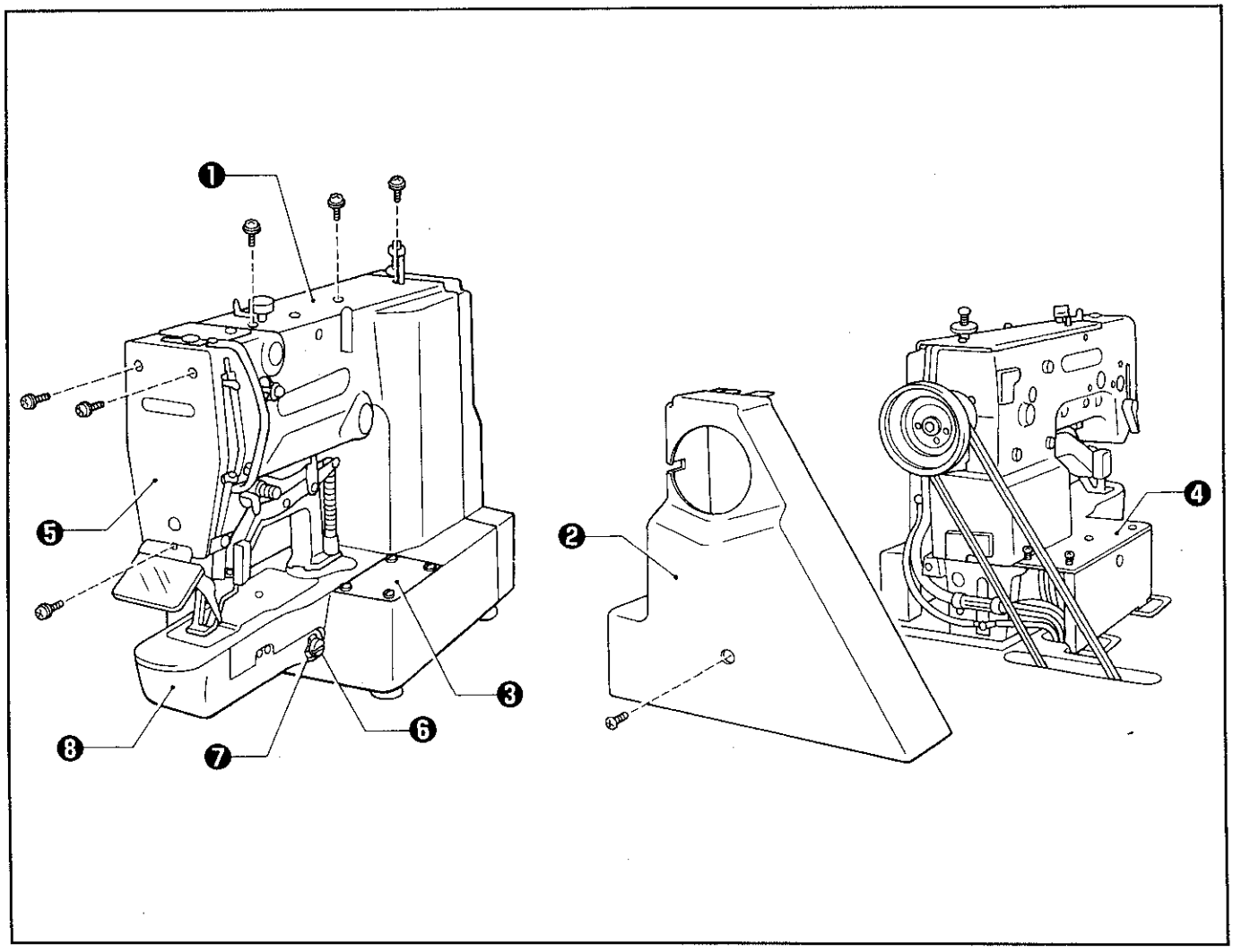

1. When the thread trimming signal is on, the thread trimmer driving lever ❶ is pushed in the direction of the arrow.
2. The thread trimmer driving lever ❶ moves the tension release lever ❸ via the tension release rod ❷.
3. The tension release lever ❸ pushes the tension release bar ❹.
4. The end of the tension release bar ❹ pushes the pin ❺.

# 4. DISASSEMBLY

## ⚠ CAUTION

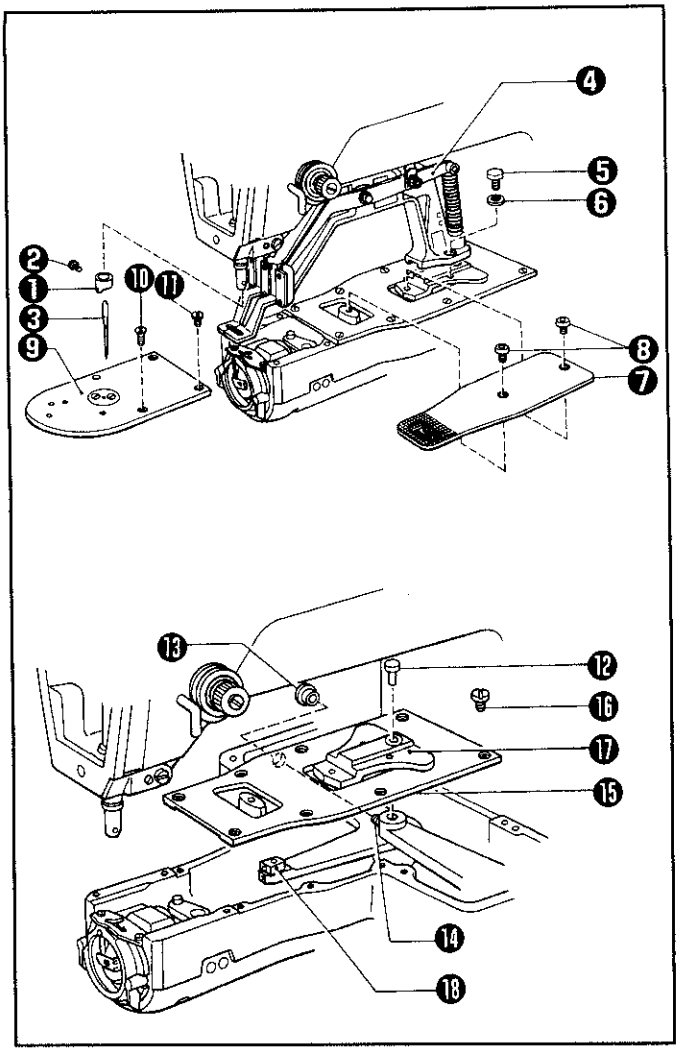
- Turn off the power switch before disassembly, otherwise the machine may operate if the foot switch is depressed by mistake, which could result in injury.
- Disassembly should only be carried out by a qualified technician.
- Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation may result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they may cause vomiting and diarrhea.
  Keep the oil out of the reach of children.
- Use only the proper replacement parts as specified by Brother.
- If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.
- Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

## 4-1. Covers



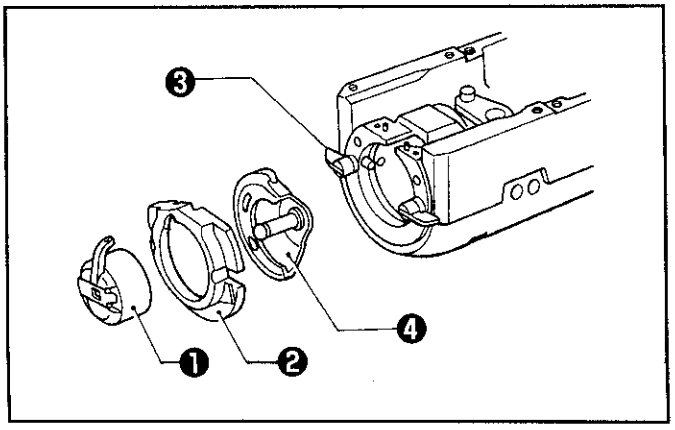

1. Remove the screws and the top cover ❶.
2. Remove the screws, the belt cover ❷, and bed covers (R) ❸ and (L) ❹.
3. Remove the screws and the face plate ❺.
4. Remove the stud screw ❻ and the washer ❼ on each side, and the large shuttle cover ❽.

## 4-2. Presser arm mechanism



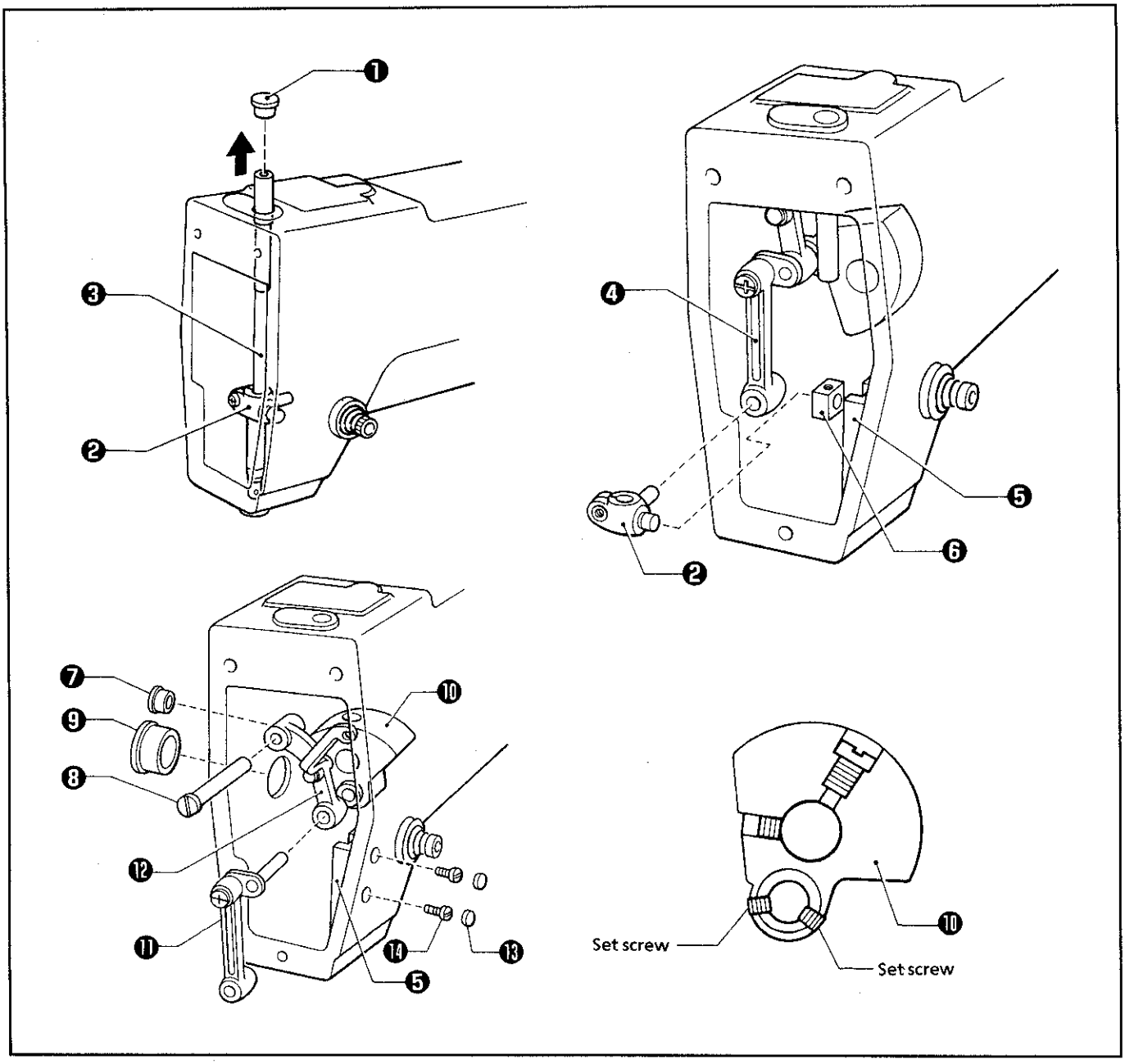

1. Remove the set screw ❷, the needle ❸ and the needle bar thread guide ❶.
2. Remove the bolt ❺ and the washer ❻ on each side, and the presser arm ❹.
3. Remove the two screws ❽ and the feed plate ❼.
4. Remove the two flat screws ❿, the two screws ⓫, and the needle plate ❾.
5. Remove the rubber cap ⓭, the set screw ⓮, and the tack width feed shaft ⓬.
6. Remove the eight screws ⓰, and the feed bar guide plate ⓯ along with the feed bracket ⓱. Pay attention not to let the ball bearing fall.
7. Remove the slide block ⓲ from the pin.

## 4-3. Shuttle hook mechanism



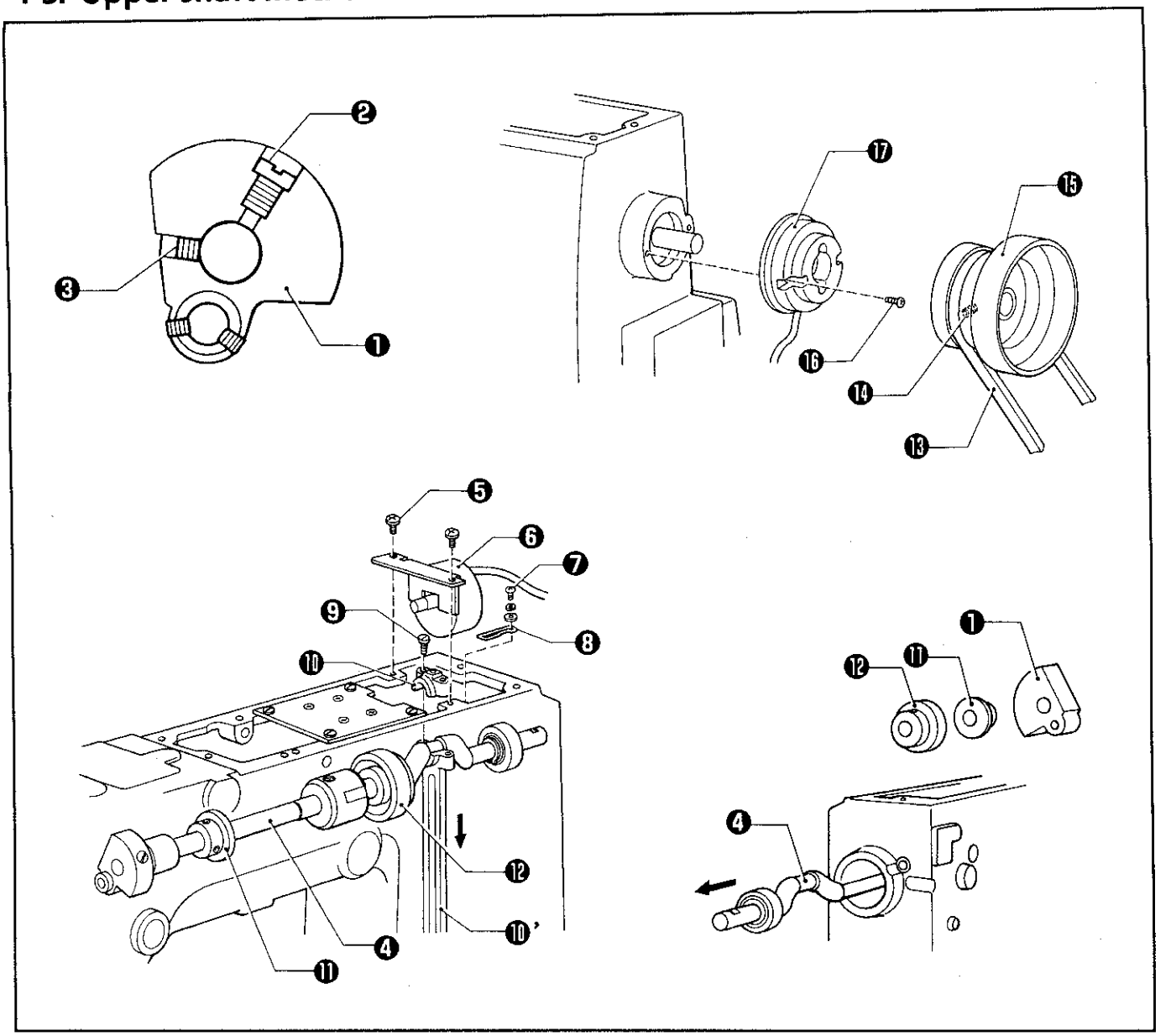

1. Remove the bobbin case ❶ by pulling its release lever.
2. Open the large shuttle hook set claw ❸ on each side, and remove the large shuttle hook ❷ along with the inner rotary hook ❹.

## 4-4. Needle bar mechanism



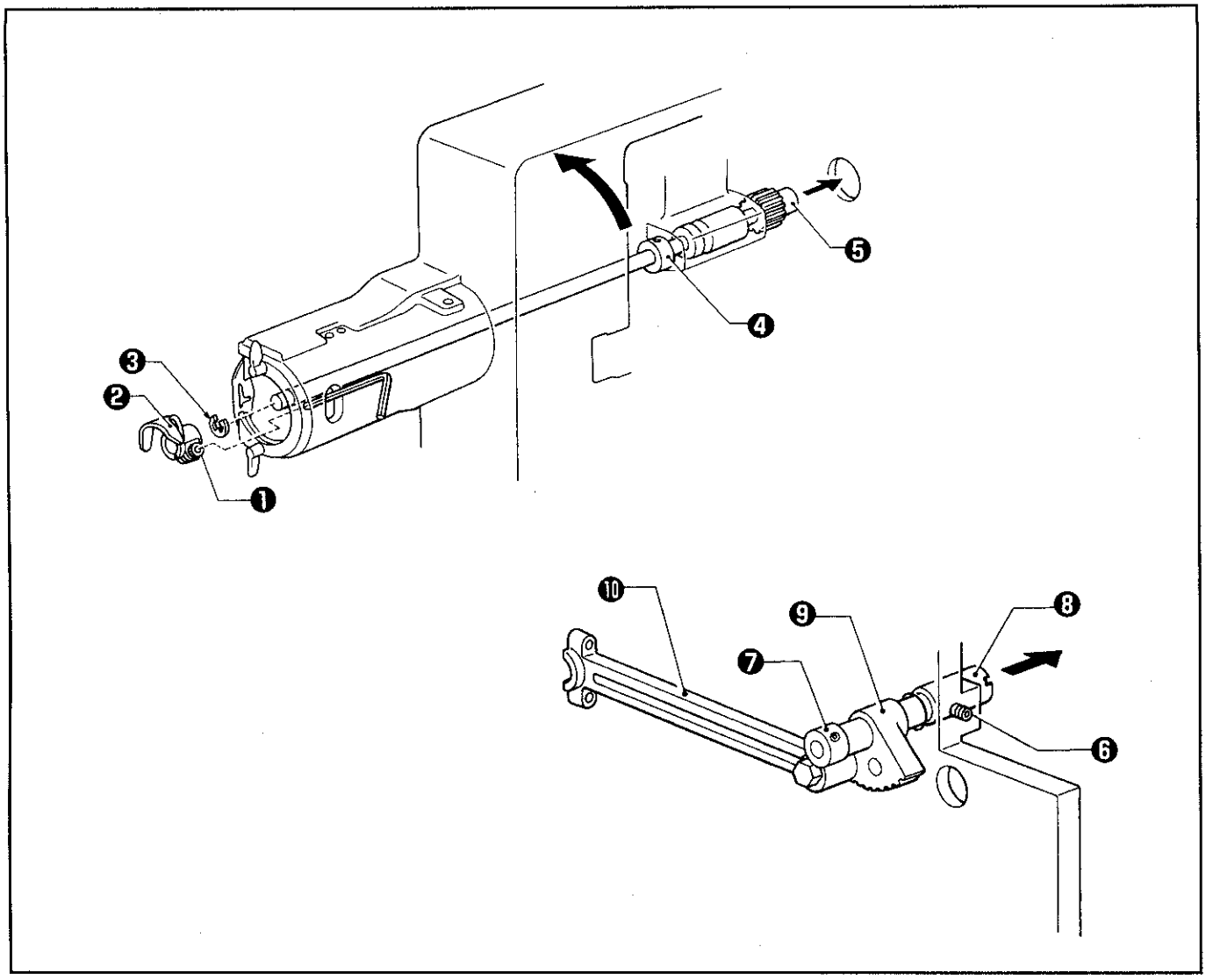

1. Remove the rubber cap ❶.
2. Loosen the screw of the needle bar clamp ❷, and remove the needle bar ❸ through the machine top.
3. Remove the needle bar clamp ❷ from the thread take-up lever ❹.
   (Remove the needle bar guide slide block ❻ from the needle bar guide ❺.)
4. Remove the rubber cap ❼, loosen the set screw, and remove the thread take-up support stud ❽.
5. Remove the oil cap ❾, loosen the set screw of the counter weight ❿, and remove the thread take-up lever ⓫.
   (The thread take-up assembly ⓬ will come off.)
6. Remove the rubber cap ⓭, the screw ⓮, and the needle bar guide ❺.
   (Do not remove them if possible to prevent the machine from overheating due to needle bar rubbing.)

## 4-5. Upper shaft mechanism



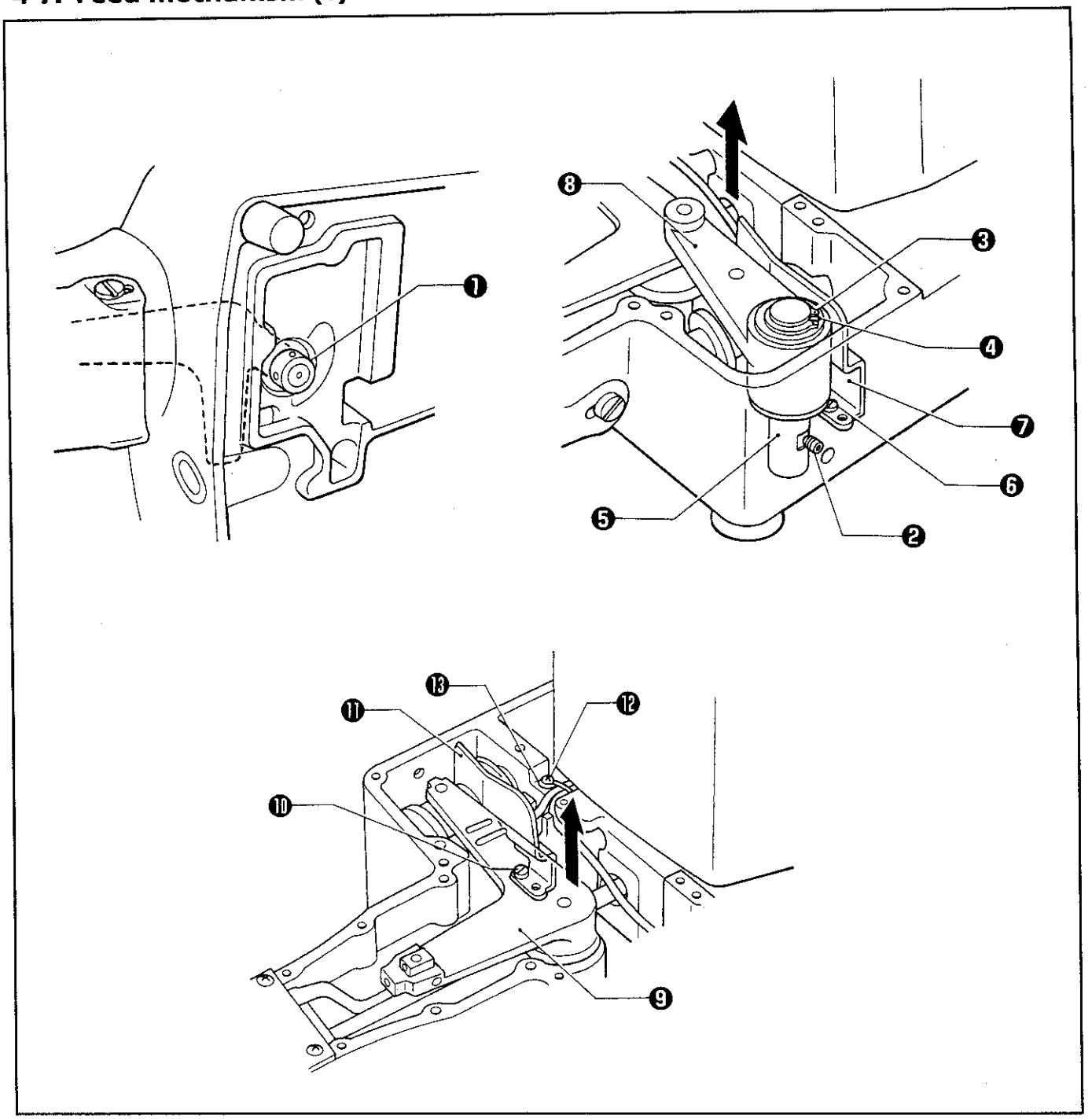

1. Loosen the screw ❷ and the set screw ❸ of the counter weight ❶.
   (The screw ❷ should be loosened until its end comes off the upper shaft ❹.)
2. Remove the screw ❺, and the thread trimming solenoid ❻.
3. Remove the screw ❼, and the wick support ❽.
4. Remove the screw ❾, and the crank rod ❿.
   (At this time, lower the crank rod ❿' in the direction of the arrow.)
5. Loosen the set screws of the bobbin winder pulley ⓫ and the thread trimmer cam ⓬.
6. Remove the V belt ⓭, loosen the set screw ⓮, and remove the pulley ⓯.
7. Remove the screw ⓰ and the synchronizer ⓱.
8. Remove the upper shaft ❹ in the direction of the arrow.
   After that, remove the counter weight ❶, the bobbin winder pulley ⓫, and the thread trimmer cam ⓬ from the upper shaft ❹, in this order.

## 4-6. Lower shaft mechanism



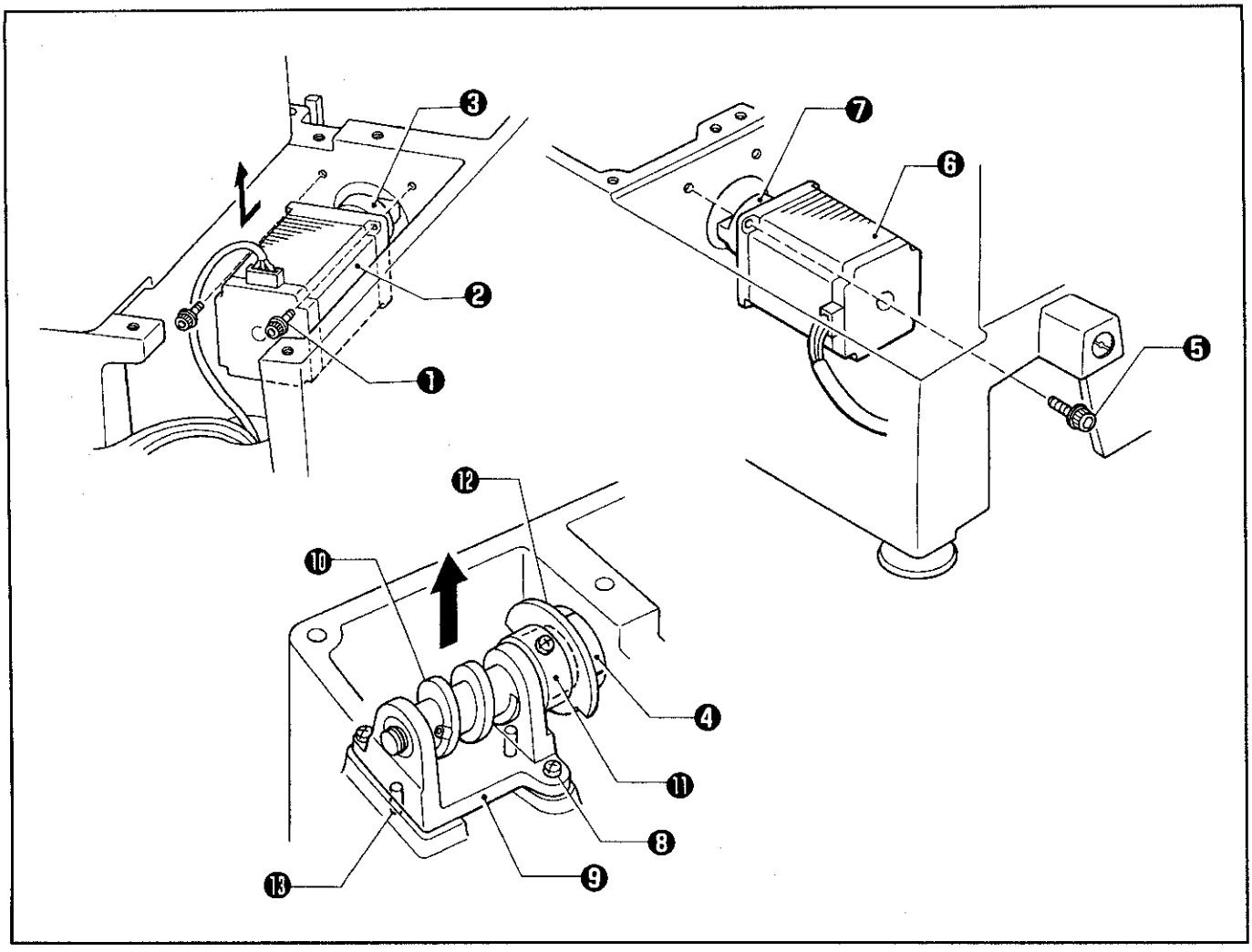

1. Tilt the machine head until it stops.
2. Loosen the screw ❶, and remove the driver ❷ and the retaining ring ❸.
3. Loosen the set screw of the set screw collar ❹, and remove the lower shaft assembly ❺ from the rear of the machine.
4. Loosen the set screw ❻.
5. Loosen the set screw of the set screw collar ❼, and remove the rock gear shaft ❽ from the rear of the machine.
6. Remove the set screw collar ❼, the rock gear ❾, and the crank rod ❿.

## 4-7. Feed mechanism (1)



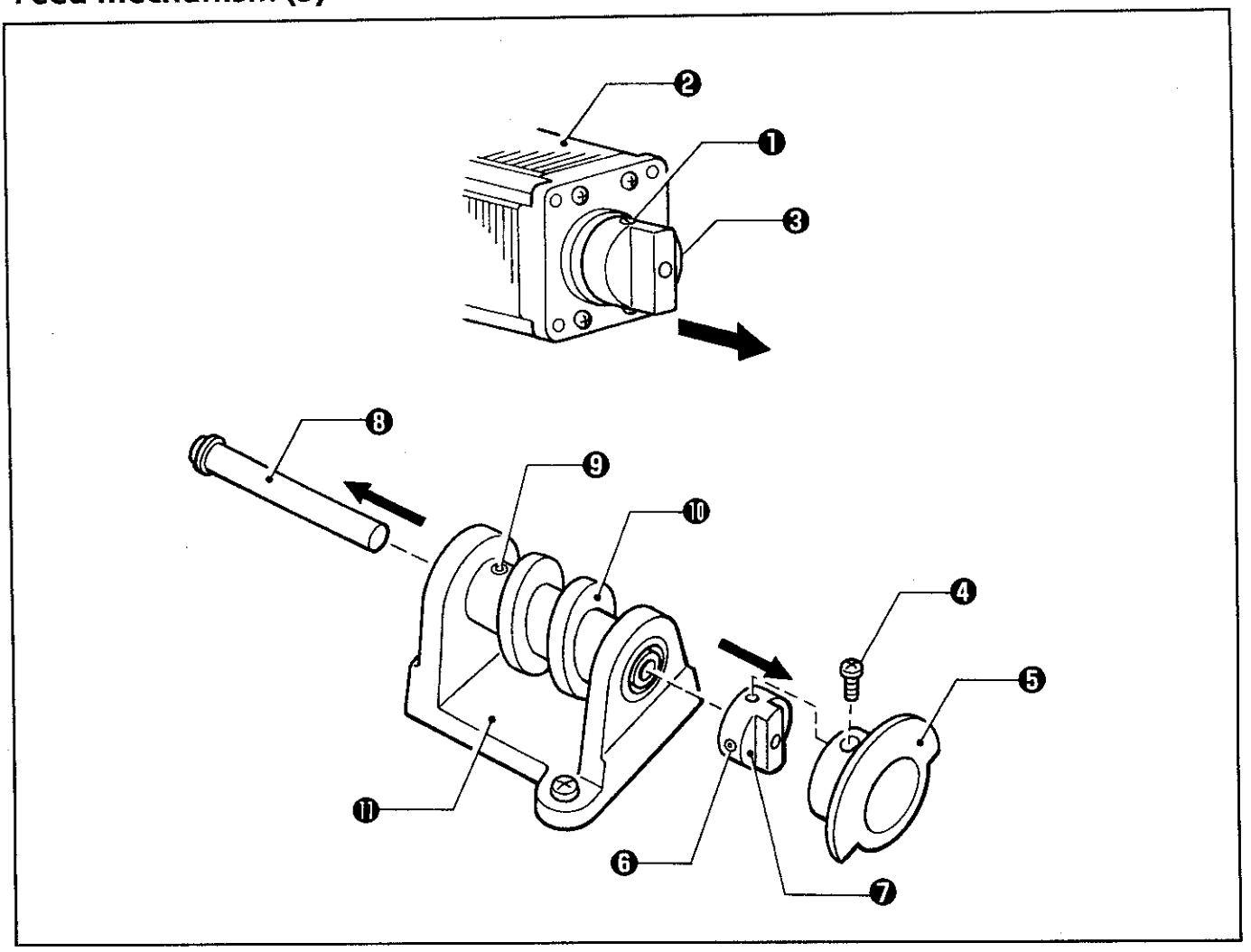

1. With the machine head tilted, loosen the set screw of the set screw collar ❶, and remove the latter.
2. Return the machine to its original position.
3. Loosen the set screw ❷, and remove the tack width lever shaft ❺ and the washer ❹ from above.
   (When the tack width lever shaft ❺ is not removed, remove the retaining ring ❸ and the washer ❹.)
4. Remove the Y feed lever ❽ by lifting it in the direction of the arrow.
   (Remember to remove the washer ❹ under the Y feed lever ❽.)
5. Remove the screw ❻, and home position sensor Y ❼.
6. Remove the X feed lever ❾ by lifting it in the direction of the arrow.
7. Remove the screw ❿ and home position sensor X ⓫.
8. Remove the screw ⓬, the cord support ⓭, and home position sensors Y ❼ and X ⓫.

