

TC-1310G TC-2210G

INSTRUCTION BOOK

ELECTRONIC PATTERN SEWING MACHINE
ELEKTRONISCHER GROSSFELD RIEGELAUTOMAT



TYPICAL

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

With industrial sewing machines, it is normal to carry out work while positioned directly in front of moving parts such as the needle and thread take-up lever, and consequently there is always a danger of injury that can be caused by these parts. Follow the instructions from training personnel and instructors regarding safe and correct operation before operating the machine so that you will know how to use 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 must not do.
-  This symbol () indicates something that you must do. The picture inside the circle indicates the nature of the thing that must be done. (For example, the symbol at left means "you must make the ground connection".)

[2] Notes on safety

 DANGER	
	Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the 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 $\pm 10\%$ 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 dealer or a qualified electrician for any electrical work that may need to be done.
	The sewing machine weighs approximately 88 kg. The installation should be carried out by two or more people.
	Do not connect the power cord until installation is complete. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
	Hold the machine head with both hands when tilting it back or returning it to its original position. Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, 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, otherwise there is the danger that fire or electric shocks could occur.
	Install the safety covers to the machine head and motor.
	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 and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. 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 the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - When threading the needle
 - When replacing the bobbin and 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 dealer or a qualified technician.
- ⚠ If the machine develops a problem, contact your nearest dealer or a qualified technician.

Cleaning

- ⚠ Turn off the power switch before carrying out cleaning. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - ⊘ Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.
- carry out any maintenance and inspection of the

Maintenance and inspection

- ⊘ Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
- ⚠ Ask your 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 before carrying out the following operations. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - Inspection, adjustment and maintenance
 - Replacing consumable parts such as the rotary hook
- ⚠ 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. Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
- ⚠ If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
- ⚠ Use only the proper replacement parts as specified
- ⚠ 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

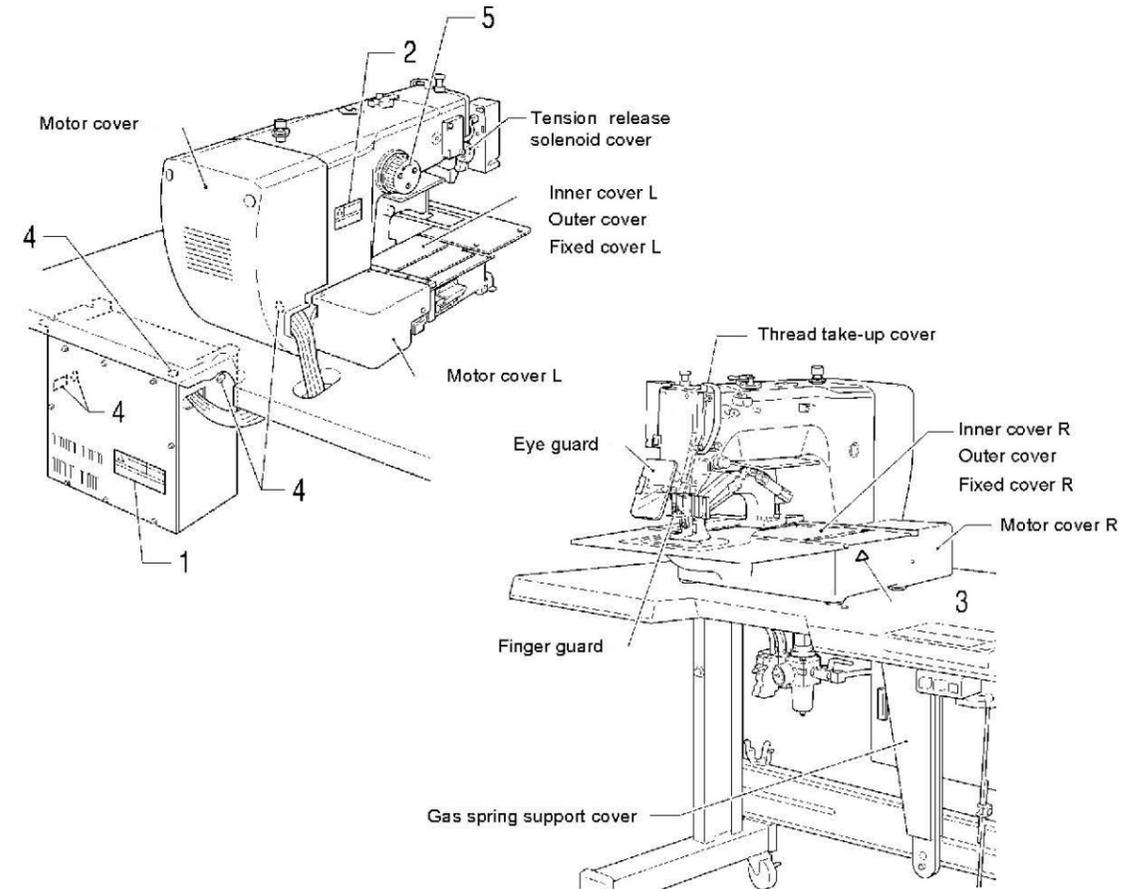
The following warning labels appear on the sewing machine. Please follow the instructions on the labels at all times when using the machine. If the labels have been removed or are difficult to read, please contact your nearest dealer.



- 3 Be careful not to get your hand caught when tilting back the machine head and returning it to its original position.

- 4 PE 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.

- 5 Direction of operation

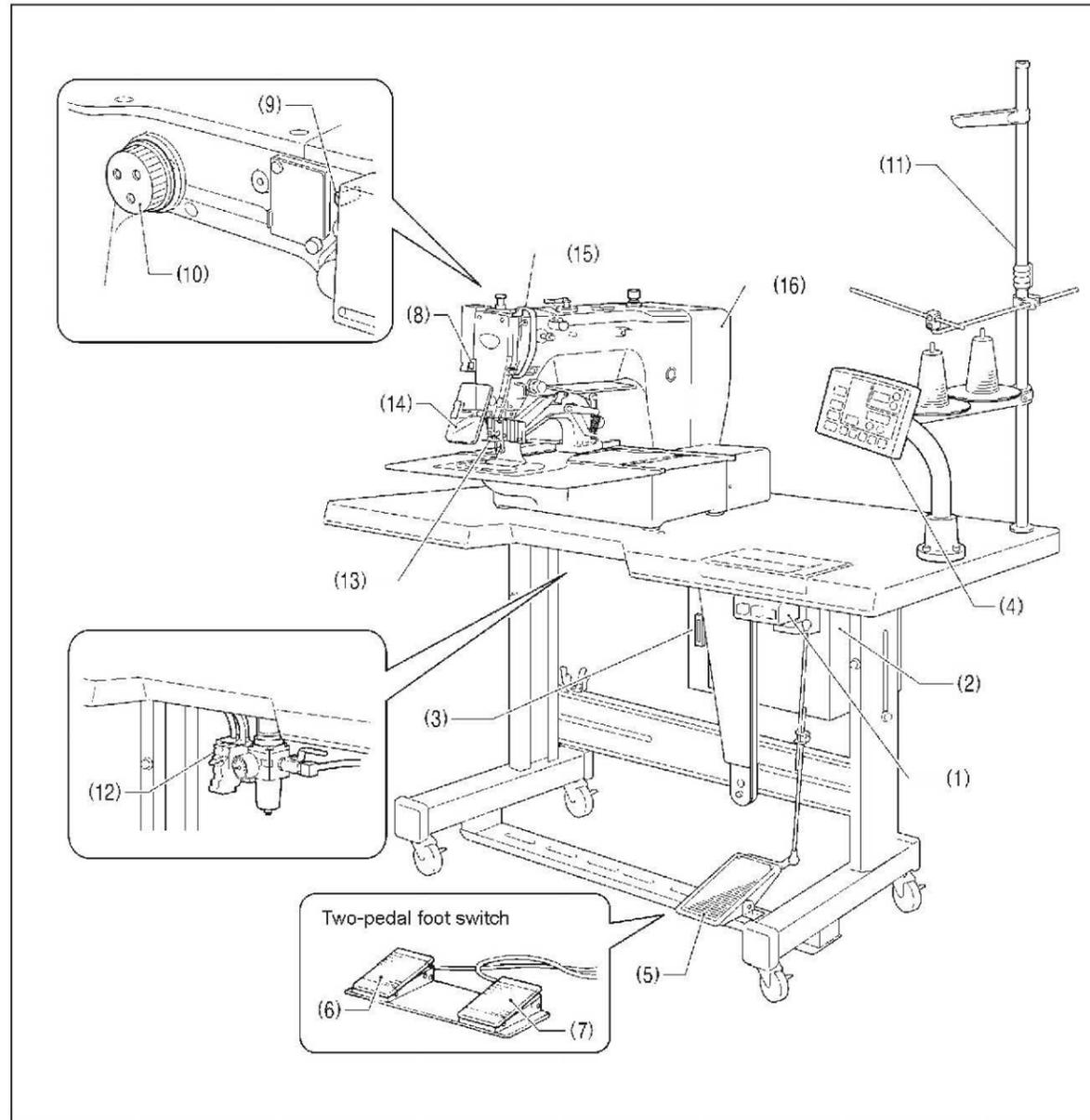


Safety devices
Devices such as eye guard, finger guard, thread take-up cover, motor cover, tension release solenoid cover, inner cover, outer cover, fixed cover and gas spring support cover

CONTENTS

1. NAMES OF MAJOR PARTS.....	1	5. USING THE OPERATION PANEL	25	9 . STANDARD ADJUSTMENTS.....	48
2. SPECIFICATIONS.....	2	(BASIC OPERATIONS)	25	9 -1. Checking the machine head switch.....	48
3. INSTALLATION	3	5-1. Name and function of each operation		9 -2. Thread take-up spring	49
3-1. Table processing diagram.....	3	panel item	25	9 -3. Arm thread guide R	49
3-2. Installing the control box	4	5-2. Loading sewing data.....	27	9 -4. Adjusting the needle bar height.....	50
3-3. Installing the oil pan	4	5-3. Setting the program number.....	27	9 -5. Adjusting the needle bar lift amount.....	50
3-4. Installing the machine head	5	5-4. Setting the X-scale and Y-scale.....	28	9 -6. Adjusting the driver needle guard.....	50
3-5. Tilting the sewing machine head.....	9	5-5. Setting the sewing speed.....	28	9 -7. Adjusting the needle clearance	51
3-6. Installing the operation panel	9	5-6. Checking the sewing pattern	29	9 -8. Adjusting the shuttle race thread guide	51
3-7. Installing the treadle unit		5-7. Setting the work clamp lift amount.....	30	9 -9. Rotary hook lubrication amount	51
(solenoid specifications).....	10	6. USING THE OPERATION PANEL		9 -10. Adjusting the position of the movable knife....	52
3-8. Installing the two-pedal foot switch		(ADVANCED OPERATIONS).....	32	9 -11. Replacing the movable and fixed knives	54
(pneumatic specifications).....	10	6-1. List of advanced functions	32	9 -11-1. Installing the feed plate.....	55
3-9. Connecting the cords	11	6-2. Setting memory switches.....	33	9 -12. Adjusting the thread wiper.....	56
3-10. Connecting the ground wire	13	6-3. List of memory switch settings.....	34	9 -13. Presser foot installation position	56
3-11. Connecting the power cord	14	6-4. Using the lower thread counter.....	35	9 -14. Changing the intermittent stroke	57
3-12. Installing the cotton stand	14	6-5. Using the production counter.....	36	9 -15. Adjusting the work clamp lift amount.....	59
3-13. Installing the pneumatic unit		6-6. Setting the split number	37	9 -16. Adjusting the air pressure	
(pneumatic specifications).....	15	6-7. Using user programs	38	(pneumatic specifications).....	59
3-14. Installing the eye guard	16	6-8. Using cycle programs	41	10. TABLE OF ERROR CODES	60
3-15. Installing the motor cover	16	6-9. Direct selection (combination table).....	43	11. TROUBLESHOOTING	63
3-16. Lubrication.....	17	7. SEWING	44	12. SEGMENT DISPLAY	66
3-17. Installing the machine head fixing bolt	18	7-1. Sewing	44		
4. PREPARATION BEFORE SEWING	19	7-2. Using the STOP switch	45		
4-1. Installing the needle	19	7-3. Using the thread wiper switch	45		
4-2. Threading the upper thread.....	19	8. CLEANING	46		
4-3. Winding the lower thread	21	8-1. Cleaning the rotary hook	46		
4-4. Installing the bobbin case.....	22	8-2. Cleaning the control box air inlet ports	47		
4-5. Thread tension	23	8-3. Draining the oil	47		
4-5-1. Lower thread tension	23	8-4. Cleaning the eye guard	47		
4-5-2. Upper thread tension	23	8-5. Checking the needle	47		
4-6. Home position detection.....	24	8-6. Lubrication.....	47		

1. NAMES OF MAJOR PARTS



- (1) Power switch
- (2) Control box
- (3) CF slot
- (4) Operation panel
- (5) Foot switch (solenoid specifications)
- (6) Work clamp switch (pneumatic specifications)
- (7) Start switch (pneumatic specifications)
- (8) STOP switch
- (9) Thread wiper switch
- (10) Pulley
- (11) Cotton stand
- (12) Solenoid valve (pneumatic specifications)

- Safety devices:**
- (13) Finger guard
 - (14) Eye guard
 - (15) Thread take-up cover
 - (16) Motor cover

2. SPECIFICATIONS

TYPICAL

• **1310G-0** ■ ■ ■ •

TYPICAL

• **2210G-0** ■ ■ ■ **A** •

1	Heavy-weight materials	1	Heavy-weight materials
2	Medium-weight materials	2	Medium-weight materials
S		Solenoid-type work clamp lifter	
A		Pneumatic-type work clamp lifter	

Sewing machine	Lock stitch, pattern tacking sewing machine (with large shuttle hook)
Stitch formation	Single needle lock stitch
Max. sewing speed	2,700 rpm
Sewing area (XxY)	CSM-1310G: Max. 130x100mm, CSM-2210G: Max. 220x100mm
Feed mechanism	Intermittent feed, pulse motor drive
Stitch length	0.05 – 12.7 mm
No. of stitches	500,000-stitch internal memory (*)
Maximum no. of stitches	20,000 stitches (per program)
No. of sewing data items that can be stored	Internal memory: 512 (*), CF card: 900
Work clamp lift method	Solenoid specifications: Pulse motor drive method Pneumatic specifications: Pneumatic method
Work clamp height	Solenoid specifications: Max. 25 mm, pneumatic specifications: Max. 30 mm
2-step work clamp	Solenoid specifications: Integrated-type work clamp Pneumatic specifications: Separate-type work clamp
Intermittent presser foot lift amount	22 mm
Intermittent stroke	2 – 4.5 mm, 4.5 – 10 mm or 0 (Default setting 3 mm)
Rotary hook	Double-capacity shuttle hook (standard shuttle hook sold separately)
Wiper device	Standard equipment
Thread trimmer	Standard equipment
Data storage method	Internal memory (Flash memory), CF card (32, 64, 128, 256 MB) [Option] 3.5 floppy disk 2HD/1.44MB, 2DD
User programs	50
Cycle programs	9
Motor	550 W AC servo motor
Weights	Machine head approx. 88 kg, operation panel approx. 0.6 kg Control box 14.2 – 16.2 kg (Differs depending on destination)
Power supply	Single-phase 100 V/220 V, Three-phase 200 V/220 V/380 V/400 V 400 VA
Air pressure	0.5 MPa 1.8 l/min.

* The number of data items and stitches that can be stored will vary depending on the number of stitches in each program.

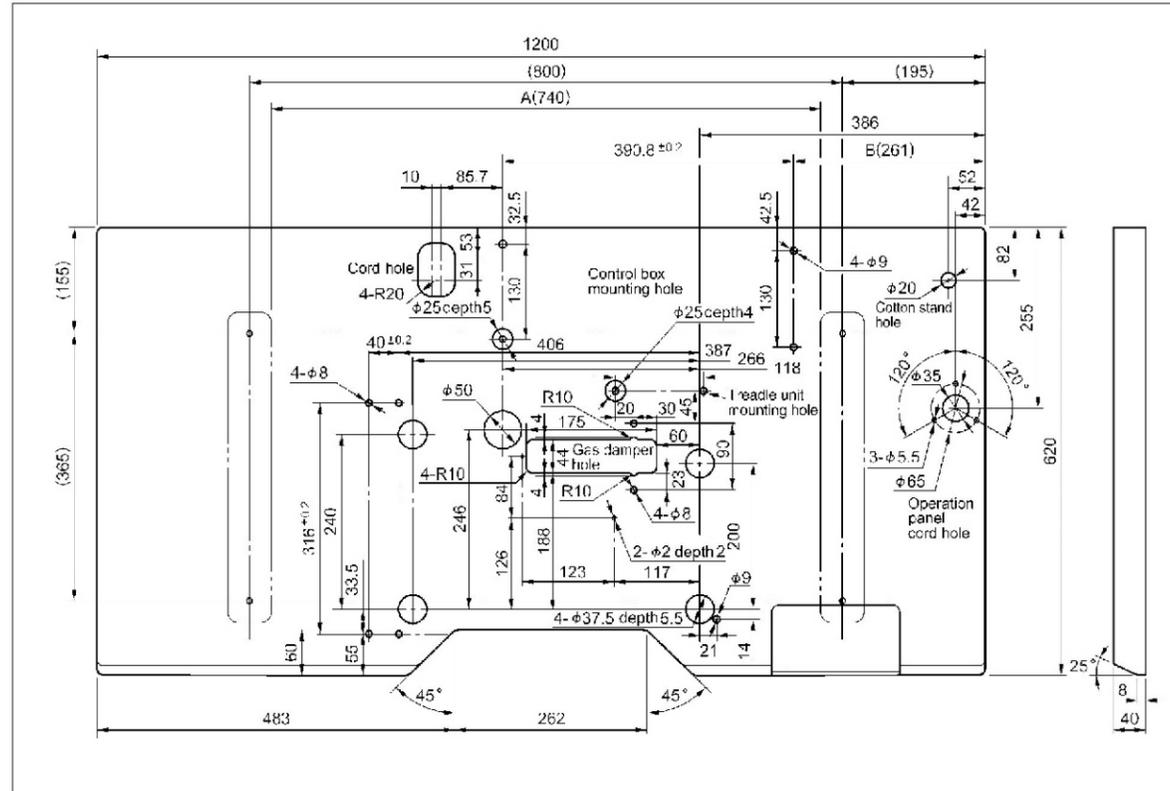
3. INSTALLATION

CAUTION

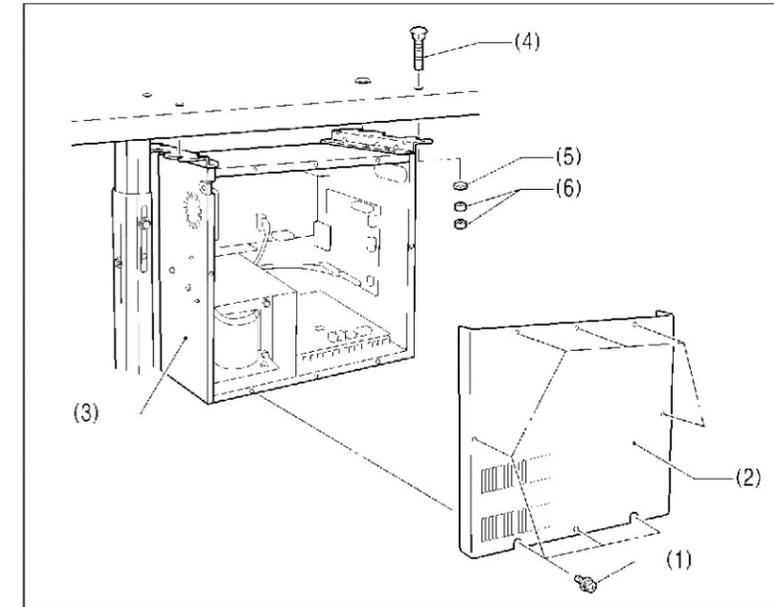
- Machine installation should only be carried out by a qualified technician.
- Contact your dealer or a qualified electrician for any electrical work that may need to be done.
- The sewing machine head weighs approximately 88kg. The installation should be carried out by two or more people.
- Do not connect the power cord until installation is complete. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
- Hold the machine head with both hands when tilting it back or returning it to its original position. Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
- 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 staples, otherwise there is the danger that fire or electric shocks could occur.
- Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.
- Install the safety covers to the machine head and motor.

3-1. Table processing diagram

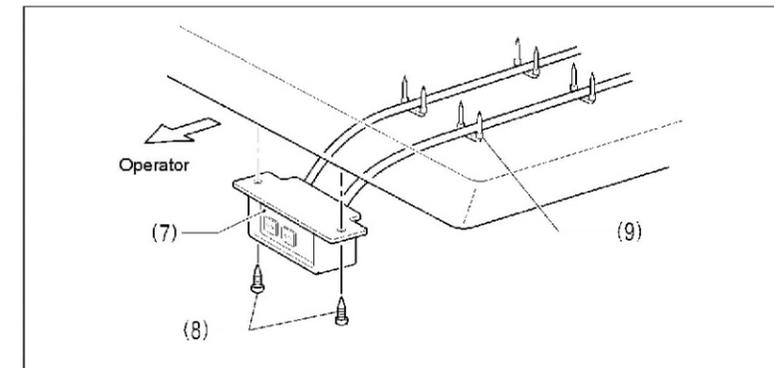
- The thickness of the table should be at least 40 mm, and it should be strong enough to bear the weight and vibration of the sewing machine.
- If the distance A between the insides of the legs is less than 740 mm, move the control box installation position to the left (B = 261mm).
- Check that the control box is at least 10 mm away from the leg. If the control box and the leg are too close together, it may result in incorrect sewing machine operation.



3-2. Installing the control box

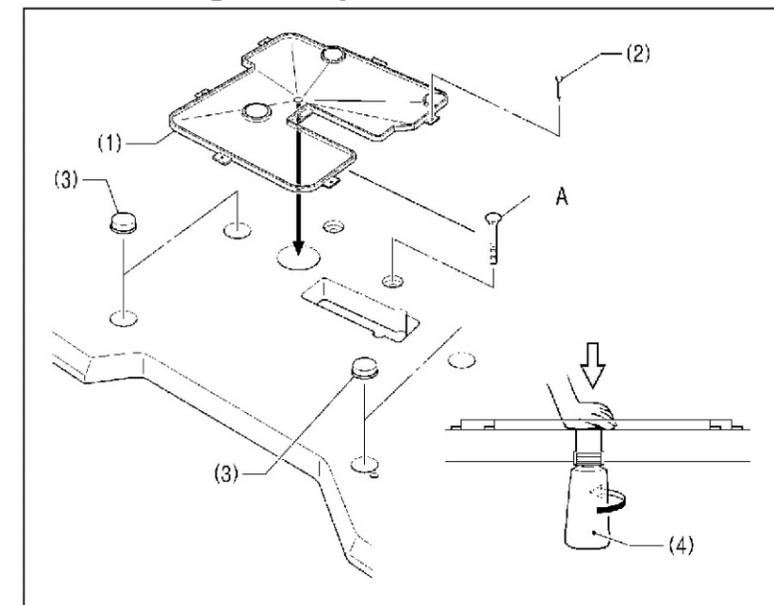


- Remove the eight screws (1), and then remove the control box cover (2).
- (3) Control box
- (4) Bolts [4 pcs.]
- (5) Plain washers [4 pcs.]
- (6) Nuts [8 pcs.]



- (7) Power switch
- (8) Wood screws [2 pcs.]
- (9) Staples [4 pcs.]

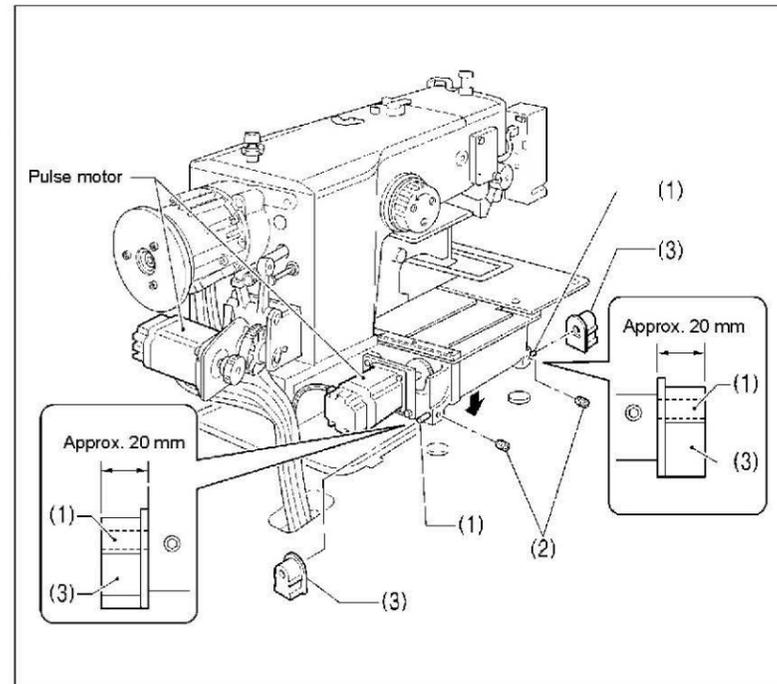
3-3. Installing the oil pan



For solenoid specifications, install the treadle unit mounting bolt (A) before installing the oil pan. (Refer to "3-7. Installing the treadle unit (solenoid specifications)".)

- (1) Oil pan
- (2) Nails [7 pcs.]
- (3) Rubber cushions [4 pcs.]
- (4) Waste oil tank

3-4. Installing the machine head

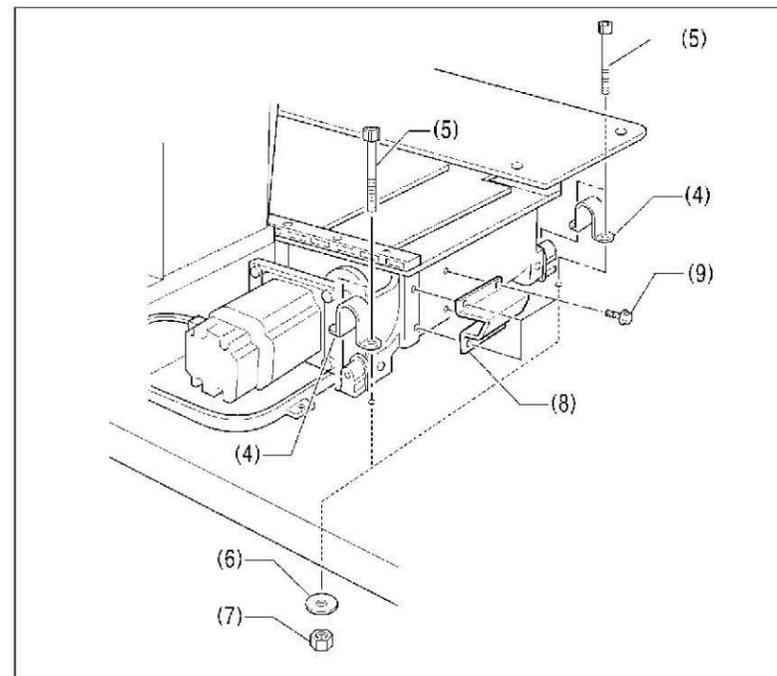


- (1) Pins [2 pcs.]
- (2) Set screws [2 pcs.]
- (3) Hinge rubber assemblies [2 pcs.]

