ZJ5820
ZJ5821

全自动电脑圆头锁眼机
AUTOMATIC EYELET BUTTONHOLE SEWING MACHINE

使 用 说 明 书
OPERATION MANUAL

Thank you very much for buying our company sewing machine. Before using your new machine, please read the safety instructions 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 it correctly.

SAFETY INSTRUCTIONS

[1] Safety indications and their meanings

This instruction 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 may result in death or serious 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 <u>must not</u> do.

⏚ ·········· This symbol (●) indicates something that you <u>must</u> 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".)

⚠ DANGER

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

⚠ CAUTION

Environmental requirements

❗ Use the sewing machine in an area which is free from sources of strong electrical noise such as electrical line noise or static electric noise.
Sources of strong electrical noise may cause problems with correct operation.

❗ Any fluctuations in the power supply voltage should be within ±10% of the rated voltage for the machine.
Voltage fluctuations which are greater than this may cause problems with correct operation.

❗ The power supply capacity should be greater than the requirements for the sewing machine's power consumption.
Insufficient power supply capacity may cause problems with correct operation.

❗ The pneumatic delivery capability should be greater than the requirements for the sewing machine's total air consumption.
Insufficient pneumatic delivery capability may cause problems with correct operation.

❗ The ambient temperature should be within the range of 5°C to 35°C during use.
Temperatures which are lower or higher than this may cause problems with correct operation.

❗ The relative humidity should be within the range of 45% to 85% during use, and no dew formation should occur in any devices.
Excessively dry or humid environments and dew formation may cause problems with correct operation.

❗ In the event of an electrical storm, turn off the power and disconnect the power cord from the wall outlet.
Lightning may cause problems with correct operation.

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 approximately 120 kg.
Installation of the sewing machine and adjustment of the table height should be carried out by four or more people.

🚫 Do not connect the power cord until installation is complete. If this is not done, the sewing machine may operate if the start switch is pressed by mistake, which could result in serious injury.

⚠ Hold the machine head with both hands when tilting it back or returning it to its original position.
In addition, do not subject the machine head to extra force while it is tilted back.
If this is not observed, the machine head may become unbalanced and fall over (together with the table), and serious injury or damage to the sewing machine may result.

⏚ Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.

❗ All cords should be secured at least 25 mm away from any moving parts. Furthermore, do not excessively bend the cords or secure them too firmly with staples.
🚫 If this is not observed, fire or electric shocks may result.

❗ Install belt covers to the machine head.

❗ If using a work table which has casters, the casters should be secured in such a way so that they cannot move.

🚫 Be sure to wear protective goggles and gloves when handling the lubricating oil, so that it does not get into your eyes or onto your skin.
If care is not taken, inflammation can result.
Furthermore, do not drink the lubricating oil. Diarrhea or vomiting may result.
Keep the oil out of the reach of children.

⚠ CAUTION

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.

❗ Be sure to wear protective goggles when using the machine.
If goggles are not worn, there is the danger that if a needle breaks, parts of the broken needle may enter your eyes and injury may result.

⚠ Turn off the power switch at the following times. If this is not done, the sewing machine may operate if the start switch is pressed by mistake, which could result in serious injury.
- When threading the needle
- When replacing the needle
- When not using the machine and when leaving the machine unattended

❗ If using a work table which has casters, the casters should be secured in such a way so that they cannot move.

⚠ Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.

⚠ 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.

Cleaning

⚠ Turn off the power switch before carrying out this operation. If this is not done, the sewing machine may operate if the start switch is pressed by mistake, which could result in serious injury.

🚫 Be sure to wear protective goggles and gloves when handling the lubricating oil, so that it does not get into your eyes or onto your skin.
If care is not taken, inflammation can result.
Furthermore, do not drink the lubricating oil. Diarrhea or vomiting may result.
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 at the following times. If this is not done, the sewing machine may operate if the start switch is pressed by mistake, which could result in serious injury.
- When carrying out inspection, adjustment and maintenance
- When replacing consumable parts such as the loopers and knife

⚠ Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.

⚠ Hold the machine head with both hands when tilting it back or returning it to its original position.
In addition, do not subject the machine head to extra force while it is tilted back.
If this is not observed, the machine head may become unbalanced and fall over (together with the table), and serious injury or damage to the sewing machine may result.

⚠ If the power switch and air need to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.

❗ 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 dealer.

1

2

Do not touch the knife or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.
Be careful not to get your hands caught when returning the machine head to its original position after it has been tilted.

3

Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.

4

High temperature warning display

5

Direction of operation

6

⚠ 注 意

触摸运动部分,易造成受伤。所以在装上安全保护装置后,再进行缝纫操作。在切断电源后,进行穿线,更换梭芯,机针和做清扫,调整工作。

⚠ CAUTION

Moving parts may cause injury. Operate with safety devices. Turn off main switch before threading, changing bobbin and needle,cleaning etc.

Safety devices
Devices such as eye guard, finger guard, needle bar guard, needle guide cover and belt cover

7

Be careful not to get your hands caught when moving the feed base backward.

Needle bar guard

1

5

Eye guard

Finger guard

Needle guide cover

Belt cover
(Rear)

6

7

2

2

2

3

3

3

3

4

4

4

CONTENTS

CONTENTS

1. NAMES OF MAJOR PARTS

The accessory switches shown below to use for starting the sewing machine will vary depending on the destination.
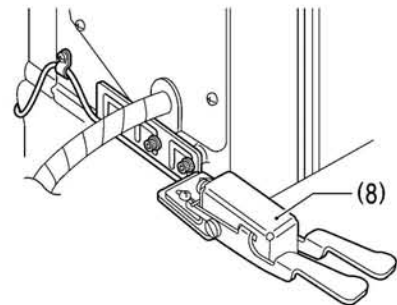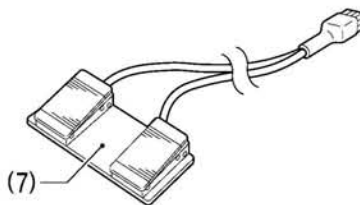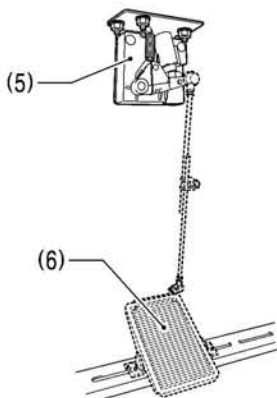
(1)	Power switch	(7)	2-pedal foot switch
(2)	Control box	(8)	Hand start switch
(3)	USB slot*	(9)	STOP switch
(4)	Operation panel	(10)	Upper shaft pulley
(5)	Treadle unit	(11)	Feed base
(6)	Treadle (commercially-available)	(12)	Cotton stand

Safety devices:

(13)	Finger guard	(16)	Needle guide cover
(14)	Eye guard	(17)	Belt cover
(15)	Needle bar guard		

2. MACHINE SPECIFICATIONS

2-1. Specifications

	Thread trimmer	Lower thread trimmer	
		Long type	Short type
-00	O	-	-
-01	O	O	-
-02*	O	-	O

* This is not covered by specification designations, ask the place of purchase for details.

SPECIFICATIONS	-00	-01	-02
Use	Men's clothes, ladies' clothes		Jeans and work clothes
Sewing speed	1,000 - 2,500 rpm (Setting possible in units of 100 rpm)		
Sewing shape	Without bartack Taper bartack Straight bartack Round bartack Circular stitch	Without bartack Taper bartack Straight bartack Round bartack Circular stitch	Without bartack Taper bartack Straight bartack Round bartack
Sewing length	5 - 50 mm	5 - 42 mm	L1422: 14 - 22 mm * L1826: 18 - 26 mm L2230: 22 - 30 mm L2634: 26 - 34 mm * L3442: 34 - 42 mm *
Stitch pitch	0.5 - 2.0 mm		
Zigzag width	1.5 - 5.0 mm (Max. 4.0 mm with mechanism, Max. 1.0 mm with software)		
Taper bartack length	0 - 20 mm		
Work clamp height	Standard ≥ 12 mm		Standard ≥ 16 mm
Starting method	Foot switch (treadle type, 2-pedal type) or hand start switch		
Feed mechanism	Intermittent feed by three pulse motors (X, Y, θ)		
Needle	DO x 558 -NY2 #14~#18(Organ)		
Safety devices	Built-in emergency stop function and automatic stopping device which stops the machine when the safety circuit is activated		
Upper shaft motor	AC servo motor (4-pole, 550 W)		
Air pressure	Main regulator: 0.5 MPa Hammer pressure regulator: 0.4 MPa		
Air consumption	43.2 l/min (8 cycles/min)		
Power supply	Single-phase 100V/220V, Three-phase 200V/220V/380V/400V 400 VA		
Weight	Gross Weight : 230kg Net Weight : 188kg		

2-2. Sewing shapes

Eyelet buttonhole			
Without bartack	Taper bartack	Straight bartack	Round bartack

Straight buttonhole			
Without bartack	Taper bartack	Straight bartack	Round bartack

Circular stitch
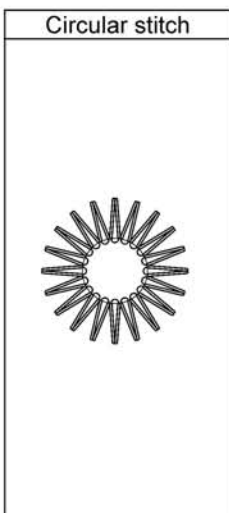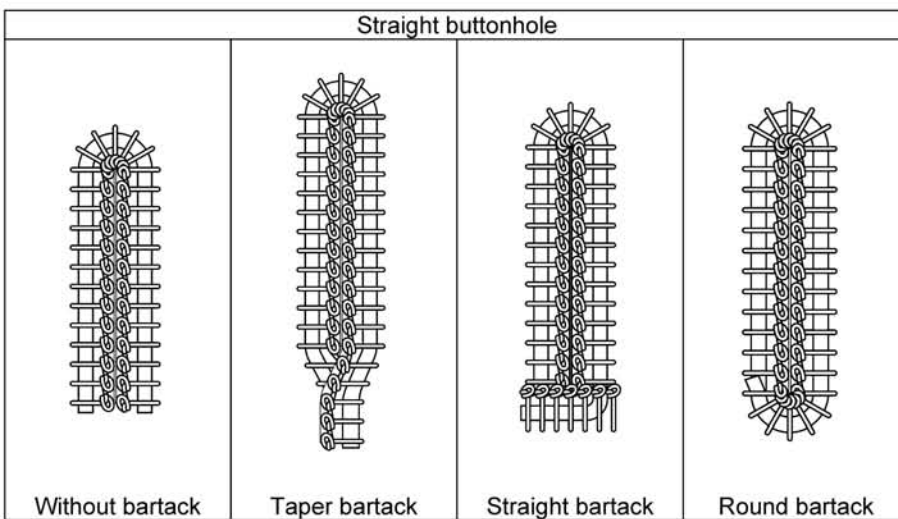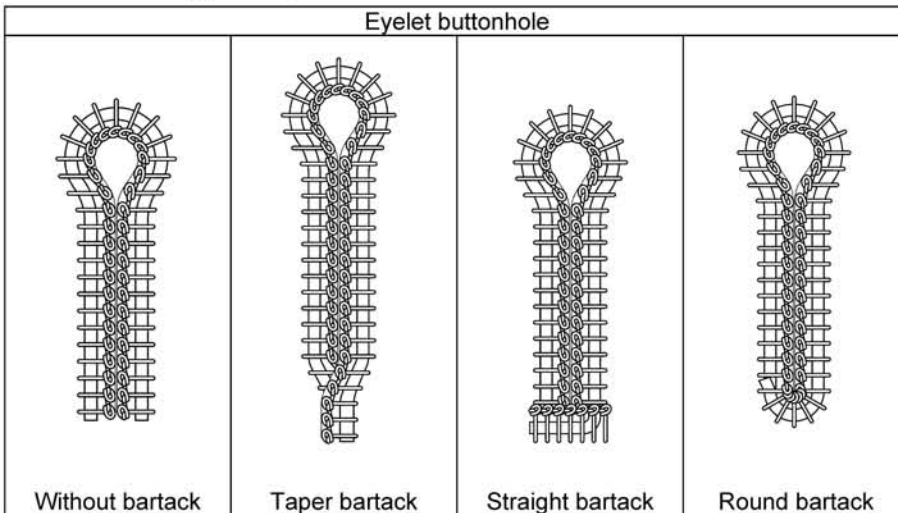
3. INSTALLATION

3-1. When embedding into the talle
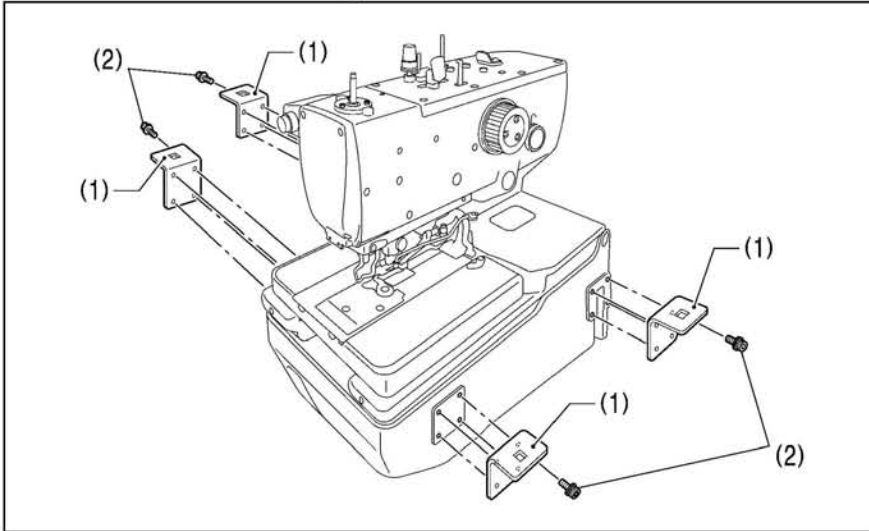
(1) Bed support plates [4 pcs.]
(2) Bolts [16 pcs.]

* Install so that they are horizontal to the bed base.
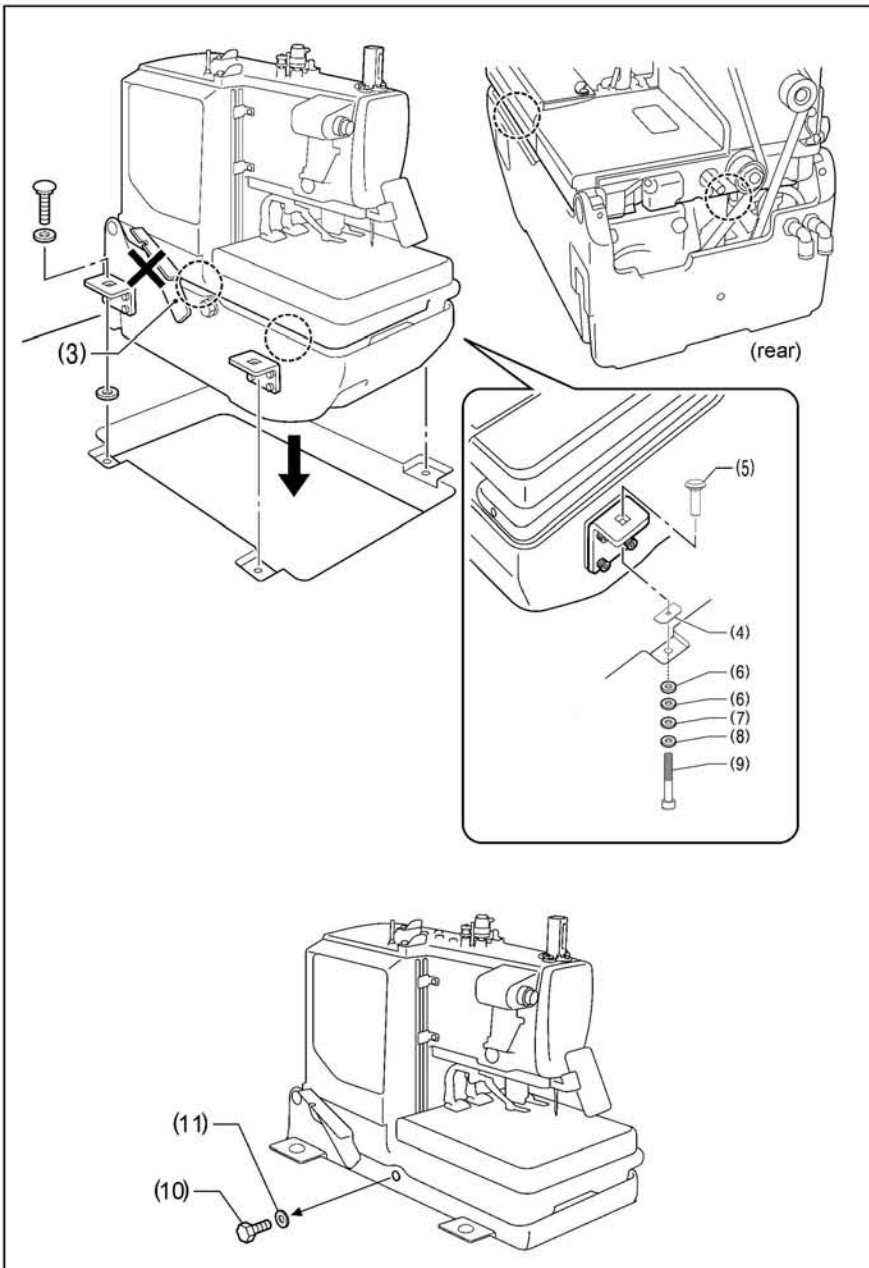
NOTE:
- When placing the machine head onto the table, have four or more people hold the machine head by the places indicated by the ⊙ locations in the illustration.
- Do not hold by the head support lever (3).

(4) Rubber sheets [4 pcs.]
(5) Connecting nut [4 pcs.]
(6) Washers (large) [4 pcs.]
(7) Washers [4 pcs.]
(8) Washers [4 pcs.]
(9) Bolts [4 pcs.]

(rear)

After installing the machine head, remove the fixing bolts (10) and washers (11).

NOTE:
The fixing bolts (10) and washers (11) are needed when moving the machine head, so store them in a safe place.

4

3-2. Tilting back and returning the machine head

> **⚠ CAUTION**
>
> ⚠ Hold the machine head with both hands when tilting it back or returning it to its original position. In addition, do not subject the machine head to extra force while it is tilted back. If this is not observed, the machine head may lose balance and fall over (together with the table), and injury or damage to the sewing machine may result.
>
> ⚠ Do not hold the feed base (2) and the feed guide shaft (3). If this is not observed and the feed base (2) or feed guide shaft (3) come off, the machine head may fall down and injury or damage to the machine head may result.

The machine head can be tilted back and returned to one of two heights.

NOTE:
Always be sure to turn off the power switch before tilting back and returning the machine head.
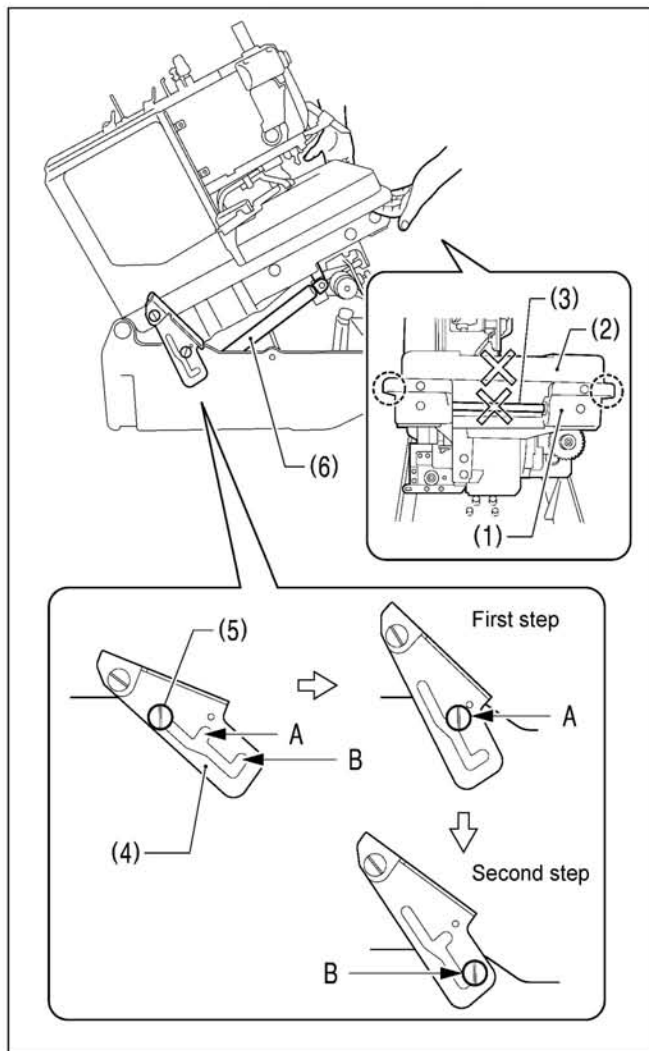
Tilting back the sewing machine head
1. Hold the bed (1) at both sides (at the places indicated by ◯ in the illustration) with both hands.
2. **To tilt back to the first step:**
   Gently lift up the machine head until the head support lever (4) securely engages section A of the hinge support shaft (5) (until a click is heard).
3. **To tilt back to the second step:**
   Remove the head support lever (4) from section A of the hinge support shaft (5), and then gently lift up the machine head until the head support lever (4) securely engages section B.

NOTE:
The machine head will be momentarily stopped by the gas spring (6) immediately before it rises to the second step, but it will not be locked at this point. Lift the machine head until the head support lever (4) securely engages section B of the hinge support shaft (5).

> **⚠ CAUTION**
>
> ⚠ Be sure to check that the head support lever (4) and the hinge support shaft (5) are engaged. If they are not engaged, the machine head may suddenly return to its original position and injury may result.

<Returning the machine head to its original position>
1. **To return the machine head from the second step:**
   After lifting up the machine head, remove the head support lever (4) from section B of the hinge support shaft (5), and then hold the bed at both sides and gently return it to its original position.
   * The machine head will start returning until the gas spring (6) starts to operate, so support the machine head securely with both hands.
   * When the machine head is returned to the first step, the head support lever will lock onto section A.
2. **To return the machine head from the first step:**
   After gently lifting up the machine head, remove the head support lever (4) from section A of the hinge support shaft (5), and then hold the bed at both sides and gently return it to its original position.

3-3. Installing the belt cover and feed bar cover U
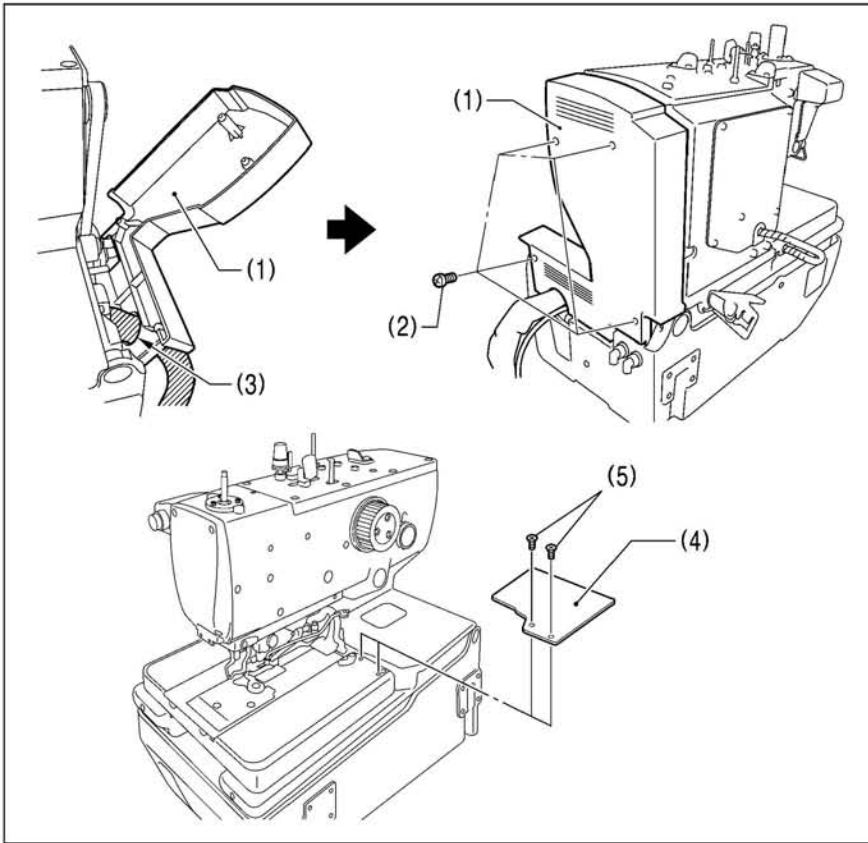
(1) Belt cover
(2) Screws [4 pcs.]
- Before installing the belt cover, pass the cords through the belt cover notch (3).

NOTE:
- Be careful not to clamp the cords when installing the belt cover. If care is not taken, the belt cover and cords may become damaged.
- If using the embedded installation method, check that the belt cover (1) does not touch the table when the machine head is tilted back.

(4) Feed bar cover U
(5) Screws [2 pcs.]

NOTE:
If the screws (5) are tightened too much, the feed bar cover U (4) may become cracked.

3-4. Installing the cotton stand
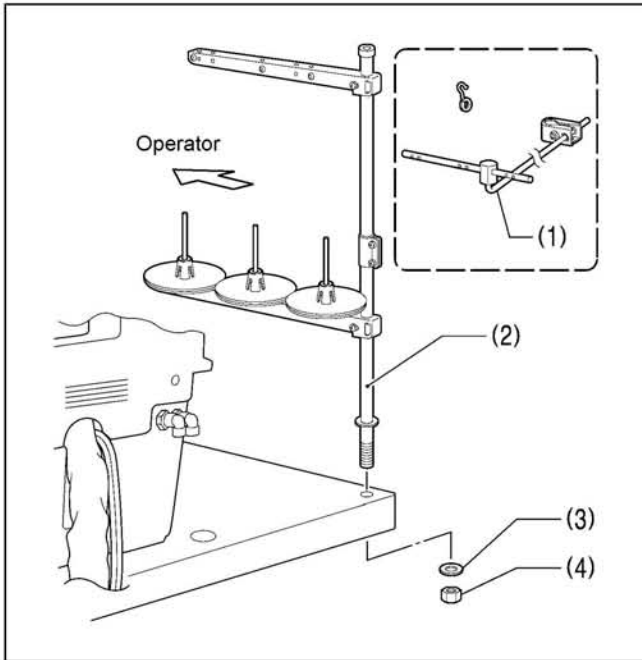
Install the cotton stand so that it is at the far left of the table when looking from the front of the sewing machine.
* Do not use the thread guide (1) which is provided a an accessory with the cotton stand.

(2) Cotton stand
(3) Washer
(4) Nut

NOTE:
* Tighten the nut to secure the cotton stand firmly so that it will not move.
* The cotton stand can also be installed on the far right side of the table, but if this is done, the threading method will change.

7

3-5. Installing the air unit and valve unit
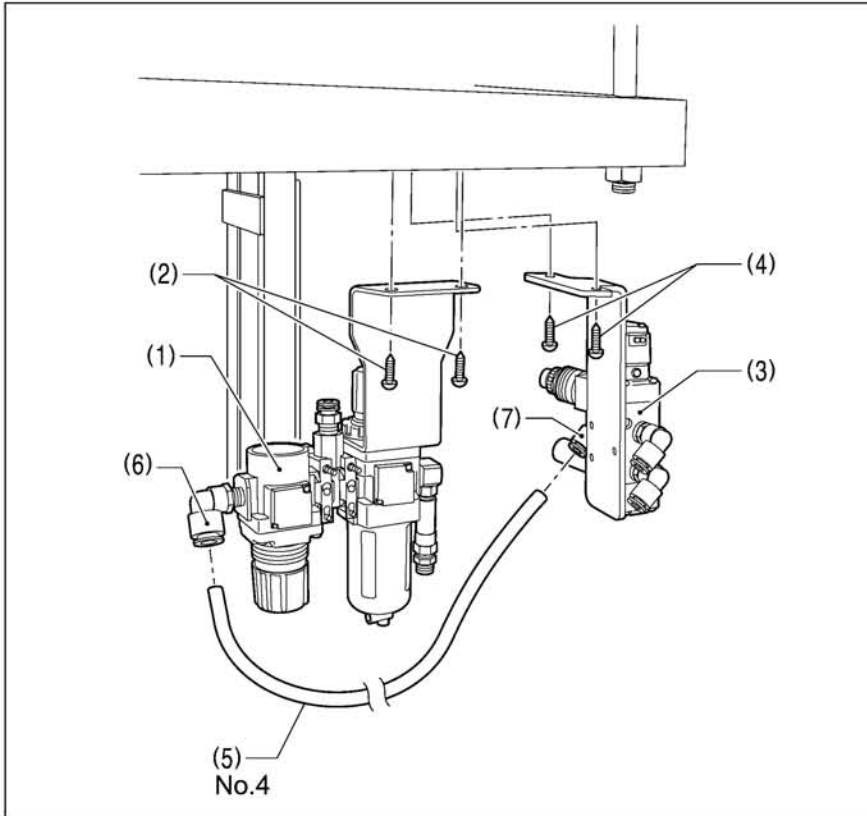
Install to the underside of the table. (Refer to "3-1. Table processing diagram" for the installation positions.)

(1) Air unit
(2) Screws [2 pcs.]
(3) Valve unit
(4) Screws [2 pcs.]
(5) Air tube No. 4

Insert air tube No. 4 (5) into the joint (6) and the joint (7).

NOTE:
- Install the air unit (1) so that it does not touch the table leg.
- Be careful to avoid injury from items such as sewing machine parts and the corners of table drawers during installation.

3-6. Installing the 2-pedal foot switch (when using the 2-pedal foot switch)
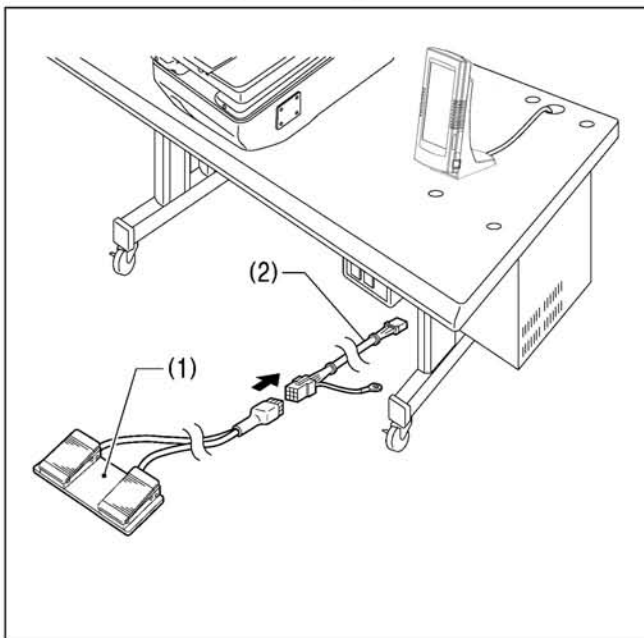
(1) 2-pedal foot switch
(2) Foot switch conversion harness

Pass the connector of the foot switch conversion harness (2) into the control box through the hole in the rear of the control box. (Refer to "3-8. Installing the operation panel".)

<2-pedal foot switch operation method>
When the work clamp switch (left side) is depressed, the work clamp will be lowered, and when the start switch (right side) is depressed, the sewing machine will start.

Work clamp switch
Start switch
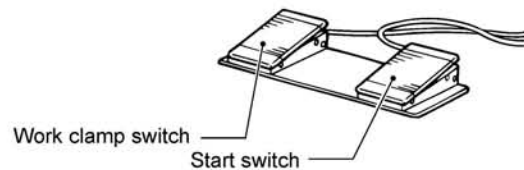
3-7. Installing the treadle unit (when using the treadle)
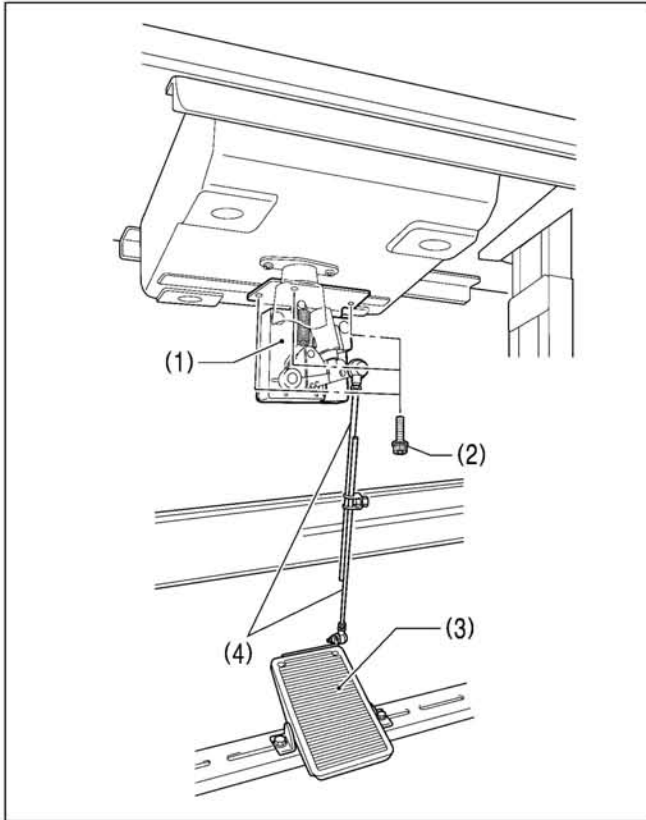
(1) Treadle unit
(2) Screws [3 pcs.]

Pass the connector of the treadle unit (1) into the control box through the hole in the rear of the control box. (Refer to "3-8. Installing the operation panel".)

* Use a commercially-available treadle (3) and connecting rod (4).

<Treadle operation method>

When the treadle (3) is depressed to the 1st step, the work clamp will be lowered, and when it is depressed to the 2nd step, the sewing machine will start.

1st step
2nd step
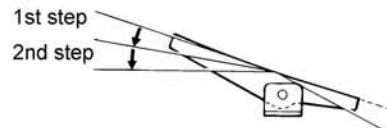
3-8. Installing the hand start switch (when using the hand start switch)

(4)
(3)
(2)
(1)

[When setting up on top of the table]

(3)
(6)
(5)
(4)

[When embedding into the table]

(5)
(3)
(4)
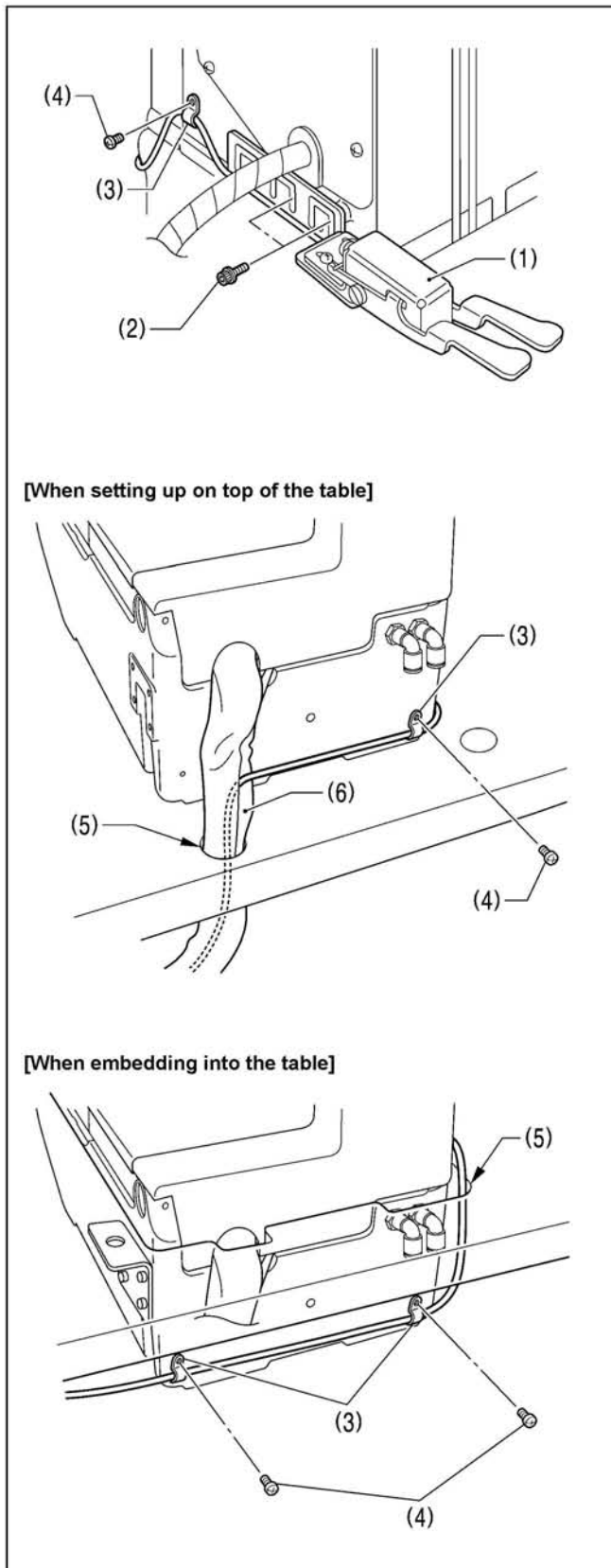
(1) Hand start switch
(2) Screws [2 pcs.]
(3) Cord holders [3 pcs.]
(4) Screws [3 pcs.]
* When setting up on top of the table, use only two of the cord holders (3) and screws (4).