## Feed mechanism (2)



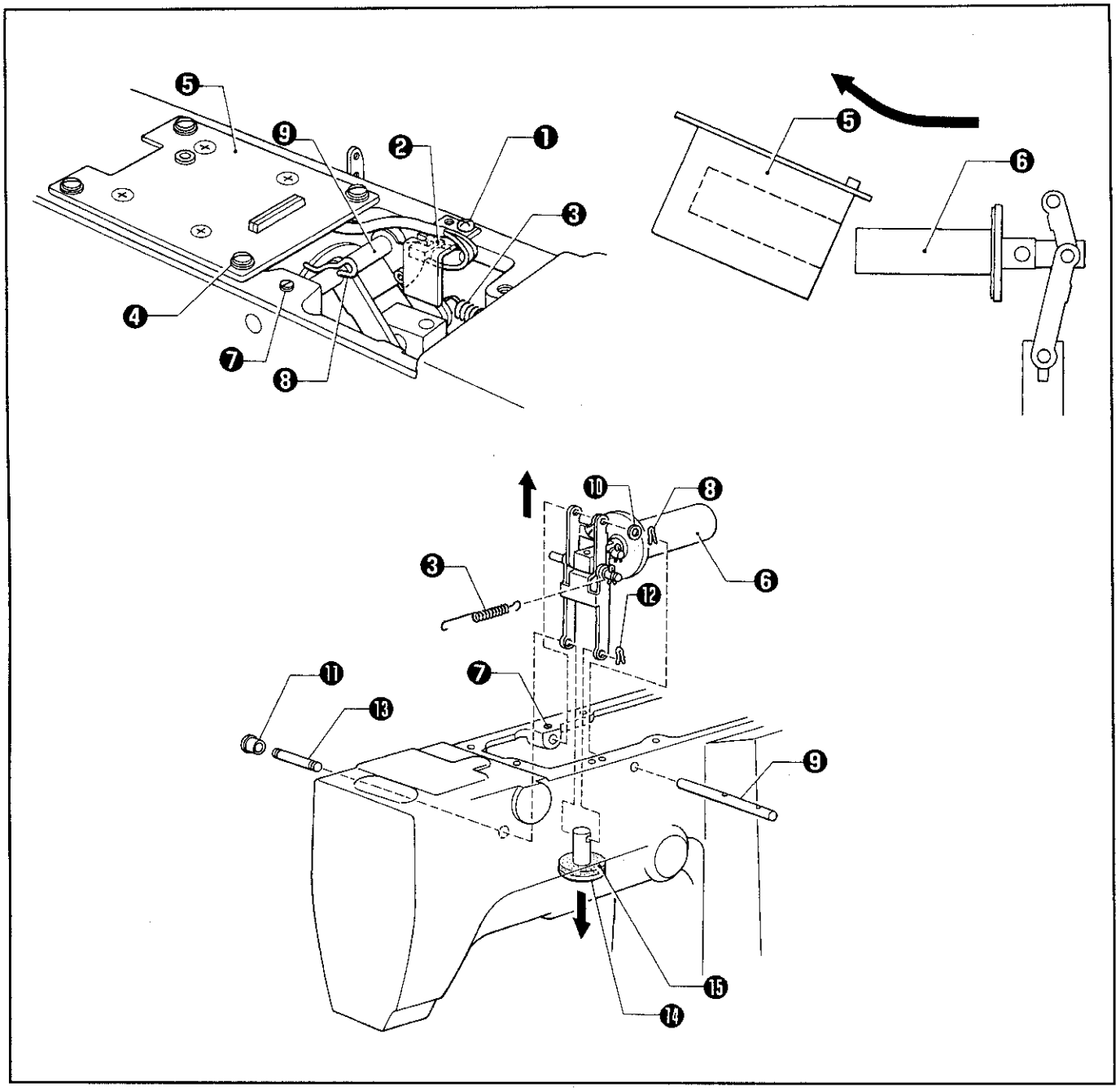

1. Remove the screw ❶, the X-pulse motor assembly ❷, coupling hub 6.35 ❸, and the coupling spacer ❹.
2. Tilt the machine head until it stops.
3. Remove the screw ❺, the Y-pulse motor assembly ❻, coupling hub 6.35 ❼, and the coupling spacer ❹.
4. Return the machine head to its original position.
5. For the X direction, remove the screw ❽, the feed cam bracket ❾, feed cam X ❿, coupling hub 8 ⓫, and the feed home position dog ⓬ by lifting them from above.
6. Remove the locator pin ⓭.
7. Repeat steps 5 and 6 for the Y direction.

## Feed mechanism (3)



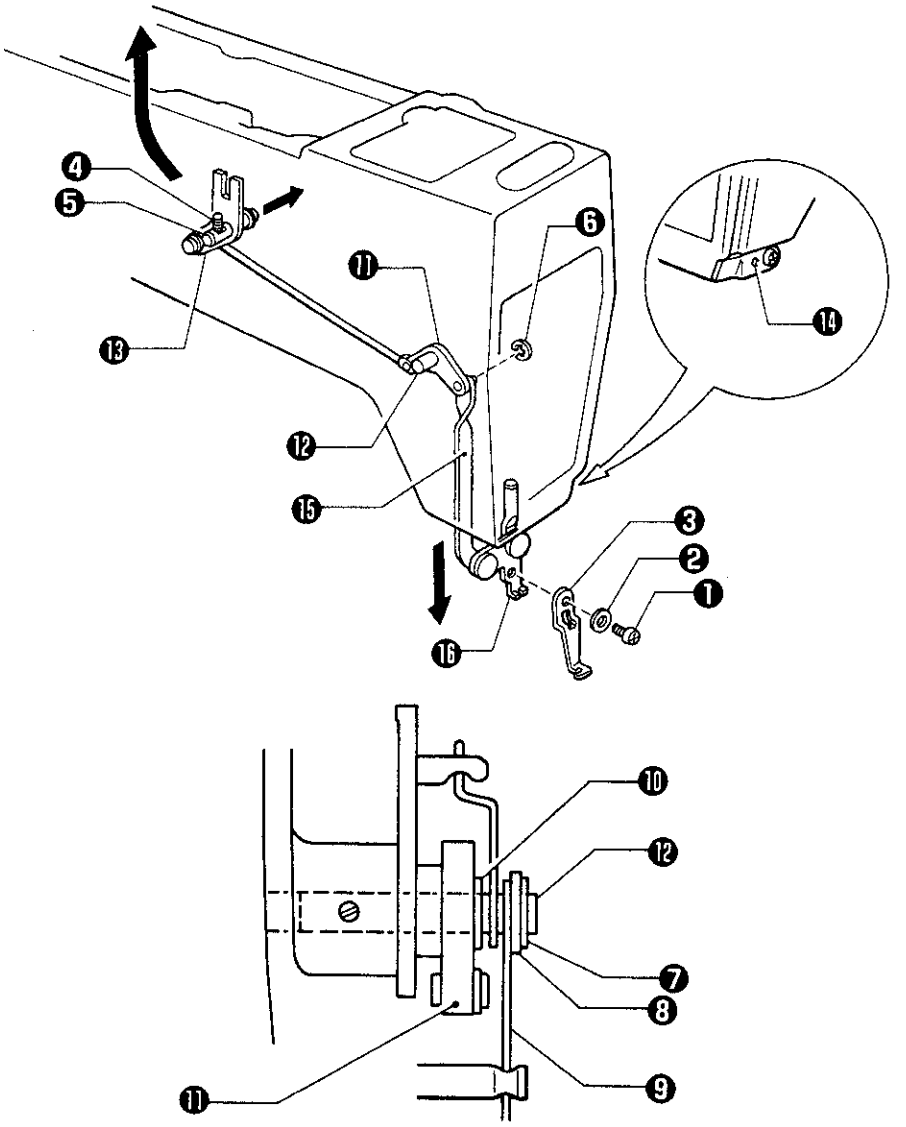

1. Loosen the set screw ❶, and remove coupling hub 6.35 ❸ from the shaft of the pulse motor ❷.
2. Remove the screw ❹, and the feed home position dog ❺ from coupling 8 ❼.
3. Loosen the set screw ❻, and remove coupling hub 8 ❼ from the cam shaft ❽.
4. Loosen the set screw ❾, and remove the cam shaft ❽.
5. Remove the feed cam ❿ from the feed cam bracket ⓫.

## 4-8. Presser mechanism



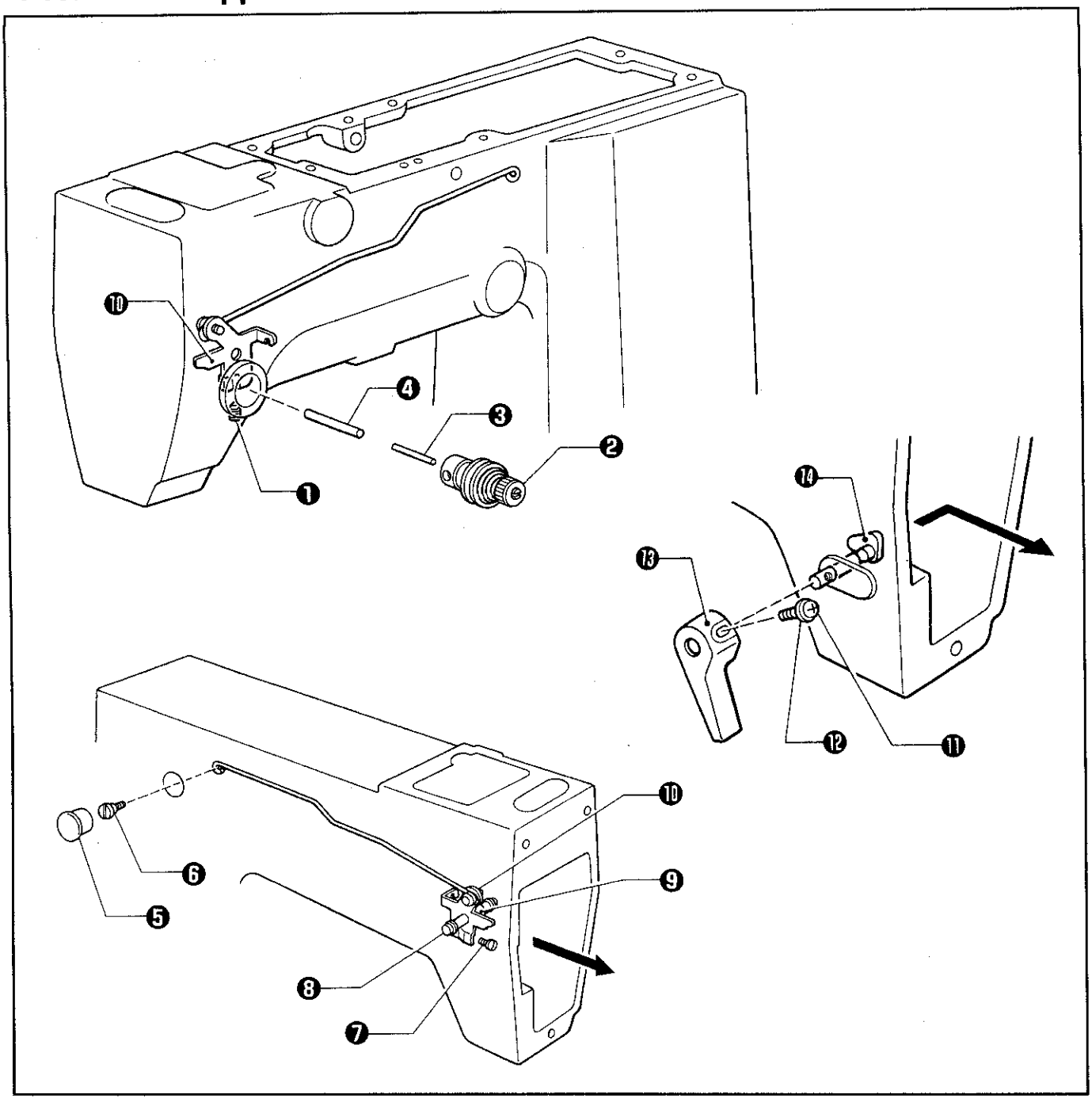

1. Remove the screw ❶ and the sewing clamp sensor ❷.
2. Remove the spring ❸.
3. Remove the screw ❹, and the presser solenoid ❺ from the plunger ❻ by lifting the latter from above.
   Be sure to hold the plunger securely so that it does not fall.
4. Loosen the set screw ❼, and remove the snap pin ❽, link shaft A ❾, and the washer ❿.
5. Remove the rubber cap ⓫, the snap pin ⓬, and link shaft C ⓭.
   Be sure to hold the presser plate ⓮ and the presser bar lifter lever rubber ⓯ so that they do not fall.
6. Remove all parts connected to the plunger ❻ by lifting them upward.

## 4-9. Thread wiper mechanism



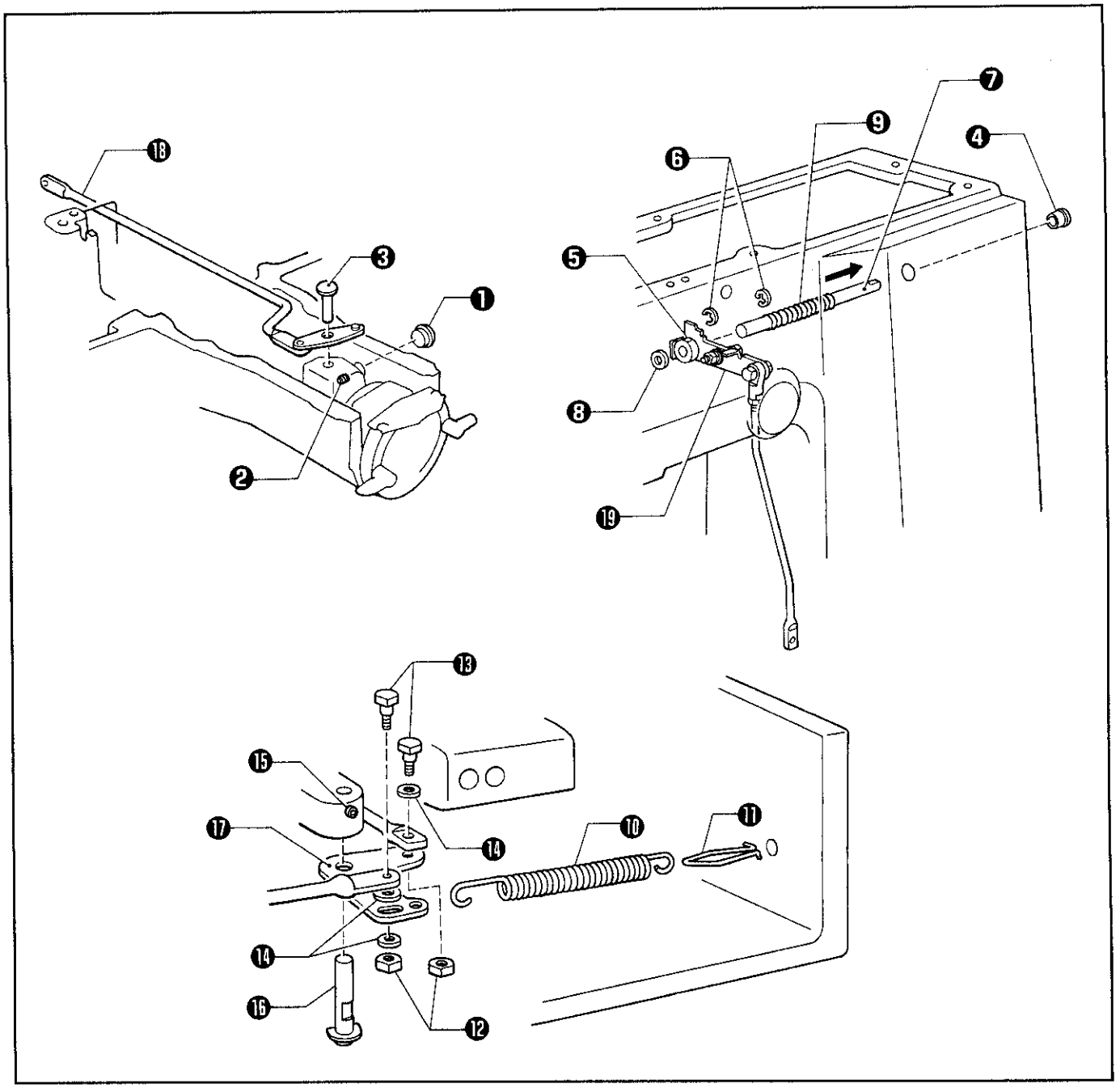

1. Remove the screw ❶, the washer ❷, and the thread wiper ❸.
2. Loosen the set screw ❹, and remove the thread wiper shaft ❺.
3. Remove the retaining ring ❻.
4. Remove the retaining ring ❼, the washer ❽, the spring ❾, and the retaining ring ❿. Then remove the thread wiper rod assembly ⓫ from the presser bar lifter lever shaft ⓬.
5. Remove the thread wiper assembly ⓫ and the thread wiper driving lever ⓭ by lifting them upward.
6. Loosen the set screw ⓮, and remove the thread wiper link ⓯ and the thread wiper arm ⓰ by pulling them downward.

## 4-10. Thread nipper mechanism




1. Loosen the set screw ❶, and remove the thread tension assembly ❷, the pin ❸, and the tension release bar ❹.
2. Remove the rubber cap ❺ and the stud screw ❻.
3. Loosen the set screw ❼, and remove the presser bar lifter lever shaft ❽ and collar 13 ❾.
4. Remove the tension release lever ❿ in the direction of the arrow.
5. Remove the screw ⓫, the washer ⓬, and the presser bar lifter lever ⓭.
6. Remove the presser bar lifter crank ⓮ in the direction of the arrow.

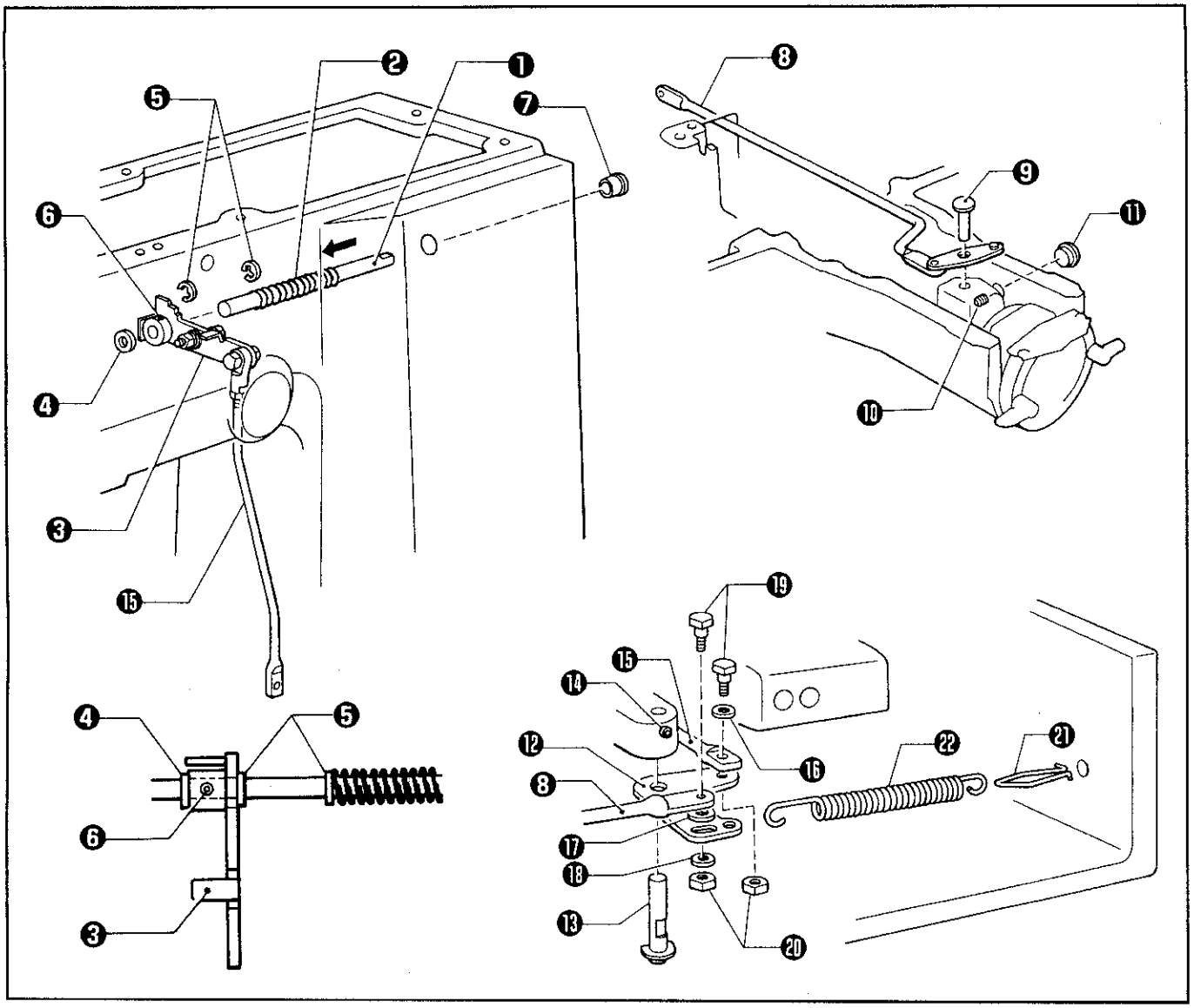
## 4-11. Thread trimmer mechanism




1. Remove the rubber cap ❶, loosen the set screw ❷, and remove the connecting rod lever shaft ❸.
2. Remove the oil cap ❹, loosen the set screw ❺, and remove the retaining ring ❻.
3. Remove the driving lever shaft ❼ by pulling it in the direction of the arrow. Then remove the cushion ❽ and the spring ❾ from the shaft.
4. Tilt the machine head until it stops.
5. Remove the thread trimmer return spring ❿ and the spring hook ⓫.
6. Remove the nut ⓬, the stud screw ⓭, and the washer ⓮.
7. Loosen the set screw ⓯, and remove the lever shaft ⓰ and the thread trimmer lever ⓱.
8. Return the machine head to its original position, and remove the connecting rod lever ⓲ and the thread trimmer driving lever ⓳.

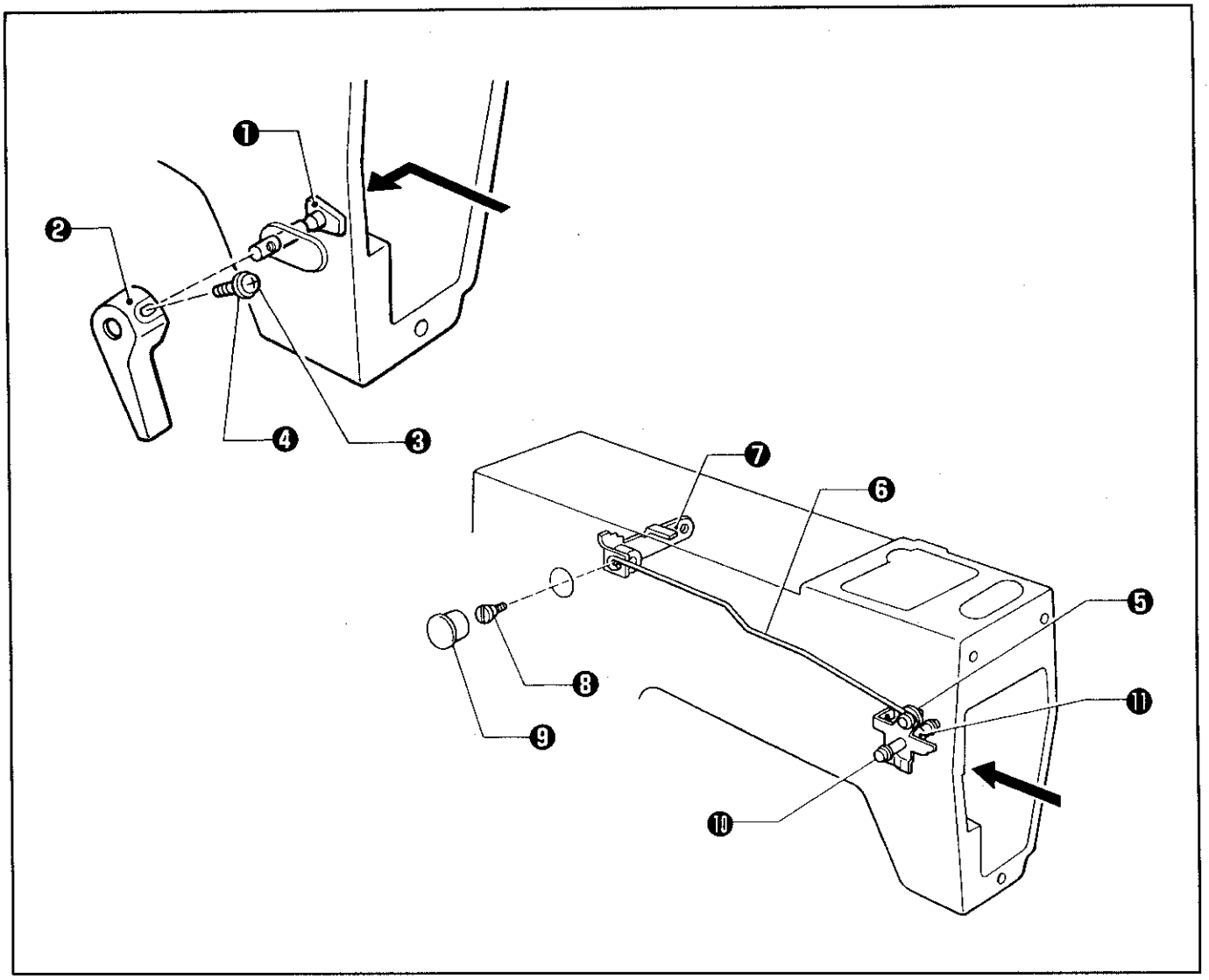
# 5. ASSEMBLY

## 5-1. Thread trimmer mechanism (1)



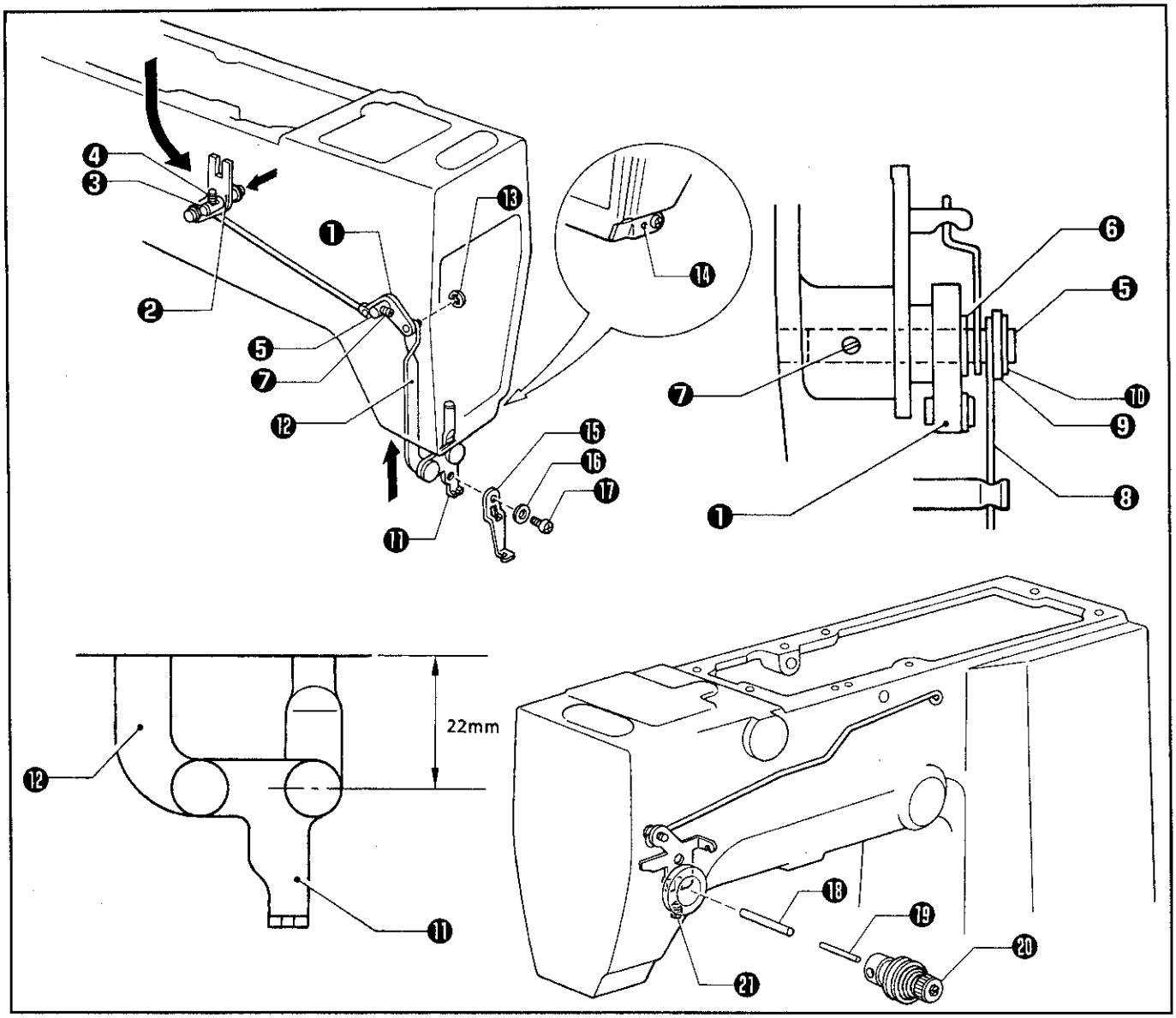
1. Insert the driving lever shaft ❶ into the machine. Place the spring ❷, the thread trimmer driving lever ❸, and the cushion ❹ on the shaft in this order.
2. Put the retaining rings ❺ on the shaft. Press the thread trimmer driving lever ❸ against the retaining rings ❺. Tighten the set screw ❻ on the screw flat.
3. Attach the oil cap ❼.
4. Insert the connecting rod lever ❽ into the machine, lightly press the connecting rod lever shaft ❾ against the former, then secure them using the set screw ❿.
5. Attach the rubber cap ⓫.
6. Tilt the machine head until it stops.
7. Pass the lever shaft ⓭ with the washer and the retaining ring, through the thread trimmer lever ⓬, and tighten the set screw ⓮ on the screw flat.
8. Attach the thread trimmer rod ⓯ and the connecting rod lever ❽ to the thread trimmer lever ⓬ using the washer ⓰, plain washer 4.37 (t = 0.8) ⓱, washer 4.76 (t = 0.5) ⓲, the stud screw ⓳, and the nut ⓴.
9. Attach the spring hook ㉑ to the inside of the machine, and connect the thread trimmer return spring ㉒ to it.
10. Return the machine head to its original position.

## 5-2. Thread nipper mechanism




1. Insert the presser bar lifter crank ❶ into the machine as shown, in the direction of the arrow, attach the presser bar lifter lever ❷ to it, and secure them using the screw ❸ and the washer ❹. (Make sure that the presser bar lifter lever ❷ moves easily.)
2. Insert the tension release lever ❺ and the tension release rod ❻ into the machine from the face plate side, and attach them to the thread trimmer driving lever ❼ using the stud screw ❽.
3. Attach the rubber cap ❾.
4. Insert the presser bar lifter lever shaft ❿ into the machine, and place the tension release lever ❺ and collar 13 ⓫ on it.

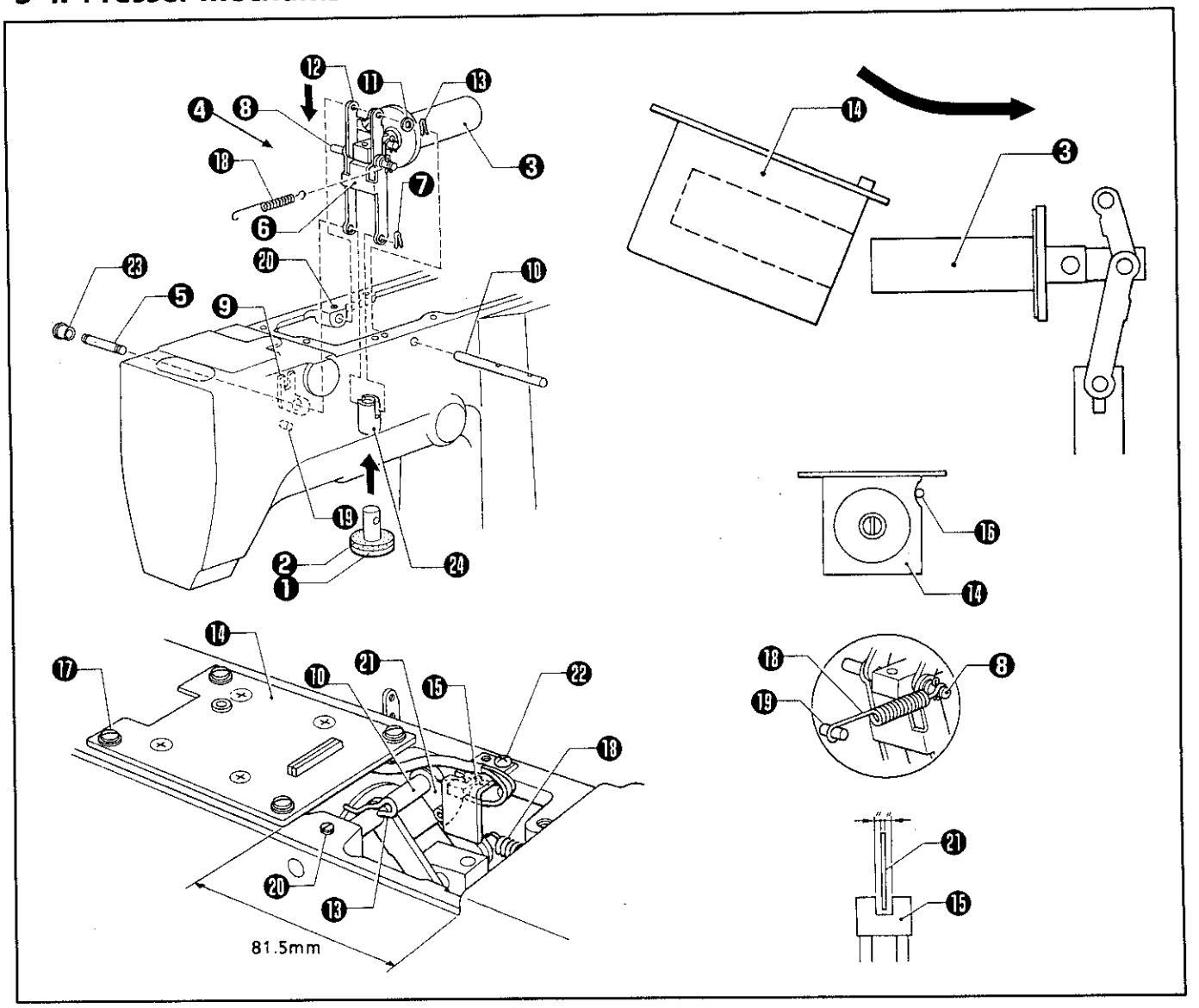
## 5-3. Thread wiper mechanism (1)




1. Insert the thread wiper rod assembly ❶ and the thread wiper driving lever ❷ into the machine from above. Fit the thread wiper shaft ❸ with retaining rings and washers on the former two, and lightly press them and secure using the set screw ❹.
2. Place the thread wiper rod assembly ❶ on the presser bar lifter lever shaft ❺, and fit the retaining ring ❻ on it.
3. Lightly press the presser bar lifter lever shaft ❺, and tighten the set screw ❼.
4. Attach the spring ❽ as shown in the figure above. Attach the washer ❾ and the stop ring ❿ to it.
5. Insert the thread wiper arm ⓫ and the thread wiper link ⓬ into the machine in the direction of the arrow, and attach the retaining ring ⓭.
6. Temporarily tighten the set screw ⓮ so that the thread wiper arm ⓫ is positioned 22 mm below from the bottom of the arm.
7. Attach the thread wiper ⓯ using the washer ⓰ and the screw ⓱.
8. Move the forked portion of the thread wiper driving lever ❷, and check that all of the thread wiper mechanism moves.
9. Insert the tension release bar ⓲, the pin ⓳, and the thread tension assembly ⓴ into the machine, and secure them using the set screw ㉑.
   (Adjust the height of the spring referring to page 2.)