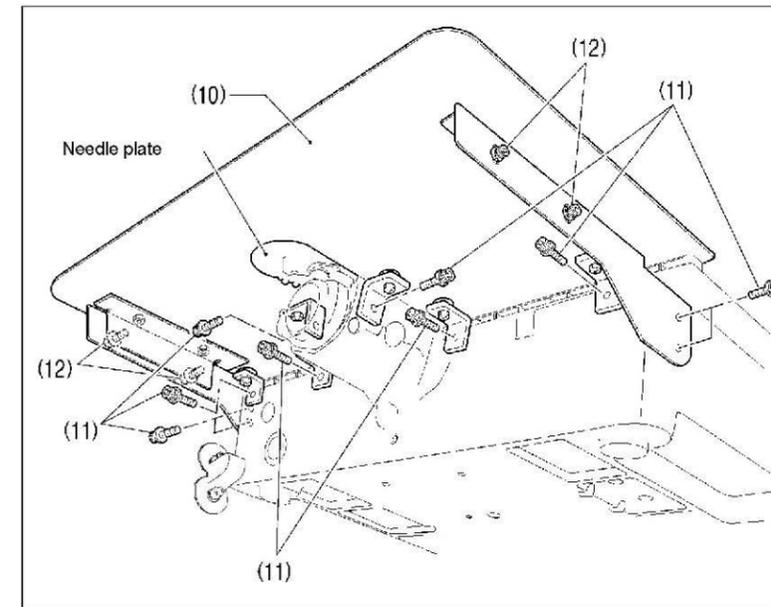
Place the machine head gently on top of the oil pan and the rubber cushions.

NOTE:

- Be careful not to get the cords clamped between the machine head and the oil pan.
- When holding the machine head, do not hold it by the pulse motor. This may cause problems with operation of the pulse motor.



- (4) Hinge holders [2 pcs.]
- (5) Bolts [4 pcs.]
- (6) Plain washers [4 pcs.]
- (7) Nuts [4 pcs.]
- (8) Head rest
- (9) Bolts with washer [4 pcs.]

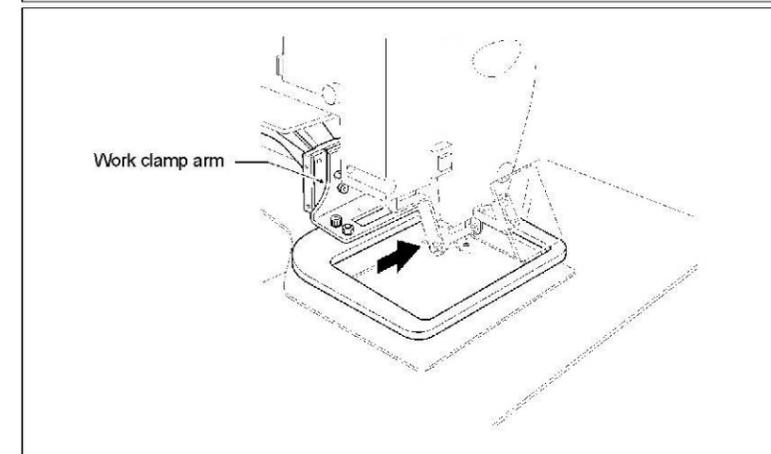


- (10) Auxiliary plate
- (11) Bolts with washer [10 pcs.]

Loosen the bolts with washer (12) and adjust so that the auxiliary plate (10) and the needle plate are at the same height.

NOTE:

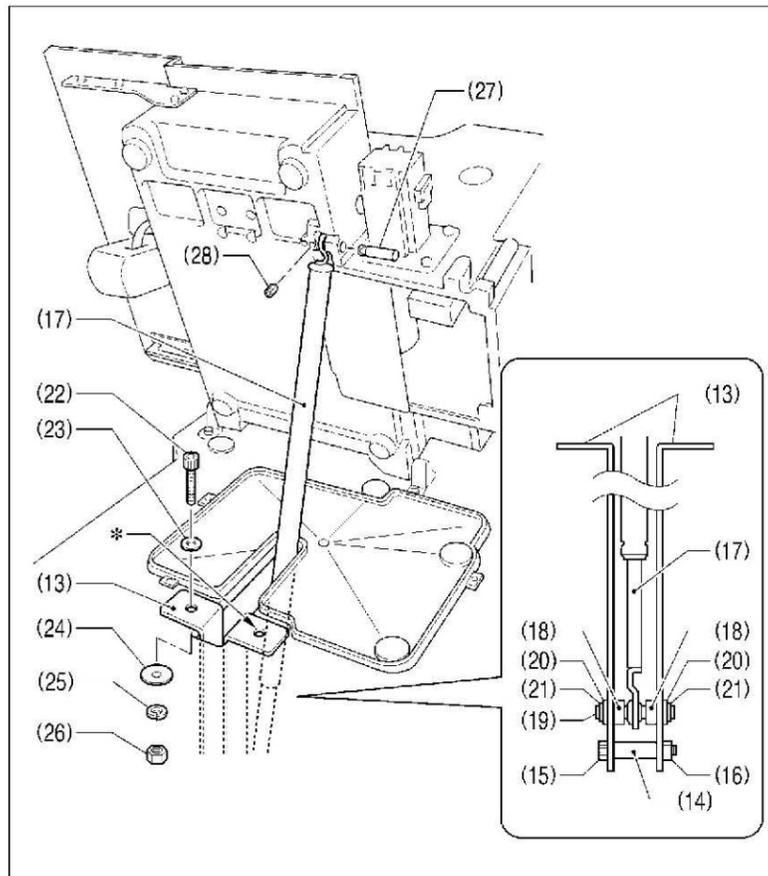
Install the auxiliary plate so that it is horizontal.



Move the work clamp arm all the way to the right when looking from the front of the sewing machine (the direction of the arrow in the illustration), and then gently tilt back the machine head.

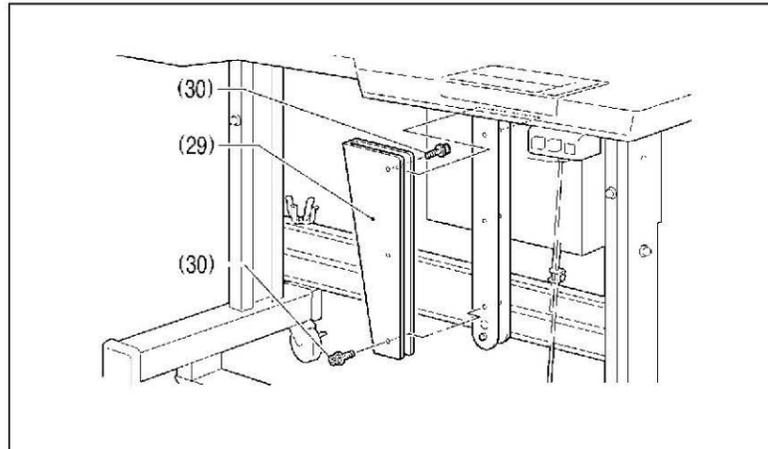
NOTE:

Two or more people should tilt back the machine head, and it should be tilted gently while being held with both hands.

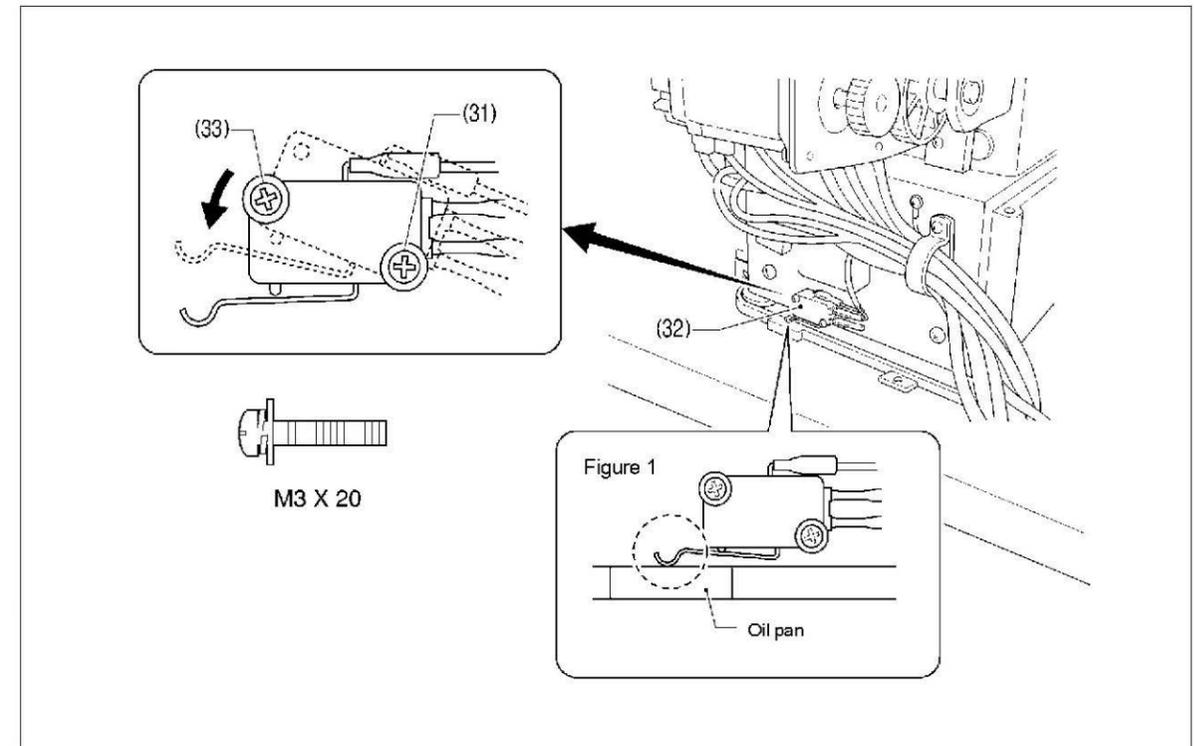


- (13) Gas spring holders [2 pcs.]
- (14) Spacer
- (15) Bolt
- (16) Nut
- (17) Gas spring
- (18) Shaft collars [2 pcs.]
- (19) Gas spring shaft D
- (20) Plain washers [2 pcs.]
- (21) Retaining rings E [2 pcs.]
- (22) Bolts [2 pcs.]
- (23) Plain washers (medium) [2 pcs.]
- (24) Plain washers (large) [2 pcs.]
- (25) Spring washers [2 pcs.]
- (26) Nuts [2 pcs.]
- (27) Gas spring shaft U
- (28) Set screw

NOTE:
For solenoid specifications, the bolts (22), plain washers (23), plain washers (24), spring washers (25) and nuts (26) in the places marked with * are also used to install the treadle unit. (Refer to "3-7. Installing the treadle unit (solenoid specifications)".)



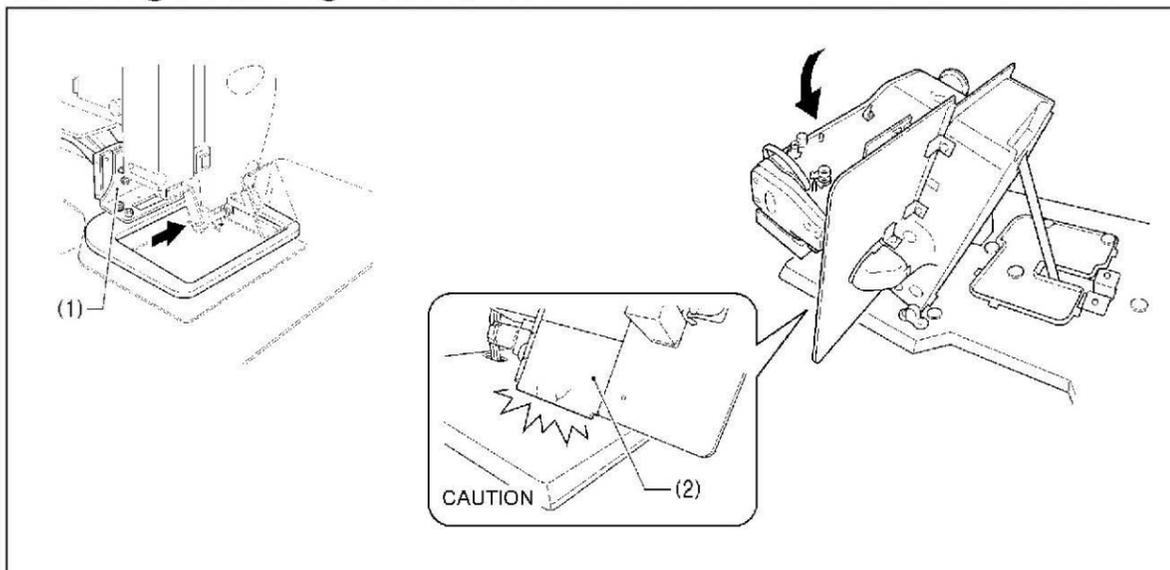
- (29) Gas spring support cover
- (30) Bolts with washer [6 pcs.]



- Gently return the machine head to its original position.
- Loosen the screw (31). Move the machine head switch (32) to the position shown in the illustration, and then secure the machine head switch (32) with the screw (31) and the accessory M3x20 screw (33).
- Check that the machine head switch (32) is turned on as shown in figure 1.

NOTE:
If the machine head switch is not turned on, errors "E050", "E051" and "E055" will be generated.

3-5. Tilting the sewing machine head

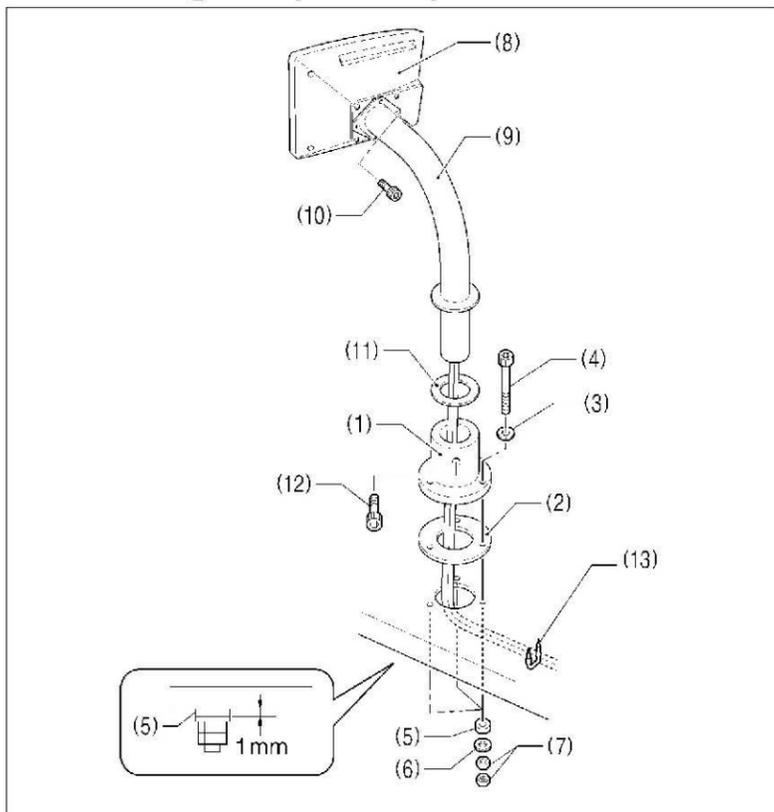


1. Move the presser arm assembly (1) as far as it will go in the direction of the arrow in the illustration (to the right when looking from the front of the sewing machine).
2. Stand at the left side of the table, and gently tilt the machine head towards you.

NOTE:

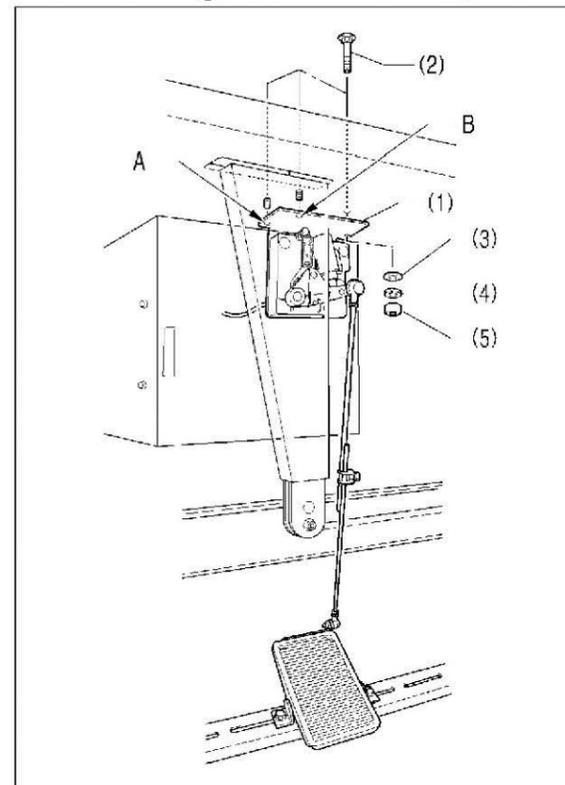
Always be sure to move the work clamp arm all the way to the right before tilting back the machine head. If you try to tilt back the machine head while the work clamp arm is still on the left side, it may damage the outer cover L (2).

3-6. Installing the operation panel



- (1) Operation panel base
 - (2) Cushion A
 - (3) Plain washers (medium) [3 pcs.]
 - (4) Bolts [3 pcs.]
 - (5) Cushions B [3 pcs.]
 - (6) Plain washers (large) [3 pcs.]
 - (7) Nuts [6 pcs.]
- Tighten until the thickness of cushion B (5) is about 1 mm.
- (8) Operation panel
 - (9) Operation panel stand
 - (10) Bolts [3 pcs.]
 - (11) Rubber seat
 - (12) Bolt
- Pass the panel cord through the operation panel stand (9) and the rubber seat (11).
 - Fit the operation panel stand (9) into the operation panel base (1), and then secure it with the bolt (12).
 - Pass the panel cord through the hole in the table, and then insert it into the control box through the hole in the side of the control box.
- (13) Staples [3 pcs.]

3-7. Installing the treadle unit (solenoid specifications)



- (1) Treadle unit
- (2) Bolts [3 pcs.]
- (3) Plain washers [3 pcs.]
- (4) Spring washers [3 pcs.]
- (5) Nuts [3 pcs.]

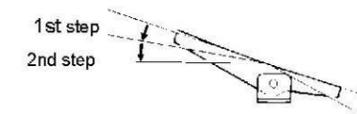
NOTE:

- Install the bolt for mounting hole A before installing the oil pan. (Refer to "3-3. Installing the oil pan.")
- Mounting hole B is used to install the gas spring supports with the bolt, plain washer, spring washer and nut. (Refer to "3-4. Installing the machine head".)

- * Use a commercially-available foot switch and connecting rod.
- * If changing the mounting position for the treadle unit, use the accessory bolts, plain washers, spring washers and nuts.

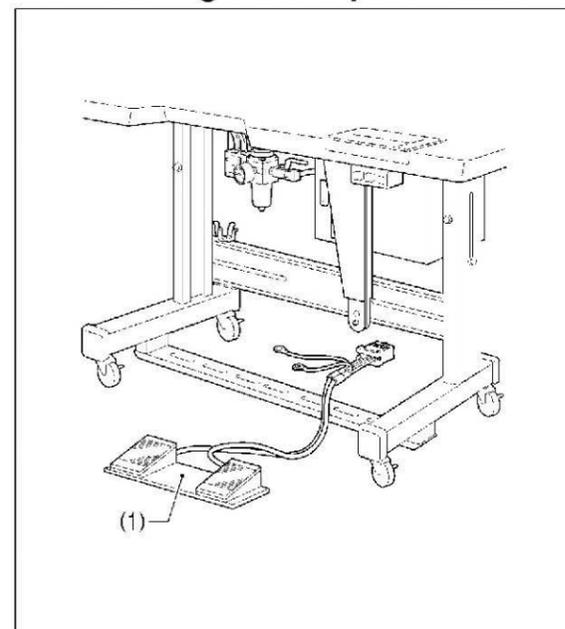
<Foot switch operating method>

When the foot switch is depressed to the 1st step, the work clamp is lowered, and when it is depressed to the 2nd step, the sewing machine starts sewing.



4441Q

3-8. Installing the two-pedal foot switch (pneumatic specifications)



- (1) Foot switch

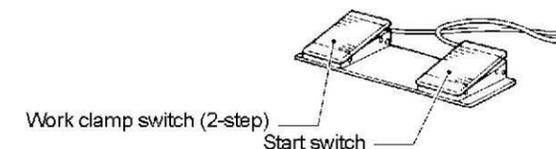
Insert the connector for the foot switch (1) into P6 (FOOT) on the main P.C. board. (Refer to "3-9. Connecting the cords".)

- * Be sure to make the ground connection. (Refer to "3-10. Connecting the ground wire".)

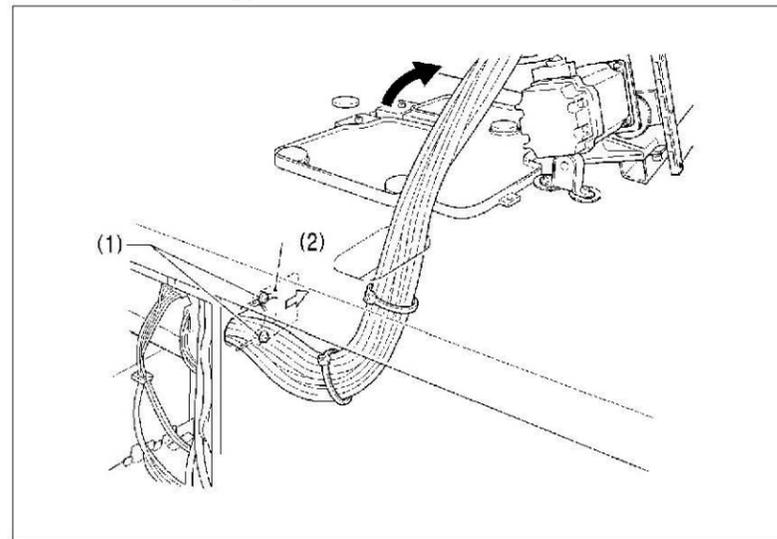
<Foot switch operating method>

When the work clamp switch (left) is depressed, both work clamps are lowered, and when the start switch (right) is depressed, the sewing machine starts sewing.

- * The work clamp lowering method can be changed using memory switch No. 002. (Refer to "6-3. List of memory switch settings".)



3-9. Connecting the cords

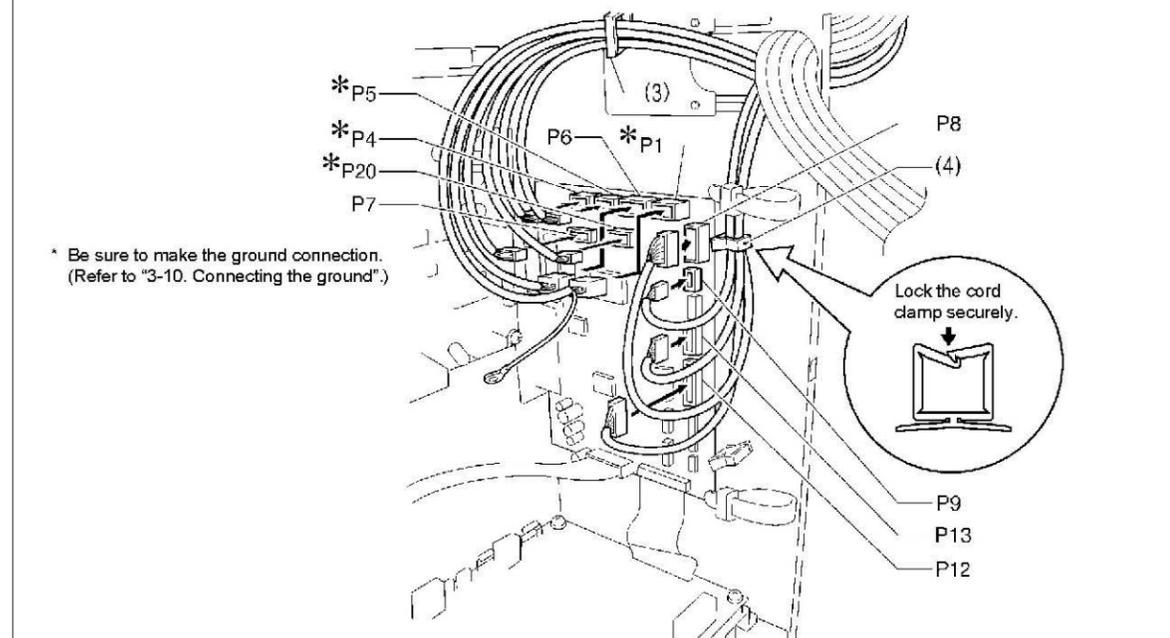


1. Gently tilt back the machine head.
2. Pass the cord bundle through the hole in the work table.
3. Loosen the two screws (1), and then open the cord presser plate (2) in the direction of the right arrow and pass the cord bundle through the opening.
4. Securely connect the connectors as indicated in the table below.

NOTE:

- Check that the connector is facing the correct way, and then insert it firmly until it locks into place.
- Secure the cables with cable ties and cord clamps, while being careful not to pull on the connector.

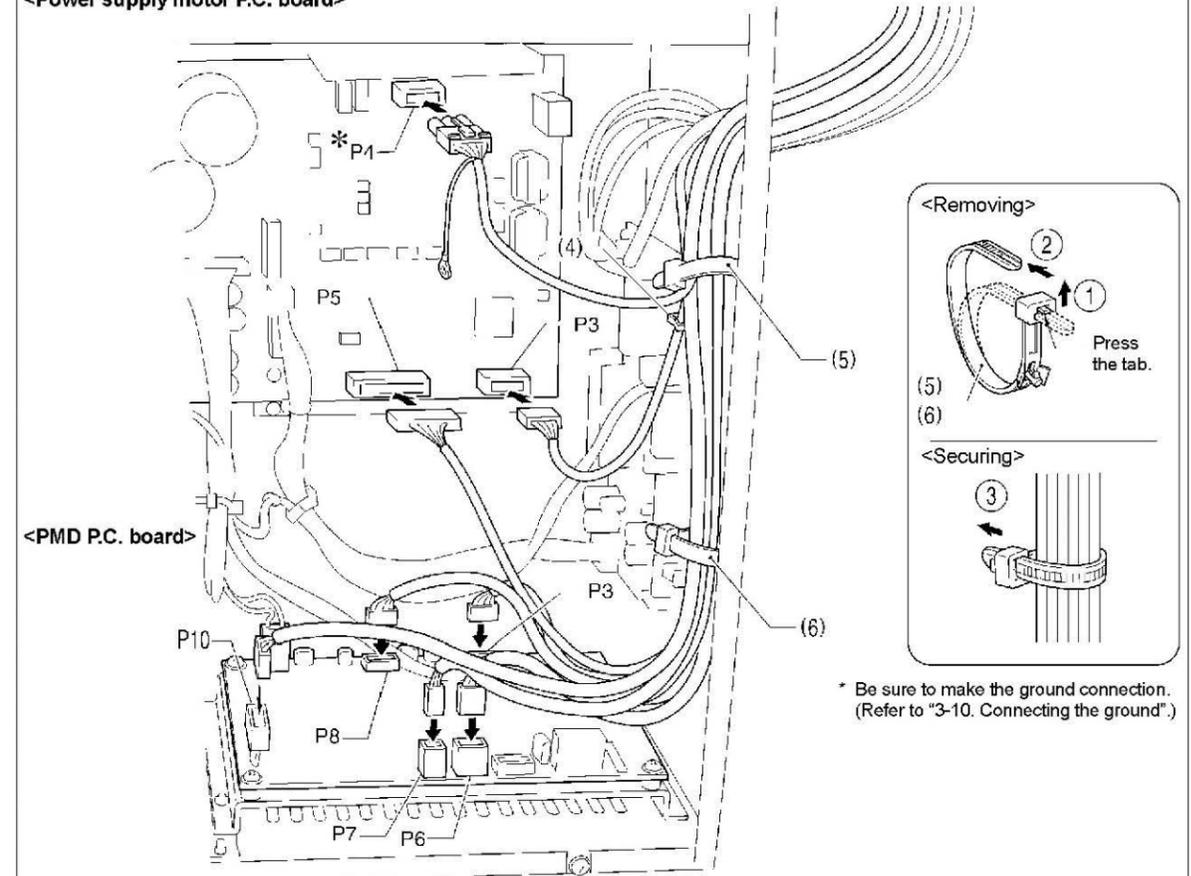
<Main P.C. board>



* Be sure to make the ground connection. (Refer to "3-10. Connecting the ground".)