Pass the cord of the hand start switch (1) through the table hole (5), and pass the connector into the control box through the hole in the rear of the control box. (Refer to "3-8. Installing the operation panel".)

[When setting up on top of the table]
Insert the cord into the quick tube (6), and then pass it through the table hole (5).
* This is to prevent damage from the cord rubbing against the table hole (5) when the machine head is tilted back and returned.

<Hand start switch operation method>
When the work clamp switch (left side) is depressed, the work clamp will be lowered, and when the start switch (right side) is depressed, the sewing machine will start.

Start switch

Work clamp switch

<Adjusting the hand start switch position>
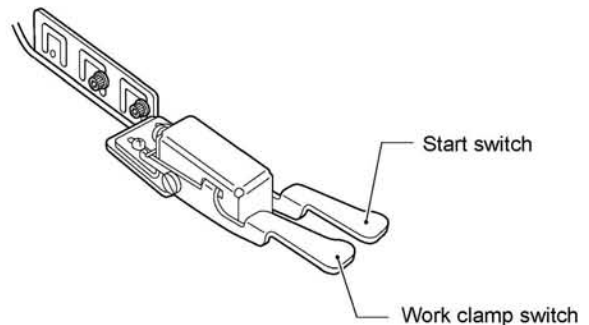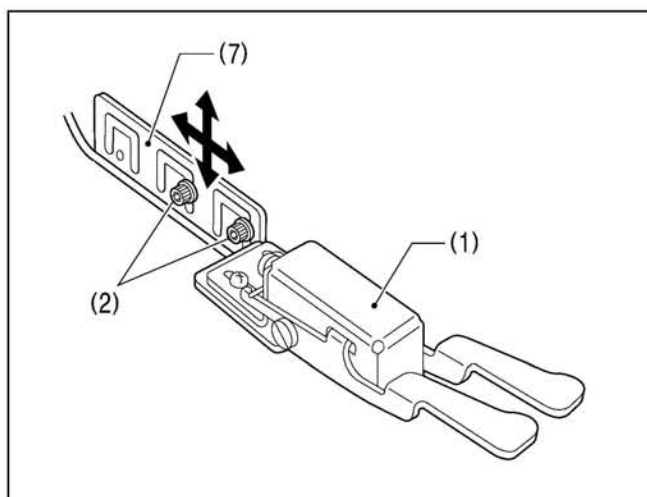
Adjust the position of the hand start switch (1) as follows so that it is in an easy-to-use position.

[Forward/back and vertical position]

1. Loosen the two screws (2), and then move the hand start switch mounting plate (7) forward, back, up or down to adjust its position.
2. Once adjustment is complete, securely tighten the screws (2).
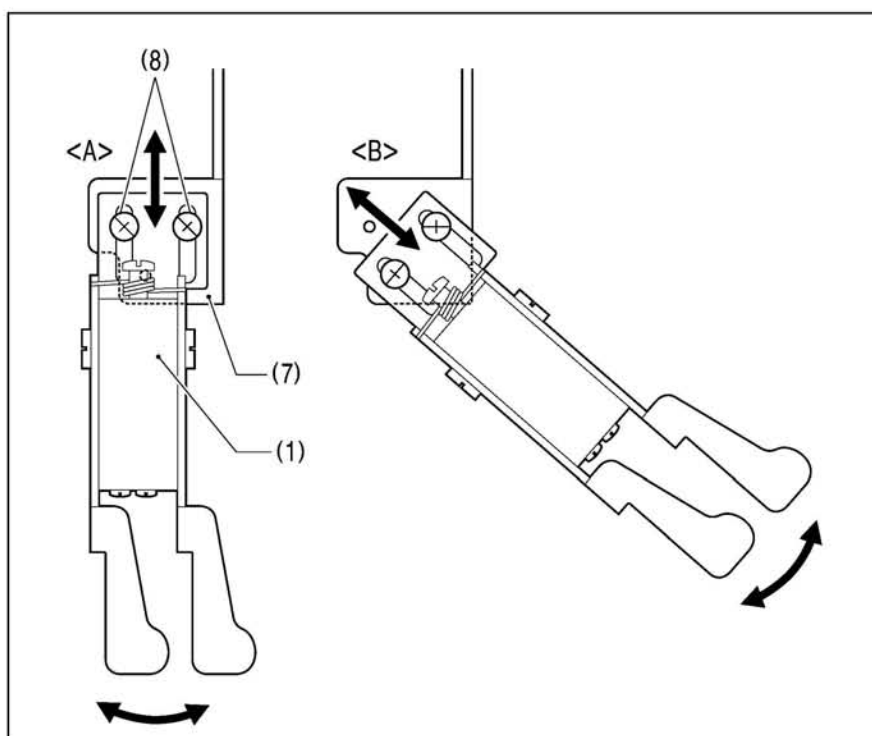
[Forward/back and sideways position]

- The hand start switch mounting plate (7) has three screw holes in it. You can select the installation position from either <A> or <B> shown in the illustration by changing the screw holes used by the screws (8).
- In addition, when the screws (8) are loosened, the hand start switch (1) can be moved forward, back and sideways to adjust its position. Once adjustment is complete, securely tighten the screws (8).

11

3-9. Lubrication

<div style="border: 2px solid black; padding: 10px;">

⚠ CAUTION

⚠ Turn off the power switch before carrying out this operation.
If this is not done, the machine may operate if the start switch is pressed by mistake, which could result in serious injury.

🚫 Be sure to wear protective goggles and gloves when handling the lubricating oil, so that it does not get into your eyes or onto your skin. If care is not taken, inflammation can result.
Furthermore, do not drink the lubricating oil. Diarrhea or vomiting may result.
Keep the oil out of the reach of children.

</div>

NOTE:
The recommended oil to use is Exxon Mobil Essotex SM10, VG10.

3-9-1. Adding oil

The sewing machine should always be lubricated and the oil supply replenished before it is used for the first time, and also after long periods of non-use.
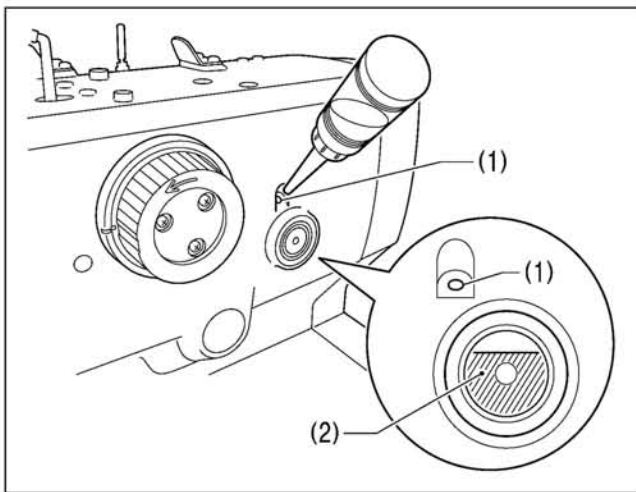
<Filling the arm oil tank>
Pour lubricating oil in through the lubricating hole (1) in the arm oil tank. Use the oil gauge window (2) to check the oil amount, and pour in the oil until the oil gauge window (2) is about 8/10ths covered.

NOTE:
- If the oil level in the oil gauge window drops to cover about 1/3rd of the window, be sure to add more lubricating oil. If this is not done, problems such as seizing may occur.
- Be careful not to add too much lubricating oil. If too much lubricating oil is added, it may overflow inside the sewing machine.
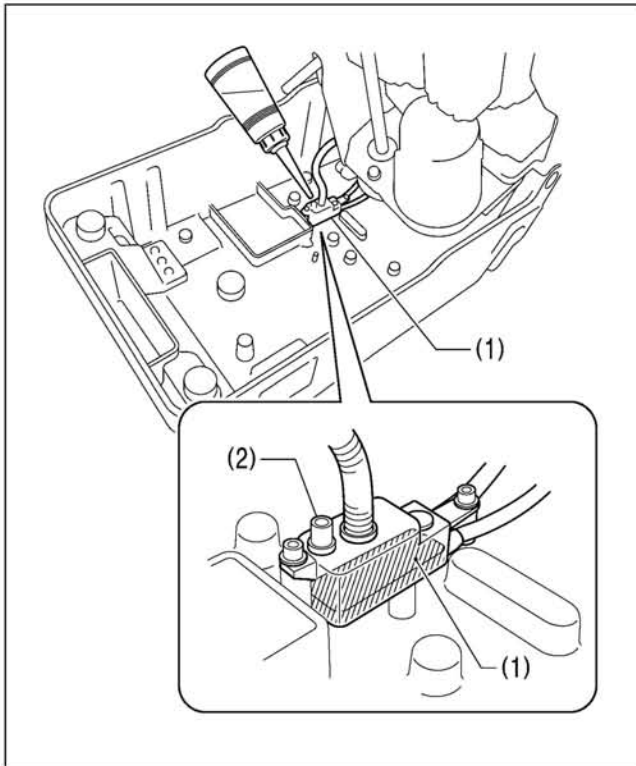
<Adding oil to the bed oil tank (sub tank)>
1. Tilt back the machine head.
2. Pour lubricating oil in through the lubricating hole (2) of the sub tank (1) without letting it overflow.

* During normal use, oil will be fed automatically from the arm oil tank, so it is not necessary to add oil.

3-9-2. Lubrication

- When using the sewing machine for the first time, and also after long periods of non-use, lubricate the sewing machine in the places indicated by arrows in the illustration below.
- Oil may get onto the thread while lubrication is being carried out. Carry out a test sewing to ensure that your material does not get stained with oil.

<Lubricating the needle bar>
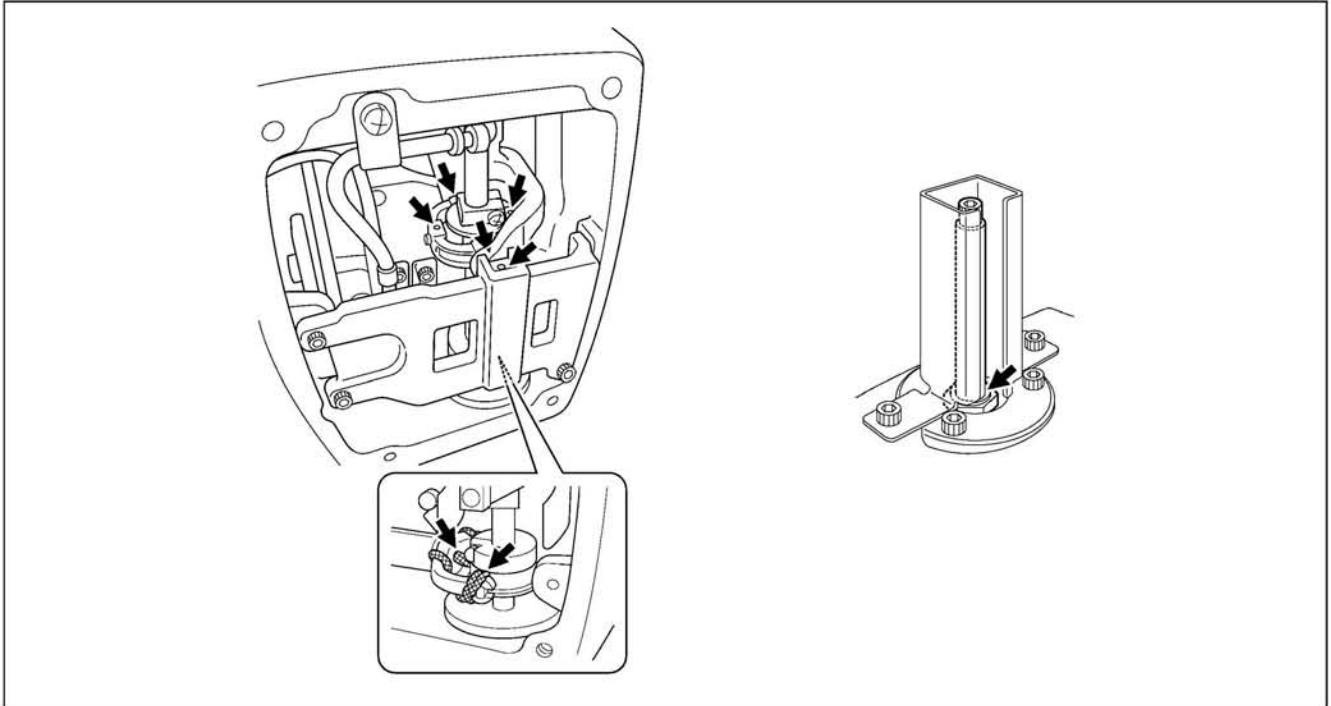
1. Loosen the four screws and then remove the face plate.
2. Add 2 - 3 drops of oil in the places indicated by the arrows.
3. Once lubrication is complete, install the face plate.

<Oiling the looper, spreader and looper base>

| Looper base (left side) | (right side) | (front) |
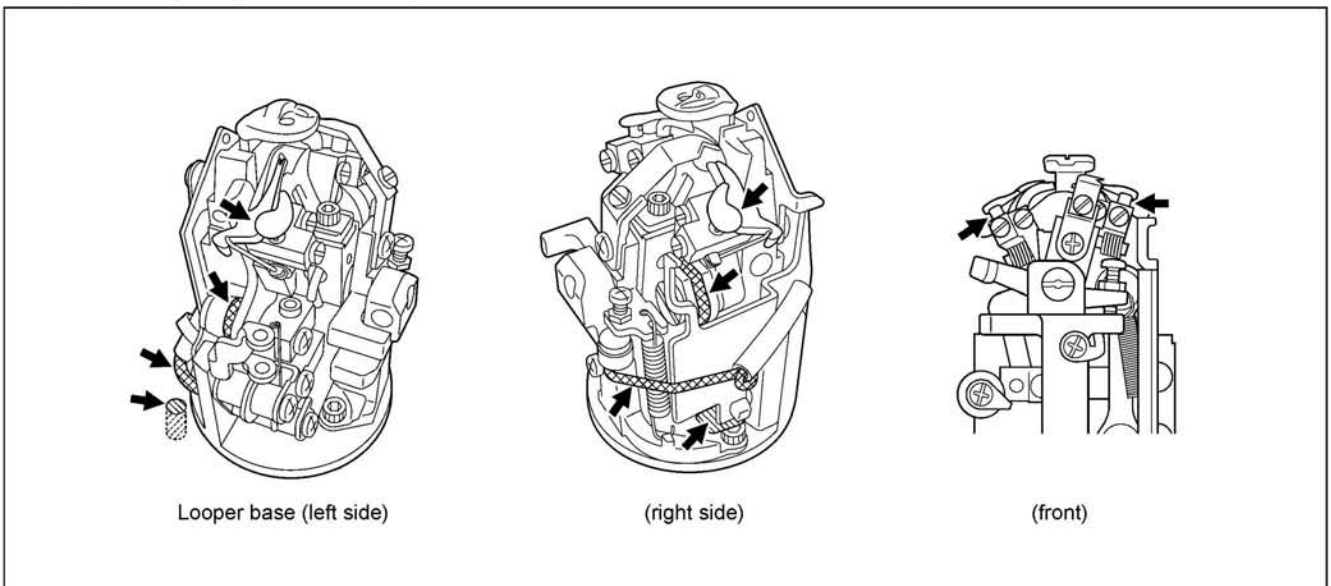
1. Remove the left and right work clamp plates.
2. Move the feed base to a position where it will not interfere with lubrication.
3. Turn the looper base and add 2 - 3 drops of oil in the places indicated by the arrows.
4. Once lubrication is complete, install the work clamp plates.

4. PREPARATION BEFORE SEWING

4-1. Installing the needle

⚠ CAUTION

Turn off the power switch before installing the needle.
Otherwise the machine may operate if the start switch is pressed by mistake, which could result in serious injury.
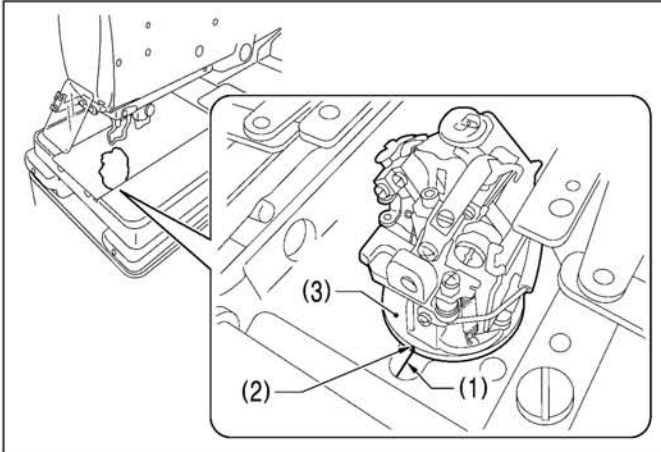
1. Remove the work clamp plates.
2. Check that the index mark (1) on the bed is aligned with the index mark (2) on the looper base.
   * If they are not aligned, turn the looper base (3) until they are aligned.

(3)

(2) — (1)
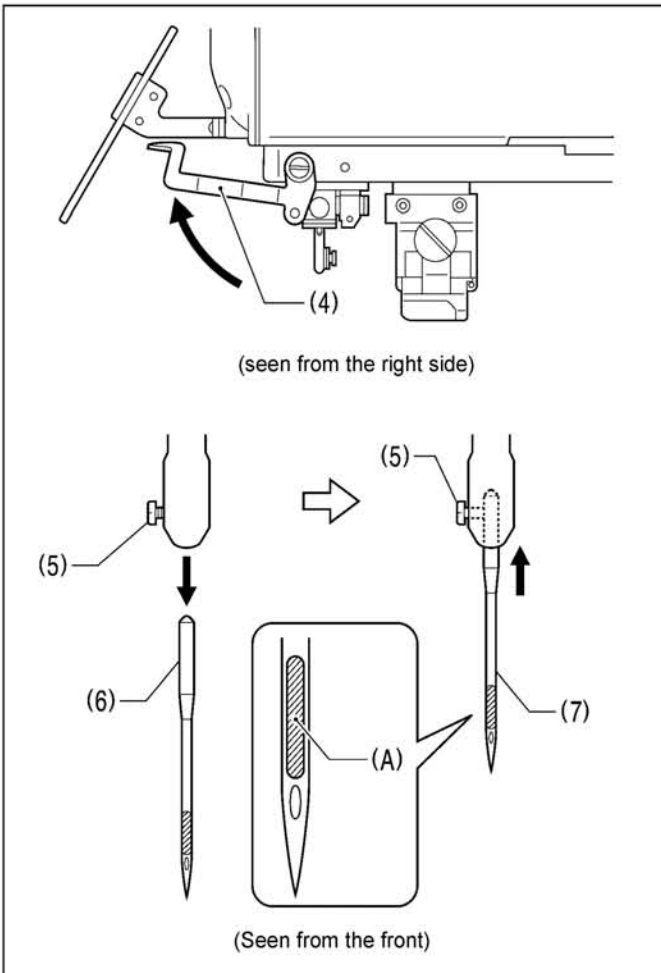
3. Raise the finger guard (4).
4. Loosen the set screw (5), and then remove the needle (6).
5. Insert the new needle (7) as far as it will go, with the hollow (A) facing toward the front.
6. Securely tighten the set screw (5).
7. Lower the finger guard (4).

NOTE:
Do not tighten the set screw (5) while the needle has been removed. If the set screw (5) is tightened, it may damage the inside of the needle bar and it may not be possible to insert the needle.

(4)

(seen from the right side)

<Recommended needle>
DO x 558 -NY2 #14~#18(Organ)

(5)

(5)

(6) — (A) — (7)

(Seen from the front)

4-2. Threading the upper thread

Thread the upper thread correctly as shown in the illustration below.

*   The illustration below shows the method when the cotton stand is installed on the left side. If the cotton stand is installed on the right side, the threading method will be different. Before threading, refer to "4-5. Threading the threads when the cotton stand is installed on the right side".
*   When using threading mode for threading, the tension discs (1) will open so that the thread can be threaded more easily.
*   Use the accessory threader (2). (① in the illustration shows the position for inserting the threader.)

4-3. Threading the lower thread

When threading the lower thread, first remove the work clamp plates, and then thread the lower thread correctly as shown in the illustration below.

* The illustration below shows the method when the cotton stand is installed on the left side. If the cotton stand is installed on the right side, the threading method will be different. Before threading, refer to "4-5. Threading the threads when the cotton stand is installed on the right side".

* (①) - (③) in the illustration show the positions for inserting the threader.) (Refer to "4-2. Threading the upper thread" for details on using the threader.)

<-00 specifications>

<-01 specifications>
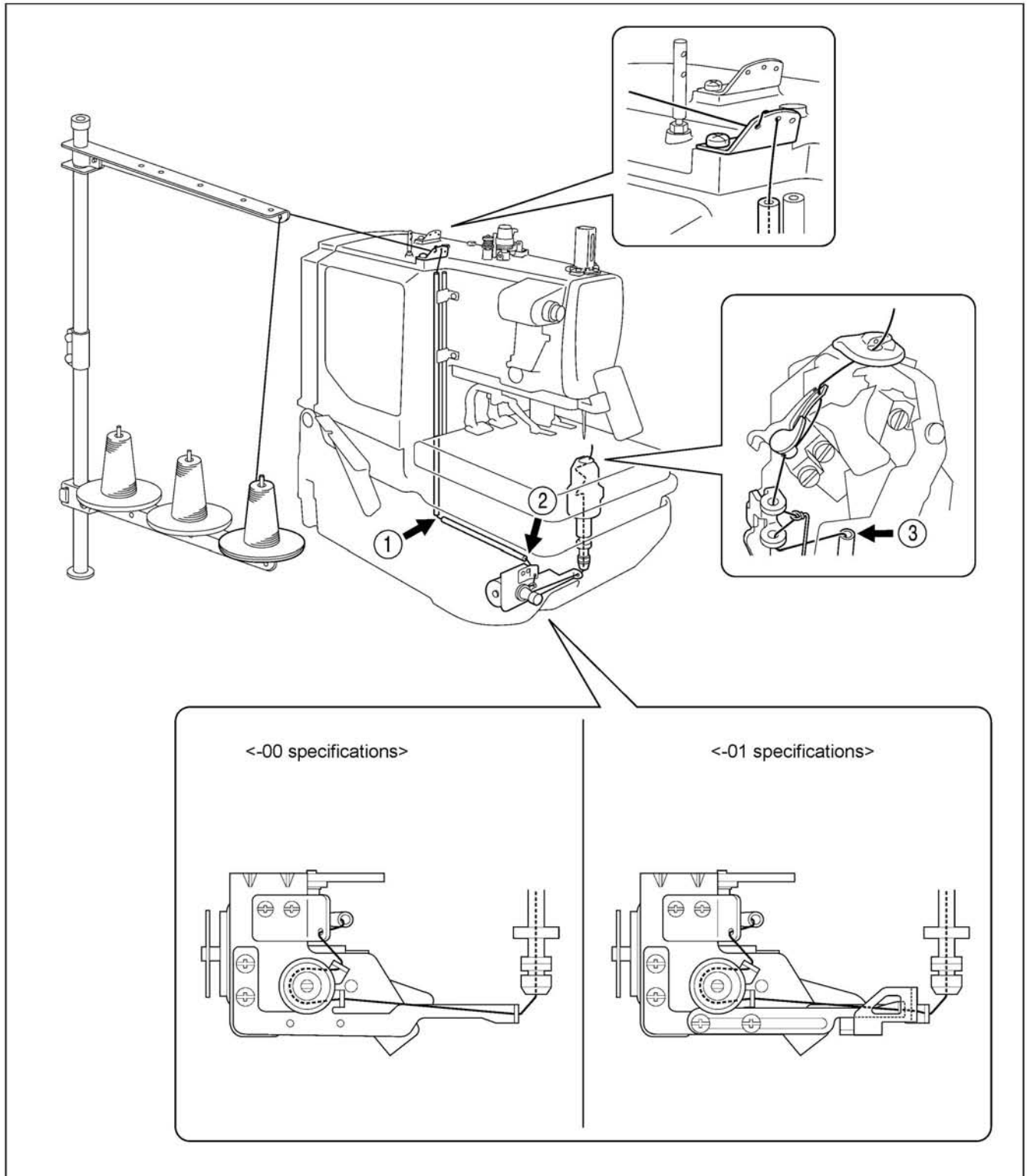
4-4. Threading the gimp

When threading the gimp, first remove the work clamp plates, and then thread the gimp correctly as shown in the illustration below. Once threading has been completed, install the work clamp plates.

* The illustration below shows the method when the cotton stand is installed on the left side. If the cotton stand is installed on the right side, the threading method will be different. Before threading, refer to "4-5. Threading the threads when the cotton stand is installed on the right side".

* ① - ② in the illustration show the positions for inserting the threader. (Refer to "4-2. Threading the upper thread" for details on using the threader.)

Gimp should
not be clamped

②

<-00 specifications>

Gimp should be clamped

②

(when using about #8 spun thread or finer as the gimp)

Gimp should
not be clamped

②

(when using a thicker gimp)

<-01 specifications>
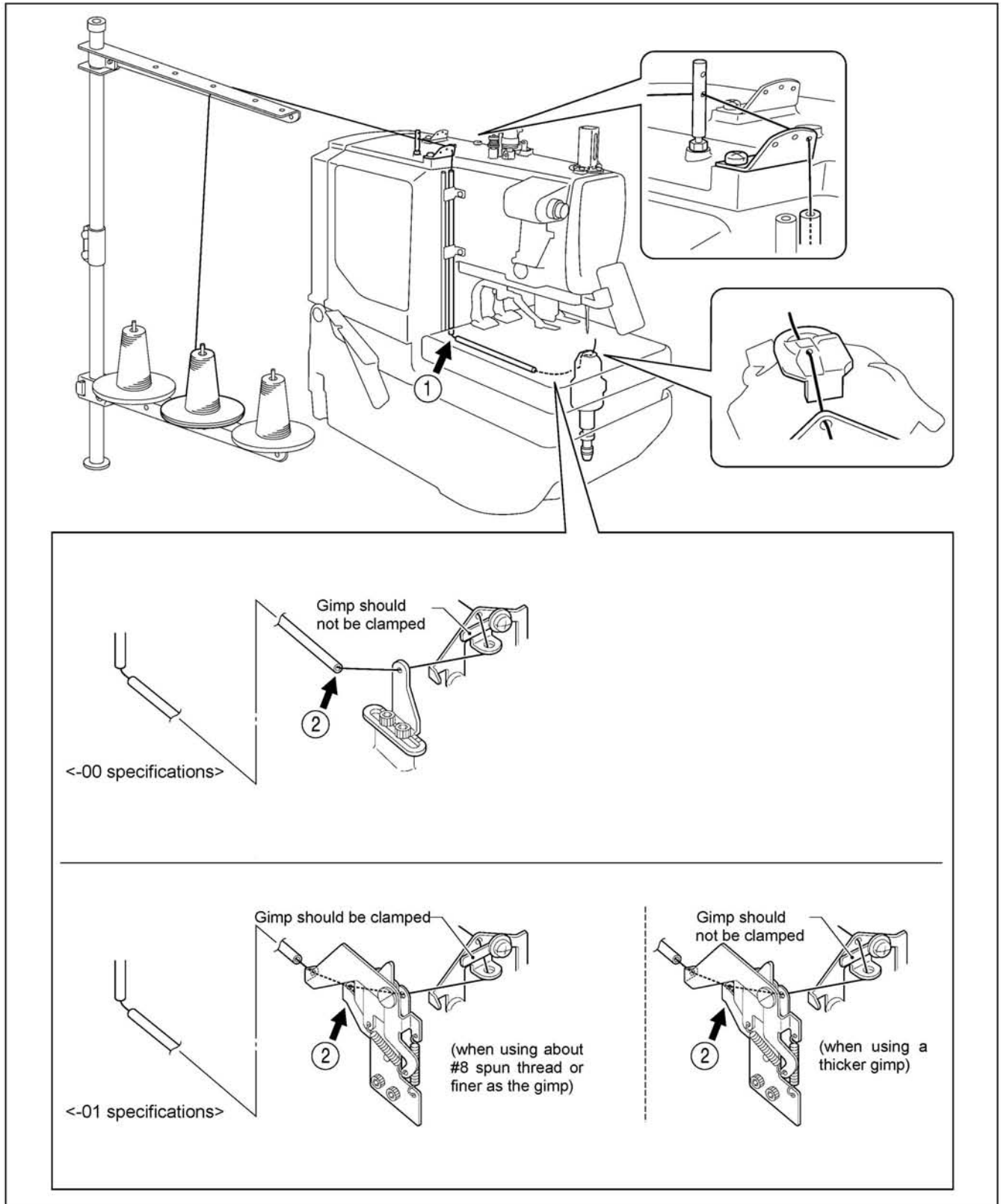
4-5. Threading the threads when the cotton stand is installed on the right side

When the cotton stand is installed on the right side, thread the threads through the parts shown inside the dotted lines below. The parts outside the dotted lines should be threaded in the same way as when the cotton stand is installed on the left side. Refer to "4-2" to "4-4" for details on threading each of the threads.

- Before threading any of the threads, move the thread spool pin (1) to the position shown in the illustration, and then install the accessory thread spool pin (2).
- When installing the cotton stand on the right side, it is recommended that you use the accessory thread guide (3).

(4) Lower thread
(5) Gimp
(6) Upper thread

Install the thread spool pins (1) and (2) so that their thread holes face as shown in the illustration below.

45° 45°

(2)

Operator

(1)

Direction of thread holes
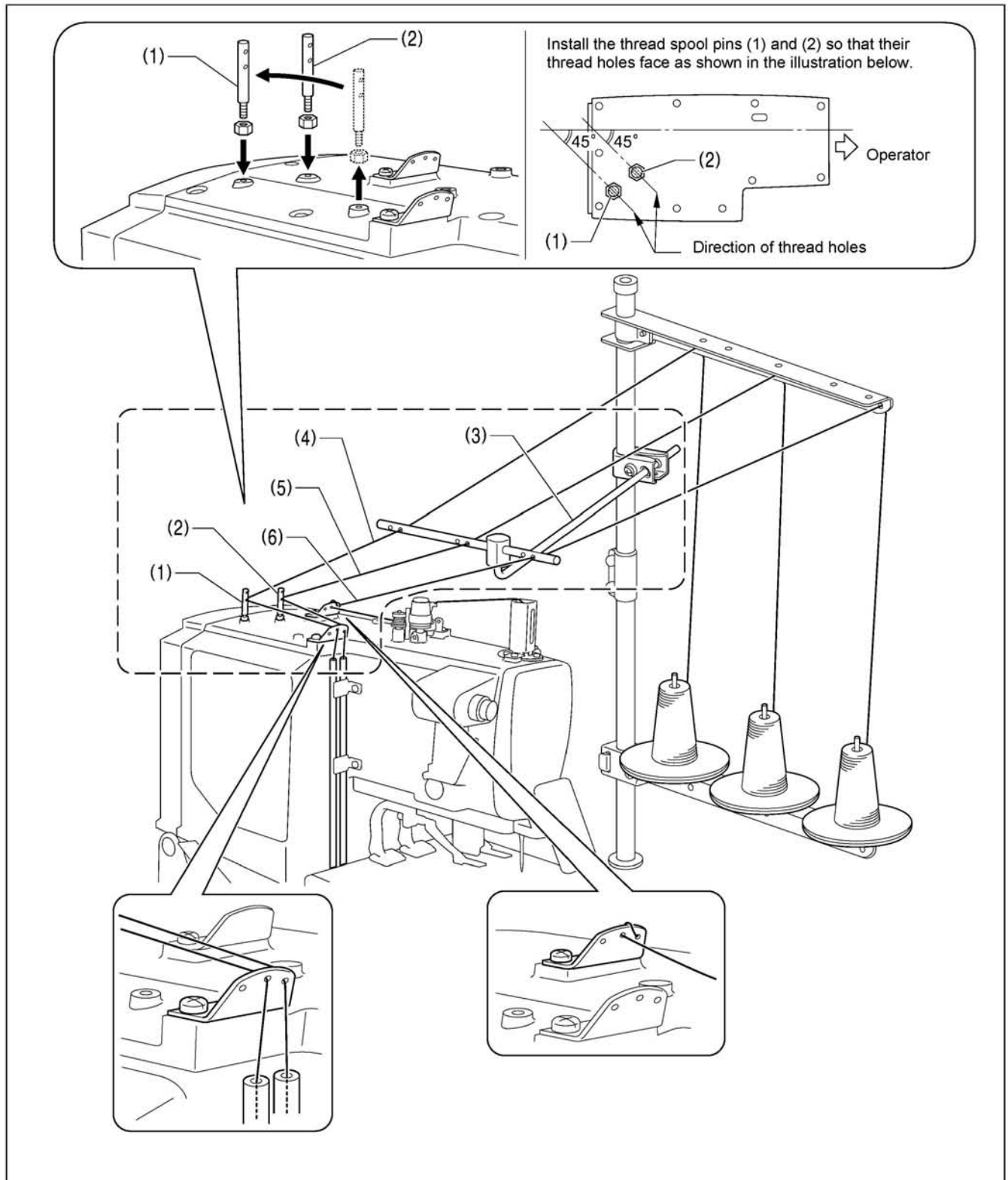
5 Basic Operating Instruction

5-1 Operation Panel

（Front Side）

1

3

（Right Side）

① Pattern Data Display Area   ② Function Mode Button Area
③ Power Cable   ④ U Disk Port

5-2 Basic Operation

① **Turn on Power**

After user turns on the power, the system will display the contents at below in order at the Pattern Data Display Area：

Welcome to using SC511 Buttonhole Machine →SC511-00（01or 02）→Create Data→ Please Start Switch.

Note：If figure A "EB012" is displayed on the operation panel when user turns on the power supply, please turn the wheel (1) in the directions shown in figure B and make the print (2) face to the gap (3) directly.

（A）　　　　　（B）
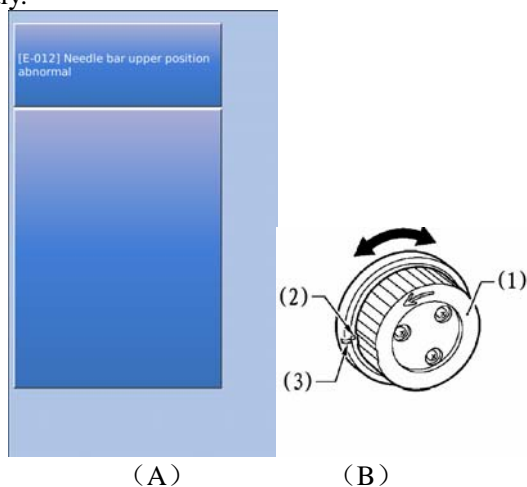
② **Step Pedal for Start**

After user stepped the right pedal for start, the feeding board will move to the position where the cloth is located. In the operation panel, the readiness status of the previous operation mode (it might be Auto Mode, Manual Mode, Test Mode, Cycle Mode or Program Mode) will be displayed.