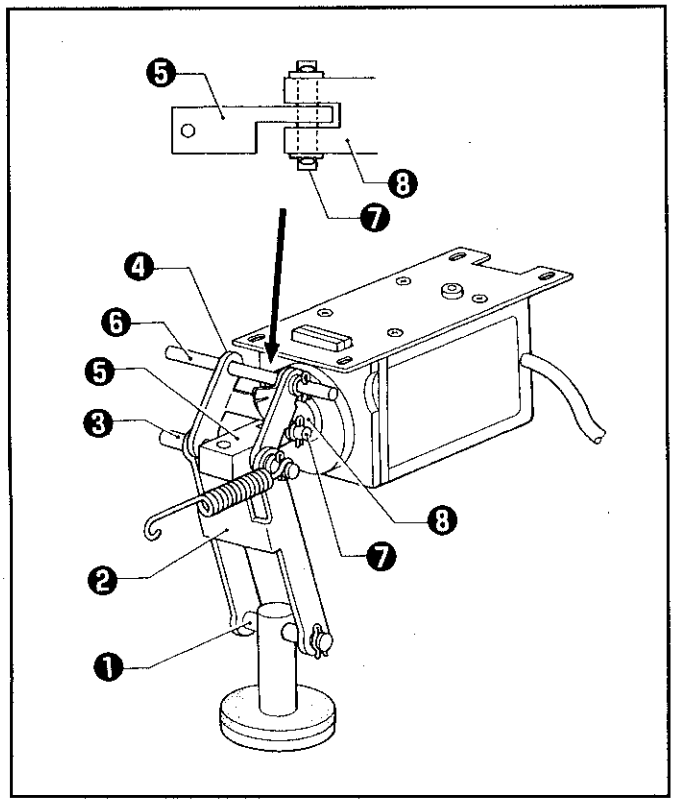
* If there is no thrust in the thread wiper rod assembly ❷ or the thread wiper mechanism operation is sluggish, it may be due to the operation of the presser plate (shown on page 23), and error E-6 may be displayed.

## 5-4. Presser mechanism

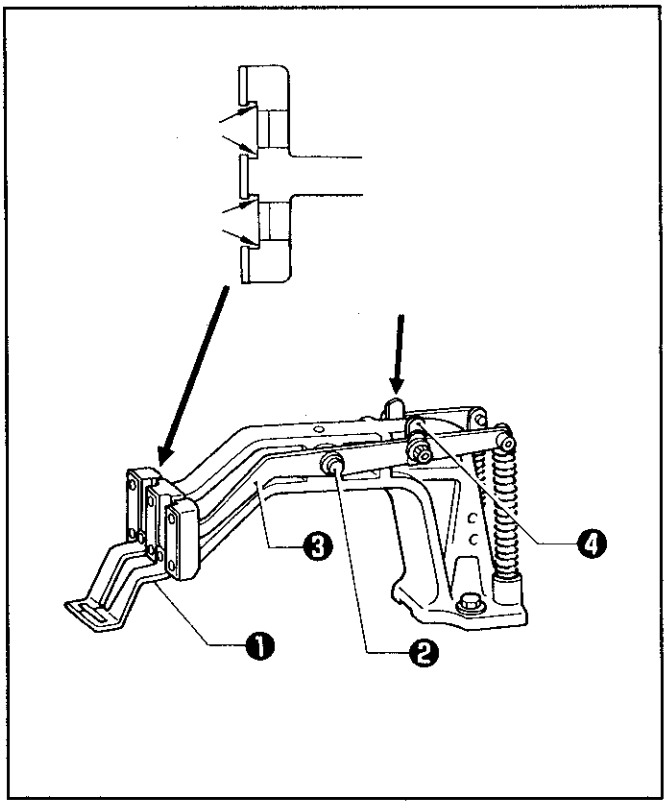



1. Attach the presser plate ❶ to the presser bar lifter lever rubber ❷, and insert them from the bottom of the arm. Insert the parts ❹ linked to the plunger ❸ from the top of the arm, and fit them on link shaft C ❺, link B ❻, and the presser plate ❶.
2. Fit the snap pins ❼ on both ends of link shaft C ❺.
3. Fit link shaft B ❽ into the forked portion of the thread wiper driving lever ❾, insert link shaft A ❿ into the machine, and pass it through the washer ⓫ and link A ⓬.
4. Fit the snap pins ⓭ on both sides of link shaft A ❿ and outside the washer ⓫.
5. Attach the presser solenoid ⓮ to the top of the arm so as to cover the plunger ❸. The cord ⓰ of the sewing clamp sensor ⓯ must be inserted into the notch of the presser solenoid ⓮.
   Secure link shaft A ❿ using the set screw ⓴ so that link B ❻ is centered in the bush ㉔.
6. Slide the presser solenoid ⓮ until it has reached 81.5 mm from the end of the arm, where the plunger ❸ easily moves, and tighten the screw ⓱.
7. Attach the spring ⓲ to link shaft B ❽ and the pin ⓳.
8. Center the sewing clamp sensor ⓯ in the sensor perceive plate ㉑, and tighten the screw ㉒.
9. Attach the rubber cap ㉓.

◎ If the presser mechanism is sluggish, it may not move well vertically, resulting in occurrence of error E-6. Make sure that it moves easily, and apply grease to sliding portions of parts before assembly.

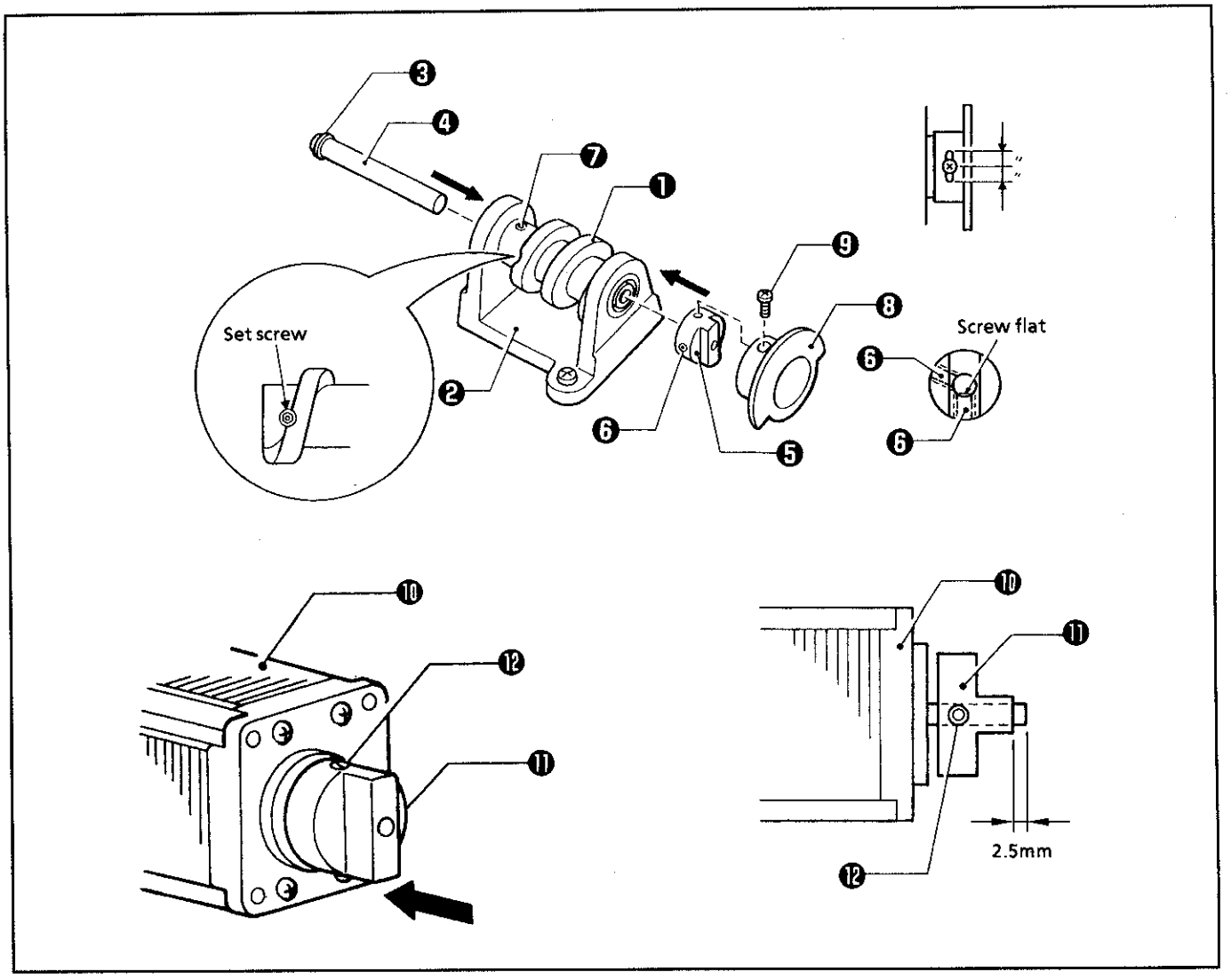



1. Sliding portions of link shaft C ❶ and link B ❷
2. Sliding portions of link shaft B ❸, link B ❷, link A ❹, and link C ❺
3. Sliding portions of link shaft A ❻ and link A ❹
4. Sliding portions of link shaft D ❼, link C ❺, and plunger ❽




1. Sliding portion of the work clamp ❶ (Apply small amount of grease.)
2. Sliding portions of the presser arm lever ❷ and presser arm levers R and L ❸
3. Round portion of the presser arm lever plate ❹

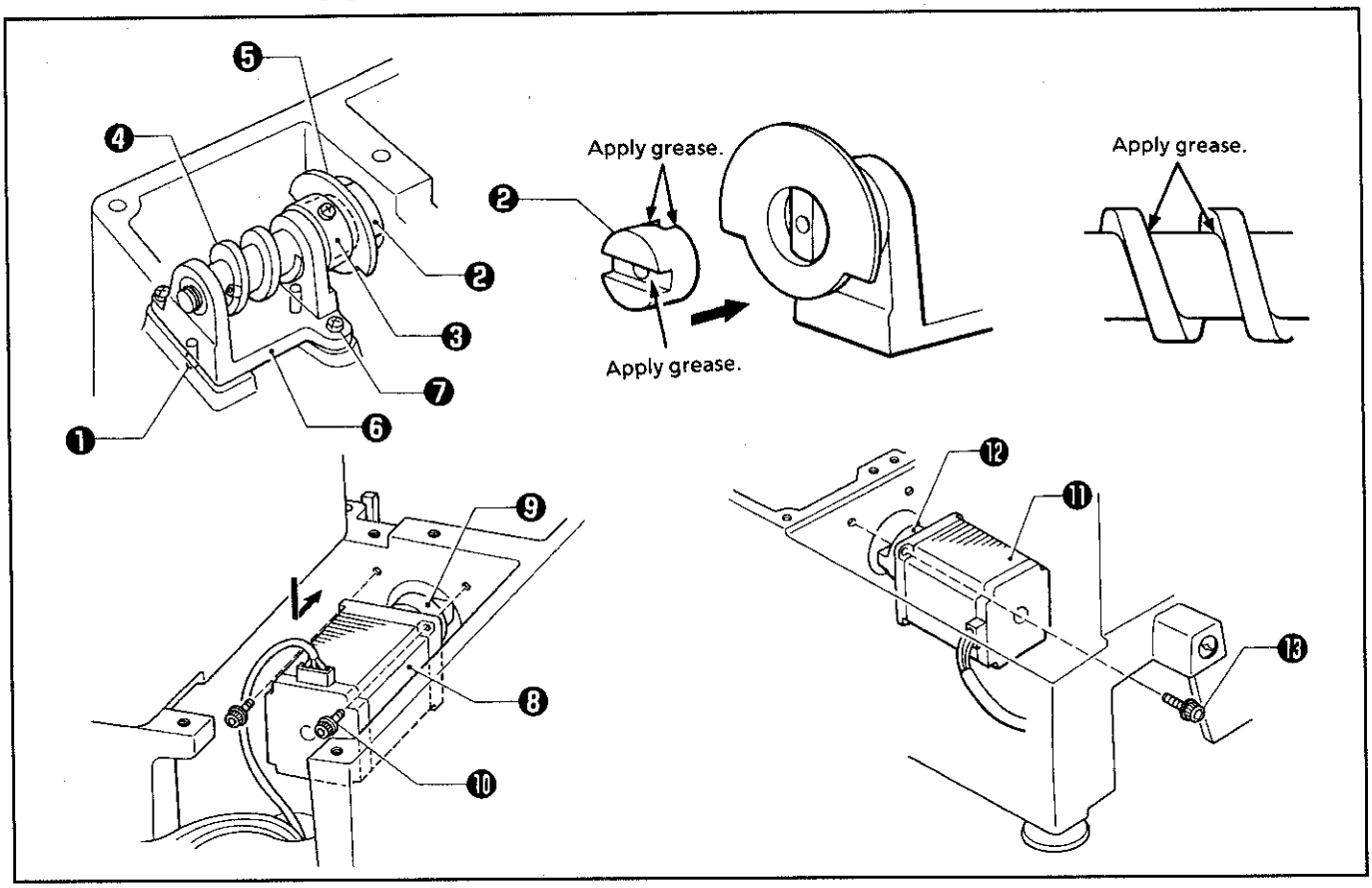
## 5-5. Feed mechanism (1)




* Assembly steps of the feed mechanism are the same for X and Y directions.
* Feed cams X and Y are similar. Be sure to check their respective markings.

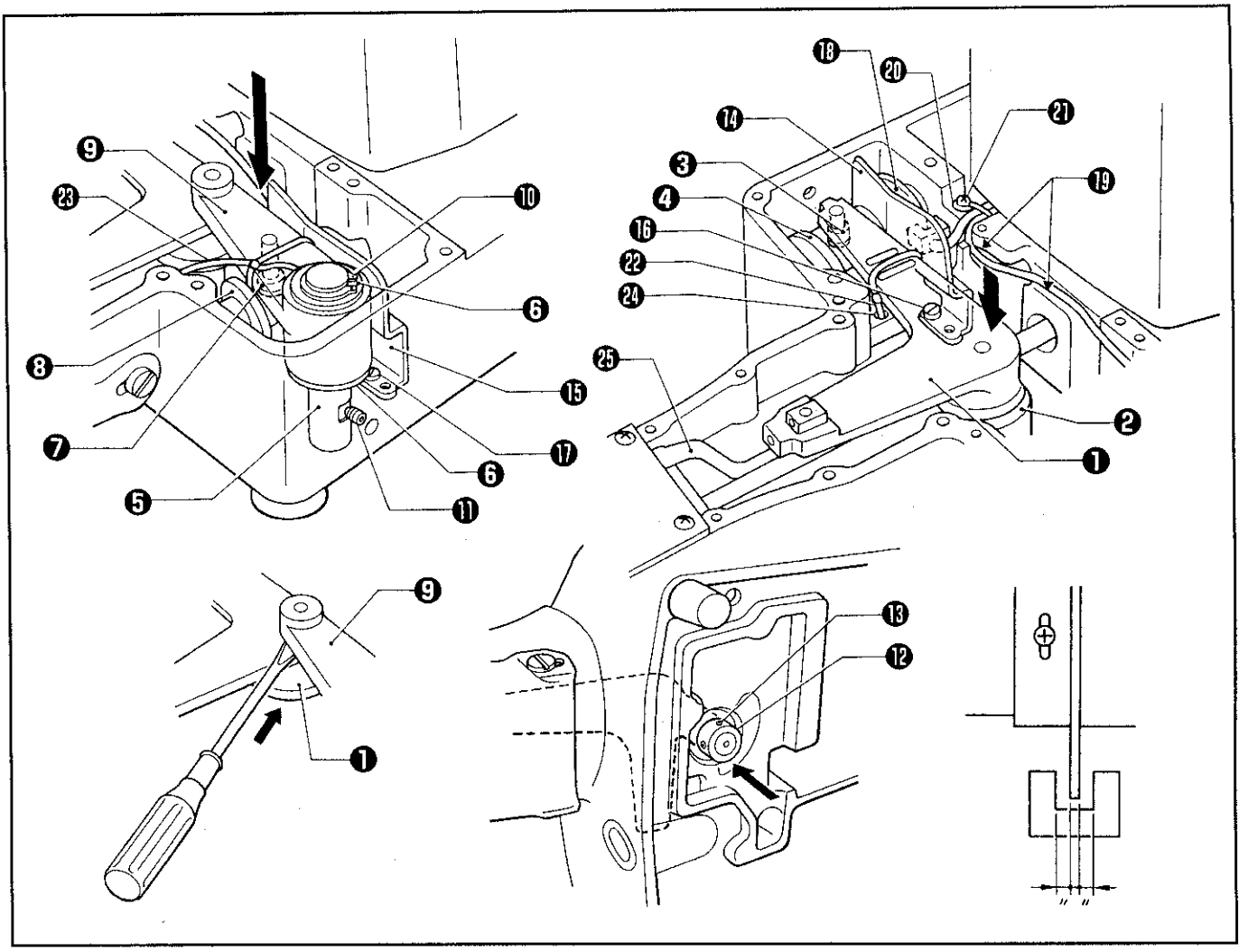
1. Insert the feed cam ❶ into the feed cam bracket ❷, and pass the cam shaft ❹ with the retaining ring ❸ attached, through them.
2. Fit coupling hub 8 ❺ on the cam shaft ❹ so that there is no end play, adjust the set screw ❻ on the screw flat, and tighten it.
3. Adjust the set screw ❼ of the feed cam ❶ on the screw flat, and tighten it so that the feed cam ❶ rotates easily.
4. Fit the feed home position dog ❽ on coupling hub 8 ❺, and tighten the screw ❾ in the center of the slot.
5. Fit coupling hub 6.35 ⓫ on the shaft of the pulse motor ⓾, and tighten the set screw ⓬ until the shaft is protruding 2.5 mm.

## Feed mechanism (2)



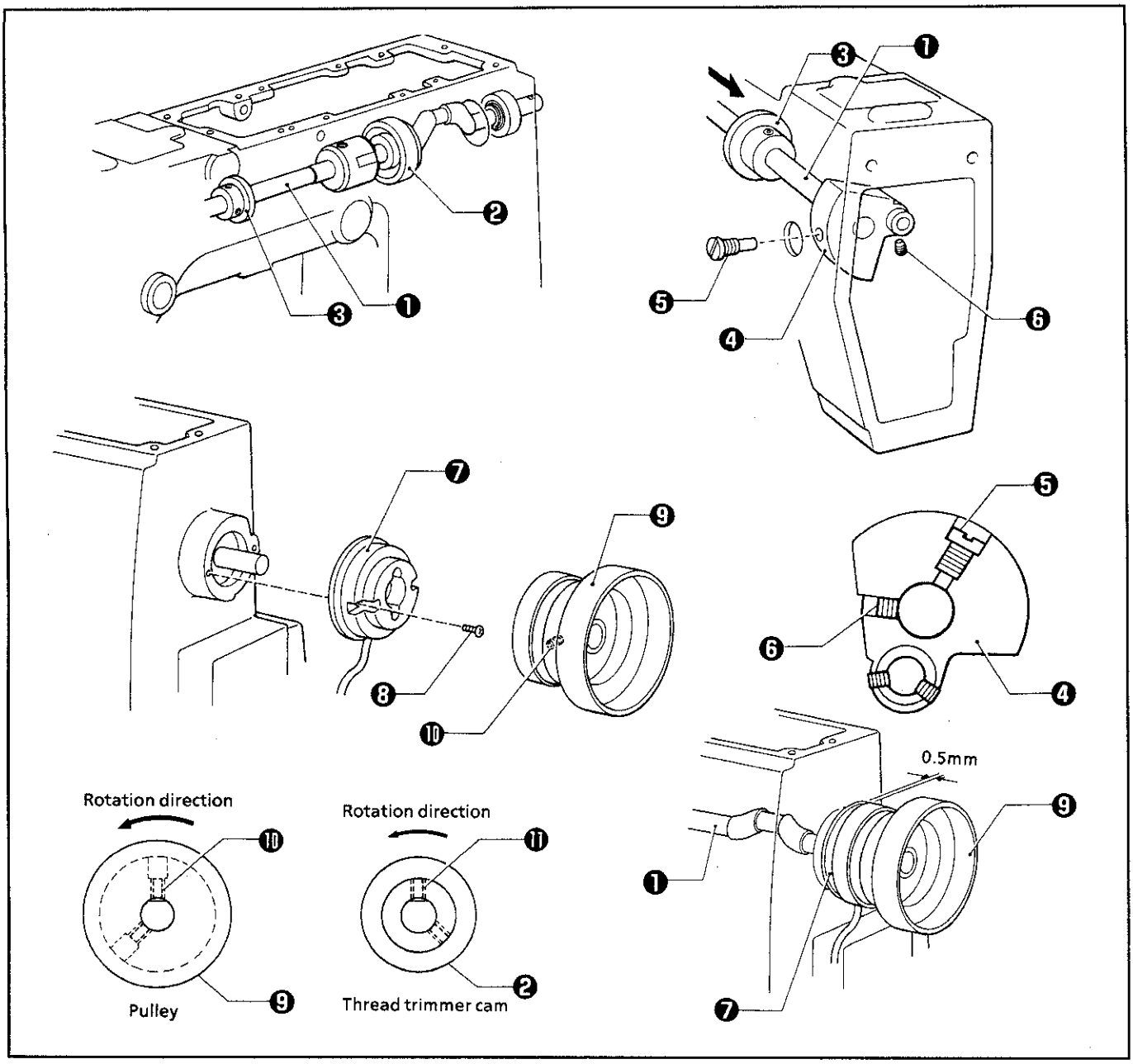

1. For the X direction, insert the locator pin ❶ into the hole in the bed.
2. Apply grease to the coupling spacer ❷, and fit it in coupling hub 8 ❸, fit the feed cam bracket ❻ with the feed cam ❹ and the feed home position dog ❺ on the locator pin ❶, and secure them using the screw ❼.
3. Repeat above steps for Y direction.
4. Adjust the angle of coupling hub 6.35 ❾ of the pulse motor ❽ to that of the coupling spacer ❷. Pass the former through the machine wall, and secure it using the screw ❿.
5. Tilt the machine head until it stops.
6. Adjust the angle of coupling hub 6.35 ⓬ of the pulse motor ⓫ to that of the coupling spacer. Pass the former through the machine wall, and secure it using the screw ⓭.
7. Return the machine head to its original position.
8. Apply grease to the circumference of the feed cam ❹.

## Feed mechanism (3)



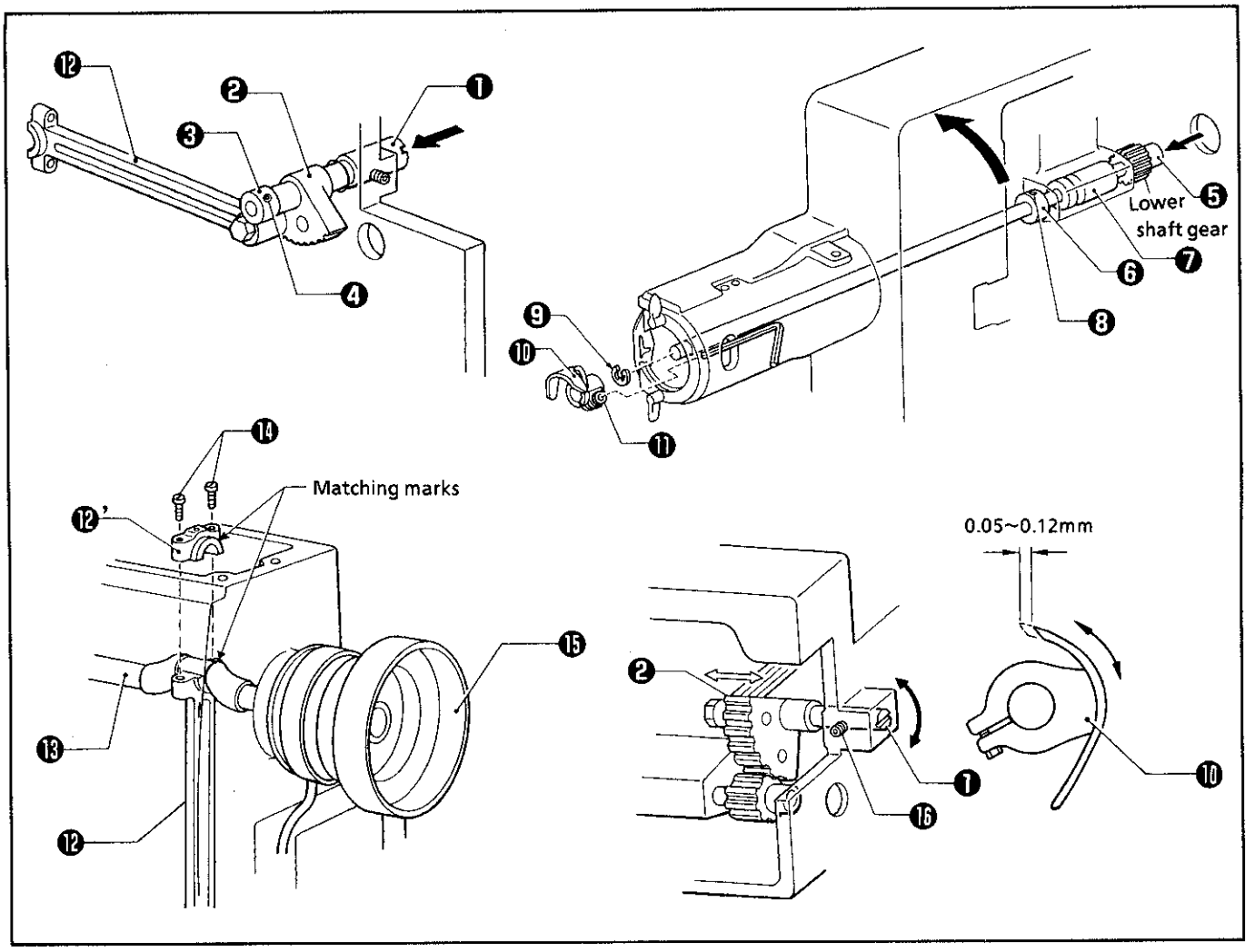
1. Pass the shaft of the X feed lever ❶ through the bush ❷, and fit the feed cam roller ❸ into the groove of feed cam X.
2. Place the washer ❻ on the bearing surface which is inside the machine and passes the tack width lever shaft ❺ through it. Place the Y feed lever ❾ on the washer ❻, and fit the feed cam roller ❼ into the groove of the Y feed cam ❽. Then, pass the tack width lever shaft ❺ with the retaining ring ❿ and the washer 6 on it, through the holes of the Y feed lever ❾ and the hole in the machine.
3. Press the tack width lever shaft ❺ downward, and adjust it so as to tighten the set screw ⓫ on the screw flat. (Pay attention to the weight of the Y feed lever.)
4. Put the driver into the end of the Y feed lever ❾, and press the X feed lever ❶ downward.
5. Tilt the machine head until it stops.
6. Place the set screw collar ⓬ on the shaft of the X feed lever ❶, press it in the direction of the arrow, and tighten the set screw ⓭.
7. Return the machine head to its original position.
8. Attach home position sensors X ⓮ and Y ⓯ respectively using screws ⓰ and ⓱ so that they are centered around the feed home position dog ⓲.
9. Place the cord of home position sensor Y ⓯ into the notch ⓳ of the machine.
10. Insert the wicks ⓬ and ⓭ of the X feed lever ❶ and the Y feed lever ❾ into the hole ⓮ for lubrication. Do not allow the wicks to make contact with the connecting rod lever ⓯.

## 5-6. Upper shaft mechanism



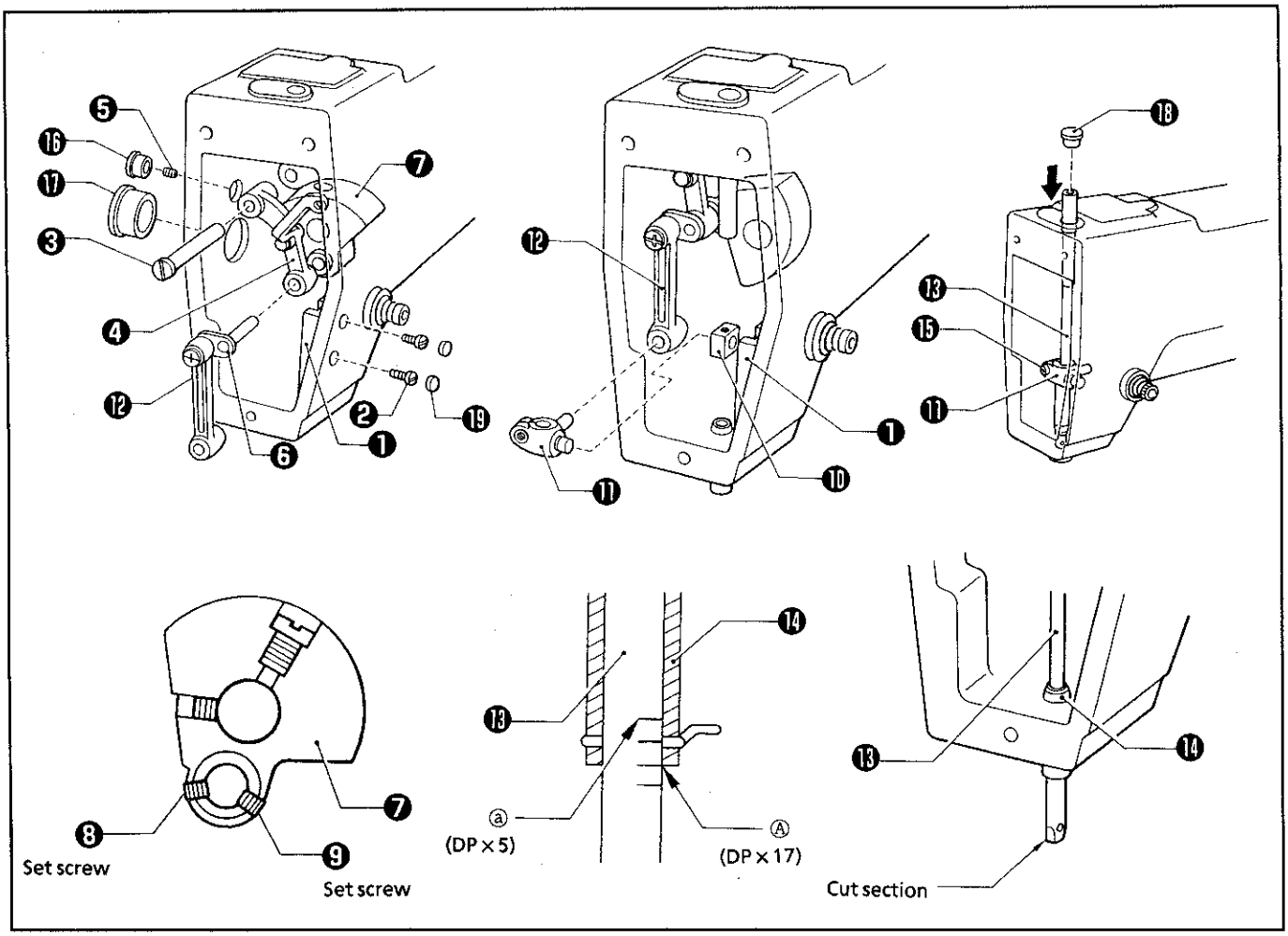

1. Insert the upper shaft ❶ from the rear of the machine, and place the thread trimmer cam ❷ and the bobbin winder pulley ❸ on the shaft.
   *Apply adhesive (equivalent of Three Bond 1401) around the area which the bearing in the machine goes into. Also, apply grease to grooves on the thread trimmer cam ❷.
2. Pass the counter weight ❹ from the face plate side over the upper shaft ❶, and tighten the screw ❺ and the set screw ❻.
3. Bring the counter crank ❹ and the bobbin winder pulley ❸ close to the upper shaft bush so that there is no end play in the upper shaft ❶. Secure the bobbin winder pulley ❸ by adjusting the set screw to its screw flat and tightening it.
4. Press the thread trimmer cam ❷ against the crank of the upper shaft ❶. Adjust the set screw ⓫ that comes first when rotating to the screw flat, and tighten it.
5. Attach the synchronizer ❼ to the machine using the screw ❽.
6. Attach the pulley ❾ leaving a 0.5 mm clearance from the protrusion of the synchronizer ❼, tighten the set screw ⓾ that comes later when rotating to the screw flat.