Connector	Connection location on main P.C. board	Cord clamp
X pulse motor encoder 5-pin white	P20 (X-ENC)	(3)
Y pulse motor encoder 5-pin blue	P4 (Y-ENC)	(3)
Work clamp pulse motor encoder 5-pin black	P5 (P-ENC)	(3)
Foot switch 10-pin	P6 (FOOT)	(3)
Operation panel 8-pin	P1 (PANEL)	(3)
Machine head switch 3-pin	P9 (HEAD-SW)	(4)
Home position sensor assembly 12-pin	P8 (SENSOR1)	(4)
STOP switch 6-pin	P13 (HEAD)	(4)
Valve harness 12-pin (pneumatic specifications)	P12 (AIR1)	(4)
Programmer relay harness 8-pin	P7 (PRG)	(3)

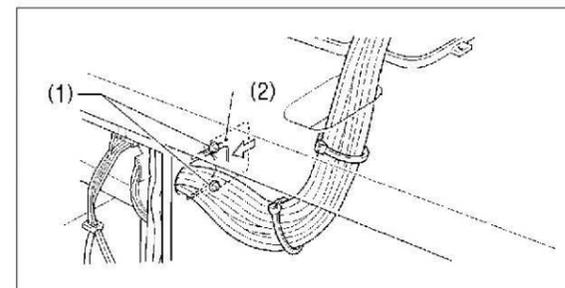
<Power supply motor P.C. board>



* Be sure to make the ground connection. (Refer to "3-10. Connecting the ground".)

Connector	Connection location on power supply motor P.C. board	Cord clamp/cable tie
Machine head memory 7-pin	P3 (HEAD-M)	(4)
Upper shaft motor 3-pin	P4 (UVW)	(5)
Synchronizer 14-pin	P5 (SYNC)	(5), (6)
Connector	Connection location on PMD P.C. board	Cable tie
Work clamp pulse motor 4-pin black	P3 (PPM)	(5), (6)
Thread trimmer solenoid 6-pin	P6 (SOL1)	(5), (6)
Tension release solenoid 4-pin	P7 (SOL2)	(5), (6)
Y pulse motor 4-pin blue	P8 (YPM)	(5), (6)
X pulse motor 4-pin white	P10 (XPM)	(5), (6)

NOTE: Route the X, Y and work clamp pulse motor harnesses so that they do not touch the PMD P.C.

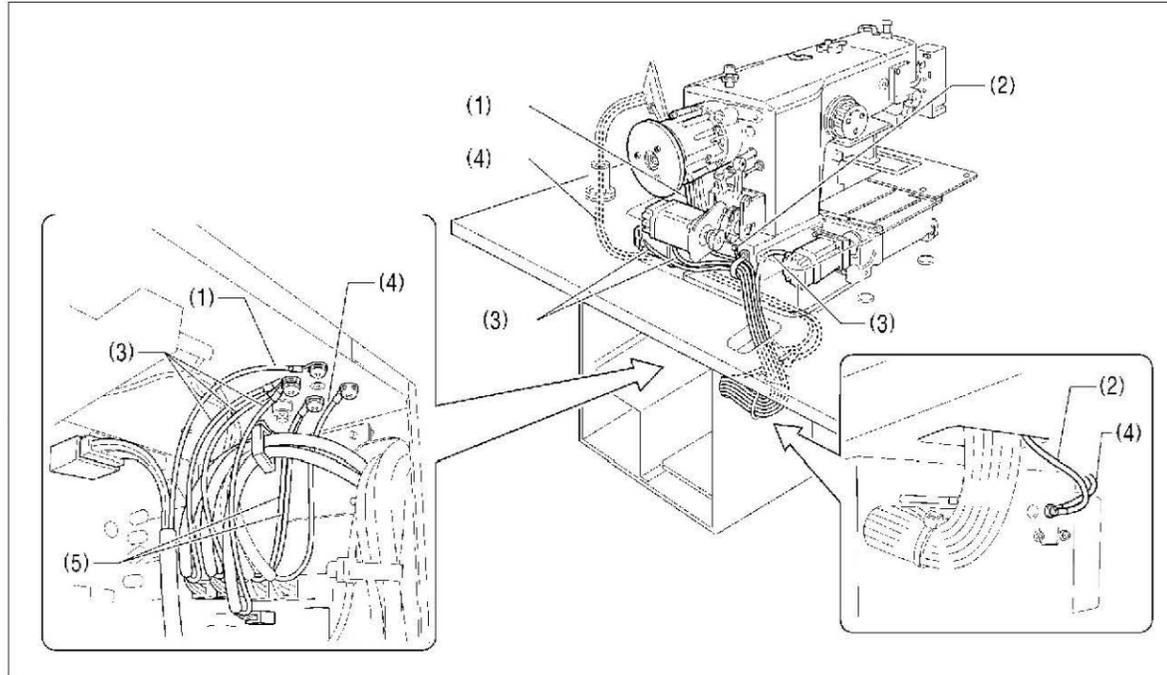


5. Close the cord presser plate (2) in the direction of the left arrow, and secure it by tightening the two screws (1).
6. Check that the cords do not get pulled, and then gently return the machine head to its original position.

3-10. Connecting the ground wire

CAUTION

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.

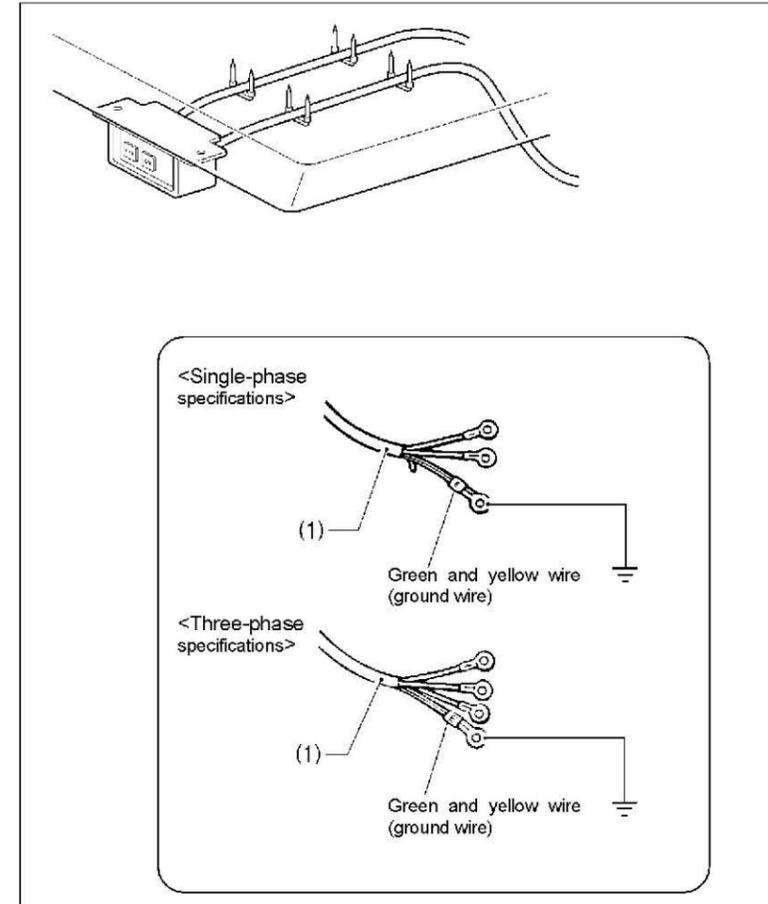


- (1) Ground wire from upper shaft motor harness
- (2) Ground wire from the machine head
- (3) Ground wires from X, Y and work clamp pulse motor encoders (3 wires)
- (4) Ground wires from operation panel (2 wires)
- (5) Ground wires from two-pedal foot switch harnesses (2 wires) [pneumatic specifications]

• Tighten the control box cover with the eight screws. Check that the cords are not clamped by the cover at this time.

NOTE: Make sure that the ground connections are secure in order to ensure safety.

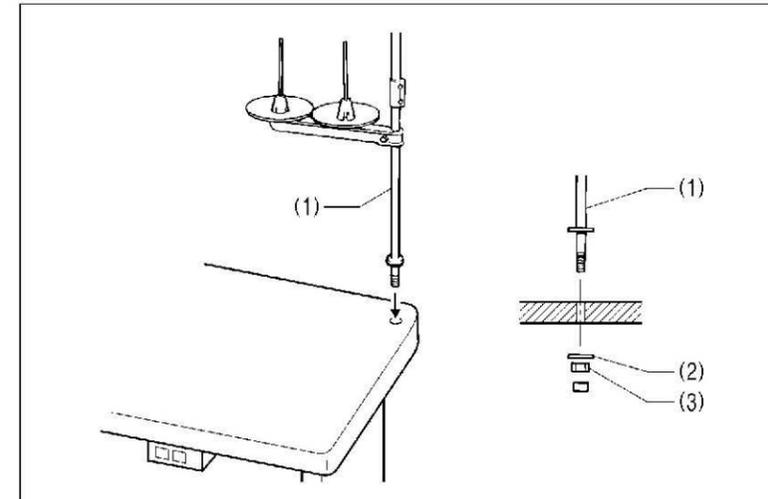
3-11. Connecting the power cord



1. Attach an appropriate plug to the power cord (1). (The green and yellow wire is the ground wire.)
 2. Insert the plug into a properly-grounded AC power supply.
- * The inside of the control box uses single-phase power.

NOTE:
Do not use an extension cord. If this is not observed, it may cause problems with correct operation.

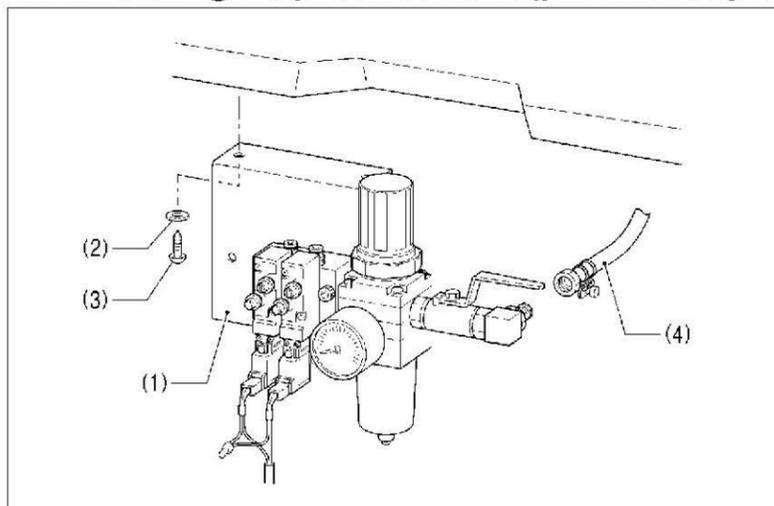
3-12. Installing the cotton stand



- (1) Cotton stand

NOTE:
Fit the washer (2), and then securely tighten the nut (3) so that the cotton stand does not move.

3-13. Installing the pneumatic unit (pneumatic specifications)



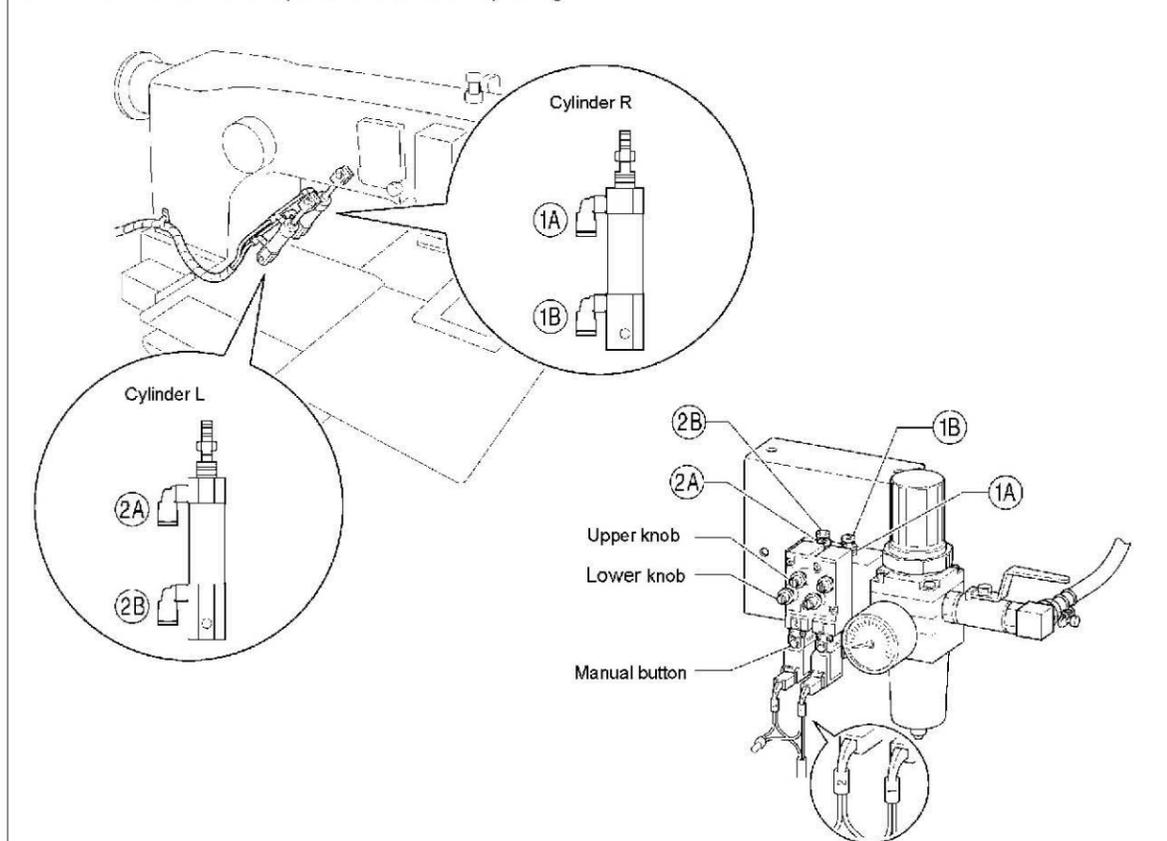
Install underneath the work table.

- (1) Solenoid valve assembly
- (2) Washers [2 pcs.]
- (3) Wood screws [2 pcs.]
- (4) Rubber hose

After installing the pneumatic unit, adjust the air pressure.
(Refer to "10-16. Adjusting the air pressure".)

NOTE:
Make sure that the pneumatic unit does not touch the control box or the work table leg.

Connect each air tube to the position with the corresponding number.



<Adjusting the speed controller>

You can use the valve knobs to adjust the lifting and lowering speeds.

The valve knobs should be adjusted so that the left and right sides of the work clamp operate at the same speed.

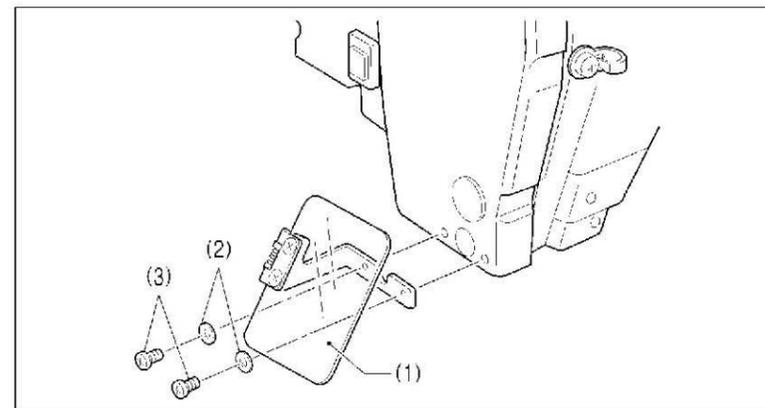
- When the upper knob is tightened, the lifting speed becomes slower. When it is loosened, the lifting speed becomes faster.
- When the lower knob is tightened, the lowering speed becomes slower. When it is loosened, the lowering speed becomes faster.

You can operate the work clamp while the power is turned off by pressing the manual button.

3-14. Installing the eye guard

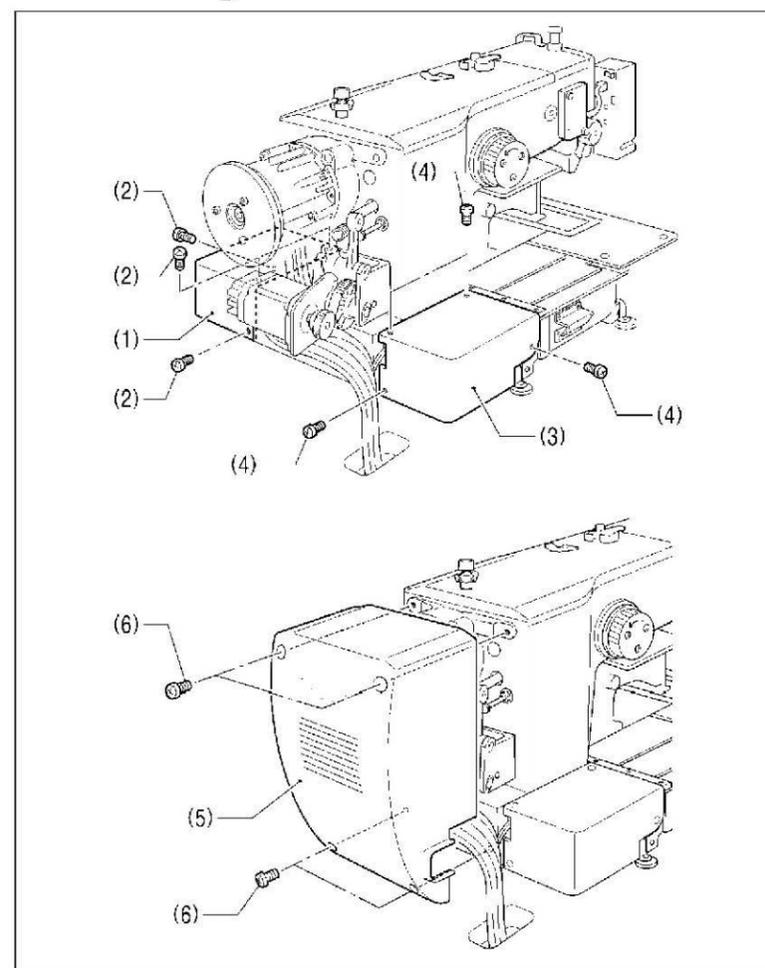


Attach all safety devices before using the sewing machine.
If the machine is used without these devices attached, injury may result.



- (1) Eye guard assembly
- (2) Plain washers [2 pcs.]
- (3) Screws [2 pcs.]

3-15. Installing the motor cover



- (1) Motor cover R
- (2) Screws [4 pcs.]
- (3) Motor cover L
- (4) Screws [4 pcs.]
- (5) Motor cover
- (6) Screws [4 pcs.]

NOTE:
Be careful not to clamp the cords when installing the motor cover.

3-16. Lubrication

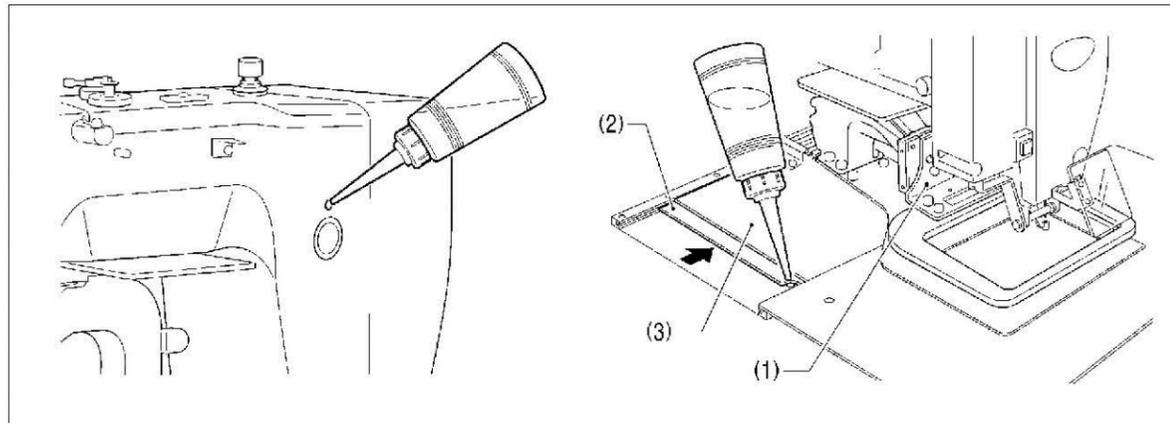
CAUTION

-  Do not connect the power cord until lubrication is complete. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
-  Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

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.

Use only the <Nisseki Mitsubishi Sewing Lube 10N; VG10> lubricating oil specified by Brother.

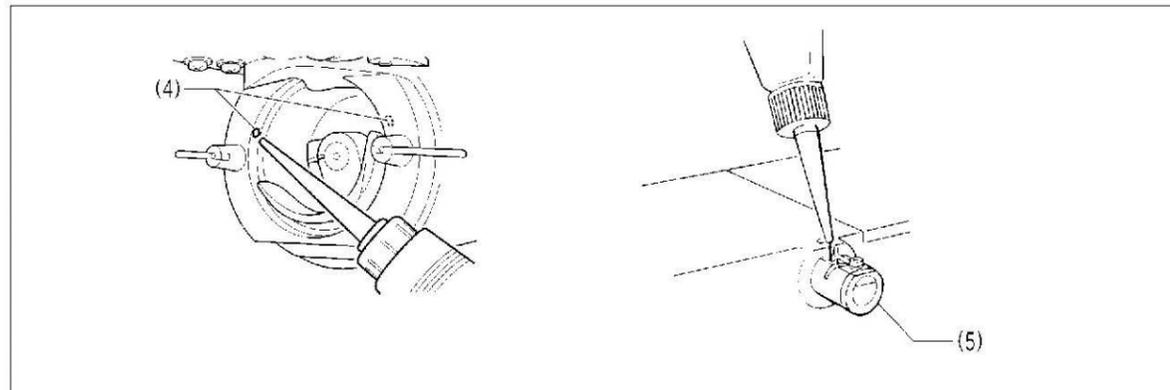
* If this type of lubricating oil is difficult to obtain, the recommended oil to use is <Exxon Mobil Essotex SM10; VG10>.



1. Fill the arm-side oil tank with oil.
2. Move the work clamp arm (1) as far as it will go to the right when looking from the front of the sewing machine, and then slide the outer cover L (2) into the inner cover L (3) so that the lubrication hole in the bed is visible. Pour oil into the bed side oil tank through this hole.

NOTE:

Be sure to fill the machine with oil when the oil level is down to about one-third full in the oil sight glass. If the oil drops below the one-third level, there is the danger that the machine may seize during operation.



3. Pour oil in through the two holes (4) of the shuttle race base assembly so that the felt is lightly moistened.

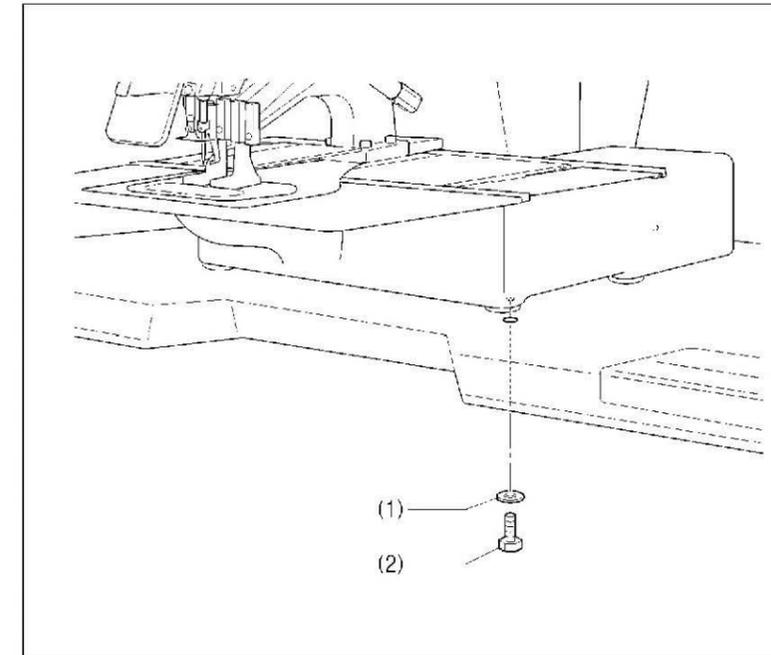
NOTE:

If there is no more oil on the felt of the shuttle race base assembly, problems with sewing may result.

4. If using the liquid cooling tank (5), fill it with silicon oil (100 mm²/s).

3-17. Installing the machine head fixing bolt

When transporting the sewing machine, secure the machine head to the table with the machine head fixing bolt.



- (1) Plain washer
- (2) Machine head fixing bolt

NOTE:

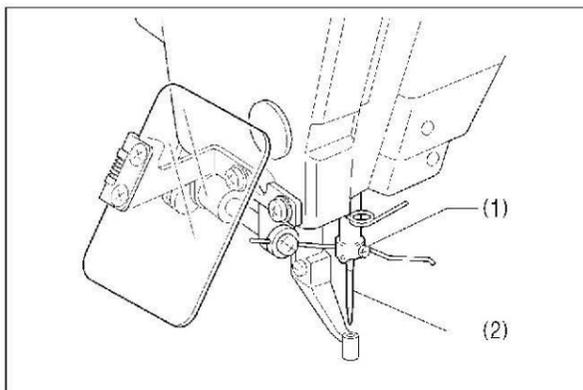
When operating the sewing machine, remove the machine head fixing bolt.

4. PREPARATION BEFORE SEWING

4-1. Installing the needle

CAUTION

Turn off the power switch before installing the needle.
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

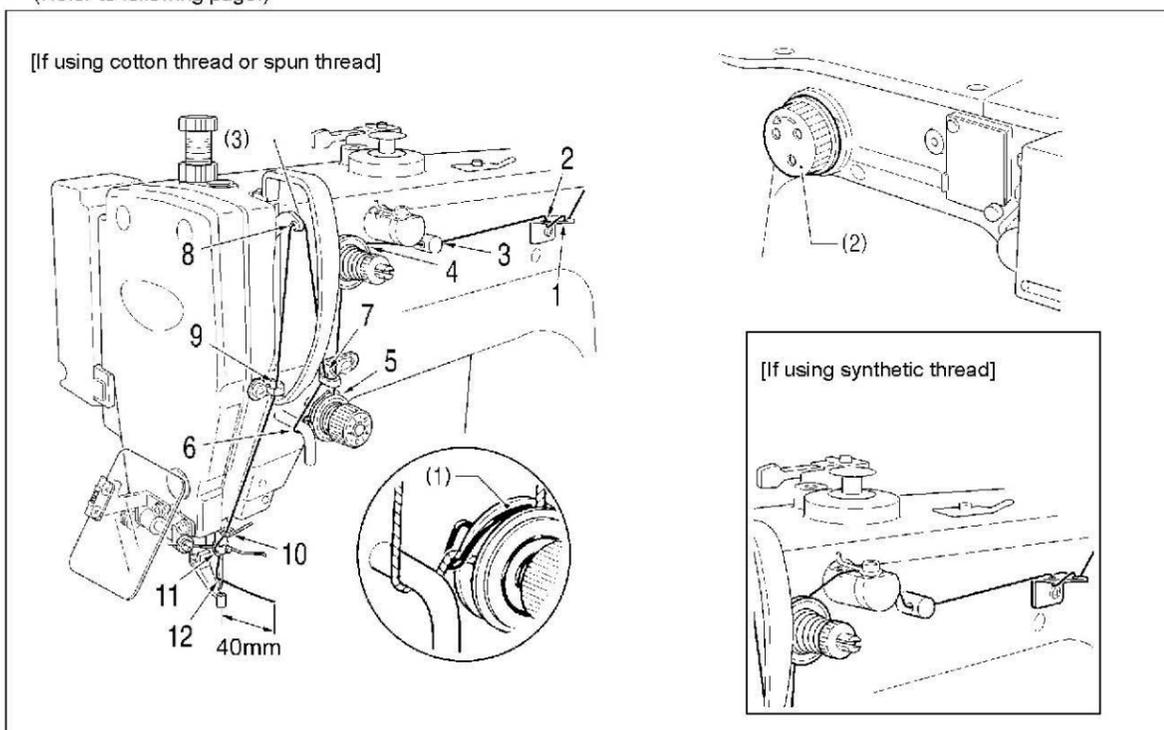


1. Loosen the set screw (1).
2. Insert the needle (2) in a straight line as far as it will go, making sure that the long groove on the needle is at the front, and then securely tighten the set screw (1).