Note：The "Readiness Status" is the status before the next action when the system moves to a mode.
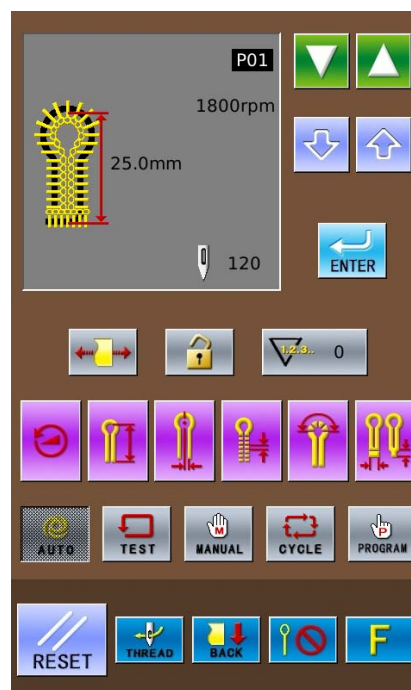
5-3 Settting Methods of Patten Program

5-3-1 Interface for Inputting Sewing Data

The data input interface is shown In the right figure. For detailed functional instructions, please refer to Table 1: Button Instruction Table.
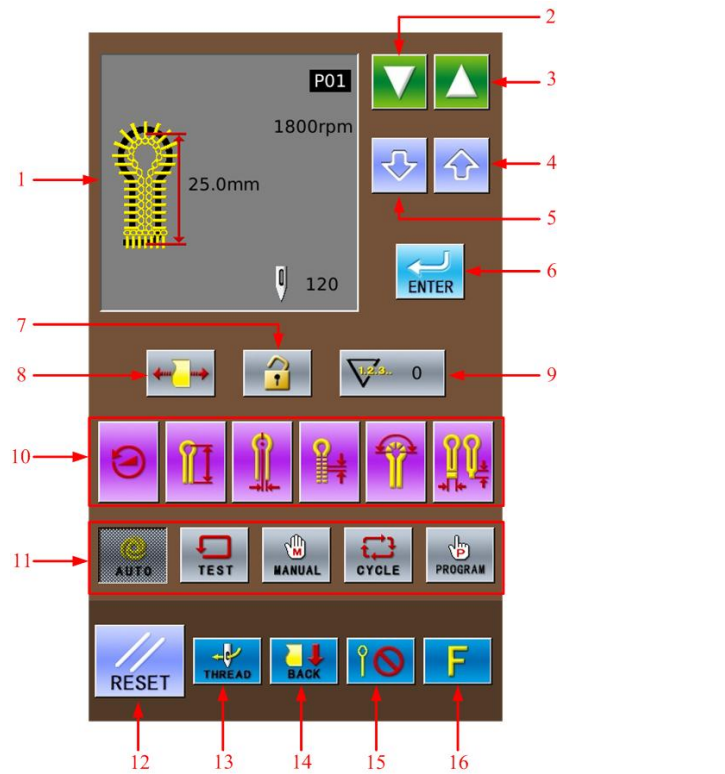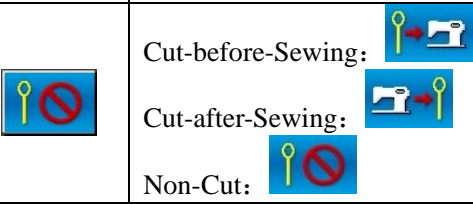
Table 1：Button Instruction Table：

No.	Figure	Functions	Remarks
1		Display of Sewing Shape	Display the pattern number, patter shape, length, stitch number, sewing speed and so on.
2		Decrease Number of Software & Parameter	
3		Increase Number of Software & Parameter	
4		Increase Value & Parameter Content	
5		Decrease Value & Parameter Content	
6		ENTER（Confirmation）Key	Confirm the parameter and the pattern data.
7		Unlock Panel： Lock Panel：	
8		Cloth-tightening Permitted: Cloth-tightening Forbidden:	The default setting is the Cloth-tightening Permitted. If user sets it as Cloth-tightening Forbidden, this parameter will return to default setting when one pattern is finished.

No.	Figure	Functions	Remarks
9		Display the value in Counter	
10		Hot Keys	Quickly change 6 parameter relating to the pattern
11		Sewing Mode	Five available sewing modes: Auto, Manual, Test, Cycle and Program
12	RESET	RESET	Release the display of incorrect information
13	THREAD	THREAD	Have access to the threading mode
14	BACK	FRONT： FRONT BACK： BACK	Shift the positions of the feeding board. Alternative positions: Front & Back.
15		Cut-before-Sewing： Cut-after-Sewing： Non-Cut：	Set the actions of knife
16	F	Parameter Management	Have access to parameter setting

5-3-2 Setting of Pattern Program

It is advised to preset the pattern data parameters which are frequently used so that user would only need to select the pattern code to have access to the set pattern in the future usage, thus saves the time for resetting the parameters at each time.

The 20 patterns can be registered at most, whose parameters can be altered at any time.

When leaving the factory, pattern codes from P01 ~P20 save the default pattern program (The patterns from P01 ~ P20 are all the same.)

① Press [TEST]

② Select a pattern code from P01~P20 (1) for changing the content.

Pattern code (1) will change in the following sequence: P01 → P02 → … P20 → C1→C2…C9, at each pressing [▲]. (press [▼] to change the code in the contrary direction.)

③ Press [PROGRAM]

The pattern data display area will display the parameter code (2) and the specific parameter information (3) at previous time.

④ Press [▼][▲] to select the parameter code (2).

⑤ Press [⬇][⬆] to change the content of parameter(3).

The shining parameter information (3) means the content is uncertain

⑥ Press [ENTER] to confirm the changed content.

If the parameter information is still, that means it has been confirmed. If press any key among [▼], [▲], [AUTO], [TEST], [MANUAL] instead of [ENTER] at (3) shining, the changed parameter (3) will be abandoned and return to the original value.

⑦ Repeat the operation from 4 to 6 to change other parameters.

23
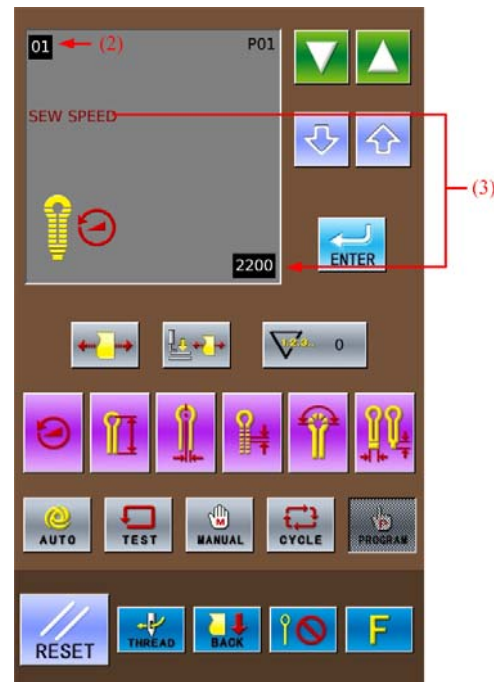
5-3-3 About Hot Keys

Among the Hot Keys (4), the following 6 parameters are registered for their frequent usage:

（5）Sewing Speed (Parameter code No.01)

（6）Length of Lockstitch Sewing at Buttonhole (Parameter code No.02)

（7）Pitch of Knife（Parameter code No.03）

（8）Distance between Stitch Form (Parameter code No.04)

（9）Stitch Number at Eyelet Part （Parameter code No.05）

（10）Length of Bar-tacking (Parameter code No.06、No.08、No.10)
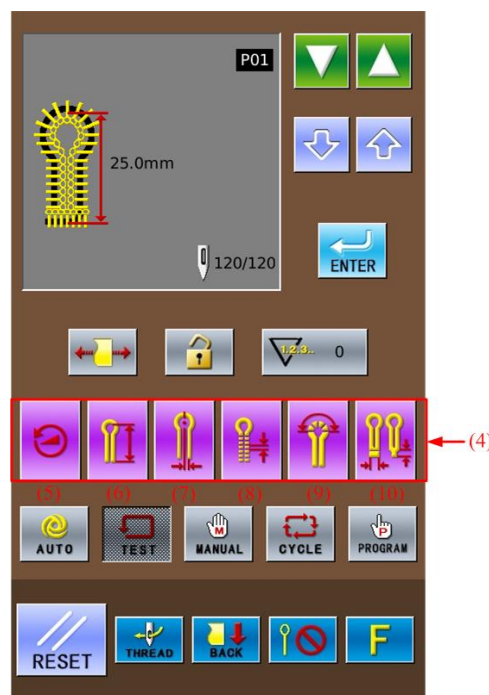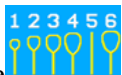
Note: The different bar-tacking sewing types set in parameter code No.40 are corresponding to the various values of bar-tacking sewing length parameter (10).

5-3-4 List of Pattern Parameters at S level

According to the set content of other parameters, the default value of some parameters may be unchangeable or invalid.

Parameter Code	Content	Range	Unit	Default Value
S01	Sewing Speed	1000~2700rpm	100	1800rpm
S02	Length of Lockstitch Sewing at Buttonhole	5~50mm	0.5	25mm
S03	Pitch of Knife	-2.5~0.5mm	0.05	0.2mm
S04	Distance between Stitch Form	0.5~2.0mm	0.1	1.0mm
S05	Stitch Number at Eyelet Part	4~20 针	1	9 Stitches
S06	Length of Taper	1~20mm	1	6mm
S07	Offset	0.5~2.0mm	0.1	1.5mm

Parameter Code	Content	Range	Unit	Default Value
S08	Length of Linear Bar-tacking	2.0~6.0mm（**Each side at 3.0mm as MAX**）	0.1	5.0mm
S09	Stitch Number of Linear Bar-tacking	5~18 Stitches	1	7 Stitches
S10	Stitch Number of Round Bar-tacking	5~17 Stitches	1	7 Stitches
S11	Shape of Knife	1~6（**select the proper knife, according to the different knife code**）	1	2
S12	Sewing Width Adjustment	-1.0~1.0mm	0.1	0.0mm
S13	Eyelet Part Low Speed	-600~0rpm（**This parameter takes the default value of the parameter 01 sewing speed as standard.**）	100	0rpm
S14	Speed of Linear Bar-tacking	1000~2500rpm（**if the sewing speed is lower than the linear bar-tacking speed, these two speeds will become equal.**）	100	1800rpm
S15	Stitch Number of Slow-start	0~3 stitches	1	0 stitch
S16	Speed of Slow-start	400~1500rpm（**if the sewing speed is lower than the slow-start speed, these two speed will become equal**）	100	700rpm
S17	Knife Adjustment in X Direction	-0.5~0.5mm	0.05	0.0mm
S18	Knife Adjustment in Y Direction	-0.7~0.7mm	0.05	0.0mm
S19	Stitch number of bar-tacking at start	0~4 Stitches	1	0 Stitch
S20	Stitch number of bar-tacking in end	0~4 Stitches	1	0 Stitch
S21	Adjustment in X Direction	-1~6	1	0

Parameter Code	Content	Range	Unit	Default Value
S22	Adjustment in Y Direction	-1~6	1	0
S23	θ1Adjustment	-3~3	1	0
S24	θ2Adjustment	-3~3	1	0
S25	Taper Bar-tacking Angle	-5~5	1	0
S26	Adjustment on Bar-tacking Width	-1.0~0.0mm	0.1	0.0mm
S27	Coincidence Amount of Bar-tacking	0.0mm~2.0mm	0.1	1.0mm
S28	Adjustment of Bar-tacking in X Direction	-1.0mm~1.0mm	0.1	0.0mm
S29	Adjustment of incline angle of Bar-tacking	-3~1	1	0
S30	Round Head Correction	-25~25	1	0
S31	Pitch of bar-tacking at sewing-end	20%~100%	5%	100%
S32	Stitch Number of Round coincidence	1~4 Stitches（45°以内）	1	1 Stitch
S33	Stitch moving when without cutting	1~2	1	1
S34	Cutting Size of Radial Hole	2~5mm	1	2
S35	Stitch Number of Radial	8~100 Stitches	1	20
S36	Coincident Stitch Number of Radial Hole	1~5 Stitches (In 45°）	1	2
S37	Bar-tacking Pitch	0~30	1	0
S38	Reserved (For future use)			

Parameter Code	Content	Range	Unit	Default Value
S39	Pattern Copy	OFF~P01~P20	1	OFF
S40	Type of Bar-tacking	1：No Bar-tacking 2：Taper Bar-tacking 3：Linear Bar-tacking 4：Round Bar-tacking 5：Radial Hole	1	2
S41	Double Sewing	0：Forbid 1：Permit	1	0
S42	Adjustment of Round Head	-0.5~0.8	0.1	0
S45	Adjustment of Stitch Form at Joint	-0.2~0.8	0.05	0

5-4 Confirm Pattern under Test Feed Mode

Test Feed Mode is that only cloth-feeding board works normally when the upper shaft keeps still. This mode is used to confirm the positional relation between needle and presser.

① **Press Test Key**

Press ![TEST] to display the stitch form (1), pattern code (2), total stitch number (3) and leftover stitch number (4) in the pattern data display area.

② **Select the Pattern Code**

The pattern code will change in the following sequence: P01 → P02 → … P20 →

C1→C2…C9…P01 at pressing the ![▲]. (Press

![▼] to reverse this sequence.)

27
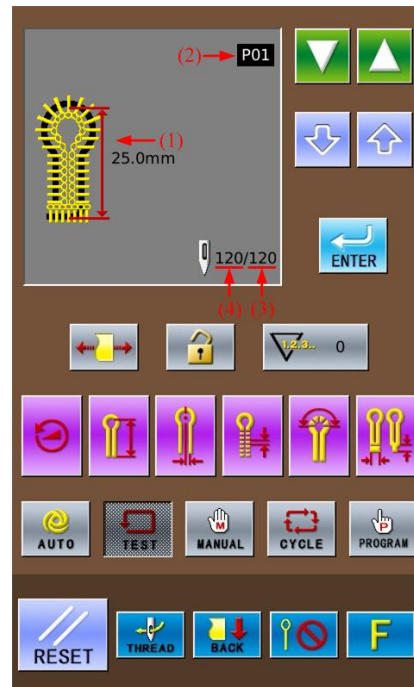
③ **Step Presser Pedal**
   Step the left pedal (5) to lower the presser
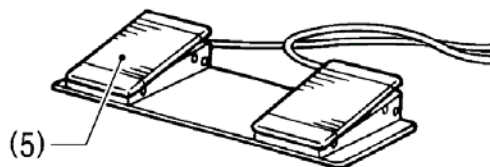
④ **Step the Start Pedal**
   Step the right pedal (6) to make the cloth-feeding board move to the position of sewing start.
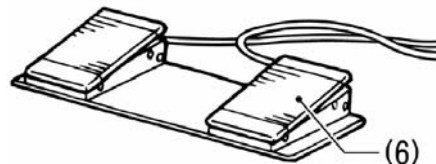
⑤ **Step Pedal（6）or press [↓][↑] to start the sewing under Test Mode.**
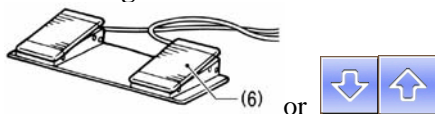
   （2 stitches will be sewn at each pressing.）
   （Holding for continuous sewing）

   Note: the leftover stitch number (4) displayed at the data display area will reduce 2 stitches at each time.

   The buzzer will work at the last stitch.
   No thread-trimming actions and knife actions in test mode.
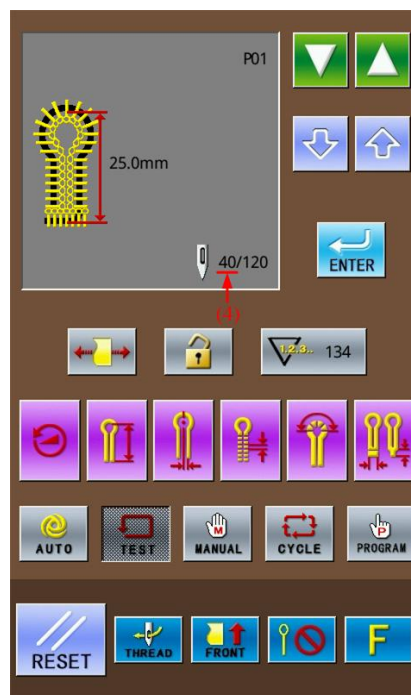
⑥ **If user wishes the cloth-feeding board to return to the cloth setting position at the ending of the test:**
   Please press Pause switch (7), and then press [RESET].
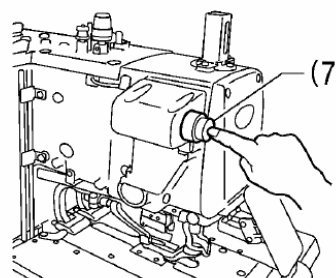
⑦ **During the cloth-feeding, if user wants cloth-feeding board to return to the former sewing position:**

Please press , 2 stitches will be returned at each pressing. The leftover stitch number (4) will add 2 stitches at each time.
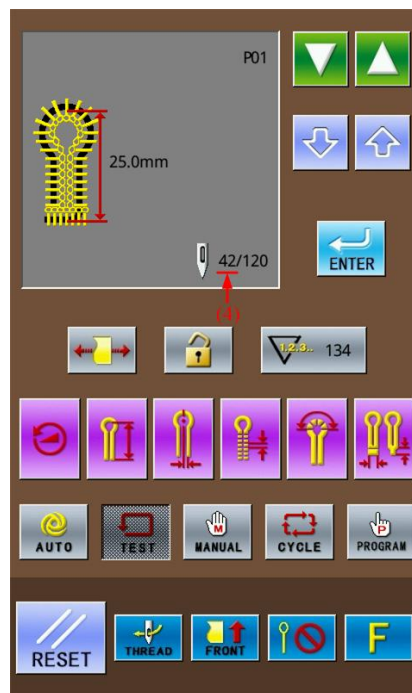
⑧ **Last Stitch**

Step Start Pedal (6) until the leftover stitch number turns to 0 and the cloth-feeding board returns to the position for setting cloth. After that, the pattern data area will display "END OF TEST FEED MODE".
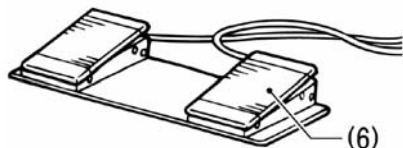
5-5 Shift of Knife Actions

① **Non-Cut**

No knife action during the sewing.

At this time, the interface shows as the picture at right. Press the Knife Mode Key to shift the status to Non-Cut (1).

② **Cut-before-Sewing**

The sewing actions are after the cutting.

In the interface shown as the right figure, shift the Knife Mode to the status of Cut-before-Sewing (2). At this time, this mode will be displayed in area (3).

③ **Cut-after-Sewing**

The sewing actions are before the cutting action.

In the interface as shown in right, press Knife Mode Key to shift the status to Cut-after-Sewing (4). At this time, this mode will be displayed at area (5).
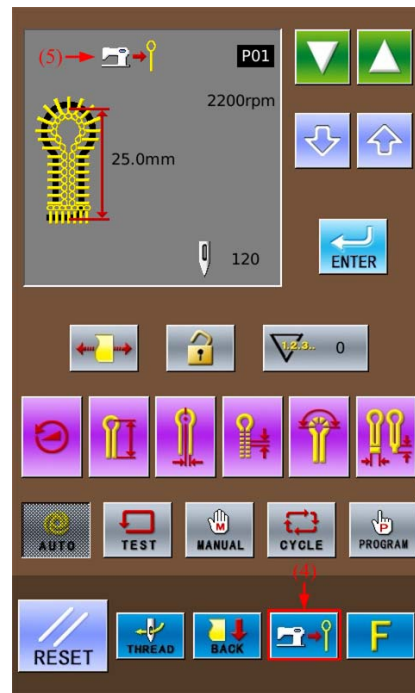
5-6 Method for Shifting Cloth Position

Because this function can move the cloth-feeding board to a position more forward than standard position for setting cloth, it will be easy for setting the cloth. Especially at the status of Cut-after-Sewing, the time of the cycle is shortened.

① **Move the cloth-feeding board to the front**

In the readiness status of Auto mode, Test Feed mode or Manual mode, press Cloth Position Shift Key (1) to change the feeding

mode to FRONT . At this time, the cloth-feeding board will be moved to the Front (position of sewing start).

Note：Front is the position nearer to the operator when he faces to the machine.
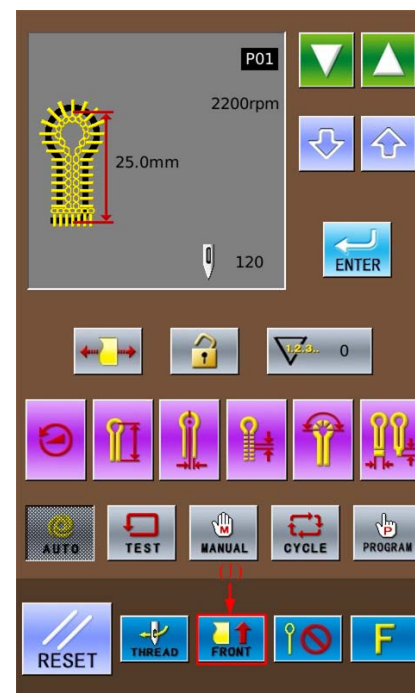
② **Move cloth-feeding board to backside (standard position for setting cloth)**
 Press the Cloth Position Shift Key (2) again

to change the cloth-feeding mode to [BACK]. At the moment，the cloth-feeding board will return to the backside (the standard position for setting cloth).
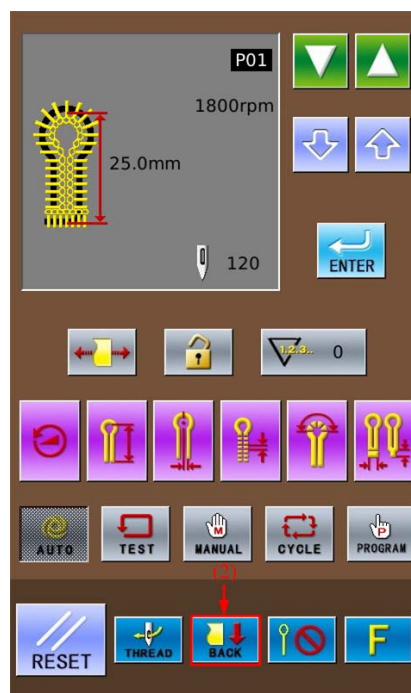
5-7 Threading Mode

 This mode is used in threading the upper thread. At threading mode, if the Z axis of needle rod turns 180 degree, the excitation of stepping motors on X, Y and Z axis will be cut off. At this time, the needle rod and cloth-feeding board can move freely so as to be easy for threading the upper thread.
① **Have access to threading mode**
 In the readiness status of Auto mode, Test Feed mode or Manual mode, press Threading Mode Key (1) to shift from cloth-feeding mode to threading mode. At this time:
1．The pattern data display area will have "Threading mode press 'RESET' " (2).
2．The thread-holder goes into open status.
3．The buzzer rings and the needle rod returns for 180° , then the excitation of the stepping motors on X, Y & Z axis will be cut off
② **Threading Upper Thread**
 After 3 minutes, the thread-holder will be turned off automatically.

③ **Finish of Threading Upper Thread**
 After threading the upper threads, please

press [RESET].

 When the needle rod and cloth-feeding board are moved to origin for origin test, they will return to the position for setting cloth.
 The thread-holder is off.

6. Instructions on Sewing Operations

6-1 Auto Mode

- For the automatic sewing at first time, do please perform the trial sewing.
- When using SC511 in the environment with low temperature, user shall perform the trial sewing for several times, so as to warm up the motor.

① Press Auto Mode Key

Press **AUTO** to show the Shape & Length of sewing stitch: Pattern Shape (1), Pattern Code (2), Knife Action (3), Sewing Speed (4) and Total Stitch Number of Existing Pattern (5) at pattern data display area, as well as the Number of Production (6) at Production Counter Key.
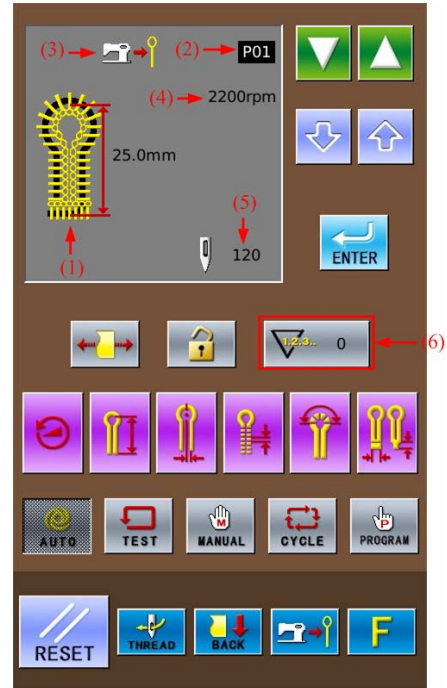
② Press ▼ ▲ to select the wanted pattern code (2). The pattern code will change in the following sequence: P01→P02→…P20→C1→C2…C9 at each pressing on ▲. Press ▼ to change the code in the contrary direction.

③ Select the wanted action of knife (Non-Cut/ Cut-before-Sewing/Cut-after-Sewing).
   Note: For the detailed shift method of Knife Action, please refer to【 **2.5 Shift of Knife Actions**】

④ Lay the fabric for sewing under the presser, step the presser pedal (7).
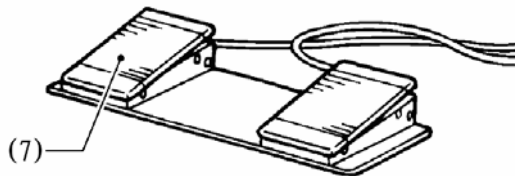
⑤ Step the start pedal (8) to start the sewing
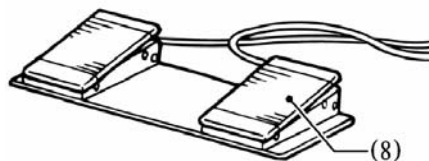
⑥ For sewing repetition, please repeat the operation in the 4ᵗʰ & 5ᵗʰ steps at above.

6-2 Manual Mode

⚠️Caution	
⚠️	**Due to the knife will act during the manual sewing, please keep hand away from the knife. Otherwise the operator may suffer serious injury.**

Under manual mode, turn the wheel to move the cloth-feeding board in stitch by stitch. This will simplify the operation in synchronizing adjustment of yarn-divider.

① Press Manual Mode

Shape of Sewing Stitch Form (1), Pattern Code (2), Knife Action (3), Total Stitch Number (4) and Leftover Stitch Number (5) are shown in the sewing data display area.

② Press ▼▲ to select the wanted pattern code (2).

The pattern code (2) will change in the following sequence: P01→P02→… P20→ C1 →C2…C9 at each pressing on ▲. （Press ▼ to change the code in contrary direction.）

③ Lay the fabric for sewing under the presser, step the presser pedal (6) to lower the presser.
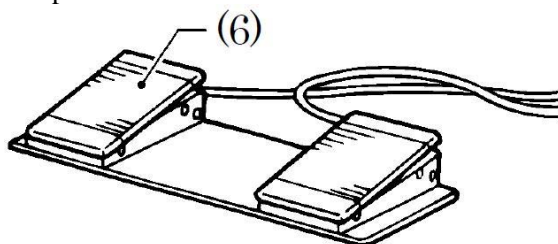
④ Step start pedal (7) to move the cloth-feeding board to the position of sewing start.
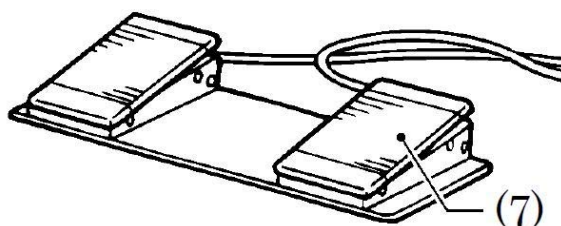
Caution：

When setting the knife action as "Cut-before-Sewing", the operator shall look out for his hand at knife moving.
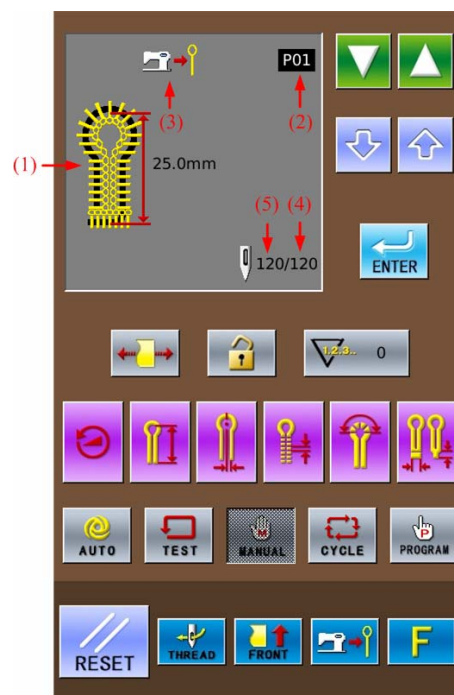
⑤ Reverse of Hand-wheel at Upper Axis
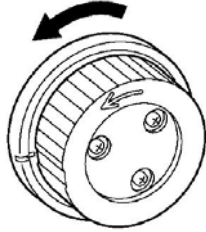
The cloth-feeding board will move to the sewing position of the next stitch at each turning round of upper axis hand-wheel. When the wheel reverses for half a cycle, the leftover stitch number (5) at sewing data display area will reduce 1 stitch

Caution：

If the upper axis hand-wheel turns reversly, the cloth-feeding board will not move the shape with the set stitch form. Please don't turn the wheel reversely.

⑥ For stopping the manual sewing, press emergence stop switch (8) when the cloth-feeding board returns to the position for laying cloth
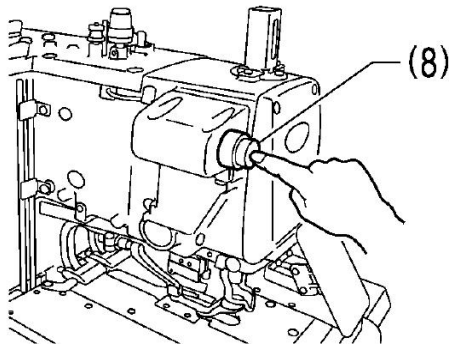
The "Pause Switch Is Pressed In Sewing" is

displayed on operation board. Press [ ] to return to sewing interface and then

press RESET .

⑦ At Last Stitch

The needle rod stops at the upper position of needle. Step start pedal (7) at this time.
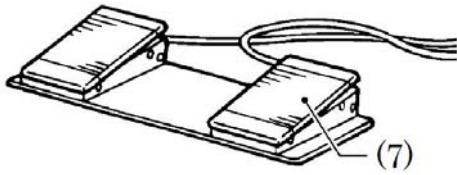
(Hold it until the cloth-feeding board returns to the position for laying cloth.)

In thread-trimming actions, when the cloth-feeding board returns to the position for laying cloth, the system will hint "END OF MANUAL MODE" in the operation panel.

Caution：

When setting knife action as "Cut-after-Sewing", user shall look out the action of knife.

6-3 Pause Switch

Pause in Auto Sewing

The pause switch is generally used for stopping the sewing machine at thread-breakage and other circumstance

6-3-1 Methods for Pausing

During the sewing, press the pause switch (1) to stop the sewing machine, and then the operation panel will hint "InstancyStop Error".
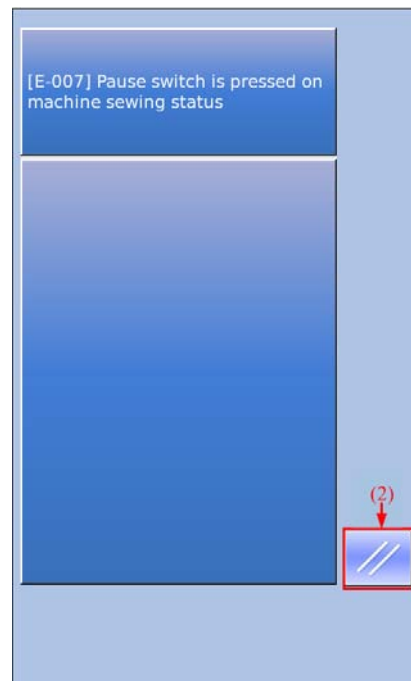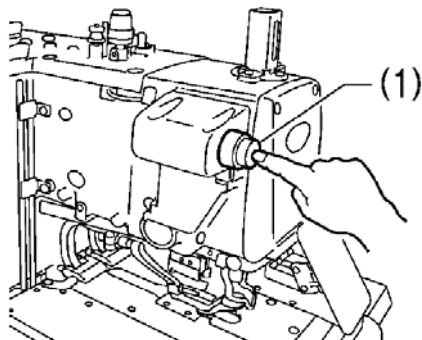
6-3-2 Method for Releasing Pause (For Stopping the Work)

① Press ![icon] (2) when the interface displays "InstancyStop Error".
 Then the operation penal will show the sewing interface, and the pattern data display area shows "Press 'Reset' or 'Down'"
② Release the error causing the pause.

③ Press RESET. After the needle rod and the cloth-feeding board performs the origin test, they will return to the position for setting cloth.

6-3-3 Method for Releasing Pause (For Continuing the Work)

① Press RESET button (2) when the interface displays "InstancyStop Error".
 Then the operation penal will show the sewing interface, and the pattern data display area shows "Press 'Reset' or 'Down'
② Release the error causing the pause.

 If the upper thread is broken, press THREAD to have access to the threading mode.

③ Press ↓ to display the total stitch number of pattern (3) and the leftover stitch number (4) in the pattern data display area.

④ Press ↑ or ↓ to move the cloth-feeding board according to the shape of pattern so as to confirm the position for continuing the sewing job.
 If the upper thread is broken, please press THREAD to have access to threading mode.

 Note: press ↑ to proceed; press ↓ to reverse. Holding means to keep proceeding or

37

reversing.

⑤ Select the position for continuing the sewing, step the start pedal (5) to continue the automatic sewing of the existing pattern.
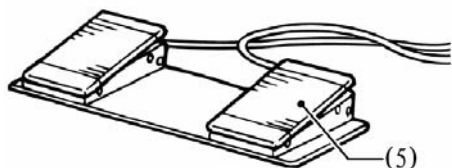
6-4 Usage Instructions on Cyclical Sewing Function

In the single pattern program (P01~P20), system can combine several edited single patterns together and register them into a "Cyclical Pattern Program" for continuous sewing, which is easy for using.

Cyclical Pattern Program：

Max Amount for Cyclical Patterns	9 （C01~C09）
Max Amount of Single Pattern in a Cyclical Pattern	9 （S1~S9）(A single P pattern can be selected for many times)

Example：

We select a single pattern P01 (3 steps, with knife action) and a single pattern P03 (1 step, without knife action) to combine a cyclical pattern, which is set as C1 for example

The set contents of Cyclical Pattern Program C1：

Step Code of C Pattern	S1	S2	S3	S4
Name of Single Pattern	P01	P01	P01	P03
Knife Action	Yes	Yes	Yes	No

① Press the keys (1) at the right interface to select sewing mode in random. （Take the auto mode as example.）
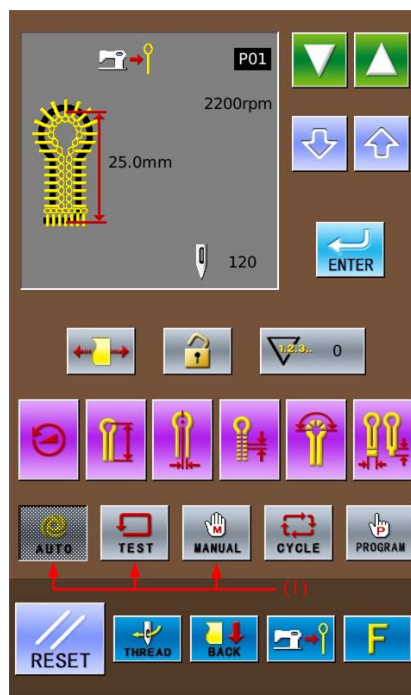
① ress ▼ ▲ to select C1, the pattern number of that cyclical pattern program.

The pattern code will change in the following sequence: P01→P02→…P20→C1 →C2…C9…P01 at each pressing on ▲.

（Press ▼ to reverse the sequence.）

② Press Cycle Mode Key (2)

The sewing data display area will show the following contents:

（3）Step Code
（4）Cyclic Program Code
（5）Pattern Content Set in S1.

③ Press ⬇ ⬆ to set the content of S1 (5) as P01

The "___" in "P01" means that this pattern has the knife action, therefore the knife mark (6) is shown in the sewing data display area

"--" in "P--" means the pattern in this step has not been set yet.

If you set the existing pattern as "P--", the content in the following steps will be deleted.

④ Press ENTER to confirm the changed content.

At that time, the content of S1 (5) will not be shining any more.

⑥ Press [▼][▲] to change the step code
（3）to S2.

⑦ Repeat the operations in steps 4 & 5 at above to set the content of S2 as "P01", which is as same as that of S1

Repeat the operations in steps 4 & 5 at above to set the content of S3 as "P01", which is as same as that of S1

⑧ Press [ENTER] to confirm the changed content.

⑨ Press [▼][▲] to change the Step Code
（3）to S4.

Press [⬇][⬆] to set the content of S4(6) as P03.

Press Knife Action Key (7) to change the "P03" at (6) to "P03".（Without Knife Action）

⑩ Press [ENTER] to confirm the changed content.

Press any key in（1）to end the setting in the Cycle Mode

Note: When selecting the cyclical program to perform the automatic sewing, the user can change the knife action in the Auto Mode. And the knife action in the C pattern will be kept same to the knife mode set at present.
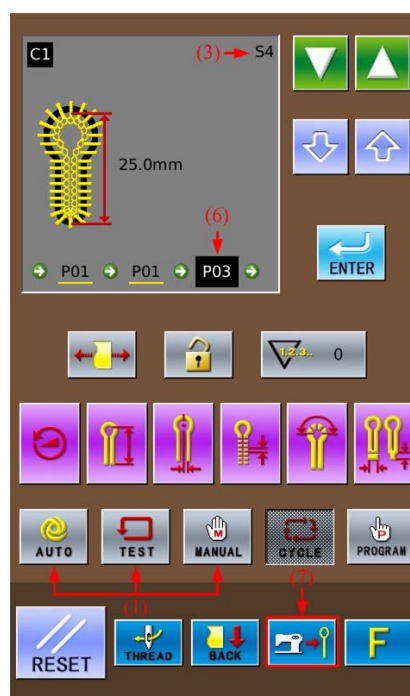
7. Interface of Parameter Setting Mode

In the interface for inputting sewing data, press to shift the data input interface and parameter setting mode interface (as shown in right). In the interface of parameter mode, user can make some detailed settings and edition operations.