## 5-7. Lower shaft mechanism



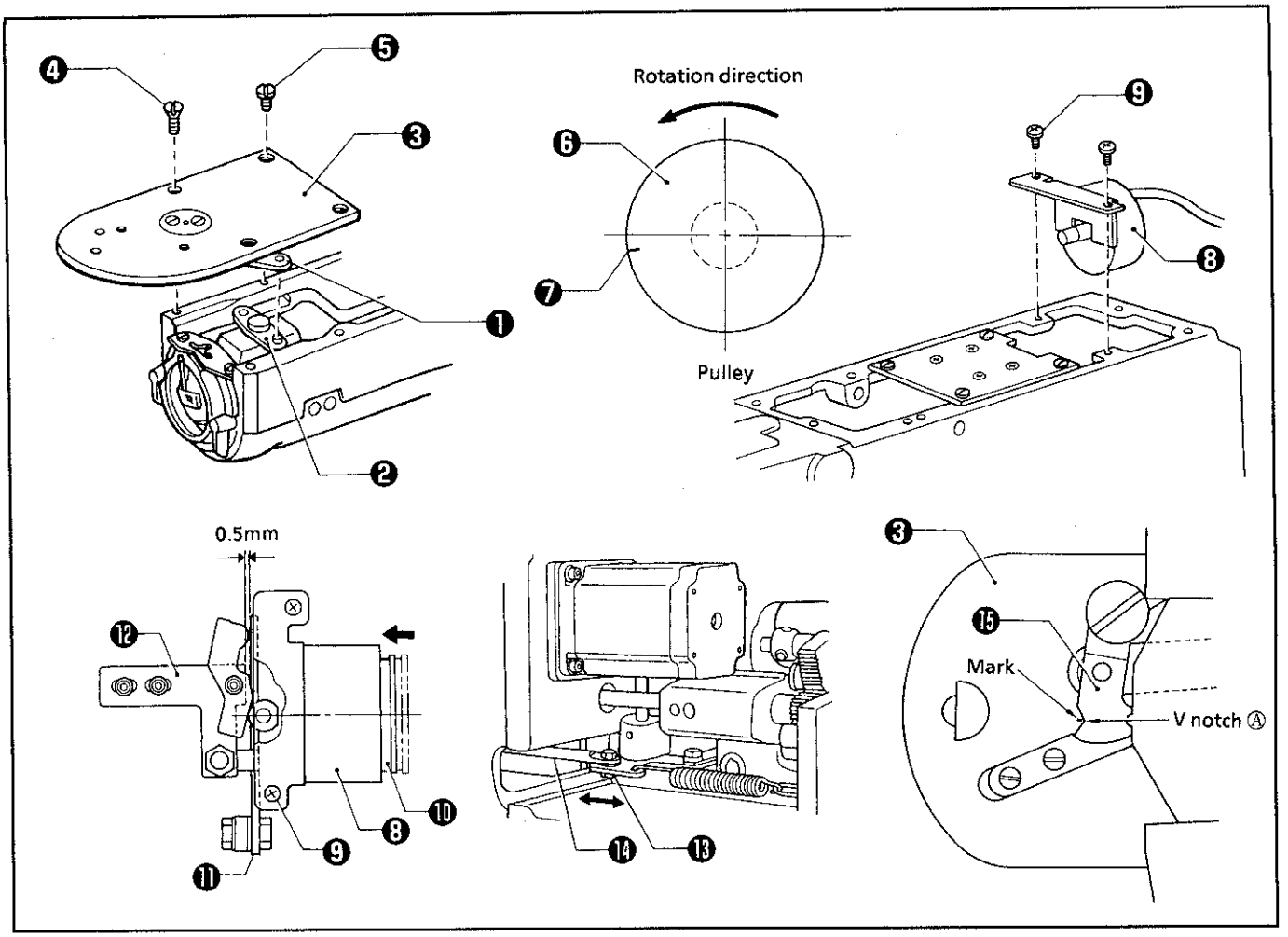

1. Tilt the machine head until it stops.
2. Insert the rock gear shaft ❶ from the rear of the machine, pass the rock gear ❷, the set screw collar ❸ over the shaft, bring them close together without any clearance, and tighten the set screw ❹.
3. Insert the lower shaft ❺ from the rear of the machine, pass the set screw collar ❻ over it, and engage the lower shaft gear with the rock gear ❷.
4. Sandwich the lower shaft bush ❼ between the lower shaft gear and the set screw collar ❻ without any clearance, and tighten the set screw ❽.
5. Fit the retaining ring ❾ on the lower shaft ❺, press the driver ❿ against the retaining ring ❾, and tighten the screw ⓫.
6. Return the machine head to its original position.
7. Fit the crank rod ⓬ over the crank of the upper shaft ⓭, align the matching mark of the crank rod ⓬' with that of the upper shaft ⓭, and tighten the screw ⓮.
8. Tilt the machine head until it stops.
9. Turn the pulley ⓯ to move the rock gear ❷ right and left until the pulley rotates easily. Turn the rock gear shaft ❶ to allow 0.05 - 0.12 mm play of the driver ❿.
10. Return the machine head to its original position.

## 5-8. Needle bar mechanism



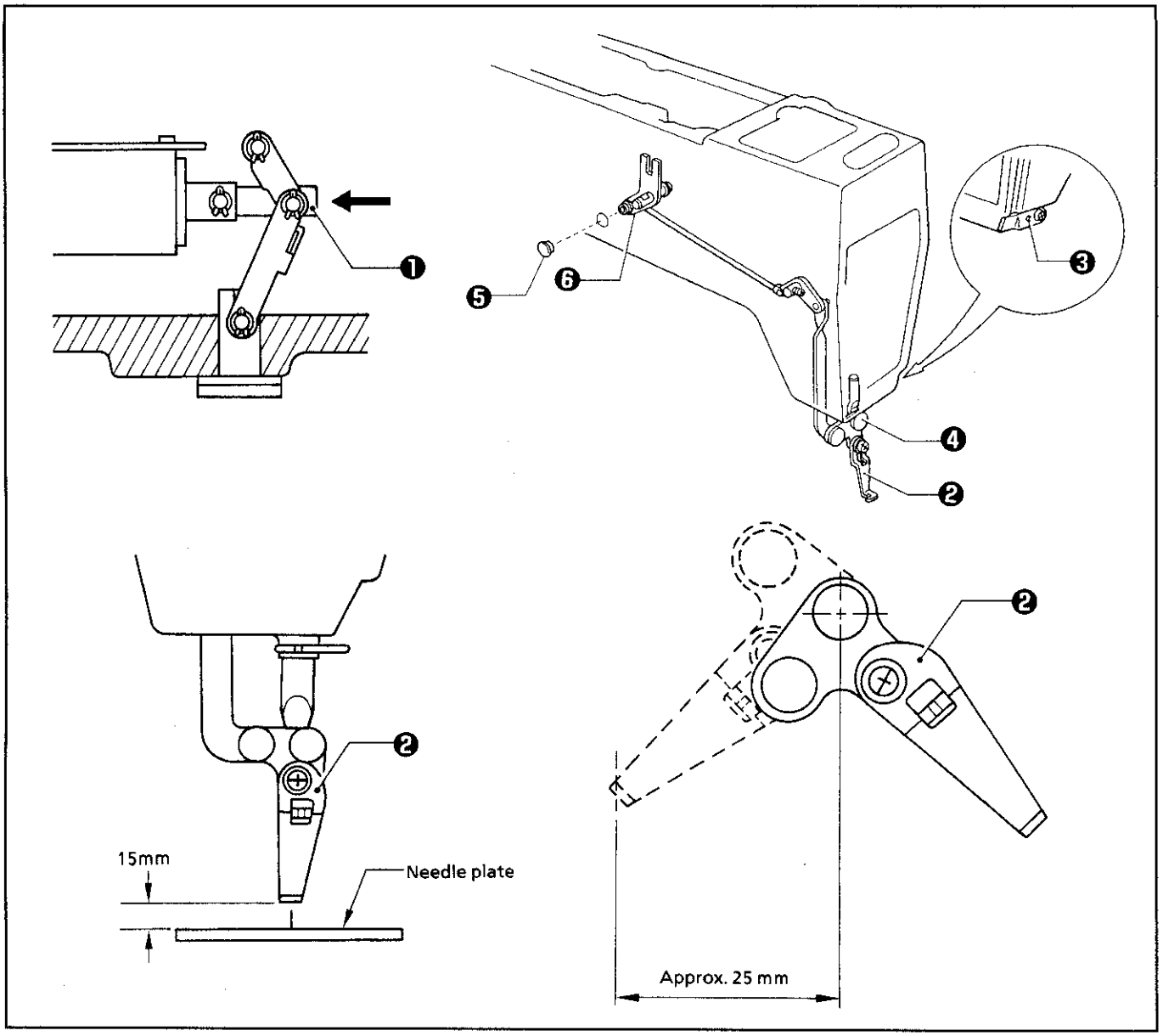

1. Temporarily tighten the screw ❷ of the needle bar guide ❶.
2. Pass the thread take-up support stud ❸ through the thread take-up assembly ❹, lightly press the former, and secure them using the set screw ❺.
3. Pass the needle bar crank ❻ through the thread take-up assembly ❹ and the counter crank ❼, adjust the set screw ❽ to the screw flat, and tighten the set screws ❽ and ❾.
4. Fit the chamfering side of the needle bar guide slide block ❿ into the groove on the needle bar guide ❶, and insert the shafts of the needle bar clamp ⓫ into the thread take-up lever ⓬ and the needle bar guide slide block ❿, as shown in the figure.
5. Insert the needle bar ⓭ from the top of the machine into the needle bar clamp ⓫.
6. Turn the pulley to set the needle bar ⓭ at its lowest position. Move the needle bar vertically so as to align the second lowest reference line Ⓐ (for using needle DP × 17) or the highest reference line ⓐ (for using needle DP × 5) on the needle bar ⓭ with the lower end of needle bar bush (D) ⓮. Tighten the screw ⓯ with the cut section of the needle bar facing the front.
7. Find the position of the needle bar guide ❶ so that the pulley rotates easily, and tighten the screw ❷.
8. Attach the oil cap ⓱ and the rubber caps ⓯, ⓲, and ⓳.

## 5-9. Thread trimmer mechanism (2)



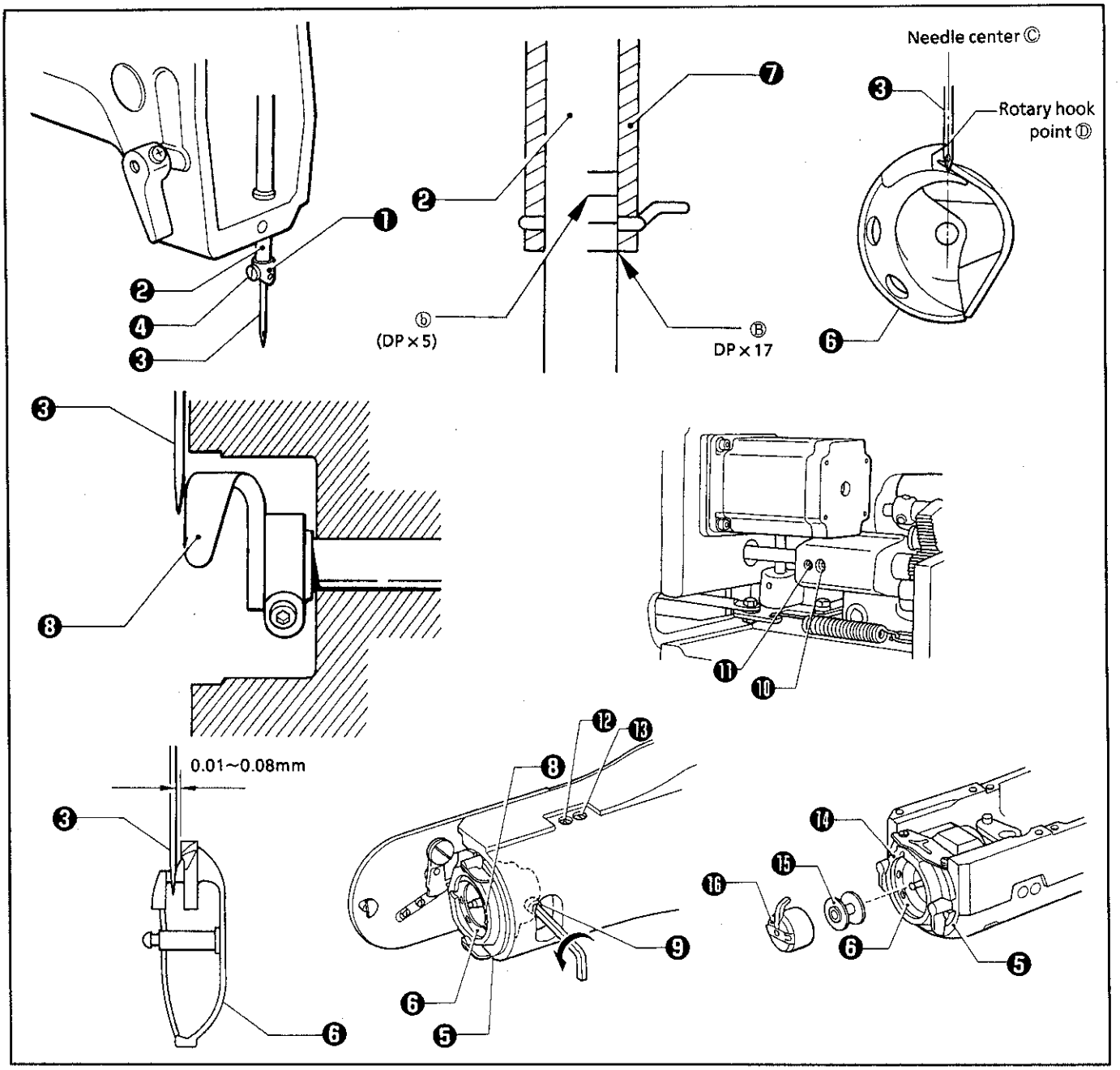

1. Fit the hole of the thread trimmer connecting rod ❶ over the pin of the connecting lever ❷. Secure the needle plate ❸ using the screws ❹ and ❺ so that the hole on the needle plate is centered at the needle position.
2. Turn the pulley ❻ until the mark ❼ has slightly passed over the horizontal line.
   (Adjust the position of the pulley to the position where the cam grooves on the thread trimmer cam do not fluctuate.)
3. Attach the thread trimming solenoid ❽ using the screw ❾. At this time, the plunger ❿ of the thread trimming solenoid ❽ must be fully pressed (the same status as when the thread trimming solenoid ❽ is turned on), and a 0.5 mm clearance must be provided between the thread trimmer driving lever ⓫ and the driving lever stopper ⓬.
4. Make sure that the thread trimmer driving lever ⓫ moves smoothly when the plunger ❿ is pressed and released.
5. Tilt the machine head until it stops.
6. Loosen the nut ⓭, move the connecting rod lever ⓮ to the left and right to align the V notch Ⓐ of the movable knife ⓯ with the mark on the needle plate ❸, and tighten the nut ⓭.
7. Return the machine head to its original position.

## 5-10. Thread wiper mechanism (2)



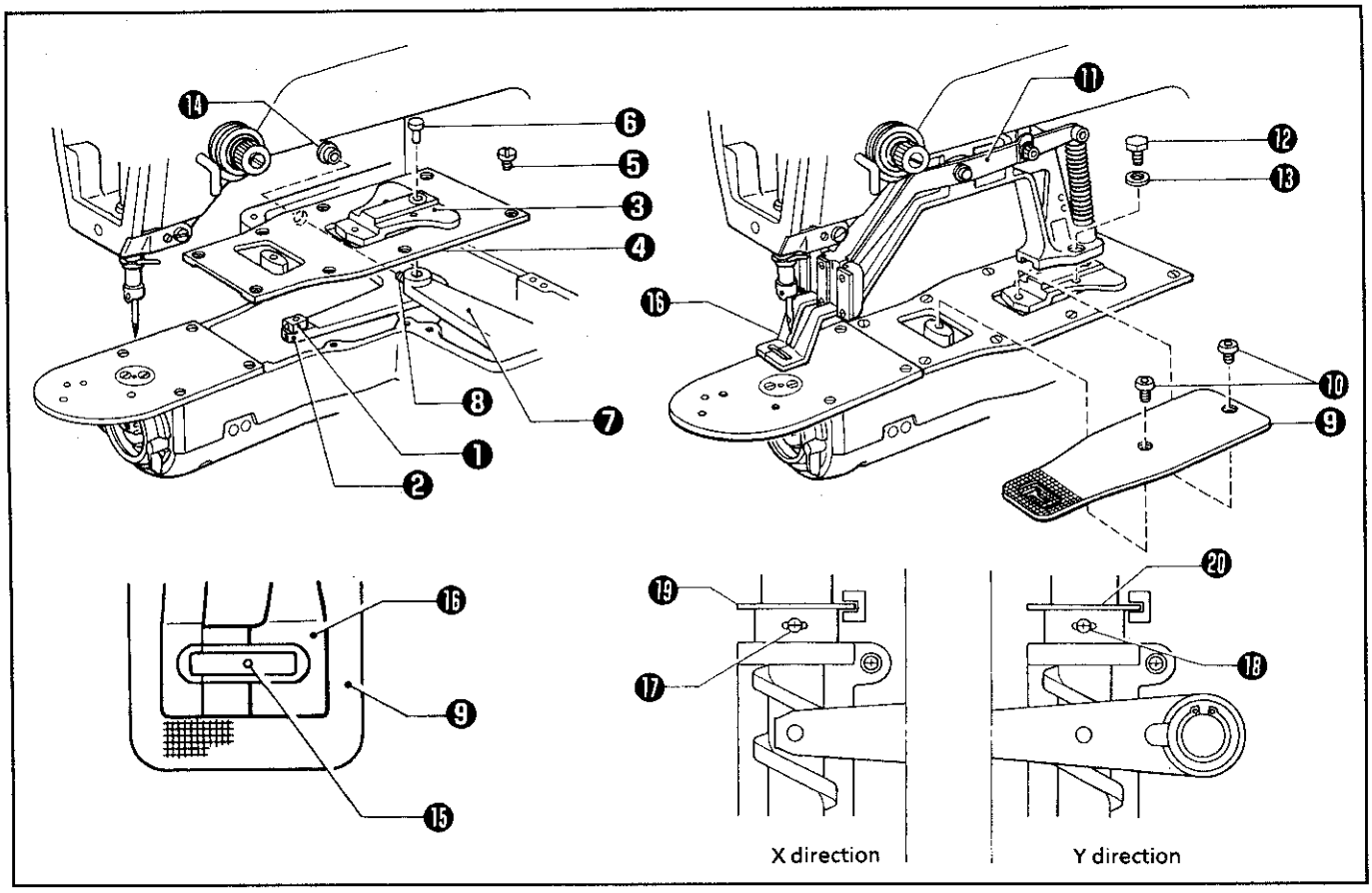

1. Press link C ❶ to check that there is a 15 mm clearance from the top of the needle plate to the bottom of the thread wiper when the thread wiper ❷ has passed under the needle.
   If there is not, loosen the set screw ❸, and adjust the thread wiper arm ❹ by moving it vertically.
2. Make sure that the thread wiper ❷ is positioned 25 mm to the left from the center of the needle bar when link C ❶ is fully pressed.
   If it is not, remove the rubber cap ❺, loosen the set screw ❻, and adjust the thread wiper position.

## 5-11. Shuttle race mechanism



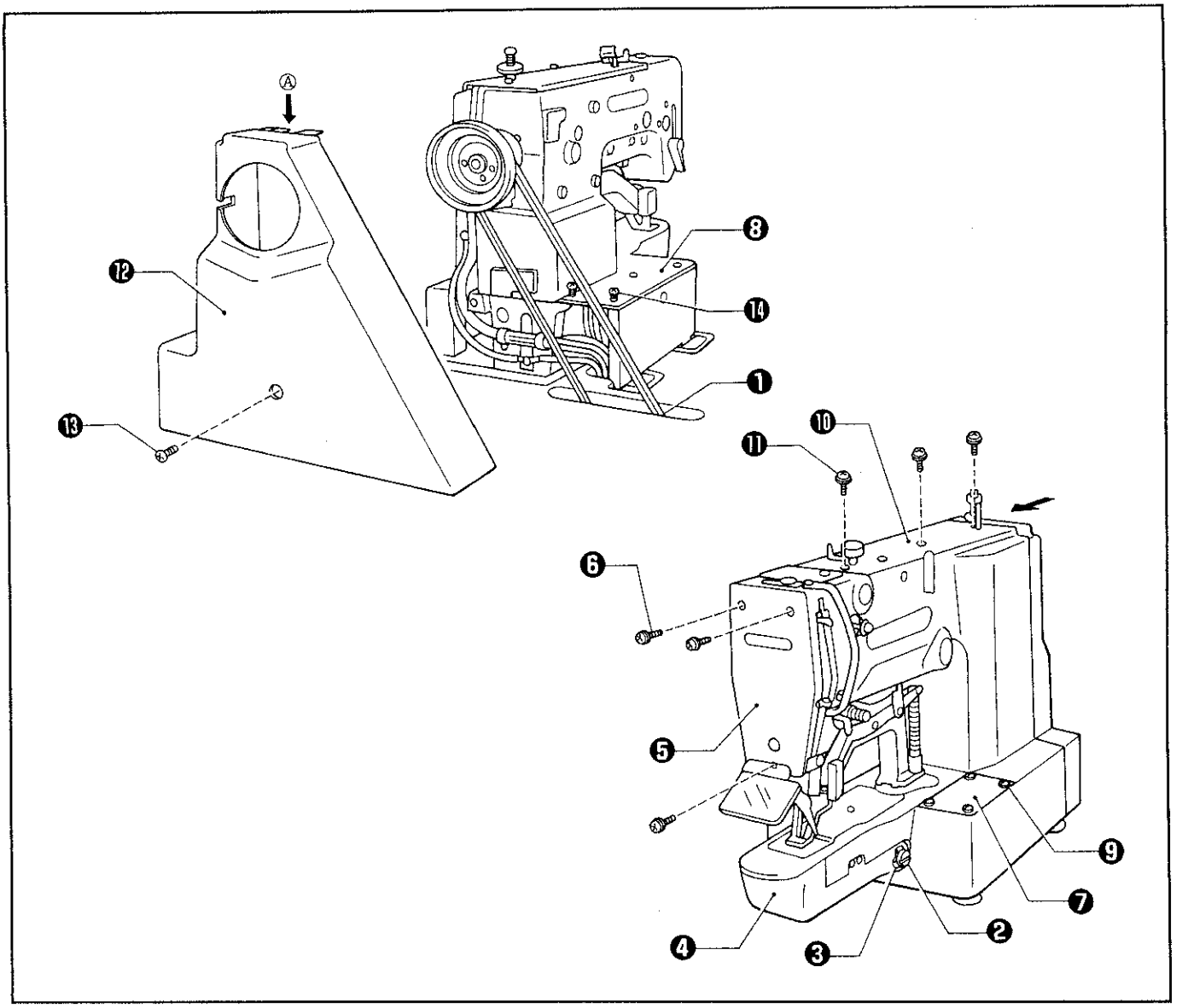

1. Attach the needle bar thread guide ❶ to the needle bar ❷, and attach the needle ❸ (DP×5 for knitwear, DP×17 for denim) with its long groove facing the front, using the set screw ❹.
2. Fit the inner rotary hook ❻ in the shuttle race base ❺. Turn the pulley to raise the needle bar ❷ from its lowest position until the lowest reference line Ⓑ (for DP×17 needle; use the second lowest reference line ⓑ for DP×5 needle) is aligned with the bottom of needle bar bush (D) ❼. Loosen the screw ❾, and move the driver ❽ to align the center of the needle Ⓒ with the inner rotary hook point Ⓓ.
3. Make sure that the needle ❸ just makes contact with the needle guard of the driver ❽ when the center Ⓒ of the needle is aligned with the point of the inner rotary hook. If it does not, loosen the set screw ❿, and turn the eccentric shaft ⓫. Retighten the set screw ❿ afterwards.
4. Make sure that there is a 0.01 - 0.08 mm clearance between the needle ❸ and the point Ⓓ of the inner rotary hook when they are aligned. If there is not, loosen the set screw ⓬, and turn the eccentric shaft ⓭. Retighten the set screw ⓬ afterwards.
5. Attach the large shuttle hook ⓮ to the shuttle race base ❺, insert the bobbin ⓯ into the bobbin case ⓰, and fit them in the inner rotary hook ❻.

## 5-12. Presser arm mechanism




1. Place the slide block ❶ on the pin of the X feed lever ❷, fit the feed bracket ❸ into the feed bar guide plate ❹ with care not to drop the ball bearing, pass the slide block ❶ through the slot in the feed bracket ❸, and secure the fed bar guide plate ❹ using the screw ❺.
2. Pass the tack width feed shaft ❻ through the hole in the feed bracket ❸ and the hole of the Y feed lever ❼, adjust the former to the screw flat, and press the tack width feed shaft ❻ from above to secure it using the set screw ❽.
3. Attach the feed plate ❾ using the screw ❿.
4. Attach the presser arm ⓫ to the feed bracket ❸ using the bolt ⓬ and the washer ⓭.
5. Attach the rubber cap ⓮.
6. Turn on the power of the machine, set the program to No. 00, press the foot switch to reset X and Y to original position.
7. Make sure that the slot ⓯ is centered in the work clamp ⓰ and the feed plate ❾.
   If it is not, loosen the screw ❿ of the feed plate ❾ and the bolt ⓬ of the presser arm ⓫, and adjust the position of the slot ⓯.
   If it still is not centered, turn off the power, loosen the screws ⓱ and ⓲, and turn the feed home position dogs ⓳ and ⓴ little by little.
   After adjustment is completed, turn off the power.

## 5-13. Covers



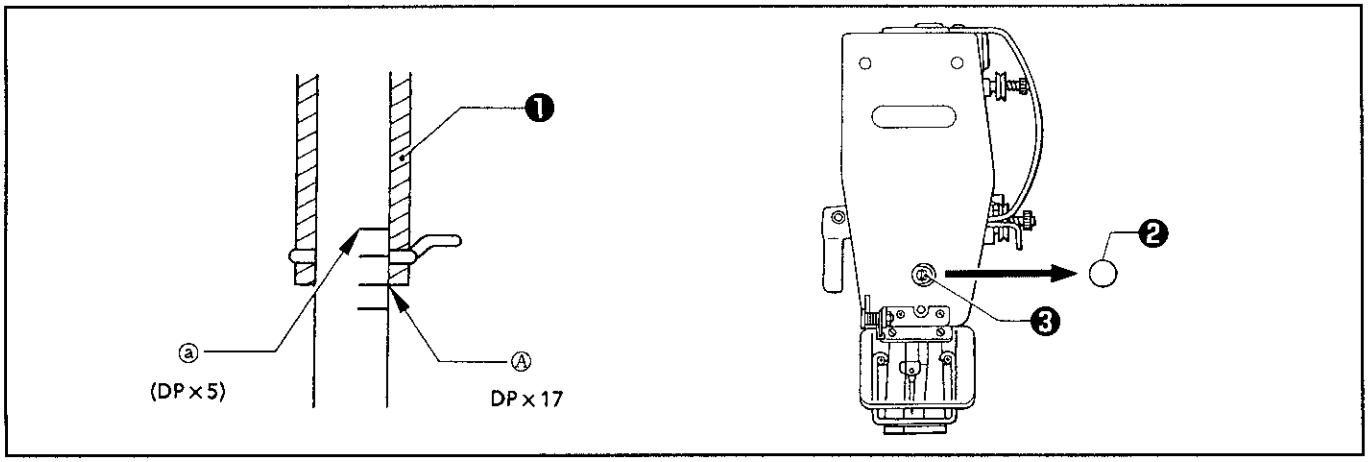

1. Attach the V belt ❶.
2. Attach the large shuttle hook cover ❹ using the shoulder screw ❷ and the washer ❸.
3. Attach the face plate ❺ using the screw ❻.
4. Attach bed covers (R) ❼ and (L) ❽ using the screws ❾.
5. Temporarily attach the top cover ❿ using the screw ⓫.
6. Attach the belt cover ⓬ while inserting part Ⓐ into the top cover ❿, and tighten the screws ⓭ and ⓮.
7. While lightly pressing the top of the belt cover ⓬ in the direction of the arrow, tighten the screw ⓫.

# 6. ADJUSTMENT

## ⚠ CAUTION

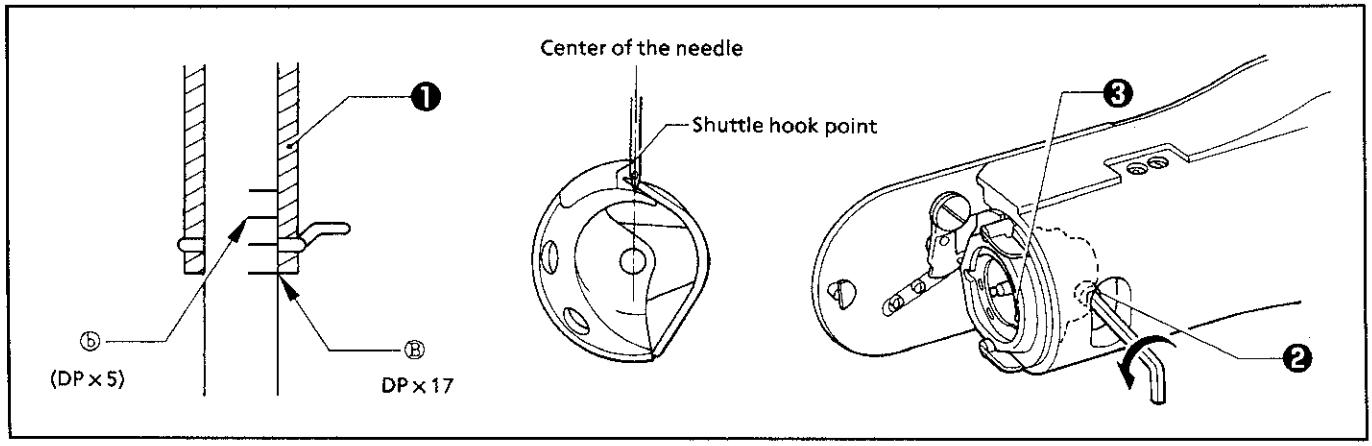
- Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
- Turn off the power switch and disconnect the power cord from the wall socket at the following times, otherwise the machine may operate if the foot switch is depressed by mistake, possibly resulting in injury.
  - When carrying out inspection, adjustment, and maintenance
  - When replacing consumable parts such as the rotary hook and knife
- If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
- Use only the proper replacement parts specified by Brother.
- If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.
- Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

## 6-1. Adjusting the needle bar height



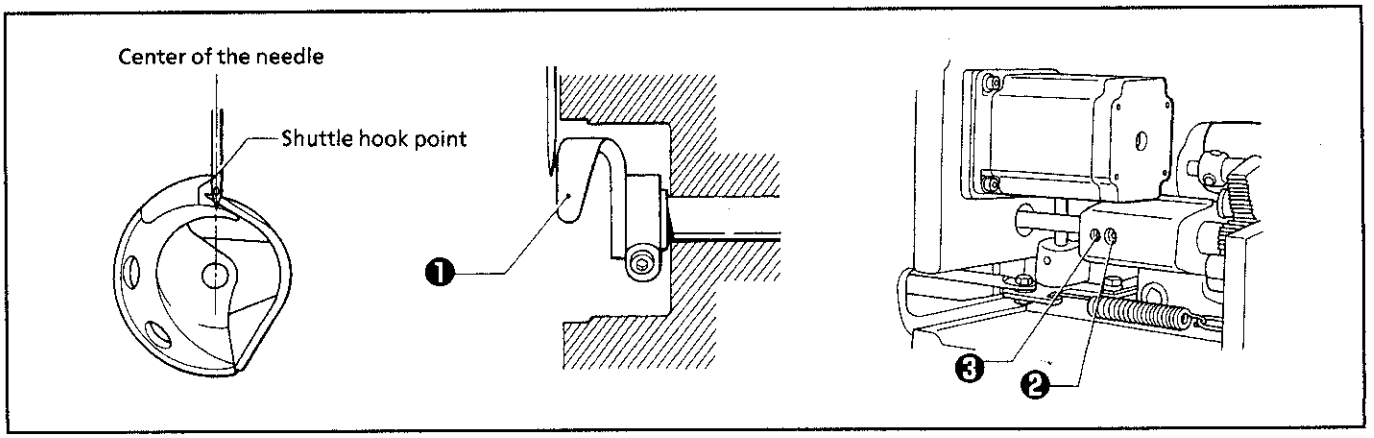

Turn the pulley to lower the needle bar at its lowest position. Remove the rubber cap ❷, and loosen the screw ❸. Move the needle bar up or down to adjust the needle bar height so that the second lowest line Ⓐ of the needle bar is aligned with the bottom of the needle bar bush ❶ when the needle bar is lowered to its lowest position.
*For needle DP×5, align the highest line ⓐ on it with the bottom of the needle bar bush.

## 6-2. Adjusting the needle bar lift stroke



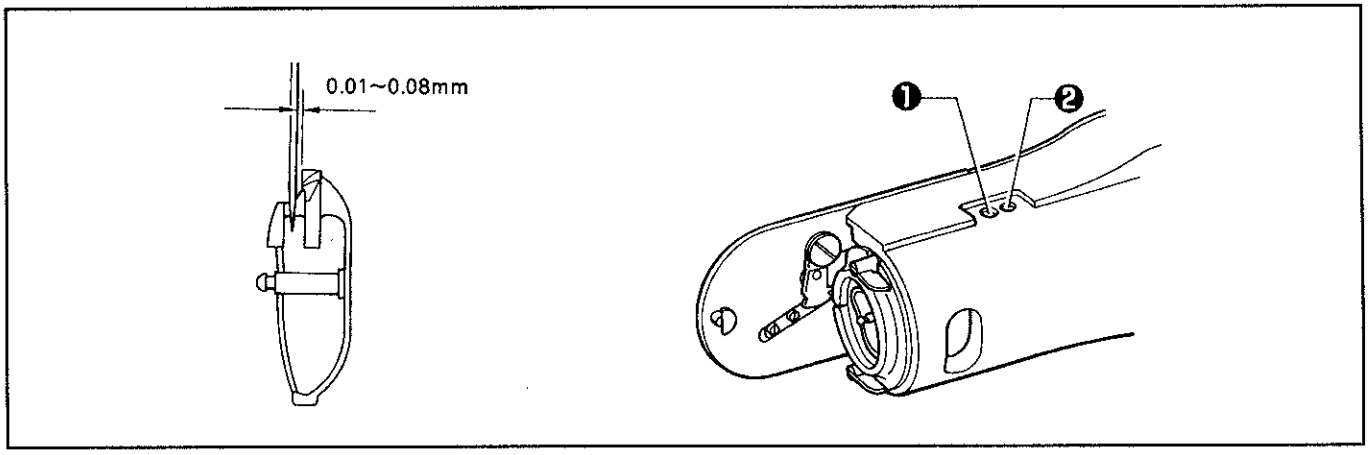

Turn the pulley to raise the needle bar from its lowest position until the lowest reference line Ⓑ on the needle bar is aligned with the bottom of the needle bar bush . Loosen the screw ❷, and move the driver ❸ to align the shuttle hook point with the center of the needle.
*For needle DP×5, align the second lowest reference line ⓑ with the bottom of the needle bar bush ❶.

## 6-3. Adjusting the driver needle guard



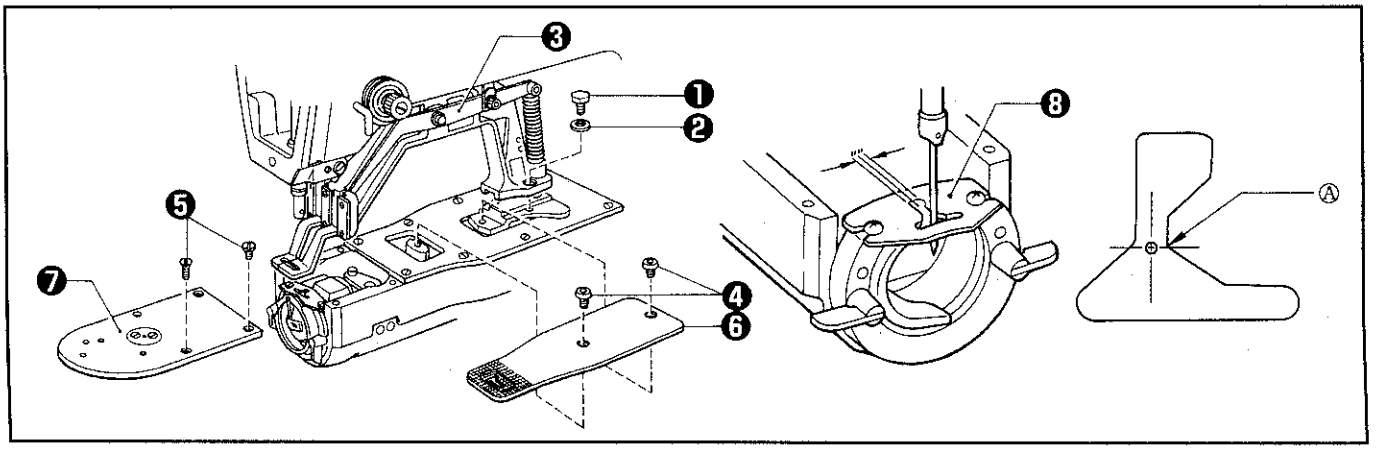

Turn the pulley to align the shuttle hook point with the center of the needle. Loosen the set screw ❷, and turn the eccentric shaft ❸ to adjust the position of the driver needle guard ❶ so that it makes contact with the needle. If the needle contact pressure is too great, skipped stitches may result. On the other hand, if the driver needle guard ❶ is not touching the needle, the inner rotary hook point will obstruct the needle, resulting in an excessively high amount of friction.