4-2. Threading the upper thread

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

* When using threading mode for threading, the tension discs (1) will open so that the thread can be threaded more easily. (Refer to following page.)



- Turn the machine pulley (2) and raise the thread take-up (3) to its highest position before threading the upper thread. (This will make threading easier and it will prevent the thread from coming out at the sewing start.)
- When threading the thread through the needle, allow a distance of approximately 40 mm between the needle hole and the end of the thread.
If the trailing length of the thread is too long, it may cause the thread to become tangled.

<Threading mode>

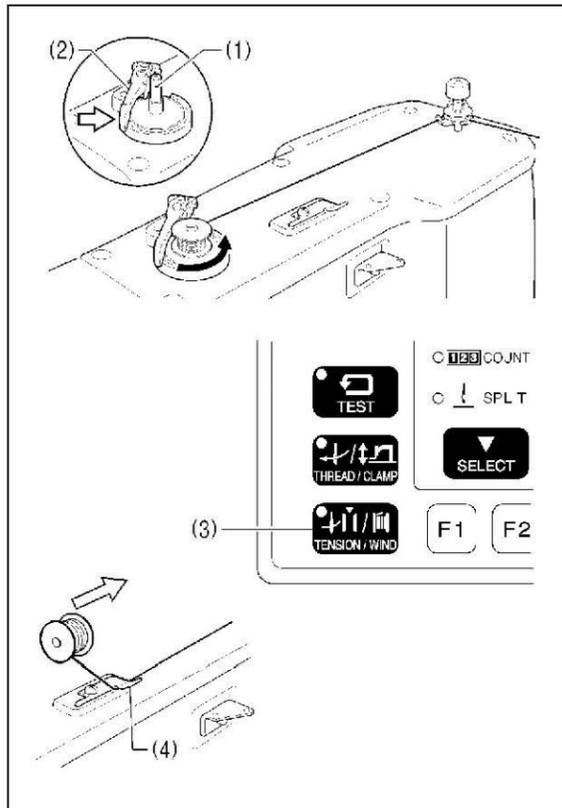
Threading mode is safe because the sewing machine will not start even when the foot switch is depressed.

1		Turn on the power switch.
2		Press the THREAD/CLAMP key. <ul style="list-style-type: none"> • The work clamp will drop. • The tension discs will open. THREAD/CLAMP indicator illuminates MENU indicator switches off
3	Threading the thread.	<ul style="list-style-type: none"> • When 5 minutes have passed, the buzzer will sound and the tension discs will close.
4		Press the THREAD/CLAMP key. <ul style="list-style-type: none"> • The work clamp will return to where it was before threading mode was started. THREAD/CLAMP indicator switches off

4-3. Winding the lower thread

CAUTION

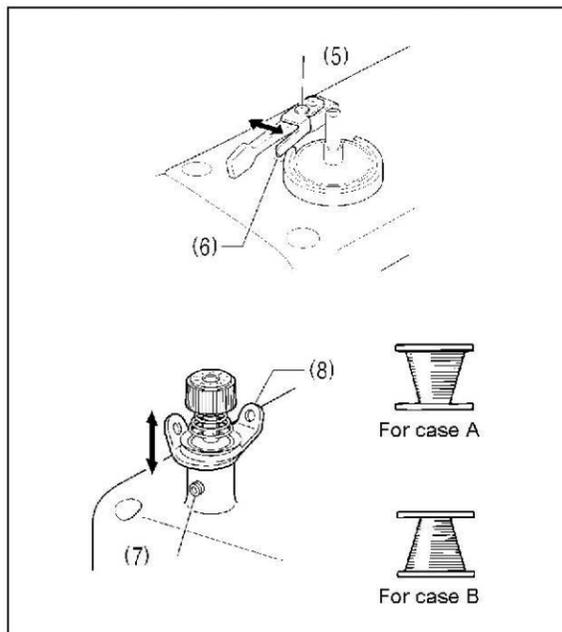
Do not touch any of the moving parts or press any objects against the machine while winding the lower thread. Injury or damage to the sewing machine may result.



- Place the bobbin onto the bobbin winder shaft (1).
- Thread the thread as shown in the illustration, wind the thread around the bobbin several times, and then press the bobbin presser arm (2).
- Turn on the power switch.
- Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
The feed mechanism will move to the home position.
- Check that the needle does not touch the work clamp, and then while pressing the TENSION/WIND key (3), depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
- Release the TENSION WIND key (3) after the machine starts operating, and keep depressing the foot switch until the lower thread stops being wound onto the bobbin.
(If you release the foot switch before winding is complete, and then depress it again while pressing the TENSION/WIND key (3), winding will start again.)
- Once winding of the set amount of lower thread (80 - 90% of the bobbin capacity) is completed, the bobbin presser arm (2) will return automatically.
- Remove the bobbin, hook the thread onto the knife (4), and then pull the bobbin in the direction of the arrow to cut the thread.

Adjusting the bobbin winding amount

Loosen the screw (5) and move the bobbin presser (6) to adjust.

**If the thread winds onto the bobbin unevenly**

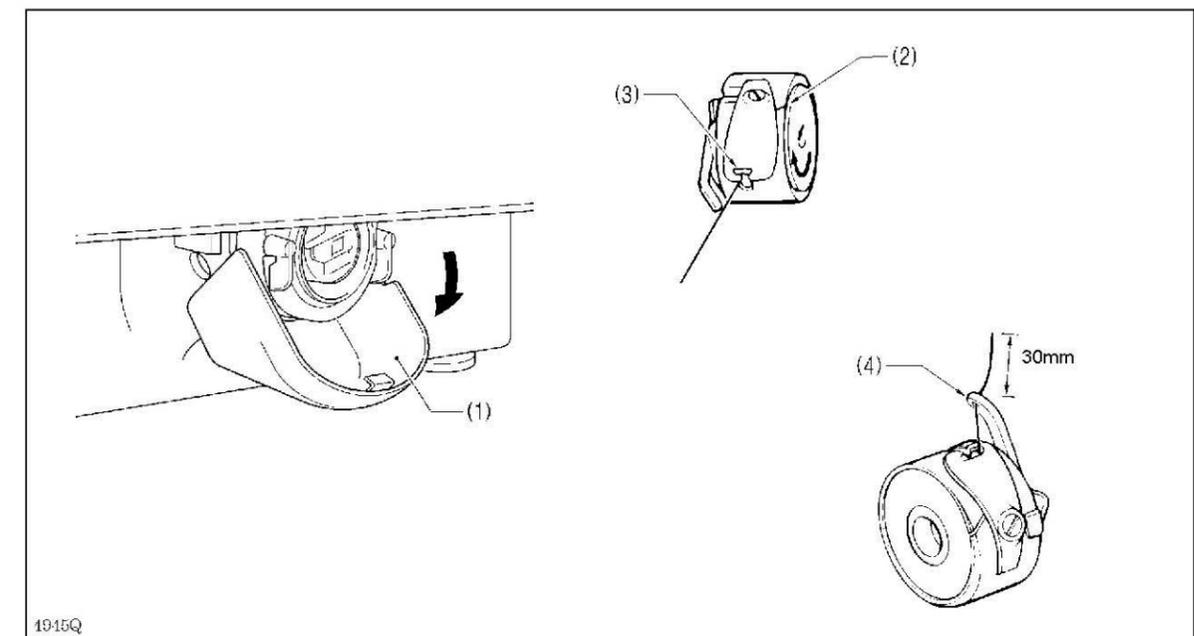
Loosen the set screw (7) and move the bobbin winder tension assembly (8) up and down to adjust.

* For case A, move the bobbin winder tension assembly (8) down, and for case B, move it upward.

4-4. Installing the bobbin case

CAUTION

Turn off the power switch before installing the bobbin case. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



1915Q

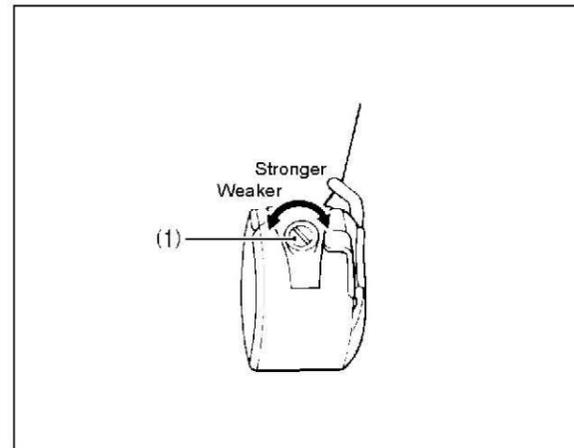
- Pull the shuttle race cover (1) downward to open it.
- While holding the bobbin so that the thread winds to the right, insert the bobbin into the bobbin case.
- Pass the thread through the slot (2) and pull it out from the thread hole (3).
- Check that the bobbin turns in the direction of the arrow when the thread is pulled.
- Pass the thread through the lever thread hole (4), and then pull out approximately 30 mm of thread.
- Hold the latch on the bobbin case and insert the bobbin case into the rotary hook.

4-5. Thread tension

[Thread tension reference]

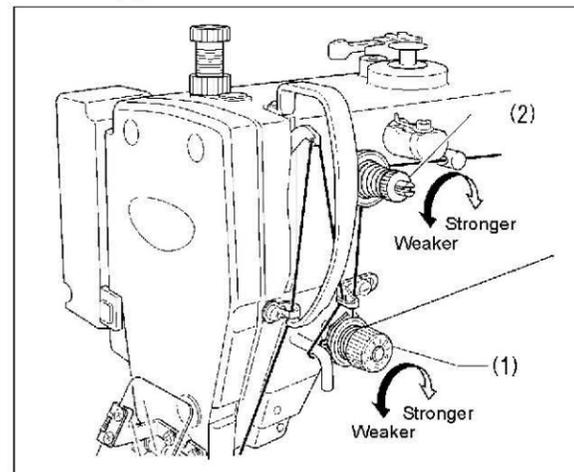
Specifications	Heavy-weight materials (-01)	Medium-weight materials (-02)
Upper thread	#20 or similar	#50 or similar
Lower thread	#20 or similar	#50 or similar
Upper thread tension (N)	1.4 – 1.8	0.8 – 1.2
Lower thread tension (N)	0.2 – 0.3	
Pre-tension (N)	0.1 – 0.6	0.1 – 0.3
Needle	DP x 17 #19	DP x 5 #16
Normal sewing speed	2,000 rpm	2,000 rpm

4-5-1. Lower thread tension



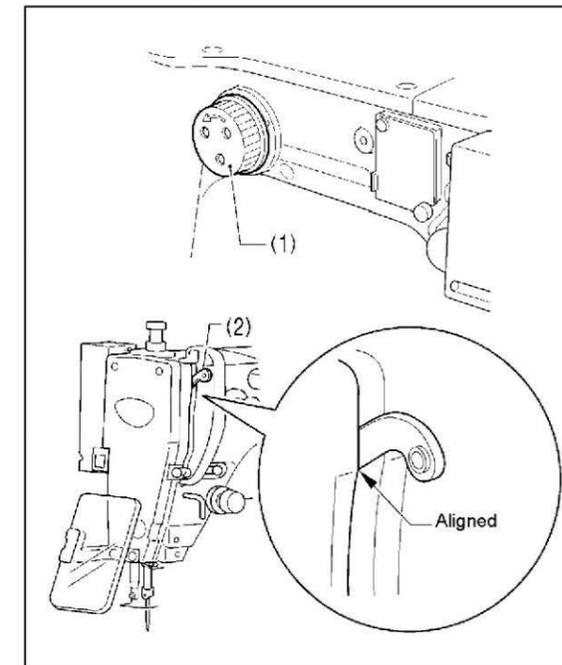
Adjust the thread tension to the weakest possible tension by turning the thread tension nut (1) until the bobbin case will not drop by its own weight while the thread end coming out of the bobbin case is held.

4-5-2. Upper thread tension



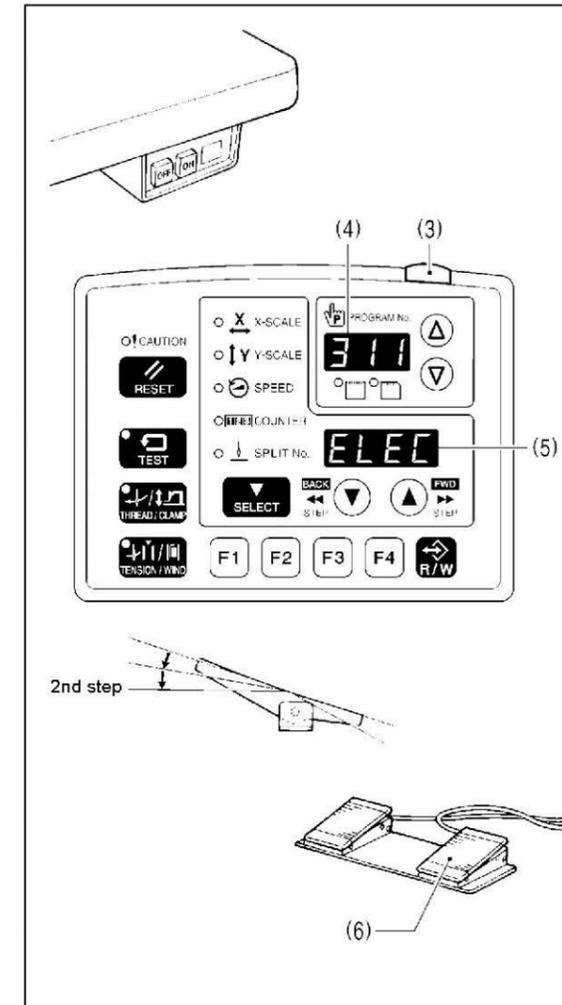
1. Turn the tension nut (1) (main tension) to adjust the tension as appropriate for the material being sewn.
2. Use the tension nut (2) (sub tension) to adjust the upper thread trailing length to about 40 mm.

4-6. Home position detection



Before starting home position detection, check that the needle bar is at its highest position.

Turn the pulley (1) until the ridge at the bottom of the thread take-up (2) is aligned with the processed line on the arm.



1. Turn on the power switch.
The power indicator (3) will illuminate, and the model number will appear in the PROGRAM No. display (4) and the specifications class will appear in the menu display (5).

Specifications	
Solenoid	[ELEC]
Pneumatic	[Air]

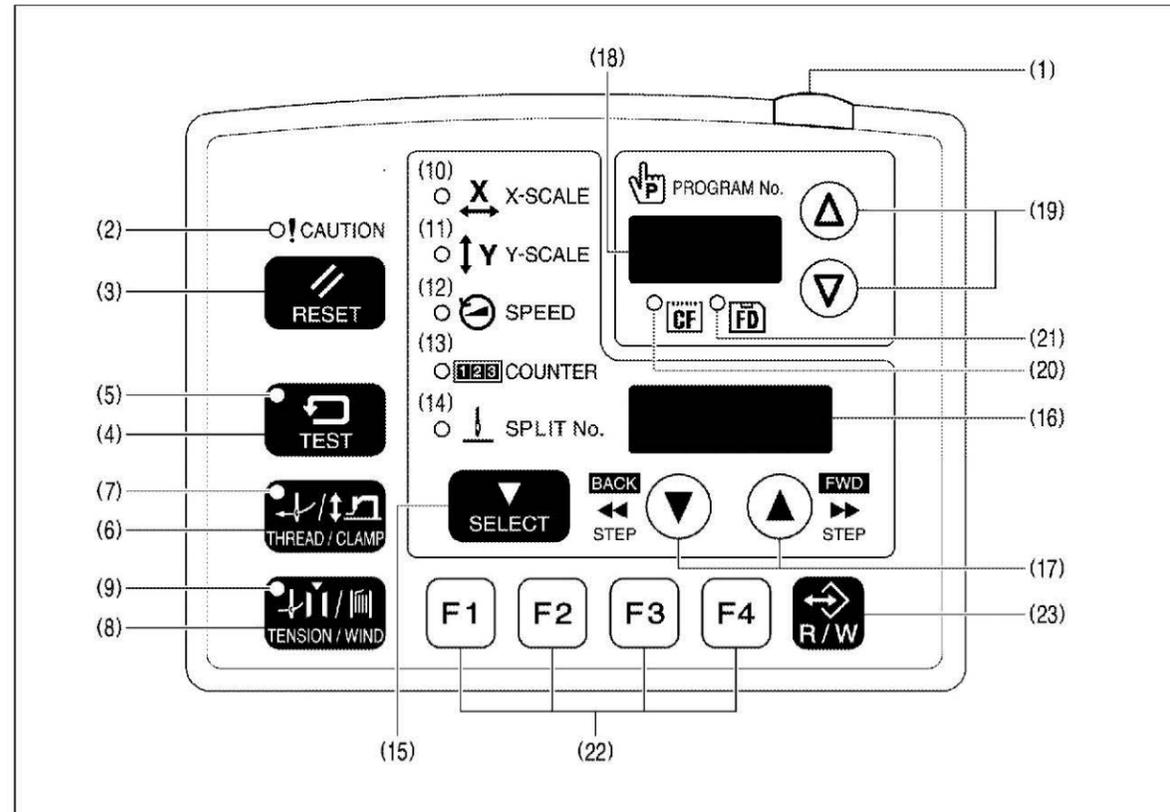
After this, the program number will flash in the PROGRAM No. display (4).

2. Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch (6).)
The sewing machine will move to the home position and the work clamp will rise.
* For programs with a large number of stitches, the buzzer will sound after the home position is detected, and then the feed mechanism will move to the sewing start position.

NOTE:
If error "E110" appears when the foot switch is depressed, turn the pulley (1) in the direction of operation to clear the error.

5. USING THE OPERATION PANEL (BASIC OPERATIONS)

5-1. Name and function of each operation panel item



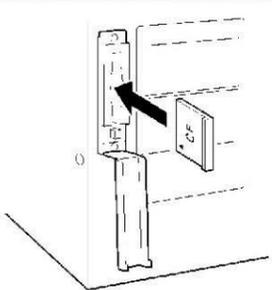
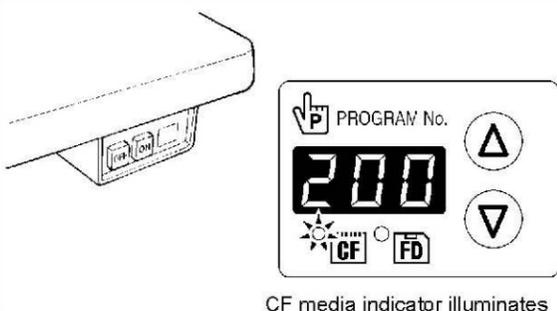
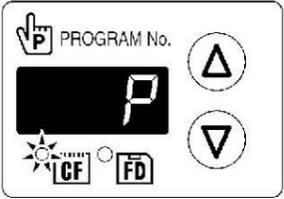
- (1) Power indicator
Illuminates when the power is turned on.
- (2) CAUTION indicator
Illuminates when an error occurs.
- (3) RESET key
Used to reset errors.
- (4) TEST key
Used to start test mode.
- (5) TEST indicator
Illuminates when the TEST key (4) has been pressed.
- (6) THREAD/CLAMP key
Used to start threading mode or work clamp height setting mode.
- (7) THREAD/CLAMP indicator
Illuminates when the THREAD/CLAMP key (6) has been pressed.
- (8) TENSION/WIND key
Used to wind the lower thread.
- (9) TENSION/WIND indicator
Spare

- (10) X-SCALE indicator
Illuminates when the SELECT key (15) is pressed to shown the X-scale setting.
- (11) Y-SCALE indicator
Illuminates when the SELECT key (15) is pressed to shown the Y-scale setting.
- (12) SPEED indicator
Illuminates when the SELECT key (15) is pressed to shown the sewing speed setting.
- (13) COUNTER indicator
Illuminates when the SELECT key (15) is pressed to shown the lower thread or production counter setting.
- (14) SPLIT No. indicator
Illuminates when the SELECT key (15) is pressed to show the split setting when split data (for specifying a pause while the program is running) exists.
- (15) SELECT key
Used to select a menu (X-scale, Y-scale, sewing speed and counter).
- (16) Menu display
Displays information such as menu setting values, memory switch settings and error codes.
- (17) Setting keys ∇ \blacktriangle
Used to change the value which is displayed in the menu display (16).
In addition, it is used to move the needle position forward and back when sewing has been paused.
- (18) PROGRAM No. display
Displays information such as program numbers.
- (19) Setting keys ∇ \blacktriangle
Used to change the value which is displayed in the PROGRAM No. display (18).
- (20) CF media indicator
Illuminates when a CF card (external media) is inserted while the power is turned on.
- (21) FD media indicator
Illuminates when a floppy disk (external media) is inserted while the power is turned on. [Option compatibility]
- (22) Function keys [F1, F2, F3, F4]
Used to select user programs and to set and select cycle programs.
- (23) R/W key
Used to read data from and write data to external media.

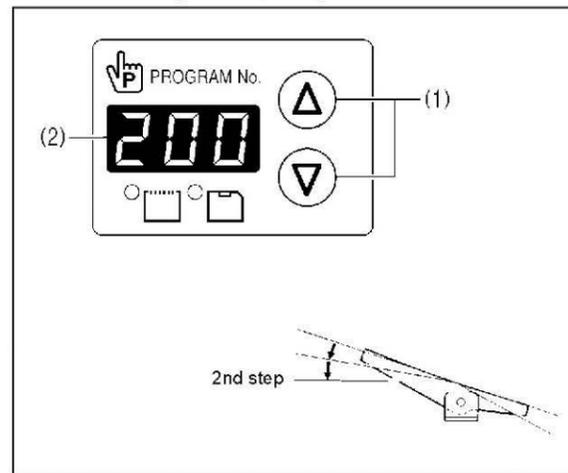
CF™ is a trademark of SanDisk Corporation.

5-2. Loading sewing data

Refer to "7-1. Notes on handling CF cards (sold separately)" for details on using CF cards.

1		<p>With the power turned off, insert the CF card into the CF slot.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Make sure the CF card is facing the correct way when inserting it. • Always be sure to keep the cover closed except when inserting and removing the CF card. If this is not done, dust may get inside and cause problems with operation.
2	 <p>CF media indicator illuminates</p>	<p>Turn on the power switch. Press the Δ or ∇ key to select the program number (100 – 999). * The "—" display is used to check the feed home position.</p>
3	 <p>Loading</p>	<p>Press the R/W key.</p>  <ul style="list-style-type: none"> • The buzzer will sound and the selected sewing data will be loaded from the CF card and copied into the sewing machine's internal memory.
4	<p>4 Loading complete The PROGRAM No. display will change from " P" to the selected program number. Turn off the power switch, remove the CF card, and then close the cover of the CF slot.</p>	

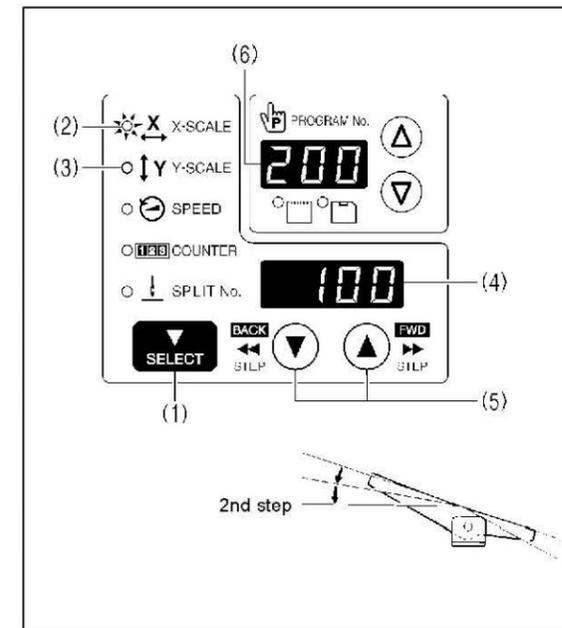
5-3. Setting the program number



1. Press the Δ or ∇ key (1) to select the program number that is loaded into the internal memory.
 - The program number will flash in the PROGRAM No. display (2).
 - "—" will appear at the time of shipment from the factory. (For checking feed home position)
2. Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
 - The feed mechanism will move to the home position and the program number will be accepted.
 - The program number will stop flashing and illuminate steadily.

NOTE:
After completing the setting, be sure to refer to "5-6. Checking the sewing pattern" to check that the needle drop position is correct.

5-4. Setting the X-scale and Y-scale

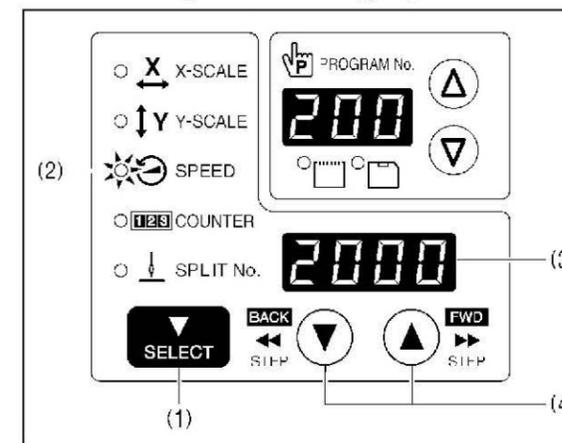


The scales are set to 100 (%) at the time of shipment from the factory.

1. Press the SELECT key (1) so that the X-SCALE indicator (2) (for X-scale setting) or the Y-SCALE indicator (3) (for Y-scale setting) is illuminated.
 - The setting value (%) will appear in the menu display (4).
 - * When memory switch no. 402 is set to "ON", the settings will be displayed in units of mm.
2. Press the Δ or ∇ key (5) to set the scale (0 – 400).
 - The program number will flash in the PROGRAM No. display (6).
3. Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
 - The feed mechanism will move to the home position and the scale will be accepted.
 - The program number will stop flashing and illuminate steadily.

NOTE:
After completing the setting, be sure to refer to "5-6. Checking the sewing pattern" to check that the needle drop position is correct.

5-5. Setting the sewing speed

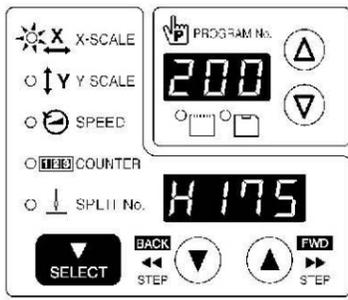
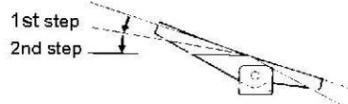
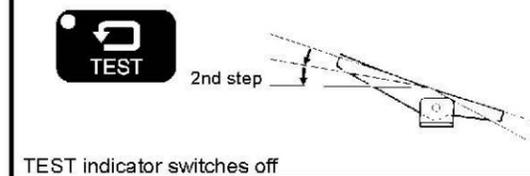


The sewing speed is set to 2000 (rpm) at the time of shipment from the factory.