In the interface for inputting sewing data, hold for 3 seconds, then the system will have access to the setting mode Level 2.
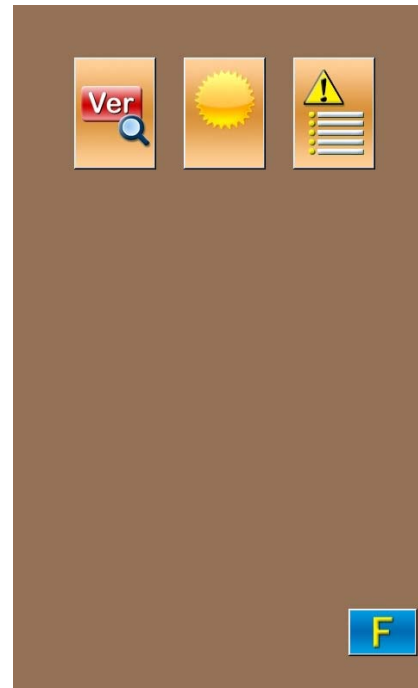
Setting Mode Level 1

Setting Mode Level 2

41
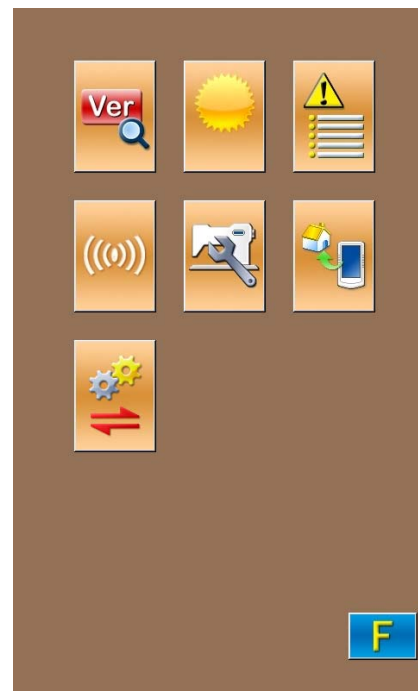
7-1 Description of Functions

Setting Mode Level 2：

No.	Figure	Functions
1		Inquiry of software version.
2		Lightness adjustment
3		Error information record
4		Communication mode
5		U level parameter
6		Recovery to default setting
7		Parameter back-up & recovery

7-2 Software Version Inquiry

In Level 1 of Setting Mode, press [Ver] to have access to the interface for inquiring the software version (as shown in the right figure).
(1): Version of Operation Penal Program
(2): Version of Controller Program
(3): Version of X Axis & Y Axis Stepping Motor Program
(4): Version of Z Axis Stepping Motor Program
(5): File System Version
(6): Operation System Version
(7): Compiling Time of Panel Program

Press [icon] to output the software version to the base inventory of U disk with name version.png.

Panel Ver:	SC511-KD-SJ-v1.0.20
Main-Control Ver:	SC511-MC-SJ-v5.2.219
Main-Motor Ver:	SC511-MM-SJ-v5.2.219
Step-Motor-1 Ver:	SC511-MD-SJ-v1.0.7
Step-Motor-2 Ver:	SC511-MD-SJ-v1.0.7
Fs Ver:	SC511-FS-SJ-v1.0.8
Os Ver:	SC511-OS-SJ-v1.0.6
Compiling Time:	2013-01-6
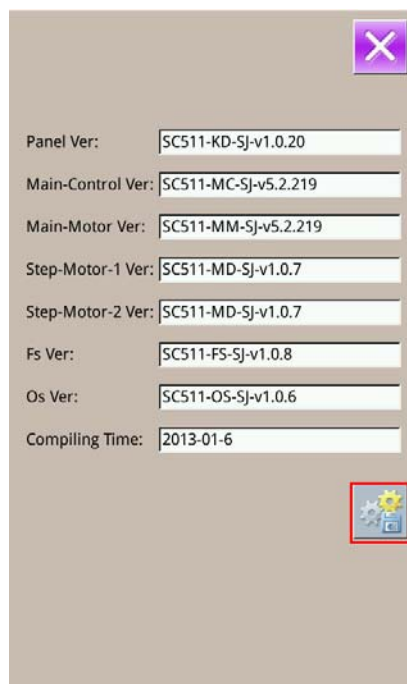
7-3 Lightness Adjustment

In Level 1 of Setting Mode, press ☀ to have access to the interface of lightness adjustment (as shown in the right figure), whose range is from 20 to 100. User can press ⬆ or ⬇ to adjust the value and it is also possible to input the value via the number keys. Press ENTER to confirm the input.
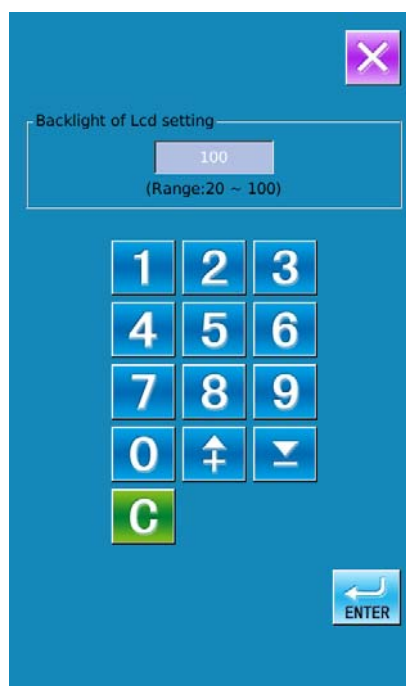
7-4 Error Information Record

In Level 1 of Setting Mode, press ⚠ to have access to the interface for recording the error information (as shown in right). In the interface, the times of the various kinds of errors and the recent error information will be displayed. The smaller number means the later occurrence.

Additionally, the system will also record the production number at each warning.

User can use ◀ or ▶ to turn the pages for checking more error information.

Press **C** to clear all the error records.
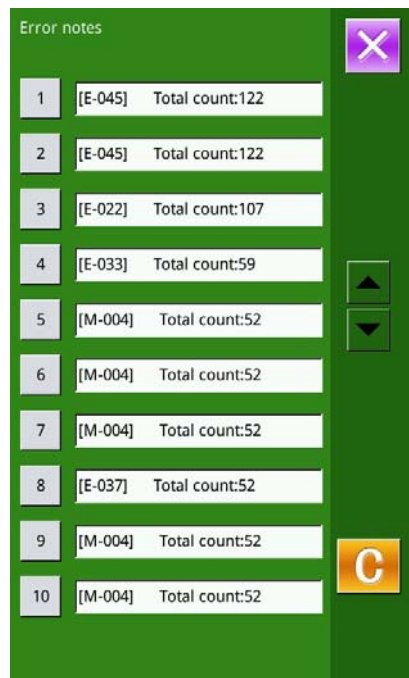
7-5 Communication Function

The communication mode contains the following functions:
1、 Update Panel Software via U Disk；
2、 Transfer U Level Parameters between Panel and U disk

7-5-1 Operation Penal Update

① **Have access to the interface of communication function**
Insert U disk, in Level 2 of Setting Mode,

press [((•))] to have access to the communication function mode (as shown in the right figure).

[🌐🔺]：Software Update

② **Enter Software Update Interface**
Press [🌐🔺] to enter the software update interface (as shown in right), where user can update the software
The updating software is located at 「update」in U disk. Click the content for update,

then please press [ENTER].
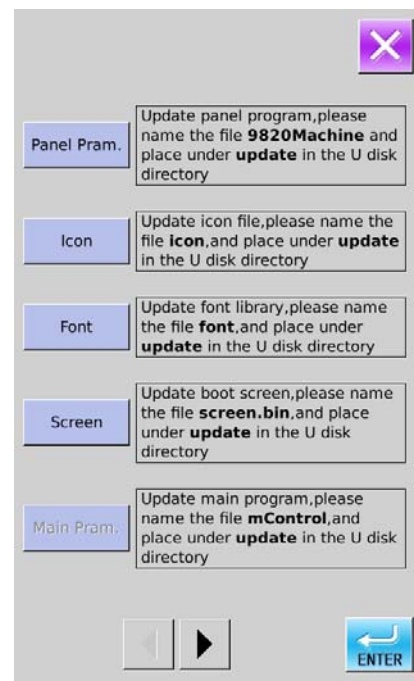
③ **Finish Updating**

　　After the update, the system will display the hint information. Please restart the machine.

[M-048] Upgrade success!

Success of upgrading,please restart after power off

7-5-2 Input/ Output U Level Parameters

① **Display the Communication Interface**

Insert U disk. In the level 2 of Setting Mode,

press ⬚ to have access to the
Communication function mode
A: Input Parameter from U disk to Panel
B: Output Parameter from Panel to U disk
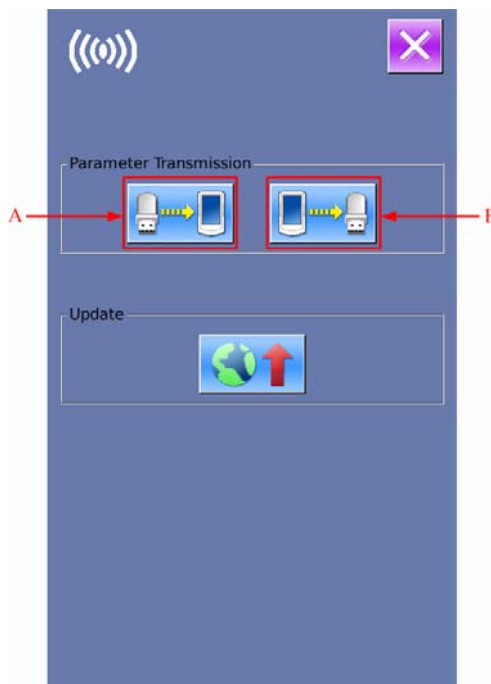
※ **When inputting patterns from U disk,
user has to save the parameters into the
DH_PARA in the U disk with name
9820Param**

※ **When outputting patterns from operation
panel, user has to save the parameters into
the DH_PARA in the U disk with name
9820Param**

※ **The parameter file is the binary file,
which is operated on the control panel.
User can not change that file manually on
PC, or the file may be damaged**

② **Press Button A to Input Parameters from
U Disk to Operation Panel**

A、Press ⬚ to input the parameters and
quit
B、Press ✕ to quit directly.

③ **Press Button B to Output Parameters to Operation Panel**

A、Press [↵] to output parameters from operation panel to U disk and quit

B、Press [✕] to quit directly

47

7-6 Parameter Setting

7-6-1 Method for Setting Parameters

① **Have Access to Parameter Setting Interface**

In Level 2 of Setting Mode, press [icon] to have access to the interface for setting U level parameters (as shown in right picture).

Press [icon] to quit the setting interface

When some parameters are changed, the system will display the "Modified" in the parameter setting interface.

Select the parameter for changing; Then the system will enter the setting status. The parameters are separated as "Data Input Type" and "Selection Type". Please refer to the example at below:

01/06	Encrypt	✕
U001	Pedal switch	2
U051	Delay time before cut	0
U056	Lower clamp when move front	ON
U057	Enable clamp at test	OFF
U058	Keep clamp down after sewing	UP
U150	Stop at n.up when suspended	ON
U152	Final stch spd main motor	800
U153	Last speed main motor	500
U156	Stop angle main motor	11.0
U256	Interval of origin detect	0

Modified   ◀ ▶

U152 Final stch spd main motor

800

Range: 700 - 900   Step: 10

Final stch spd main motor

1 2 3
4 5 6
7 8 9
0 ⇕ ⤓
C

✕   ENTER

Input Type

U150   Stop at n.up when suspended   01/01

OFF   At pause, the upper axis is in the status of emergency stop

ON   At pause, the upper axis stop at needle upper position

✕   ENTER

Selection Type

② **Parameter Encryption**

Press "Encryption" to enter the password input interface.

Press CLR to clear all the content

Press ABC to erase one figure at each pressing
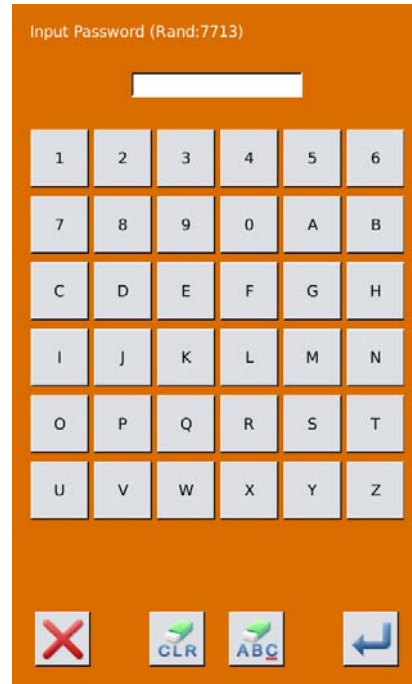
③ **Change the Parameter**

Input the right password to enter the interface for parameter encryption

A、Select the parameter for encryption

B、Press 【Select All】 to attach password to all the parameters

C、Press【Reverse】 to select parameter for encryption in reverse way

D、Press [X] to quit the encrypting function

④ **Check the changed parameter**

A、 When parameter is changed, the system will display "Modified" key at parameter setting interface.

B、 In the parameter setting interface, press 【Modified】 to check the changed parameters.

At first, the system will ask user to input the password. For the operation at password input interface, please refer to the "A" at ②. After inputting the right password, user can enter the interface for inquiring changed parameters.

C、 Under the interface of changed parameter inquiry, user can find the list containing all the changed parameters with their current value and default value.

In that interface：

● Press 【All Rest】 will restore all the changed parameters to their default values

● Click Parameter Name, like 【Limit maximum cut Space】 and then press 【Select Rest.】 to restore this parameter to the default value. User can select many parameters at here.

● Press Parameter Number, like 【U453】 to enter the parameter setting interface, where user can reset the parameter value.

7-6-2 List of Parameters at U Level

No.	Functions	Description	Range	Changing Step	Default Setting
U001	1 Pedal/2 Pedals Switch	0：Single Pedal（Simulation） 1: Step the start pedal to lower the presser, and the sewing machine starts. 2：Press the presser switch to lower the presser. Then step the start pedal to start the sewing machine.	0~2	1	2
U051	Delay time before cut for 1 Pedal model	For automatic sewing in Cut-before-Sewing mode, this parameter will determine the delay time of knife action after the pedal 1 is stepped	0~800	50ms	0
U056	Lower clamp when move front	0：OFF After sewing, the cloth-feeding board moves to the position set before with the presser at up position; the presser keeps up at searching the original	0~1	1	0

No.	Functions	Description	Range	Changing Step	Default Setting
		1：ON After sewing, the presser doesn't rise until the cloth-feeding board moves to the position for laying cloth; during the process of searching origin, the presser keeps going down when each axis return to origin. The presser doesn't rise until the frame goes to the position for laying cloth.			
U057	Enable clamp at test	0：OFF The raise of presser is forbidden in test mode 1：ON In Test mode, the following operations can make presser go up： （A）：Manual switch type or double pedal type: press presser switch （B）：pedal type：return to pedal In restarting the test mode, the following operations have to be done for lowering the presser （A）：Manual switch type or double pedal type: press presser switch （B）：pedal type：return to pedal	0~1	1	0
U058	Keep clamp down after sewing	0：Up Presser goes up when the automatic sewing is finished 1：Down Presser keeps going down when the automatic sewing is finished. Please perform the following operations when the presser rise: （A）：Manual switch type or double pedal type: press presser switch （B）：pedal type：return to pedal	0~1	1	0
U150	Stop at n. up when suspended	OFF：At pause, the upper axis is in the status of emergency stop ON：At pause, the upper axis stop at needle upper position	0~1	1	1
U152	Final stch spd main shaft	Set speed of the last stitch	700~900	10rpm	800
U153	Last speed main shaft	Set the stop speed	250~450	10rpm	350
U156	Stop angle main shaft	The stop control section will be prolonged when this value goes up.	2.5~17.5	0.5°	11.0
U256	Interval of origin detect	0：OFF Do not detect origin after sewing	0~9	1	0

No.	Functions	Description	Range	Changing Step	Default Setting
		1~9：Detect the origin position after sewing in certain times.			
U301	Parameter column in Auto Mode	1：Sewing length 2：Interval	1~2	1	1
U350	Forbid Program Mode	0：OFF General Conditions 1：ON Forbid to enter program mode, the hotkeys are invalid.	0~1	1	0
U351	Forbid Cycle Mode	0：OFF General Conditions 1：ON Forbid to enter cycle mode	0~1	1	0
U352	Forbid to change counter	0：OFF General Conditions 1：ON Forbid to change the value in products counter	0~1	1	0
U353	Forbid to edit sewing speed	0：OFF General Conditions 1：ON Forbid to change the sewing speed	0~1	1	0
U354	Forbid to edit the program code	0：OFF General Conditions 1：ON Forbid to change the program code, but the step number in cycle can be changed	0~1	1	0
U355	Forbid to change Cut-before-Sewing	0：OFF General Conditions 1：ON Forbid to change the action of Cut-before-Sewing (If existing status is Cut-before-Sewing, it will change to Non-cut automatically.)	0~1	1	0
U356	Forbid to change Cut-after-Sewing	0：OFF General Conditions 1：ON Forbid to change the action of Cut-after-Sewing (if existing status is Cut-after-Sewing, it will change to Non-cut automatically)	0~1	1	0
U357	Safe Switch	0：OFF Safe Switch Invalid 1：ON Safe Switch Valid	0~1	1	0
U358	Pressure Measurement	0：OFF Invalid 1：ON Valid	0~1	1	0
U450	Max sewing speed	Set the Max sewing speed	1000~2700	100rpm	2700

No.	Functions	Description	Range	Changing Step	Default Setting
U451	Max cycle program number	Number of effective cycle program number (if user doesn't use the cycle program number, this parameter can be set at 0).	0~9	1	9
U452	Product count for cycle pattern	0：OFF Count after sewing a hole 1：ON Count after sewing a cycle	0~1	1	0
U453	Max knife interval	Set the max knife interval	0.5~1.0	0.1mm	0.5
U454	Max linear bar-tacking length	Set the max length of linear bar-tacking	6~9	3	6
U455	Additional needle swing at Non-cut	If the Non-cut is used, the needle swing will be added automatically.	0~1.0	0.1mm	0
U456	Adjustment of needle swing at start	Set adjustment of needle swing at sewing start	-1.0~0.0	0.1mm	0
U550	Time for air-hammer ON	The larger value, the longer contact time between air-hammer and knife will become.	25~200	5ms	25
U551	Air-hammer origin height	In readiness status, Error code E650 will be activated when the value of air-hammer position sensor is smaller than this value. (only effective when the air-hammer origin error detection is turned on)	150~170	1	160
U552	Air-hammer origin error detection	0：OFF No air-hammer origin error detection (used when the air-hammer position sensor is down) 1：ON Have air-hammer origin error detection	0~1	1	1
U553	Determine air-hammer rise position by time	0：OFF According to position of air-hammer to detect the lowering of air-hammer 50~500：Detect the lowering of air-hammer according to time（used when the air-harmer position sensor is down）	0~500	10	100
U554	Determined air-hammer lowering by time	0：OFF Determine the position of air-hammer for lowering. 50~500：Detect the lowering of the air-hammer according to time (used when the air-hammer position sensor is down.)	0~500	10	150
U555	Increase of leftover upper thread	0：OFF General Conditions 1~3：Because only the sequence	0~12	1mm	0

No.	Functions	Description	Range	Changing Step	Default Setting
		delay of trimming upper thread is set, the leftover upper thread may be increase after sewing.			
U556	Time for loosing upper thread	The larger value, the longer the time for loosing upper thread after thread-trimming.	0~100	2ms	50
U557	Upper thread-loosing Off Sequence	0~100：the larger value is, the later the thread-loosing OFF time after trimming will be.	0~100	2ms	50
U558	Forbid to use bottom thread trimmer device	0：OFF General Conditions (Bottom thread trimmer device is activated） 1：ON Forbid to use bottom thread trimmer device	0~1	1	0
U559	Neglect of bottom thread knife sensor and counter	0：OFF Detect the bottom thread knife device is off according to the OFF sensor of bottom thread trimmer 5~50：Detect the bottom thread knife device is off according to time. Set this parameter with a step at 5ms	0~50	5ms	30
U560	Bottom thread-trimming time	0~100：the larger value is, the later the thread-trimming time will be.	0~100	1	0
U561	Upper thread-breakage sensor	0：OFF Device Invalid 1：ON Device Valid	0~1	1	0
U562	Start stitch number before upper thread-breakage sensor	1~9：Sew the set stitches before the upper thread-breakage detection.	1~9	1	5
U563	Upper thread-breakage judging stitch number	2~7：When the thread-breakage signal turns ON at the set stitches , the Error of thread-breakage will be activated.	2~7	1	4
U564	Upper thread-catching device	0：OFF Device Invalid 1：ON Device Valid	0~1	1	0
U565	Upper thread-catching close time correction	-10~10： the larger value is, the later the upper thread-catching will be	-10~10	1	0
U576	Upper thread-catching open time	5~20ms：set in unit of 1ms	5~20	1	10
U577	Frame-moving Method	0~5：select different frame-moving method	0~5	1	4
U578	Frame-moving adjustment 1	-50~50：Adjust the XY frame-moving angle	-50~100	1	0
U579	Z axis frame-moving adjustment	-50~50：Adjust Z axis frame-moving angle	-50~50	1	0

No.	Functions	Description	Range	Changing Step	Default Setting
U580	Upper thread taking-up action time	0~200：Start time adjustment of upper thread taking-up	0~200	5	0
U581	Upper thread tension adjustment	0~250：Adjust upper thread solenoid current	0~250	5	230
U586	Fast moving time adjustment	Adjust fast frame-moving time	-90~100	10	0
U588	Frame-moving adjustment 2	Adjust the X frame-moving angle at frame-moving at 4 or 5	-50~100	1	0
U650	Time to buzzer stop	0：OFF Buzzer keeps ringing from the start of error to the release of it 5~15：At the error, the buzzer stop ringing after the set time	0~15	5s	0
U651	Motor excitation status at error	0：OFF At unrecoverable problem, the excitation of pulse motor will be off. 1：ON At unrecoverable problem, the excitation of pulse motor remains.	0~1	1	0
U752	Adjustment of X position on knife	The set value is the adjustment of X position on knife, which will be added into entire pattern program.	-0.50~0.50	0.05mm	0
U850	Sewing machine head configuration	0：-00 Set configuration as -00 1：-01 Set configuration as -01 2：-02 Set configuration as -02	0~2	1	1
U852	Radial Hole Presser	0：OFF Use general presser (except that of radial hole) 1：ON Use the special program for radial hole presser. The displayed is the special parameter for radial hole.	0~1	1	0
U853	Language	0：Chinese 1：English	0~1	1	0
U854	Back light auto Off	0：OFF No auto off 1：ON Auto off	0~1	1	0
U855	Backlight auto off wait time	Set the waiting time of the backlight auto off	1~9	1 Min	3
U856	Button display style	0：Sty1 Style 1 1：Sty2 Style 2	0~1	1	0
U857	Voice Volume	30~63：adjust the volume of voice	30~63	1	50
U858	Password setting effective	0：Invalid 1：Valid	0~1	1	0
U910	Sewing board position adjustment	Adjust the position of sewing board	-100~100	1	0
U911	Air hammer down	Set adjustment of hammer lowering	0~60	1	15

No.	Functions	Description	Range	Changing Step	Default Setting
	detection adjustment	detection			
U912	Main motor type	0：360 wire motor 1：256 wire motor	0~1	1	0
U913	DIP1	Temporary adjusting parameter（reserved）	-100~100	1	0
U913	DIP2	Temporary adjusting parameter（reserved）	-100~100	1	0

7-7 Initialization of Parameters

① In level 2 of setting mode, press [icon] to have access to interface of parameter initialization, as shown in right:
可以选择：
User can select:
（1）LEVEL1：Para. And C Program (Level S pattern parameter and C pattern cycle program)
（2）LEVEL2：Storage Data (Including U level parameters)
（3）LEVEL3：All Internal Data
（4）LEVEL4：Initialize U disk
The detailed initialization content is at below：

Level, Content & Clear of Initialization			
	LEVEL1	LEVEL2	LEVEL3
Program Content	Default value	—	Default value
Cycle program	Clear	—	Clear
Storage switch	—	Default value	Default value
Program code	1	—	1
Parameter code	1	—	1
Production counter	—	—	0
Mode	Program	—	Program
Position for locating cloth	Built-in	—	Built-in
Knife action	OFF	—	OFF

1 Pattern and C program

2 Storage switch

3 All internal data

4 Format USB
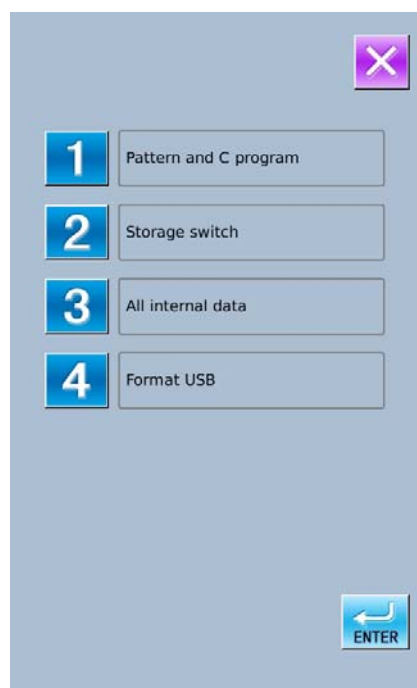
② Select the parameter for initialization, then press

for confirmation.

The right interface will be displayed on the

screen, press to initialize the parameter.

7-8 Parameter Back-up & Recovery

User can save 8 groups of U level parameter for future use.

In setting mode level 2, press to enter the interface of parameter back-up & restoration, as shown in right:

Clear：Clear all the customized parameters that are saved.

Save：Save current parameters

Restore：Restore the current parameters

① Click any key among ~ to set the position for saving the parameter. And then press「Save」to save that parameter.

② Check the content on「Custom xx（On/Off）」. If 「On」 is displayed in bracket, that means this position has the user parameter, for an example

③ Select the button with parameters, press「Restore」to reload the corresponding parameter values

④ Press「Clear」to delete all the saved parameters
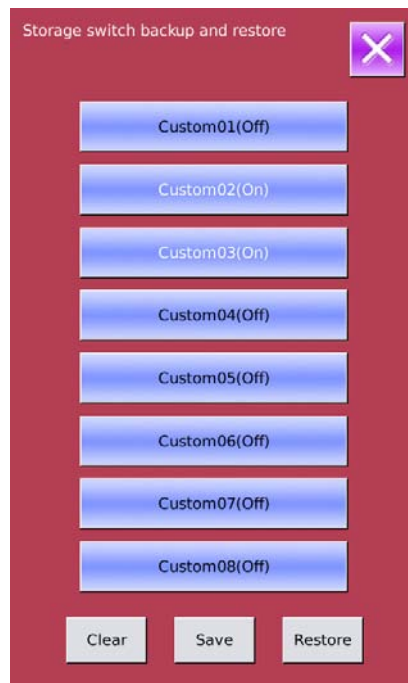
8. CLEANING AND INSPECTION

⚠ CAUTION

⚠ Turn off the power switch before carrying out this operation.
Turn off the power switch before starting any cleaning work, otherwise the machine may operate if the start switch is pressed by mistake, which could result in serious injury.

🚫 Be sure to wear protective goggles and gloves when handling the lubricating oil, so that it does not get into your eyes or onto your skin.
If care is not taken, inflammation can result.
Furthermore, do not drink the lubricating oil. Diarrhea or vomiting may result.
Keep the oil out of the reach of children.

8-1. Daily cleaning and inspection

The following cleaning operations should be carried out each day in order to maintain the performance of this machine and to ensure a long service life. Furthermore, if the sewing machine has not been used for a long period of time, carry out the following cleaning procedures before using it again.

8-1-1. Cleaning

NOTE:
Do not use the air gun while the machine head is tilted back. Thread scraps may get inside the machine head and cause problems with operation.
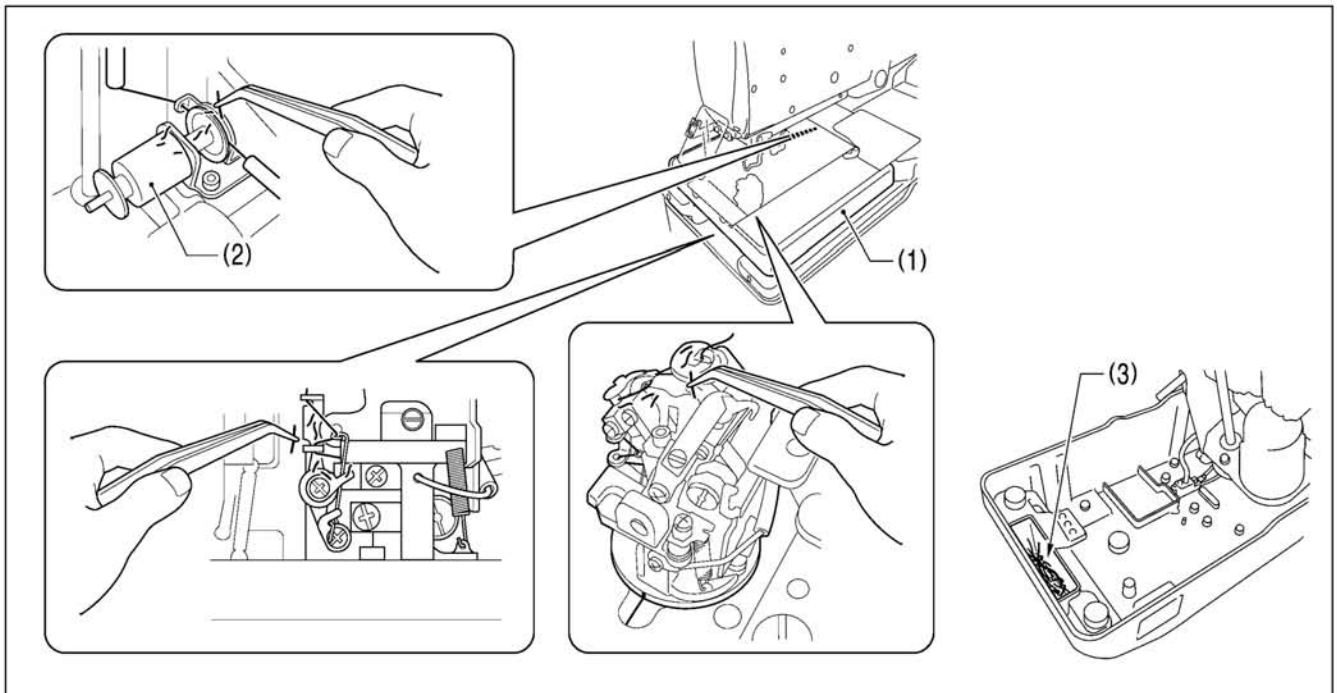
1. Turn off the power switch.
2. Turn the air cock to stop the flow of air, and then press the button to release the air.
3. Remove the work clamp plates.
4. Remove any thread scraps and dust, etc. from the thread paths for the upper thread, lower thread and gimp.
   * In particular, the looper thread path should be cleaned every day to keep it free from thread scraps and dust.
5. Tilt back the machine head and remove any thread scraps that have collected in the thread scrap collection pocket (3) in the bed base.

8-1-2. Checking the needle
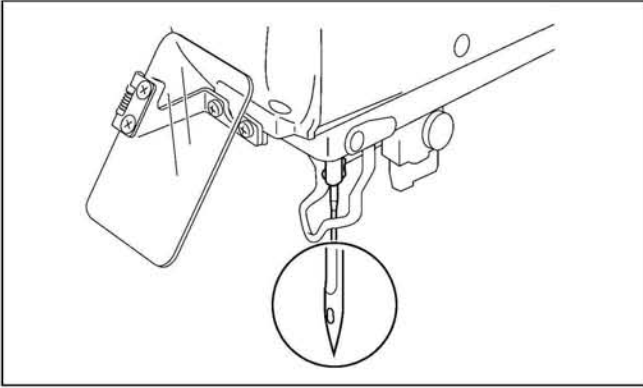
Always check that the tip of the needle is not broken and also the needle is not bent before starting sewing.

8-2. Cleaning and inspection as required

This section describes the cleaning procedures that should be carried out not regularly but when required.

8-2-1. Cleaning the eye guard
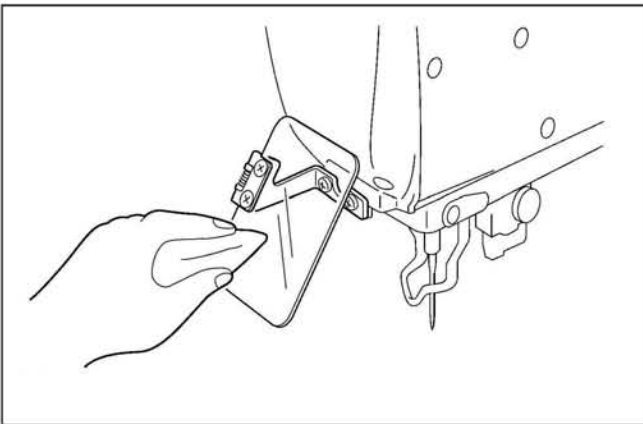
Wipe the eye guard clean with a soft cloth.

NOTE:
> Do not use solvents such as kerosene or thinner to clean the eye guard. They may cause discoloration or deterioration of the eye guard.

8-2-2. Lubrication

Lubricate the machine head when required while referring to "3-9. Lubrication".

8-2-3. Draining water
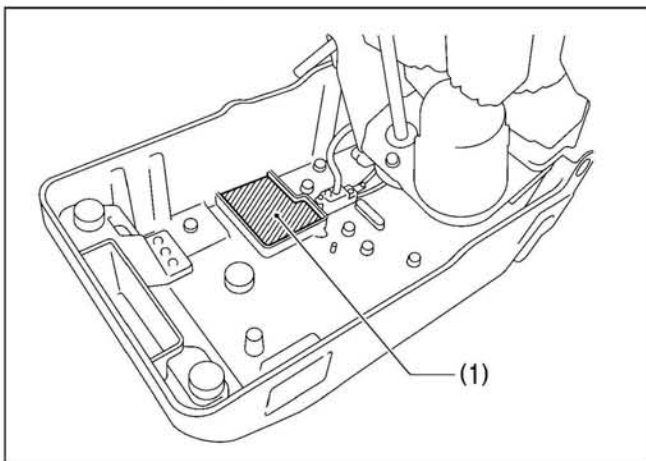
1. Tilt back the machine head.
2. Water may collect in the bed base (1) depending on the condition of the air coming from the compressor, so drain this water if necessary.

NOTE:
> If water collects in the bed base (1), carry out the inspections in "8-1-2. Checking the air filter". If water still continues to collect, there may be a problem with the air cylinder, so it is recommended that you install an automatic drain (commercially-available).

—(1)

9. STANDARD ADJUSTMENTS

⚠ CAUTION

🚫 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 at the following times.
If this is not done, the sewing machine may operate if the start switch is pressed by mistake, which could result in serious injury.
- When carrying out inspection, adjustment and maintenance
- When replacing consumable parts such as the loopers and knife

⚠ Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.

⚠ If the power switch and air need to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.

❗ 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.

9-1. Adjusting the heights of the spreaders and loopers

Spreader height

(When seen from directly above)　　　(When seen from the front)
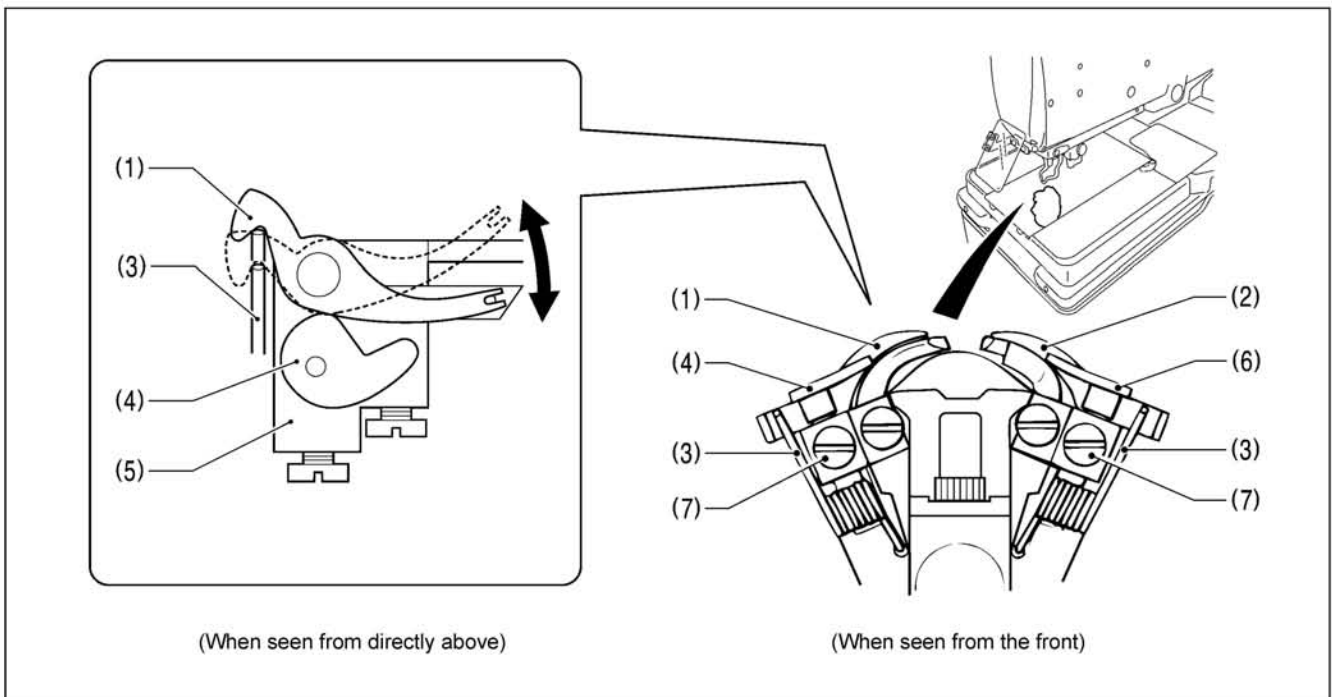
1. Remove the work clamp plates.
2. Check the following.
   - Check that the spring (3) causes the spreader L (1) to move smoothly without any play between the spreader stopper L (4) and the LS holder base (5).
   - Check that the spring (3) causes the spreader R (2) to move smoothly without any play between the spreader stopper R (6) and the LS holder base (5).
3. If the spreaders do not move smoothly or if there is play in their movement, loosen the set screws (7) and move the spreader stopper L (4) or spreader stopper R (6) up or down to adjust.
4. Once adjustment is complete, securely tighten the set screws (7).