## 6-4. Adjusting the needle clearance



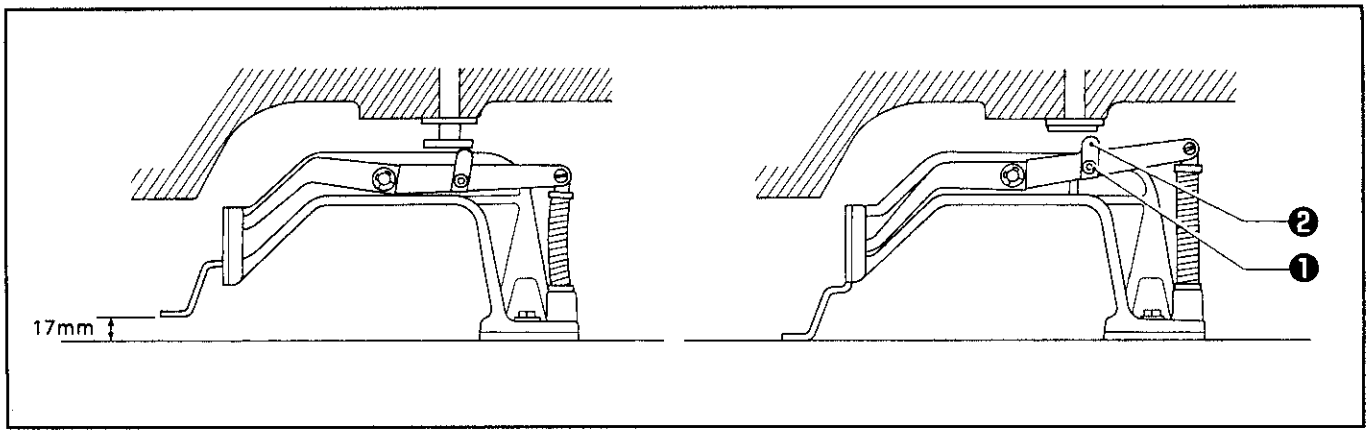

Turn the pulley to align the shuttle hook point with the center of the needle. Loosen the set screw ❶, and turn the eccentric shaft ❷ to adjust the clearance between the needle and the shuttle hook point to 0.01 - 0.08 mm.

## 6-5. Adjusting the shuttle race thread guide




1. Loosen the bolt ❶ and the washer ❷, and remove the presser arm ❸. Then loosen the screws ❹ and ❺, and remove the feed plate ❻ and the needle plate ❼.
2. Adjust the shuttle race thread guide ❽ so that the needle is centered in the hole of the shuttle race thread guide, and align the center of the needle with corner Ⓐ.

## 6-6. Adjusting the work clamp lift stroke

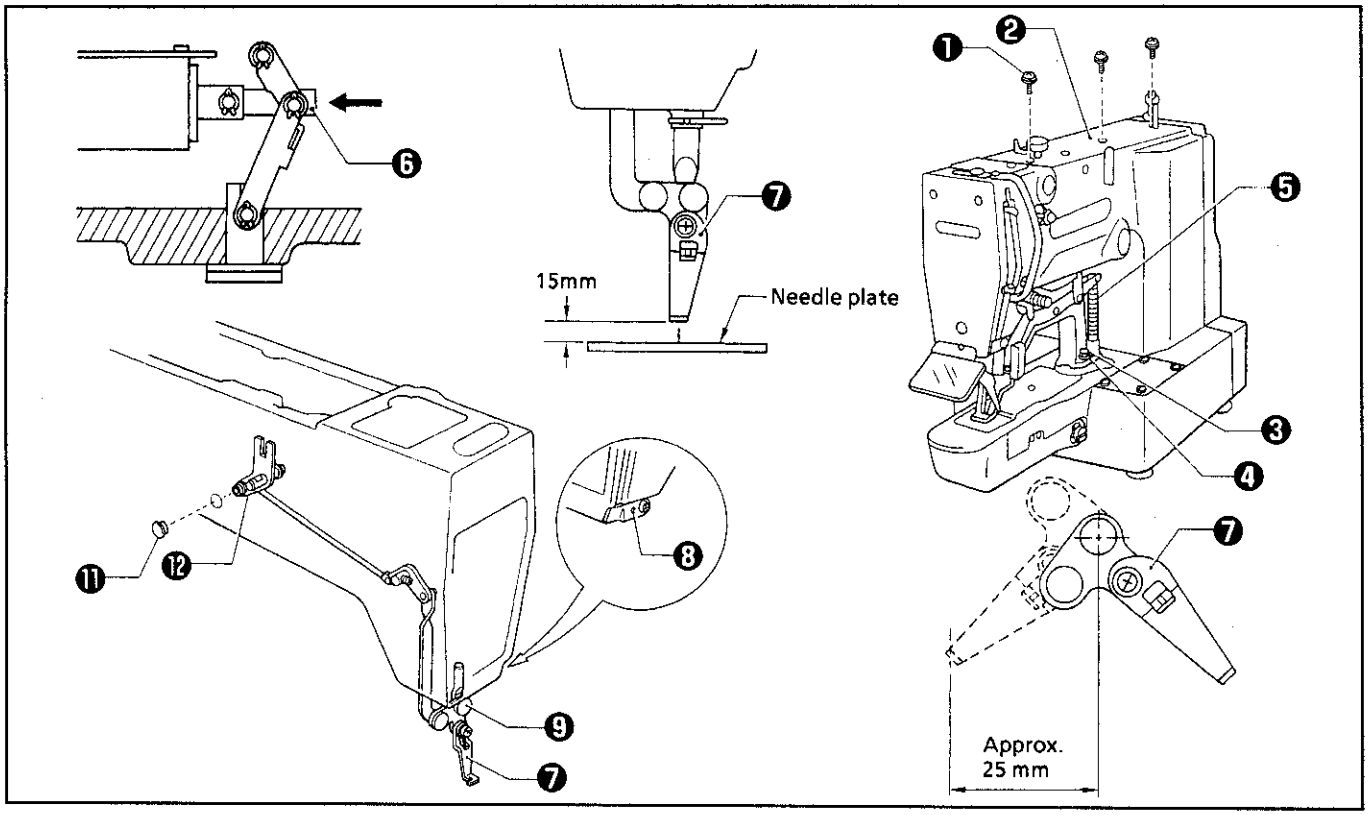



The maximum lift stroke of the work clamp is 17 mm from the top of the needle plate.
The lift stroke for each model is adjusted to that shown in the table, at the time of shipment.

| | General clothing (-1, -5) | Denim (-2) | Knitwear (-7) |
|---|---|---|---|
| Lift stroke | $10^{+1}_{0}$ mm | $14^{+1}_{0}$ mm | $9^{+1}_{0}$ mm |

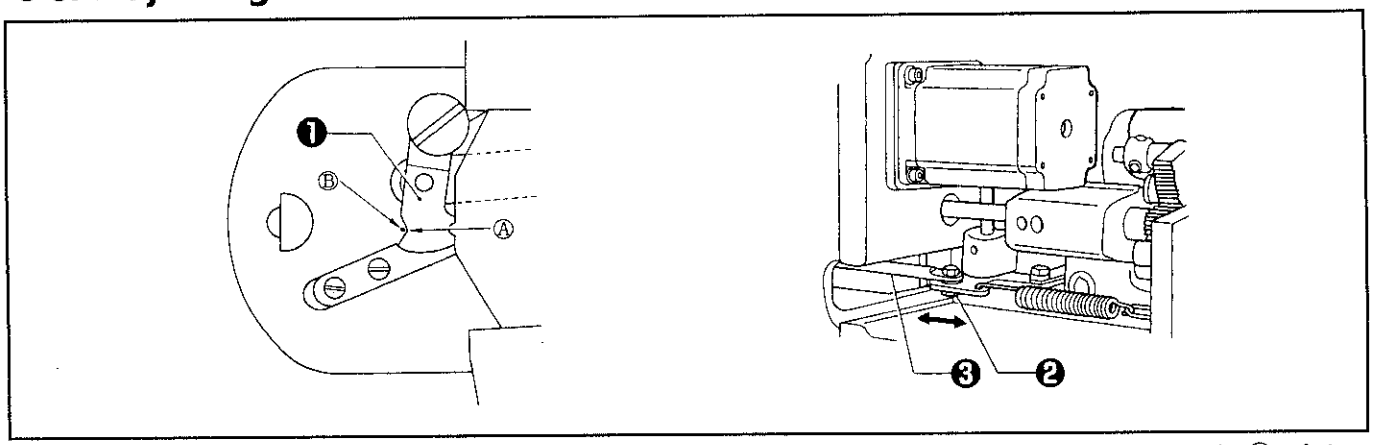
1. Loosen the bolt ❶, and move the presser arm lever plate ❷ up and down to adjust the work clamp lift stroke.
   When checking the lift stroke of the work clamp, the power is turned on to raise the presser bar; when adjusting the stroke, however, make sure that the power is turned off.

## 6-7. Adjusting the thread wiper



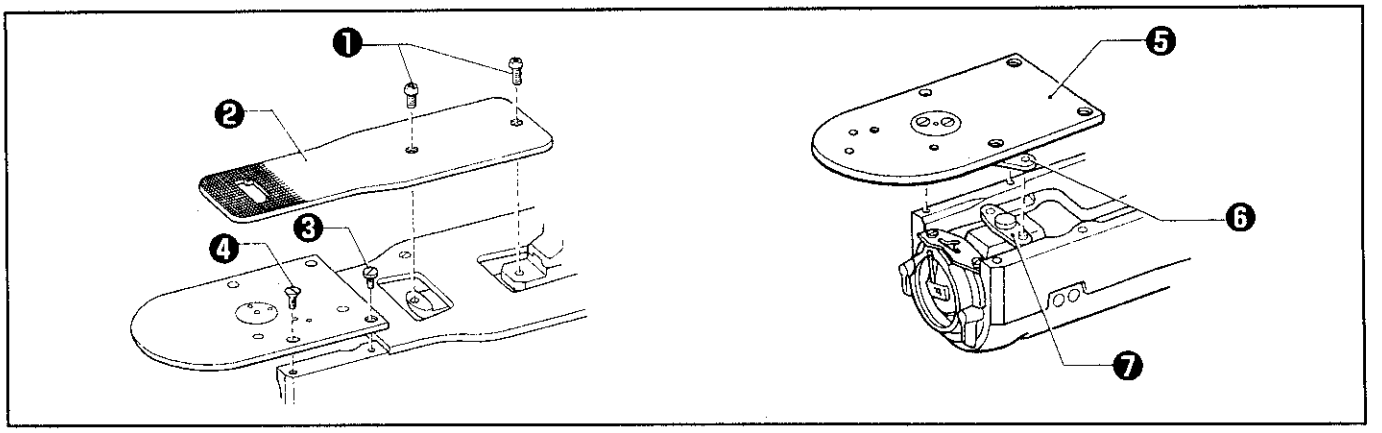

1. Loosen the screw ❶, and remove the top cover ❷.
2. Remove the bolt ❸, the washer ❹, and the presser arm ❺.
3. Press link C ❻ to pass the thread wiper ❼ under the needle. Loosen the set screw ❽, and move the thread wiper arm ❾ up and down to adjust the clearance from the top of the needle plate to the bottom of the thread wiper to 15 mm.
4. Remove the rubber cap ❿, and loosen the set screw ⓬ to adjust the position of the thread wiper so that it is positioned to the left, approximately 25 mm from the center of the needle bar, when link C ❻ is fully pressed.

## 6-8. Adjusting the movable knife

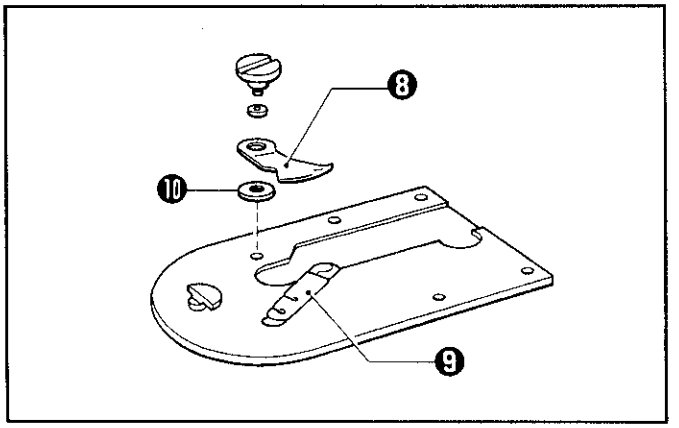



Loosen the nut ❷, and move the connecting rod lever ❸ to the left and right so that the V notch Ⓐ of the movable knife ❶ is aligned with the mark Ⓑ on the needle plate when the machine is stopped.

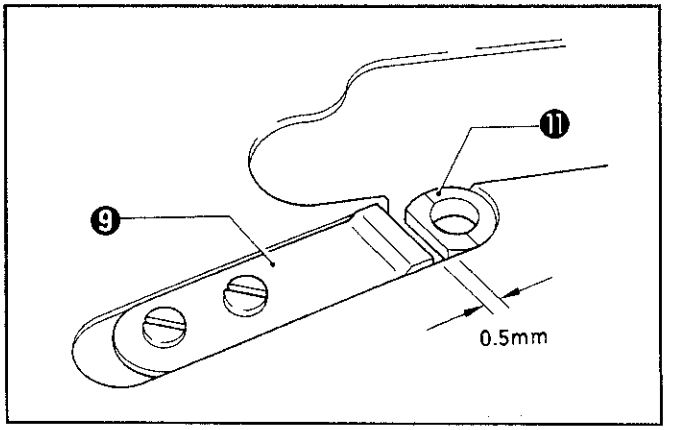
≪Replacing the movable and fixed knives≫




1. Open the large shuttle hook cover, and remove the screws ❶ and the feed plate ❷.
2. Remove the screws ❸ and ❹, and needle plate ❺.
3. Remove the thread trimmer connecting rod ❻ from the pin of the connecting rod lever ❼.

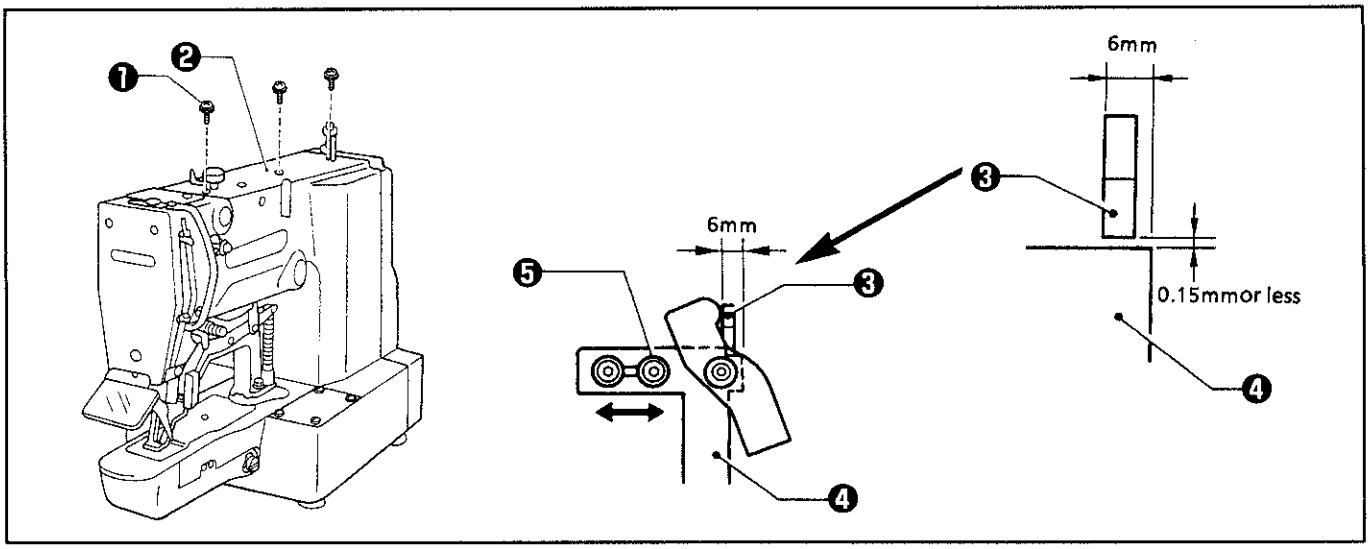



4. Remove the movable knife ❽, and replace it with a new one. At this time, make sure that the movable knife ❽ and the fixed knife ❾ cut the thread cleanly. If necessary, replace the washer ❿ to obtain a clean cut.



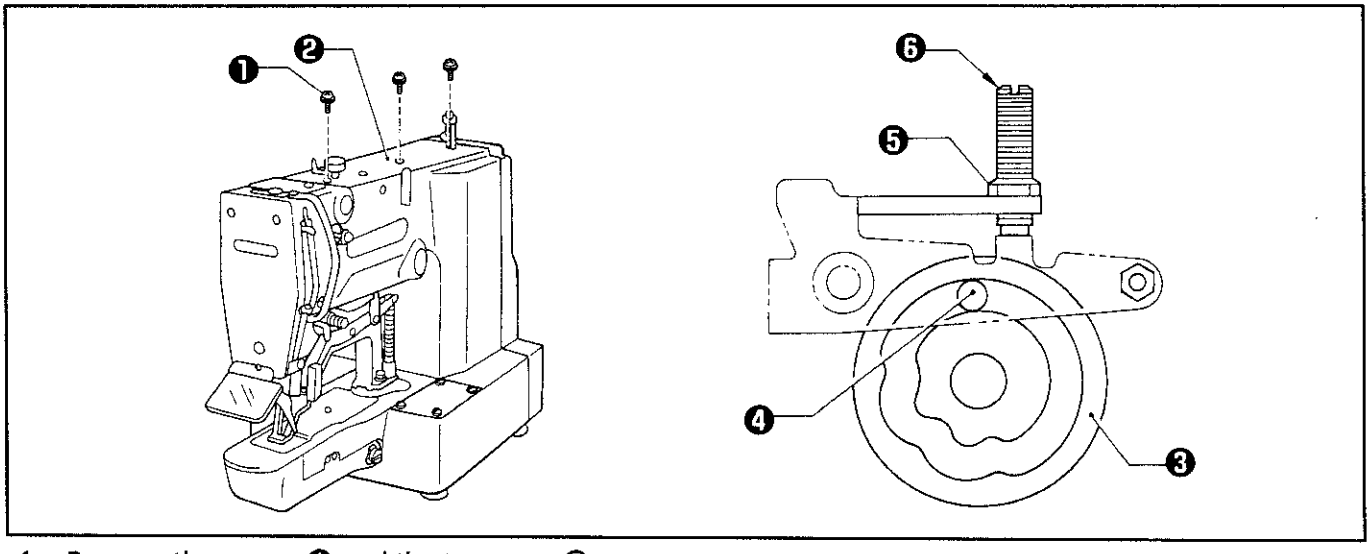

5. Remove the fixed knife ❾, and replace it with a new one. Place it 0.5 mm from the needle hole plate ⓫.

## 6-9. Adjusting the driving lever stopper position



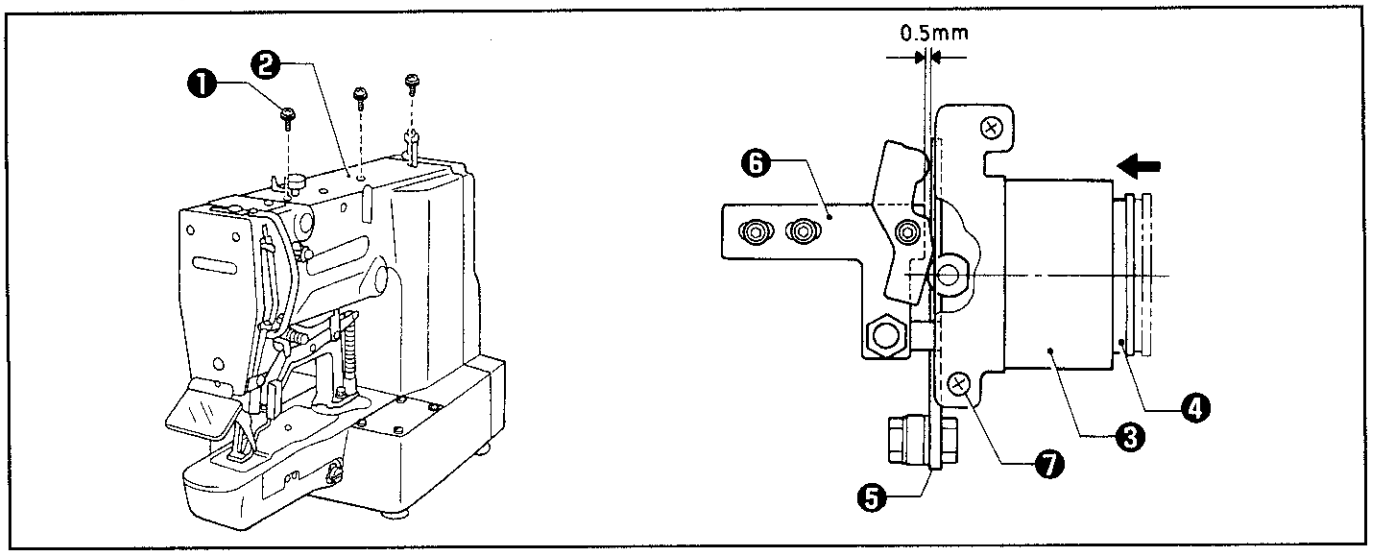

1. Remove the screw ❶ and the top cover ❷.
2. If thread trimming is not performed, loosen the screw ❺ so that the difference between the thread trimmer driving lever ❸ and the driving lever stopper ❹ is 6 mm.
   ※ Make sure that the clearance between the thread trimmer driving lever ❸ and the driving lever stopper ❹ is at the most 0.15 mm.
   The driving lever stopper ❹ has an imprinted number mark: 2, 3, or 4. If the clearance is larger than 0.15 mm, replace the driving lever stopper 4 with that with a different number. For example, when the number 3 stopper is used, replace it with number 4 stopper. When the number 4 stopper is used, replace it with number 2 stopper.

## 6-10. Adjusting the thread trimmer driving lever position



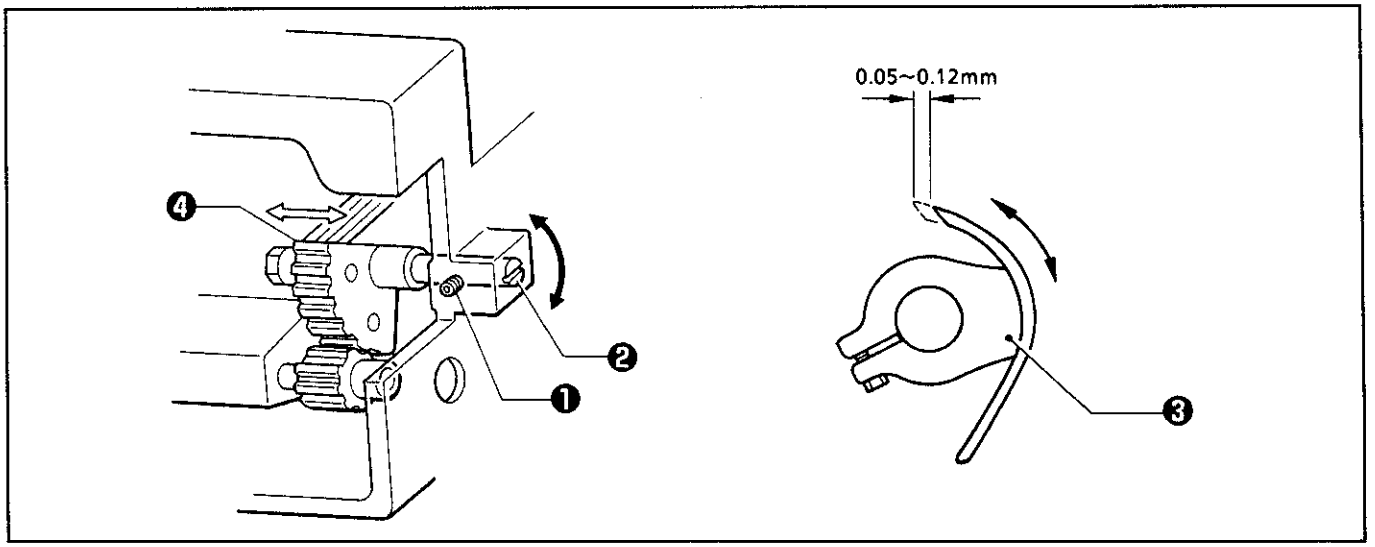

1. Remove the screws ❶ and the top cover ❷.
2. Turn the pulley to place the thread trimmer cam ❸ with its non-operating portion facing upward.
3. Loosen the nut ❺. Move the screw ❻ so that the roller ❹ of the thread trimmer driving lever will return smoothly when it is put into the groove of the thread trimmer cam ❸.

## 6-11. Adjusting the thread trimming solenoid position



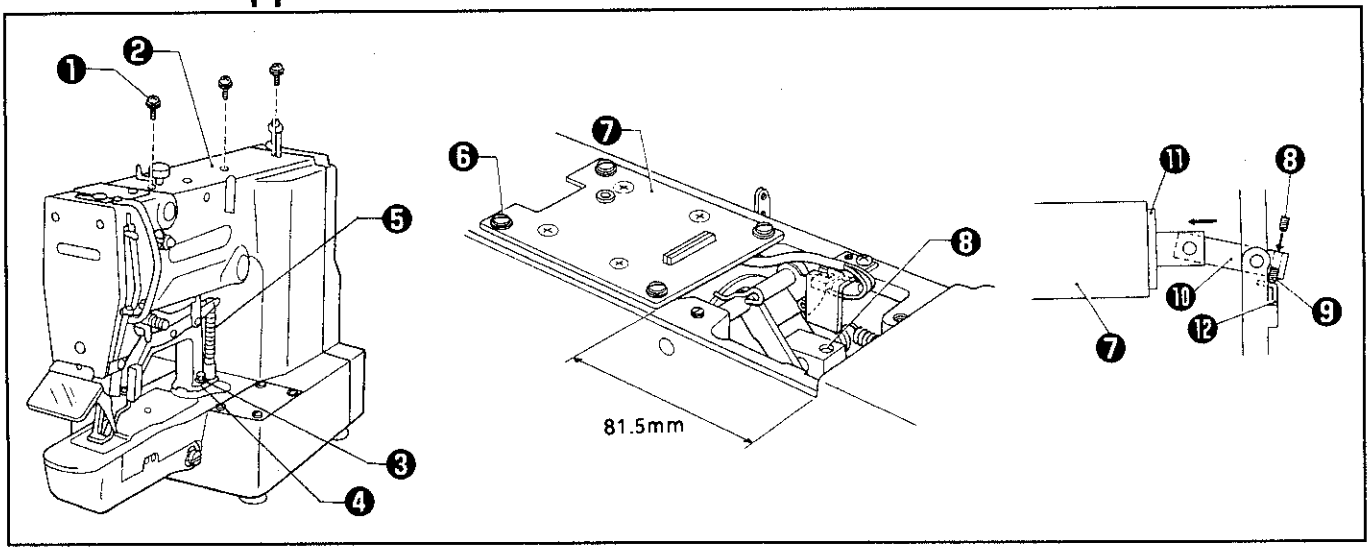

1. Remove the screws ❶ and the top cover ❷.
2. Fully press the plunger ❹ of the thread trimming solenoid ❸, adjust the clearance between the thread trimmer driving lever ❺ and the driving lever stopper ❻ to 0.5 mm, and tighten the screw ❼.

## 6-12. Adjusting the backlash




1. Loosen the set screw ❶, and turn the rock gear shaft ❷ to adjust the play at the end of the driver ❸ to 0.05 - 0.12 mm.
2. After adjustment, move the rock gear shaft ❷ to the left and right so that the pulley can rotate easily, and tighten the set screw ❶.

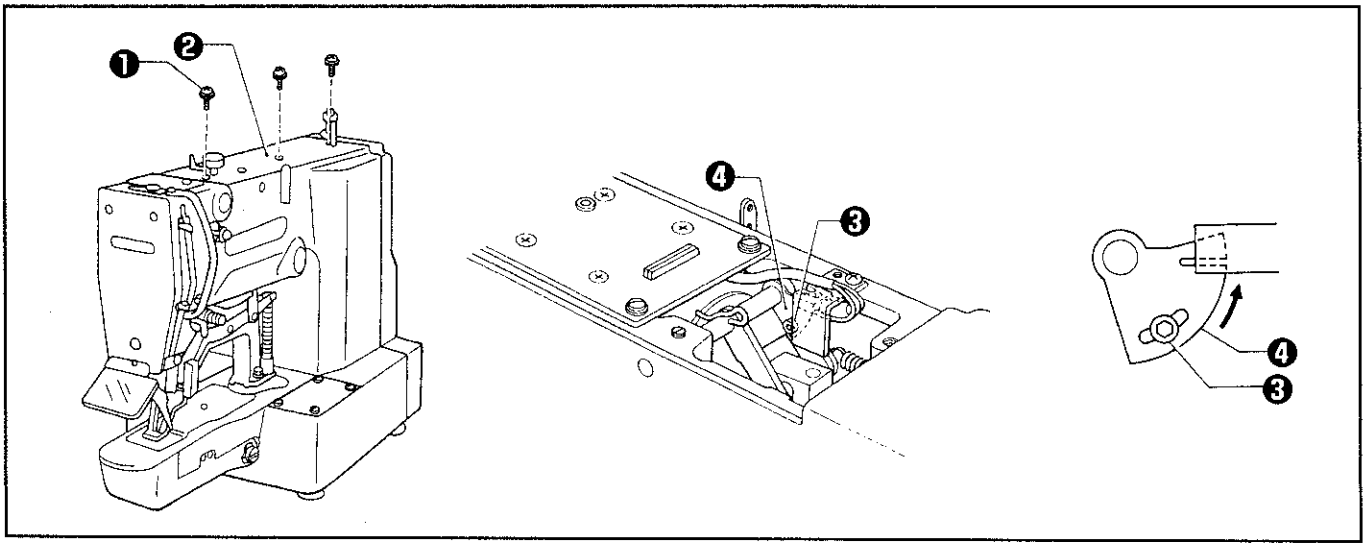
## 6-13. Adjusting the positions of the presser solenoid and the set screw of the stopper




1. Remove the screws ❶ and the top cover ❷.
2. Remove the bolt ❸, the washer ❹, and the presser arm ❺.
3. Loosen the screw ❻, adjust the position of the presser solenoid ❼ so that it is positioned 81.5 mm away from the shoulder of the machine. Tighten the screw ❻.
4. Remove the set screw ❽, and loosen the set screw ❾.
5. Press link C ❿ until the stopper rubber ⓫ of the plunger makes contact with the presser solenoid ❼. Tighten the set screw ❾ until it makes contact with link B ⓬, turn the former 90°, and then tighten the set screw ❽.

* If this adjustment is not performed properly, the work clamp may not rise or lower properly, resulting in the occurrence of error E-6.

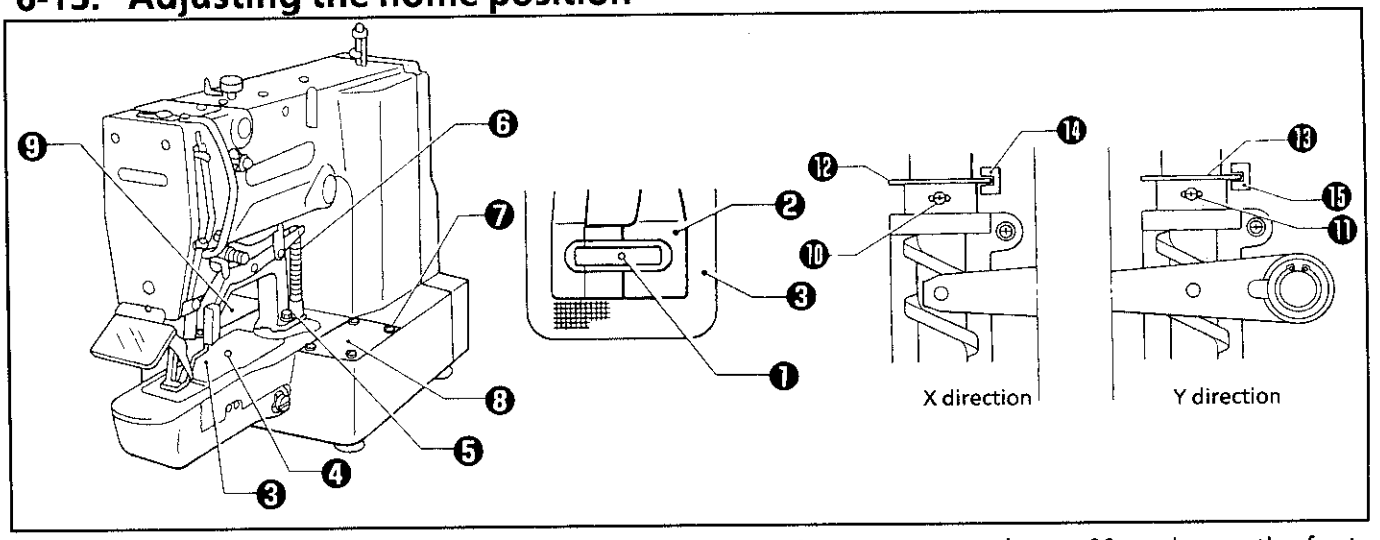
## 6-14. Adjusting the sensor perceive plate position



1. Remove the screws ❶ and the top cover ❷.
2. Loosen the screw ❸, adjust the position of the sensor perceive plate ❹ by moving it slightly vertically to eliminate noise which occurs when the work clamp is lowered, and tighten the screw ❸. Turn on the power, and check the noise.
   Be sure to turn off the power before adjustment.

* If this adjustment is not performed properly, error E-6 may occur.