1. Press the SELECT key (1) until the SPEED indicator (2) illuminates.
 - The setting value (rpm) will appear in the menu display (3).
2. Press the Δ or ∇ key (4) to set the sewing speed. (Sewing speed setting: 400 – 2700)

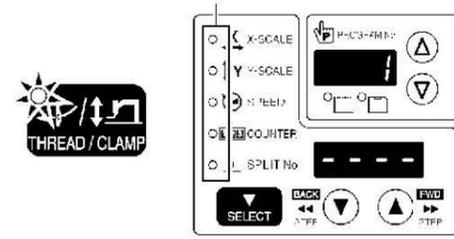
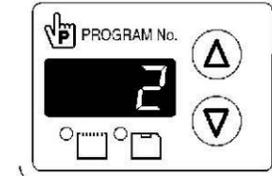
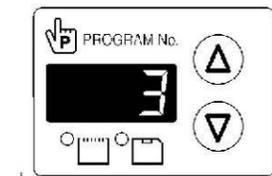
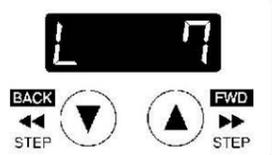
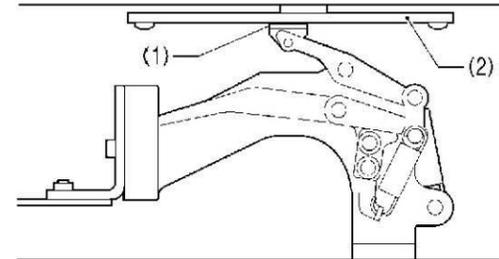
5-6. Checking the sewing pattern

Use test feed mode to check the needle movement with only the feed mechanism operating. Check that the needle hole does not come out from the frame of the work clamp.

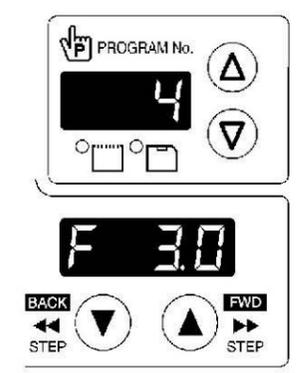
1		Press the TEST key.
	TEST indicator illuminates	
2		<p>Select the program number to be checked, and then set the X-scale and the Y-scale.</p> <ul style="list-style-type: none"> The program number will flash. <p>Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)</p> <ul style="list-style-type: none"> The feed mechanism will move to the home position and the program number will stop flashing and illuminate steadily. The number of stitches will appear in the menu display.
	COUNTER indicator illuminates	
3	<p>Starting continuous test feed mode</p> 	<p>Depress the foot switch to the 2nd step and then release it. (If using a two-pedal foot switch, lower the work clamp before depressing the start switch and releasing it.)</p> <ul style="list-style-type: none"> Feed mechanism starts moving continuously one stitch at a time. <p>[Fast-forward test mode] If you depress the foot switch to the 1st step while the feed mechanism is moving, the feeding speed will become faster while the foot switch is being depressed. (If using a two-pedal foot switch, depress the work clamp switch.)</p>
	 <p>TEST indicator illuminates</p>	<p>If you press the ▲ key, the feed mechanism will move forward one stitch at a time, and if you press the ▼ key, the feed mechanism will move backward one stitch at a time. (The feed will move quicker if you keep the key pressed down.)</p>
	 <p>TEST indicator switches off</p>	<p>If you would like sewing to start while test feeding is in progress, press the TEST key to switch off the TEST indicator. When you depress the foot switch to the 2nd step, sewing will start. (If using a two-pedal foot switch, depress the start switch.)</p>
4	<p>If test feeding continues to the final stitch, it will then stop.</p> 	Press the TEST key.
	TEST indicator switches off	

5-7. Setting the work clamp lift amount

The setting for the work clamp lift amount can be changed using the operation panel.
* For pneumatic specifications, only threading mode and intermittent presser foot height setting mode will be available.

1		<p>All indicators switch off</p> <p>Press the THREAD/CLAMP key. The sewing machine will switch to threading mode.</p> <ul style="list-style-type: none"> " 1" will appear in the PROGRAM No. display, and the work clamp will drop.
	THREAD/CLAMP indicator illuminates MENU indicator switches off	
2	<p>Solenoid specifications only</p> 	<p>Press the ▲ key. The sewing machine will switch to work clamp height setting mode.</p> <ul style="list-style-type: none"> " 2" will appear in the PROGRAM No. display, and the work clamp will rise to the setting value that appears in the menu display. (Work clamp height setting: 15 – 25) <p>Press the ▲ or ▼ key to set the work clamp height.</p> <ul style="list-style-type: none"> The work clamp will rise or drop to the height of the new value that has been set.
		
	<p>When memory switch No. 003 is set to "2"</p> 	<p>Press the ▲ key. The sewing machine will switch to intermediate work clamp height setting mode.</p> <ul style="list-style-type: none"> " 3" will appear in the PROGRAM No. display, and the work clamp will move to the setting value that appears in the menu display. (Intermediate work clamp height setting: 1 – 15) <p>Press the ▲ or ▼ key to set the intermediate work clamp height.</p> <ul style="list-style-type: none"> The work clamp will rise or drop to the height of the new value that has been set.
		
	<p>NOTE:</p> <p>When setting the work clamp height and the intermediate presser foot work clamp height, check that the slider (1) is touching the work clamp lifter plate assembly (2).</p>	

3



Press the Δ key.
The sewing machine will switch to intermittent presser foot height setting mode.

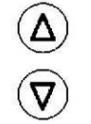
- " 4" will appear in the PROGRAM No. display, and the work clamp will rise to the setting value that appears in the menu display.
(Intermittent presser foot height setting: 0.0 – 10.0)

Press the Δ or ∇ key to set the intermittent presser foot height.

- The presser foot will rise or drop to the height of the new value that has been set.

NOTE:
After making the setting, be sure to turn the pulley once by hand and check that the presser foot does not touch the needle bar.

<Changing modes>



Solenoid specifications

- " 1" Threading mode
- " 2" Work clamp height setting mode
- " 3" Intermediate work clamp height setting mode (*)
- " 4" Intermittent presser foot height setting mode

* When memory switch No. 003 is set to "2"

Pneumatic specifications

- " 1" Threading mode
- " 4" Intermittent presser foot height setting mode

4 Ending setting mode

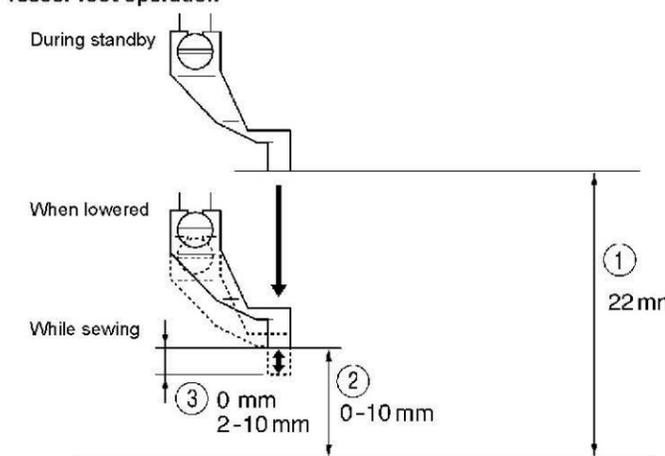


Press the THREAD/CLAMP key.

- The setting values will be memorized.
- The work clamp will return to where it was before setting mode was started.

THREAD/CLAMP indicator switches off

Presser foot operation

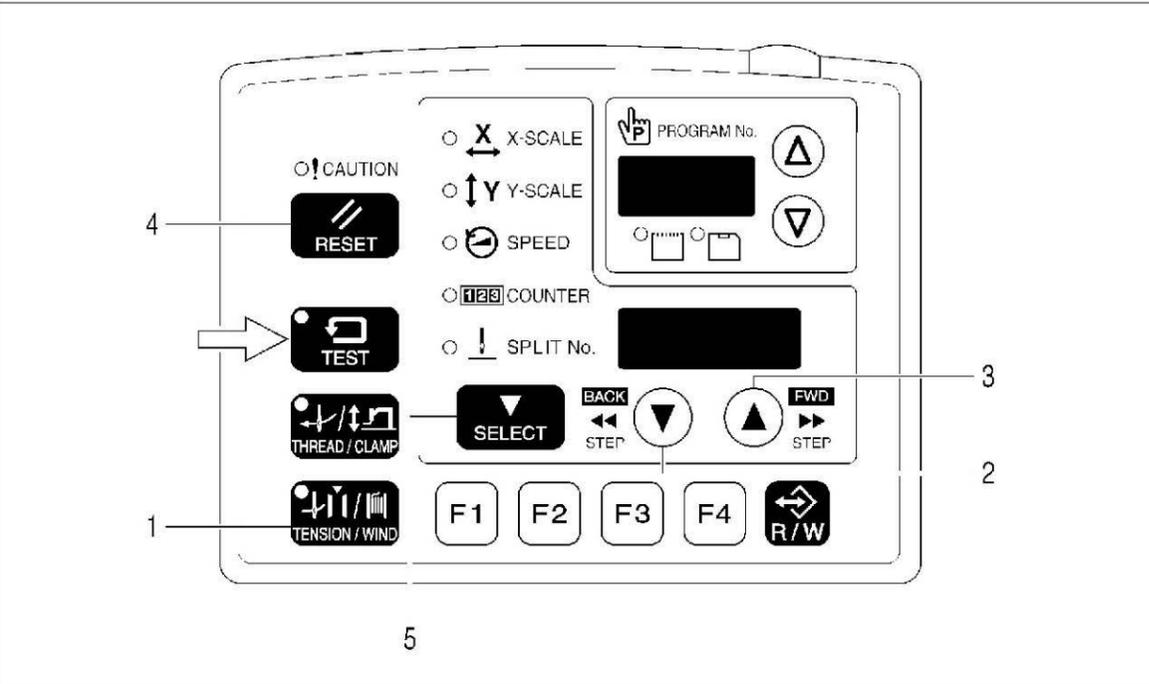


- ① Intermittent presser foot lift amount
- ② Intermittent presser foot height
The settings can be made by the above operations.
However, if the intermittent presser foot height is set to a smaller setting than the intermittent presser foot stroke, the intermittent presser foot will not drop in order to prevent it from coming into contact with the needle plate. (Refer to page 64.)
- ③ Intermittent stroke
Refer to "10-14. Changing the intermittent stroke" when making the adjustment.

6. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

6-1. List of advanced functions

While holding down the TEST key, press the corresponding combination key.

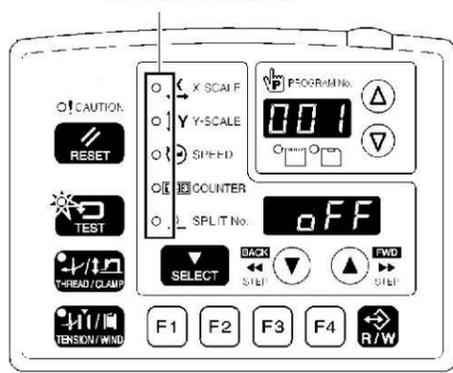


1	 + 	Memory switch setting mode Refer to "6-2. Setting memory switches".
2	 + 	Lower thread counter setting mode Refer to "6-4. Using the lower thread counter".
3	 + 	Production counter setting mode Refer to "6-5. Using the production counter".
4	When SPEED indicator is illuminated  + 	Production counter temporary display function Refer to "6-5. Using the production counter".
5	 + 	User program setting mode Refer to "6-7. Using user programs".

6-2. Setting memory switches

1

All indicators switch off



While pressing the SELECT key, turn on the power switch.
* Keep pressing the SELECT key until the model name is displayed and the buzzer beeps once.

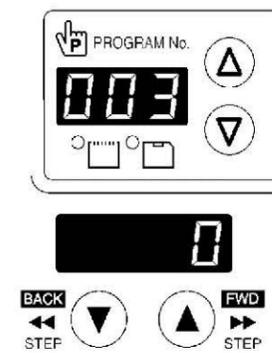
or

With the power turned on, press the TEST key and the TENSION/WIND key simultaneously.

The memory switch number will appear in the PROGRAM No. display, and its setting value will appear in the menu display.

Menu indicator switches off
TEST indicator illuminates

2



Press the Δ or ▽ key to select the memory switch number.

Press the ▲ or ▼ key to change the setting.

3 Ending setting mode

Press the TEST key.

The changes will be memorized and the sewing machine will switch to home position detection standby.

TEST indicator switches off

RESET

- If you would like to return the setting for a single memory switch to the default setting, press the RESET key while the number for that memory switch is displayed.
- To return the settings for all memory switches to the default settings, keep pressing the RESET key for two or more seconds until the buzzer makes a long beep.

6-3. List of memory switch settings

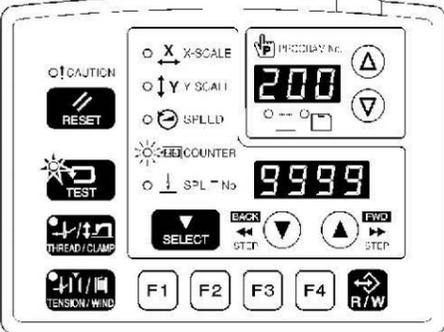
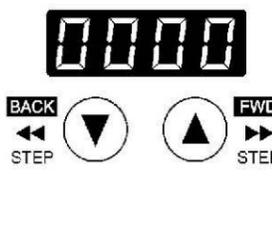
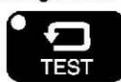
No.	Setting range	Setting items	Initial value
001	Work clamp lift timing after sewing is completed		ON
	OFF	Lifts at the final stitch position.	
	ON	Lifts after moving to the home position.	
002	Separate-type work clamp drop operation (pneumatic specifications)		0
	0	Left and right work clamp drop at the same time.	
	1	Work clamp drops in the order left → right.	
	2	Work clamp drops in the order right → left.	
003	Work clamp drop operation (solenoid specifications)		2
	0	Analog dropping: Work clamp drops in direct proportion to the pedal depression amount, and sewing starts when the pedal is fully depressed	
	1	1st step drop: Work clamp drops when the pedal is depressed to the 1st step, and sewing starts when the pedal is depressed to the 2nd step	
	2	2nd step drop: Work clamp drops to intermediate height when the pedal is depressed to the 1st step, and work clamp drops and sewing starts when the pedal is depressed to the 2nd step.	
100	Sewing start speed		OFF
	OFF	The sewing speed for the first 1 – 5 stitches is set by memory switch numbers 151 – 155. (Refer to the service manual for details of memory switch Nos. 151 – 155.)	
	ON	1st stitch at 400 rpm, 2nd stitch at 400 rpm, 3rd stitch at 600 rpm, 4th stitch at 900 rpm, 5th stitch at 2,000 rpm	
200	Single-stitch test feed		OFF
	OFF	Test feed starts when the foot switch (start switch) is depressed, and it continues automatically until the final stitch.	
	ON	Test feed is carried out one stitch at a time when the foot switch (start switch) is depressed (feed becomes continuous if the foot switch [start switch] is continuously depressed). In addition, when the TEST indicator is illuminated, test feeding will move forward one stitch at a time when the machine pulley is turned by hand.	
300	Production counter display		OFF
	OFF	Lower thread counter display	
	ON	Production counter display	
400	User programs		OFF
	OFF	Disabled	
	ON	User program mode is enabled.	
401	Cycle programs		OFF
	OFF	Disabled	
	ON	When sewing user programs, the set programs are sewn in numeric order.	
402	Maximum reduction ratio (mm display) (*)		OFF
	OFF	Displayed as %.	
	ON	Displayed as mm.	
403	Split mode selection		0
	0	Continuous split (split menu is disabled before split detection)	
	1	Continuous split (split menu is always enabled)	
	2	Independent split	

* The mm display may differ slightly from the actual sewing size.

6-4. Using the lower thread counter

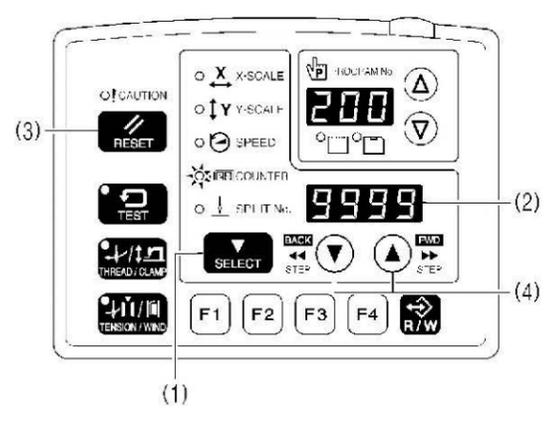
If you use the lower thread counter to set the number of articles which can be sewn with the amount of lower thread available, you can stop the lower thread running out in the middle of sewing a pattern.

<Setting defaults>

1		<p>While pressing the TEST key, press the ▼ key.</p> <p>TEST indicator illuminates, COUNTER indicator flashes</p> <ul style="list-style-type: none"> The initial value which was set previously will appear in the menu display.
2		<p>Press the ▲ or ▼ key to set the initial value.</p> <ul style="list-style-type: none"> The initial value can be set from 1 ("0001") to 9999 ("9999"). If the initial value is set to "0000", the lower thread counter will not operate. If you press the RESET key during setting mode, the value will become "0000". <p>If you press the R/W key during setting mode, the initial value for the program number being displayed will be stored, and you can set the lower thread counter separately for each item of sewing data.</p>
3	<p>Ending setting mode</p> 	<p>Press the TEST key.</p> <ul style="list-style-type: none"> The initial value will be memorized. <p>TEST indicator switches off</p>

<Lower thread counter operation>

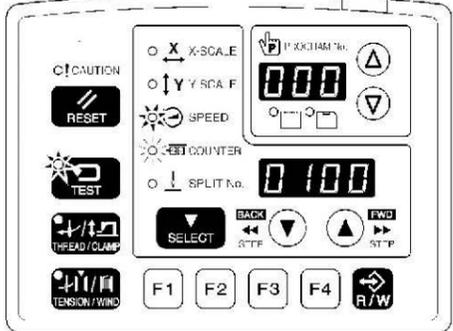
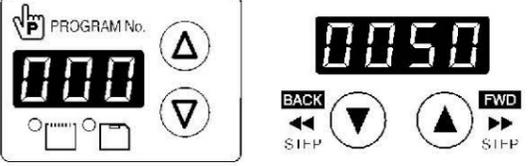
If you press the SELECT key (1) to select the counter display menu when memory switch no. 300 is set to "OFF", the COUNTER indicator will illuminate and the lower thread counter will appear in the menu display (2).



- Each time the sewing of a single article is completed, the value shown in the menu display (2) is reduced by 1.
 - When the lower thread counter reaches "0000", the buzzer will sound continuously. The sewing machine will not operate during this time, even if the foot switch is depressed.
 - When you press the RESET key (3), the buzzer will stop, the initial value will appear in the menu display (2) and sewing will be possible.
 - If no initial value has been set, the display will be "0000".
- * You can press the ▲ or ▼ key (4) to set the lower thread counter to a desired value. However, this value will not be stored as the initial value.
- * If a lower thread counter value is set, the lower thread counter will operate even if the lower thread counter is not being displayed.

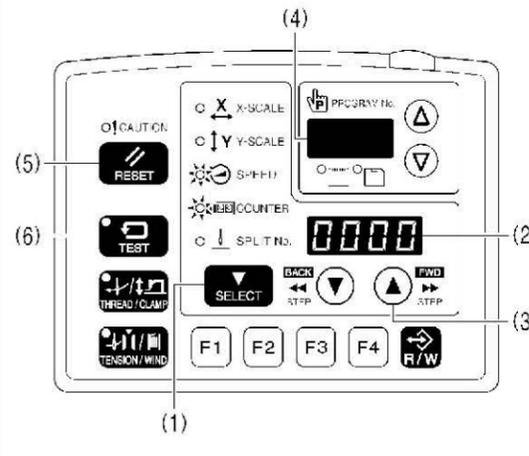
6-5. Using the production counter

<Setting the counter value>

1		<p>While pressing the TEST key, press the ▲ key.</p> <p>TEST indicator and SPEED indicator illuminate COUNTER indicator flashes</p> <ul style="list-style-type: none"> The counter value that was previously set will appear as a 7-digit number in the PROGRAM No. display and the menu display.
2		<p>Press the ▲ or ▼ key to set the counter value.</p> <ul style="list-style-type: none"> The counter value can be set to between "000" "0000" and "999" "9999". If you press the RESET key during setting mode, the value will become "000" "0000".
3	<p>Ending setting mode</p> 	<p>Press the TEST key.</p> <ul style="list-style-type: none"> The counter value will be memorized. <p>TEST indicator switches off</p>

<Production counter operation>

If you press the SELECT key (1) to select the counter display menu when memory switch no. 300 is set to "ON", the SPEED and COUNTER indicators will illuminate and the production counter will appear in the menu display (2).



- Each time the sewing of a single article is completed, the value shown in the menu display (2) is increased by 1.
- While the ▲ key (3) is being pressed, the first three digits will appear in the PROGRAM No. display (4) so that the total number of digits displayed will be seven.
- If you press the RESET key (5) for 2 seconds or more, the counter value will be reset to [0000].

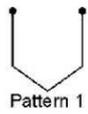
Temporary display function

You can display the production counter temporarily while the lower thread counter is being displayed.

When the SPEED indicator is illuminated, hold down the TEST key (6) and then press the RESET key (5) to display the production counter in the menu display (2). Press the TEST key (6) or the SELECT key (1) to switch the menu back to the normal menu display.

* You can start sewing while the temporary display still appears.

6-6. Setting the split number



Pattern 1



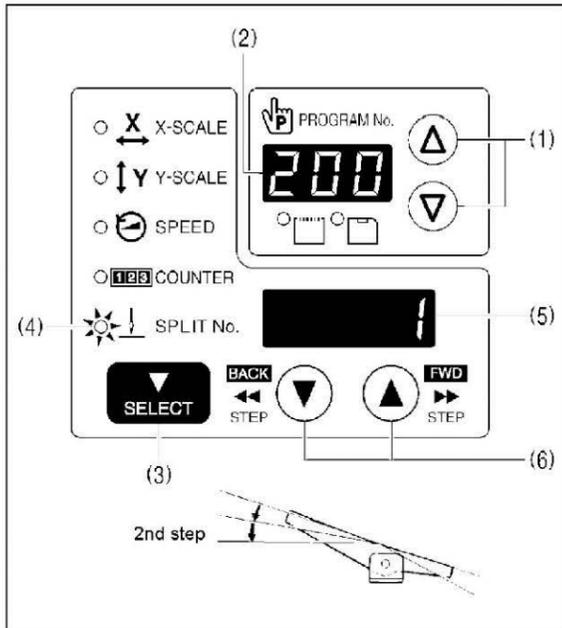
Pattern 2



Pattern 3

If split data (data that causes sewing to pause) exists within a single program, the numbers that are used to specify the patterns that are separated by split data are called split numbers.

- Pattern 1: Split No. 1
- Pattern 2: Split No. 2
- Pattern 3: Split No. 3



1. Press the Δ or ∇ key (1) to select a program number for a program that contains split data.
 - The program number will flash in the PROGRAM No. display (2).
2. Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
 - The feed mechanism will move to the home position and the program number will be accepted.
 - The program number will stop flashing and illuminate steadily.
3. Press the SELECT key (3) so that the SPLIT No. indicator (4) illuminates.
 - The split number will appear in the menu display (5).
4. Press the Δ or ∇ key (6) to set the split number.

The setting for memory switch No. 403 lets you select the split mode.

[Continuous split]

Memory switch No. 403 = 0 (Split mode is enabled after split data is detected)
 Memory switch No. 403 = 1 (Split mode is always enabled)

- Sewing is carried out each time in the order of steps 1 → 2 → 3 → 1 (for example, if there are two sections of split data).

[Independent split]

Memory switch No. 403 = 2

- The pattern for the displayed split number is sewn independently.

6-7. Using user programs

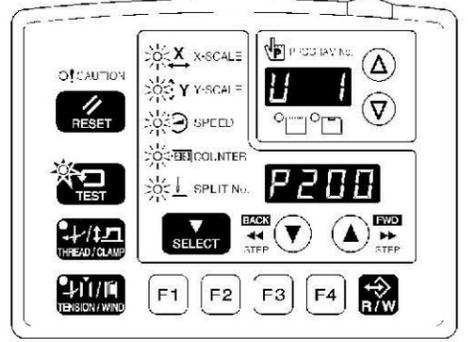
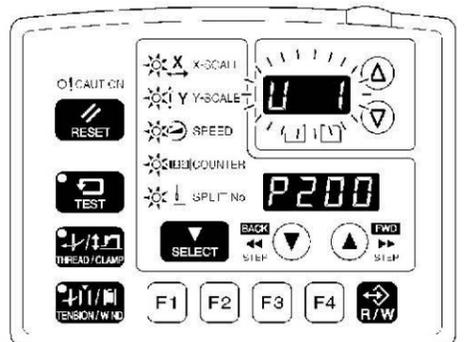
Up to 50 different combinations of settings including program no., X-scale, Y-scale, sewing speed, work clamp height and intermittent presser foot height can be memorized as user programs (U1 to U50). (However, the work clamp height setting is only enabled for solenoid specifications.)

If you are sewing certain patterns over and over again, it is useful to record the settings for these patterns into a user program.

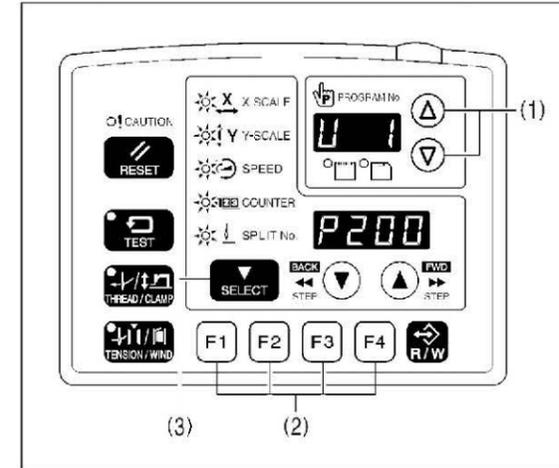
User programs are enabled when memory switch no. 400 is set to "ON".

<Recording user programs>

<p>1 Select a user program number.</p> <p>TEST indicator illuminates, MENU indicator flashes</p>	<p>While pressing the TEST key, press the SELECT key.</p> <ul style="list-style-type: none"> • Switch to user program recording mode. Check that the menu indicators are flashing. • The user program number will appear in the PROGRAM No. display, and "P- - -" will appear in the menu display. <p>Press the Δ or ∇ key to select the user program number.</p>
<p>2 First, set the program number.</p>	<p>Press the Δ or ∇ key to set the user program number to be recorded.</p> <p>NOTE: Select a program number that is recorded in the internal memory. You cannot specify program numbers on removable media.</p>
<p>3 Next, set the X-scale.</p> <p>X-SCALE indicator flashes</p>	<p>Press the SELECT key.</p> <p>Press the Δ or ∇ key to set the X-scale to be recorded.</p>
<p>4 Next, set the Y-scale.</p> <p>Y-SCALE indicator flashes</p>	<p>Press the SELECT key.</p> <p>Press the Δ or ∇ key to set the Y-scale to be recorded.</p>
<p>5 Next, set the sewing speed.</p> <p>SPEED indicator flashes</p>	<p>Press the SELECT key.</p> <p>Press the Δ or ∇ key to set the sewing speed to be recorded.</p>

<p>6</p>	<p>Next, set the work clamp height (Solenoid specifications only).</p>  <p>THREAD / CLAMP indicator flashes</p>	<p>Press the SELECT key.</p>  <p>Press the ▲ or ▼ key to set the work clamp height to be recorded.</p>
<p>7</p>	<p>Next, set the intermediate work clamp height (When memory switch No. 003 is set to "2" for solenoid specifications).</p>  <p>THREAD / CLAMP indicator flashes</p>	<p>Press the SELECT key.</p>  <p>Press the ▲ or ▼ key to set the intermediate work clamp height to be recorded.</p>
<p>8</p>	<p>Next, set the intermittent presser foot height.</p>  <p>THREAD / CLAMP indicator flashes</p>	<p>Press the SELECT key.</p>  <p>Press the ▲ or ▼ key to set the intermittent presser foot height to be recorded.</p>
<p>9</p>	 <p>TEST indicator illuminates, MENU indicator flashes</p>	<p>Press the SELECT key.</p>  <ul style="list-style-type: none"> If setting further user programs, select the user program number and then repeat steps 2 to 9.
<p>10</p>	 <p>TEST indicator switches off, MENU indicator illuminates</p>	<p>Press the TEST key.</p>  <p>This completes the recording of a user program.</p> <ul style="list-style-type: none"> The user program number will flash in the PROGRAM No. display, and the sewing machine will switch to home position detection standby.