Looper height
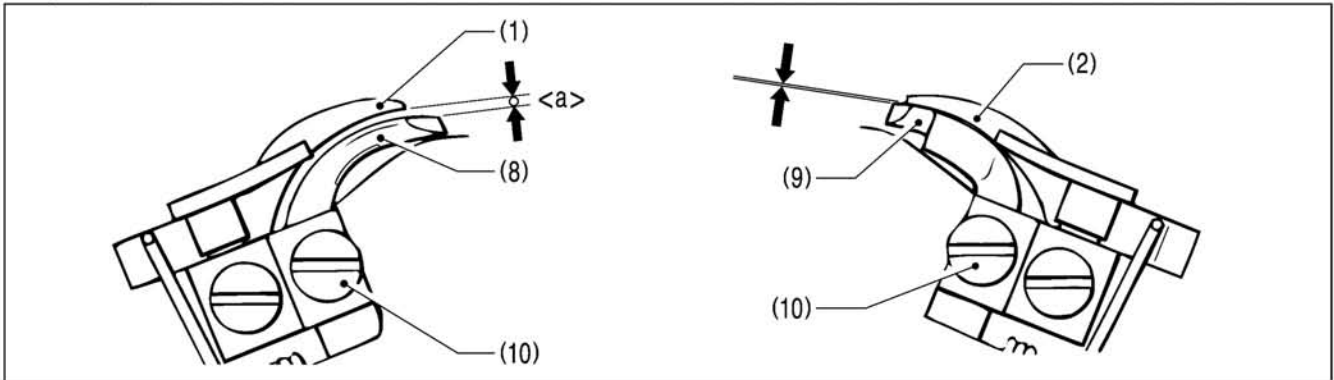
Adjust so that the positions of the eye looper (8) and the looper R (9) are as follows.
- The clearance <a> between the eye looper (8) and the spreader L (1) should be equal to the thickness of the lower thread (looper thread).
- The clearance between the looper R (9) and the spreader R (2) should be as small as possible (so that the two parts do not touch).

<Adjustment method>
1. Loosen the set screws (10), and then move the eye looper (8) or the looper R (9) up or down to adjust.
2. Check that the spreader L (1) and the spreader R (2) move smoothly by the force of the springs (3).
3. Once adjustment is complete, securely tighten the set screws (10).

9-2. Adjusting the zigzag width (stitch width)

The zigzag width can be adjusted to between 1.5 - 4 mm. It is set to 3 mm at the time of shipment from the factory.
* If the zigzag width is set to 3.2 mm or more, replace the throat plate (optional part).
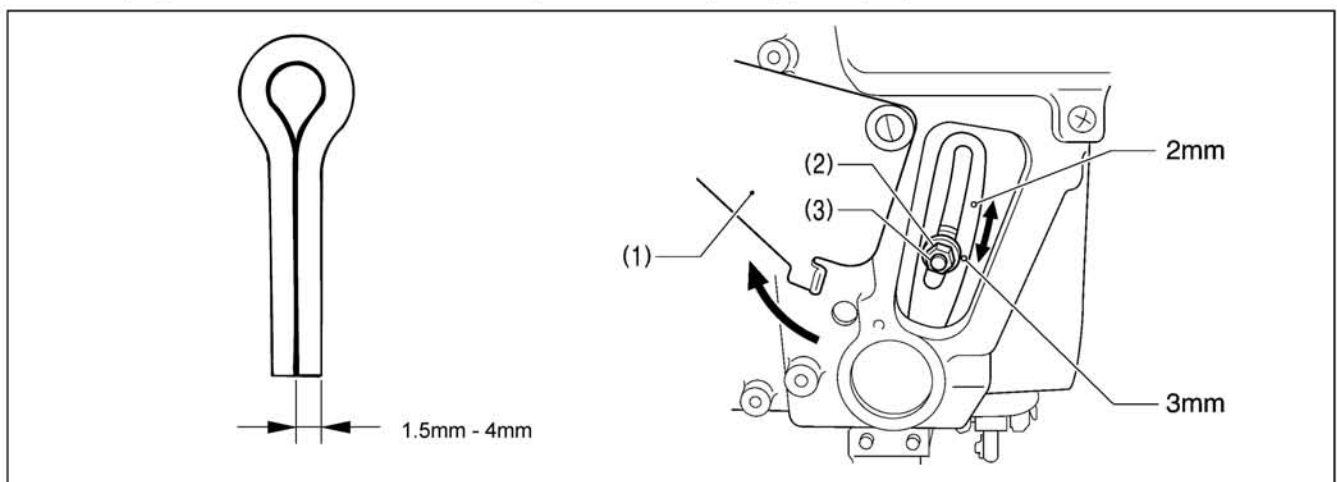
1. Turn the cover (1) to open it.
2. Use the accessory socket wrench to loosen the zigzag width adjustment nut (2).
3. Move the adjustment screw (3) up or down along the slot to adjust.
    * The zigzag width becomes smaller as the adjustment screw (3) is moved upward.
    * The zigzag width becomes larger as the adjustment screw (3) is moved downward.
* There are index marks at the 2 mm and 3 mm zigzag width positions. Align the middle of the adjustment screw (3) with the index marks.
4. Once adjustment is complete, securely tighten the adjustment nut (2), and then close the cover (1).

NOTE:
- If the zigzag width has been increased, carry out the following readjustments.
  "9-4. Adjusting the needle and looper timing", "9-5. Adjusting the looper stroke", "9-6. Adjusting the height of the needle bar", 9-7. Adjusting the clearance between the loopers and needle", "9-8. Adjusting the needle guard", "9-9. Adjusting the spreader installation positions", "9-10. Adjusting the spreader timing".
- The index marks are a guide to the zigzag width. Lower the needle onto a piece of paper or similar to accurately measure the zigzag width.

9-3. Adjusting the zigzag base line position

Preparing a short customized needle

Prepare a short needle as described below in order to make very small holes in a piece of paper while checking the needle drop position.
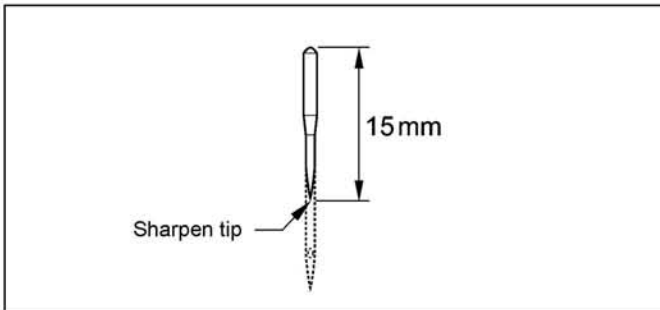
1. Use a grinder or similar to grind the tip of the currently-used needle until the length of the needle is 15 mm.
2. Sharpen the tip of the needle.

15mm

Sharpen tip
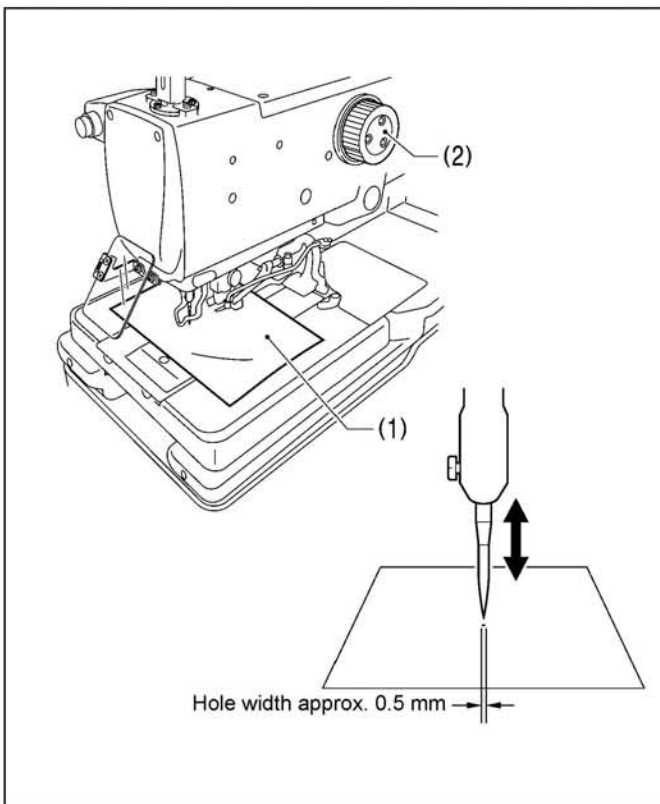
3. Place a piece of paper (1) underneath the work clamps.
4. Turn the upper shaft pulley (2) to set the needle to its lowest position.
5. Move the needle up or down to adjust the installation position of the needle so that the tip of the needle makes a hole with a width of about 0.5 mm in the paper (1) when the needle comes to the needle down position.

(2)

(1)

Hole width approx. 0.5 mm

Adjusting the zigzag base line position

The zigzag base line is on the inside of the zigzag.
If you change the zigzag width, only the outer needle drop position will change, and the zigzag base line (inner base line) will not change.
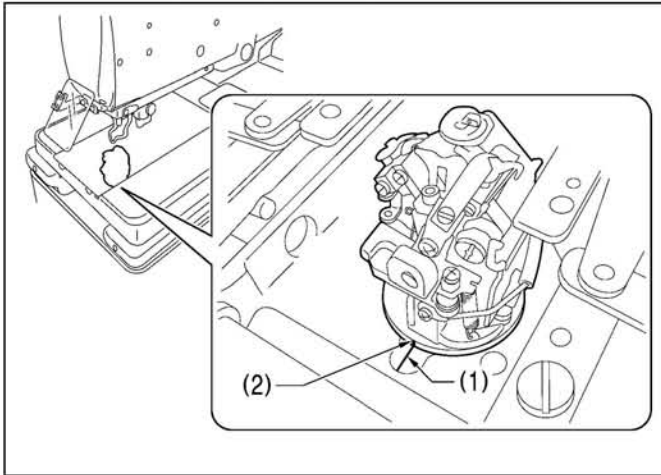
1. Move the needle bar guard block (7) to the home position.
   * The home position for the needle bar guard block (7) is when the bed index mark (1) and the looper base index mark (2) are aligned.
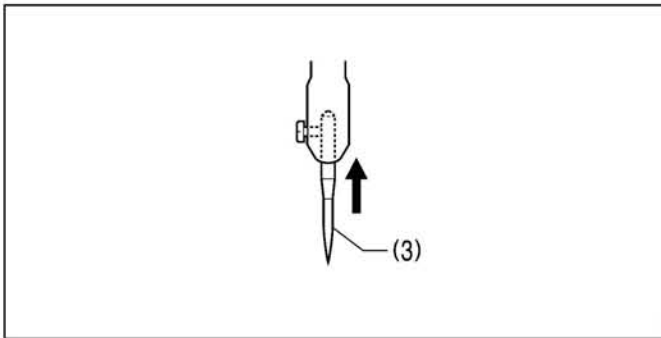
2. Install the short customized needle (3). (Refer to "Preparing a short customized needle" on the previous page.)
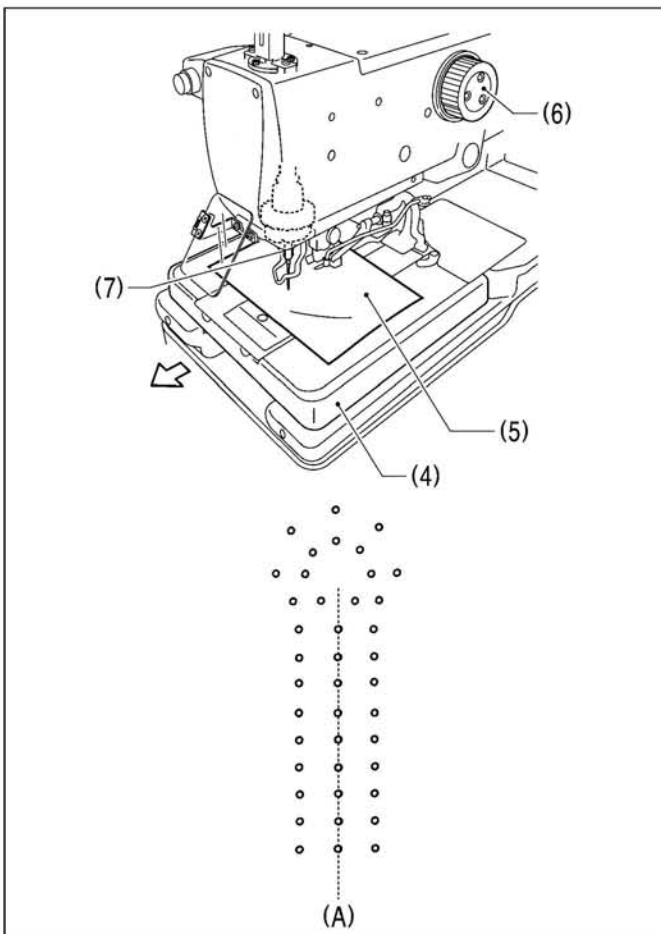
3. Move the feed base (4) forward (to near the sewing start position) by hand.
4. Place a piece of paper (5) underneath the work clamps.
   * Secure the piece of paper so that it will not move.
5. Turn the upper shaft pulley (6) to lower the needle so that it makes a small hole in the paper (5).
6. Turn the upper shaft pulley (6) in reverse to return the needle to its original position (needle up position).
7. Turn the needle bar guard block (needle bar) (7) by hand 180 degrees.
8. Turn the upper shaft pulley (6) to lower the needle so that it makes a small hole in the paper (5).
   * If the inner needle drop positions (A) are not aligned, carry out the adjustments in steps 9 - 12 on the next page.

(8)

(9)

<Zigzag base line position adjustment>
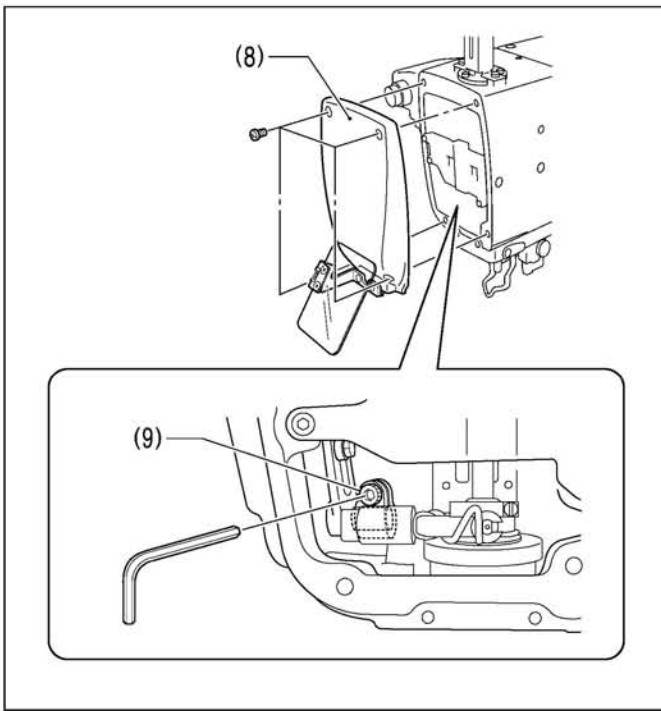
9. Remove the face plate (8), and then loosen the socket bolt (9).

(10)

(11)

(12)
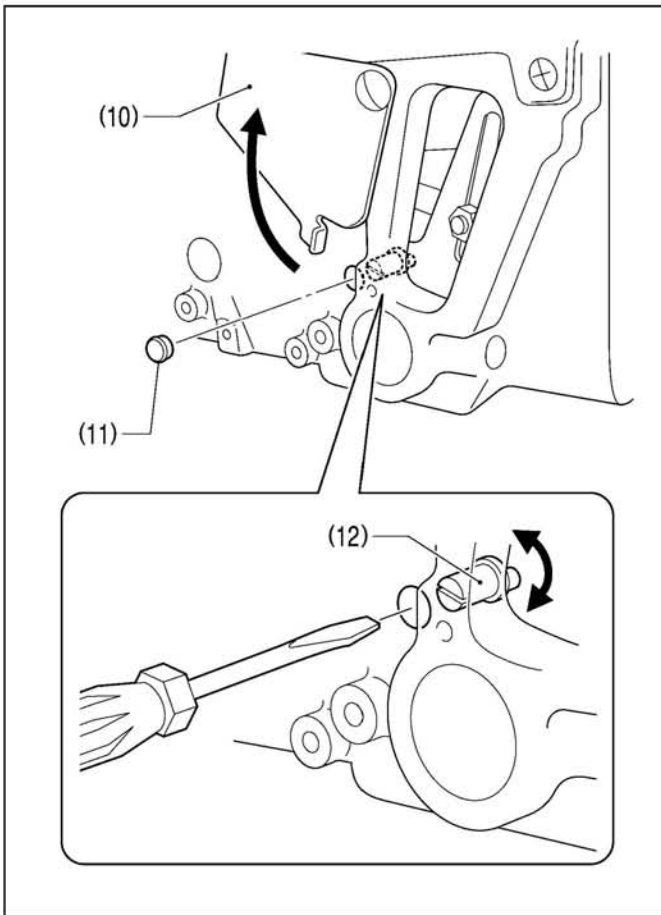
10. Open the cover (10), and then remove the cap (11).
11. Insert a flat-tipped screwdriver into the hole and turn the zigzag eccentric pin (12) to adjust the zigzag base line position.
12. Tighten the socket bolt (9).
13. Repeat steps 4 - 12 until the inner zigzag base line is aligned correctly.
14. Once adjustment is complete, return the cap (11), cover (10) and face plate (8) to their original positions.

9-4. Adjusting the needle and looper timing

NOTE:

The needle bar moves through two needle drop cycles for each single turn of the upper shaft pulley. The needle drop movement toward the left side (knife cutting side) is called the "**inside sewing position**", and the needle drop movement toward the right is called the "**outside sewing position**". In addition, the amount of movement involved when the needle bar rises from its lowest position until the tip of the looper at either the left or right is aligned with the center of the needle is called the "**loop stroke**".

The left and right loop strokes must be the same as each other. This section describes the adjustments to be carried out so that the left and right loop strokes are the same.

* Before carrying out these adjustments, set the zigzag width (stitch width).
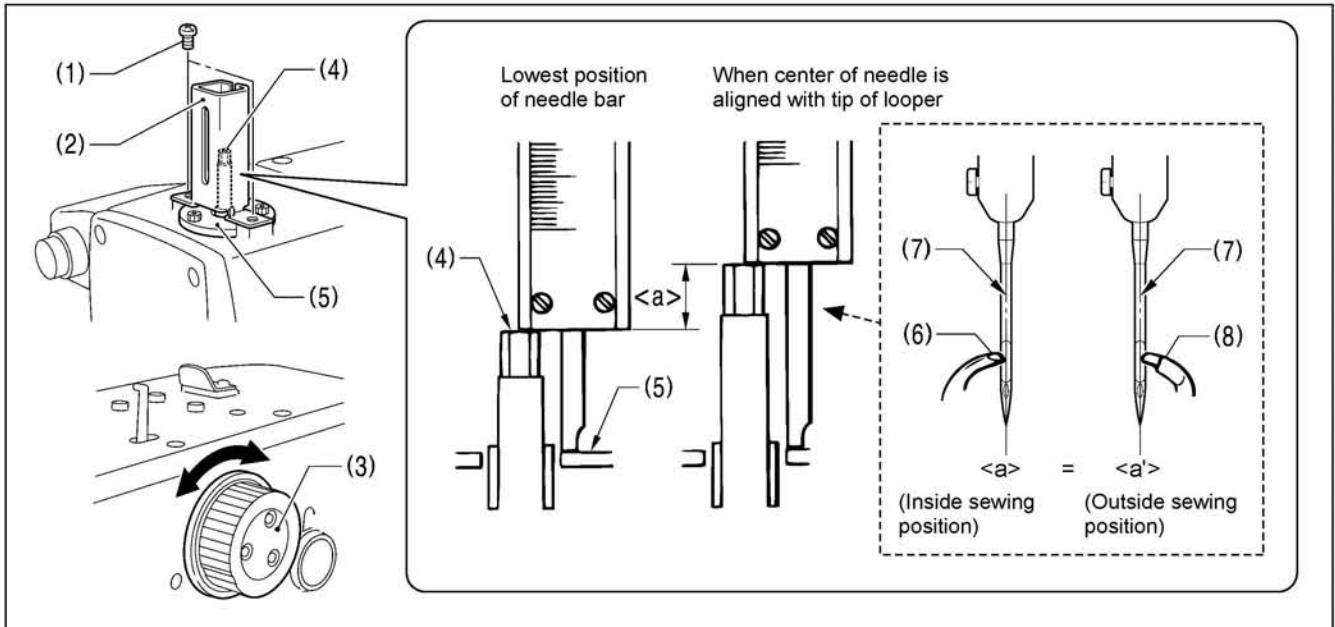
1. Remove the two screws (1), an then remove the needle bar guard (2).
2. Turn the upper shaft pulley (3) to set the needle bar to its lowest position at the inside sewing position.
3. Use calipers to measure the length from the edge of the needle bar (4) to the top of the needle bar bush holder base (5).
4. Next, turn the upper shaft pulley (3) until the tip of the eye looper (6) is aligned with the needle center (7).
5. In the same was as in step 3, use calipers to measure the length from the edge of the needle bar (4) to the top of the needle bar bush holder base (5).
6. Calculate the difference <a> between the value obtained in step 5 and the value obtained in step 3.
7. Repeat steps 2 - 6 and calculate the difference <a'> for the outside sewing position in the same way as for the inside sewing position.
   * For the inside sewing position, align the tip of the eye looper (6) with the needle center (7), and for the outside sewing position, align the tip of looper R (8) with the needle center (7).
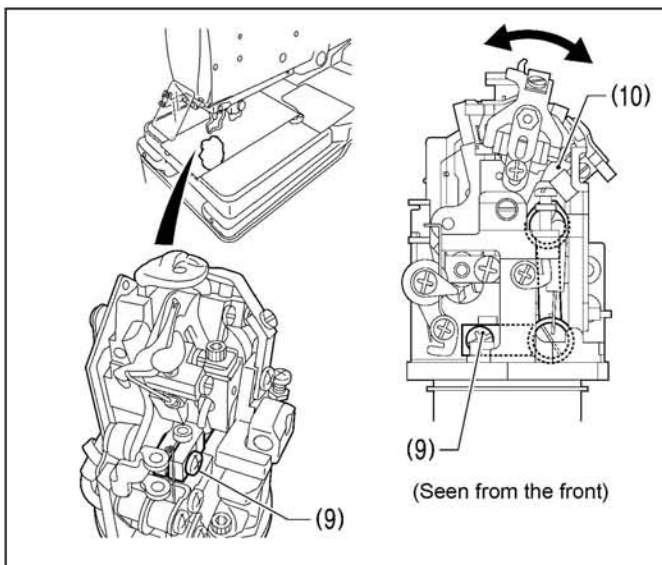
8. Loosen the screw (9).
9. Move the LS holder base (10) to the left or right to adjust so that length <a> and length <a'> are the same.
10. Once adjustment is complete, securely tighten the screw (9).

(Seen from the front)

9-5. Adjusting the looper stroke

The standard looper stroke is 2.7 mm. (It may be preferable to change this depending on the material and thread.)
* Adjusting the needle and looper timing" before making this adjustment.
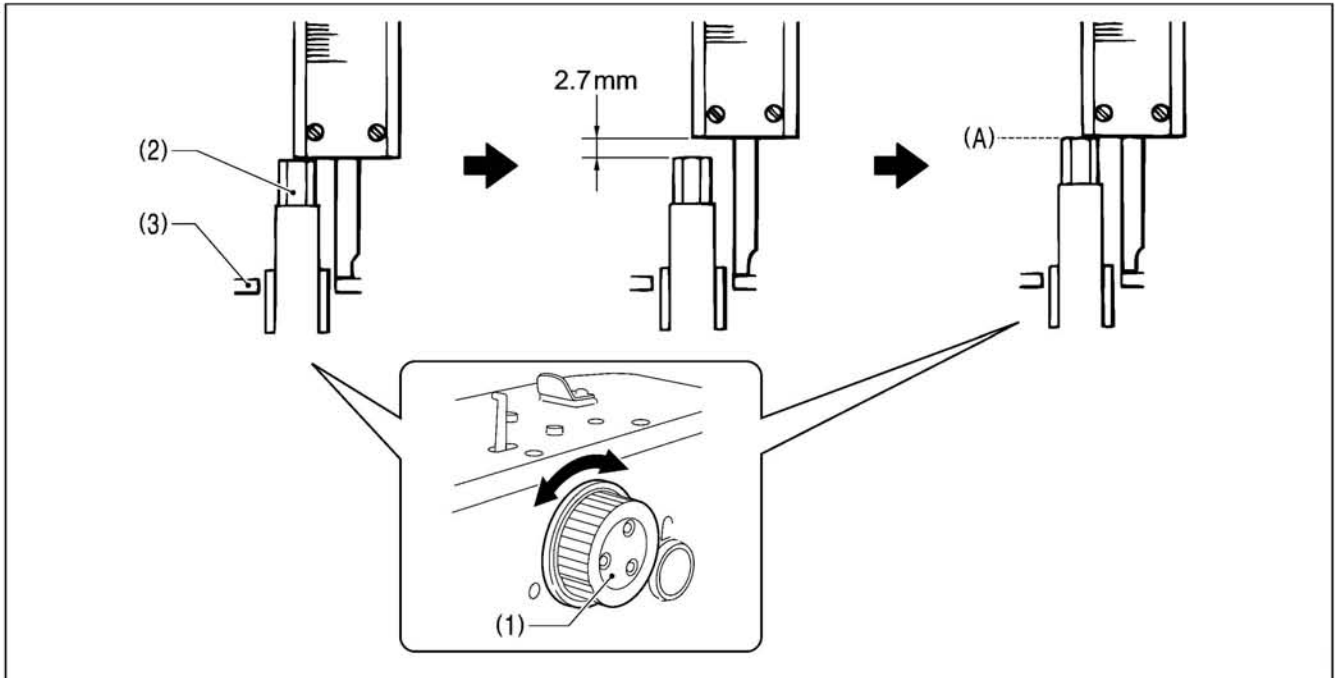
1. Turn the upper shaft pulley (1) to set the needle bar to the needle drop position at the inside sewing position.
2. At this position, use calipers to measure the length from the edge of the needle bar (2) to the top of the needle bar bush holder base (3).
3. Add 2.7 mm to the value obtained in step 2 above, and set the width of the calipers to the resulting value.
4. Turn the upper shaft pulley (1) until the edge of the needle bar (2) touches the edge of the calipers, and stop turning the upper shaft pulley (1) at that point (A).
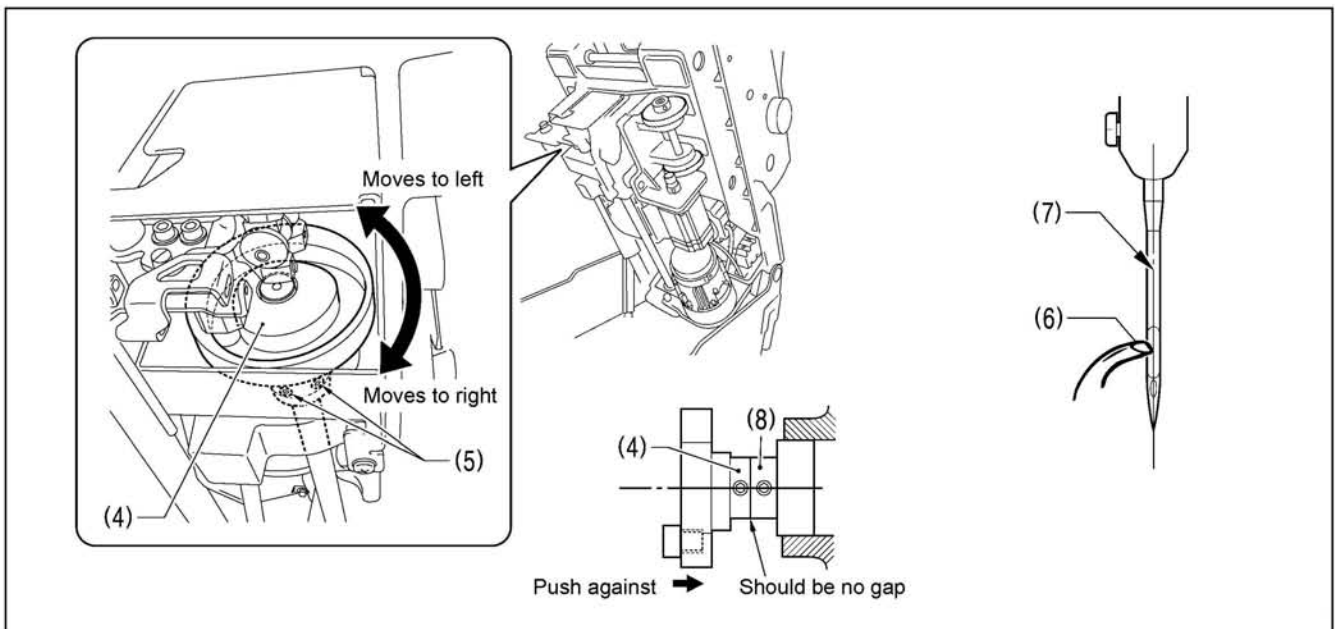
5. Tilt back the machine head.
6. Loosen the two set screws (5) of the lower shaft cam (4).
7. With the upper shaft pulley (1) stopped, turn the lower shaft cam (4) to adjust so that the tip of the eye looper (6) is aligned with the needle center (7).
8. Once adjustment is complete, push the lower shaft cam (4) against the surface of the bearing collar (8), and then securely tighten the two set screws (5).

9-6. Adjusting the height of the needle bar

The standard height for the needle bar is 2.5 mm. (It may be preferable to change this depending on the material and thread.)
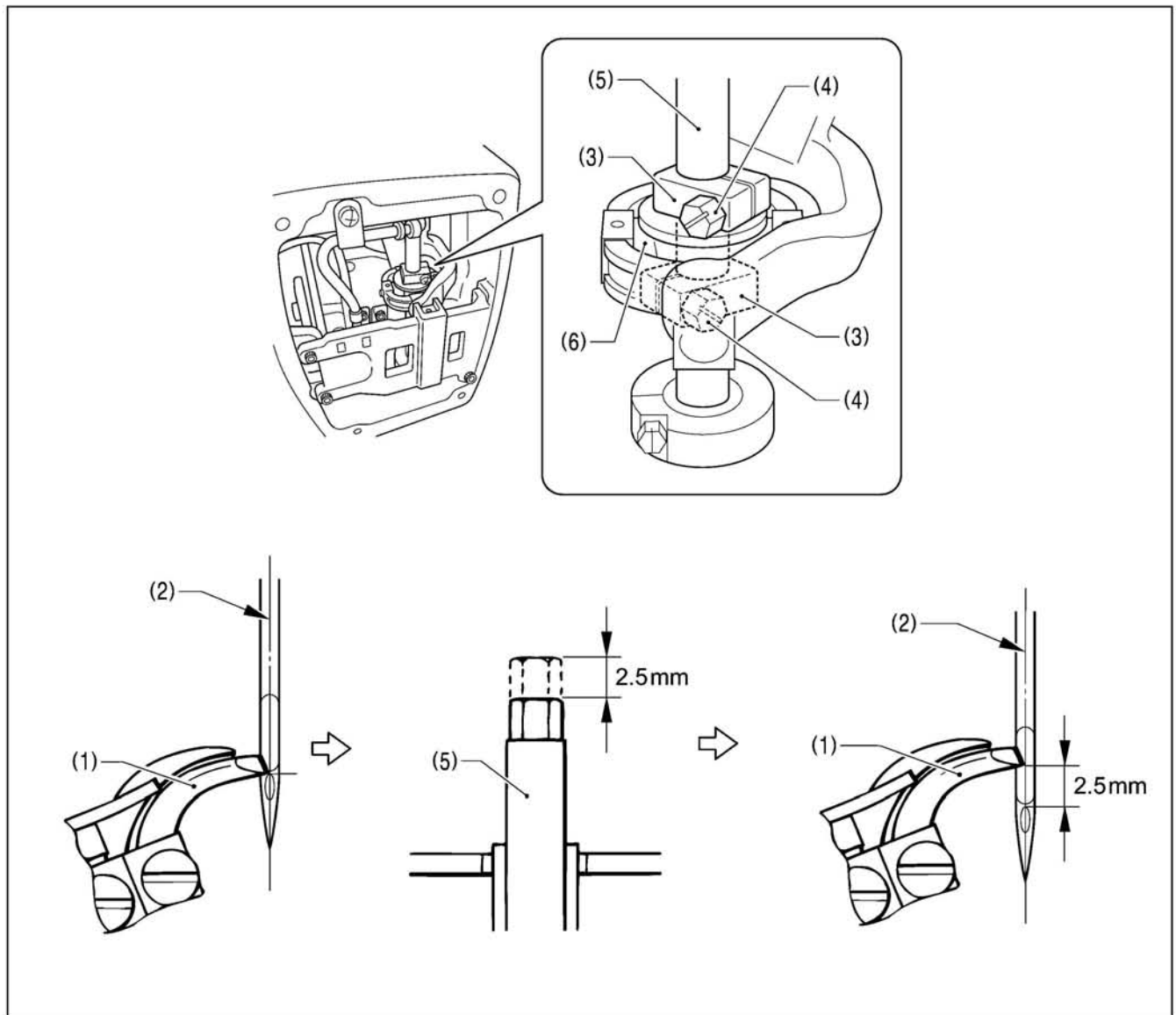
1. Remove the face plate.
2. Turn the upper shaft pulley until the tip of the eye looper (1) is aligned with the top edge of the needle hole in the needle center (2) when the needle is at the inside sewing position.
3. Loosen the two screws (4) of the top and bottom needle bar clamps (3).
4. Lower the needle bar (5) 2.5 mm from the position where the tip of the eye looper (1) is aligned with the top edge of the needle hole.
5. In order to make the needle bar turn smoothly, adjust so that there is no play in the needle bar, but so that there is enough of a gap between the needle bar clamps (3) and the needle bar feed rock link (6) for oil to get into.
6. Once adjustment is complete, securely tighten the two screws (4) and install the face plate.