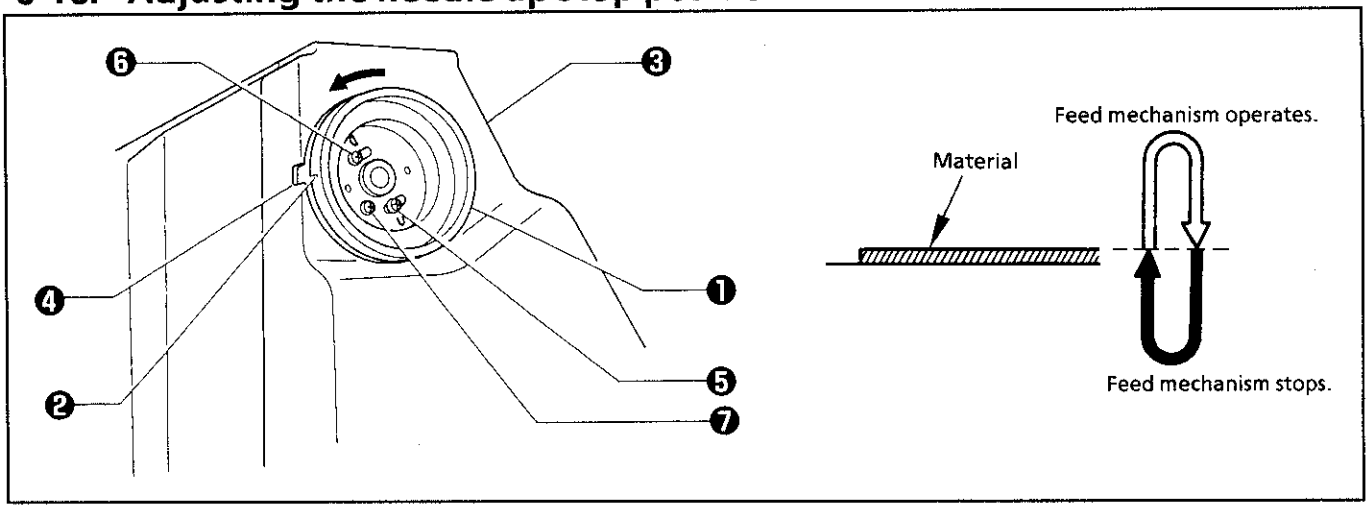
## 6-15. Adjusting the home position




1. Following the instruction manual, turn on the power, set the program number to 00, and press the foot switch to set the home position of X and Y axes.
2. Turn off the power. Loosen the screw ❹ and the bolt ❺, and move the feed plate ❸ and the presser arm ❻ so that the needle plate ❶ comes to the center of the feed plate ❸ and the presser arm ❻.
   After that, turn on the power again to check the alignment.
3. If this adjustment does not make the alignment correct, loosen the screw ❼ after turning off the power, and remove bed covers R ❽ and L ❾.
   Loosen the screws ❿ and ⓫, rotate the feed home position dogs ⓬ and ⓭ gradually, tighten screws again, and repeat step 1.
4. Turn off the power.

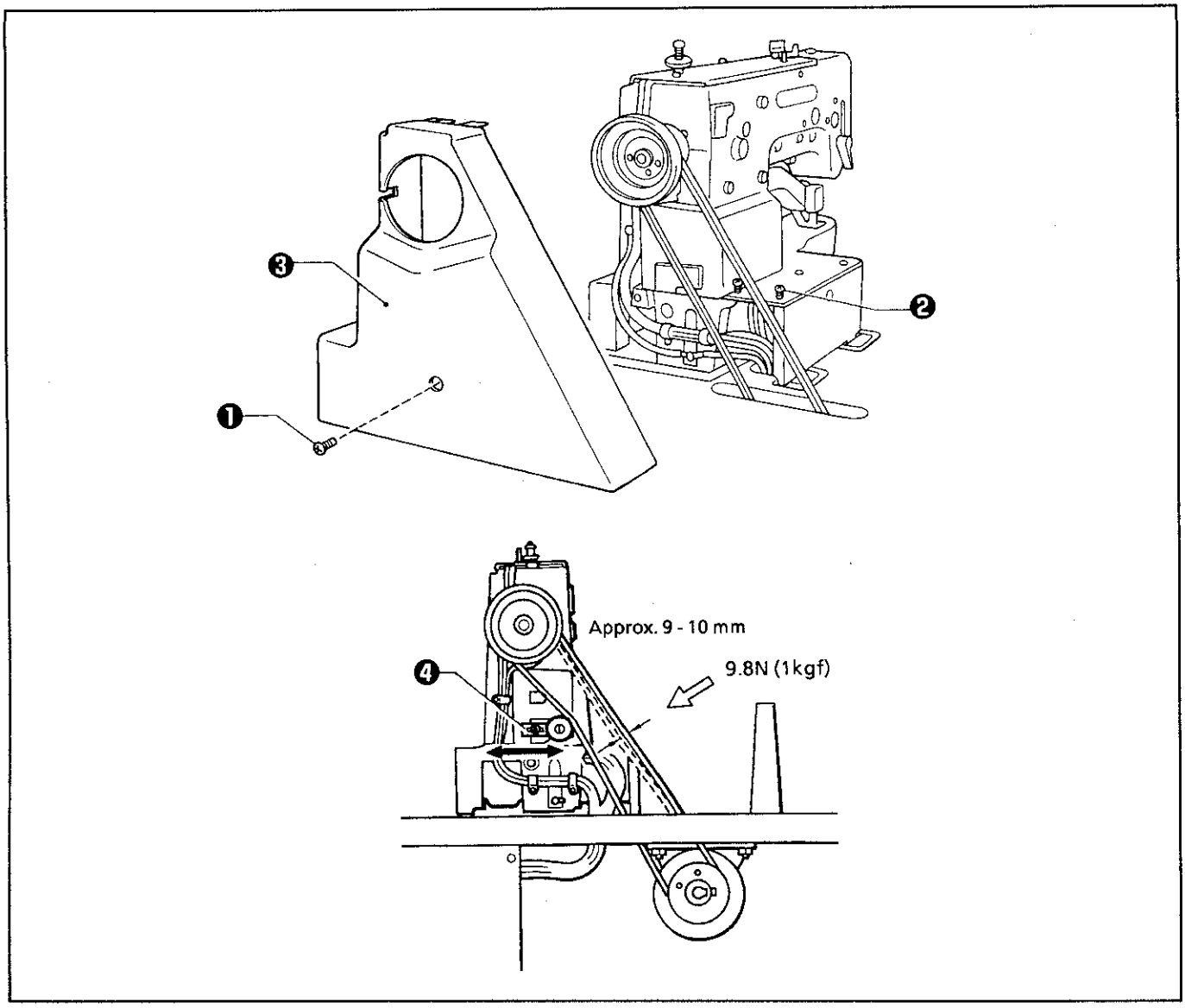
* If oil or grease is adhered to the home position sensors ⓮ and ⓯, or a wire is broken, error E-A may occur.

## 6-16. Adjusting the needle up stop position




1. Loosen the screw ❺ (at the U side on the pulley ❶), and turn the pulley ❶ so that the mark ❷ on the pulley is inside the mark ❹ of the belt cover ❸.
   The pulley ❶ stops later if it is turned clockwise; it stops earlier if it is turned counterclockwise.
   The standard needle up stop position is 6 mm below the needle bar dead point.
2. Timing between the needle and the feed mechanism is adjusted so that the feed mechanism starts operating after the needle comes out of the material sewn, and stops before the needle penetrates the material.
   The screw ❻ on the D side is tightened fully counterclockwise at the time of shipment.
3. The screw ❼ cannot be adjusted because it is used for detecting the needle stop position.

## 6-17. Adjusting the V belt tension

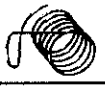
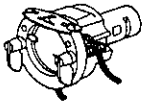
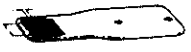



1. Remove the screws ❶ and ❷, and the belt cover ❸.
2. Press the center of the V belt with a load of 9.8 N (1 kgf), and adjust the tension pulley ❹ so that the V belt deflection is approximately 9 - 10 mm.

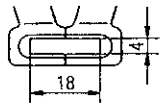
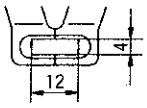
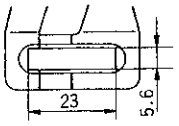
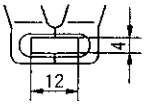
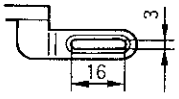
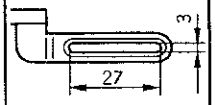
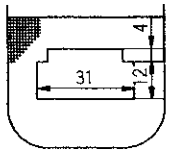
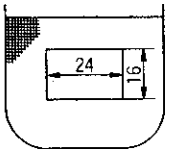
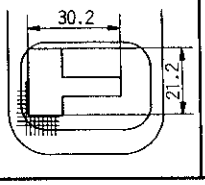
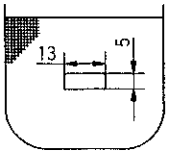
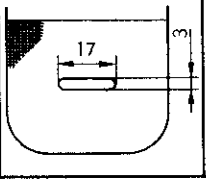
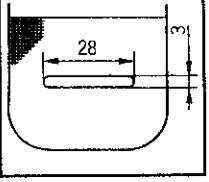
* The tension is greater than that of the BAS-300 series machines.
* If the belt tension is insufficient, it may cause the following:
- Noise or vibration may be greater.
- The needle up stop position may fluctuate.
- Error E-5 may occur.

# 7. GAUGE PARTS LIST ACCORDING TO SUBCLASSES

★ The following are standard gauge parts according to each specification.
(In the following table, parts marked with ◎ are common with the LK3-B430; parts with ○ are common with the BAS-304A.)

| Model | B430E | | | |
|---|---|---|---|---|
| Subclass | -2 | -1 | -5 | -7 |
| Use / Part name | For denim | For general clothing | | For knitwear |
| Needle hole plate  | ○ Needle hole plate E (Ø2.6) S10212-101 | ○ Needle hole plate F (Ø2.2) S10213-001 | | ○ Needle hole plate A (Ø1.6) S10211-001 |
| Inner rotary hook assembly  | ◎ Inner rotary hook B assembly 152687-902 | ◎ Inner rotary hook A assembly 152685-902 | | |
| Large shuttle hook  | ◎ Large shuttle hook B 152686-001 | ◎ Large shuttle hook A 152682-001 | | |
| Tension spring  | ◎ Tension spring 107606-001 | ◎ Tension spring 104525-001 | | |
| Spring  | ◎ Spring B 144588-001 | ◎ Spring 145519-001 | | |
| Shuttle race base assembly  | ◎ Shuttle race base assembly S02427-201 | | | Shuttle race base assembly for knitwear S37976-001 |
| Needle bar thread guide   | Needle bar thread guide A 152890-001 | Needle bar thread guide B S41222-001 | | Needle bar thread guide A 152890-001 |
| Needle  | DP × 17 NY #19 S37928-019 | ◎ DP × 5 #16 107415-016 | | ◎ DP × 5 #9 107415-009 |
| Presser arm assembly | Presser arm assembly for denim use S37948-009 | Presser arm assembly S37952-009 | Presser arm assembly for knitted material use S37953-009 | |
| Spring  | ◎ Spring C 154356-001 | ◎ Spring A 153568-001 | | |
| Work clamp  | ◎ 5.6 × 23 (for 3 mm use) R. 153608-101 L. 154527-001 | ◎ 4 × 18 (for 2 mm use) R.152777-001 L.152778-001 | ◎ 4 × 12 (for 2 mm use) R.152779-001 L.152780-001 | |
| Feed plate  | ◎ 153610-101 | ◎ 12 × 31 (Submerged-type L) 153055-201 | ◎ 12 × 24 (Submerged-type S) 153207-201 | ◎ 5 × 13 (for 2 mm use) 152791-201 |

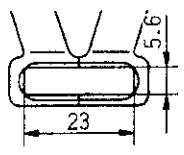
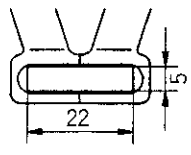
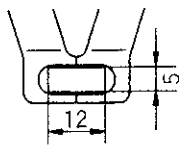
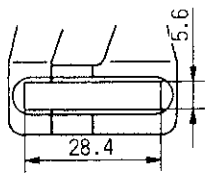
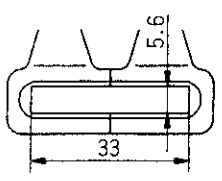
Standard sizes for work clamps and feed plates are as follows:
(The actual sewing area has a 1.5 mm margin on every side; inside the lines which the dimensions indicate.)

| Specification | B430E | | | | B431E | |
|---|---|---|---|---|---|---|
| Model | -1 | -5 | -2 | -7 | -2 | -3 |
| R | 152777-001 | 152779-001 | 152608-101 | 152779-001 | 154416-001 | 154417-001 |
| L | 152778-001 | 152780-001 | 154527-001 | 152780-001 | | |
| Work clamp |  |  |  |  |  |  |
| | 153055-201 | 153207-201 | 153610-101 | 152791-201 | 154419-201 | 054420-201 |
| Feed plate |  |  |  |  |  |  |

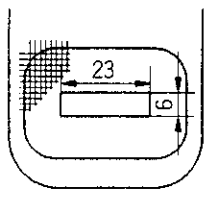
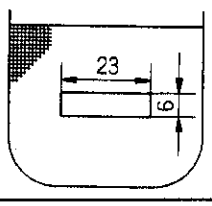
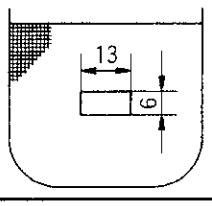
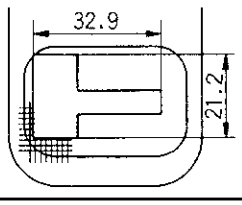
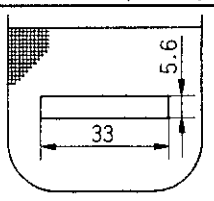
*The movable knife assy (S10205-001) and the fixed knife (S10210-101) are used.

<Gauge parts >
The following are provided as optional gauge parts.
(Each work clamp pair is used in combination with the feed plate directly below them.)

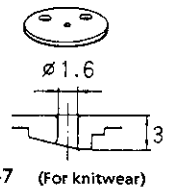
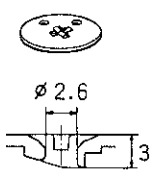
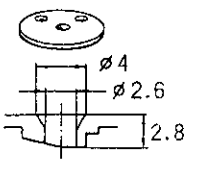
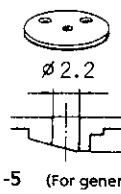
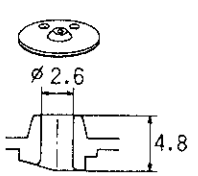
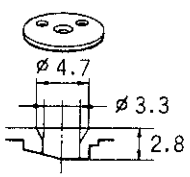
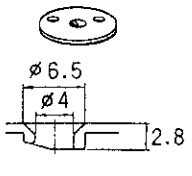
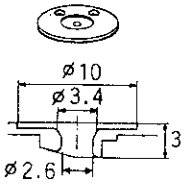
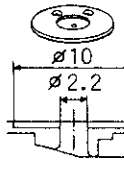
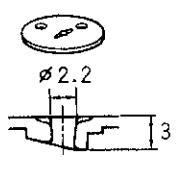
- Work clamps R and L ◎

| 152781-001 (For denim) | 153201-001 (PL) | 153203-001 (PS) | S00906-001 (1 Inch) | S33747-001 (30 mm) |
|---|---|---|---|---|
| 152782-001 (For denim) | 153202-001 (PL) | 153204-001 (PS) | S00907-001 (1 Inch) | S33748-001 (30 mm) |
|  |  |  |  |  |

- Feed plate ◎

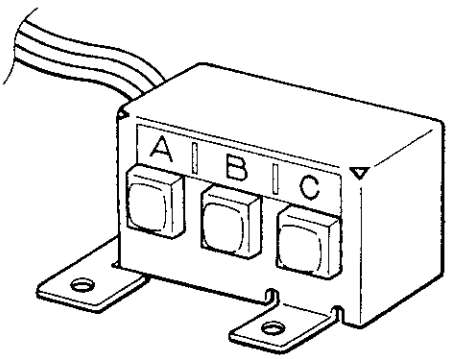
| 152792-001 (For denim) | 153205-201 (PL) | 153206-201 (PS) | S00908-001 (1 Inch) | S33749-001 (30 mm) |
|---|---|---|---|---|
|  |  |  |  |  |

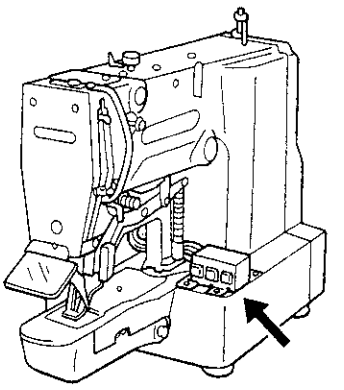
- Needle hole plate ○

| A S10211-001 | D S29997-001 | E S10212-101 | F S10213-001 | H S30450-001 |
|---|---|---|---|---|
|  -7 (For knitwear) |  |  -2 (For denim) |  -1, -5 (For general clothing) |  |
| **L S25127-001** | **M S34348-001** | **ED S30925-001** | **FD S30926-001** | **BZ S41013-001** |
|  |  |  |  |  |

# 8. ACCESSORIES

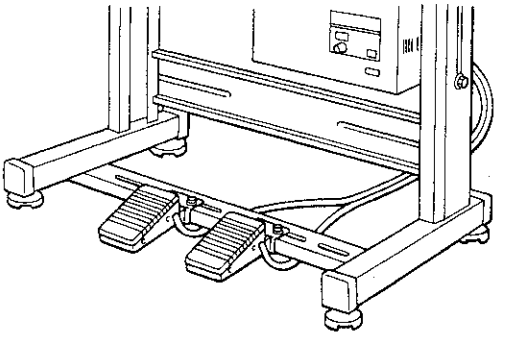
Handy switch
(OP box assy)
S38048009



The handy switch can be used to call up to 6 sewing patterns registered on the machine in advance.
It can help to increase productivity in a process where many sewing patterns are sewn and quick change is necessary.

2-pedal foot switch set
S38058001



The start and clamp switches are separately allocated.

# 9. TROUBLESHOOTING

| Problem | Cause | Check | Solution | Page |
|---|---|---|---|---|
| Work clamp does not rise. | Link operation is sluggish. | Solenoid position | Adjust solenoid position. | 42 |
| | | Stopper set screw position | Adjust the position of the stopper set screw. | 42 |
| | Work clamp operation is sluggish. | Grease on work clamp | Apply grease to the sliding part of the work clamp. | 24 |
| | Too high work clamp lift stroke | Distance between work clamp and needle plate top | Adjust the height of the work clamp to 17 mm or less. | 38 |
| | Improper sliding of presser plate and presser arm lever plate | Grease on presser plate and presser arm lever plate | Apply grease to the presser plate and the presser arm lever plate. | 24 |
| | Work clamp makes contact with thread wiper. | Thread wiper stand-by position | Adjust the position of the thread wiper. | 38 |
| | Improper position of sensor perceive plate | Sensor perceive plate position | Adjust the position of the sensor perceive plate. | 42 |
| | Electrical trouble | See #12 "Presser foot does not lower" in the table in 10-10 | ← | 73 |
| Work clamp does not lower. | Link does not return. | Spring | Hook the spring properly. | |
| | | Solenoid position | Adjust the solenoid position. | 42 |
| | | Stopper set screw position | Adjust the position of the stopper set screw. | 42 |
| | Electrical trouble | See #12 "Presser foot does not lower" in the table in 10-10 | ← | 74 |
| Insufficient work clamp lift stroke. | Improper position of presser arm lever plate | Distance between work clamp and needle plate top | Adjust the work clamp lift stroke. | 38 |
| Improper thread wiper operation | Thread wiper obstructs needle | Clearance between thread wiper and needle tip | Adjust the height of the thread wiper. | 38 |
| | Improper position of thread wiper | Thread wiper position | Adjust the operating distance of the thread wiper. | 38 |

| Problem | Cause | Check | Solution | Page |
|---|---|---|---|---|
| Lower thread is wound to one side. | Improper height of tension stud | Height of the tension stud | Adjust the height of the tension stud. | |
| Insufficient lower thread wound | Improper position of bobbin presser | Wound lower thread amount | Adjust the height of the bobbin presser. | |
| Upper thread unthreaded | Stitches skipped at start of sewing | See "Skipped stitches occur." | See "Skipped stitches occur." | |
| | Unstable thread length after thread trimming | Upper thread length after thread trimming | Adjust the sub tension. | 2 |
| Upper thread breaks. | Upper thread tension too great | Upper thread tension | Adjust the upper thread tension. | 2 |
| | Improper needle orientation | Needle orientation | Reinstall the needle with its long groove facing the front. | |
| | Thread is too thick for needle. | Upper thread and needle | Use the correct thread for the needle. | |
| | Improper tension and height of the thread take-up spring | Thread take-up spring tension and height | Adjust the tension and height of the thread take-up spring. | 2 |
| | Damaged or burred rotary hook, needle hole plate or needle | Scratches or burrs | File or replace the affected part. | |
| | Thread melting (synthetic thread) | Thread end | Use the thread cooling device. | |
| Lower thread breaks. | Lower thread tension too great | Lower thread tension | Adjust the tension of the lower thread. | 2 |
| | Damaged corners of needle hole plate or bobbin case | Damage | File or replace the affected part. | |
| Skipped stitches occur. | Excessive clearance between needle and rotary hook tip | Clearance between needle and rotary hook point | Adjust the needle clearance between the needle and the rotary hook point. | 37 |
| | Improper timing between needle and rotary hook | Needle bar lift stroke | Adjust the needle bar lift stroke. | 36 |
| | Driver is contacting needle more than is necessary. | Clearance between driver and needle | Adjust the driver needle guard. | 37 |
| | Needle bent | Needle curve | Replace the needle with a new one. | |
| | Needle improperly installed | Needle orientation | Reinstall the needle with its long groove facing the front. | |

| Problem | Cause | Check | Solution | Page |
|---|---|---|---|---|
| Needle breaks. | Needle is interfering with rotary hook. | Clearance between needle and rotary hook point | Adjust the clearance between the needle and rotary hook point. | 37 |
| | | Needle bar lift stroke | Adjust the needle bar lift stroke. | 36 |
| | Needle is bent. | Needle curve | Replace the needle with a new one. | |
| | Sideways needle movement | Needle and feed timing | Adjust the needle down detection position. | 43 |
| | Needle is too thin. | Needle and thread | Use the correct needle for the material. | |
| | Electrical trouble | See #20 "The machine cannot produce correct stitches" in the table in 10-10. | ← | 76 |
| Upper or lower thread is not trimmed. | Fixed knife is blunt. | Fixed knife blade | Sharpen or replace the fixed knife. | |
| | Movable knife does not pick up the thread. | Rotary hook thread guide | Adjust the position of rotary hook thread guide. | 37 |
| | | Needle bar lift stroke | Adjust the needle bar lift stroke. | 36 |
| | Movable knife does not pick up the thread because of skipped stitches at the end of sewing. | Skipped stitches at the end of sewing | See "Skipped stitches occur." | |
| | Improper position of movable knife | Movable knife position | Adjust the position of the movable knife. | 39 |
| | Sub tension is insufficient. | Sub tension | Turn the tension nut to adjust the tension. | |
| | Electrical trouble | See #21 "The thread trimmer does not operate" in the table in 10-10. | ← | 76 |
| Thread jamming | Inadequate tension and height of thread take-up spring | Tension and height of thread take-up spring | Adjust the tension and height of the thread take-up spring. | 2 |
| | Improper needle and rotary hook timing | Needle bar lift stroke | Adjust the needle bar lift stroke. | 36 |
| | Rotary hook thread guide does not separate upper and lower threads. | Rotary hook thread guide position | Adjust the position of the rotary hook thread guide. | 37 |

| Problem | Cause | Check | Solution | Page |
|---|---|---|---|---|
| Poor stitching on reverse side of material | Rotary hook thread guide does not separate upper and lower threads properly. | Rotary hook thread guide position | Adjust the position of the rotary hook thread guide. | 37 |
| | Improper upper thread tension | Upper thread tension | Adjust the upper thread tension. | 2 |
| | Unstable upper thread length after thread trimming | Upper thread length after thread trimming | See "Unstable upper thread length." | |
| Poor stitching | Upper thread tension insufficient | Upper thread tension | Adjust the upper thread tension. | 2 |
| | Lower thread tension insufficient | Lower thread tension | Adjust the lower thread tension. | 2 |
| | Improper tension and height of thread take-up spring | Thread take-up spring tension and height | Adjust the tension and height of the thread take-up spring. | 2 |
| Unstable upper thread length | Improper tension and height of thread take-up spring | Thread take-up spring tension and height | Adjust the tension and height of the thread take-up spring. | 2 |
| | Improper adjustment of sub tension | Sub tension | Adjust the sub tension. | |
| | Needle up stop position fluctuates. | See "Unstable needle up stop position." | ← | |
| | Fixed knife is blunt. | Fixed knife blade | Sharpen or replace the fixed knife. | |
| Unstable needle up stop position | Inadequate adjustment of V belt tension | Tension pulley position | Adjust the tension of the V belt using the tension pulley. | 44 |
| | Electrical trouble | See #22 "The machine does not stop with the needle at the upper position after thread trimming" in the table in 10-10. | ← | 77 |

# 10. ELECTRIC MECHANISM

## 10-1. Precautions at the time of adjustment

Pay attention to the following when opening the control box for maintenance.

◎ Electric shock

Some large capacitors may have a high voltage remaining in them for up to 5 minutes after the power is turned off. To prevent electric shock, wait at least 5 minutes after the power is turned off before doing the following:

- Opening and closing the control box
- Replacing fuses
- Separating and joining connectors
- Measuring resistance
- Doing anything with a possibility of touching something inside the control box

Some adjustments require measuring the voltage while the power is turned on with the control box kept open.

In such a case, be careful not to touch any place other than that for the measurement. In addition, always keep in mind that a high voltage remains for 5 minutes after the power is turned off.

◎ Injury

While the power is turned on, the cooling fan of the control box operates; be careful not to get caught in it.

When separating or rejoining connectors, and measuring something, be careful not to cut your fingers on metal parts such as heatsinks and covers.

## 10-2. Components inside the control box

The following are brief explanations of components inside the control box. See control circuit block diagram at the end of this manual for the details of the connections.

◎ Main PCB

The main PCB is fixed to the rear panel of the control box. This PCB serves to control machine operation.

◎ Power supply circuit board

The power supply circuit board is fixed at the bottom of the control box. Four fuses are mounted on this PCB.

◎ Panel circuit board

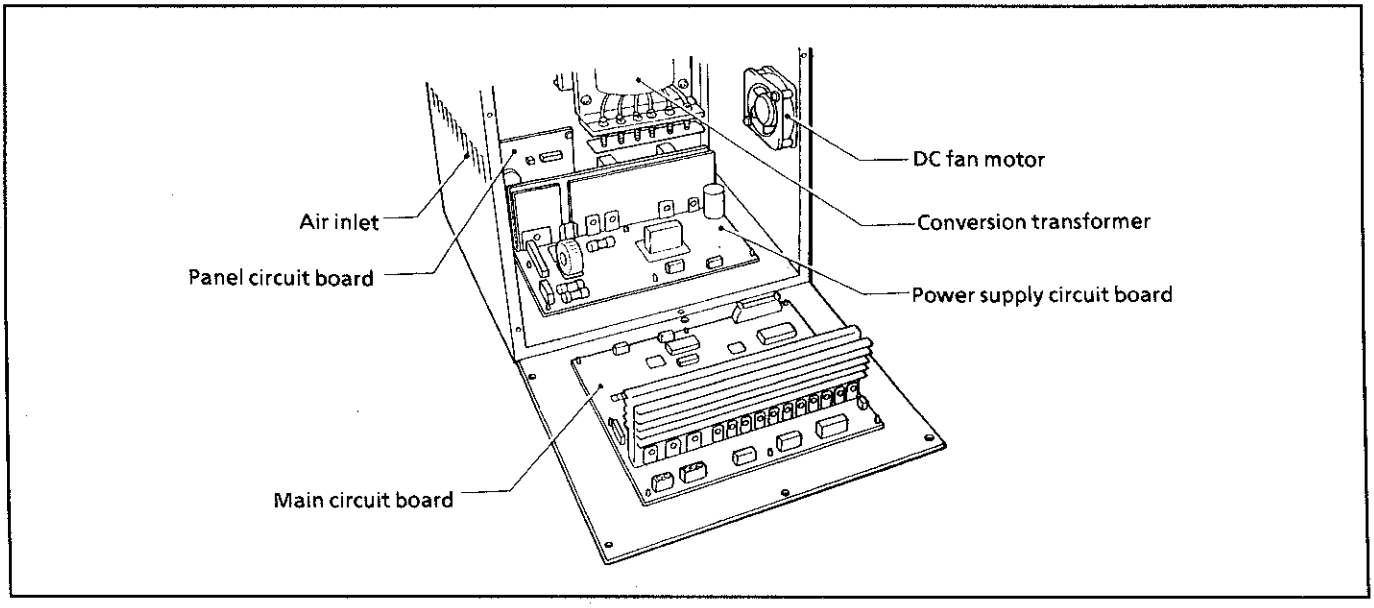
The panel circuit board is fixed to the front panel of the control box. This PCB controls indications of the machine status and the input operation.

◎ DC fan motor

The DC fan motor serves as a fan to cool the inside of the control box. Clean the inlet filter monthly.

◎ Conversion transformer (depending on power supply voltage specification)

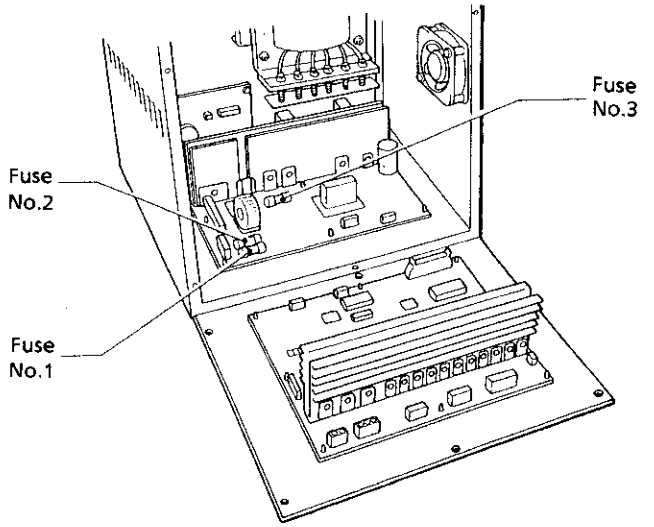
The conversion transformer controls the power supply voltage to provide 220 V.



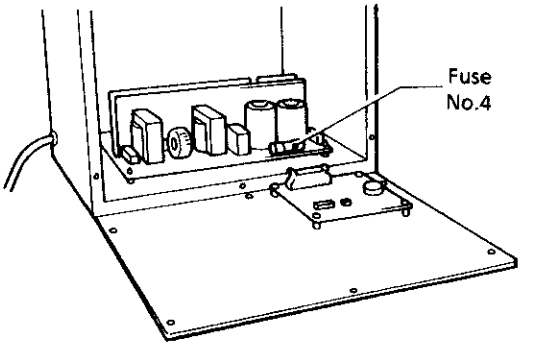
## 10-3. Fuse explanation

When replacing a fuse, follow the instructions indicated in "10-9. Troubleshooting flowchart."
If a component on a PCB is damaged, a fuse may blow again immediately even when it has been replaced.
When replacing a fuse, be sure to use the specified ones listed below.

| No. | Part name | Part code | Manufacturer | When a fuse has blown |
|---|---|---|---|---|
| 1 | Fuse 5A-D<br>(glass tube fuse, 5A-250V) | 157219-000 | Fuji Tanshi Company<br>FGB0 | The power lamp is not lit, and nothing operates. |
| 2 | Fuse 5A-D<br>(glass tube fuse, 5A-250V) | 157219-000 | Fuji Tanshi Company<br>FGB0 | The power lamp is not lit, and nothing operates. |
| 3 | G fuse (5AFB)<br>(quick melting type, 5A-250V) | S08030-000 | Toyo Fuse Company<br>TOYO5A | The feed mechanism and work clamp do not operate. |
| 4 | G fuse (5AFB)<br>(quick melting type, 5A-250V) | S08030-000 | Toyo Fuse Company<br>TOYO5A | The machine motor does not turn. |




Main PCB mounting side



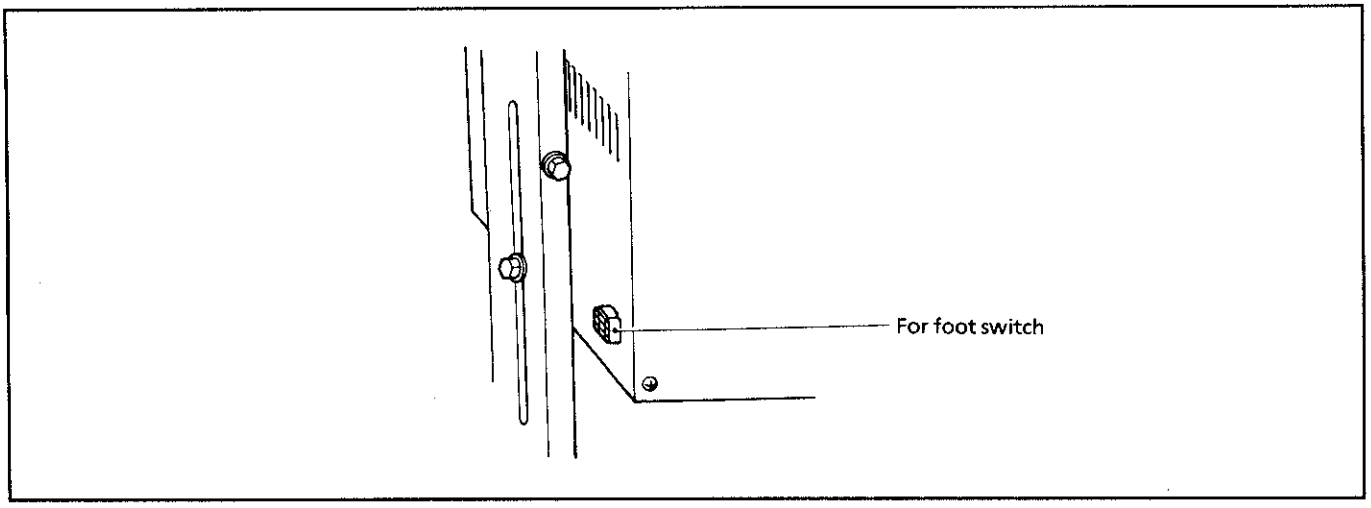

Panel PCB mounting side

## 10-4. Connectors

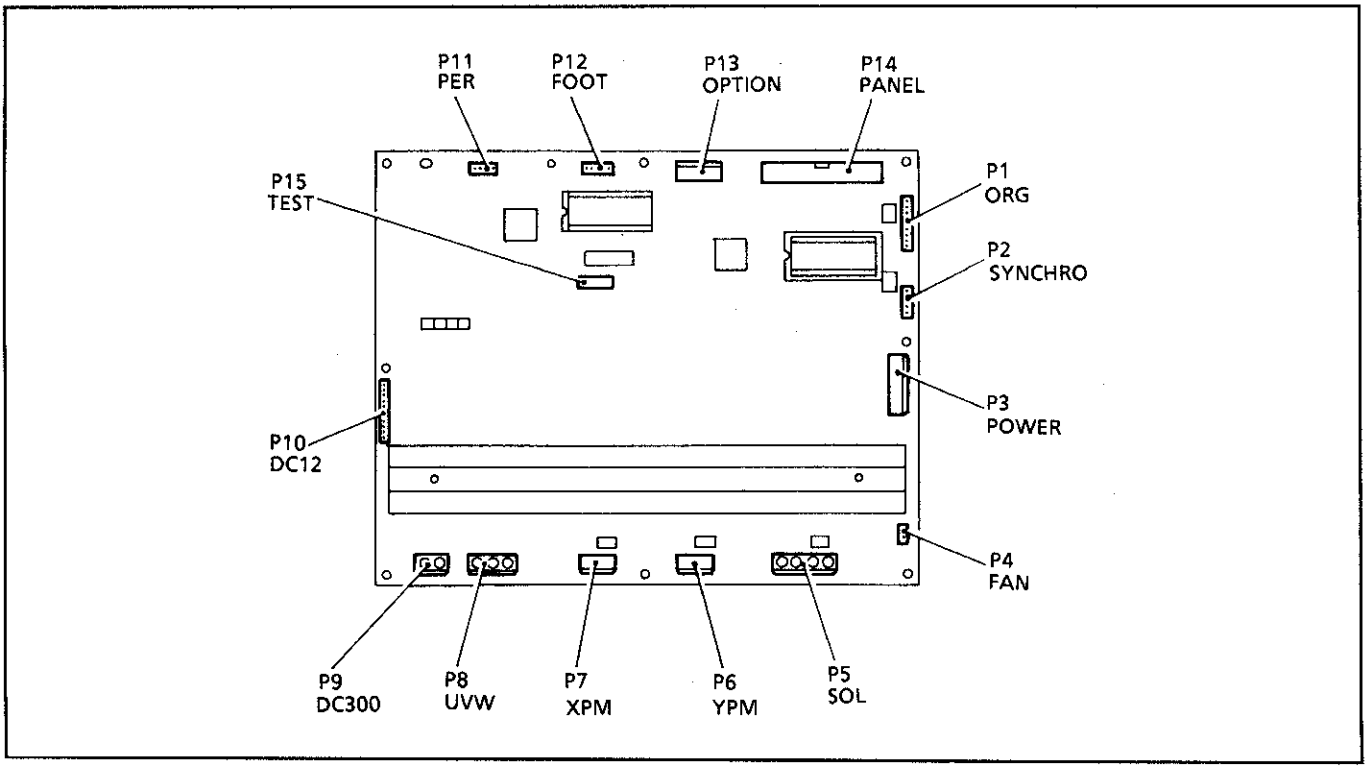
Most of the machine trouble is due to connector problems including improper connection or insufficient contact. Therefore, be sure to check if each connector is correctly inserted and that there is no contact failure between pins and wires before starting troubleshooting procedures.