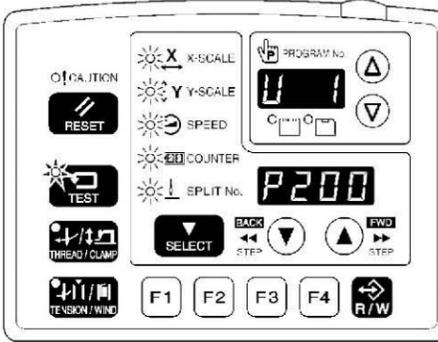
<Setting method>



- Press the ▲ or ▼ key (1) to select the user program number that you would like to use.
 - If the user program number is flashing, depress the foot switch to move the feed mechanism to the home position. After this, it is not necessary to detect the home position until the next time the power is turned off and back on, even if you change the user program number.
 - User programs U1 to U10 can be selected directly using function keys F1 to F4 (2). (Refer to "6-9. Direct selection".)
- Check that the needle drop position is correct, and then start sewing. (Refer to "5-6 Checking the sewing pattern".)

- If you press the SELECT key (3), you can check the settings for the displayed user program (such as X-scale and sewing speed).

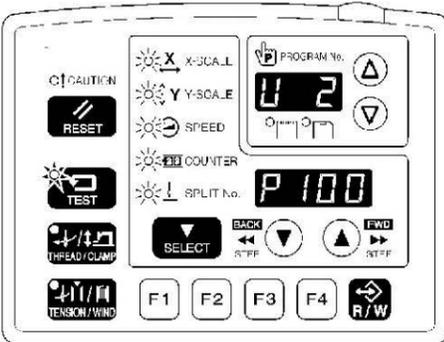
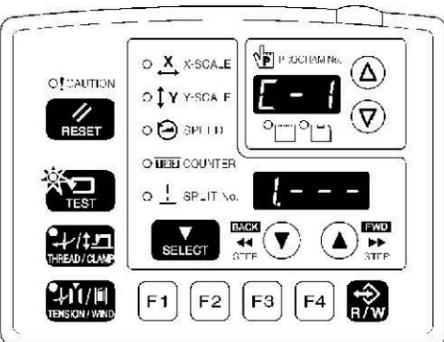
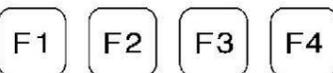
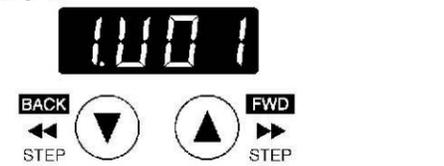
<Clearing method>

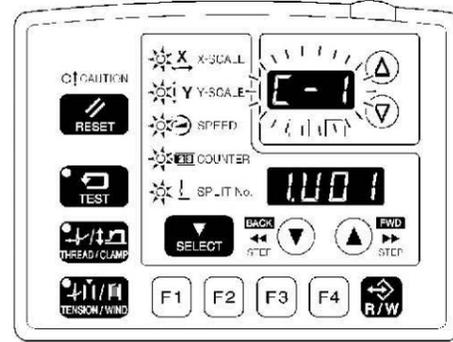
<p>1</p>	 <p>TEST indicator illuminates, MENU indicator flashes</p>	<p>While pressing the TEST key, press the SELECT key</p>  <ul style="list-style-type: none"> Switch to user program recording mode. Check that the menu indicators are flashing. The user program number will appear in the PROGRAM No. display, and the program number will appear in the menu display. <p>Press the ▲ or ▼ key (1) to select the user program number that you would like to clear.</p>
<p>2</p>		<p>Press the RESET key.</p> <ul style="list-style-type: none"> The buzzer will sound and the user program with the number selected will be cleared. <p>NOTE: If a cleared user program has been stored as part of a cycle program, the step that involves that user program will become blank. The cycle program itself will not be cleared.</p> <p>Clearing all user programs</p> <p>Press and hold the RESET key for 2 seconds or more.</p> <ul style="list-style-type: none"> The buzzer will sound and all user programs will be cleared. <p>NOTE: If any cycle programs have been memorized, all of the memorized cycle programs will also be cleared.</p>

6-8. Using cycle programs

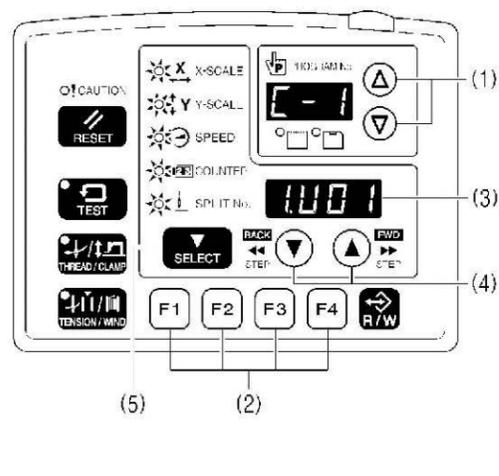
Sewing patterns that have been recorded in user programs can be recorded in up to nine cycle programs (C-1 to C-9). One cycle program can contain up to a maximum of fifteen steps. When sewing the sewing patterns in numerical order, it can be useful to record them in a cycle program beforehand. Cycle programs are enabled when memory switch nos. 400 and 401 are set to "ON".

<Recording method>

<p>1 Switch to user program recording mode.</p>  <p>TEST indicator illuminates, MENU indicator flashes</p>	<p>While pressing the TEST key, press the SELECT key.</p>  <ul style="list-style-type: none"> • Check that the menu indicators are flashing. • The user program number will appear in the PROGRAM No. display, and the program number will appear in the menu display. <p>Record the sewing pattern that you would like to use in a cycle program into a user program.</p>
<p>2 Switch to cycle program recording mode, and select the cycle program number.</p>  <p>MENU indicator switches off</p>	<p>Press a function key from F1 to F4.</p>  <ul style="list-style-type: none"> • The cycle program number (C-1 to C-4) will appear in the PROGRAM No. display, and "1- -" will appear in the menu display. <p>Press the function key (F1 to F4) or press the Δ or ∇ key to select the cycle program number.</p>
<p>3 Set step 1.</p>  <p>Press the SELECT key.</p>	<p>Press the ▲ or ▼ key to select the user program number that you would like to record.</p> <p>Press the SELECT key.</p>
<p>4 Set the rest of the steps in the same way from step 2 onward. From step 9 onward, "A- -", "b- -", "c- -", "d- -", "E- -" and "F- -" will be displayed.</p> <p>If you would like to return to a previous step during the setting procedure</p> <p><For cycle programs C-1 to C-4></p> <ol style="list-style-type: none"> 1. Press the respective function key from F1 to F4 to return to the display for step 1. 2. Press the SELECT key until the desired step is reached. <p><For cycle programs C-5 to C-9></p> <ol style="list-style-type: none"> 1. Press the Δ or ∇ key to switch the cycle program number. 2. Select the desired cycle program number again, and then press the SELECT key until the desired step is reached. 	

<p>5 To record another cycle program, repeat steps 2 to 4.</p>	
<p>6 End cycle program recording mode.</p>  <p>TEST indicator switches off, MENU indicator illuminates</p>	<p>Press the TEST key.</p>  <p>This completes the recording of cycle programs.</p> <ul style="list-style-type: none"> • The cycle program number will flash in the PROGRAM No. display, and the sewing machine will switch to home position detection standby.

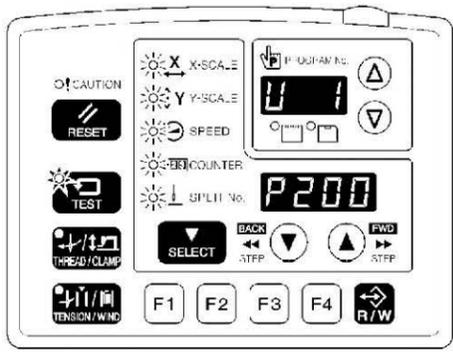
<Setting method>

	<ol style="list-style-type: none"> 1. Press the Δ or ∇ key (1) to select the cycle program number that you would like to use. <ul style="list-style-type: none"> • If the cycle program number is flashing, depress the foot switch to move the feed mechanism to the home position. After this, it is not necessary to detect the home position until the next time the power is turned off and back on, even if you change the cycle program number. • The cycle program number can be selected directly by pressing function keys F1 to F4 (2). (Refer to "6-9. Direct selection".) 2. Check that the needle and work clamp do not interfere with each other, and then start sewing. (Refer to "5-6. Checking the sewing pattern".)
<p>3. The recorded user program will be sewn step by step, and when the final step is complete, the menu display (3) will return to showing step 1.</p> <ul style="list-style-type: none"> • If you press the ▲ or ▼ key (4), you can return to the previous step or skip to the next step respectively. (You do not need to carry out home position detection again.) • If you press the SELECT key (5), you can check the details (such as X-scale, Y-scale and sewing speed) of the user program for the displayed step. The setting cannot be changed at this time. 	

NOTE:
If cycle program sewing mode is active (when memory switch no. 401 is "ON") but no cycle programs have been recorded, the user programs will be sewn in numeric order.

<Clearing method>

1



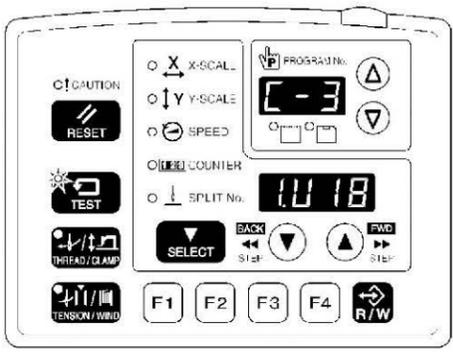
While pressing the TEST key, press the SELECT key.

TEST **SELECT**

- Switch to user program recording mode. Check that the menu indicators are flashing.

TEST indicator illuminates, MENU indicator flashes

2



Press a function key from F1 to F4.

F1 **F2** **F3** **F4**

- Switch to cycle program recording mode.

Press the function key (F1 to F4) or press the Δ or ∇ key to select the cycle program number to clear.

MENU indicator switches off

3



Press the RESET key.

- The buzzer will sound and the cycle program with the number selected will be cleared.

Clearing all cycle programs
Press and hold the RESET key for 2 seconds or more.

- The buzzer will sound and the all cycle programs will be cleared.

NOTE: If you clear all user programs after any cycle programs have been recorded, all recorded cycle programs will also be cleared.

6-9. Direct selection (combination table)

You can use the function keys to directly select user program numbers and cycle program numbers. U1 to U4 and C-1 to C-4 can be selected using function keys F1 to F4. U5 to U10 and C-5 to C-9 can be selected by simultaneously pressing combinations of function keys F1 to F4 (addition).

U5/C-5	U6/C-6	U7/C-7
F1 + F4 Or F2 + F3	F2 + F4 Or F1 + F2 + F3	F3 + F4 Or F1 + F2 + F4
U8/C-8	U9/C-9	U10
F1 + F3 + F4	F2 + F3 + F4	F1 + F2 + F3 + F4

7. SEWING

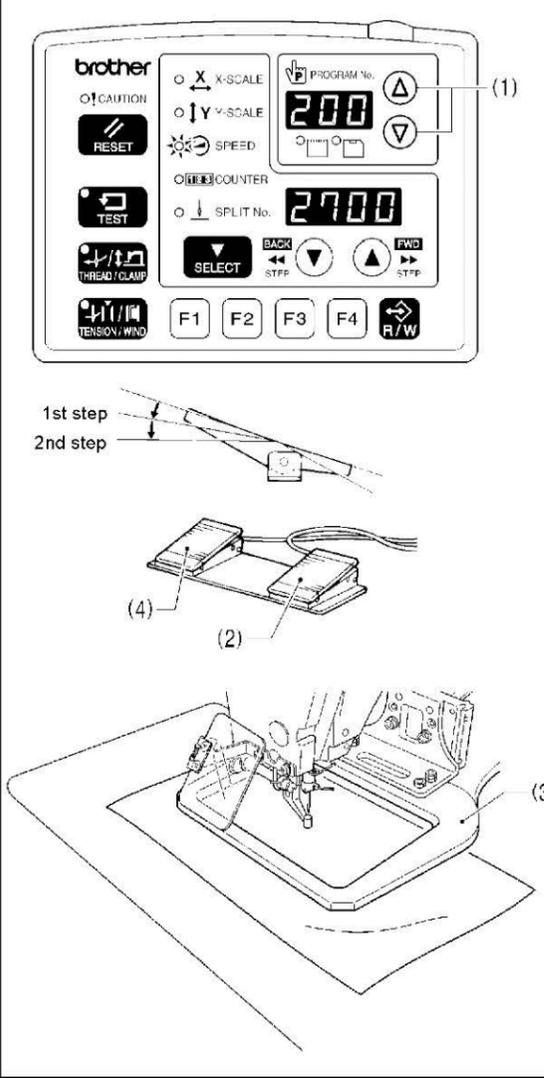
CAUTION

Turn off the power switch at the following times.
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

- When threading the needle
- When replacing the bobbin and needle
- When not using the machine and when leaving the machine unattended

Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.

7-1. Sewing

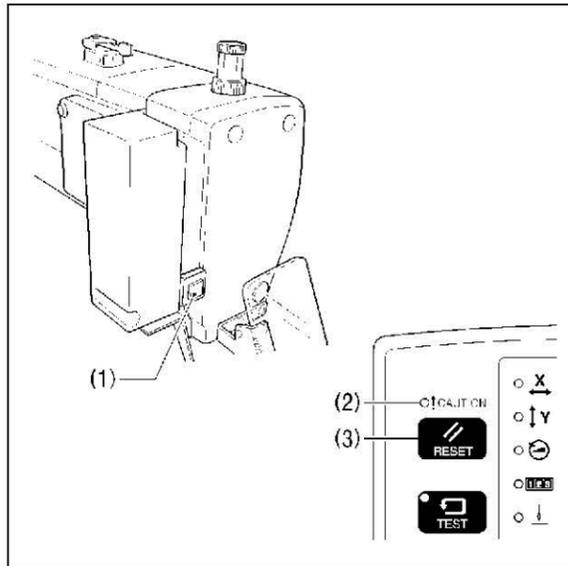


- Turn on the power switch.
- Press the Δ or ∇ key (1) to select the sewing program number that you would like to use.
* Refer to "5-2. Loading sewing data" for details on reading sewing data from a CF card.
- Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch (2).)
 - The feed mechanism will move to the home position.
- Place the article to be sewn underneath the work clamp (3).
- Depress the foot switch to the 1st step.
(If using a two-pedal foot switch, depress the work clamp switch (4).)
 - The work clamp (3) will drop.
- Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, depress the start switch (2).)
 - The sewing machine will start sewing.
- When sewing is complete, the thread will be trimmed and the work clamp (3) will rise.

Use a work clamp that hold the article being sewn firmly, without allowing it to slip.
If using the standard work clamp and feed plate and the article being sewn is slipping, take measures to stop the work clamp and feed plate from being slippery.

7-2. Using the STOP switch

If you press the STOP switch (1) while sewing or test feeding is in progress, the CAUTION indicator (2) will illuminate and the sewing machine will stop immediately.



<Clearing>

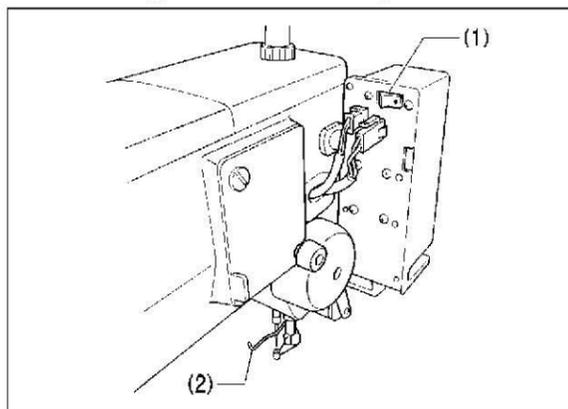
1. Press the RESET key (3).
 - The thread will be trimmed, and then the CAUTION indicator (2) will switch off and the buzzer will stop sounding.
2. If you do not wish to continue sewing, press the RESET key (3) once more.
 - The program number will flash. Carry out preparation for the next sewing.

<Continuing sewing from a stopping point>

If you have pressed the STOP switch (1) at times such as if the thread breaks while sewing or the lower thread runs out, you can resume sewing from the point where the thread ran out.

1		Press the RESET key. <ul style="list-style-type: none"> • The thread will be trimmed, and then the CAUTION indicator will switch off and the buzzer will stop sounding.
2		Press the ▼ key to return to the position where sewing stopped. <ul style="list-style-type: none"> • When you press the ▼ key, the feed mechanism will move backward one stitch at a time, and when you press the ▲ key, it will move forward one stitch at a time. (The feed will move quicker if you keep the key pressed down.)
3		Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, depress the start switch.) <ul style="list-style-type: none"> • The sewing machine will start operating and sewing will start.

7-3. Using the thread wiper switch



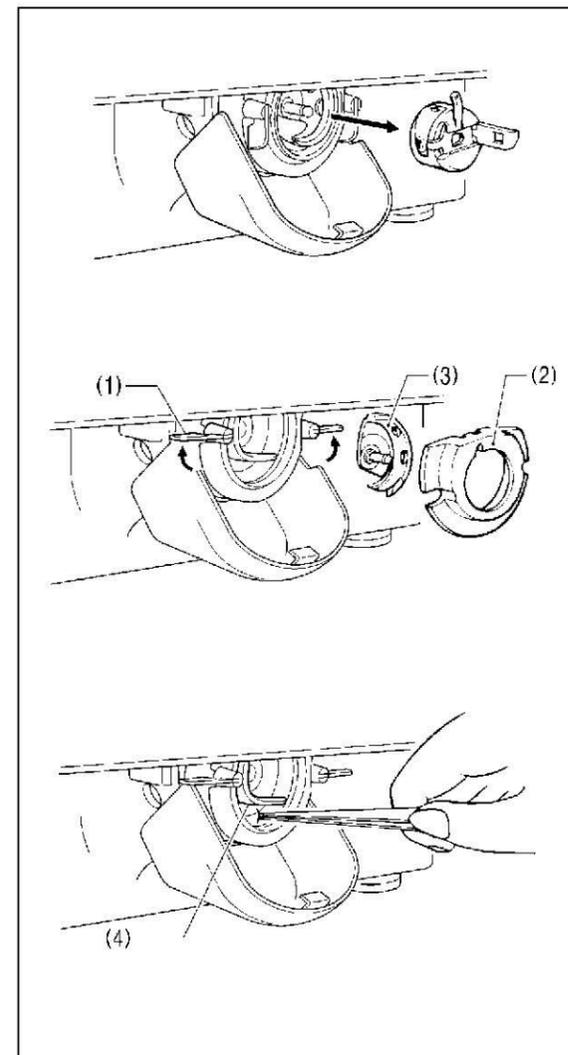
The thread wiper switch (1) can be used to turn the thread wiper (2) on and off.

8. CLEANING

CAUTION

- Turn off the power switch before carrying out cleaning. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
- Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

8-1. Cleaning the rotary hook

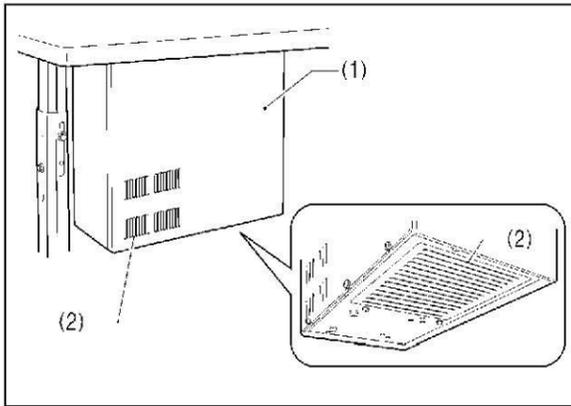


1. Pull the shuttle race cover downward to open it, and then remove the bobbin case.

2. Open the setting claw (1) in the direction indicated by the arrow, and then remove the shuttle race base (2) and the shuttle hook (3).

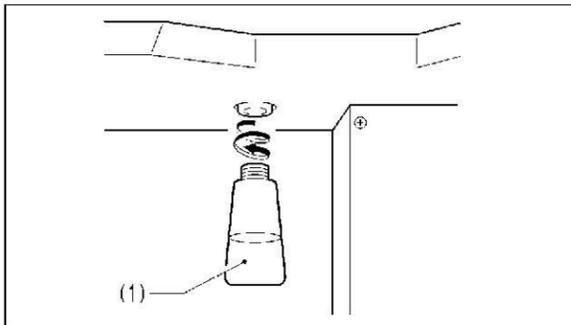
3. Clean all the dust and thread ends from around the driver (4), the top of the rotary hook thread guide and the shuttle race.

8-2. Cleaning the control box air inlet ports



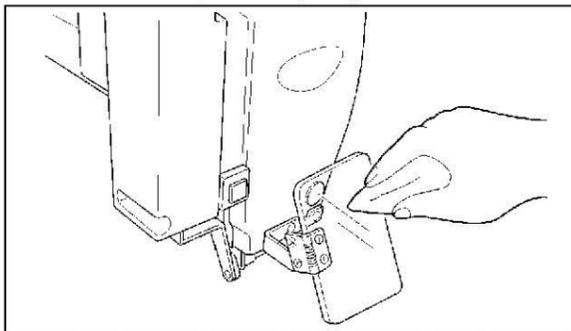
Use a vacuum cleaner to clean the filter in the air inlet ports (2) of the control box (1) at least once a month.

8-3. Draining the oil



1. Remove and empty the waste oil tank (1) whenever it is full.
2. After emptying the waste oil tank (1), screw it back into its original position.

8-4. Cleaning the eye guard

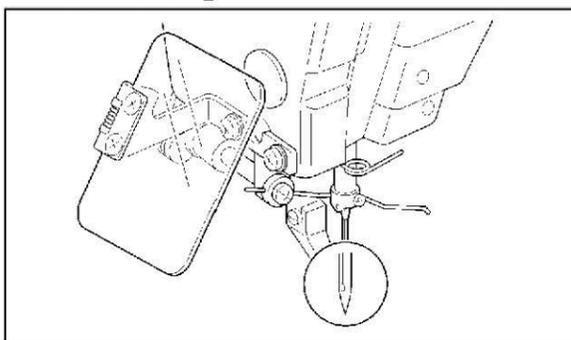


Wipe the eye guard clean with a soft cloth.

NOTE:

Do not use solvents such as kerosene or thinner to clean the eye guard.

8-5. Checking the needle



Always check that the tip of the needle is not broken and also that the needle is not bent before starting sewing.

8-6. Lubrication

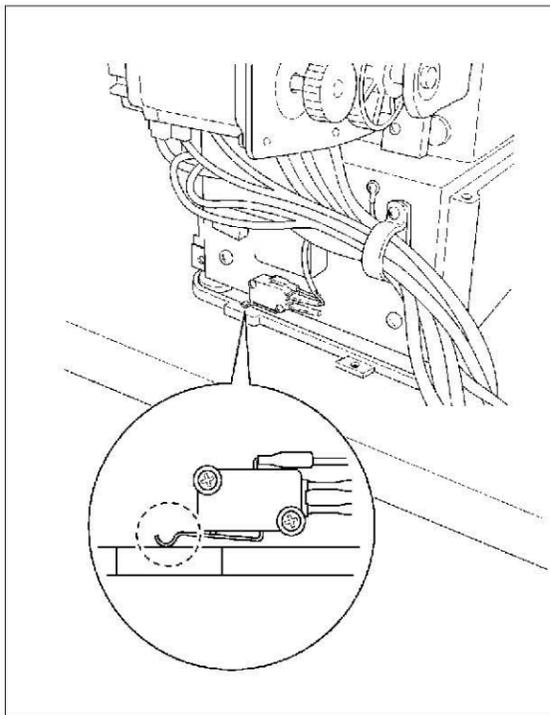
Lubricate the sewing machine while referring to "3-16. Lubrication".

9. STANDARD ADJUSTMENTS

CAUTION

- ⊘ Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
- ⚠ Hold the machine head with both hands when tilting it back or returning it to its original position. In addition, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
- ⚠ Ask your 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 before carrying out the following operations. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - Inspection, adjustment and maintenance
 - Replacing consumable parts such as the rotary hook
- ⚠ If the power switch needs 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. Checking the machine head switch



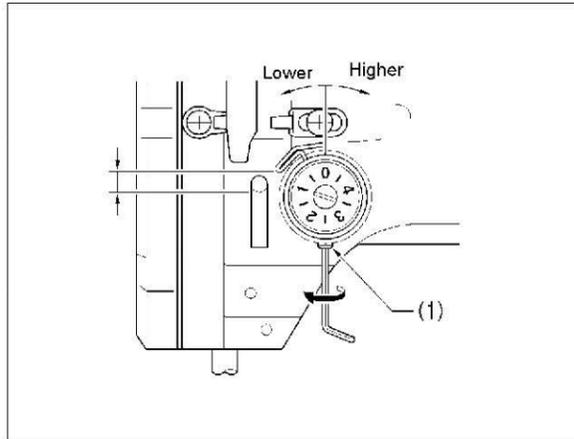
Check that the machine head switch is turned on as shown in the illustration.

NOTE:

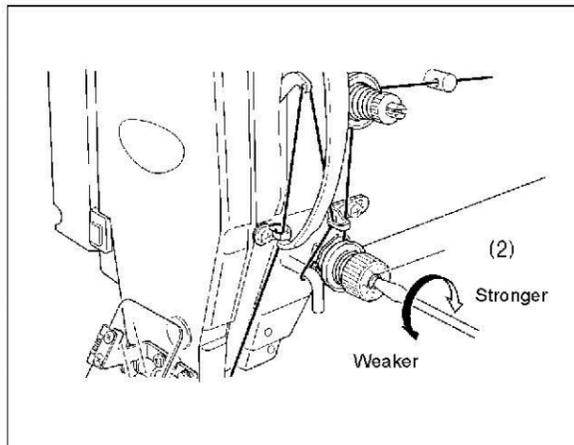
If the machine head switch is not turned on, errors "E050", "E051" and "E055" will be generated.

9 -2. Thread take-up spring

Specifications	Heavy-weight materials (-01)	Medium-weight materials (-02)
Thread take-up spring height (mm)	7 - 10	
Thread take-up spring tension (N)	0.6 - 1.2	0.2 - 0.5



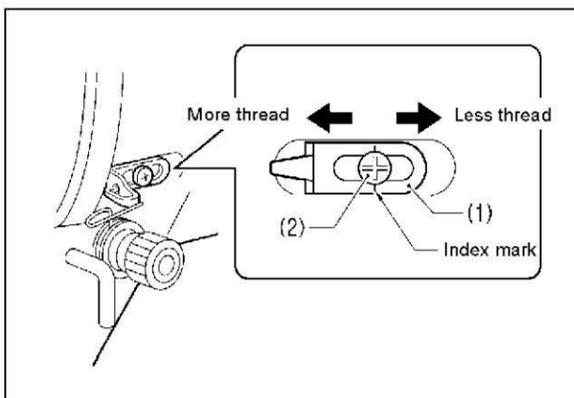
<Thread take-up spring height>
Loosen the set screw (1) and turn the adjuster to adjust.