9-7. Adjusting the clearance between the loopers and needle

If the needle count has been changed, always be sure to check the clearance between the needle and the loopers, and adjust the clearances if necessary. These adjustments should be made for both the inside sewing position and outside sewing position.
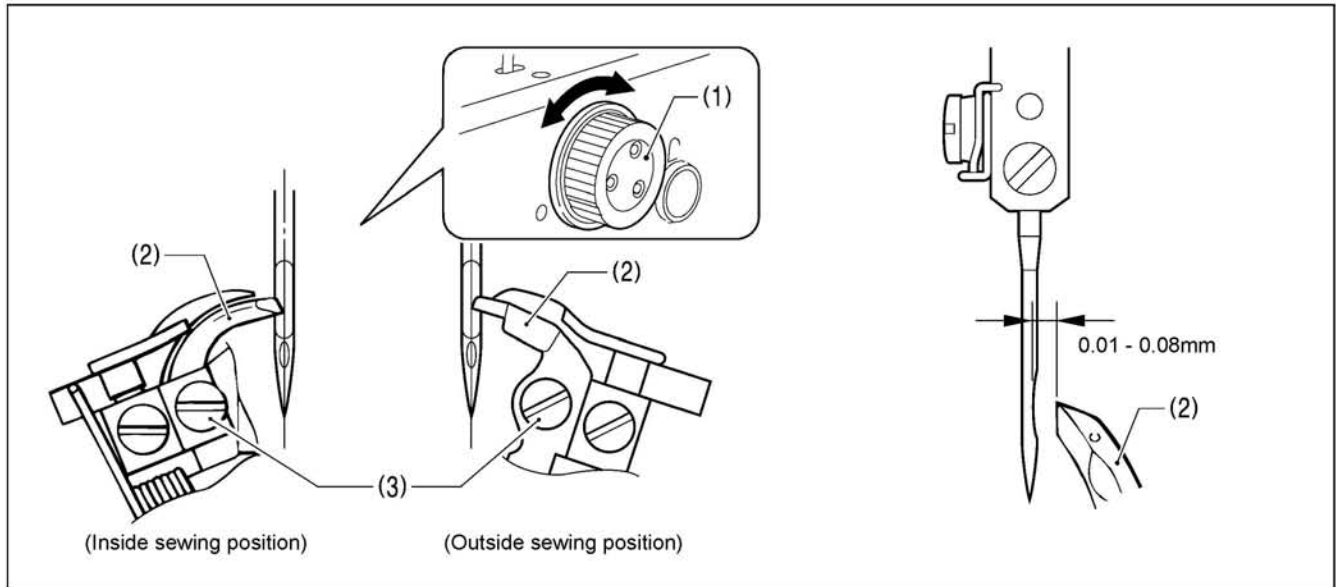
(Inside sewing position)   (Outside sewing position)

0.01 - 0.08mm

Turn the upper shaft pulley (1) so that the tips of both the left and right loopers (2) are aligned with the needle center, and then loosen the set screws (3) and adjust the clearances between the needle and the tips of the loopers (2) to 0.01 - 0.08 mm.
* These clearances must be uniform while the looper base is rotating (through 360 degrees). If they are not uniform, adjust the center of rotation of the needle bar. (The center of rotation is already adjusted at the time of shipment from the factory.)
* After making this adjustment, carry out the adjustment procedures given in "9-9. Adjusting the spreader installation positions".

9-8. Adjusting the needle guard

If the needle count has been changed, always be sure to check the position of the needle guard, and adjust the position if necessary. This adjustment should be made for both the inside sewing position and outside sewing position.
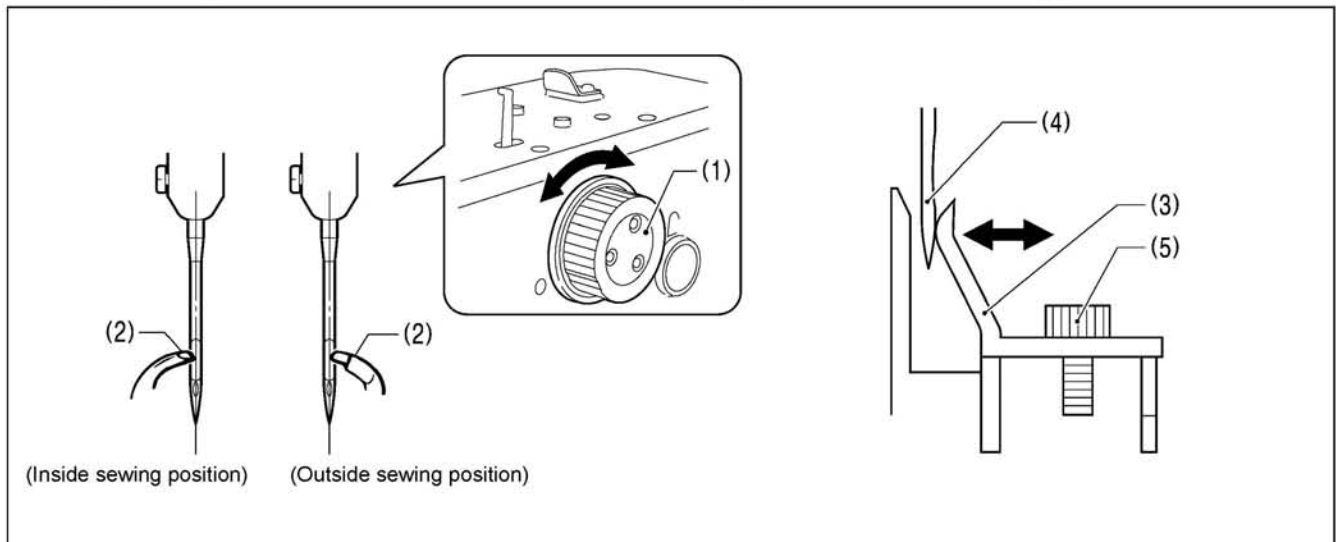
(Inside sewing position)   (Outside sewing position)

Turn the upper shaft pulley (1) so that the tips of both the left and right loopers (2) are aligned with the needle center, and then loosen the screw (5) and adjust the needle guard (3) so that it touches the needle (4).

NOTE:
If it crosses the needle more than necessary, it will place a load on the needle and this may cause the needle to break. Alternatively, if it does not cross the needle at all, the tips of the loopers will interfere with the needle and skipped stitches may occur.

9-9. Adjusting the spreader installation positions
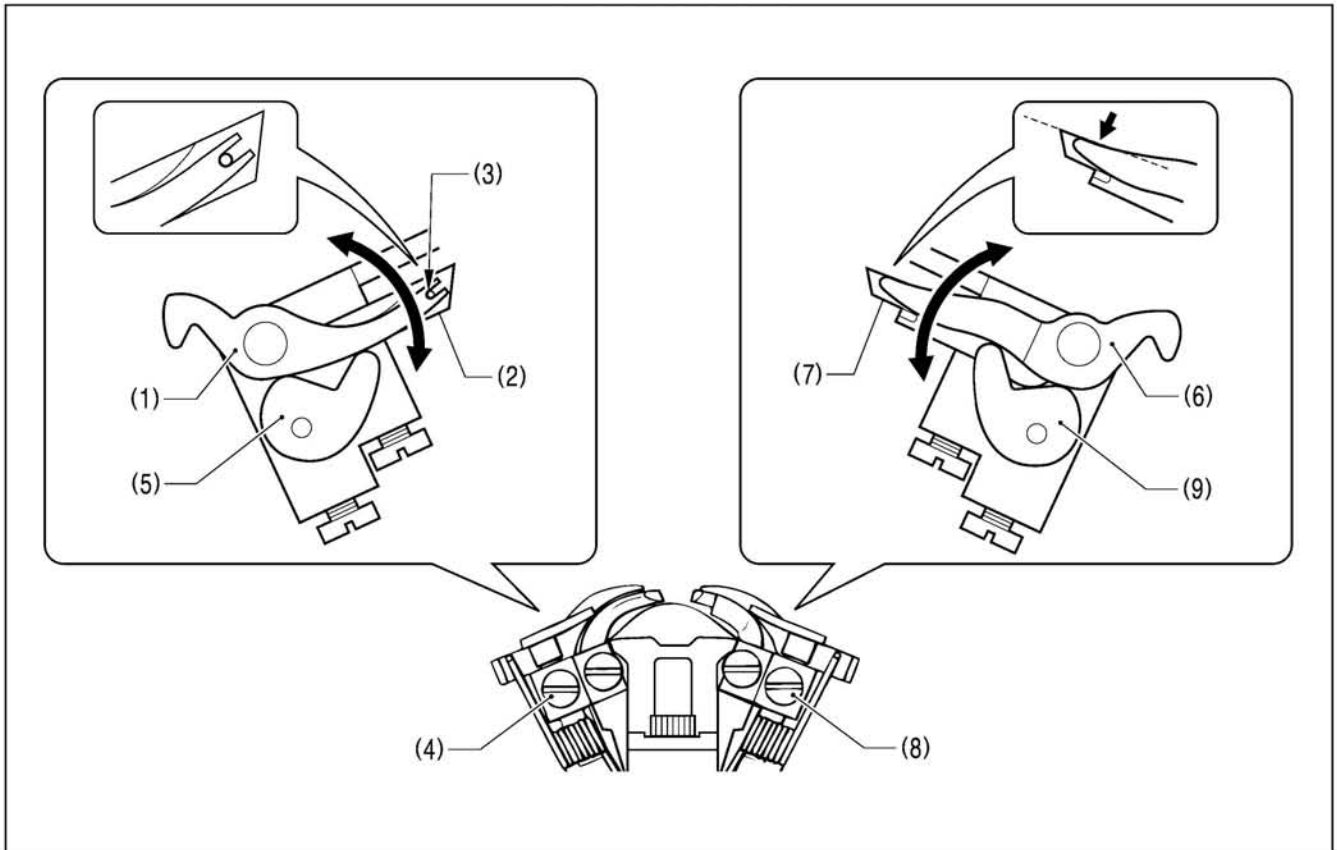
1. Loosen the set screw (4) and adjust spreader stopper L (5) so that the relative positions of the U-shaped part at the tip of spreader L (1) and the lower thread guide hole (3) in the eye looper (2) are as shown in the illustration below.
2. Once adjustment is complete, tighten the set screw (4).
3. Loosen the set screw (8) and adjust the spreader stopper R (9) so that the top edge of the tip of spreader R (6) is aligned with the top edge of the tip of looper R (7).
4. Once adjustment is complete, tighten the set screw (8).

NOTE:
Spreader L (1) and spreader R (6) should not protrude above the eye looper (2) or looper R (7) respectively. If they do, skipped stitches or needle breakages may occur.

9-10. Adjusting the spreader timing

Spreader R (1) (at inside sewing position) an spreader L (at outside sewing position) must touch the spreader stoppers (3) and (4) respectively and stop moving immediately before the needle bar reaches its lowest position.
* Adjustment can be carried out more easily if it is done in manual mode.
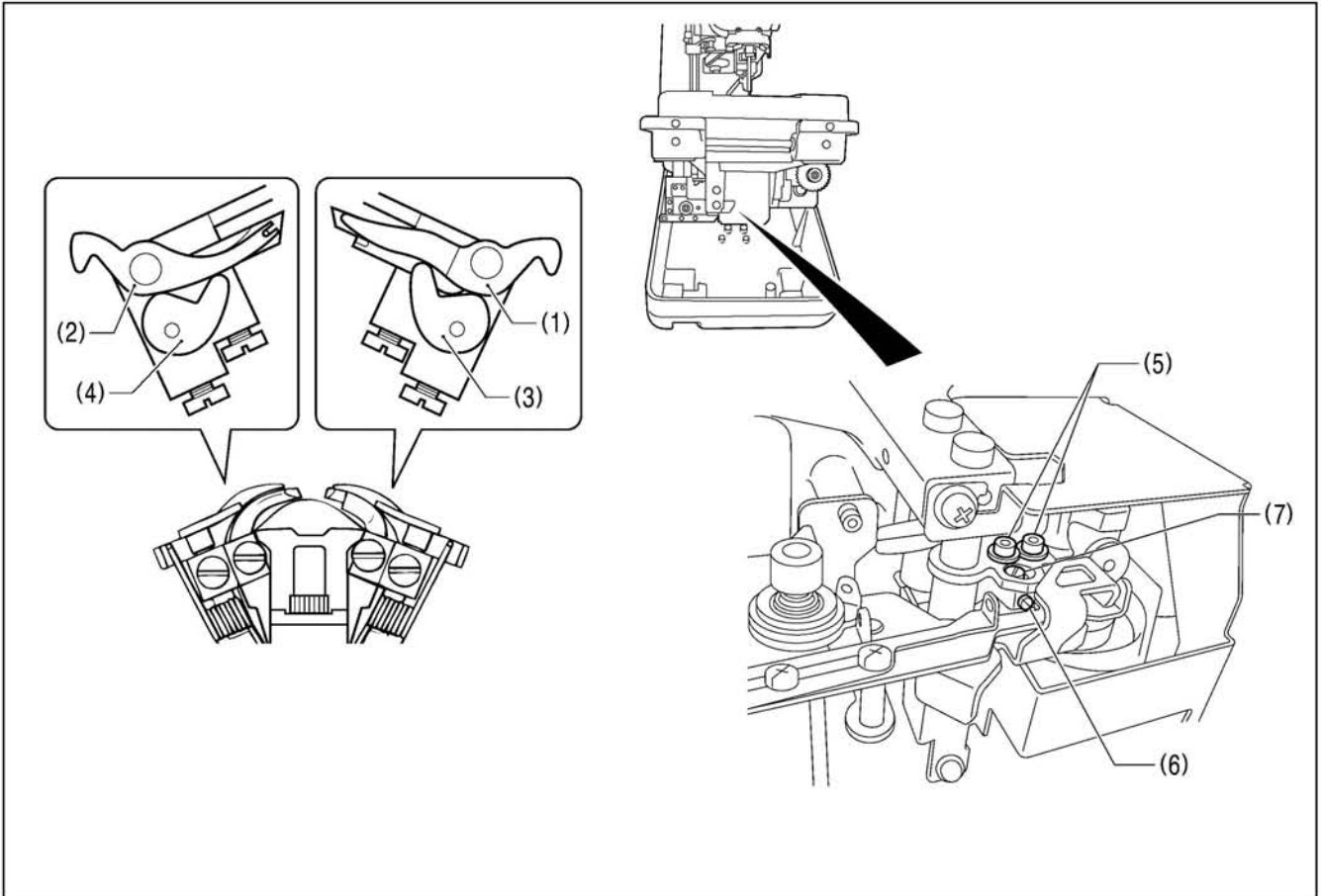
1. Tilt back the machine head.
2. Loosen the two screws (2), and then loose the set screw (6).
3. Turn the eccentric pin (7) to adjust.
4. After adjusting, tighten the set screw (6) and the two screws (5) in that order.

NOTE:
   Make sure that spreader R (1) and spreader L (2) do not obstruct the needle after adjustment.

9-11. Adjusting the height of the throat plate

(Seen from the front)

(Seen at an angle from above-right)
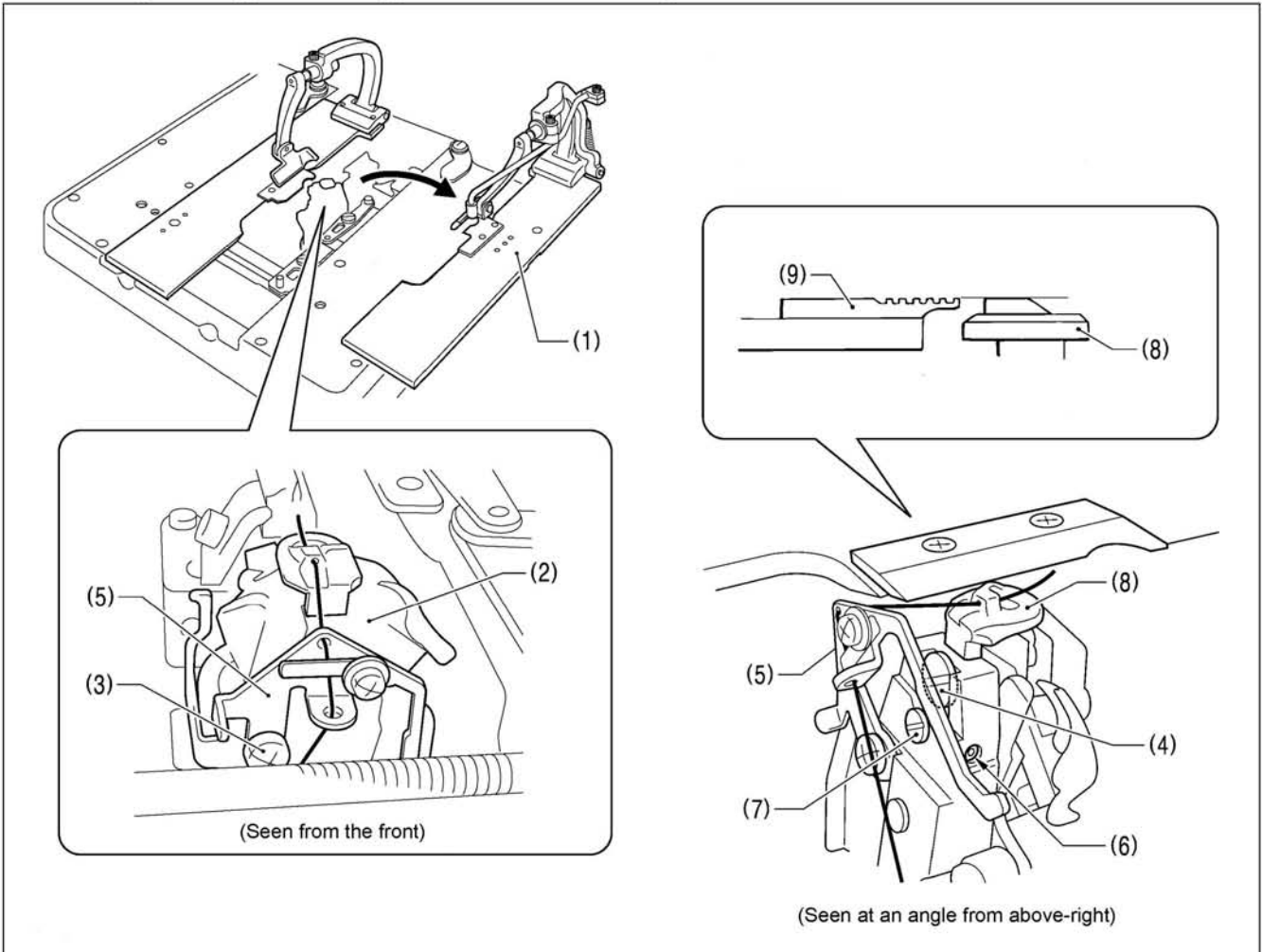
1. Remove the right-side work clamp plate (1).
2. Turn the looper base (2) so that it faces as shown in the illustration.
3. Loosen the screw (3), and then move gimp thread guide C (5) to a position where it will not obstruct turning of the screw (4).
4. Loosen the screw (4) by about 10 turns.
5. Loosen the set screw (6).
6. Move the vertical pin (7) to adjust so that the top of the throat plate (8) and the top of the needle plate (9) are at the same height.
   NOTE:
   - If the position of the throat plate (8) is too high, it may obstruct the movable knife and damage it.
   - Press down gently on the throat plate (8) from above while adjusting it. If the adjustment is carried out while the throat plate (8) is lifted up, the correct adjustment result will not be obtained.
7. Once adjustment is complete, tighten the screws that were loosened and return all other parts to their original positions.

9-12. Changing the cutting length (Replacing the hammer)

The cutting length is determined by the length of the hammer. File or replace the hammer in order to change the cutting length.
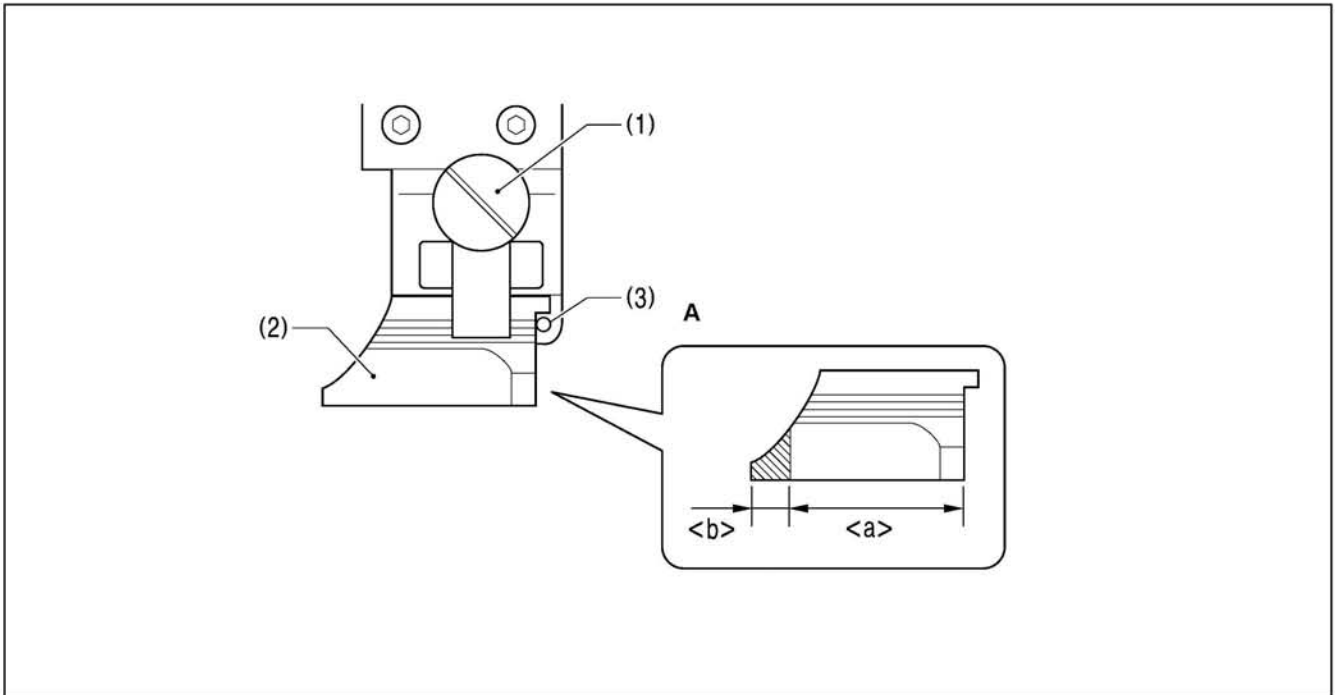
1. Loosen the knob screw (1), and then remove the hammer (2).
2. **[If grinding the hammer (Refer to Figure A)]**
   Use a grinder to grind section <b> of the hammer so that <u>cutting length + 1.5 mm = <a>.</u>
3. **[If installing a new hammer]**
   Push the hammer against the positioning pin (3) (or the hammer spacer (4)), and then tighten the knob screw (1).

NOTE:
   If the knife that was being used previously is replaced by a knife with a different number, replace the hammer also. If the same hammer is used for two or more different types of knife, different knife incisions will be formed on the hammer, and this may cause problems with the accurate cutting of the material or may damage the knife.

9-13. Adjusting the cutting surface of the hammer

(a) (b) (c) (d)
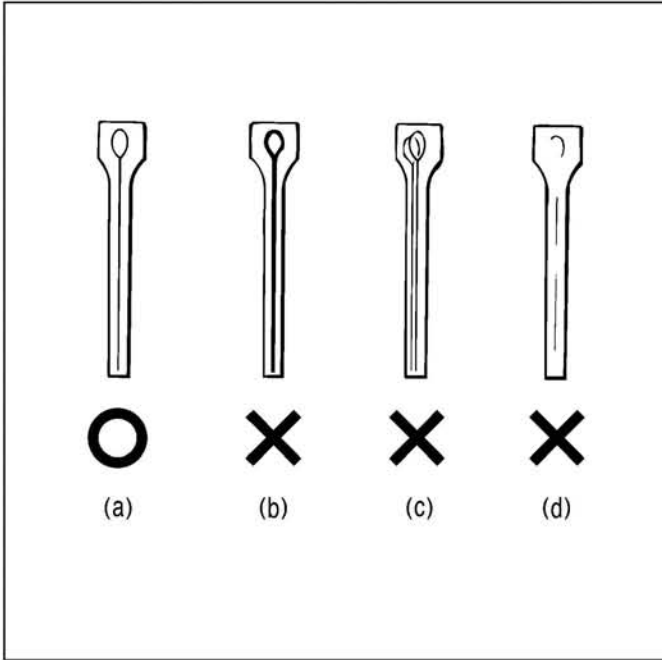
<Adjustment procedure>
1. Remove the hammer. (Refer to the previous page for instructions on removing the hammer.)
2. Check the cutting surface of the hammer. Refer to the illustration at left, and if the cutting surface looks like (b) - (d), file the cutting surface so that the knife incision is made evenly on the cutting surface.

   (a) Knife incision is correct
   (b) Knife incision is too deep
   (c) A different knife was used which produced an overlapping knife incision
   (d) Partial knife incision which is not being made completely

3. If the material cannot be cut cleanly even though the hammer has been ground correctly, also check whether the tip of the knife is worn.
   * If the tip is worn, replace the knife.
   * Do not use the old hammer after the knife has been replaced. If the same hammer is used, it may damage the tip of the knife.

9-13-1. Filing the cutting surface of the hammer
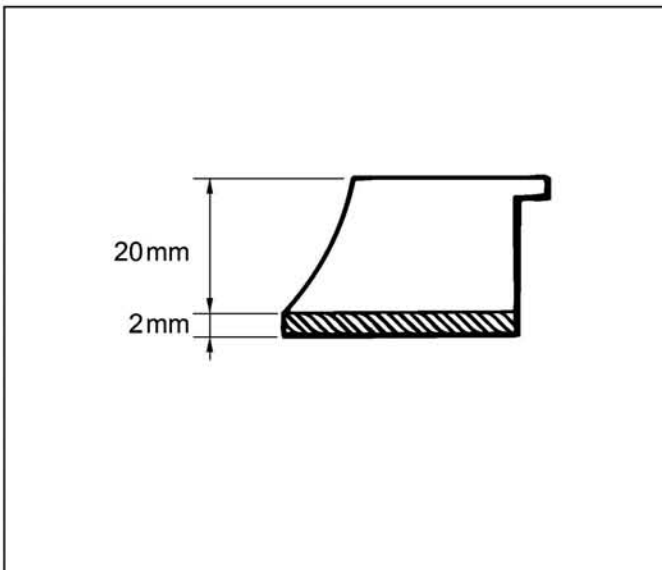
The cutting pressure over the whole of the hammer should be uniform so that the material will be cut cleanly. File the cutting surface of the hammer so that the knife incision will be uniform over the whole of the hammer.
* The hammer can be filed until a height of 20 mm remains.
* Use a flat file for filing the hammer.

Filing the cutting surface of the hammer on which the knife incision is overlapping or has shifted
1. Grip the hammer in a vise.
2. Use the flat file to file the cutting surface of the hammer until the knife incision disappears.

Filing the cutting surface of the hammer in which knife incision is deep
1. Grip the hammer in a vise.
2. Use the flat file to file the cutting surface of the hammer smoothly until a single knife incision can still be seen faintly.

* Once filing is complete, install the hammer.

9-13-2. Adjusting the contact between the knife and the hammer

The knife incision can be seen more clearly if the cutting surface of the hammer is filled over with a marker pen or similar.
1. Operate the hammer three times with the knife making a mark on it each time.
2. If the knife incision is not uniform, file the hammer. (Refer to the previous page for details on filing the hammer.)
3. Repeat steps 1 and 2 until the knife incisions are uniform.
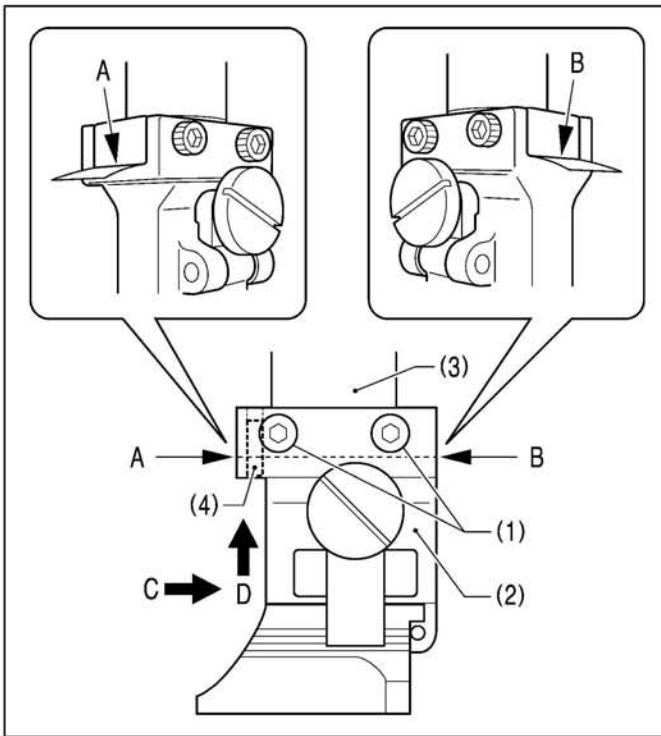
<Contact adjustment method using thin paper>
The following method can also be used to adjust the contact.
1. Loosen the four screws (1).
2. Insert some thin paper into either of the gaps A or B between the hammer bracket (2) and the cutter driving shaft (3).
3. Tighten the four screws (1).
    *   Push the hammer bracket (2) in the direction of arrow C and firmly upward in the direction of D shown in the illustration so that there is no gap between the hammer bracket (2) and the cutter driving shaft (3), and then tighten the screws.
        (This operation will position the hammer bracket (2) accurately by pushing the pin (4) of the hammer bracket (2) against the hole side of the cutter driving shaft (3).)

9-14. Replacing the knife and adjusting its position

9-14-1. Replacing the knife

> ### ⚠ CAUTION
>
> ⚠ Do not operate the sewing machine while a knife and hammer with numbers that are different from those which have been set in programs.
> If this is not observed, damage to sewing machine parts or the needle or serious injury may occur.
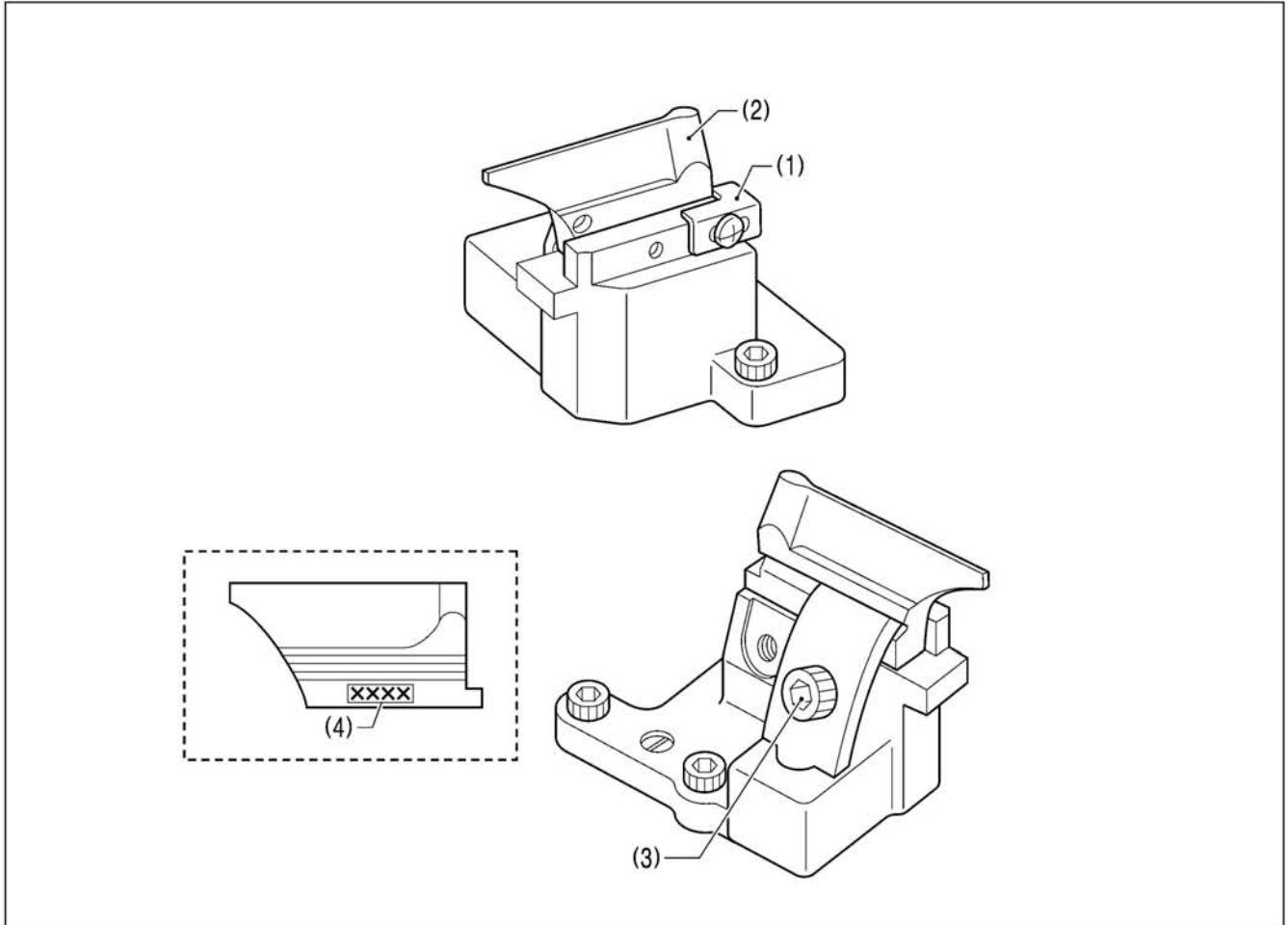
1. Check that there is no gap between the block stopper plate (1) and the knife (2), and then loosen the socket bolt (3) and remove the knife (2).
2. Place the new knife to be installed against the block stopper plate (1), and then tighten the socket bolt (3).

NOTE:
- When replacing the knife, use the parameter settings to change the eyelet pattern to the pattern that corresponds to the knife number (4) that is given on one side of the knife.
- Replace the knife and hammer as a set. If the same hammer is used for two or more different types of knife, different knife incisions will be formed on the hammer, and this may cause problems with the accurate cutting of the material or may damage the knife.

9-14-2. Making fine adjustments to the knife position

Adjust the knife position so that it cuts the material cleanly at the inside sewing position and around the eyelet.
* Before carrying out this adjustment, check that the zigzag base line position has been completed correctly.
* The knife position can be adjusted independently in the forward/back direction and tilt direction.
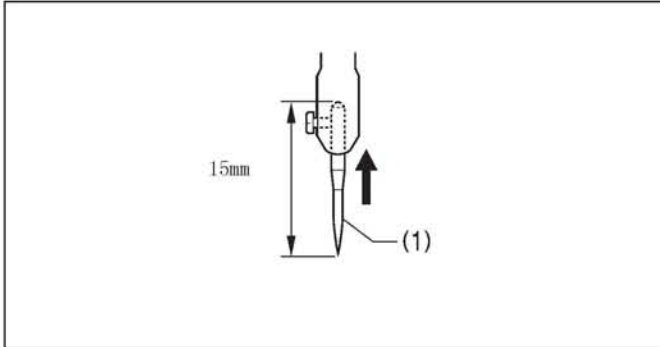
<Adjustment procedure>
1. Install the short customized needle(1).
2. Set the air pressure at the hammer pressure adjustment regulator on the underside of the table to about 0.2 MPa.
   * This is so that the knife will not make several overlapping incisions in the hammer and so that the paper for checking the needle drop does not become pierced while adjusting the knife position.
3. Press the AFTER key [AFTER] on the operation panel to set thecutting method to "cutting after sewing".
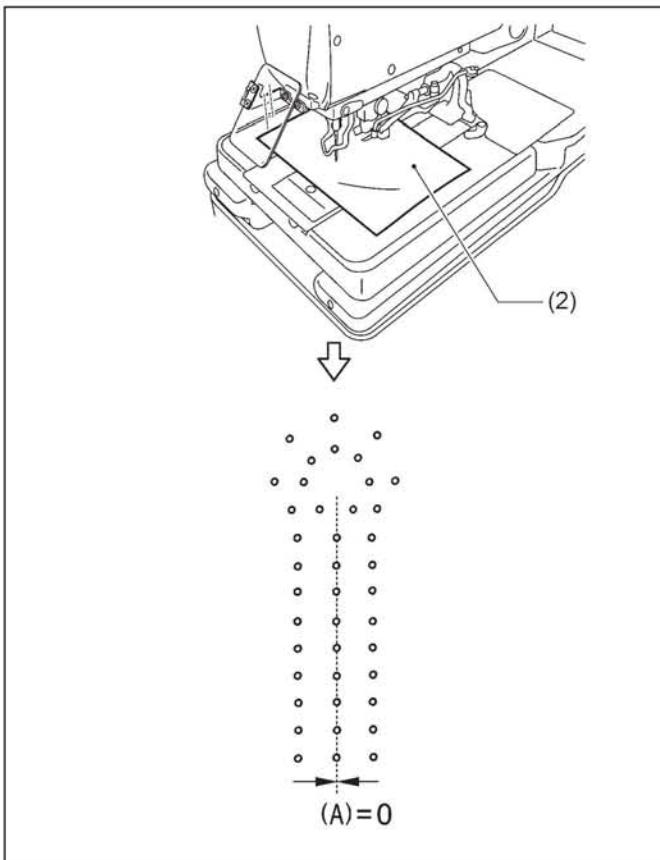
4. Place a piece of paper (2) underneath the work clamps.
5. Start the sewing machine and trace the needle drop position around the eyelet hole.
6. Check that the needle drop positions around the eyelet hole and the knife cutting position overlap uniformly.
   * Checking will be easier if the cutting position value (A) in the parameter settings is set to "0".

7. If they do not overlap uniformly, turn off the power and carry out the adjustment in steps 8 - 13.
   * Once adjustment is complete, repeat steps 4 - 6 to check, and if further adjustment is needed, repeat step 7.