◎ Connector positions

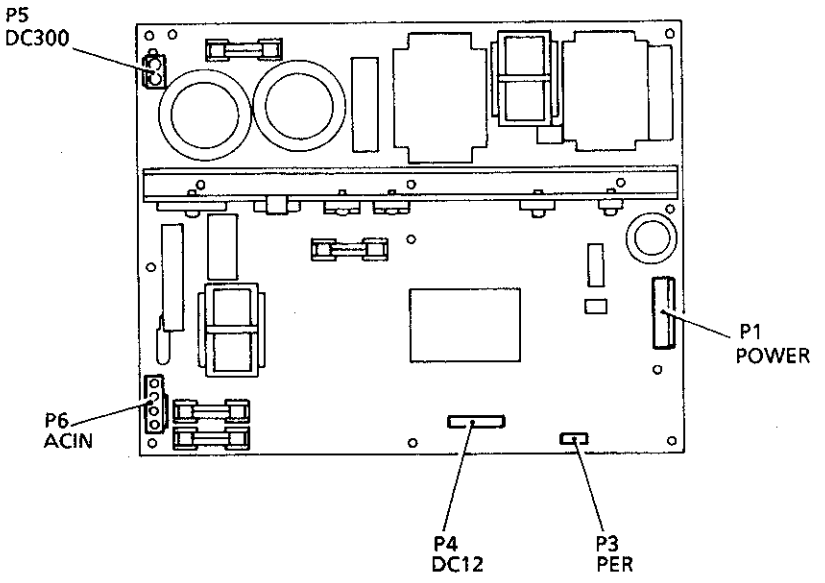
Outside of the control box



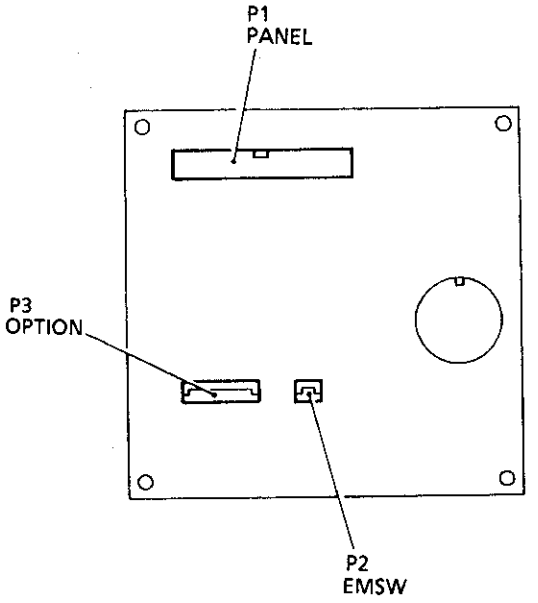

Main PCB



Power supply circuit board



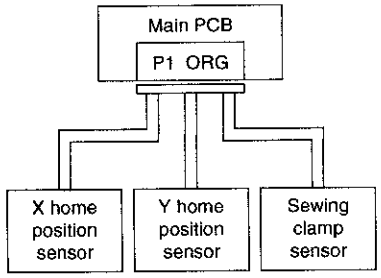
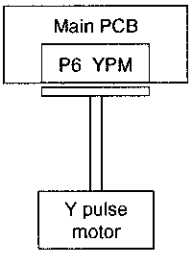
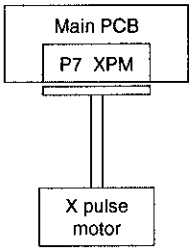

Panel circuit board



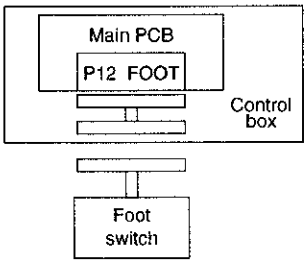
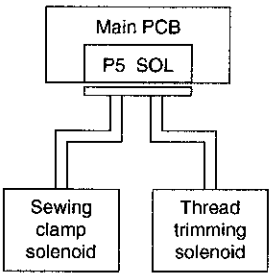
◎ Contact failure

- The connectors functions are divided into four categories. Some connectors may belong to more than one group. Be sure to investigate another category if a problem is not found in one category.
- For the details of connections, refer to the control circuit block diagram at the end of this manual.

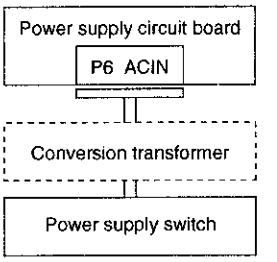
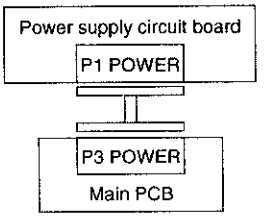
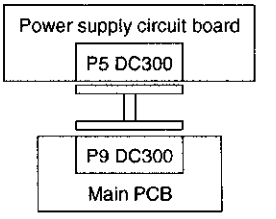
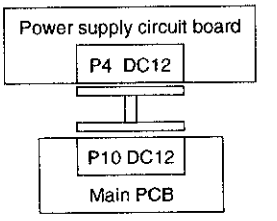
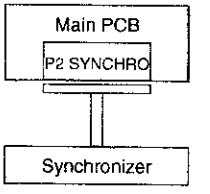
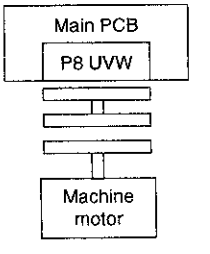
1. Feed mechanism

| Problem | Connector No. and position |
|---|---|
| • Home position is not properly detected.<br>• Error E-A is displayed.<br>• The work clamp does not operate.<br>• Error E-6 is displayed. |  |
| • Forward feed does not operate correctly.<br>• Error E-A is displayed. |  |
| • Sideways feed does not operate correctly.<br>• Error E-A is displayed. |  |

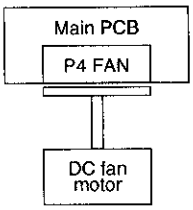
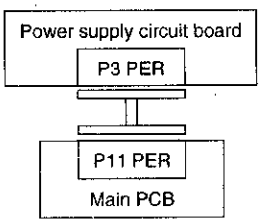
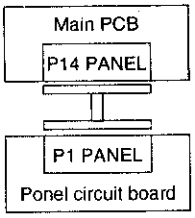
2. Work clamp lifter and thread trimmer mechanisms

| | |
|---|---|
| • The work clamp does not operate.<br>• The machine does not operate. |  |
| • The work clamp does not operate.<br>• Thread trimming is not performed.<br>• Error E-6 is displayed. |  |

3. Sewing operation

| | |
|---|---|
| • The power lamp is not lit, and nothing operates.<br>• Machine operation is unstable. |  |
| • The power lamp is not lit, and nothing operates.<br>• Machine operation is unstable.<br>• The feed mechanism does not operate.<br>• The work clamp lifter mechanism does not operate.<br>• Error E-6 is displayed.<br>• Error E-A is displayed. |  |
| • The machine motor does not run.<br>• Motor operation is unstable.<br>• Needle up stop position is not correct.<br>• Error E-2 is displayed.<br>• Error E-5 is displayed. |  |
| • The machine motor does not run.<br>• Motor operation is unstable.<br>• Needle up stop position is not correct.<br>• Error E-2 is displayed.<br>• Error E-5 is displayed. |  |
| • The machine motor does not run.<br>• Motor operation is unstable.<br>• Needle up stop position is not correct.<br>• Error E-2 is displayed.<br>• Error E-5 is displayed. |  |
| • The machine motor does not run.<br>• Motor operation is unstable.<br>• Needle up stop position is not correct.<br>• Error E-2 is displayed.<br>• Error E-5 is displayed. |  |

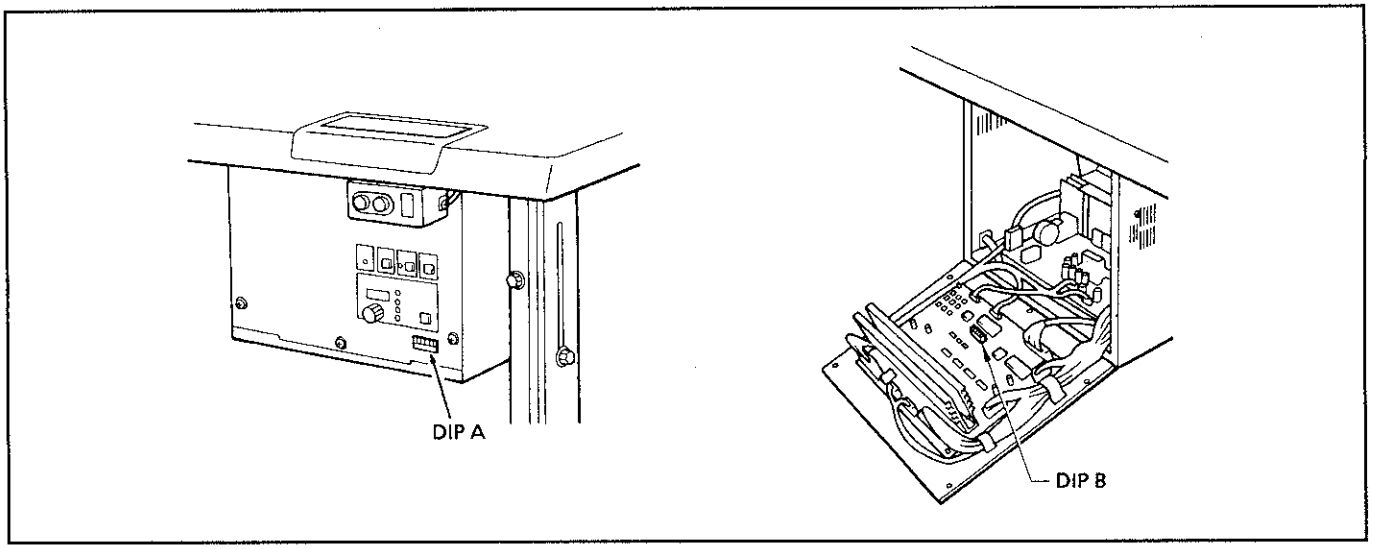
4. Others

| | |
|---|---|
| • The DC fan motor does not run.<br>• Error E-7 is displayed. |  |
| • Error E-9 is displayed.<br>• Error E-F is displayed. |  |
| • Indication is strange.<br>• Any switch does not have any effect.<br>• The power lamp is not lit. |  |

## 10-5. DIP and memory switches

NOTE: Be sure to turn off the power before changing the DIP switch setting.

The DIP switches are located on the front part of the operation panel (DIP A) and on the main PCB in the control box (DIP B).




The contents of DIP switches

| Switch | When it is set to on | |
|---|---|---|
| DIPA-1 | The work clamp does not rise automatically after sewing is finished. | See "Work clamp mode setting" on the next page. |
| DIPA-2 | 2-pedal foot switch mode is available. | |
| DIPA-3 | User program mode is available. | |
| DIPA-4 | – | |
| DIPA-5 | The work clamp does not rise automatically during split mode operation. | |
| DIPA-6 | – | |
| DIPA-7 | Enlargement function is not activated. | |
| DIPA-8 | Program number is unchanged. | |

| Switch | When it is set to on |
|---|---|
| DIPB-1 | First two stitches are sewn at a low speed of 260 spm. |
| DIPB-2 | Last two stitches are sewn at a low speed of 260 spm. |
| DIPB-3 | First two stitches are sewn at a low speed of 400 spm regardless of program number. *1 |
| DIPB-4 | Last two stitches are sewn at a low speed of 400 spm regardless of program number. *1 |
| DIPB-5 | – |
| DIPB-6 | Low speed sewing at the start of sewing is not activated. |
| DIPB-7 | – |
| DIPB-8 | Sewing area is unlimited. |

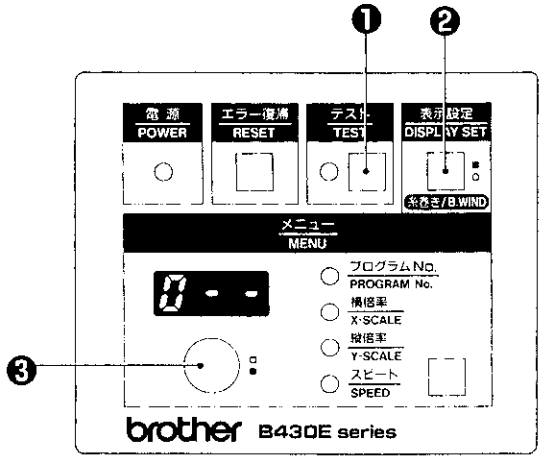
*1 The sewing speed for the last two stitches is 700 spm for denim specification with standard sewing pattern (program number 2, 3, or 6): other than that, it is automatically set to 400 spm.

(Work clamp mode setting)
Work clamp operation can be changed according to the combination of DIP A-1 and DIP A-2.

| DIPA-1 | DIPA-2 | Pedal | Work clamp movement when sewing is completed |
|---|---|---|---|
| – | – | Single | The work clamp automatically rises. (Normal setting at shipment) |
| On | – | Single | The work clamp is raised by pressing the pedal. |
| – | On | 2 pedals | The work clamp automatically rises. It is lowered by pressing the pedal. |
| On | On | 2 pedals | The work clamp keeps rising while the pedal is pressed. |

Memory switches are stored in the memory of the EEPROM chip on the main PCB. Their functions can be changed from the operation panel as follows:

1. While pressing the TEST switch ❶, press the DISPLAY SET switch ❷.
   (0-will appear on the display.)
2. Turn the switch ❸ until a number to be changed appears at the left end of the display.
3. Use the DISPLAY SET switch ❷ to set the setting to on or off. Each time the DISPLAY SET switch ❷ is pressed, on and off will be switched between alternately.
4. Press the TEST switch ❶. (The display will return to normal status.)




The contents of memory switches

| Switch | When it is set to on |
|---|---|
| memo-0 | When sewing is completed, the feed plate returns to the sewing start point via mechanical home position. |
| memo-1 | The work clamp rises after it moves to the sewing start point. * |
| memo-2 | When using the handy switch to select a user program, the work clamp moves to the next sewing start point at the same time as the program is switched. (Normally the work clamp moves to the sewing start point after sewing starts.) |
| memo-3 | Programs are performed during sewing in the order specified in the user program. |
| memo-4 | Sewing speed is fixed at the minimum speed for the data. |
| memo-5 | Feed timing is changed. (See "Feed timing setting.") |
| memo-6 | |
| memo-7 | – |
| memo-8 | Single stitch test mode is available. |
| memo-9 | The reference point of enlargement or reduction is the sewing start point. |
| memo-A | – |
| memo-b | – |
| memo-c | – |
| memo-d | – |
| memo-E | Test feeding is performed at the same speed as that for actual sewing. (For checking feeding operation) |
| memo-F | The work clamp automatically opens and shuts once when sewing is completed. (For running-in operation) |

* Normally, the work clamp will rise at the final stitch so as to lose no time for taking out the sewing material.

Feed timing setting

| Memory switch | | Feed timing | Machine model | Example (* NOTE 1) | | | |
|---|---|---|---|---|---|---|---|
| | | | | 3 mm pitch | | | |
| memo-5 | memo-6 | | | 2000spm | 1600spm | 1300spm | 1000spm |
| off | off | Slow | B430E | 135° | 160° | 180° | 200° |
| off | on | Rather slow | | 125° | 125° | 130° | 130° |
| on | off | Rather fast | | 115° | 110° | 105° | 100° |
| on | on | Fast | B431E-B433E | 110° | 100° | 90° | 85° |

NOTE 1: Angles listed in the left table are the angles of the upper shaft which rotates from the point where the needle down signal is input until the point where the feed mechanism starts to operate, and are for reference only. They will vary depending on factors such as the weight of the material being sewn, and the stitch length.

NOTE 2: Memory switches are reset to default settings before the sewing machine is shipped from the factory or when the memory is cleared.

## 10-6. Error code list

Error code list

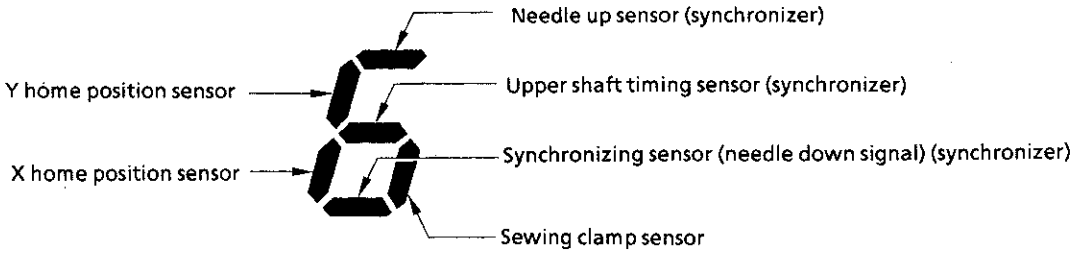
| Error code | Cause | Remedy |
|---|---|---|
| E-2 | The motor has stopped, the motor will not run, or there is a malfunction of the synchronizer. | Turn off the power, turn the pulley, and check that the machine is not locked.<br>Check the synchronizer connections.<br>Check whether connectors P8, P9, P10, and P11 are securely attached. |
| E-3 | Sewing data extends outside sewing area. | Press the RESET switch, and then set the enlargement ratio again. |
| E-4 | The length of a stitch exceeds 10 mm, or there is some other abnormality in the sewing data. | Press the RESET switch, and set the enlargement ratio again. If new data has been created, repeat the procedure from the beginning. |
| E-5 | The machine does not stop with its needle bar at its upper position. | Turn the pulley to align the mark to the needle up stop position. (See 6-16.)<br>Adjust the tension of the V belt. (See 6-17.)<br>Check whether connector P2 is securely attached. |
| E-6 | Work clamp does not move up and down. | See 10-10. |
| E-7 | The DC fan motor does not run. | Turn off the power, and check if the motor is jammed with scraps of thread. * |
| E-8 | The PROM motor assembly or main PCB is defective. | Turn off the power, and contact our authorized service center. |
| E-9 | Abnormal voltage occurs. | Turn off the power, and check input voltage. (See 10-8.) |
| E-A | The machine can not detect the home position (malfunction of the home position sensor), or the power supply circuit board is defective. | Turn off the power, and contact our authorized service center. |
| E-b | Operator tried to change the program number when DIP switch A-8 was set to off. | Press the RESET switch.<br>Set DIP switch A-8 to off before changing the program number. |
| E-d | The heatsink of the main PCB overheated. | Turn off the power, and clean the air inlet of the control box. |
| E-E | EEPROM chip is defective. | Turn off the power, wait a while, and then turn on the power again. If the same error occurs repeatedly, contact our authorized service center. |
| E-F | Power supply relay does not operate (malfunction of the power supply circuit board). | Turn off the power, and contact our authorized service center. |

* Before opening the control box, be sure to turn off the power, remove the power supply plug, and wait 5 minutes. Touching areas where high voltages are present can result in severe injuries.

## 10-7. Sensor check function

When you want to know the current status of the sensor operations, perform the following procedure to indicate it on the display.

1. Turn on the power.
2. Press the MENU switch to light up the X-scale lamp.
3. While pressing the TEST switch, press the RESET switch.
4. The sensors currently activated will appear in the first digit display area as shown below.




(Lighting requirements)

| | | |
|---|---|---|
| Y home position sensor | : | is lit when the home position is detected. |
| X home position sensor | : | is lit when the home position is detected. |
| Needle up sensor | : | is lit when the needle is raised. |
| Upper shaft sensor | : | is lit when a signal is input. |
| Synchronizing sensor | : | is lit when the needle is lowered. |
| Sewing clamp sensor | : | is lit when the work clamp is lowered. |

5. Press the TEST switch to return the display to normal.

## 10-8. Input voltage check

When you want to know the status of the currently input voltage, perform the following procedures to indicate it on the display.
The voltage values are expressed as a percentage (100% when 200V is supplied to the power supply circuit board).

1. Press the MENU switch to light the Y-scale lamp.
2. While pressing the TEST switch, press the RESET switch.
3. The input voltage will appear on the display.

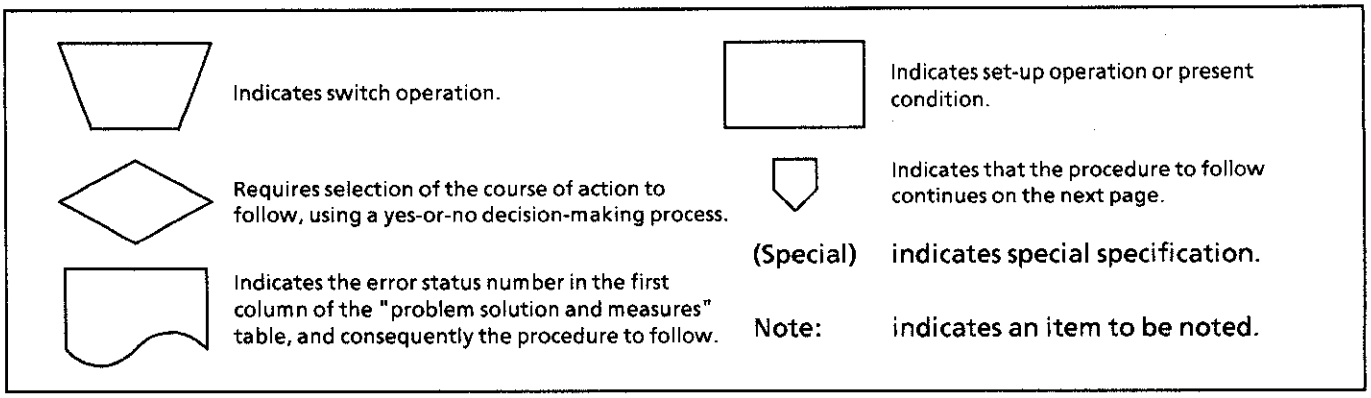
[When a normal voltage is input]

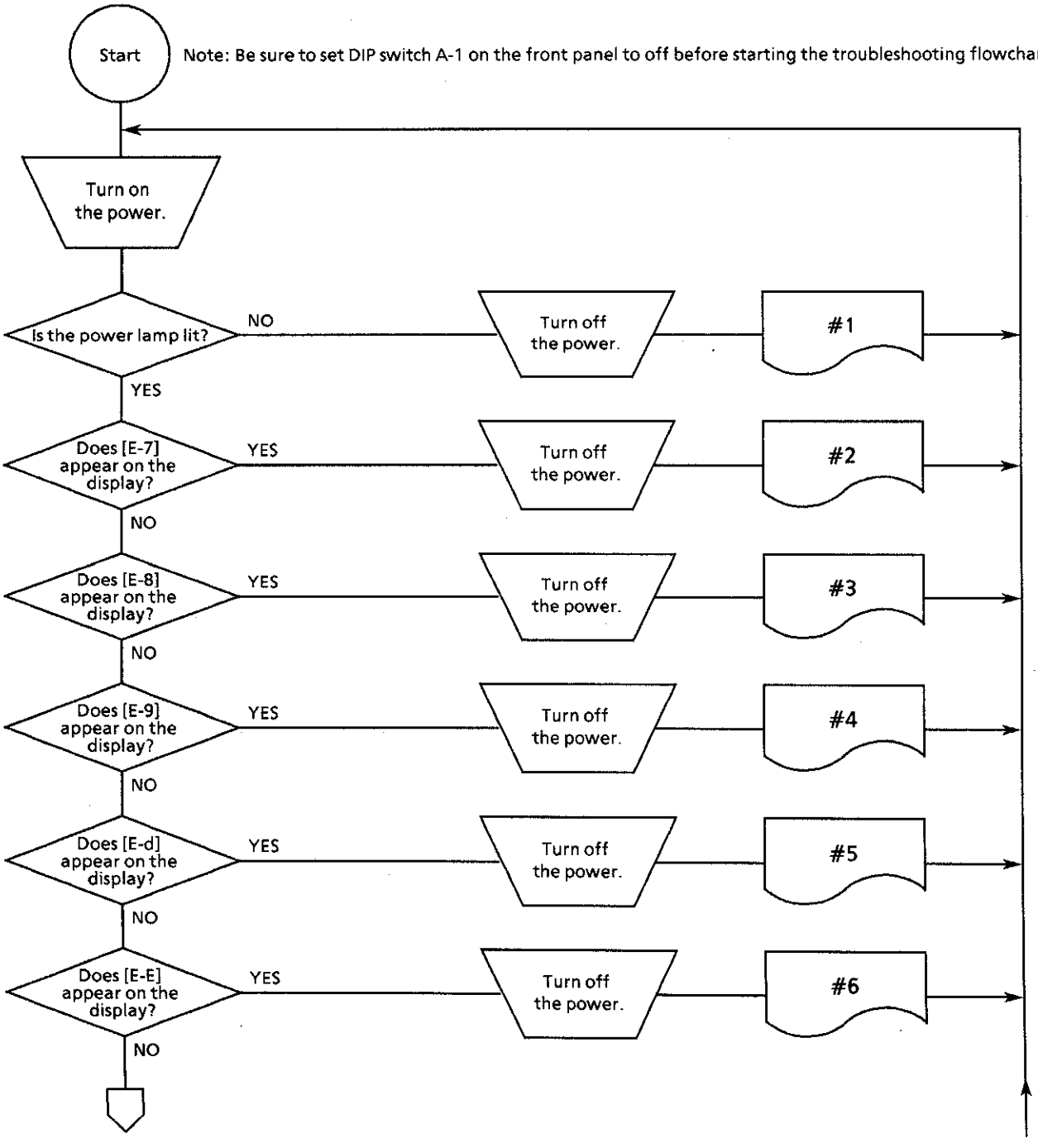
| | |
|---|---|
| 200V specification | ( 090 ) ~ ( 110 ) |
| 220V specification | ( 100 ) ~ ( 120 ) |
| 230V specification | ( 105 ) ~ ( 125 ) |
| 100V specification | ( 100 ) ~ ( 120 ) |
| 380V specification | |
| 400V specification | |
| 415V specification | |

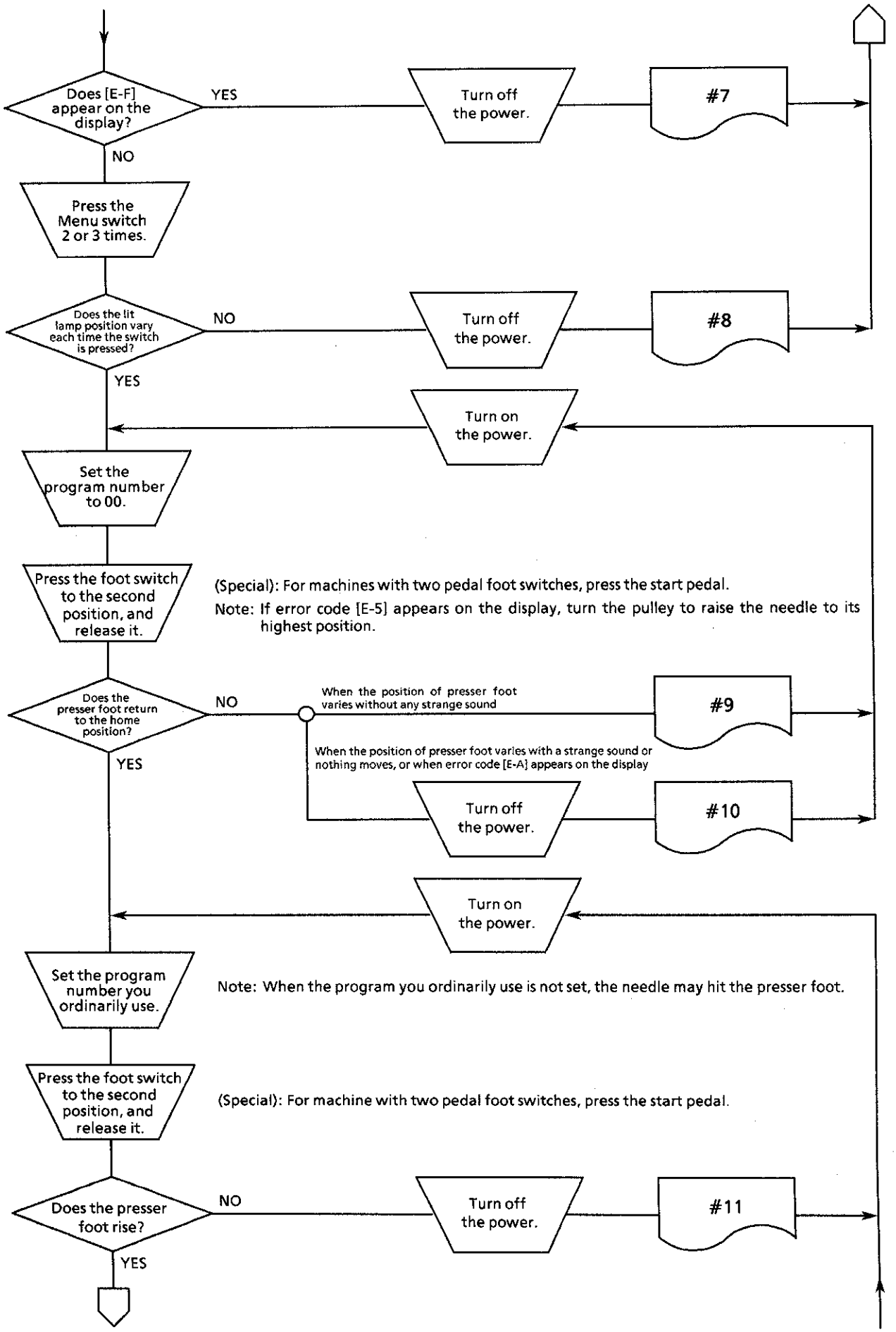
4. Press the TEST switch to return the display to normal.