<Thread take-up spring tension>
Turn the tension stud (2) with a screwdriver to adjust the tension.

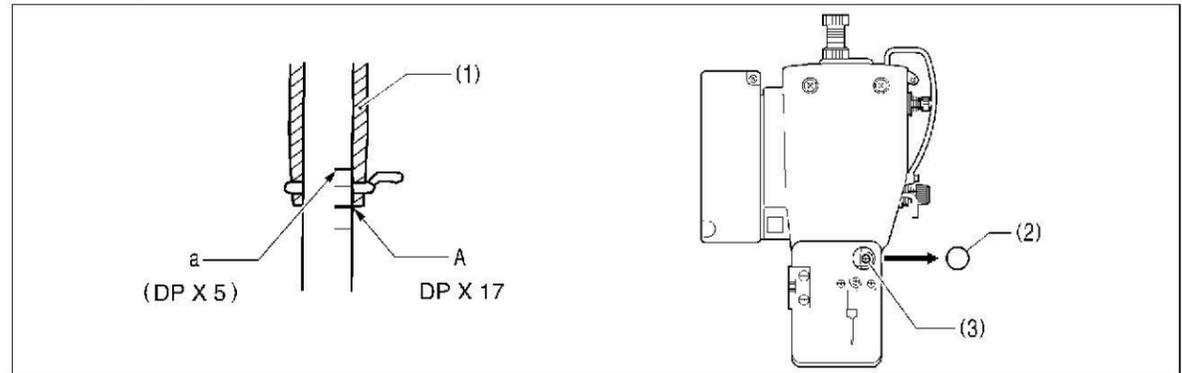
NOTE:
If the thread tension spring is not adjusted correctly, the upper thread trailing length will be uneven after thread trimming.

9 -3. Arm thread guide R



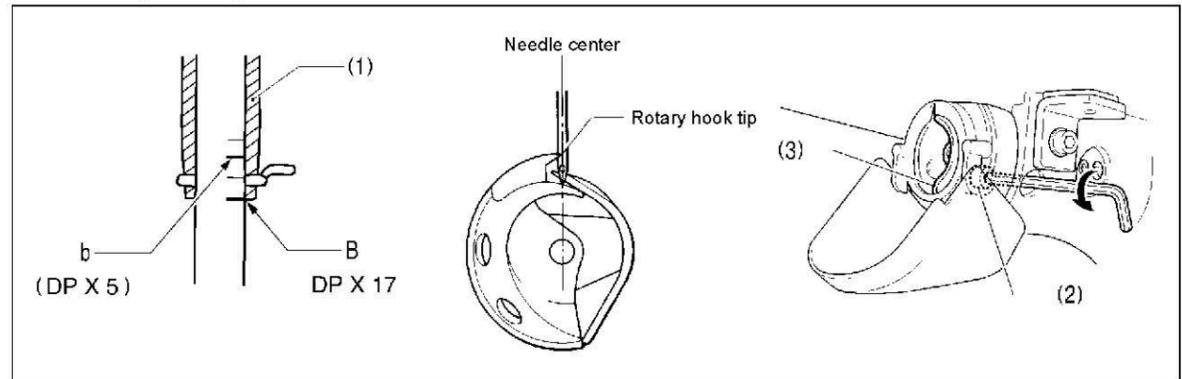
The standard position of arm thread guide R (1) is when the screw (2) is aligned with the index mark. Loosen the screw (2) and move arm thread guide R (1) to adjust.
* When sewing heavy material, move arm thread guide R (1) to the left. (The thread take-up amount will become greater.)
* When sewing light material, move arm thread guide R (1) to the right. (The thread take-up amount will become less.)

9 -4. Adjusting the needle bar height



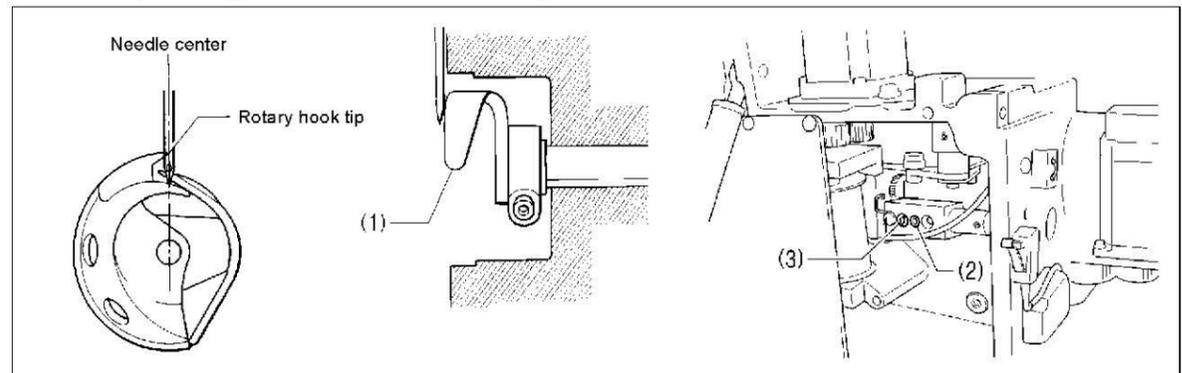
Turn the machine pulley to move the needle bar to the lowest position. Then remove the rubber plug (2), loosen the screw (3) and then move the needle bar up or down to adjust so that the second reference line from the bottom of the needle bar (reference line A) is aligned with the lower edge of the needle bar bush (1).
* If using a DP X 5 needle, use the highest reference line (reference line a).

9 -5. Adjusting the needle bar lift amount



Turn the machine pulley to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (1), and then loosen the bolt (2) and move the driver (3) so that the tip of the rotary hook is aligned with the center of the needle.
* If using a DP X 5 needle, use the second reference line from the top of the needle bar (reference line b).

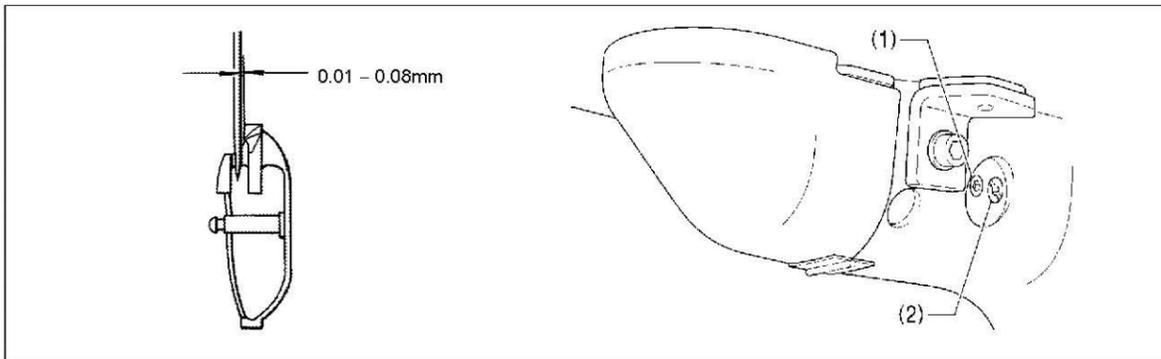
9 -6. Adjusting the driver needle guard



Turn the machine pulley to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (2) and turn the eccentric shaft (3) to adjust so that the driver needle guard (1) is touching the needle.

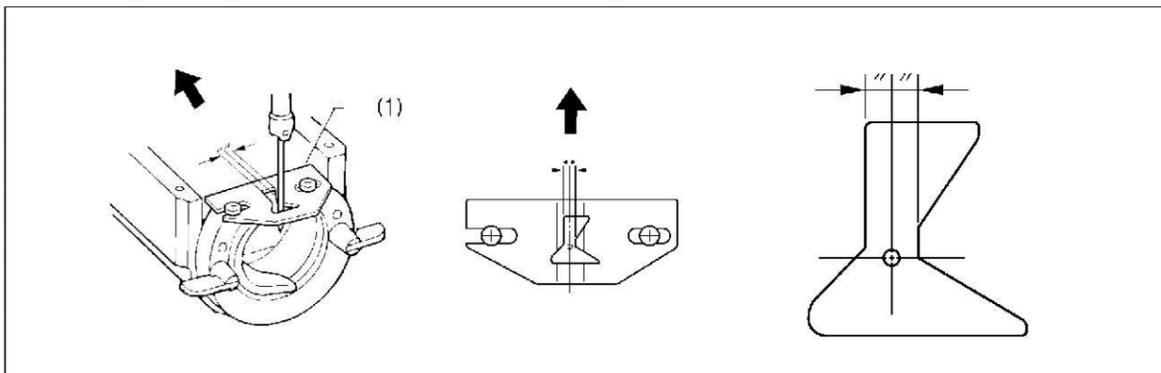
NOTE:
If it crosses the needle more than necessary, it will place a load on the needle, or it may cause poor thread tension. Furthermore, if it does not cross the needle at all, the tip of the rotary hook will interfere with the needle and skipped stitches may occur.

9-7. Adjusting the needle clearance



Turn the machine pulley to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (1) and turn the eccentric shaft (2) to adjust so that the clearance between the needle and the rotary hook is 0.01 - 0.08 mm.

9-8. Adjusting the shuttle race thread guide



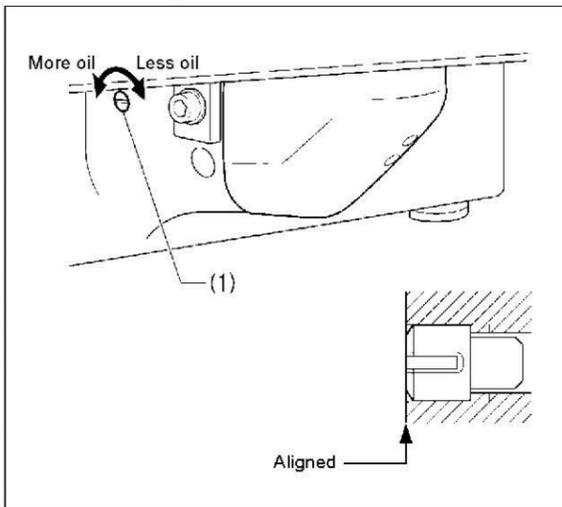
Install the shuttle race thread guide (1) by pushing it in the direction of the arrow so that the needle groove is aligned with the center of the needle plate hole.

NOTE:

If the shuttle race thread guide is in the wrong position, thread breakages, soiled thread or tangling of the thread may occur.

The position of the shuttle race thread guide is adjusted at the time of shipment from the factory. It should not be changed if possible.

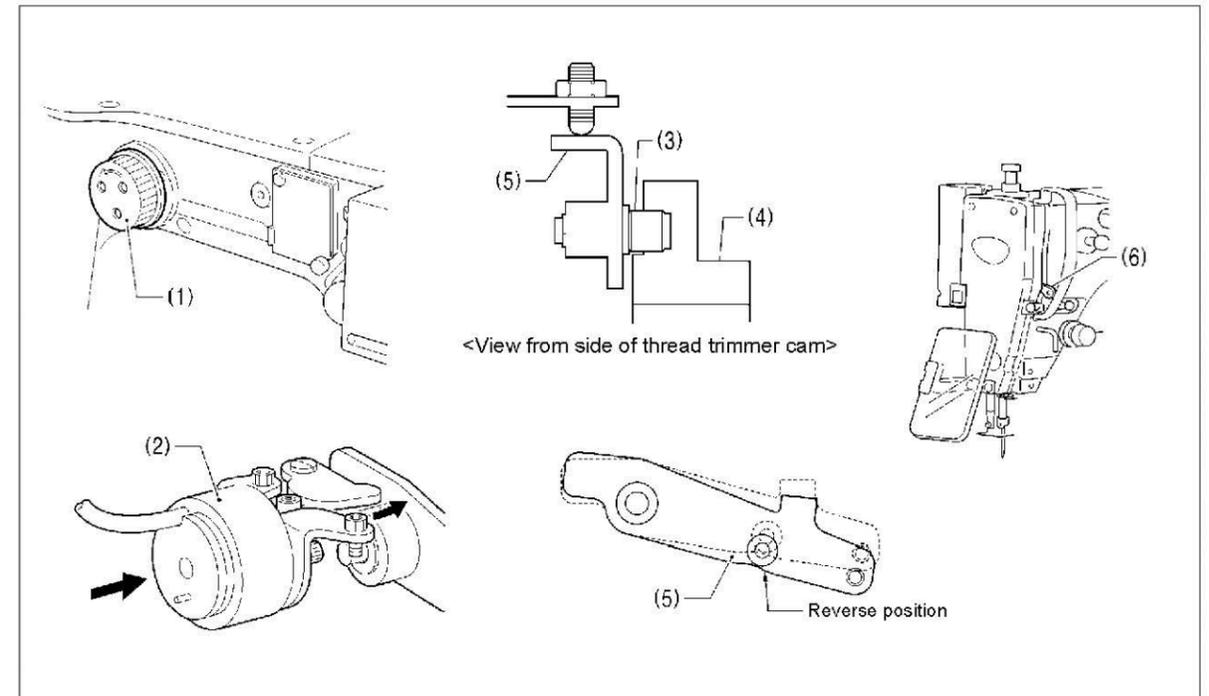
9-9. Rotary hook lubrication amount



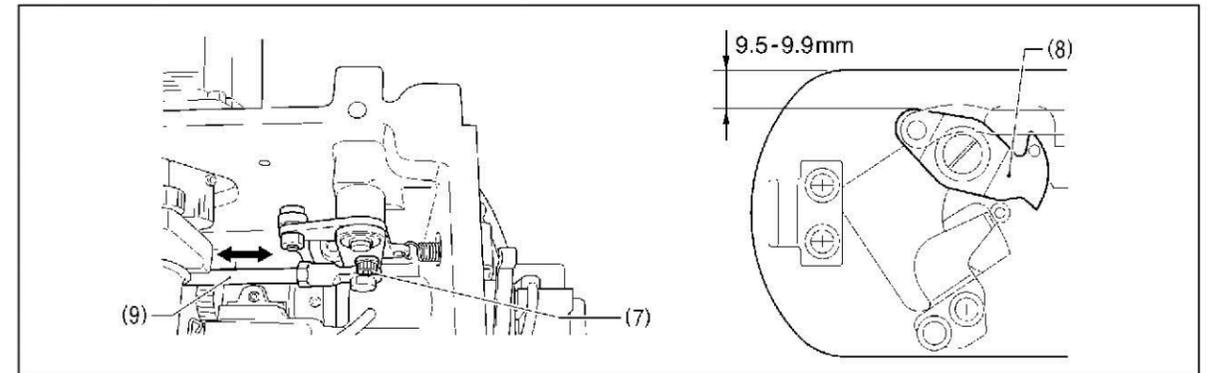
The optimum position is when the head of the set screw (1) is aligned with the edge of the bed. The rotary hook lubrication amount can be adjusted within three turns to the right from that position.

- If the set screw (1) is turned clockwise, the lubrication amount becomes smaller.
- If the set screw (1) is turned counterclockwise, the lubrication amount becomes greater.

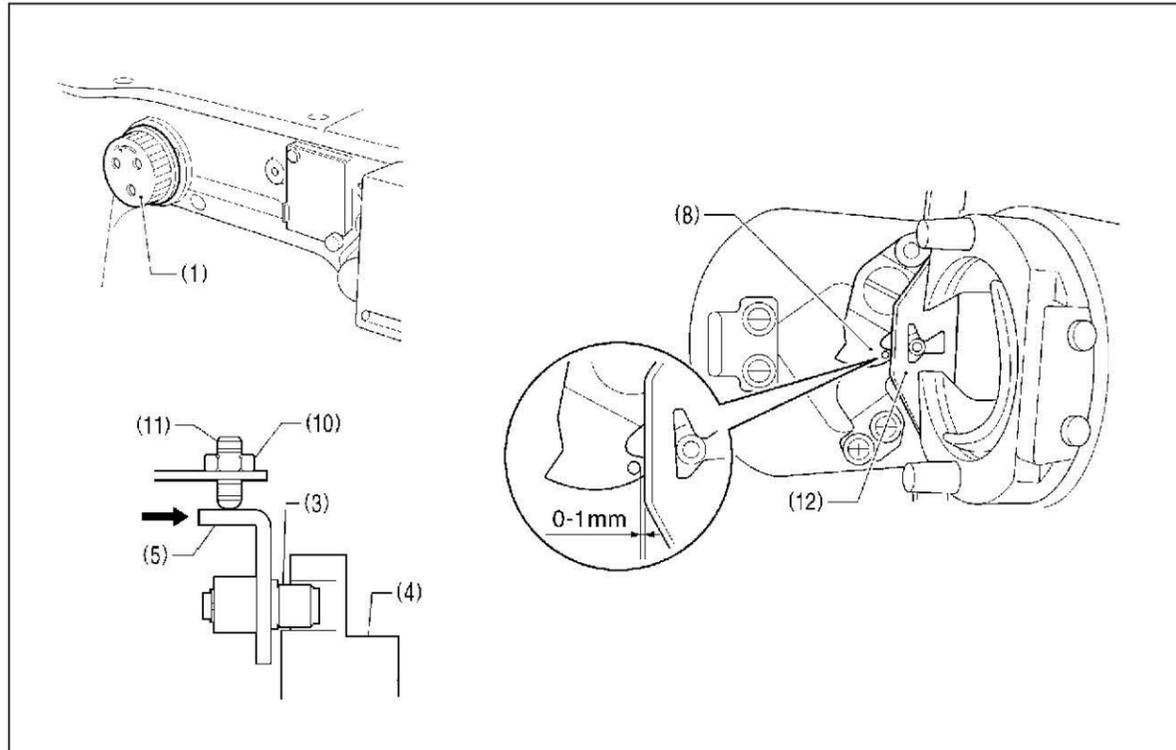
9-10. Adjusting the position of the movable knife



1. Open the top cover and tilt back the machine head.
2. Turn the pulley (1) by hand to lower the needle bar to its lowest position, and push the thread trimmer solenoid (2) as far as it will go.
3. With the collar (3) inserted into the groove of the thread trimmer cam (4), turn the pulley (1) by hand to set the driving lever (5) to the reverse position (when the thread take-up (6) is close to its lowest position).

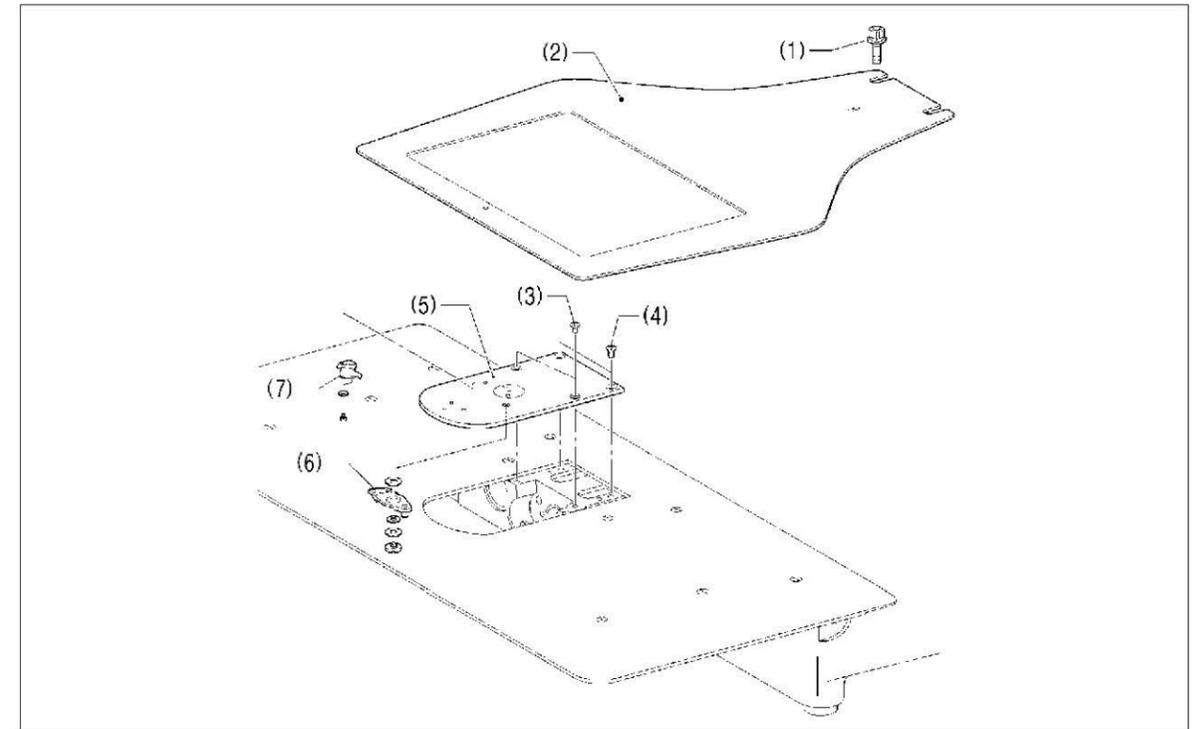


4. Loosen the bolt (7).
5. Move the thread trimming rod H (9) forward or back to adjust so that the distance from the ridge line on the right side of the needle plate to the ridge line on the movable knife (8) is 9.5 - 9.9 mm.
6. After tightening the bolt (7), check the above position once more.

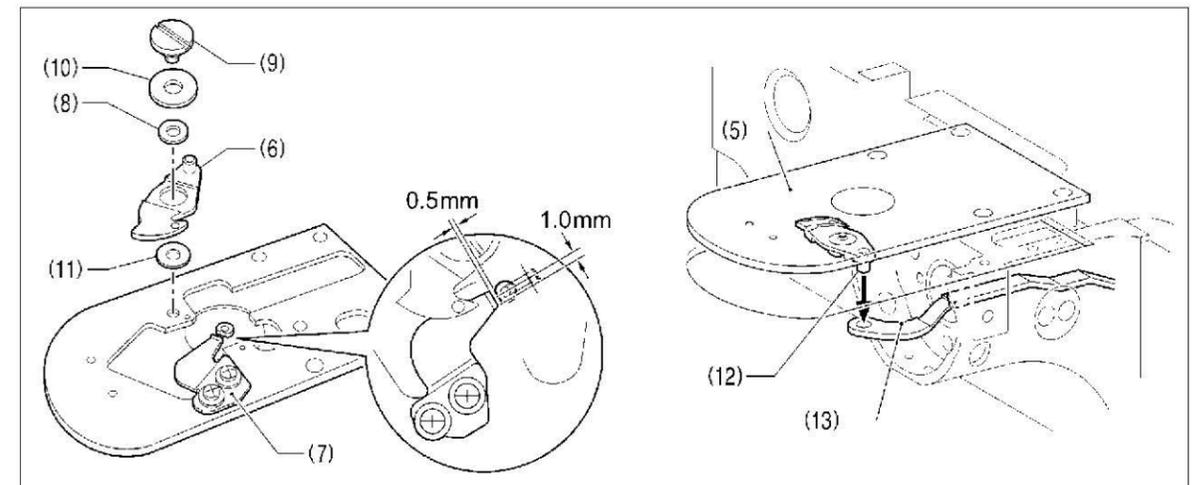


7. Turn the pulley (1) by hand to move the needle bar to its lowest position.
8. Loosen the nut (10), tighten the set screw (11) until the collar (3) is touching the inside of the groove in the thread trimmer cam (4), and then turn it back in the counterclockwise direction by approximately 1/4 of a turn.
9. Tighten the nut (10), and then check that the collar (3) is not touching the inside of the groove in the thread trimmer cam (4). In addition, push the driving lever (5) by hand toward the thread trimmer cam until the collar (3) touches the groove of the thread trimmer cam (4), and then check that the driving lever (5) returns smoothly to its original position when it is released.
10. Check that there is a gap of about 0 - 1 mm between the outside of the hole in the movable knife (8) and the ridge line on the shuttle race thread guide (12) when there is still play between the parts.

9-11. Replacing the movable and fixed knives

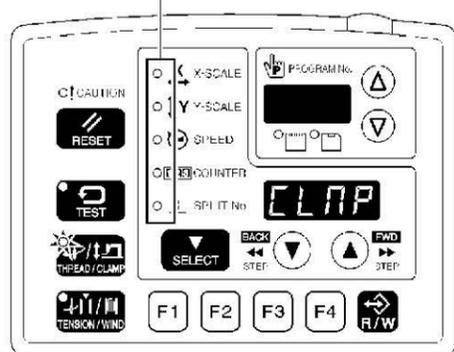
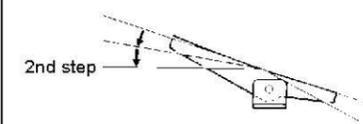
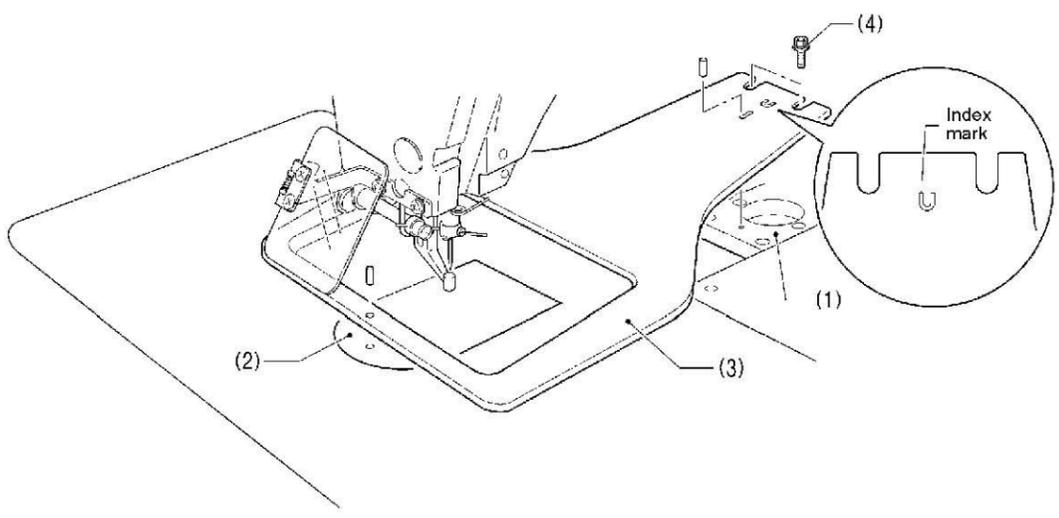


1. Loosen the two bolts (1) and then remove the feed plate (2).
2. Open the shuttle race cover, remove the two screws (3) and the two flat screws (4), and then remove the needle plate (5).
3. Remove the movable knife (6) and the fixed knife (7).