<Forward/back position adjustment>
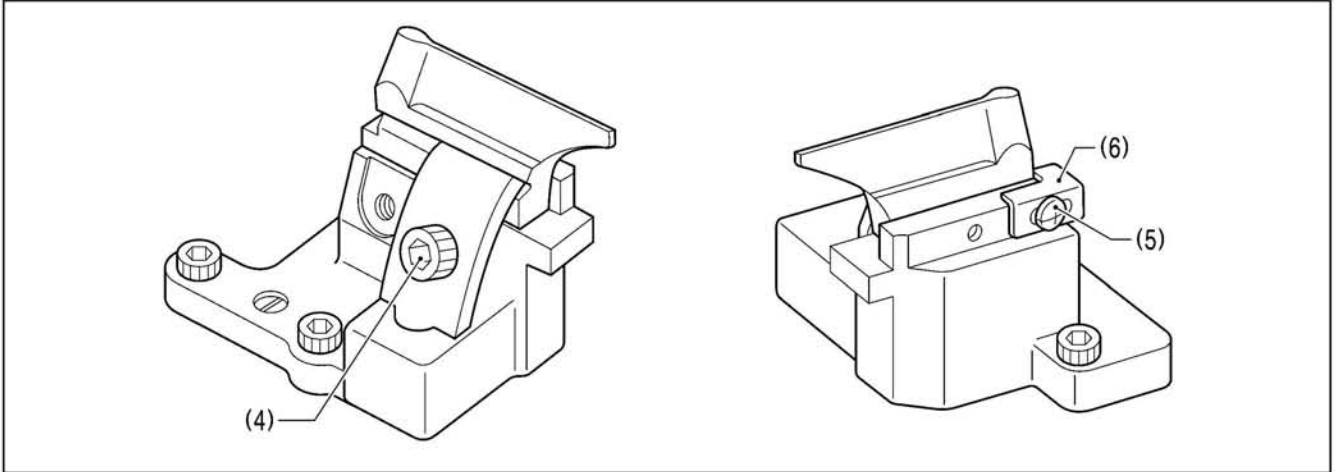
8. Loosen the socket bolt (4), and move the knife position forward or back to adjust.
9. Once the knife position has been determined, securely tighten the socket bolt (4).
10. Loosen the screw (5), push the block stopper plate (6) against the knife, and then tighten the screw (5).
   * The block stopper plate (6) is a guide for showing the current position of the knife, so be sure to move the block stopper plate (6) so that it is touching against the knife.

(Seen from directly above the knife base)
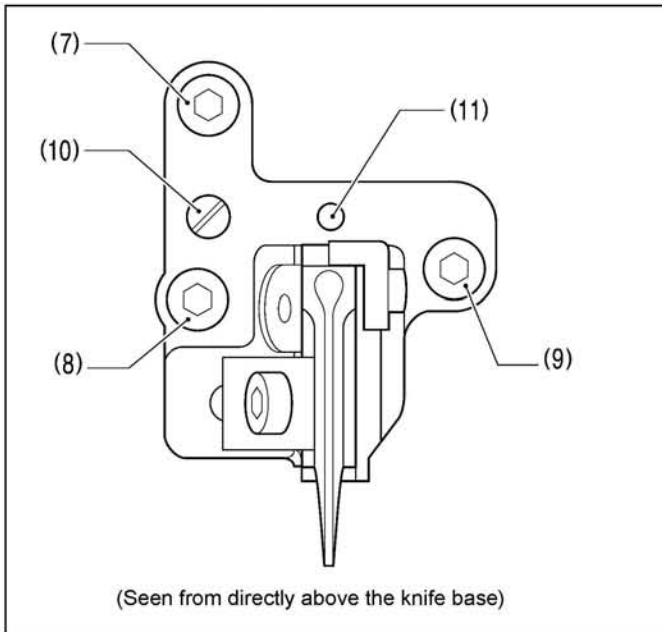
<Tilt adjustment>
11. Loosen the socket bolts (7), (8) and (9).
12. Turn the eccentric pin (10) to adjust.
   * Fine adjustments can also be made by turning centering on the pivot (11).
13. Once adjustment is complete, tighten the socket bolts (9), (8) and (7) in that order.

NOTE: Relationship between needle drop position and eyelet pattern at the eyelet

Eyelet pattern a x b   Needle drop c x d

Cutting before sewing   Cutting after sewing
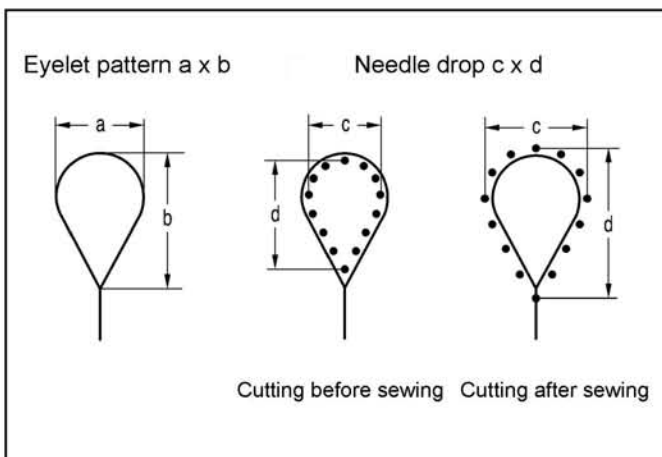
When switching between cutting before sewing or no cutting and cutting after sewing, the needle drop position at the inside sewing position will change automatically in accordance with the eyelet pattern as shown in the illustration.

Knife No.	Eyelet pattern a x b	Needle drop c x d	
		Cutting before sewing or no cutting	Cutting after sewing
1	2.1 x 3.2	1.7 x 2.7	2.5 x 3.8
2	2.8 x 4.3	2.4 x 3.9	3.2 x 4.9
3	3.0 x 4.6	2.6 x 4.1	3.4 x 5.2
4	3.2 x 5.4	2.8 x 4.9	3.6 x 6.0
5	Straight	Straight	Straight
6	3.8 x 4.3	3.4 x 3.8	4.2 x 4.9

9-15. Adjusting the work clamp lift amounts

Adjust the work clamp lift amount <a> = 12 mm .

* The work clamp lift amount <a> is the value which includes the play in crank lever B (1) and the clamp lever (2).
* Carry out adjustment for both the left and right work clamps. (The following describes how to adjust the lift amount for the right-side work clamp.)
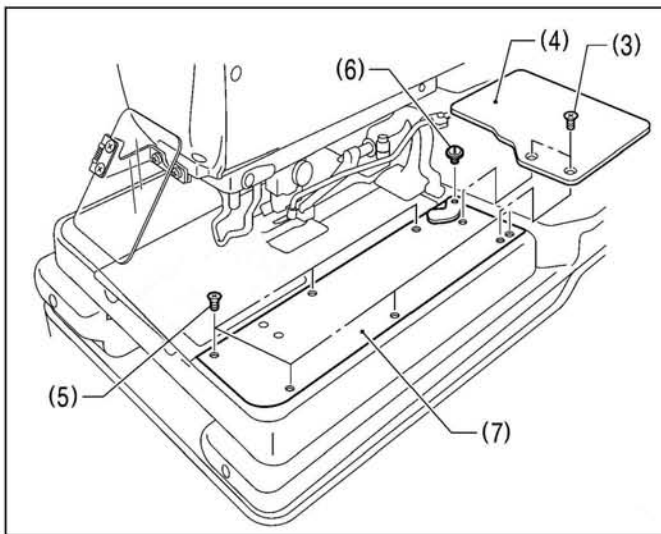
1. Remove the two screws (3), and then remove feed base cover U (4).
2. Remove the six screws (5) and the shoulder screw (6), and then remove feed base cover R (7) at the right side.

(Seen from directly to the right)
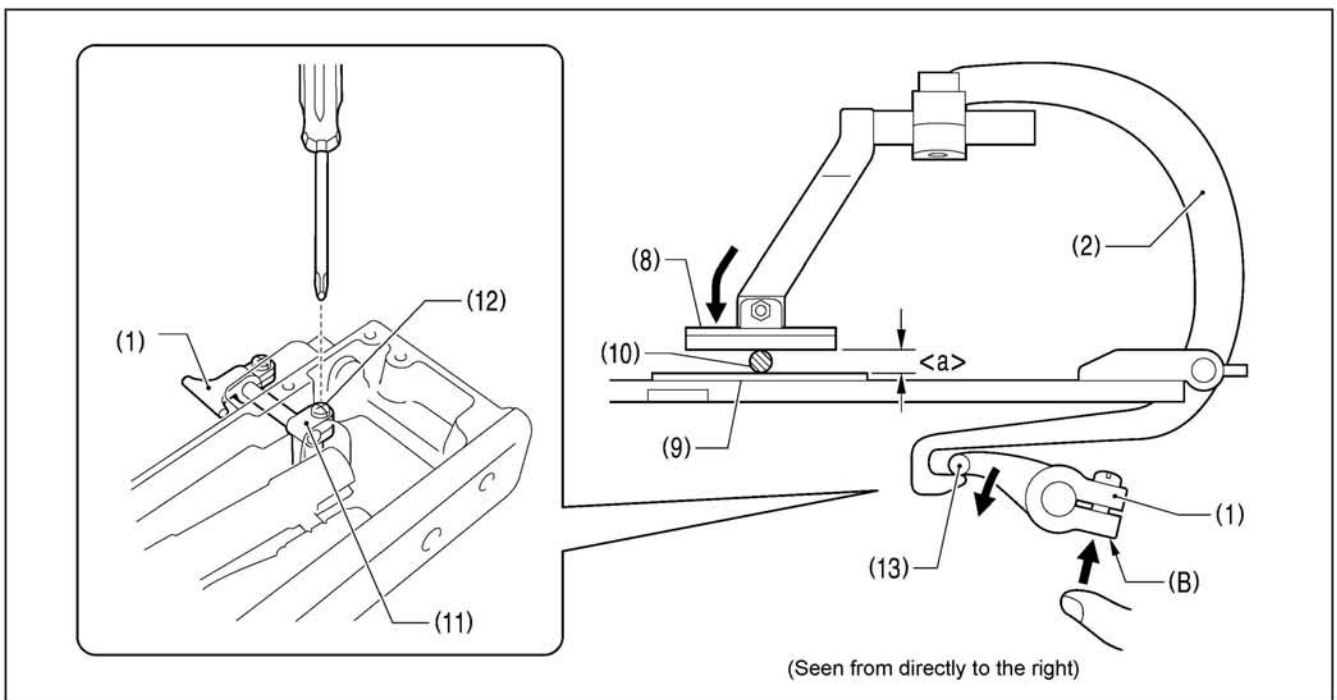
3. Insert a block with a thickness of 12 mm or 16 mm or a gauge (10) in between the support point of work clamp R (8) and the needle plate (9).
4. Loosen the screw (12) of the clamp driving lever (11).
5. Push section (B) of crank lever B (1) upward so that the tip (13) is pressed against the end of clamp lever R (2) as shown in the illustration.
6. While holding the parts in the position in step 5, tighten the screw (12).
   NOTE:
   Check that work clamp R (8) is pressed securely against the block or the gauge (10).
7. Install feed base cover R (7) and feed base cover U (4).
* Adjust the lift amount for the left-side work clamp in the same way.

78

9-16. Adjusting the work clamp positions

The positions of the work clamps relative to the needle plate can be adjusted forward, back and sideways.
*   Adjust the left and right work clamps so that they are both positioned at an equal distance from the needle drop position.
    (The following describes how to adjust the position of the right-side work clamp.)

(Seen from directly to the right)
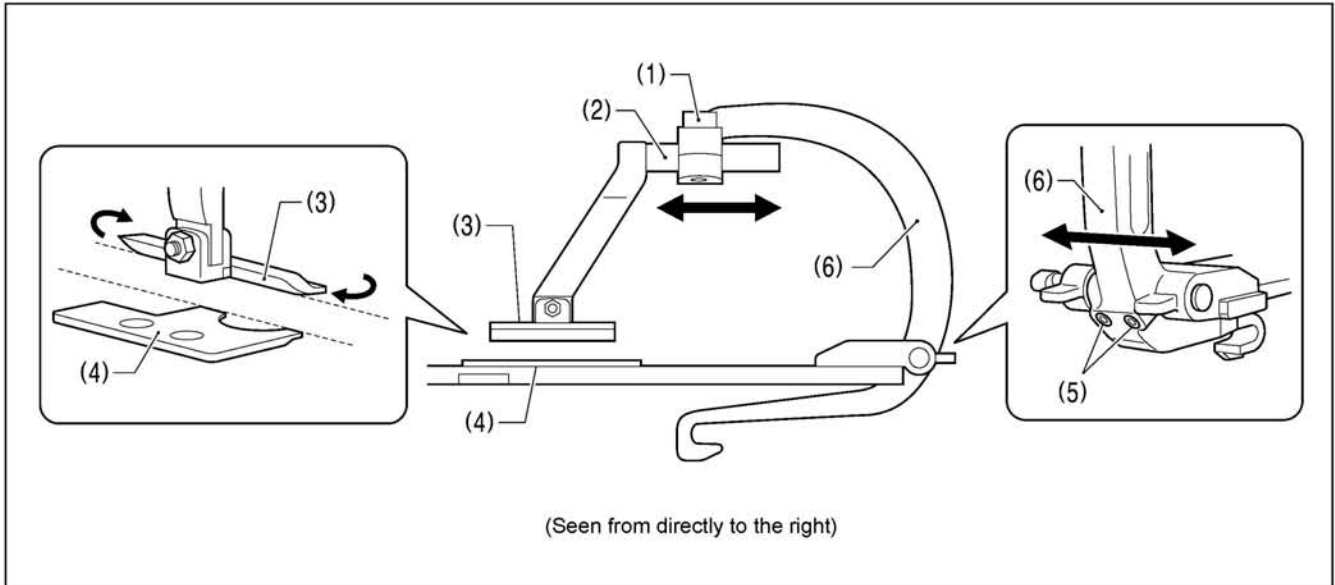
<Forward/back adjustment>
1. Loosen the socket bolt (1), and then move the position of the clamp arm (2) forward or back to adjust.
2. Next, adjust so that the side of work clamp R (3) is parallel to the side of the needle plate (4).
3. Once adjustment is complete, tighten the socket bolt (1).

<Sideways adjustment>
1. Loosen the two set screws (5), and then adjust the sideways position of the clamp lever (6).
2. Once adjustment is complete, tighten the two set screws (5).

*   Adjust the position for the left-side work clamp in the same way.

9-17. Adjusting the positions of the work clamp plates

Adjust the positions of the work clamp plates (3) so that the throat plate (1) and needle plates (2) do not touch during sewing. The standard adjustment is when there is a gap of 0.8 mm between the throat plate (1) and the needle plates (2) (when the cutting space is set to "0").

* Carry out adjustment for both the left and right work clamps. (The adjustment method described below is for the position of the right-side work clamp plate (3).)
* Carry out adjustment with the work clamp plates (3) installed.
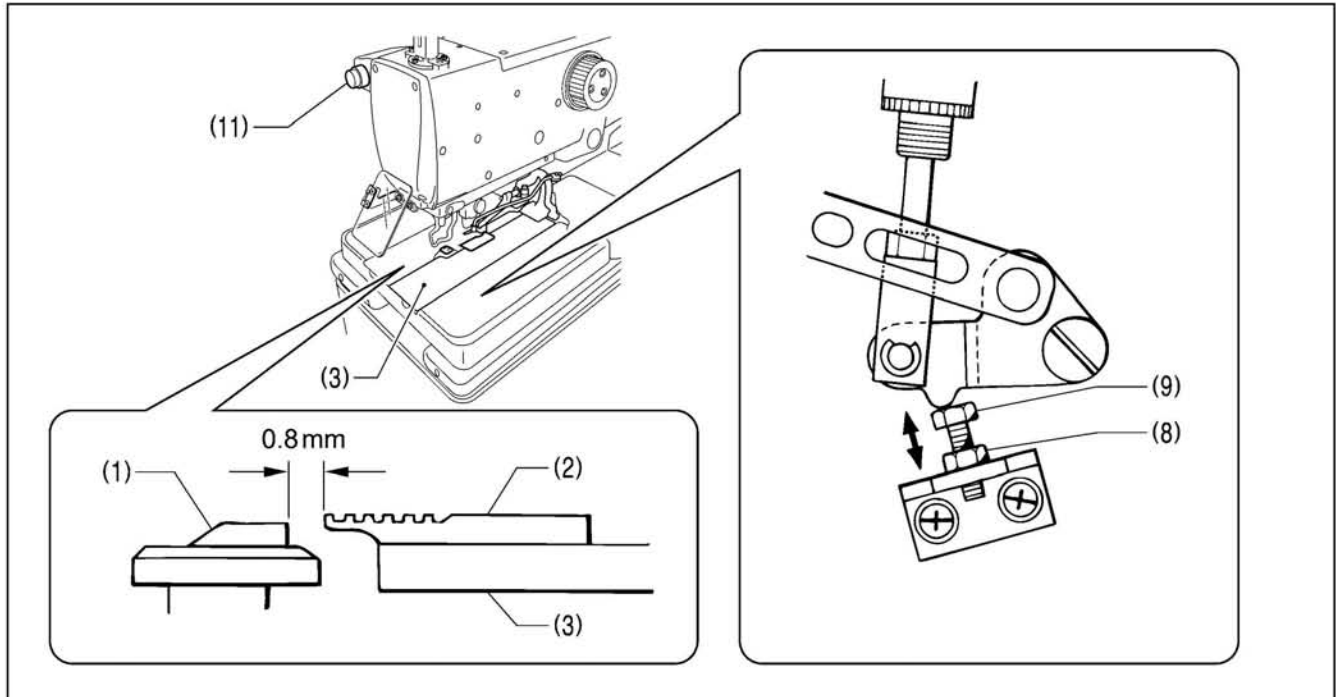
1. Check that there is a gap of 0.8 mm between the throat plate (1) and needle plate R (2).
2. If there is not a gap of 0.8 mm, loosen the nut (8), and then turn the bolt (9) to adjust.
3. Once adjustment is complete, tighten the nut (8).
* Adjust the gap between the throat plate (1) and needle plate L in the same way.

9-18. Adjusting the cloth opening amounts

Adjust so that the opening amounts for the left and right work clamp plates are equal.
* The cloth opening amounts should always be 0.8 mm or more on each side.

Cloth opening amount = <b> - <a>
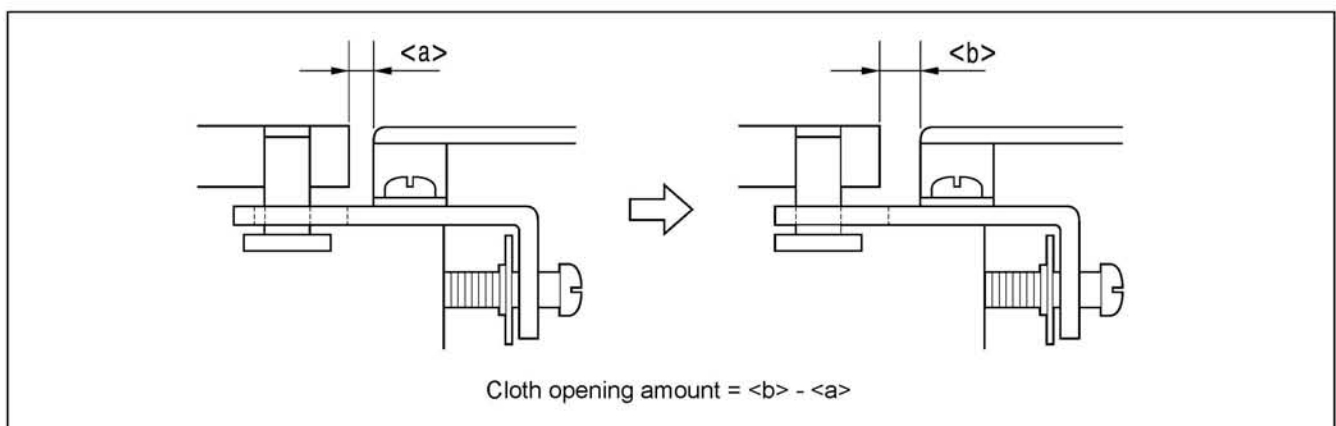
3. Use calipers to measure <a> (at both left and right).
4. Turn off the power for the sewing machine.
   * The gap <a> will become wider. This opening amount is <b>.
5. Lower the work clamps, and then use calipers to measure <b> (at both left and right).

   (Cloth opening amount = <b> - <a>)

6. Calculate the cloth opening amounts for both sides.
7. Carry out adjustment if the two cloth opening amounts are not the same, or if the cloth opening amount at either side is lower than 0.8 mm. (Refer to following page.)

<Cloth opening amount adjustment>
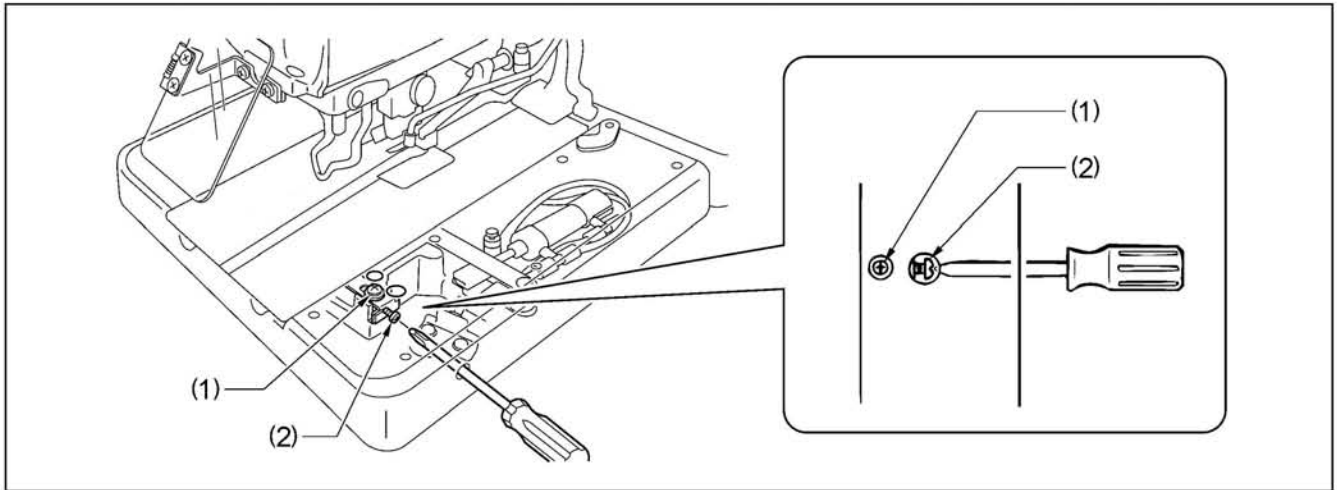
6. Loosen the screw (1).
7. Insert a screwdriver into the notch in the side of the feed base, and turn the adjustment screw (2) to adjust.
8. After tightening the screw (1), measure the opening amounts once more.
9. Repeat steps 2 - 10 until the left and right cloth opening amounts are equal to each other.

9-19. Adjusting the upper thread feeding amount

It is necessary for enough of an upper thread feeding amount to be maintained so that the amount of upper thread is sufficient for stitches to be formed accurately at the sewing start.

NOTE:
The thread take-up lever (1) operates at the same time as sewing ends, and it stops operating at the same time as the feed base starts moving when the start switch is pressed.
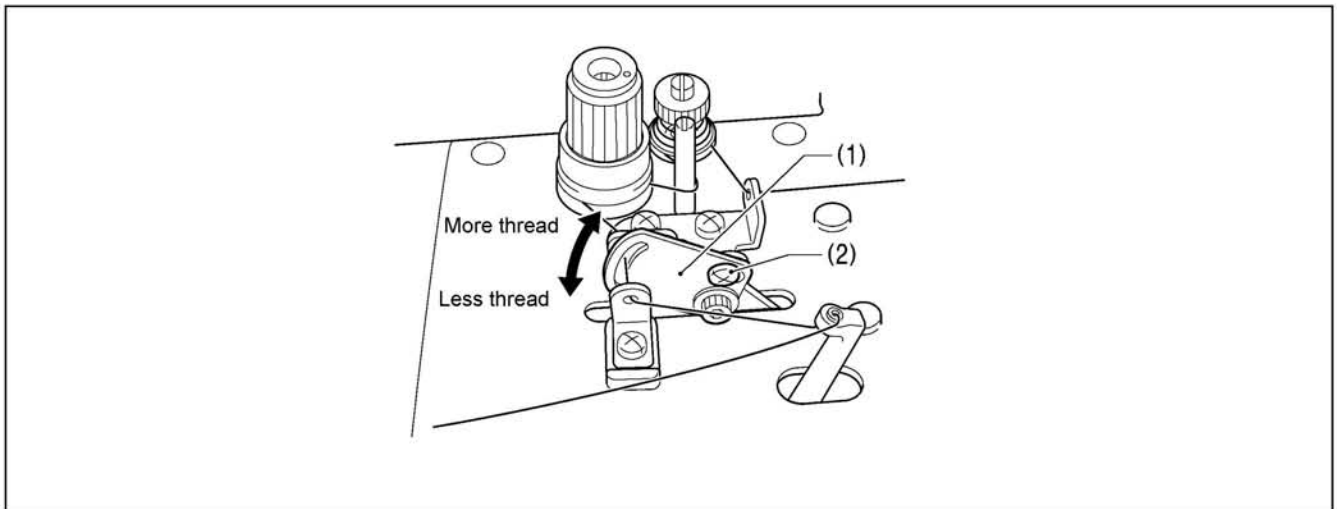
1. Loosen the screw (2).
2. Move the thread take-up lever (1) up or down to adjust the upper thread feeding amount.
3. Once adjustment is complete, securely tighten the screw (2).

9-20. Adjusting the lower thread feeding amount <-01>

It is necessary for enough tension to be applied to the lower thread during the time from when the upper thread is picked up by the eye looper at the first stitch until spreader L finishes opening, without the lower thread being pulled out by the thread nipper, so that the first stitch can be sewn correctly at the sewing start.
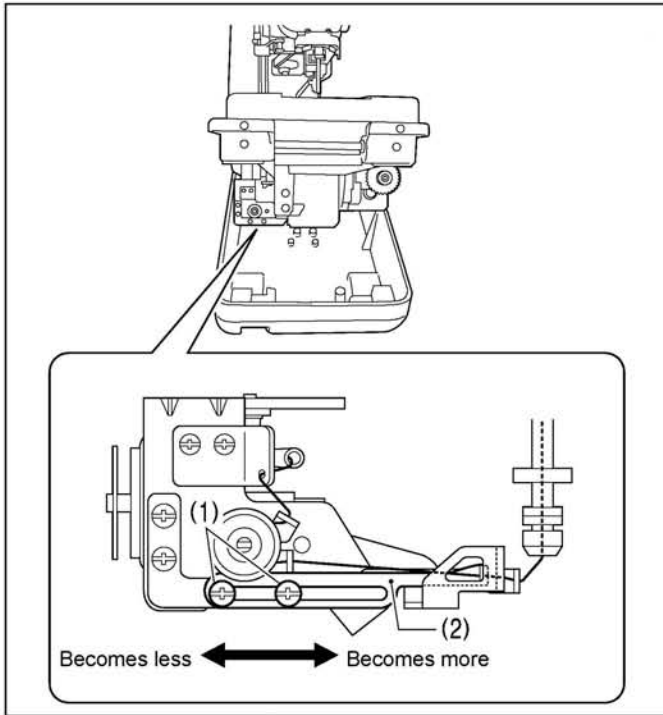
1. After automatic sewing is finished, switch to manual mode and then press the start switch.
2. Turn the upper shaft pulley and check the condition of the lower thread.

<If adjustment is necessary>
3. Turn off the power, and then tilt back the machine head.
4. Loosen the two screws (1), and then move lower thread guide C (2) in the direction of the arrow to adjust.
   * If it is moved to the right, the lower thread feeding amount will increase, and if it is moved to the left, the amount will decrease.
5. Once adjustment is complete, securely tighten the two screws (1).

Becomes less ⬅➡ Becomes more

9-21. Replacing and adjusting the upper movable knife

9-21-1. Replacing the upper movable knife
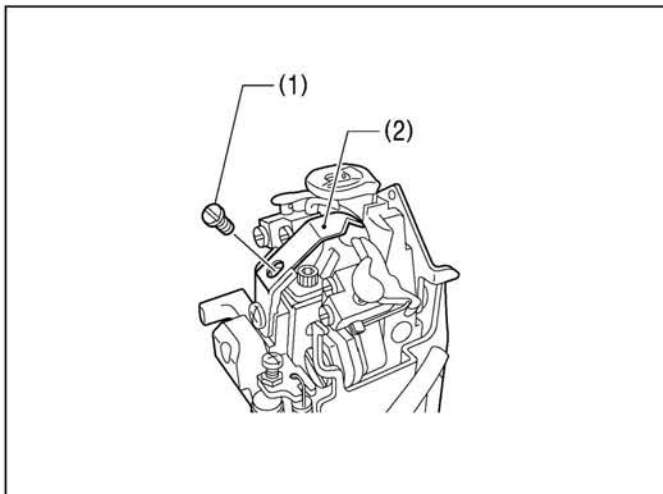
1. Remove the screw (1), and then remove the upper movable knife (2).
2. Install the new upper movable knife with the screw (1).

82

9-21-2. Adjusting the upper movable knife

The upper movable knife (1) is adjusted so that only the upper thread that is in front of looper L (2) is cut. If two of the upper thread loops (front and back) are cut, the upper thread trailing length will become too short and skipped stitches may occur at the sewing start.

* If this adjustment is carried out in manual mode, the upper thread trimming operation can be checked step by step, which will make adjustment easier.

(Seen from directly to the right)
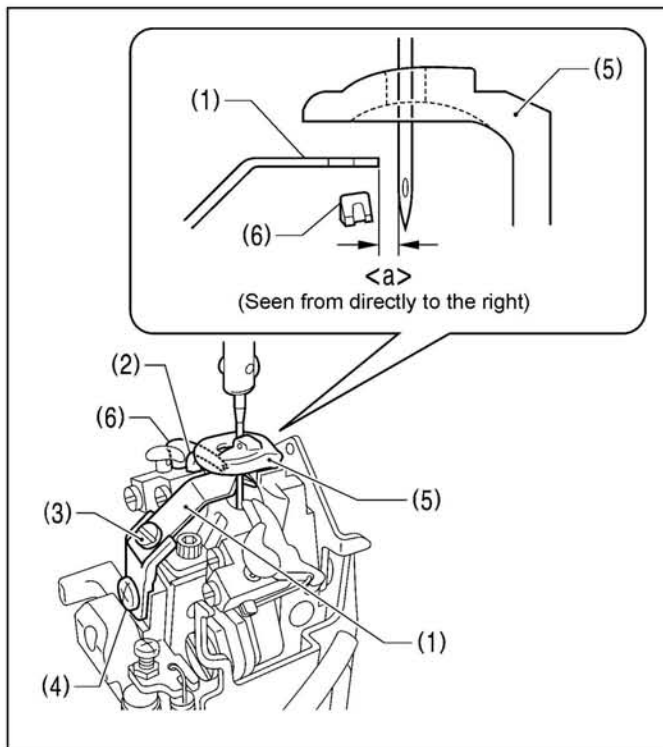
1. Turn the upper shaft pulley to set the needle to the lowest position at the outside sewing position.
2. Loosen the screw (3), and then adjust the gap <a> between the tip of the upper movable knife (1) and the needle to 0.1 - 0.4 mm.
3. Turn the upper shaft pulley to set the needle to its highest position (needle up stop position) at the outside sewing position.
4. Loose the screw (4), and then adjust the position of the upper movable knife (1) so that it is in between the throat plate (5) and spreader L (6) without touching either of them.
5. Move the upper movable knife (1) sideways by hand and check that it does not touch either the throat plate (5) or spreader L (6).
6. Once adjustment is complete, tighten the screws (4) and (3) in that order.
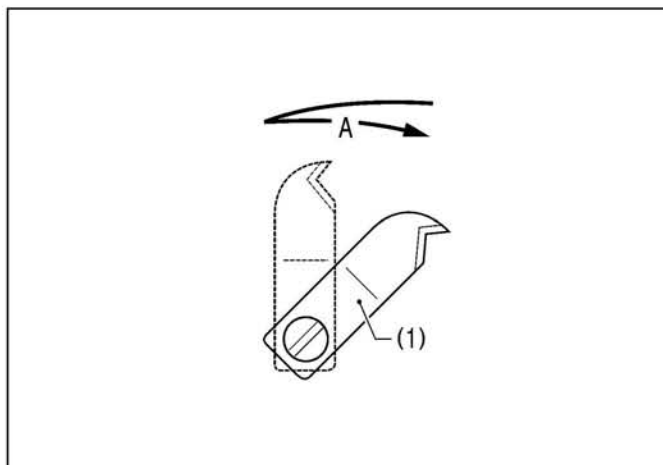
NOTE: Upper thread trimming timing

When the upper movable knife (1) has returned to its original position, the upper thread is trimmed at position A.

9-21-3. Adjusting the position of the thread trimmer lever bracket

The position of the needle must be adjusted so that it does not obstruct the upper movable knife when it is at the maximum zigzag width for the outside sewing position.

(Seen from the front)
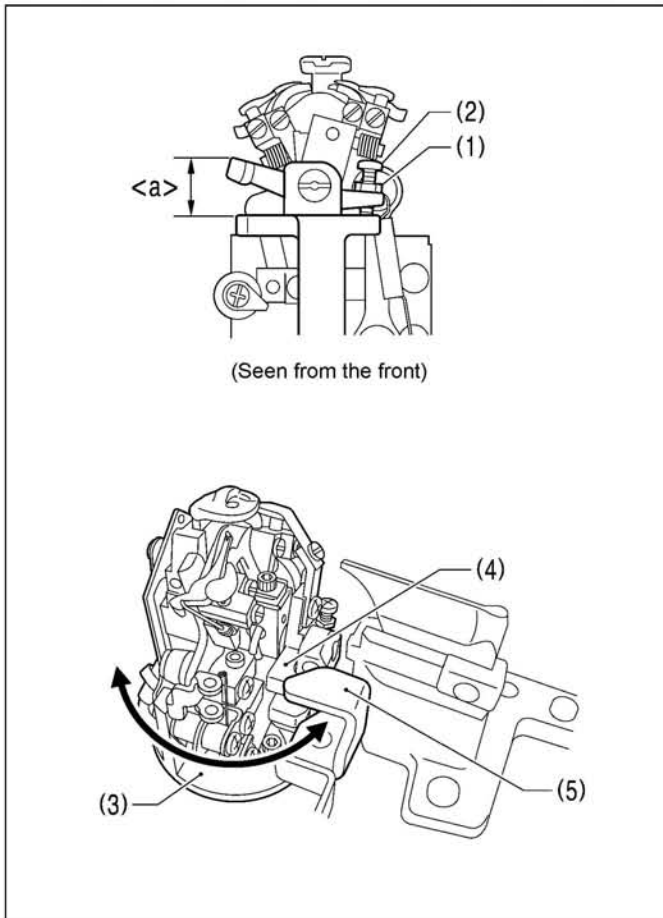
1. Loosen the nut (1).
2. Turn the screw (2) to adjust <a> in the illustration to 12 mm.
3. Turn the looper base (3) and check that the thread trimmer lever bracket (4) moves underneath the thread trimmer hammer (5) without obstructing any other parts.
4. Once adjustment is complete, securely tighten the screw (2).

84

9-22. Replacing and adjusting the movable knife and fixed knife (for the lower thread and gimp) <-01>

9-22-1. Replacing the movable knife and fixed knife
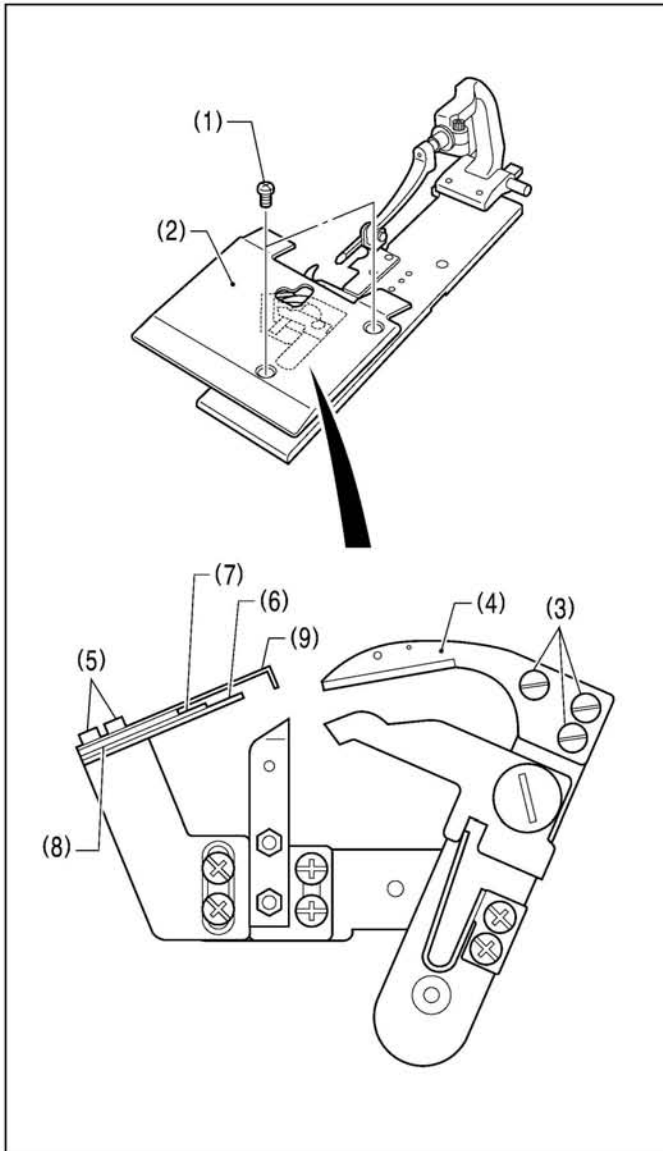
1. Remove the two screws (1), and then remove work clamp plate U (2).