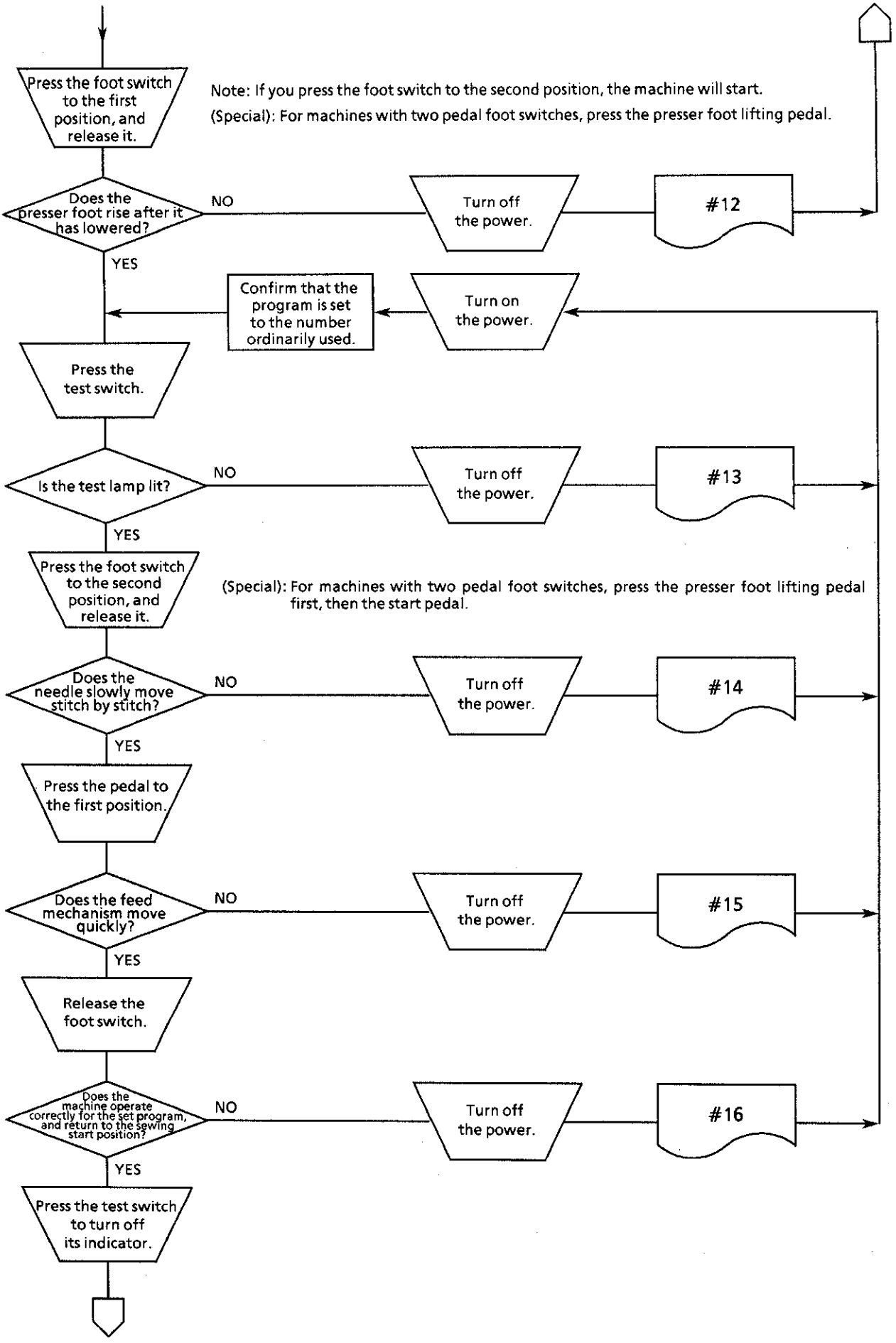
## 10-9. Troubleshooting flowchart

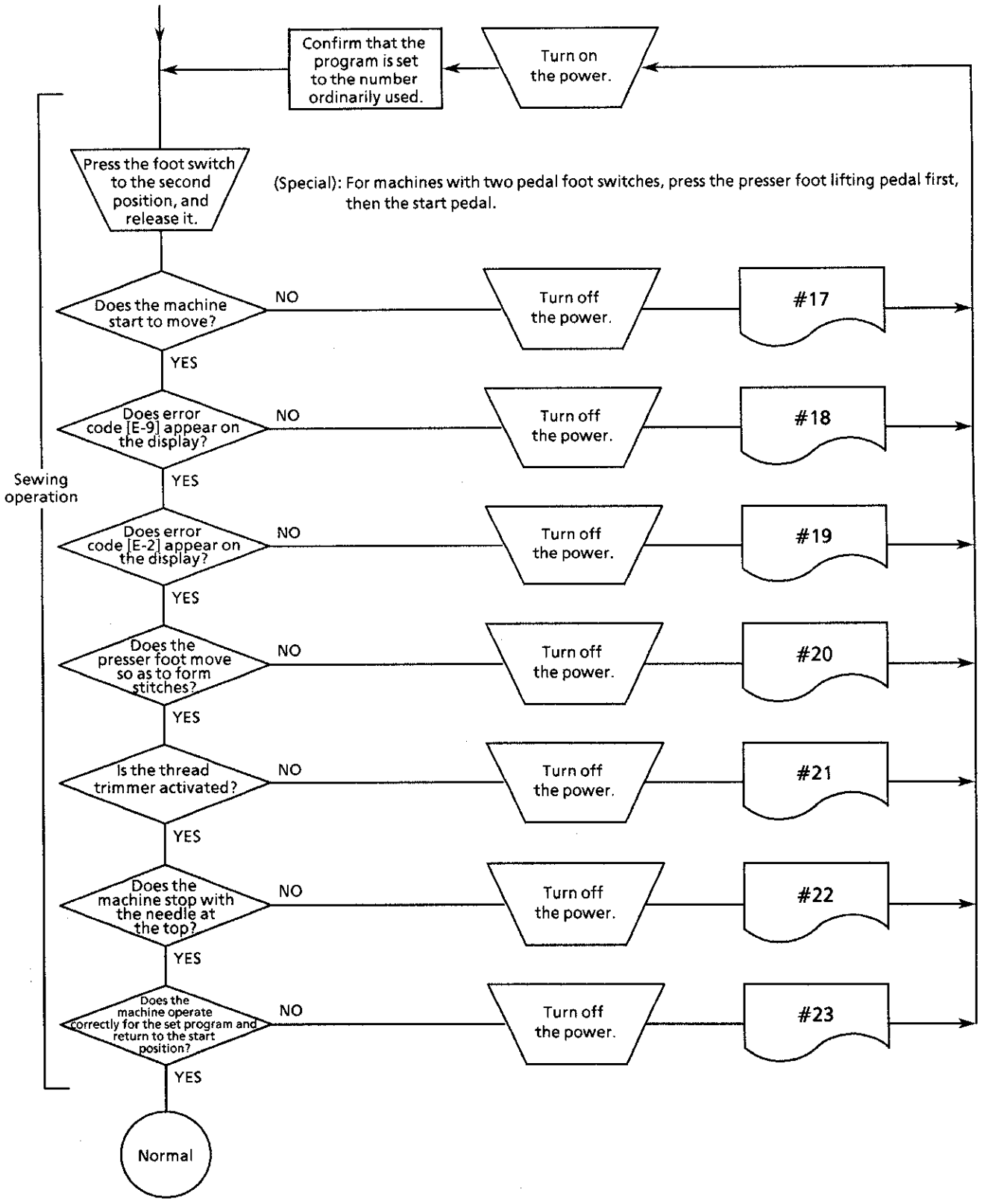
Symbols and their meanings




Does [E-F] appear on the display?
YES
Turn off the power.
#7
NO
Press the Menu switch 2 or 3 times.
Does the lit lamp position vary each time the switch is pressed?
NO
Turn off the power.
#8
YES
Turn on the power.
Set the program number to 00.
Press the foot switch to the second position, and release it.
(Special): For machines with two pedal foot switches, press the start pedal.
Note: If error code [E-5] appears on the display, turn the pulley to raise the needle to its highest position.
Does the presser foot return to the home position?
NO
When the position of presser foot varies without any strange sound
#9
When the position of presser foot varies with a strange sound or nothing moves, or when error code [E-A] appears on the display
Turn off the power.
#10
YES
Turn on the power.
Set the program number you ordinarily use.
Note: When the program you ordinarily use is not set, the needle may hit the presser foot.
Press the foot switch to the second position, and release it.
(Special): For machine with two pedal foot switches, press the start pedal.
Does the presser foot rise?
NO
Turn off the power.
#11
YES


Press the foot switch to the first position, and release it.
Note: If you press the foot switch to the second position, the machine will start.
(Special): For machines with two pedal foot switches, press the presser foot lifting pedal.
Does the presser foot rise after it has lowered?
NO
Turn off the power.
#12
YES
Confirm that the program is set to the number ordinarily used.
Turn on the power.
Press the test switch.
Is the test lamp lit?
NO
Turn off the power.
#13
YES
Press the foot switch to the second position, and release it.
(Special): For machines with two pedal foot switches, press the presser foot lifting pedal first, then the start pedal.
Does the needle slowly move stitch by stitch?
NO
Turn off the power.
#14
YES
Press the pedal to the first position.
Does the feed mechanism move quickly?
NO
Turn off the power.
#15
YES
Release the foot switch.
Does the machine operate correctly for the set program, and return to the sewing start position?
NO
Turn off the power.
#16
YES
Press the test switch to turn off its indicator.


Turn on the power.
Confirm that the program is set to the number ordinarily used.
Press the foot switch to the second position, and release it.
(Special): For machines with two pedal foot switches, press the presser foot lifting pedal first, then the start pedal.
Does the machine start to move?
NO
Turn off the power.
#17
YES
Does error code [E-9] appear on the display?
NO
Turn off the power.
#18
YES
Sewing operation
Does error code [E-2] appear on the display?
NO
Turn off the power.
#19
YES
Does the presser foot move so as to form stitches?
NO
Turn off the power.
#20
YES
Is the thread trimmer activated?
NO
Turn off the power.
#21
YES
Does the machine stop with the needle at the top?
NO
Turn off the power.
#22
YES
Does the machine operate correctly for the set program and return to the start position?
NO
Turn off the power.
#23
YES
Normal

## 10-10. Problem solution and measures

Precautions

1. Pay attention to the following when opening the control box for maintenance.

◎ Electrical shock

Some large capacitors may have a high voltage remaining in them for up to 5 minutes after the power is turned off. To prevent electrical shock, wait at least 5 minutes after the power is turned off before doing the following:

- Opening and closing the control box
- Replacing fuses
- Separating and rejoining connectors
- Measuring resistance
- Doing anything with a possibility of touching something inside the control box

Some adjustments require measuring the voltage while the power is turned on with the control box kept open.

In such a case, be careful not to touch any place other than that for the measurement. In addition, always keep in mind that a high voltage remains for 5 minutes after the power is turned off.

◎ Injury

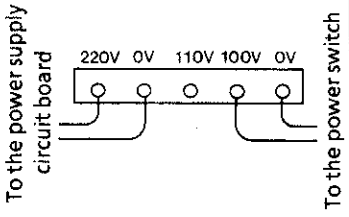
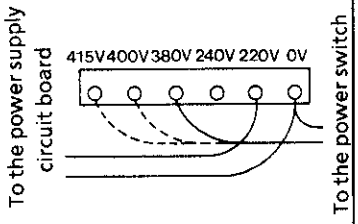
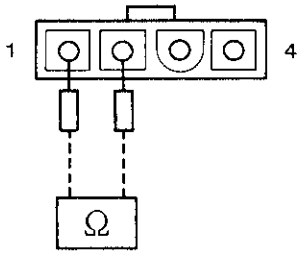
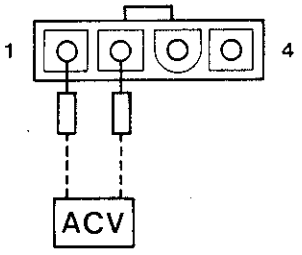
While the power is turned on, the cooling fan of the control box operates; be careful not to get caught in it.

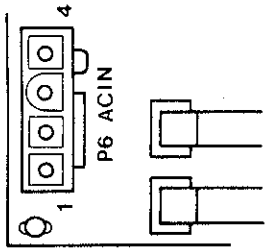
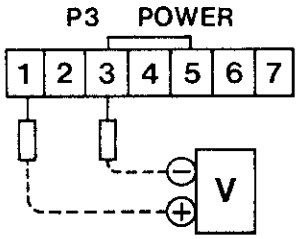
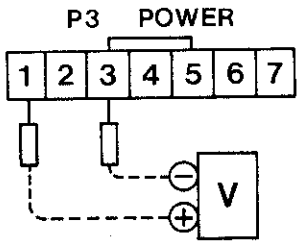
When separating or rejoining connectors, and measuring something, be careful not to cut your fingers on metal parts such as the heatsinks and covers.

2. When replacing a fuse, be sure to use a new one of the same quality and capacity as the old one.
3. Refer to the circuit block diagram at the end of this manual regarding the connector numbers and their matches.

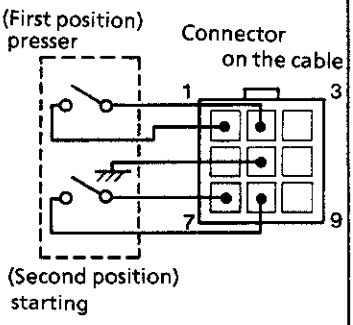
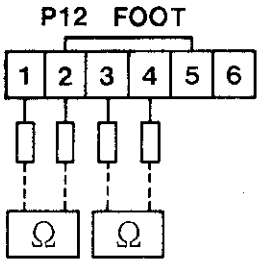
Before adjustment

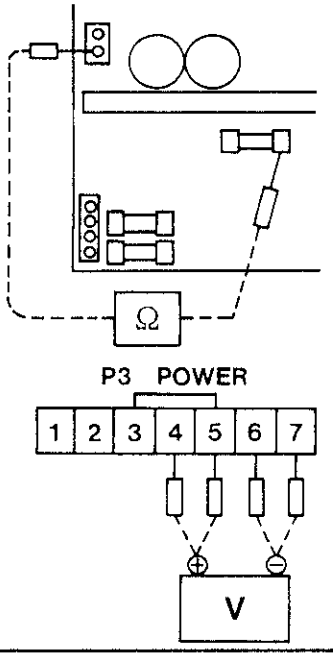
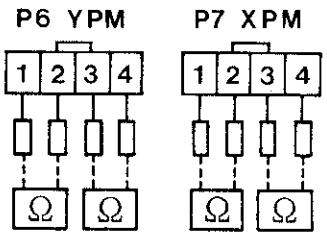
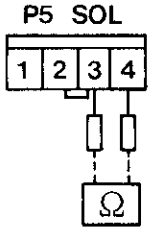
1. While the power is turned off, check each connector is securely plugged in by referring to page *, "List of connector numbers and matches."
2. Find the error status number in the troubleshooting flowchart.
3. From the applicable part of the flowchart, take the reference number to find the correspondingly numbered details of the problem in the following table.

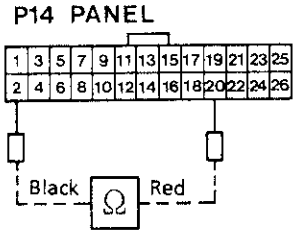
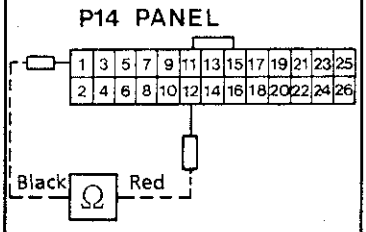
| Error status | Probable causes | Check/repair/adjust | Parts to be replaced |
|---|---|---|---|
| #1<br>The power lamp does not light when the power is turned on. | 1. Conversion transformer improperly wired<br>(for 100 V specification)<br>  <br><br>(For 380 V, 400 V, and 415 V specifications)<br>  <br><br>(For 200 V, 220 V, and 230 V specifications)<br>No conversion transformer is installed. | Note: Before adjustment, be sure to check that the power is turned off to prevent electric shock.<br>If the power is turned on, turn off the power, and wait at least 5 minutes.<br>a. Conversion in the control box<br>Check the transformer is correctly and securely wired to the terminals.<br>(For 200 V, 220 V, and 230 V specifications, this is not necessary.) | |
| | 2. Conversion transformer defective<br>  <br> | Separate P6 (ACIN) connectors on the power supply circuit board, and check there is continuity between pins 1 and 2 in the connector on the cable.<br>If there is no continuity, replace the conversion transformer.<br>(For 200 V, 220 V, and 230 V specifications, this is not necessary.) | Conversion transformer |
| | 3. Power supply cable defective<br>  <br> | Separate P6 (ACIN) connectors on the power supply circuit board, turn on the power, and measure the voltage across pins 1 and 2 in the connector on the cable.<br>If the voltage is as shown in the table below, the power supply cable is not defective.<br>For 200 V, 220 V, and 230 V specifications: The same as the power supply voltage of wall socket<br>For 100 V, 380 V, 400 V, and 415 V specifications: About 220 V<br>After checking, turn off the power, and rejoin P6 connectors. | Power supply cable |

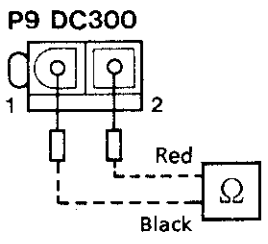
| | | | |
|---|---|---|---|
| #1 continued | 4. Fuse has blown | a. Remove fuses No. 1 and No. 2, and check them for continuity.<br>If there is no continuity, replace the fuses with new ones, and perform the check/repair/adjust items of #1-5. | Fuse 5A-250V |
| | 5. Power supply circuit board defective<br>  <br><br>  <br> | a. Separate P6 (ACIN) connectors on the power supply circuit board, and then measure the resistance between the following pairs of pins, pins 1 and 4 and pins 2 and 4, in the connector on the cable.<br>If the resistance is ∞ Ω in both cases, the power supply circuit board is not defective.<br>b. Measure the resistance between pins 1 and 2.<br>If there is no short, the power supply circuit board is not defective.<br>c. Rejoin P6 (ACIN) connectors on the power supply circuit board.<br>Separate P3 (POWER) connectors on the main circuit board, turn on the power, and measure the voltage across pins 1 and 3 in the connector on the cable.<br>If it is + 5V, the power circuit board is not defective.<br>After measurement, turn off the power, wait at least 5 minutes, and then rejoin P3 connectors. | Power supply circuit board |
| | 6. Main circuit board defective<br>  <br> | With P3 (POWER) connectors plugged in on the main circuit board, turn on the power, and measure the voltage across pins 1 and 3 in the connector on the cable.<br>If it is + 5V, the power circuit board is not defective.<br>After measurement, turn off the power. | Main circuit board |
| | 7. Panel circuit board defective | Check that P14 (PANEL) connectors of the main circuit board and P1 (PANEL) connectors of the panel circuit board are plugged in. | Panel circuit board |

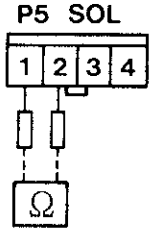
| | | | |
|---|---|---|---|
| #2<br>Error code E-7 appears on the display. | 1. Cooling fan defective | a. Check threads are not tangled in the cooling fan.<br>b. Check P4 (FAN) connectors are securely plugged in on the main circuit board. | DC fan motor assy |
| #3<br>Error code E-8 appears on the display. | 1. PROM chip defective | a. Check the PROM chip is securely attached to the main circuit board without its lead bent.<br>b. Check the PROM chip is attached to the main circuit board with letters MN and MT on the PROM chip and those on the main circuit board matching. | PROM chip |
| | 2. Main circuit board defective | | Main circuit board |
| #4<br>Error code E-9 appears on the display. | 1. Power supply voltage incorrect | a. Check the power supply voltage of the wall socket is in the range of ± 10% from the specified voltage.<br>b. See #1-1, #1-2, and #1-3. | |
| | 2. Cord defective | Check P3 (PER) connectors are attached to the power supply circuit board and P11 (PER) connectors are attached to the main circuit board. Check the cord connecting P3 and P11 is not damaged. | PER cord |
| #5<br>Error code E-d appears on the display. | 1. Control box has overheated | Clean the ventilation outlet of the control box. | |
| | 2. Main circuit board defective | Keep the control box open for a while to allow the inside to cool down, and then turn on the power again.<br>If the same code still appears on the display, the main circuit board is defective. | Main circuit board |
| #6<br>Error code E-E appears on the display. | 1. Main circuit board defective | Turn on the power again.<br>If the same code still appears on the display, the main circuit board is defective. | Main circuit board |
| #7<br>Error code E-F appears on the display. | 1. Cord defective | See #4-2. | |
| | 2. Power supply circuit board defective | | Power supply circuit board |

| | | | |
|---|---|---|---|
| #8<br>No switches on the operation panel are activated. | 1. Foot switch defective | Remove the foot switch connector from the outside of the control box, and turn on the power.<br>If a switch on the operation panel is activated, the foot switch is defective. | Foot switch |
| | 2. Panel circuit board defective | See #1-7. | |
| #9<br>Home position is not correct. | 1. Home position sensor not adjusted properly | a. Look the status of home position signals referring to page ∗.<br>When both X- and Y- home position signal lamps are lit, adjust the home position while referring to page ∗.<br>When either signal lamp is not lit, perform the check/repair/adjust items of #10. | |
| #10<br>Presser foot does not return to the home position even after the start switch is pressed. | 1. Foot switch and its cord are defective<br>  <br> | (Make sure that the power is turned off. If you proceed from #9, be sure to turn off the power.)<br>Remove the foot switch connector from the outside of the control box, and check it for continuity between the following pairs of pins, pins 1 and 2 and pins 7 and 8, in the connector on the cable:<br>If it is normally ∞ Ω, 0 Ω between pins 1 and 2 when pressing the foot switch to the first position, or 0 Ω between pins 1 and 2 and pins 7 and 8 when pressing the foot switch to the second position, the foot switch and its cord are not defective. | Foot switch |
| | 2. Cord in the control box is defective<br>  <br> | Rejoin the connector checked in #10-1.<br>Open the control box, and check P12 (FOOT) connectors for continuity between the following pairs of pins, pins 1 and 2 and pins 3 and 4, in the connector on the main circuit board.<br>(Do not separate P12 connectors. Make sure the tester probes touch the leads.)<br>If it is normally ∞ Ω, 0 Ω between pins 3 and 4 when pressing the foot switch to the first position, or 0 Ω between pins 1 and 2 and pins 3 and 4 when pressing the foot switch to the second position, the cord is not defective. | Foot switch<br>cord 7 |
| | 3. Home position signal defective | (If nothing moves, skip this item because there may be a more major cause than that covered in this item. Proceed to #10-4, #10-5, and #10-6.)<br>Check P1 (ORG) connectors are securely attached to the main circuit board. | Home position sensor |

| | | | |
|---|---|---|---|
| #10 continued | 4. Fuse has blown | a. Remove fuse No. 3, and check it for continuity.<br>If there is no continuity, the fuse is defective.<br>Proceed to #10-5. | Fuse 5A-250V |
| | 5. Power supply circuit board defective<br>  <br> | a. Measure the resistance between the fuse No. 3 terminal which is close to the center of the power supply circuit board and pin 2 of P5 (DC300) connector.<br>If the resistance is ∞ Ω, the power supply circuit board is not defective.<br><br>b. Separate P3 (POWER) connectors on the main circuit board, turn on the power, and measure the voltage across the following pairs of pins, pins 4 and 6, pins 4 and 7, pins 5 and 6, and pins 5 and 7, in the connector on the cable.<br>If the voltage is + 45V in each case, the power supply circuit board is not defective.<br>After measurement, turn off the power, wait at least 5 minutes, and rejoin P3 connectors. | Power supply circuit board |
| | 6. X- or Y-pulse motor and its cord are defective<br>  <br> | Separate P6 (YPM) and P7 (XPM) connectors on the main circuit board. Measure the resistance between the following pairs of pins, pins 1 and 2, and pins 3 and 4, in each connector on the cable.<br>If the resistance is 2 - 3 Ω, it is not defective.<br>After measurement, rejoin P6 and P7 connectors. | X- or Y-pulse motor assy |
| | 7. Main circuit board defective | | Main circuit board |
| #11 Presser foot does not rise. | 1. Power supply circuit board defective | See #10-5-b. | |
| | 2. Presser foot lifter solenoid defective<br>  <br> | Separate P5 (SOL) connectors on the main circuit board, and measure the resistance between pins 3 and 4 in the connector on the cable.<br>If the resistance is 3 - 4 Ω, the presser foot lifter solenoid is not defective.<br>After measurement, rejoin P5 connectors. | Presser foot lifter solenoid |

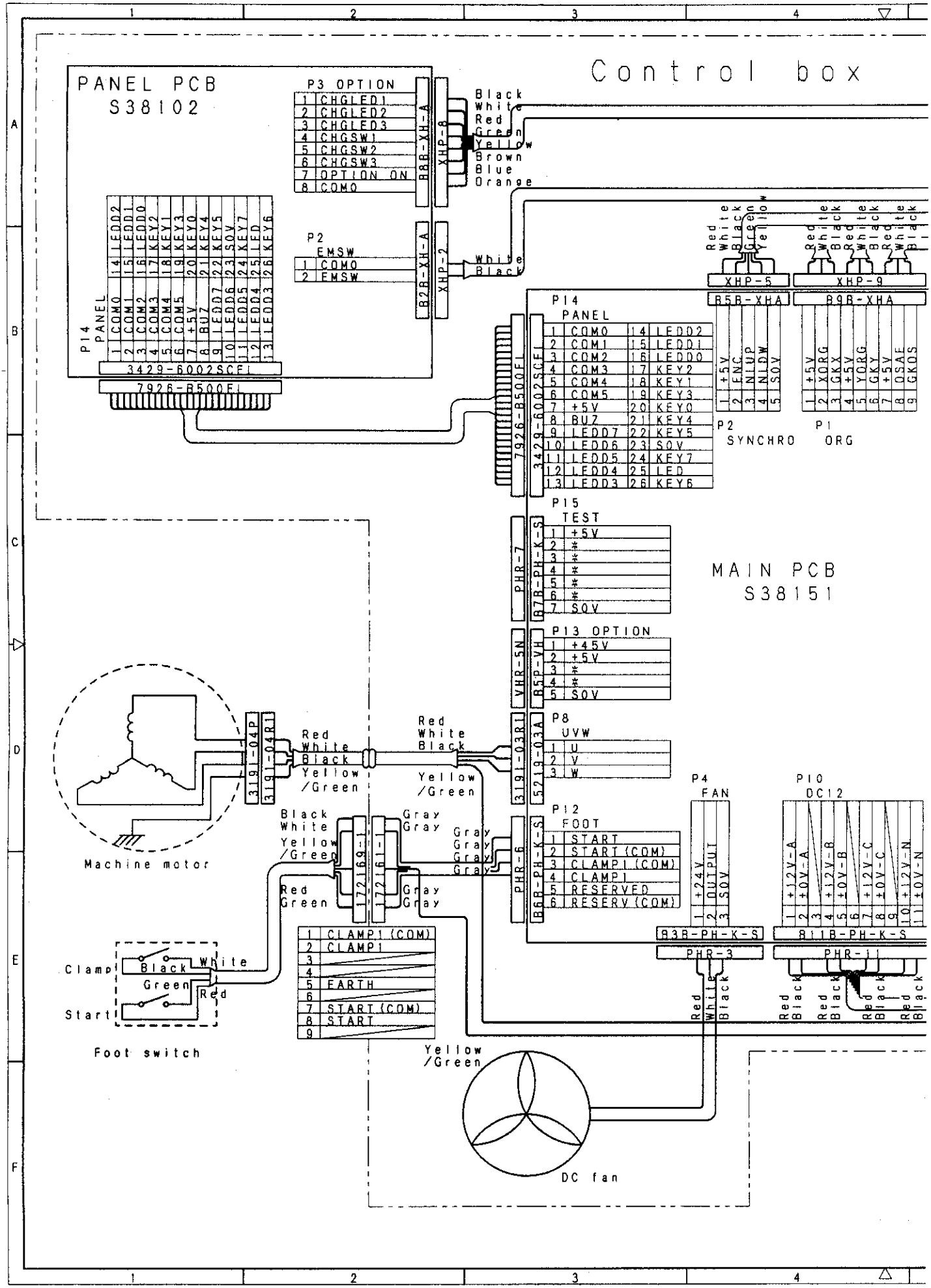
| | | | |
|---|---|---|---|
| #11 continued | 3. Home position sensor not adjusted properly | If an error occurs just before the presser foot operates, adjust the following:<br>• Position of the sensor perceive plate<br>• Position of the presser foot lifter solenoid | |
| | 4. Main circuit board defective | | Main circuit board |
| #12<br>Presser foot does not lower. | 1. Foot switch defective | See #10-1, and #10-2. | |
| #13<br>The test lamp does not light when the test switch is pressed. | 1. Test switch and its cord are defective<br>  | Separate P14 (PANEL) connectors on the main circuit board, and measure the resistance between pins 2 and 20 in the connector on the cable with the polarity shown in the left figure.<br>(Use of a digital meter is prohibited.)<br>If the resistance is normally ∞ Ω, or the needle oscillates at its maximum limits when the test switch is pressed, the test lamp and its cord are not defective. | Panel circuit board or panel cable assy |
| | 2. Test lamp and its cord are defective<br>  | Measure the resistance between pins 1 and 12 with the same method as for #13-1.<br>If the needle oscillates at its maximum limits, the test lamp and its cord are not defective. | Panel circuit board or panel cable assy |
| | 3. Main circuit board defective | | Main circuit board |
| #14<br>The feed mechanism does not move during test. | | See #10-1, #10-2, #10-4, #10-5, #10-6, and #10-7. | |

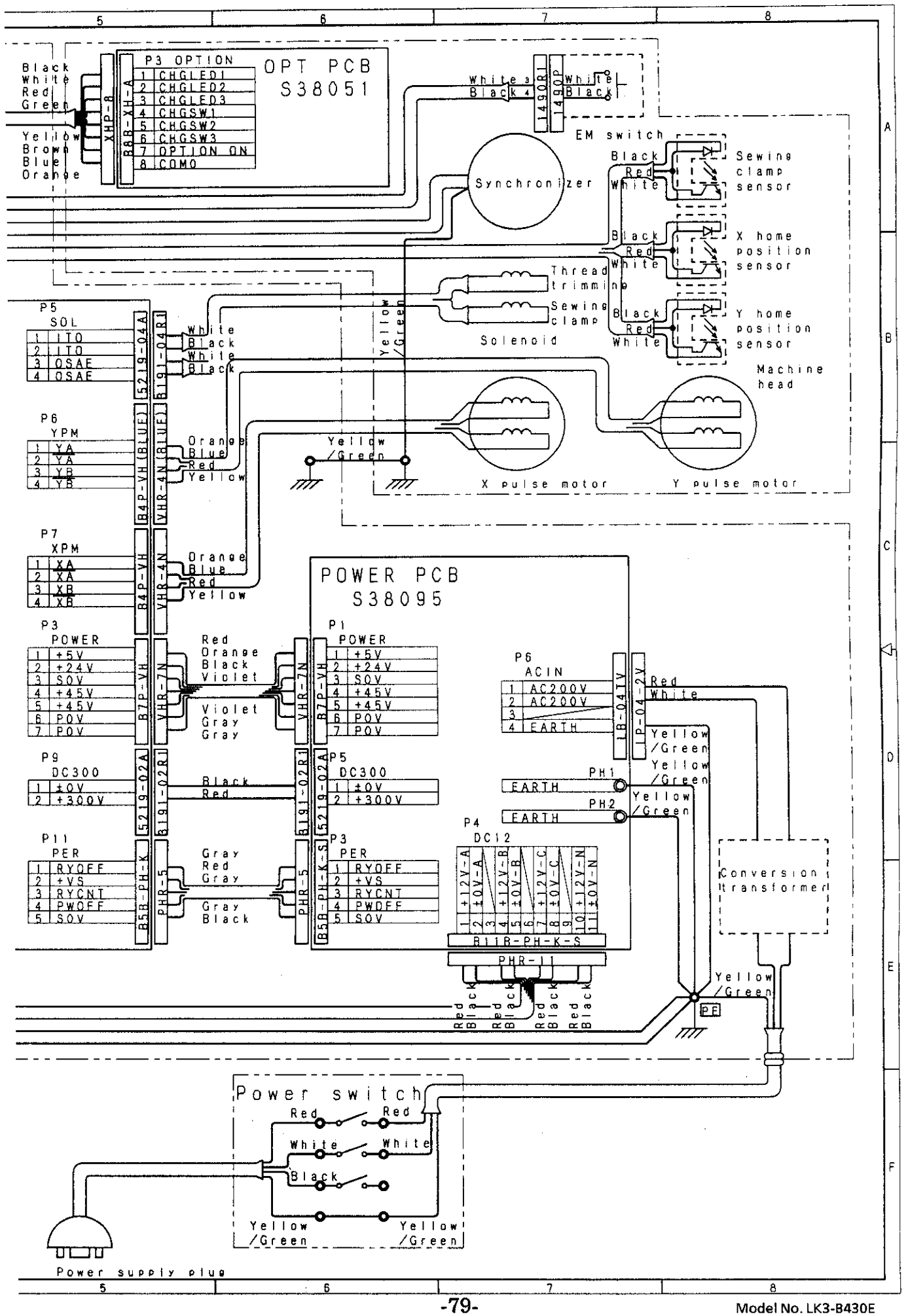
| | | | |
|---|---|---|---|
| #15<br>Quick feeding cannot be performed during test. | | See #10-1, and #10-2. | |
| #16<br>The machine does not operate correctly for the set program during test sewing. | | See #10-1, #10-2, #10-4, #10-5, #10-6, and #10-7. | |
| #17<br>The machine does not operate during sewing. | 1. Machine motor cable defective | Check the machine motor cable is securely attached to the outside of the control box. For the cable attached to the terminal block of the motor, check the terminal is not loose. | |
| | 2. Main circuit board defective<br>  | Separate P9 (DC300) connectors on the main circuit board, and measure the resistance between pins 1 and 2 in the connector on the main circuit board with the same polarity as shown in the left figure.<br>(Use of a digital meter is prohibited.)<br>If the pointer indicates 10kΩ-30kΩ on the × 1kΩ range, the main circuit board is not defective.<br>After measurement, rejoin P9 connectors.<br>(If the pointer does not, fuses No. 1, 2, and 4 may be blown. Examine them.) | Main circuit board |

| | | | |
|---|---|---|---|
| #18<br>Error code E-9 appears on the display. | | See #4-1, and #4-2. | |
| #19<br>Error code E-2 appears on the display. | 1. Machine motor cable and main circuit board are defective | See #17-1, and #17-2. | |
| | 2. Synchronizer and its cord are defective | Check P2 (SYNCHRO) connectors are plugged in on the main circuit board. | Synchronizer assy |
| #20<br>The machine cannot produce correct stitches. | 1. Synchronizer and its cord are defective | See #19-2. | Synchronizer assy |
| #21<br>The thread trimmer does not operate. | 1. Home position sensor not adjusted properly | Adjust the thread trimmer mechanism (page *). (When it is obvious that the thread trimmer does not operate, perform the check/repair/adjust items of #21-2, #21-3, and #21-4.) | |
| | 2. Thread trimmer solenoid defective<br>  | Separate P5 (SOL) connectors on the main circuit board, and then measure the resistance between pins 1 and 2 in the connector on the cable.<br>If the resistance is 7 - 8 Ω, the solenoid is not defective. | Thread trimmer solenoid |
| | 3. Synchronizer and its cord defective | See #19-2. | Synchronizer assy |
| | 4. Main circuit board defective | | Main circuit board |

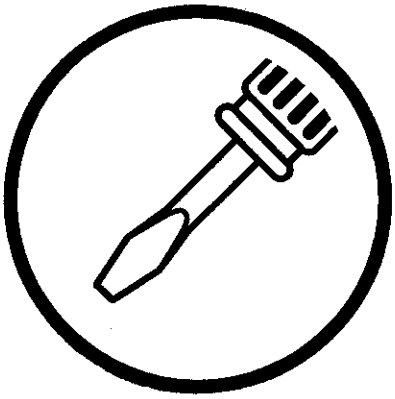
| | | | |
|---|---|---|---|
| #22<br>The machine does not stop with the needle at the upper position after thread trimming. | 1. Synchronizer not adjusted properly | If the needle position varies randomly each time the machine operation is completed, adjust the upper needle stop position while referring to page ∗. | |
| | 2. Main circuit board defective | | Main circuit board |
| #23<br>Patterns cannot be sewn correctly for the set program. | | See #10-1, #10-2, #10-4, #10-5, #10-6, and #10-7. | |

# 10-11. Control circuit block diagram




OPT PCB
S38051
P3 OPTION
1 CHGLED1
2 CHGLED2
3 CHGLED3
4 CHGSW1
5 CHGSW2
6 CHGSW3
7 OPTION ON
8 COMO
Black
White
Red
Green
Yellow
Brown
Blue
Orange
XHP-8
B8B-XH-A
EM switch
Synchronizer
Sewing clamp sensor
X home position sensor
Y home position sensor
Thread trimming
Sewing clamp
Solenoid
Machine head
X pulse motor
Y pulse motor
P5 SOL
1 ITO
2 ITO
3 OSAE
4 OSAE
P6 YPM
1 YA
2 YA
3 YB
4 YB
P7 XPM
1 XA
2 XA
3 XB
4 XB
POWER PCB
S38095
P3 POWER
1 +5V
2 +24V
3 SOV
4 +45V
5 +45V
6 POV
7 POV
P1 POWER
P9 DC300
1 ±0V
2 +300V
P5 DC300
P11 PER
1 RYOFF
2 +VS
3 RYCNT
4 PWOFF
5 SOV
P3 PER
P6 ACIN
1 AC200V
2 AC200V
3
4 EARTH
PH1
PH2
EARTH
P4 DC12
1 +12V-A
2 ±0V-A
3 +12V-B
4 ±0V-B
5 +12V-C
6 ±0V-C
7 +12V-N
8 ±0V-N
B11B-PH-K-S
PHR-11
Conversion transformer
PE
Power switch
Power supply plug

brother



# SERVICE MANUAL

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