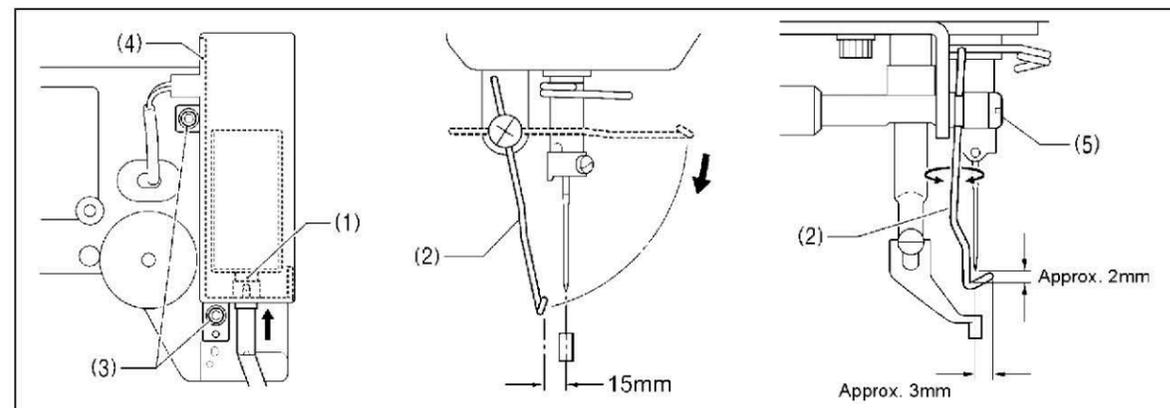


4. Install the new fixed knife (7) in the position shown in the illustration.
5. Apply grease to the outside of the collar (8) and to the shoulder screw (9), and then install the new movable knife (6) together with the thrust washer (10) and the movable knife spacer (11).
6. Check that the movable knife (6) and fixed knife (7) cut the thread cleanly. Replace the movable knife spacer with accessory spacers (t=0.2, 0.3, 0.4) so that the knives trim the thread accurately.
 - * If the knife pressure is too weak and the thread is not completely cut, use a thinner movable knife spacer.
 - * If the knife pressure is too strong and the movable knife (1) turns stiffly, use a thicker movable knife spacer.
7. Apply grease to the pin (12), place it into the movable knife connecting plate (13), and install it to the needle plate (5).
8. Check that the needle is aligned with the center of the needle hole.

9-11-1. Installing the feed plate

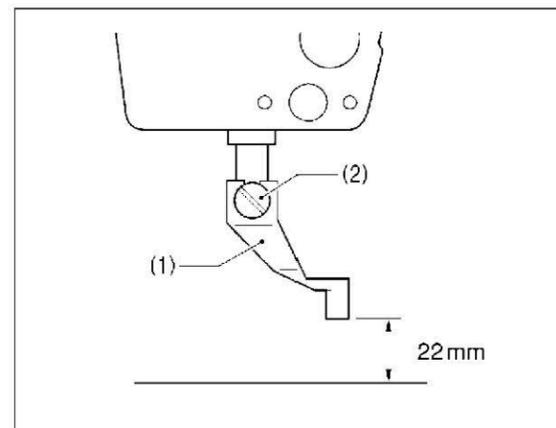
<p>1</p>  <p>All indicators switch off MENU indicator switches off THREAD/CLAMP indicator illuminates</p>	<p>While pressing the THREAD/CLAMP key, turn on the power switch. * Keep pressing the THREAD/CLAMP key until the model name is displayed and the buzzer beeps once.</p>  <ul style="list-style-type: none"> "CLMP" will appear in the menu display.
<p>2</p>  <p>2nd step</p>	<p>Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)</p> <ul style="list-style-type: none"> After the home position is detected and the work clamp drops, the feed mechanism will move to the feed plate installation position and then the work clamp will rise.
<p>3</p>  <p>Use a 2 mm diameter pin to align the holes in the X feed bracket (1) and the needle plate (2) with the two holes in the feed plate (3), and then tighten the two bolts (4). NOTE: Install the feed plate so that the surface with the index mark is facing upward.</p>	
<p>4</p> <p>End feed plate installation mode</p>	<p>Turn off the power.</p>

9-12. Adjusting the thread wiper



- Loosen the two screws (3) and shift the entire solenoid setting plate (4) up or down to adjust so that the thread wiper (2) is 15 mm in front of the needle center when the plunger (1) of the thread wiper solenoid is driven to the full stroke.
 - Loosen the screw (5) and adjust the position of the thread wiper (2) so that the distance from the thread wiper to the tip of the needle is approximately 2 mm and the tip of the thread wiper (2) is approximately 3 mm from the center of the needle when the thread wiper (2) passes below the needle during operation.
- Note:** Check that the thread wiper (2) does not touch the finger guard.

9-13. Presser foot installation position

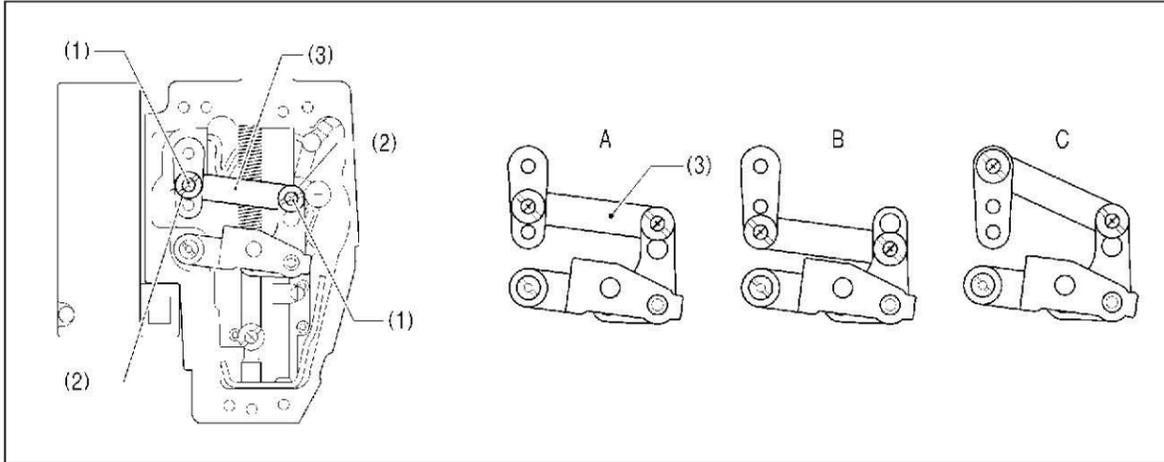


Install the presser foot (1) with the screw (2) so that the distance from the bottom of the presser foot to the top of the needle plate is 22 mm when the sewing machine is stopped and the presser foot (1) is raised.

9-14. Changing the intermittent stroke

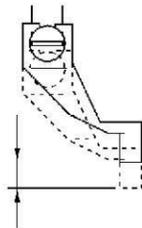
The intermittent stroke can be adjusted to within 2 – 10 mm by adjusting the position of the stepping clamp connecting rod and changing the installation position of stepping clamp link A.

<Changing the installation position of stepping clamp link A>

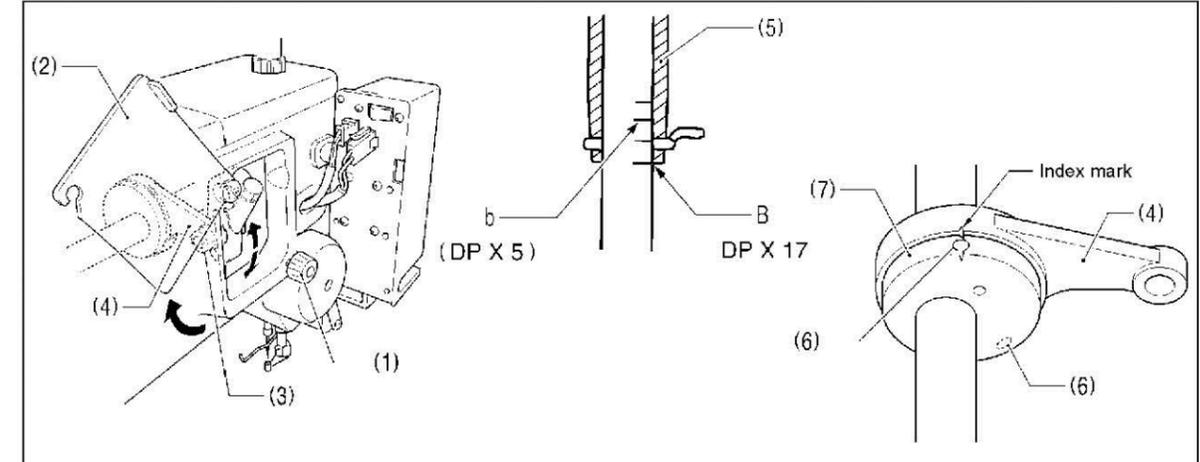


1. Remove the face plate.
 2. Remove the two screws (1) and the two shoulder screws (2), and then remove stepping clamp link A (3).
 3. Change the installation position for stepping clamp link A (3) to either A, B or C above.
- If the position of the stepping clamp connecting rod is adjusted as described in the following at any one of the installation positions, the adjustment range for the intermittent stroke will as given in the following table.

Installation position	Intermittent stroke range
A	2 – 4.5mm
B	4.5 – 10mm
C	0 mm (Presser foot does not move up and down)



<Stepping clamp connecting rod position adjustment>

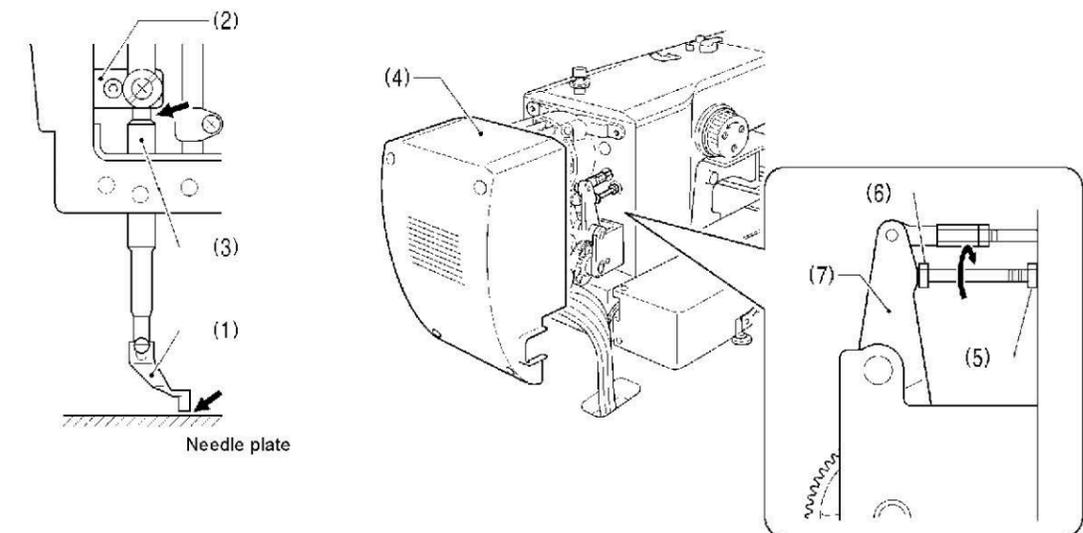


1. Loosen the screw (1), and then open the cover (2).
2. Loosen the nut (3), and then adjust the position of the stepping clamp connecting rod (4).
 - When the stepping clamp connecting rod (4) is raised, the intermittent stroke will increase.
 - When the stepping clamp connecting rod (4) is lowered, the intermittent stroke will decrease.

Next, adjust the needle bar and presser foot timing.

3. Turn the machine pulley to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (5).
(If using a DP x 5 needle, align with the second reference line from the top (reference line b).)
4. Open the top cover and loosen the two set screws (6).
5. Align the index marks on the stepping clamp cam (7) and the stepping clamp connecting rod (4), and then tighten the set screws (6).

Check the following after changing the intermittent stroke.



1. With the intermittent presser foot (1) lowered, turn the pulley to move the intermittent presser foot (1) to its lowest position.
2. Check that the presser foot (1) does not touch the needle plate and that the presser bar clamp (2) does not touch the presser bar bush (3).

<If they are touching>

Remove the motor cover (4).

Loosen the nut (5), and turn the bolt (6) until it is pressing against the intermittent drive lever (7), and then adjust until the two points mentioned above are not touching.

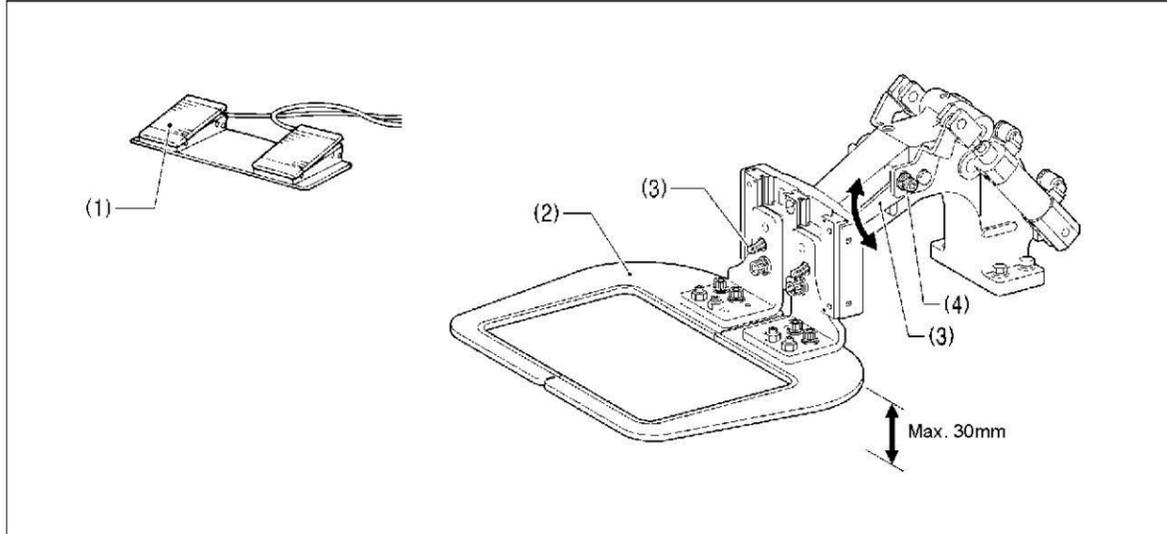
9-15. Adjusting the work clamp lift amount

<Solenoid specifications>

The operation panel settings can be used to adjust the height to within 15 – 25 mm. (Refer to "5-7. Setting the work clamp lift amount.")

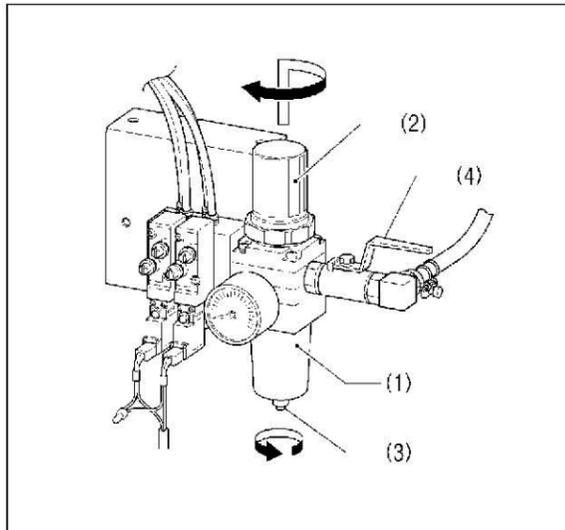
<Pneumatic specifications>

The maximum lift amount for the work clamp is 30 mm above the top of the needle plate.



1. Turn on the air, and depress the work clamp switch (1) to raise the work clamp (2).
2. Loosen the two bolts (4) of the work clamp arm lever (3), and move the work clamp arm lever (3) up or down to adjust.

9-16. Adjusting the air pressure (pneumatic specifications)



Lift up the handle (2) of the regulator (1) and then turn it to adjust the air pressure to 0.5 MPa. After adjustment is complete, push the handle (2) downward to lock it.

If water has collected in the bottle of the regulator (1), turn the drain cock (3) in the direction indicated by an arrow to drain the water.

NOTE:
Open the air cock (4) slowly.

10. TABLE OF ERROR CODES

⚠ 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.

If a malfunction should occur with the sewing machine, a buzzer will sound and an error code will appear in the display window. Follow the remedy procedure to eliminate the cause of the problem.

Switch-related errors

Code	Cause and remedy
E010	Stop switch was pressed. Press the RESET key to clear the error.
E011	Stop switch was pressed. Press the RESET key to clear the error. Press the ▼ key to move the feed mechanism so that you can continue sewing.
E015	The stop switch was still being pressed, or there is a problem with the stop switch connection. Turn off the power, and then check that connector P13 on the main P.C. board is properly connected.
E025	Foot switch is depressed to the 2nd step. (If using a two-pedal foot switch, the power was turned on while the start switch was still depressed, or the start switch was pressed without the work clamp being lowered.) Turn off the power and check the foot switch.
E035	Foot switch is depressed to the 1st step. (Work clamp switch if using a two-pedal foot switch) Turn off the power and check the foot switch.
E036	A foot switch that does not match specifications is connected, or work clamp mode has not been set correctly. Use a foot switch that matches specifications, or initialize the memory switch settings.
E050	Machine head tilting was detected after the power was turned on. Turn off the power, and then return the machine head to its original position. Check that connector P9 on the main P.C. board is properly connected.
E051	Machine head tilting was detected while the sewing machine was operating. Turn off the power, and then check that connector P9 on the main P.C. board is properly connected.
E055	Machine head tilting was detected when the power was turned on. Turn off the power, and then return the machine head to its original position. Check that connector P9 on the main P.C. board is properly connected.
E065	An operation panel key was still being pressed when the power was turned on, or key is faulty. Turn off the power and check the operation panel.

Upper shaft motor-related errors

Code	Cause and remedy
E110	Needle up stop position error. Turn the machine pulley until the point where the error display disappears.
E111	Upper shaft did not stop at the needle up stop position when the sewing machine stopped. Turn the machine pulley until the point where the error display disappears.
E121	Thread trimming was not completed. Turn off the power, and then check if the cutting edges of the fixed knife and movable knife are damaged or worn.
E130	Sewing machine motor stopped due to a problem, or synchronizer is faulty. Turn off the power, and then turn the machine pulley and check if the sewing machine has locked up. Check that connectors P4 and P5 on the power supply motor P.C. board are properly connected.
E131	Synchronizer is faulty. Turn off the power, and then check that connector P5 on the power supply motor P. C. board is properly connected.

10. TABLE OF ERROR CODES

Feed mechanism-related errors

Code	Cause and remedy
E200	X-feed motor home position cannot be detected. Problem with X-feed motor or poor X home position sensor connection. Turn off the power, and then check that connector P10 on the PMD P.C. board and connector P20 on the main P.C. board are properly connected.
E201	X-feed motor stopped due to a problem. Turn off the power, and then check if there are any problems in the X-feed direction.
E202	Problem with X-feed motor or Y-feed motor home position adjustment data. Re-adjust the home position.
E210	Y-feed motor home position cannot be detected. Problem with Y-feed motor or poor Y home position sensor connection. Turn off the power, and then check that connector P8 on the PMD P.C. board and connector P4 on the main P.C. board are properly connected.
E211	Y-feed motor stopped due to a problem. Turn off the power, and then check if there are any problems in the Y-feed direction.

Work clamp-related errors

Code	Cause and remedy
E300	Work clamp home position cannot be detected. Problem with work clamp motor or poor work clamp home position sensor connection. Turn off the power, and then check that connector P3 on the PMD P.C. board and connector P5 on the main P.C. board are properly connected.
E301	Work clamp raised or lowered position cannot be detected. Turn off the power, and then check if there are any problems in the work clamp vertical direction.

Communication and memory-related errors

Code	Cause and remedy
E420	No CF card is inserted.
E421	Program contents are incorrect and cannot be used, or no data. Check that the CF card or floppy disk contains data with this program number.
E422	Error occurred while reading the CF card or floppy disk. Check the data on the CF card or floppy disk.
E424	Insufficient free space on CF card. Use a different CF card.
E425	Error occurred while writing to the CF card or floppy disk. Use the specified type of CF card. Check if the floppy disk is write-protected and if it has enough free space.
E426	R/W key has not been pressed. Press the R/W key to load the data.
E427	CF card or floppy disk does not contain any data with this program number. Check the program number. Data that has already been loaded into internal memory can be used without having to press the R/W key again.
E450	Model selection cannot be read from the machine head memory. Turn off the power and check that connector P3 on the power supply motor P.C. board is properly connected.

10 . TABLE OF ERROR CODES

Data editing-related errors

Code	Cause and remedy
E500	The enlargement ratio setting caused the sewing data to extend outside the sewing area. Set the enlargement ratio again.
E501	Sewing data that exceeds the sewing machine's sewing area was loaded. Check the size of the sewing data.
E502	The enlargement ratio caused the data pitch to exceed the maximum pitch of 12.7 mm. Set the enlargement ratio again.
E510	Invalid code in sewing data. Reload the data from the CF card or floppy disk.
E511	No end code has been input into sewing data. Input an end code, or change the program number.
E512	Number of stitches exceeds allowed maximum.
E520	Extended option output number already exists. Change the extended option output number. If not using the extended option output, initialize the data to clear the extended option output data.
E530	Changing program number is prohibited.

P.C. board-related errors

Code	Cause and remedy
E700	Abnormal rise in power supply voltage. Turn off the power and check the input voltage.
E705	Abnormal drop in power supply voltage. Turn off the power and check the input voltage.
E740	Cooling fan does not operate. Turn off the power, and then check if the cooling fan is blocked with scraps of thread. Check that connector P22 on the main P.C. board is properly connected.

If an error code that is not listed above appears, contact the place of purchase.

11. TROUBLESHOOTING

- Please check the following points before calling for repairs or service.
- If the following remedies do not fix the problem, turn off the power switch and consult a qualified technician or the place of purchase.

⚠ CAUTION
⚠
Turn off the power switch and disconnect the power cord before carrying out troubleshooting. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

Problem	Cause	Remedy	Reference
Work clamp does not lift.	Work clamp moves stiffly.	Apply a suitable amount of grease to the sliding parts of the work clamp.	/
	Air tube of presser lifter cylinder is bent or damaged (Pneumatic specifications).	Straighten the bend in the tube or replace the tube.	/
Work clamp does not drop.	Work clamp moves stiffly.	Apply a suitable amount of grease to the sliding parts of the work clamp.	/
	Air tube of presser lifter cylinder is bent or damaged (Pneumatic specifications).	Straighten the bend in the tube or replace the tube.	/
Work clamp lift amount is incorrect.	Work clamp lift amount setting at operation panel is incorrect (Solenoid specifications).	Change the work clamp lift amount setting.	P. 30
	Work clamp arm lever position is incorrect. (Pneumatic specifications)	Adjust the position of the work clamp arm lever.	P. 65
Work clamp does not lift to the maximum height.	Work clamp arm stopper position is incorrect (Solenoid specifications).	Adjust the position of the stopper.	/
	Cylinder joint position is incorrect. (Pneumatic specifications)	Adjust the position of the cylinder joint.	/
Thread wiper does not operate correctly.	The thread wiper is obstructing the needle.	Adjust the height of the thread wiper.	P. 62
		Adjust the stroke of the thread wiper.	P. 62
	Thread wiper position is incorrect.	Adjust the stroke of the thread wiper.	P. 62
Lower thread winds to one side.	Bobbin winder tension assembly height is incorrect.	Adjust the height of the bobbin winder tension assembly.	P. 21
Lower thread winding amount is incorrect.	Bobbin presser position is incorrect.	Adjust the position of the bobbin presser.	P. 21
Thread slips out of the needle.	Stitches being skipped at the sewing start.	Refer to "Skipped stitches occur".	P. 70
	Upper thread length is irregular.	Adjust the sub-tension.	P. 23
	Position of shuttle race thread guide is incorrect	Adjust the position of the shuttle race thread guide.	P. 57

Problem	Cause	Remedy	Reference
Upper thread breaks.	Upper thread tension is too strong.	Adjust the upper thread tension.	P. 23
	Needle is incorrectly installed.	Install the needle correctly.	P. 19
	Thread is too thick for the needle.	Select a thread that matches the needle.	P. 23
	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	P. 55
	Damage or burring of the rotary hook, needle hole plate or needle.	Repair or replace the problem part.	/
	Thread breaking from heat (Synthetic thread)	Use a cooling tank.	P. 19
	Thread is threaded incorrectly.	Thread the thread correctly.	P. 19
Lower thread breaks.	Lower thread tension is too strong.	Adjust the lower thread tension.	P. 23
	Damage to corners of needle hole plate or bobbin case.	Repair or replace the problem part.	/
Skipped stitches occur.	Clearance between needle and rotary hook tip is too great.	Adjust the needle clearance.	P. 57
	Needle and rotary hook timing is incorrect.	Adjust the needle bar lift amount.	P. 56
	The driver is covering the needle more than necessary.	Adjust the driver needle guard.	P. 56
	Needle is bent.	Replace the needle.	/
	Needle is incorrectly installed.	Install the needle correctly.	P. 19
Needle is broken.	Clearance between needle and rotary hook tip is too great.	Adjust the needle clearance.	P. 57
		Adjust the needle bar lift amount.	P. 56
	Needle is bent.	Replace the needle.	/
	Needle deflection	Select a needle that is suitable for the sewing conditions. Reduce the sewing speed.	P. 23
	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	P. 23
Thread jamming.	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	P. 55
	Needle and rotary hook timing is incorrect.	Adjust the needle bar lift amount.	P. 56
	Shuttle race thread guide is not separating the threads.	Adjust the position of the shuttle race thread guide.	P. 57

Problem	Cause	Remedy	Reference
Upper thread is not trimmed.	Movable knife is not cutting cleanly.	Replace with a new one.	P. 60
	Fixed knife is not cutting cleanly.	Sharpen the fixed knife or replace it with a new one.	P. 60
	Movable knife is not picking up the upper thread.	Adjust the position of the shuttle race thread guide.	P. 57
		Adjust the needle bar lift amount.	P. 56
	Movable knife is not picking up the upper thread because the last stitch is being skipped.	Refer to "Skipped stitches occur".	P. 70
	Movable knife position is incorrect.	Adjust the position of the movable knife.	P. 58
Poor stitch finish on underside of material.	Sub-tension is too weak.	Turn the sub-tension nut to adjust the tension.	P. 23
	Shuttle race thread guide is not separating the threads enough.	Adjust the position of the shuttle race thread guide.	P. 57
	Incorrect tightening of the upper thread	Adjust the upper thread tension.	P. 23
Incorrect tightening of the thread	Upper thread length is irregular.	Adjust the sub-tension.	P. 23
	Upper thread tension is too weak.	Adjust the upper thread tension.	P. 23
	Lower thread tension is too weak.	Adjust the lower thread tension.	P. 23
	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	P. 55
Upper thread length is irregular.	Position of arm thread guide R is incorrect.	Adjust the position of arm thread guide R.	P. 55
	Thread take-up spring tension and height are incorrect.	Adjust the tension and height of the thread take-up spring.	P. 55
	Sub-tension is too weak.	Turn the sub-tension nut to adjust the tension.	P. 23
Sewing machine does not operate when the power is turned on and the foot switch is depressed.	Fixed knife is not cutting cleanly.	Sharpen the fixed knife or replace it with a new one.	P. 60
	Machine head switch does not work.	Check if the machine head switch cord is disconnected.	P. 11
		Adjust the position of the machine head switch.	P. 8
		If the machine head switch is malfunctioning, replace it with a new one.	

12. SEGMENT DISPLAY

0	1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z				
U	u	H	h	Y	Y				

TC1310G

ELECTRONIC PATTERN SEWING MACHINE
ELEKTRONISCHER GROSSFELD RIEGELAUTOMAT



This machine may only be operated by adequately trained operators only after having completely read and understood the instruction manual.

Parts are subject to changes in design without prior notice.



XI'AN TYPICAL INDUSTRIES CO., LTD.
No. 335, South Taibai Road
Xi'an 710068, P.R.China
Tel.: +86-29-88279093 // 88279150 // 88279151
Fax: +86-29-88249715 // 88245215

tic@chinatypical.com
www.chinatypical.com

VETRON TYPICAL EUROPE GmbH
Clara-Immerwahr-Str. 6
67661 Kaiserslautern, Germany
Tel.: +49 6301 320 75-0
Fax: +49 6301 320 75-11

info@vetrontypical.com
www.vetrontypical.com