<Movable knife replacement>
2. Remove the three screws (3), and then remove the movable knife (4).
3. Install the new movable knife, and then tighten the three screws (3).

<Fixed knife replacement>
4. Remove the two screws (5), and then remove the fixed knife (6).
5. Install the new fixed knife (6), fixed knife plate spring (7), fixed knife plate spring U (8) and thread guide plate (9) on top of each other in that order, and then tighten the two screws (5).

* After replacing the knives, carry out the adjustments from "9-25-2. Adjusting the cutting pressure" to "9-25-5. Adjusting the thread handler". Once adjustment is complete, install work clamp plate U (2).

9-22-2. Adjusting the cutting pressure

Adjust the cutting pressure to a suitable pressure so that the threads are trimmed cleanly.
NOTE:
 Do not apply excessive pressure. Excessive pressure will cause the knives to become worn or damaged.
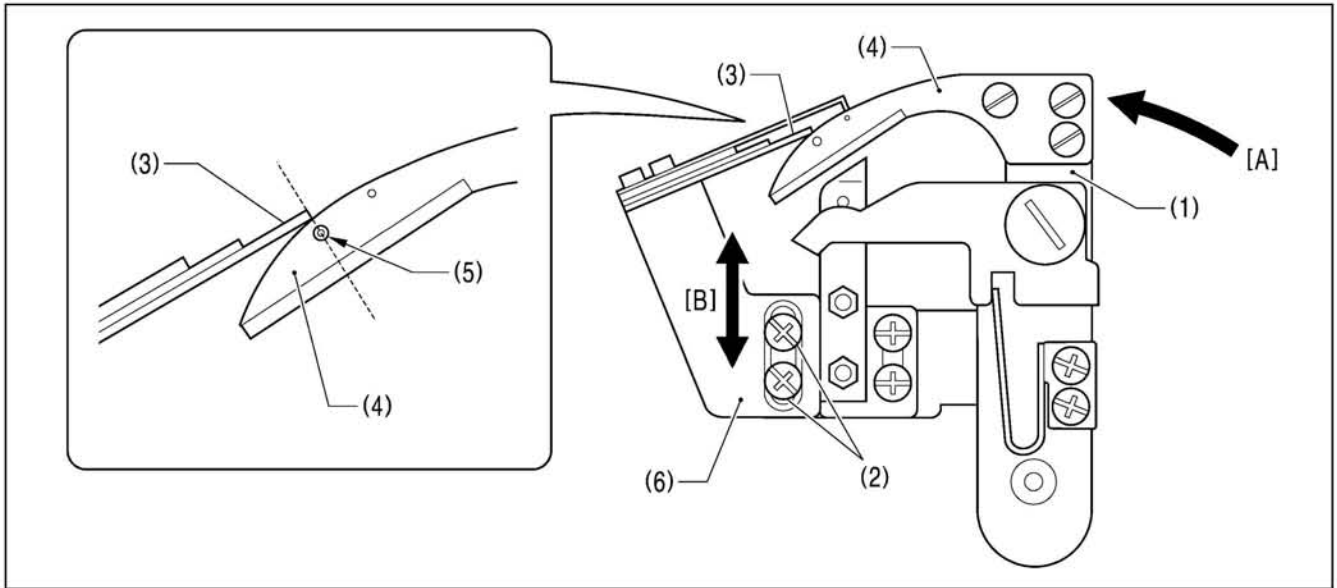
1. Push the thread trimmer arm (1) as far as it will go in the direction of the arrow [A].
2. Loosen the two screws (2).
3. With the thread trimmer arm (1) pushed as far as it will go, move the fixed knife setting bracket (6) along the guide groove in the direction of arrow [B] to adjust so that the position where the tip of the fixed knife (3) and the movable knife (4) first start touching is immediately above the mark (5).
4. Once adjustment is complete, securely tighten the two screws (2).

9-22-3. Adjusting the meshing amount
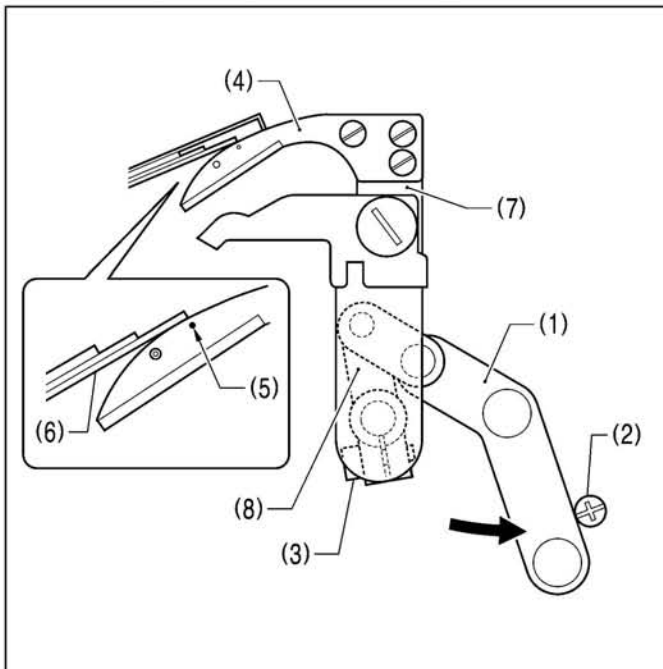
1. Turn the thread trimmer link lever (1) in the direction of the arrow until it touches the screw (2).
2. Loosen the socket bolt (3).
3. Adjust the position of the thread trimmer arm (7) so that the tip of the fixed knife (6) is directly above the index mark (5) on the movable knife (4).
4. Once the adjustment is complete, securely tighten the socket bolt (3).

NOTE:
• When tightening the socket bolt (3), check that the thread trimmer lever arm (8) and the thread trimmer arm (7) move smoothly with no play.
• If the meshing amount is too small, problems with the lower thread nipper will occur and the thread will be pulled out at the sewing start.

9-22-4. Adjusting the thread nipper assembly and opener

The lower thread must pass through thread nipper D (1) and the gimp thread must pass through thread nipper U (2). Therefore, check that the thread nipper assembly (3) is installed in the correct position and that the thread nipper opener (4) moves correctly.

NOTE:
The lower thread must be securely held by thread nipper D (1) at the sewing start.

(Side view of thread nipper assembly (3) and the thread handler (7) seen from position A)
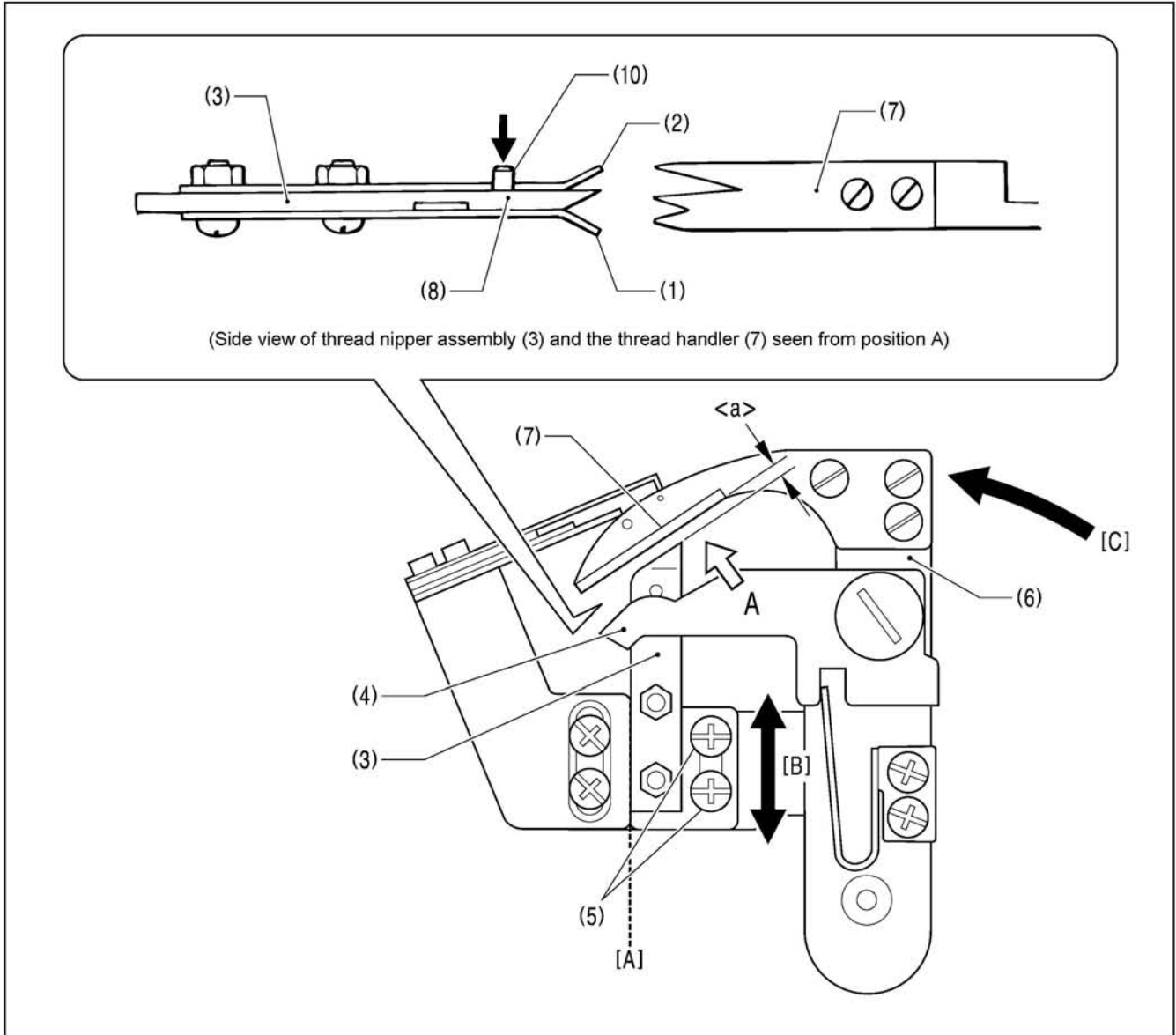
1. Loosen the two screws (5), and then move the thread nipper assembly (3) along the dotted line [A] in the illustration in the direction of the arrow [B] to adjust.
   * Adjust so that the gap <a> between the thread nipper assembly (3) and the thread handler (7) is as narrow as possible without the two parts touching when the thread trimmer arm (6) is turned in the direction of the arrow [C].
   NOTE:
   - If the gap <a> is too wide, problems with the lower thread nipper will occur and the thread will be pulled out at the sewing start.
   - If the thread nipper assembly (3) is installed at an angle, thread nipper D (1) may touch the throat plate and fail to open, and problems with the lower thread nipper will occur and the thread will be pulled out at the sewing start.
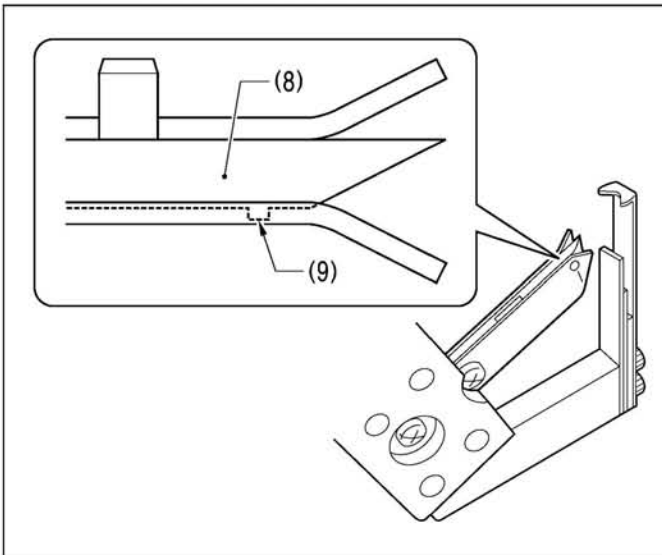
2. The lower thread must go over the projection (9) on thread nipper M (8) and be held securely. To make sure this happens, check that the operations in (a), (b) and (c) below are all correct.
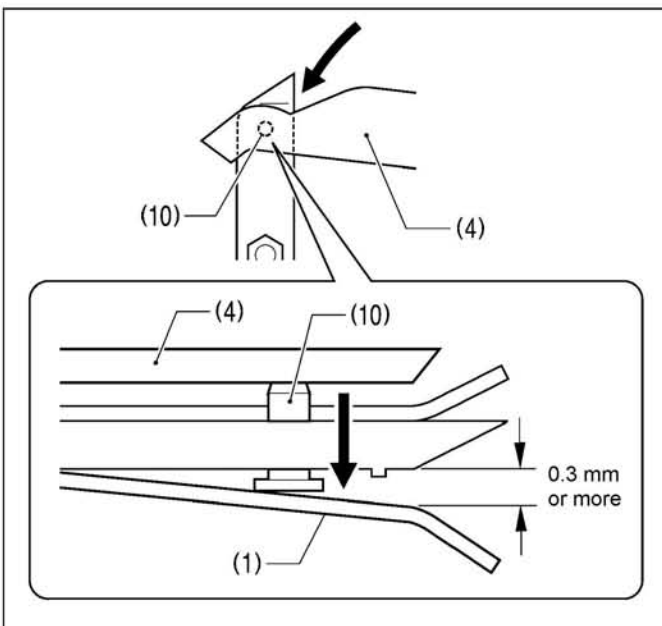
(a) Thread nipper D (1) should open by 0.3 mm or more when the thread nipper opener (4) pushes down on the opener pin (10).

(b) Thread nipper D (1) should close immediately before the thread is trimmed.
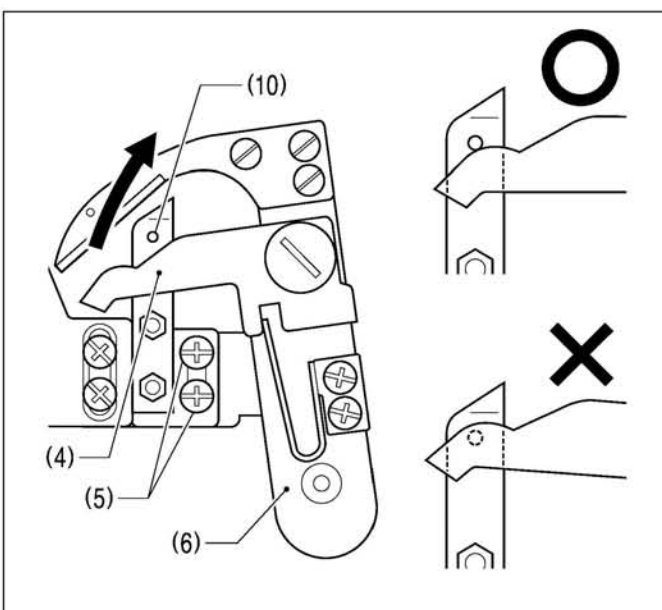
(c) Thread nipper D (1) should not open when the thread trimmer arm (6) returns after thread trimming, so that the thread nipper opener (4) returns without going over the opener pin (10).

3. Once adjustment is complete, securely tighten the two screws (5).

9-22-5. Adjusting the thread handler

The lower thread and gimp are securely separated and guided by the thread handler (1), after which the lower thread needs to go smoothly into thread nipper D (2), while the gimp needs to go smoothly into thread nipper U (3).

NOTE: Principle of the thread handler

When the thread trimmer arm operates, the throat plate (4) turns 45 degrees. This causes the gimp to sit on top of the projection (5) of the throat plate (4) so that a difference in height is created between the lower thread and the gimp, and a triangular shape (A) is formed between the two threads and the final stitch. The thread handler (1) goes into this triangular shape (A) to separate the lower thread and gimp.
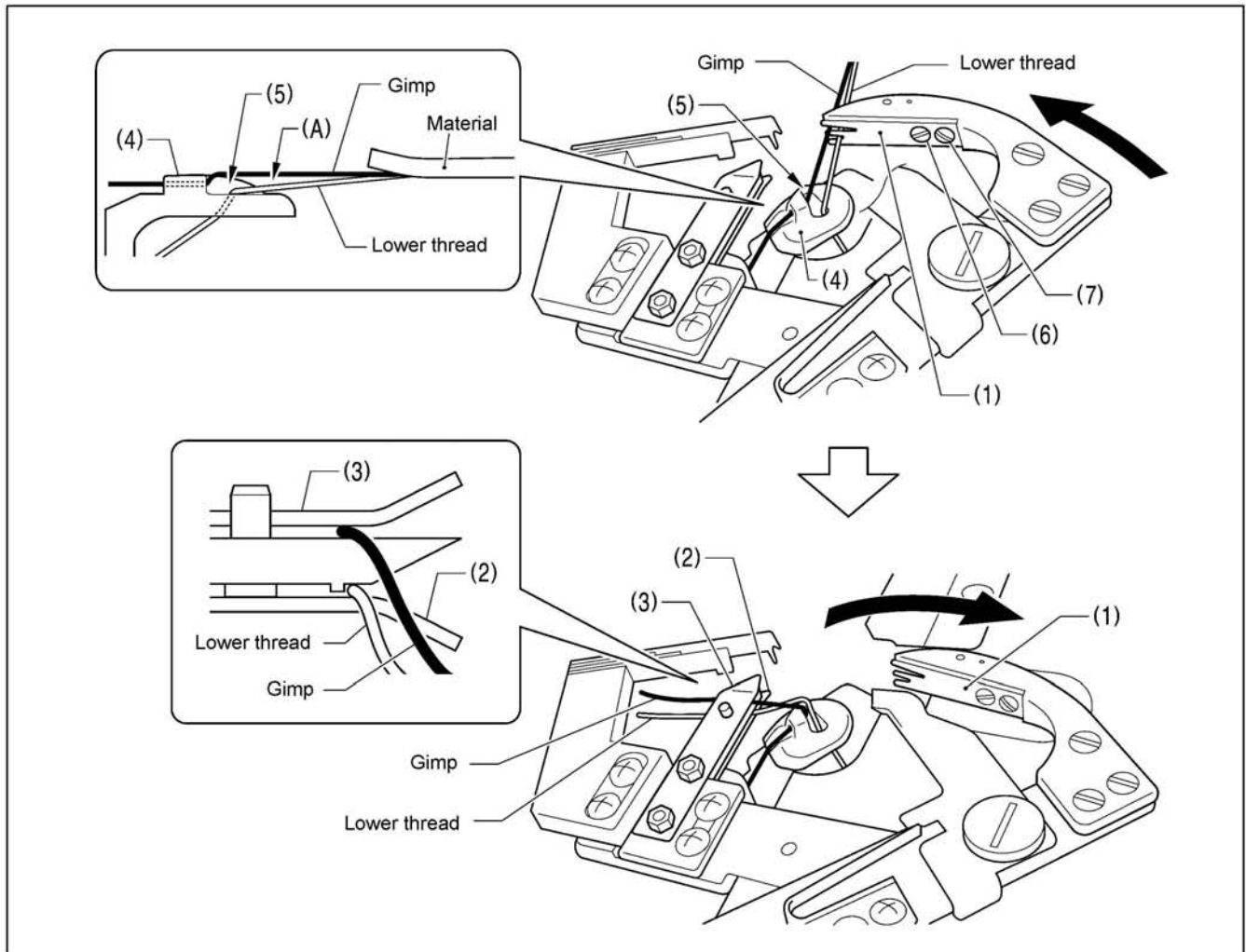
\<Adjustment method\>
*   If this adjustment is carried out in manual mode, the lower thread trimming operation can be checked step by step, which will make adjustment easier.
1. Use the parameter settings to set the stitch pitch to 2.0 mm and reduce the total number of stitches.
2. In manual mode, depress the start switch, and then turn the upper shaft pulley to sew manually as far as the final stitch.
3. With the needle bar at the needle up stop position, depress the start switch one press at a time.
    *   The thread trimming operation will be carried out one step at a time.
4. Loosen the pan screw (6) and the screw (7), and then use the pan screw (6) as a pivot to turn the thread handler (1) to adjust.
5. Once adjustment is complete, securely tighten the pan screw (6) and the screw (7).

NOTE:

If the height of the throat plate (4) has been changed, the triangular shape (A) defined by the final stitch, lower thread and gimp will change, and so you should adjust the thread handler (1).

10. Appendix 1

10-1. Hint List

No.	Name	Content
M-001	Set value too large	Please input value within range
M-002	Set value too small	Please input value within range
M-003	Parameter save error	Press Enter to recover default setting
M-004	Communication error	Communication error between operation panel and control box
M-005	Operation head not match to control box	Please check the model and the software version
M-006	Clock error	The hardware clock is down, please contact manufacturer for repair
M-007	Wrong password	Input again
M-008	Wrong user ID	Input again
M-009	Fail to confirm password	Input password again
M-010	Can not change system time	Periodical password has been set, can not change system time
M-011	Password file input error	
M-012	Password file load error	
M-013	Password save successful	
M-014	Clear all password failed	Can not delete password file
M-015	Fail to clear password	After clearance of password, the input of file has problem
M-016	Password file is deleted without authorization	Password file is deleted without authorization, please turn off machine
M-017	Can not input blank	Input password again
M-018	Current password not match	Input current password again
M-019	New password not match	Input new password again
M-020	Periodical password is same to super password error	Input password again
M-021	Enter touching panel correction mode	Are You Sure？Yes：enter　No：X
M-022	Correction successful	Correction is successful, please restart machine
M-023	Correction failed	Please perform correction again
M-024	SRAM initialization	Clear all the data within SRAM, please turn off machine and restore the DIP switch
M-025	Turning off	
M-026	No warning record	
M-027	Clear warning record	Are You Sure？Yes：enter　No：X

No.	Name	Content
M-028	USB is pulled out	USB is pulled out
M-029	Save software version successful	Software version is saved to the root directory of U disk
M-030	Counter at set value	Press ENTER to release it
M-031	Over sewing range	Please make sure the pattern is within the sewing range
M-032	Stitch number over range	Please reduce patter stitch number
M-033	Load default patterns	No pattern in memory, please load default patterns
M-034	Pattern data error	Current pattern data error, it will be replaced by default patterns
M-035	Pattern information file open failed	Restore to default pattern configuration
M-036	Restore to default setting	Press Enter to perform operation; Press ESC to quit
M-037	Parameter recovery successfully	Successful recovery of parameter. Please restart machine
M-038	Restore all the settings	Are You Sure？Yes：enter No：X
M-039	Restore the selected items	Are You Sure？Yes：enter No：X
M-040	Not select an item	Please select one or several parameters
M-041	Successful	Current operation is successful
M-042	Failed	Current operation is failed
M-043	Initialize U disk	Press Enter to perform operation; Press ESC to quit. The initialization will delete all the files in U disk
M-044	Initialize memory	Press Enter to perform operation; Press ESC to quit. The initialization will delete all the files in memory
M-045	Please turn off machine	Current operation is finished, please restart machine
M-046	Not select update item	Please select at least one item for update
M-047	Selected item for update is not existed	If the item has no update file, the system will cancel the selection. If user wants to update the rest, please confirm again
M-048	Update successful	Update successful, please restart machine
M-049	Copy failed	Check the room of memory
M-050	Copy failed,	Check whether the U disk is pulled out
M-051	Not select update item	Please select at least one item for update
M-052	File I/O error	File I/O error
M-053	Parameter transfer	Are You Sure？Yes：enter No：X
M-054	Pattern-designing data error	

No.	Name	Content
M-055	Cyclic sewing pattern open error	Pattern file has mistake
M-056	Open file failed	Open file failed
M-057	Clear all customized parameters	Are You Sure？Yes：enter　No：X
M-058	Over set range	

10-2. Malfunctions Settlement

Malfunction	Reasons	Solutions
Thread-breakage	Thread-tension is so high.	Adjust the thread-tension to proper level
	The needle is not properly installed.	Install the needle in the right direction
	Compared to needle, the thread is so thick.	Select the thread fitting to the needle
	The needle doesn't match to the bend needle.	Adjust the pitch between the needle land bend needle, as well as the height of needle rod, bend needle and yarn divider.
	There is damage or rags on needle, bend needle, yarn divider, winding plate or thread rail.	Polish or replace the rough parts.
	Threading method is wrong.	Thread correctly.
Needle-jumping	The upper thread tension is too large or too small.	Adjust the upper thread tension to a proper level
	The needle tip is broken or crooked.	Replace for a new needle
	The interval between needle and bend needle tip is incorrect.	Adjust the interval between the needle and bend needle tip to a proper level.
	The needle, bend needle and yarn divider don't match to each other.	Adjust the relationships among these three.
	The needle and needle stand are not adjusted properly.	Properly adjust the needle stand.
	The bend needle tip is blunt.	Polish it or replace it.
	The needle is not properly installed.	Install the needle in right direction.
	The needle is too thin.	Select needles fit the sewing conditions
Needle-breakage	The needle is crooked	Replace a new needle
	The needle, bend needle and yarn divider don't match to each other	Adjust the relationships among these three.
	The needle and needle stand are not adjusted properly.	Properly adjust the needle stand.

	The needle is too thin.	Select needles fit the sewing conditions
Upper thread is not cut off.	The upper knife is not so sharp	Replace a new upper knife
	The pressure is too low to let upper knife cut to bottom.	Adjust the pressure
	The upper knife can't catch the upper thread.	Install a upper thread bend needle, and cut the tread at the stitch before the last one
	At the last stitch, the upper knife can't catch the upper thread due to the needle-jumping	Refer to "Needle-jumping", try to avoid the needle from jumping
	The position of upper knife is improper	Adjust the position of upper knife
Bottom thread is not cut off.	The knife is not so sharp.	Replace a new knife.
	The pressure is too low to let upper knife cut to bottom	Adjust the pressure
	The position of knife is improper	Adjust the position of the knife and thread-scanning
	The pressure on knife for trimming bottom thread is too low	Adjust to a proper knife pressure level
Stitch-missing at sewing start	Can't hold bottom thread.	Adjust the bottom thread holder (configuration 01) or bottom thread pressing board (configuration 02)
	The leftover part of the upper thread after trimming is too short.	Adjust the assistant thread holder.
	The release upper thread is far from sufficient.	Adjust the amount of released upper thread.
Cutting function abnormal	Low pressure on cutting device	Adjust the pressure to a proper level
	Knife doesn't properly contact to the cutting hammer	Polish the surface of cutting hammer
	The knife is not so sharp.	Replace a new knife.
Low thread density	The tension of upper thread is so strong or so weak	Adjust the upper thread tension to a proper level.
	The tension of bottom thread is so strong or so weak	Adjust the bottom thread tension to a proper level.
	The strength and stroke of take-up spring are improper.	Adjust the strength and stroke of take-up spring.

10-3. Alarm Information List

Malfunction code	Name of Malfunction	Method for Settlement
System Malfunction		
E-001	IPM over-voltage or over-current	Turn off machine and check the device as below: 1、 Check the input voltage； 2、 Initialize the main motor again； 3、 Check the load at the main-shaft and the blockage at the mechanism； 4、 Check the main motor； 5、 Check the mother board.
E-002	Supplementary device (24V) over-voltage	Turn off machine and check the device as below： 1、 Check the short connection at control cable of solenoid valve； 2、 Check the condition of expansion board
E-003	Supplementary device (24V) low-voltage	Turn off machine and check the device as below： 1、 Check the condition of expansion board
E-004	EEPROM Error	Turn off machine and check the device as below： 1、 Check the installation of head board； 2、 Check the connection of X9 cable.
E-005	Motor running error	Turn off machine and check the device as below： 1、 Check the load at the main-shaft and the blockage at the mechanism； 2、 Check the main motor； 3、 Initialize the main motor again； 4、 Check the mother board
Special Malfunction		
E-006	Press Pause key at ready status	Release pause switch
E-007	Press Pause key at ready sewing	Press RESET key
E-008	Pause Key bad connection	Turn off machine and check the device as below： 1、 Check the installation of pause switch； 2、 Check the connection of the pause cable.
E-009	Start Switch is held or bad connection at start switch	Release the start switch or turn off machine. And check the connection of start switch
E-010	Presser Switch is held or bad connection at presser switch	Release the start switch or turn off machine. And check the connection of presser switch
E-011	Machine head is tilted.	Turn off machine and check the device as below： 1、 Check the installation of safe switch； 2、 Check the connection of the safe switch cable.
E-012	Needle bar upper position abnormal	Turn the wheel to the upper position
E-013	Synchronization signal	Turn off machine and check the device as below：

Malfunction code	Name of Malfunction	Method for Settlement
	detector connection error	1、 Check the connection of main motor cable 2、 Check the main motor
E-014	Can not find X feeding motor origin. X feeding motor abnormal or bad connection at X origin sensor	Turn off machine and check the device as below： 1、 Check the connection of the cable at X motor sensor； 2、 Check the X sensor and its signal； 3、 Check the X motor and its movement； 4、 Check the stepping driving board
E-015	Can not find Y feeding motor origin. Y feeding motor abnormal or bad connection at Y origin sensor	Turn off machine and check the device as below： 1、 Check the connection of the cable at Y motor sensor； 2、 Check the Y sensor and its signal 3、 Check the Y motor and its movement； 4、 Check the stepping driving board
E-016	Can not find θ feeding motor origin. θ feeding motor abnormal or bad connection at θ origin sensor	Turn off machine and check the device as below： 1、 Check the connection of the cable at Z motor sensor； 2、 Check the Z sensor and its signal； 3、 Check the Z motor and its movement； 4、 Check the stepping driving board
E-017	IPM Over-current	Turn off machine and check the device as below: 1、 Check the input voltage； 2、 Initialize the main motor again； 3、Check the load at the main-shaft and the blockage at the mechanism； 4、 Check the main motor； 5、 Check the mother board。
E-018	IPM Over-current	Turn off machine and check the device as below: 1、 Check the input voltage； 2、 Initialize the main motor again； 3、Check the load at the main-shaft and the blockage at the mechanism； 3、 Check the main motor； 5、 Check the mother board。
E-019	Program version of main controller or motor error.	Turn off machine. Please update the main control software again.
E-020	Upper thread-breakage	Press RESET
E-021	Bottom thread-trimming device not work or bottom thread-trimming sensor abnormal	Turn off machine and check the device as below： 1、 Check the installation of the bottom thread-trimming device 2、 Check the pressure； 3、 Check the installation and the working

Malfunction code	Name of Malfunction	Method for Settlement
		condition of the bottom thread-trimming detection sensor; 4、 Check the cables on the bottom thread-trimming sensor 5、 Change the parameter U558 and U559 to deactivate the bottom thread-trimming device or sensor
E-022	Hammer is lowered or hammer position sensor is abnormal	Turn off machine and check the device as below: 1、 Check the installation of the hammer and the blockage at mechanism; 2、 Check the pressure; 3、 Check the installation and working condition of the hammer sensor; 4、 Check the connection of the cable on the hammer sensor; 5、 Change the parameter U552, U553 and U554 to deactivate the detection sensor.
E-023	Hammer is not lowered or hammer position sensor is abnormal	Turn off machine and check the device as below: 1、 Check the installation of the hammer and the blockage at mechanism; 2、 Check the pressure; 3、 Check the installation and working condition of the hammer sensor; ; 4、 Check the connection of the cable on the hammer sensor; 5、 Change the parameter U552, U553 and U554 to deactivate the detection sensor
E-024	Power over-voltage	Turn off machine and check the device as below: 1、 Check the power supply. Make sure it is stable; 2、 Check the mother board。
E-025	Stepping motor over-voltage	Turn off machine and check the device as below: 1、 Check all the stepping motors. 2、 Check the stepping boards and mother boards.
E-026	Power low-voltage	Turn off machine and check the device as below: 1、 Check the power supply. Make sure it is stable; 2、 Check the mother board。
E-027	Stepping motor over-current	Turn off machine and check the device as below: 1、 Check the stepping motor; 2、 Check the stepping boards.
E-028	Fan not work	Turn off machine and check the device as below: 1、 Check the installation of the cooling fan; 2、 Check the connection of cables on cooling fan.

Malfunction code	Name of Malfunction	Method for Settlement
E-029	Hammer can not go down	Turn off machine to increase the knife pressure
E-030	Stepping board communication abnormal	Turn off machine and check the device as below: 1、 Check the connection between the stepping communication board and the mother board; 2、 Check the stepping board.
E-031	X motor running abnormal	Turn off machine and check the device as below: 1、 Check the communication cable of stepping board 2、 Check the stepping driving board
E-032	Y motor running abnormal	Turn off machine and check the device as below: 1、 Check the communication cable of stepping board 2、 Check the stepping driving board
E-033	Cloth board over--range	Turn off machine and check the device as below: 1、 Check the range of parameter. Make sure the pattern parameters are not over the range of presser; 2、 Check the cable connection between the operation panel and the main control box.
E-034	Z motor running abnormal	Turn off machine and check the device as below: 1、 Check the connection of communication cable on stepping board; 2、 Check the stepping driving board
E-035	Motor close loop abnormal	Turn off machine and check the device as below: 1、 Check the load at the main-shaft and the blockage at the mechanism; 2、 Check the connection of main-shaft motor cable; 3、 Check the main motor。
E-036	Main-shaft 0 position signal error	Turn off machine and check the device as below: 1、 Check the connection of main-shaft motor cable; 2、 Check the main motor; 3、 Check the mother board。
E-037	Main-shaft encoder error	Turn off machine and check the device as below: 1、 Check the connection of main-shaft motor cable; 2、 Check the mother board。
E-038	Main-shaft stop abnormal	Turn off machine and check the device as below: 1、 Check the installation and load of mechanism; 2、 Check the main motor。
E-039	Sewing stop abnormal	Turn off machine and check the device as below:

Malfunction code	Name of Malfunction	Method for Settlement
		1、 Check the connection of emergency stop switch
E-040	SPI communication busy	Turn off machine and check the device as below： 1、 Check the cable connection between the stepping board and main controller； 2、 Check the stepping board
E-041	Stitch signal error	Turn off machine and check the device as below： 1、 Check the installation of main shaft； 2、 Check the installation of upper needle sensor； 3、 Check the cable connection and the working condition of upper needle sensor.
E-042	X motor busy	Turn off machine and check the device as below： 1、 Check the cable connection between the stepping board and main controller； 2、 Check the stepping driving board；
E-043	Y motor busy	Turn off machine and check the device as below： 1、 Check the cable connection between the stepping board and main controller； 2、 Check the stepping driving board；
E-044	Z motor busy	Turn off machine and check the device as below： 1、 Check the cable connection between the stepping board and main controller； 2、 Check the stepping driving board；
E-045	Pattern stitch number error	Turn off machine and check the device as below： 1、 Check the setting of pattern parameters； 2、 Check the cable connection between panel and main control box.
E-046	Main-shaft speed abnormal	Turn off machine and check the device as below： 1、 Check the cable connection of main-shaft motor； 2、 Check the main motor； 3、 Initialize the main motor again。
E-047	No encryption device	Turn off machine. Update the program again.
E-048	Wrong password 1	Turn off machine. Update the program again.
E-049	Wrong password 2	Turn off machine. Update the program again.
E-050	Low pressure	Turn off machine and check the device as below： 1、 Check the installation of air pressure test switch 2、 Check the cable connection of air pressure test switch； 3、 Check the working condition of valve. Make sure the valve switch opens normally

11. Appendix 2

11-1. Eyelet Buttonhole Machine System Diagram

X步进电机 DH-24HS5402-05N-X
Y步进电机 DH-24HS5402-05N-Y
Z步进电机 DH-TR86BYGH250C1-Z
锤电磁阀
Y原点传感器 APS4-12S-E
上针位传感器 APS4-12S-E
剪底线传感器 D-H7A1
机头底部风扇 RDH4010B2
松面线电磁铁 JPT-4835B
松底线电磁铁 JPT-4835C
面线挑线电磁阀
剪底线电磁阀
剪底线电磁阀
松布电磁阀
压脚电磁阀

L490-1
L490-2
L489-1
L484-1
L487-1
L486-1
L494-1
L493-1

Z步进位置检测板 (SC062)
X步进位置检测板 (SC062)
锤位置传感器 ELV-2425GDF
机头信息板 (SC043)
安全开关 SS-5
急停开关 ABW211E-B

L488-1
L488-2
L495-1
L485-1
L492-1
L491-1

CZ011 6P
CZ012 6P
CZ013 6P
CZ014 6P
步进驱动板 MD301
风扇
CZ017 7P
CZ0111 3P
C059-1
H079-1
CZ341 20P
CZ342 10P
CZ344 3P
扩展板 SC034
CZ343 40P
X15 7P
X13 2P
X10 40P
X9 37P
主控制板 SC011
X7 9P
X1 3P
X8 9P
X4 5P
X5 9P
控制箱
H122-1
操作控制箱
L534-1
电源开关
H065-1
脚踏板机构 MDFS-202
主轴电机 SM083-1730-D00
电源 AC220V